Nipron
GAZE into the future

August 2023

Single Output Power Supply
UZP series / OZP-350 series

UZP-120 series

UZP-150 series

UZP-220 series

OZP-350 series

UZP-400 series

UZP-400/1200P series

UZP-600 series

Nipron Guard
www.nipron.co.jp

Nipron Co.,Ltd.

AC-DC
switching power supply

UZP-120 series

UZP-120

Switching PSU with extremely low noise and heat generation

ULTRA ZERO POWER SUPPLY

Ultra-thin/high-efficiency

UZP-120 Series

Continuous:100/120W
Peak: 200W
Output voltage:12/15/24V

*15V output type is only for mUZPT-120 series.

Efficiency (At output voltage 24V)

At 100V AC: **92.0%**

At 230V AC: **94.0%**

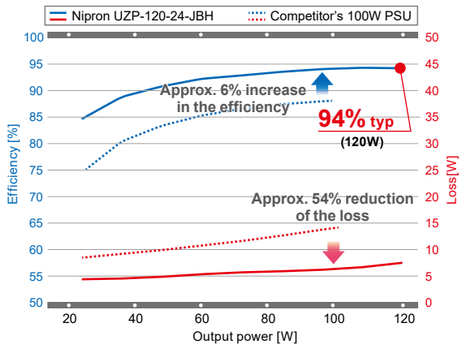
* Measured with UZP-120-24-JBH*
An example measurement

High-efficiency design

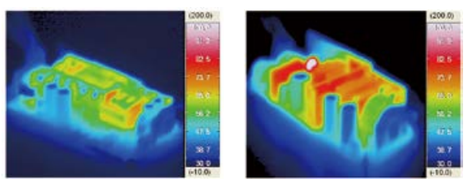
This is an energy-saving PSU of which efficiency is approx. 6% higher and power loss is approx. 54% lower than competitor's equivalent model . (UZP-120-24-JBH) Its high efficiency resulting in low heat generation enables miniaturization and long life.

UZP-120 VS competitor's 100W PSU

■Efficiency & loss comparison
[Measurement condition: 230V AC input] (An example measurement)



■Temperature rise comparison
[Measurement condition: 100V AC input, 24V, 100W output]

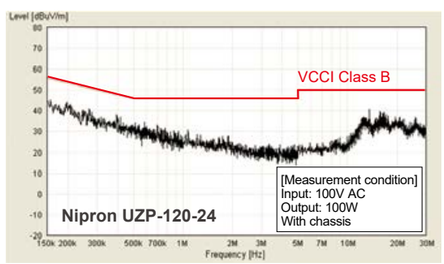


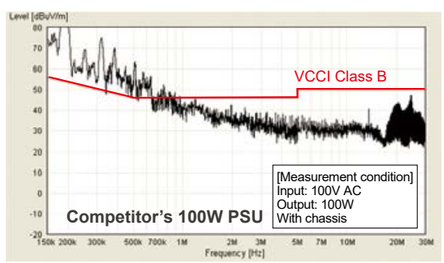
UZP-120-24 Competitor's 100W PSU

Low leakage current & low noise

While the leakage current is reduced to 0.05mA at 100V AC and 0.11mA at 200V AC, the conducted emission is compliant to VCCI Class B without an external noise filter due to enhanced noise filter circuit and optimized arrangement of parts. No need for an external noise filter, helping to save associated work and costs.

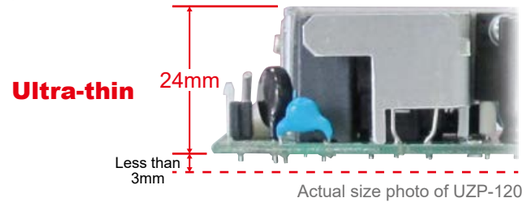
Conducted emission comparison
(An example measurement)





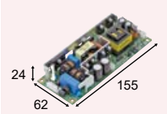
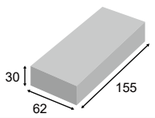
Small size, large capacity, ultra-thin

Compare to competitors' equivalent size PSUs, UZP-120 has advantages in many aspects such as efficiency, output power, and leakage current.
Furthermore, it has realized ultra-thin height of 24mm (from the bottom of PCB).



Actual size photo of UZP-120

■Comparison with competitor's equivalent size PSU
[24V output] (Efficiency and leakage current are examples of actual measurement.)

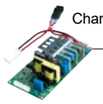
Power supply	UZP-120-24-JBH	Competitor's 100W PSU
Size *Height from the bottom of PCB		
Efficiency (100V/230V)	92/94% typ	84.5/87.5% typ
Leakage current (100V/200V)	0.06/0.12mA typ	0.13/0.29mA typ
Output power (continuous)	120W	103.2W
Output power (forced air cooling)	162W	- W
Output power (peak)	200W	206.4W

Backup for blackout/momentary power failure

It is possible to prevent momentary power failure or blackout by connecting a capacitor pack or a battery pack (except for -JOL types).
(In connecting the capacitor pack or battery pack, a dedicated conversion harness is required.)

Capacitor pack
BS13A-EC400/422F

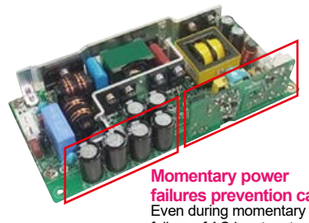
Capacitor board
CB03A-EC400/801F



Charging/discharging board for lead-acid battery
BS27A-P350/12V

Battery pack
BS28A-H350 / 2.5L

Optional capacitor and standby output board



Standby output board
Remote ON/OFF control is available without an external PSU.

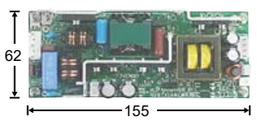
(Image)

Momentary power failures prevention capacitor
Even during momentary power failure of AC input, output voltage can be kept stable.

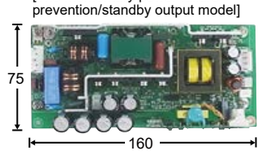
Please note that the size of models with the backup or standby power is larger than the standard models.

(For mounting, it is compatible with UZP-150/220.)

[Standard model]



[The momentary power failure prevention/standby output model]



*Please contact us about the model with the momentary power failure prevention or standby output.

Models certified for medical standards are also added

An input fuse or an insulated transformer is not needed when Nipron's "m-series" (medical standard approved PSU) is used. Size and cost of devices can be reduced compared to the power supply units that are not certified with the medical standard. mUZP-120 series has the models compliant to Means of Operator Protection (MOOP) in IEC60601-1 3rd , and also the models complaint to both MOOP and Means of Patient Protection (MOPP).

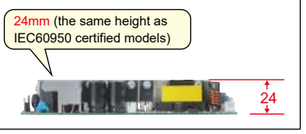
■UZP-120 series: medical standard certified models

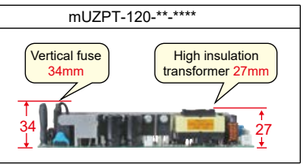
Model	Medical standard IEC60601-1		
	2nd	3rd (MOPP)	3rd (MOOP)
mUZP-120 series	–	–	○
mUZPT-120 series	○	○	○

Protective measures

●Protective measures for the operator: MOOP (Means of Operator Protection)
⇒ Protective measures to reduce the risk of electric shock to people other than the patient
●Protective measures for the patient: MOPP (Means of Patient Protection)
⇒ Protective measures to reduce the risk of electric shock to the patient
The criteria for certification are harder than MOOP.

mUZP-120 and mUZPT-120 are different size.

Model	mUZP-120-**-****
Size *Height from the bottom of PCB	

Model	mUZPT-120-**-****
Size *Height from the bottom of PCB	

Product outline

■UZP-120 series output specifications

Model: (m)UZP-120- mUZPT-120-	12-J0L 12-JB0	12-JBH	15-J0L 15-JB0	15-JBH	24-J0L 24-JB0 24-JBH
Output voltage	+12V	+12V	+15V	+15V	+24V
Continuous current/power (Convection cooling)	8.4A	10.0A	6.7A	8.0A	5.0A
	100.8W	120W	100.5W	120W	120W
Continuous current/power (Forced air cooling)	13.5A	13.5A	10.8A	10.8A	6.75A
	162W	162W	162W	162W	162W
Peak current/peak power (within 10 s)	16.7A	16.7A	13.4A	13.4A	8.4A
	200.4W	200.4W	201.0W	201.0W	201.6W
Input voltage	85 - 264V AC (with PFC, worldwide range)				

*15V output type is lined up in only mUZPT-120 series.

■UZP-120 series features

Model: (□=output voltage)	Remote ON/OFF	Variable resistor for output voltage	Optional connector*	Secondary side synchronous rectification
UZP-120-□-J0L	—	—	—	—
UZP-120-□-JB0	○	○	○	—
UZP-120-□-JBH	○	○	○	○
mUZP-120-□-J0L	—	—	—	—
mUZP-120-□-JB0	○	○	○	—
mUZP-120-□-JBH	○	○	○	○
mUZPT-120-□-J0L	—	—	—	—
mUZPT-120-□-JB0	○	○	○	—
mUZPT-120-□-JBH	○	○	○	○

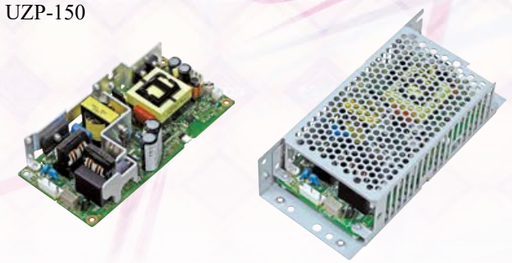
*Optional connector: connector for the capacitor pack/battery pack

AC-DC
switching power supply

UZP-150/220 series

UZP-220

UZP-150



ULTRA ZERO POWER SUPPLY

High-efficiency/high functionality

UZP-220 Series

Continuous: 180/220W

Peak: 400W

Output voltage: 12/18/24/48V

Efficiency (At output voltage 24V)

At 100V AC: **91.5%**

At 230V AC: **94.0%**

* An example measurement

Economy type

UZP-150 Series

Continuous: 150W

Peak: 400W

Output voltage: 12/18/24/48V

Efficiency (At output voltage 24V)

At 100V AC: **88.5%**

At 230V AC: **92.0%**

* An example measurement

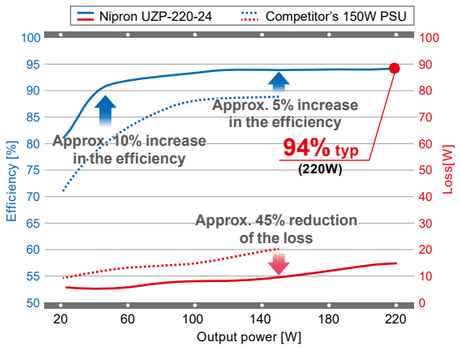
High-efficiency design

This is an energy-saving PSU of which efficiency is approx. 5% (at 150W) to 10% (at 50W) higher and power loss is approx. 45% lower than equivalent models of competitors. Its high efficiency resulting in low heat generation enables miniaturization and long life. (UZP-220 series at 230V AC input)

UZP-220 VS competitor's 150W PSU

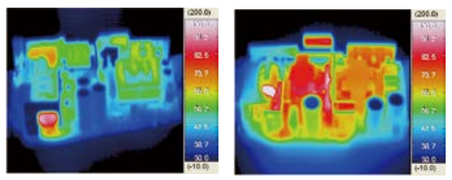
■Efficiency & loss comparison

[Measurement condition: 230V AC input] (An example measurement)



■Temperature rise comparison

[Measurement condition: 100V AC input, 24V, 150W output]

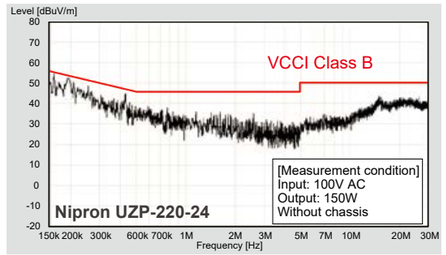


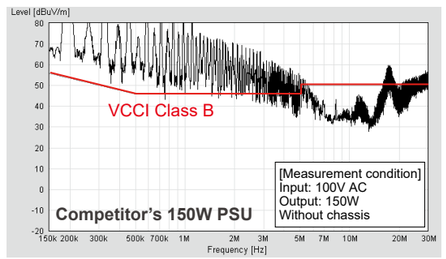
UZP-220-24 Competitor's 150W PSU

Low leakage current & low noise

While the leakage current is reduced to 0.06mA at 100V AC and 0.12mA at 200V AC, the conducted emission is compliant to VCCI Class B without an external noise filter due to enhanced noise filter circuit and optimized arrangement of parts. No need for an external noise filter, helping to save associated work and costs.

Conducted emission comparison (An example measurement)



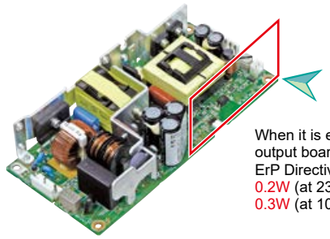


Medical standards certified models are also available

■UZP-150/220 series: medical standards certified models

Model	Medical standard IEC60601-1		
	2nd	3rd (MOPP)	3rd (MOPP)
mUZP-150 series	○	○	○
mUZP-220 series	○	○	○

Momentary power failures, blackout prevention capacitor/standby output board



Standby output PCB

When it is equipped with a standby output board (5VSB), it conforms to ErP Directive Lot6 under up to about 0.2W (at 230V AC input) and about 0.3W (at 100V AC input).

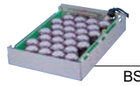
Momentary power failures prevention capacitor

Even during momentary power failure of AC input, output voltage can be kept stable.

Holding time: about 80msec (at 130W output)

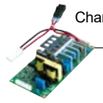
It is possible to prevent Momentary power failure or blackout by connecting a capacitor pack or a battery pack (only UZP-220 series).

(In connecting the capacitor pack or battery pack, a dedicated conversion harness is required.)



Capacitor pack
BS13A-EC400/422F

Capacitor PCB
CB03A-EC400/801F



Charging/discharging board for lead-acid battery
BS27A-P350/12V

Battery pack
BS28A-H350/2.5L

*Please contact us about the model with the momentary power failure prevention or standby output.

Low standby power

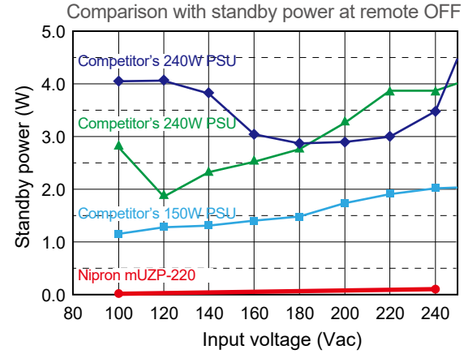
■UZP-150/220 series Standby power at RC signal OFF

Model	Input current	
	100V AC	240V AC
UZP-150 series	0.02W typ	0.11W typ
UZP-220 series	0.02W typ	0.09W typ

(An example measurement)

Since the standby power at remote OFF is reduced, the model with the standby output board conforms to ErP directive Lot6 at up to approximately 0.3 W output (at 100V AC input).

Comparison with standby power at remote OFF



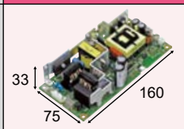
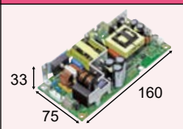
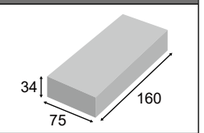
0.02W typ at 100V AC input, 0.10W typ at 200V AC input

*An example measurement (mUZP-220 series)

Small size, large capacity

Compare to competitors' equivalent size PSUs, UZP series has advantages in many aspects such as efficiency, output power, and leakage current.
If you are thinking about miniaturization and energy-saving of products, please consider UZP series.

■Comparison with competitors' equivalent size PSU [24V output]
(Efficiency and leakage current are example measurements)

Power supply	UZP-150-24	UZP-220-24	Competitor's 150W PSU
Size *Height from the bottom of PCB	 33 160 75	 33 160 75	 34 160 75
Efficiency (100V/230V)	88.5/92% typ	91.5/94% typ	85.7/88.4% typ
Leakage current (100V/200V)	0.06/0.12mA typ	0.06/0.12mA typ	0.16/0.41mA typ
Output power (continuous)	151.2W	220.8W	151.2W
Output power (forced air cooling)	252W	331.2W	- W
Output power (peak)	400.8W	400.8W	302.4W

Product outline

■UZP-220 series output specifications

Model (UZP-220-)	12	18	24	48
Output voltage	+12V	+18V	+24V	+48V
Continuous current/power (Convection cooling)	15A	10A	9.2A	4.6A
	180W	180W	220.8W	220.8W
Continuous current/power (Forced air cooling)	21A	14A	13.8A	6.9A
	252W	252W	331.2W	331.2W
Peak current/power (within 10 s)	33.4A	22.3A	16.7A	8.35A
	400.8W	401.4W	400.8W	400.8W
Input voltage	85–264V AC (with PFC, worldwide range)			
Size (W×H×D)*	75×33×160			

*Height from the bottom of PCB

•Input/output terminal block type is in line up.
•Optional connector equipped

*Optional connector: connector for capacitor pack / battery pack

■UZP-150 series output specifications

Model (UZP-150-)	12	18	24	48
Output voltage	+12V	+18V	+24V	+48V
Continuous current/power (Convection cooling)	12.5A	8.4A	6.3A	3.2A
	150W	151.2W	151.2W	153.6W
Continuous current/power (Forced air cooling)	21A	14A	11.3A	5.7A
	252W	252W	271.2W	273.6W
Peak current/power (within 10 s)	33.4A	22.3A	16.7A	8.35A
	400.8W	401.4W	400.8W	400.8W
Input voltage	85–264V AC (with PFC, worldwide range)			
Size (W×H×D)*	75×32×160			

*Height from the bottom of PCB

•Input/output terminal block type is in line up.

AC-DC
switching power supply

OZP-350 series

Open frame

With chassis and cover

ULTRA ZERO POWER SUPPLY

High-efficiency/high functionality

OZP-350 Series

Efficiency (At output voltage 24V)

At 100V AC: **92%**

At 230V AC: **95%**

* An example measurement

Continuous: 300-352W

Peak: 504-601W

Output voltage: 12/15/24/30/36/48V

OZP-350 series

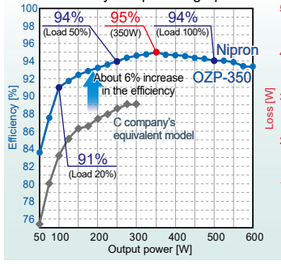
"OZP-350 series", 350W PCB type AC/DC switching power supply, is now available. "OZP-350" is an ultra-high efficient single output power supply that has achieved 80 PLUS PLATINUM level efficiency with its 95%typ efficiency at maximum. continuous 350W/500W* and peak 600W* output are available in the same size as competitors' 300W equivalent models. It is possible to build a large capacity fanless power supply by parallel connection. *Output voltage: 24V or more

Ultra-high efficiency 95%, low standby power

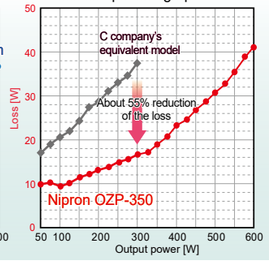
Ultra-high efficiency of 95%typ

Ultra-high efficiency of 95%typ is achieved for a 24 V output type. It can contribute for saving energy and reducing CO_2. It is an energy-saving PSU of which efficiency is approx. 6% higher and power loss is approx. 55% lower compared to competitors' equivalent models. (at 230V AC input)

■Efficiency comparison graph



■Loss comparison graph

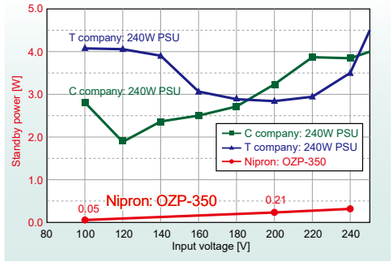


Reduction of standby power at remote OFF

Achieved reducing CO_2 and electricity bills by saving the power consumption at standby model

0.05Wtyp at 100V AC input　0.2Wtyp at 200V AC input

(An example measurement)

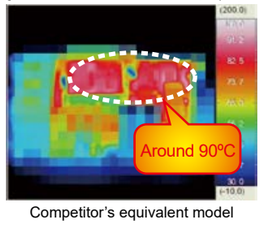


Reduced temperature rise due to ultra-high efficiency

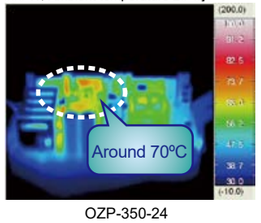
Ultra-high efficiency of mOZP-350 resulting in low power loss and low heat generation enables a long-life power supply unit which allows for large capacity output.

■Temperature rise comparison

[Measurement condition: 100V AC input, Load 300 W, Ambient temperature 25ºC]



Competitor's equivalent model



OZP-350-24

High reliability

Double-sided PCB with plated through hole

A double-sided PCB with plated through hole, which is suitable for the industrial use, has been adopted. This ensures a high reliability against vibration and resolve the problem of solder crack. Also, the use of an epoxy-glass board has made it possible to enhance the durability against aging and improve the reliability further.

Solder joint cracking

Parallel operation available

Large capacity by parallel operation

If the capacity is insufficient, it can be increased by parallel operation.

■Output specifications at parallel operation

OZP-350 12V output type

Number of pcs	1pc (normal)	2pcs (in parallel)	3pcs (in parallel)
Continuous (Normal)	300W	540W	810W
Continuous (Forced air cooling)	430W	774W	1161W
Peak	500W	900W	1350W

OZP-350 24/30/36/48V output type

Number of pcs	1pc (normal)	2pcs (in parallel)	3pcs (in parallel)
Continuous (Normal)	350W	630W	945W
Continuous (Forced air cooling)	500W	900W	1350W
Peak	600W	1080W	1620W

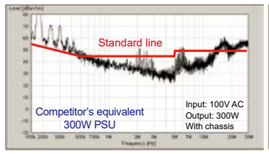
Built-in current balancing circuit makes the parallel operation easy

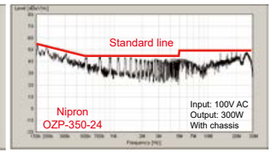
Because it also balances the variable setting of output voltage, setting up the voltage on one unit is enough to configure the system. The higher voltage setting will take the precedence and the voltage of other unit will be increased to the same level. (Connection of three or more units is also possible.)

Low noise& low leakage current

Reduction of cost and workload

The power supply unit clears VCCI Class B for conducted emissions. No need for an external noise filter, helping to save associated work and costs. The leakage current is as low as 0.06 mA typ at 100 VAC and 0.12 mA typ at 200 VAC. Both low noise and low leakage current are satisfied simultaneously.





Supports 5VSB/12VSB unit

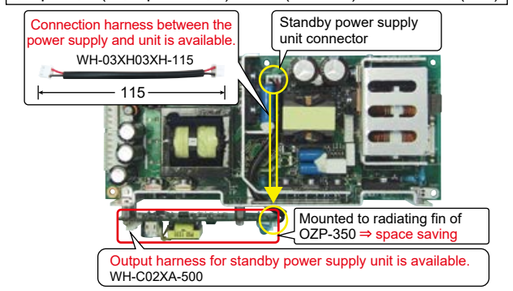
Standby power supply unit can be attached

Attachment to OZP-350 enables the standby output (5V/12V). It can be used for power supply units that are turned ON/OFF remotely.

PS-10WP-5VSB

Because it eliminates the need for rectifying bridges and filters, it facilitates miniaturization and cost reduction compared to the provision of a separate standby output power supply unit. It also enables the user to reduce the power consumption at a light load, making it possible to adapt to the ErP Directive Lot6.

Output: 5V (1.5A/peak 2.0A)　Size (W×H×D): 31×25×100 (mm)



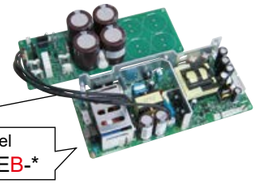
Optional capacitor

Backup for momentary power failure at low cost

Backup from 0.4 to 1s or more possible by connecting an electrolytic capacitor backup unit (CB01A series) on the outside.

Capacitor backup unit
[Open frame type]
CB01A-EC400/***F

[Connection harness]
WH-07XH0306XH-300



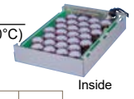
Power supply model
OZP-350-**-*SEB-*

Possible to connect a capacitor pack (BS13A-EC400/422F)

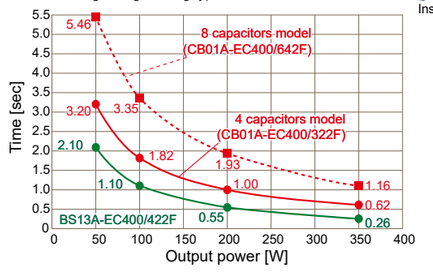
*Connectable to OZP-350 series

BS13A-EC400/422F

- Expected life of more than 12 years (at 40°C)
- Operatable in high and low temperature
- Lightweight 1.4kg typ



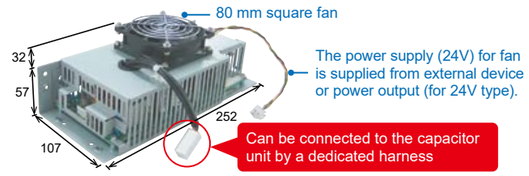
Inside



Large capacity by cooling fan

About 1.4 times output of continuous capacity by using cooling fan

Max. 500W continuous output is available at forced air cooling. It can replace a unit type power supply, and efficiency and cost can be improved.



Other features

- **Output voltage remote sensing**
  Line drop of output cable etc. can be compensated by connecting this signal to the end of load to monitor the output voltage. (supports the line drop of positive side pole)
- **Coil whine reduction**
  Reducing the coil whine from such as LED display at pulse load.
- **The blackout detection signal is equipped**
  The blackout detection signal is equipped as a standard, therefore the cost for preparing a detection board can be reduced.
- **Variable resistor for output voltage equipped**
- **Output ON/OFF control function is equipped**
- **Installation of an overcurrent timer latch board supported**
- **Medical standard IEC60601-1 (2nd,3rd(MOPP)) is certified mOZP-350 series is also available.**

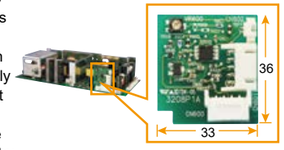
A two-stage overcurrent protection (OCP) board with a timer

Incorporation of an overcurrent limiter board enables a two-stage overcurrent protection (OCP) with a timer

The motor itself runs by maintaining a certain speed. Once a problem occurs due to some reason, such as an interference between the motors, there will be a force to increase the motive power in an attempt to regain the speed, picking up a larger current. Keeping the motor running at a current above the rated current can make the motor seize, damage the equipment and cause a fire.

■For the protection of DC motor running with a restraint

The peak overcurrent at the startup shall not be detected until it reaches the second OCP level and the operation can be shut down with an arbitrary timer setting (approximately 200 ms to 5 seconds) and a current setting to avoid burning the wiring, connectors and the motor itself due to a continued overcurrent caused by the restrained operation.



Product specifications

Model (OZP-350-)	12	15	24	30	36	48
Output voltage	12V	15V	24V	30V	36V	48V
Max. current/power (Convection cooling)	25A	20A	14.6A	11.7A	9.8A	7.3A
	300W	300W	350.4W	351W	352.8W	350.4W
Max. current/power (Forced air cooling)	36A	29A	21A	16.8A	14A	10.5A
	432W	435W	504W	504W	504W	504W
Peak current/power (within 10 s)	42A	40A	25A	20A	16.7A	12.5A
	504W	600W	600W	600W	600W	600W
Min. current	0A	0A	0A	0A	0A	0A
Input voltage	85–264 VAC (with PFC, worldwide range)					
W×H×D(mm)	95×47×222 (Open frame)　107×57×252 (With chassis)					
Safety standards	UL/CSA/IEC60950-1 certified (15V output type is compliant) Medical standards IEC60601-1 (2nd, 3rd) model is available.					

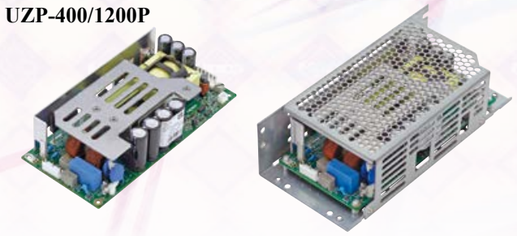
- **Input/output terminals can be selected from a connector type and screw terminal block type.**
- **A chassis or/and cover can be attached.**
  Selectable from 3 types: without chassis and cover, with a chassis, or with a chassis and cover.

AC-DC
switching power supply

UZP-400 series

UZP-400

UZP-400/1200P



Standard model

UZP-400 Series

Continuous: 320*/ 400W
Peak: 500*/ 600W
Output voltage: 12 / 24 / 36 / 48V
*12V output type

Efficiency* (At output voltage 24V)
At 100V AC: 92%
At 200V AC: 94%
* An example measurement

High peak model

UZP-400/1200P Series

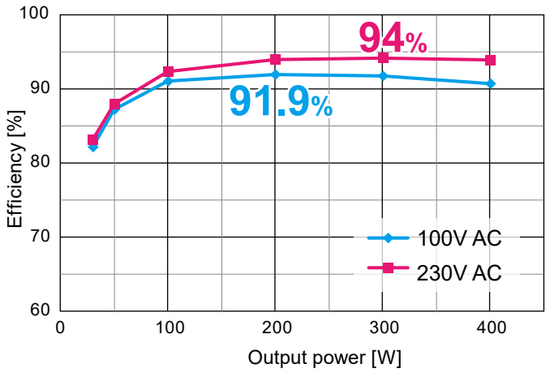
Continuous: 400W
Peak: 1200W
Output voltage: 24 / 30 / 36 / 48V

Efficiency* (At output voltage 24V)
At 200V AC: 94%
* An example measurement

Designed for high efficiency

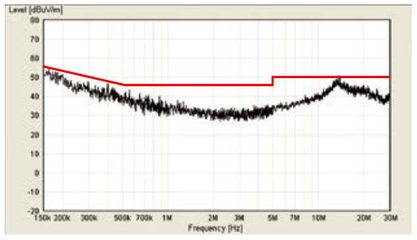
High level efficiency 94% typ achieved at 230V AC input. Miniaturization and long life realized by low heat generation from high efficiency. It works for the cost cut for heat management in the customer's system.

Efficiency graph (UZP-400-A24, an example measurement)



Clears VCCI Class B for the conducted emissions

The power supply unit clears VCCI Class B for conducted emissions. No need for an external noise filter, helping to save associated work and costs.



Measurement condition
Input: 230V AC
Output: rated load

(UZP-400-A24, an example measurement)

Low leakage current

Leakage current of 0.05mA at 100V AC and 0.11mA at 200V AC.

Input voltage	Rated load	Min. load
100VAC	0.05mA	0.05mA
200VAC	0.11mA	0.11mA

(UZP-400-A24, an example of measurement)

Support high peak power

Optimal for devices requiring an inrush current, such as motors. No need for power supply with a large continuous rated output to match the peak load, so power supply can be downsized. And many advantages, like equipment can be fanless, can be realized by replacing a fan-equipped unit-type power supply.

■ UZP-400 Series

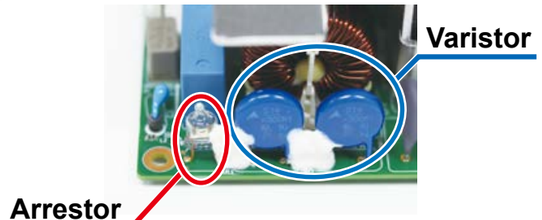
Standard models, support peak power output (within 10s) 1.5 times as high as the continuous rated output.

■ UZP-400/1200P Series

The high peak models, support peak power output (within 10s) three times as high as the continuous rated output.

Enhanced resistance against lightning surges

Resistance to external surges due to lightning or other causes has been enhanced by incorporating an arrestor and a varistor as a surge protector.

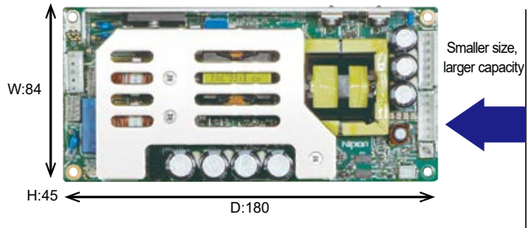


Common mode: actual performance ± 8kV

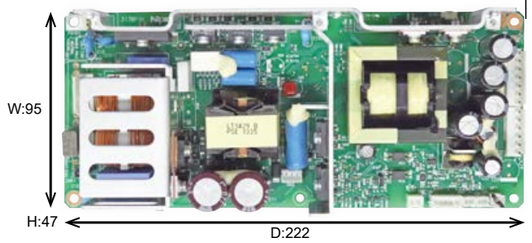
Smaller size with higher capacity

Compared with Nipron's past/current models of the OZP-350 series, the UZP-400 series offers a 50W increased continuous capacity and a 30% smaller size.

UZP-400/1200P series Continuous: 400W Peak: 1200W
(Nylon connector type)

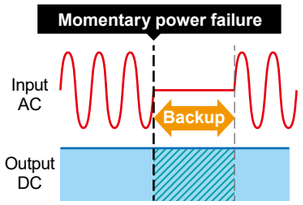


OZP-350 series Continuous: 350W Peak: 600W (launched in 2012)



Backup for momentary power failure

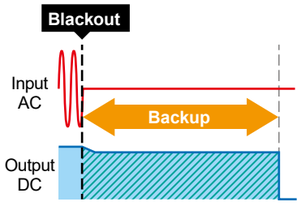
Connecting capacitor boards creates a backup for momentary power failure by extending the output holding time.
(except for UZP-400/1200P)
(A conversion harness is required separately when connecting a capacitor board.)



Capacitor board
CB03A-EC400/801F

Backup for blackout

Connecting battery packs creates a backup for momentary power failure/blackouts by extending the output holding time.
(except for UZP-400/1200P)
(A conversion harness is required separately when connecting a battery pack.)



Ni-MH battery pack
BS28A-H350/2.5L

Other features

■ With remote ON/OFF function
■ With chassis or with chassis and cover versions are available

With chassis

With chassis and cover

■ Screw terminal block type is also available
(Model: UZP-400-A24-TBH)

Screw terminal block type

Product outline

■UZP-400 Series

UZP-400-A	12	24	36	48
Output voltage	+12V	+24V	+36V	+48V
Continuous current / power (Convection cooling)	26.7A	16.8A	11.2A	8.4A
	320.4W	403.2W	403.2W	403.2W
Continuous current / power (Forced air cooling)	36A	21A	14A	10.5A
	432W	504W	504W	504W
Peak current (within 10 s)	42A	25A	16.7A	12.5A
Peak power (within 10 s)	504W	600W	601.2W	600W
Input voltage	85–264V AC (worldwide range)			
Safety standards	UL (cUL) 62368-1 certified, CE marking, UKCA marking SEMI-F47, EN62477-1 (OVCⅢ) compliant			
Size (W×H×D)	84×45×180 mm			

■UZP-400/1200P Series

UZP-400/1200P-A	24	30	36	48
Output voltage	+24V	+30V	+36V	+48V
Continuous current / power (Convection cooling)	16.8A	13.4A	11.2A	8.4A
	403.2W	402W	403.2W	403.2W
Continuous current / power (Forced air cooling)	21A	16.8A	14A	10.5A
	504W	504W	504W	504W
Peak current (within 10 s)	50A	40A	33.4A	25A
Peak power (within 10 s)	1200W	1200W	1202.4W	1200W
Input voltage	170–264V AC (240–400V DC input available)			
Safety standards	UL (cUL) 62368-1 certified, CE marking, UKCA marking SEMI-F47 (At conditions with output up to 600W), EN62477-1 (OVCⅢ) compliant			
Size (W×H×D)	84×45×180 mm			

AC-DC
switching power supply

UZP-600 series

Switching PSU with extremely low noise and heat generation

ULTRA ZERO POWER SUPPLY

Ultra-thin/high-efficiency

UZP-600 Series

Continuous: **600W** Peak: **1200W**

Output voltage: **24/30/36/48V**

Efficiency (At output voltage 24V)

At 100V AC: **93.1%**

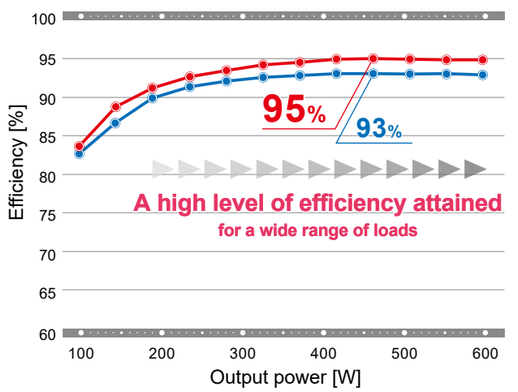
At 230V AC: **95.0%**

* An example measurement with UZP-600-A24

High-efficiency design

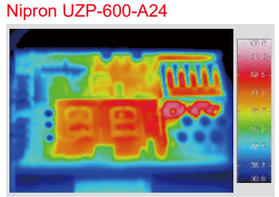
A high level of efficiency 95%typ has been achieved for a 24 V output type, providing a significant support for saving energy and reducing CO_2 emission. Its high efficiency resulting in low heat generation enables miniaturization and long life.

Efficiency graph (an example measurement)



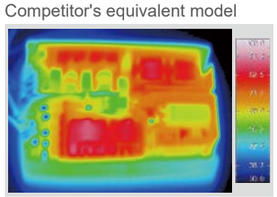
[Measurement condition: 100V AC input 230V AC input]

Nipron UZP-600-A24



[Measurement condition]
Input: 100V AC, Output: 24V, 600W

Competitor's equivalent model



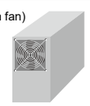
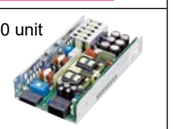
[Measurement condition]
Input: 100V AC, Output: 24V, 600W

Supports a high peak 200% higher than the continuous power

The unit can supply power 200% the continuous power for the predefined time (5s). This eliminates the need to select a power supply unit with a large continuous power rating matching the peak load and enables a reduction in the PSU size, leading to many benefits like fanless construction of the device, replacement of unit type PSUs, and so on.

Advantages brought about by the replacement

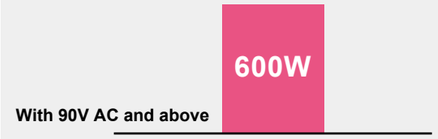
The UZP-600 is a fanless PSU with a large capacity of continuous power of 600W and the peak power of 1200W. It offers a number of advantages like fanless construction of the device, replacement of unit type PSUs, and so on.

Competitors' products	UZP-600
PCB type 300W PSU × 2 units  Two units price and spaces	Single UZP-600 unit Continuous: 600W Peak: 1200W  **Cost reduction and miniaturization enabled**
Unit type (with a built-in fan) 600W PSU  The trouble of servicing the fan, the risk of sucking in foreign matters	Single UZP-600 unit Continuous: 600W Peak: 1200W  **Fanless achieved**

UZP-600, the difference maker!

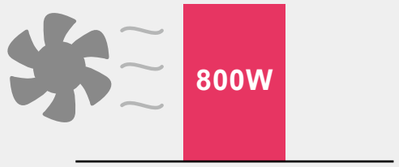
Given below are the strengths of new PSU UZP-600 series, which is a level unprecedented for a fanless unit.

Continuous output capacity (convection cooling)



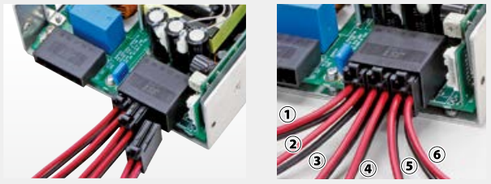
Continuous power output of 600W possible with the supply of 90V AC and above

Continuous output capacity (forced air cooling)



Continuous output of 801.6W enabled with forced air cooling

Dividable connectors

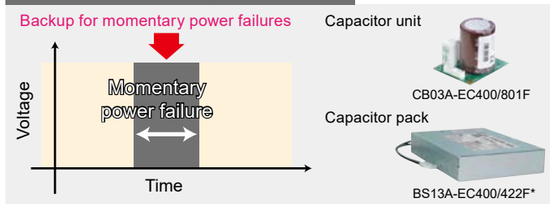


Use a required number of terminals matching the load

Lightning surge resistance

An arrestor is built in to enhance the resistance to lightning surges (Common mode: actual performance ± 8kV)

Can address momentary power failures



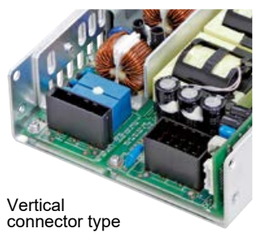
Momentary power failures addressed by connecting the capacitor unit

*A separate conversion harness is required.

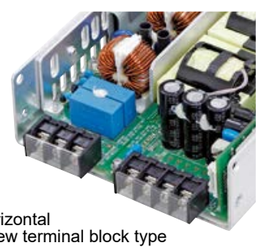
I/O terminal blocks for different scenes of use are available

The PSU comes with screw terminal blocks or dividable nylon connectors as I/O terminals.

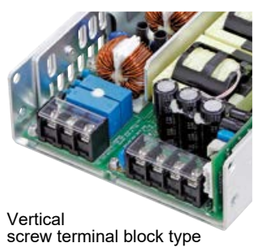
Horizontal connector type



Vertical connector type



Horizontal screw terminal block type



Vertical screw terminal block type

Other features

- Miniature size of 5 × 9 inches
- Comes with a +12 V standby output linked to the AC input
- Blackout detection signal and remote ON/OFF feature equipped
- Medical standards certified models will also be added
- With a +12 V output (optional) linked with the remote ON/OFF for the fan
- Service life indicator models are also available (optional)
  Warnings of the deterioration of the electrolytic capacitor are provided by H/L signals and LEDs.
- With cover or with cover and front panel versions are available

With cover

with cover and front panel
(only for horizontal connector type)

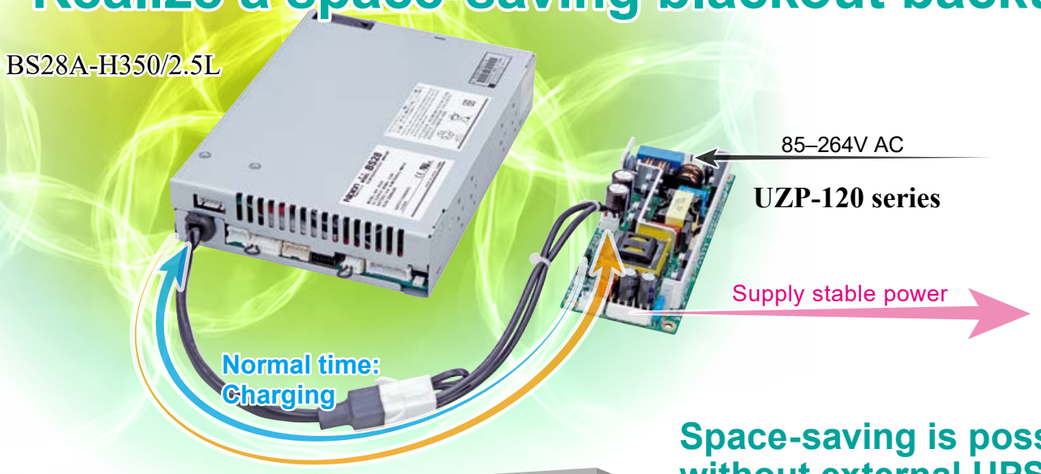
Product outline

■UZP-600 series output specifications

Model(UZP-600-)	A24	A30	A36	A48	Common specifications
Output voltage	+24V	+30V	+36V	+48V	+12VSB
Continuous current/power (Convection cooling)	25A	20A	16.7A	12.5A	0.42A
	600W	600W	601.2W	600W	5W
Continuous current/power (Forced air cooling)	33.4A	26.7A	22.3A	16.7A	–
	801.6W	801W	802.8W	801.6W	–
Peak current/power (within 5 s)	50A	40A	33.4A	25A	–
	1200W	1200W	1202.4W	1200W	–
Input voltage	85–264 VAC (with PFC, worldwide range)				
Size (W×H×D)	Without cover: 127 (5 inches) ×44×228.6 (9 inches)				

With the UZP series × BS28A

Realize a space-saving blackout backup

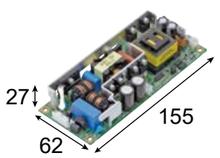


Space-saving is possible without external UPS

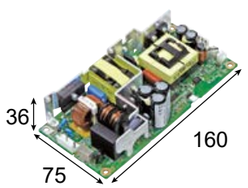
With our unique charging/discharging technology, a blackout backup system without an interruption can be realized simply by connecting BS28A to a PSU that supports the feature.
By installing a battery pack within the housing, a power backup system for momentary power failures and blackout becomes available within the stand-alone unit.

Single output power supply units supporting the feature

*UZP-120 series**

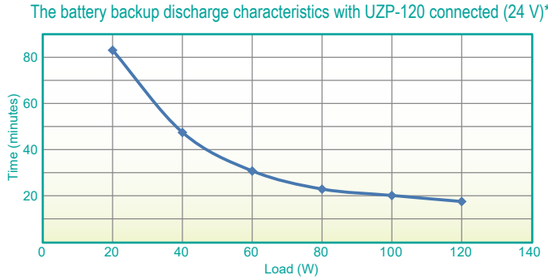
Appearance photo and size	Product description
	Input voltage 85–264V AC Output voltage 12, 24V Output power Continuous: 100–120W (convection cooling) 162W (forced air cooling) 162W (forced air cooling)

UZP-220 series

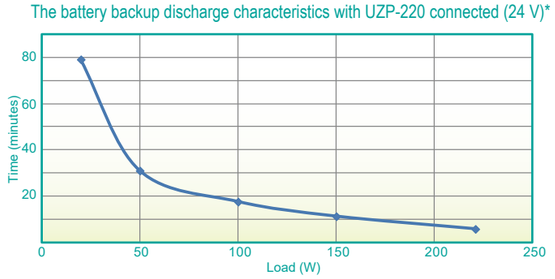
Appearance photo and size	Product description
	Input voltage 85–264V AC Output voltage 12, 18, 24, 48V Output power Continuous: 180–220W (convection cooling) 250–331W (forced air cooling) Peak: 400W

* The models UZP-120-**-J0L do not support the feature.

The battery backup discharge characteristics with UZP-120 connected (24 V)*

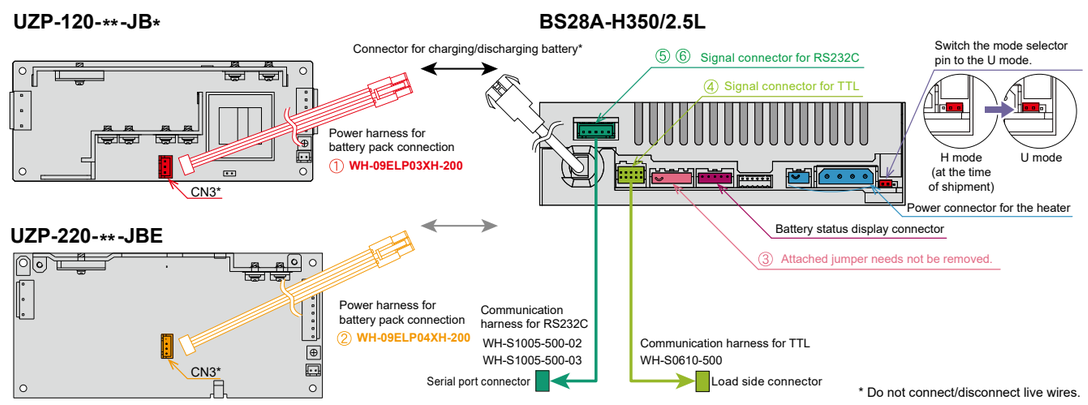


The battery backup discharge characteristics with UZP-220 connected (24 V)*



* The chart is for the purpose of reference only and the values shown are not guaranteed.

Connecting concept

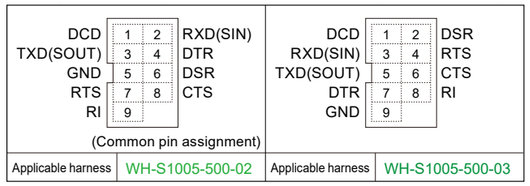


Connection harness

No	Model	Details
①	WH-09ELP03XH-200	A connection harness required for the connection of UZP-120 series
②	WH-09ELP04XH-200	A connection harness required for the connection of UZP-220 series
③	– (Comes with the unit)	By connecting this connector, the blackout backup (the operation of discharging circuit) becomes available. If it is necessary to turn it ON/OFF remotely, consult us.
④	WH-S0610-500	Harness for signal communication harness for TTL For AC_FAIL, SHUT_DOWN, BATT_LOW
⑤	WH-S1005-500-02	Harness for signal backup signal harness (RS232C) For AC_FAIL, SHUT_DOWN, BATT_LOW
⑥	WH-S1005-500-03	Harness for signal backup signal harness (RS232C) For AC_FAIL, SHUT_DOWN, BATT_LOW

Signal harness for RS232C

Pin assignment of serial port connector on the motherboard (internal connector)

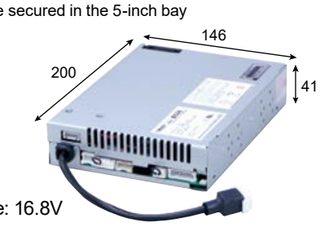


Applicable harness	WH-S1005-500-02	Applicable harness	WH-S1005-500-03

Check the complete pin assignment by referring to the user's manual for the motherboard.

Products features and specification

- Status outputs (remaining capacity / battery life indicator) available for the battery pack
- Prevents the drop in the capacity at low temperature with a built-in heater
- Low standby power specification
- A battery pack that can be secured in the 5-inch bay



Specification
Nominal battery voltage: 16.8V
Rated capacity: 2.5Ah
Output power: 230W (peak power 380W)
Usage battery: Ni-MH

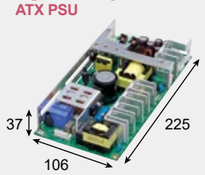
BS28A also supports ATX power supply units

HPCFL-400P-X2S

High efficiency fanless ATX PSU

Continuous 170 W
Peak 400 W

- Min. load current of 0A for all outputs
- Long life design with expected service life of 10 years or longer



HPCSF-400P-X2B

Compact and large capacity SFX PSU

Continuous 310 W
Peak 400 W

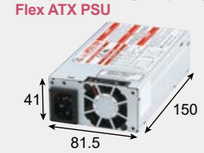
- Min. load current of 0A for all outputs
- High efficiency achieved by the adoption of a synchronous rectification circuit

HPCFX-350P-X2B

Compact and large capacity Flex ATX PSU

Continuous 245 W
Peak 346 W

- Min. load current of 0A for all outputs
- Low noise design with a temperature controlled variable-speed fan



Single Output Power Supply UZP-120 series

Structure and I/O connector	Model	Output voltage	Output current *1	Output power *1
Open frame type/ Nylon connector	UZP-120-12-J0L	+12V	8.4A (16.7A)	100.8W (200.4W)
	UZP-120-12-JB0	+12V	8.4A (16.7A)	100.8W (200.4W)
	UZP-120-12-JBH	+12V	10A (16.7A)	120W (200.4W)
	UZP-120-24-J0L	+24V	5A (8.4A)	120W (201.6W)
	UZP-120-24-JB0	+24V	5A (8.4A)	120W (201.6W)
	UZP-120-24-JBH	+24V	5A (8.4A)	120W (201.6W)

Structure	Description
With chassis	'-C' is added after open frame model name (Ex: UZP-120-12-JBH-C)
With chassis and cover	'-K' is added after open frame model name (Ex: UZP-120-12-JBH-K)

■ Model name coding

UZP-120-**-J***-*
① ② ③ ④⑤⑥⑦ ⑧

① Series name
② Output power
③ 12:12V 24:24V
④ Input/Output connector J:Nylon connector
⑤ Optional joint connector "0":Without connector "B":With connector
⑥ Presence or absence of function
"L": Without output ON/OFF control signal, without variable resistor to adjust output voltage, low cost type
"O": With output ON/OFF control signal, with variable resistor to adjust output voltage
"H": With output ON/OFF control signal, with variable resistor to adjust output voltage, high-efficiency type
⑦ Modification
⑧ Blank:Without chassis and cover C:With chassis K:With chassis and cover

*1 Values in ( ) above show peak current and power.

Features

- Significantly reduced heat generation with high-efficiency design
- Blackout backup is possible (UZP-120-**-*B*)
- Low noise and low leakage current eliminates the need for an external noise filter.
- The cost competitive models are available.
- Equipped with a variable resistor to adjust output voltage (except -J0L type)

An amazing high level of efficiency 94% has been achieved for a 24V output type, and peak power of 200W also supported.*

*UZP-120-24-JBH with 230V AC input and load of 120W

Safety standards	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

●Function

TTL PFC RoHS Directive

●Input

AC input	85-264V AC (Worldwide range)

●Dimension

W×H×D (mm)	Without chassis and cover	62×27×155
	With chassis and cover	72×38.8×185

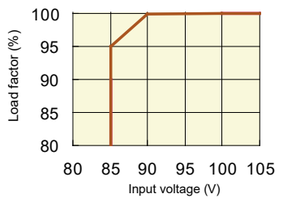
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items		Specification				Measurements conditions, etc.
AC Input	Rated Voltage		100-240VAC (85*-264VAC)				Worldwide range *See <Fig.1> Low input voltage derating on the following page.
	Input Frequency		50-60Hz				Frequency range 47-63Hz
	Efficiency	100VAC	87.5% typ (-JOL,-JB0/12V output), 89.5% typ (-JBH/12V output) 90.0% typ (-JOL,-JB0/24V output), 92.0% typ (-JBH/24V output)				At 100W output (convection cooling) *Characteristic data: Fig.5
		200VAC	90.0% typ (-JOL,-JB0/12V output), 91.5% typ (-JBH/12V output) 92.0% typ (-JOL,-JB0/24V output), 94.0% typ (-JBH/24V output)				
	Power Factor	100VAC	99% typ				At rated output (convection cooling) *Characteristic data: Fig.6
		200VAC	90% typ				
	Inrush Current		17A typ (100VAC), 34A typ (200VAC) *Characteristic data: Fig.7				Power thermistor system at cold start (25°C)
	Model (UZP-120-)		-12-J0L,JB0	-12-JBH	-24-J0L,JB0	-24-JBH	
	Input Current	100VAC (convection cooling)	1.16A typ	1.35A typ	1.35A typ	1.32A typ	At rated output *Characteristic data: Fig.5
		100VAC (forced air cooling)	1.87A typ	1.83A typ	1.82A typ	1.78A typ	
		200VAC (convection cooling)	0.62A typ	0.73A typ	0.72A typ	0.71A typ	
		200VAC (forced air cooling)	1.00A typ	0.98A typ	0.98A typ	0.96A typ	
Output	Model		UZP-120-**-J0L,JB0		UZP-120-**-JBH		
	Rated Voltage		+12V	+24V	+12V	+24V	
	Continuous Rated Output1 (convection cooling)		8.4A	5A	10A	5A	At rated input Refer to <Fig.4> output derating on the following page.
			100.8W	120W	120W	120W	
	Continuous Rated Output2 (forced air cooling)		13.5A	6.75A	13.5A	6.75A	
			162W	162W	162W	162W	
	Peak Current/Power		16.7A	8.4A	16.7A	8.4A	*Refer to peak output power condition on the following page. Convection cooling and forced air cooling
			200.4W*	201.6W*	200.4W*	201.6W*	
	Factory Setting		-J0L: 12V±4% -JB0: 12V±2%	-J0L: 24V±4% -JB0: 24V±2%	12V±2%	24V±2%	At continuous rated output1
	Adjustable Voltage Range		-5%,+10%	-5%,+20%	-5%,+10%	-5%,+20%	*Model: UZP-120-**-J*L-* is not equipped this function.
	Static Input Regulation		48mV max.	94mV max.	48mV max.	94mV max.	
	Static Load Regulation		100mV max.	150mV max.	100mV max.	150mV max.	
	Temperature Regulation		0.02%/°Cmax.				
	Max. Ripple Voltage	0-70°C	120mV max.				Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band. *Characteristic data: Fig.18
		-10-0°C	160mV max.				
	Max. Spike Voltage	0-70°C	150mV max.				
		-10-0°C	180mV max.				
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current				
		Method	Blocking oscillation *Characteristic data: Fig.20				
		Recovery	Automatic recovery				
	Over Voltage Protection	OVP point (V)	13.8-16.2V	30.0-35.0V	13.8-16.2V	30.0-35.0V	
		Method	Output shutdown (latch lock)				
		Recovery	Reclosing of AC input				
Environment	Operating Temp./ Humidity	Open Frame	-10-60°C (at convection cooling), -10-70°C (at forced air cooling) */20-90%				*<Fig.3> on the next page shows the guideline of forced air cooling. Refer to <Fig.4> output derating.
		With Chassis and Cover	-10-55°C (at convection cooling), -10-70°C (at forced air cooling) */20-90%				
	Storage Temp./Humidity		-20-85°C/10-95%				There shall be no condensation
	Vibration		To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.				Follow JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3times for each of four bottom edges, and no malfunction shall be observed.				Follow JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		3kVAC/1minute between input and output/RC				Cut-off current 10mA
			2kVAC/1minnute between input and FG				Cut-off current 10mA
			500VAC/1minute between each output /RC/FG				Cut-off current 100mA
	Insulation Resistance		50MΩmin. between each input/output/RC/FG				At 500VDC
	Leakage Current		0.06mA typ (100VAC), 0.12mA typ (200VAC) *Characteristic data: Fig.8				
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000nS,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)				There shall be no fluctuation of DC output or malfunction.
	Electrostatic Discharge		EN61000-4-2 compliant				Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency, Electromagnetic Field		EN61000-4-3 compliant				There shall be no malfunction, nor failure.
	Fast Transient Burst		EN61000-4-4 compliant				
	Lightning Surge		EN61000-4-5 compliant				
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant				
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant				
	Voltage dips/Regulation		EN61000-4-11 compliant				
	Conducted Emmision		VCCI-B,FCC-B,CISPR22-B, and EN55022-B compliant *Characteristic data: Fig.9, 10				At rated input and rated output (convection cooling), with chassis
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) class D, EN61000-3-2 (A14) class D compliant.				At rated input/output
Others	Safety Standards		UL60950-1, CSA60950-1 (c-UL), CE Marking (IEC62368-1) PSE (ordinance clause 2) compliant				
	Cooling System		Convection cooling/Forced air cooling				
	Output Grounding		Capacitor grounding				
	Output Hold-up Time		AC cut-off → 90% of rated voltage within 16ms min.				Rated input, output: 100W
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)				Following our standard
	Weight		250g typ (without chassis and cover), 430g typ (with chassis and cover)				
	Warranty		Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.				Except for errors caused by operation not specified in this specification.

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.1> Low input voltage derating

Follow the derating below to derate rated current/power.

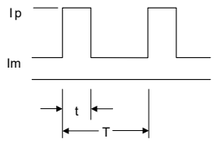


Peak output power condition

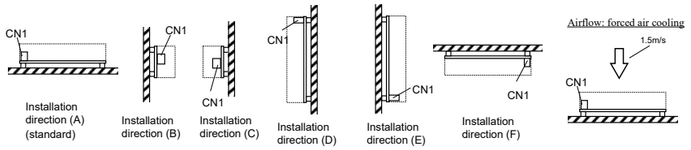
- Duty ratio of peak current shall be 30% or less.
- Energized period of peak current shall be 10 seconds or less.
- Energized period of peak current shall be 5 seconds or less at convection cooling and 40 deg. or higher of ambient temperature.
- The value resulting from the formula below shall not exceed continuous rated current, Io, after derating specified in the output derating on the following page.

$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$

Ip=Peak current value
Im= Min. current value
D= Duty ratio, t/T
t= Pulse width of peak current
T= Cycle
Io= Continuous rated current specified in output derating



<Fig.2> Installation/Air cooling



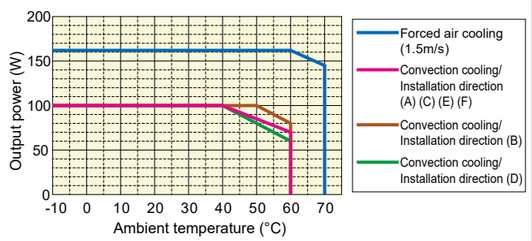
<Fig.3> Guideline for forced air cooling

Please contact us about the guideline for temperature rise of each component at forced air cooling.

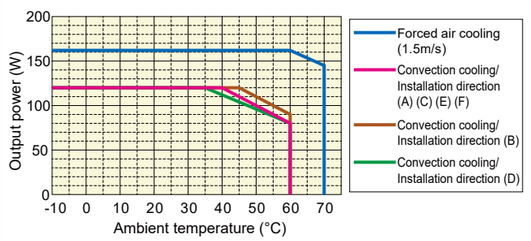
<Fig.4> Output derating

Follow the derating diagram below for output according to (A) ambient temperature and installation direction. Ask us separately except installation direction (A). In case of using the type with chassis and cover, input voltage range shall be 90V AC or higher, and shall not use in direction (F). Also, forced air cooling condition in the diagram shall be provided that the air flow of 1.5 m/s is applied from the direction shown <Fig.2>.

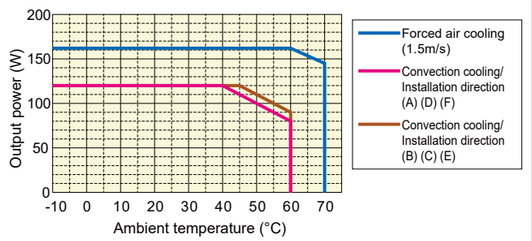
For open frame (UZP-120-12-J0L, 12-JB0)



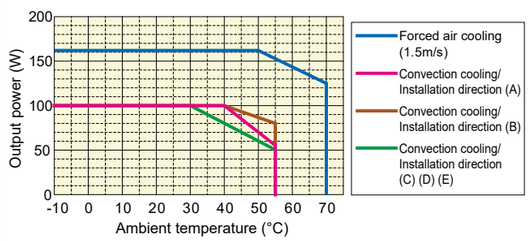
For open frame (UZP-120-24-J0L, 24-JB0)



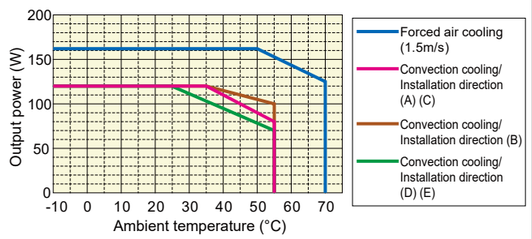
For open frame (UZP-120-12-JBH, 24-JBH)



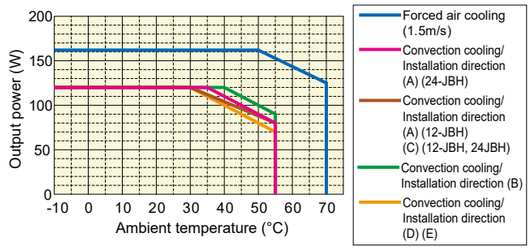
With chassis and cover (UZP-120-12-J0L, 12-JB0)



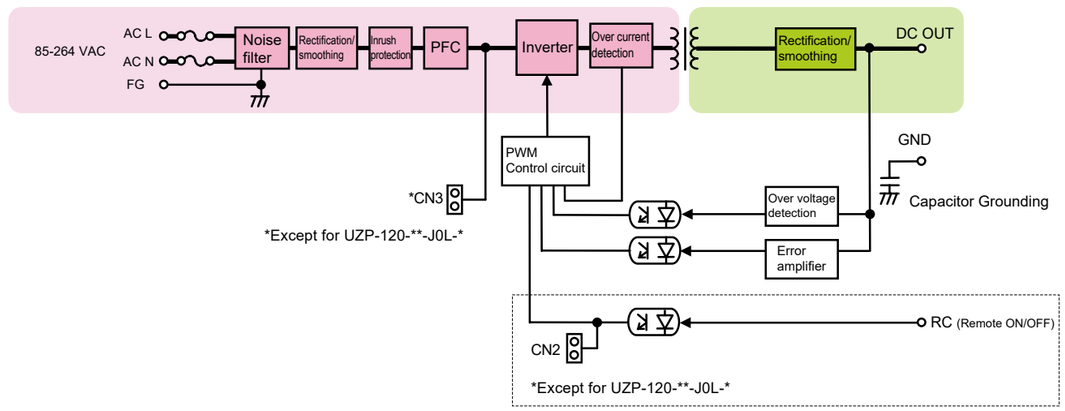
With chassis and cover (UZP-120-24-J0L, 24-JB0)



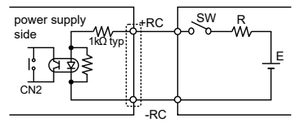
With chassis and cover (UZP-120-12-JBH, 24-JBH)



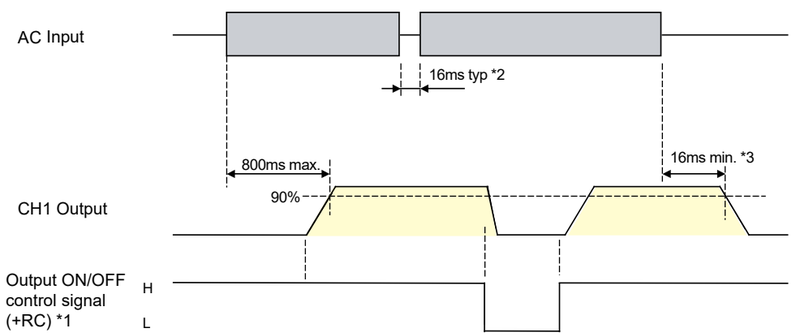
Block Diagram



Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.) *Except for UZP-120-**-J0L-*

	Items	Specification	Note
Input Signal	Output ON/OFF control signal (RC signal) *Remove the shorting plug of CN2 in using RC signal.	Operating mode Between +RC and -RC: Output SW ON (4.5V or higher): ON SW OFF (0.8V or lower): OFF External power supply and Load-limiting resistor External power supply: E / Load-limiting resistor: R 4.5 ~ 12.5Vdc: Not required 12.5 ~ 30Vdc: 1.5kΩ 30 ~ 48Vdc: 8.2kΩ	Shorting Plug With shorting plug (CN2) connected, output starts up when AC input is applied regardless of RC signal. To control Start/Stop of output by RC signal, uncap shorting plug of CN2. Note: Shorting plug (CN2) is primary circuit components. Make sure to operate the plug after the AC input is turned off.
Input Signal Circuit	Signal Circuit (RC signal) Connection example: using external power supply		

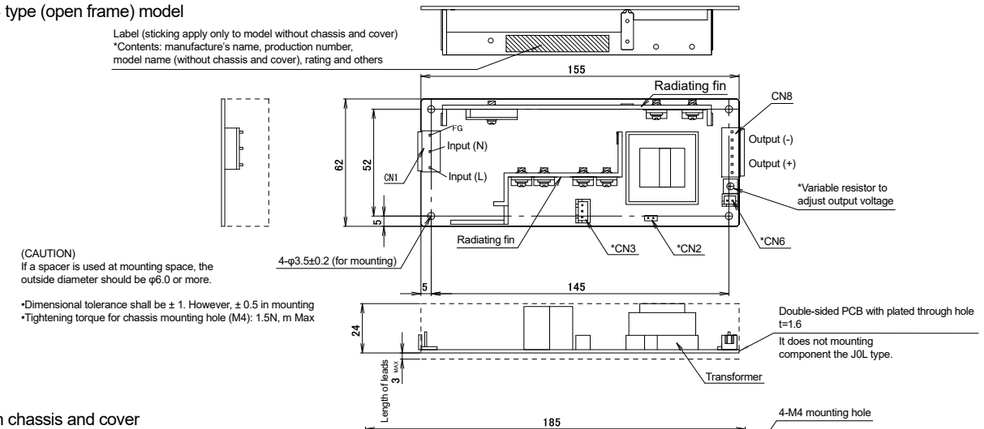
Sequence Timing Chart



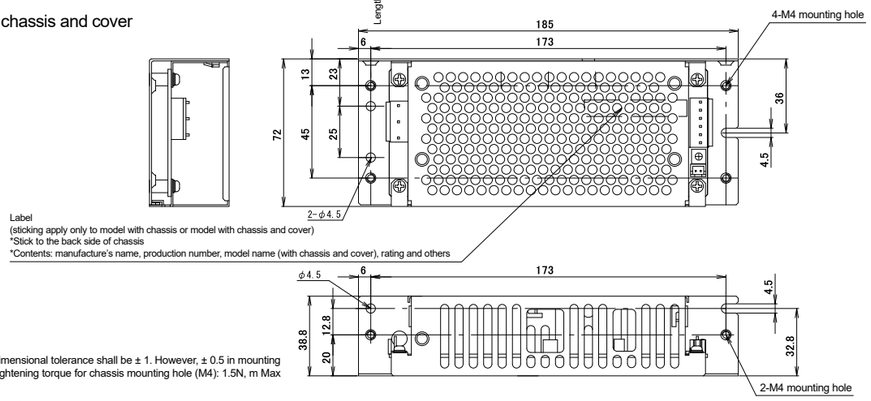
*1 Model: UZP-120-**-J0L is equipped without output ON/OFF function.
*2 At rated input/80 W output
*3 At rated input/100 W output

Outline Drawing

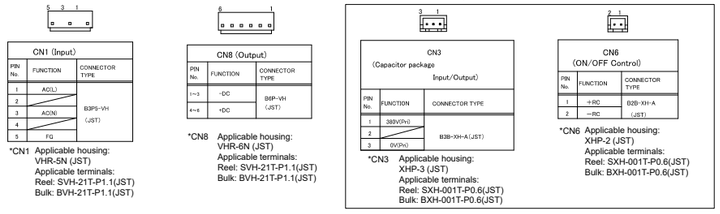
■ PCB type (open frame) model



■ With chassis and cover

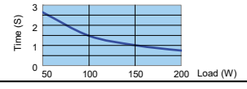
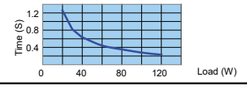
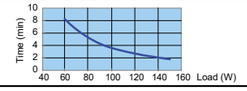
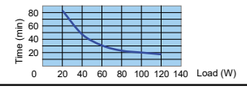


■ Connector pin allocation



Options (Sold separately)

Capacitor packs and Battery packs *1

Photos	Model	Type	Description	Backup time
	BS13A-EC400/422F	Capacitor pack	5 inch bay size	*2 
	CB03A-EC400/801F	Capacitor unit		*2 
	BS27A-P350/12V	Charging/discharging board for lead-acid battery	Supported a lead acid battery of up to 12V 5Ah	*3 
	BS28A-H350/2.5L	Ni-MH	5 inch bay size	*2 

*Backup time is just a guideline for first use, and not guaranteed.

*1 Applicable UZP-120-**-*B* *2 The backup time is reference *3 Reference when GS Yuasa's lead-acid battery, PXL12023 is connected

Options (Sold separately)

Cable

Photos	Model	Category	Description
	WH-C05VH-800	Input harness	For nylon connector models
	WH-C05VH-800-01	Input harness (with ferrite core)	For nylon connector models
	WH-C06VH-500-03	Output harness	For nylon connector models
	WH-02XH02XH-500	Signal harness for RC signal	For using the output ON/OFF control signal (RC signal) * Except for UZP-120-**-J0L
	WH-03ELP03XH-200	Power harness for the capacitor pack	For connecting the power supply to the capacitor pack (BS13A-EC400/422F). * Except for UZP-120-**-J0L
	WH-03XH03XH-115	Power harness for the capacitor unit	For connecting the power supply to the capacitor unit (CB03A-EC400/801F). Length: 115mm
	WH-03XH03XH-350	Power harness for the charging/ discharging board	For connecting the power supply to the charging/discharging board (BS27A-P350/12V) or the capacitor unit (CB03A-EC400/801F). Length: 350mm * Except for UZP-120-**-J0L
	ACC6198	Shorting connector for startup	For enabling blackout backup (operation of the discharging circuit) by connecting to the charging/discharging board (BS27A-P350/12V).
	WH-09ELP03XH-200	Power harness for connecting the battery pack	For connecting the power supply to the battery pack (BS28A-H350/2.5L).
	WH-S0610-500	Harness for TTL communication	For automatically shutting down the system at blackout. Connect to the battery pack (BS28A-H350/2.5L).
	WH-S1005-500-02	Harness for RS232C communication	For automatically shutting down the system at blackout. Connect to the battery pack (BS28A-H350/2.5L). *The pin allocation is different from "WH-S1005-500-03". (See P10 for details.)
	WH-S1005-500-03	Harness for RS232C communication	For automatically shutting down the system at blackout. Connect to the battery pack (BS28A-H350/2.5L). *The pin allocation is different from "WH-S1005-500-02". (See P10 for details.)

Connection in Series and Parallel

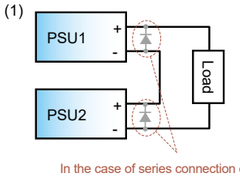
■ Series operation

Series connection is available as in figure (1) and (2) on the right.
Series connection between different output voltages is available, such as 12 V and 24 V.

Note: In the case that different voltages are connected in series as in figure (1) on the right;

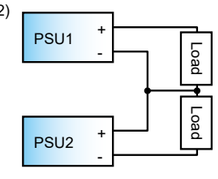
1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.
2. Connect diodes for protection as show in the figure (1).
   The rated current of the diodes shall be 1.5 times or more of the peak output current of the power supply which has larger peak output current among PSU1 and PSU2.
   Also, use Schottky diodes whose forward voltage is lower than the forward voltage of the diodes used in the PSU.

(1)



In the case of series connection of different output voltages, connect diodes shown as above.

(2)

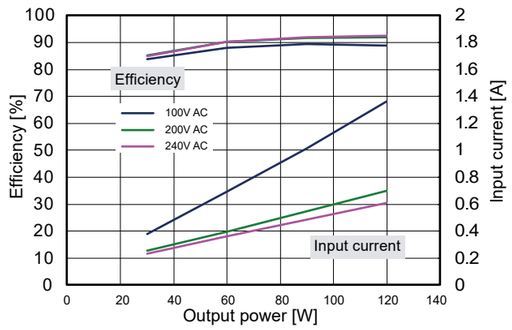


■ Parallel operation

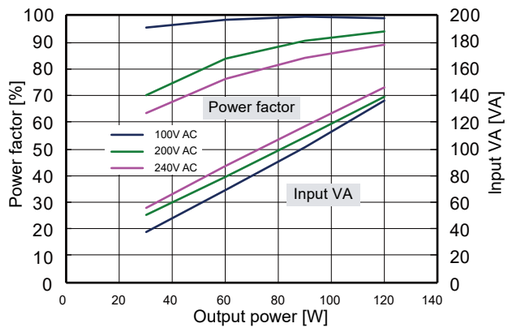
Parallel operation is not possible.

Characteristics Data (Typical features of the product series) UZP-120-24-JB0 (Examples of actual measurement)

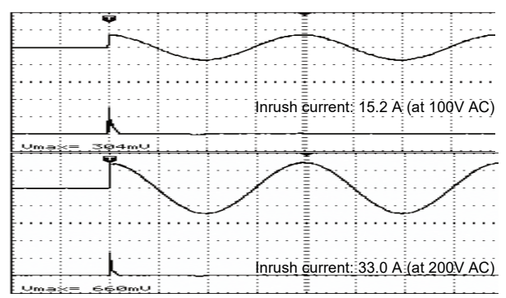
● Fig.5 Efficiency/Input Current vs. Output Power



● Fig.6 Power Factor/Input VA vs. Output Power



● Fig.7 Inrush Current



● Fig.8 Leakage Current

Input : 100, 200V AC, 60 Hz
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.05 mA	0.05 mA
200V AC	0.10 mA	0.11 mA

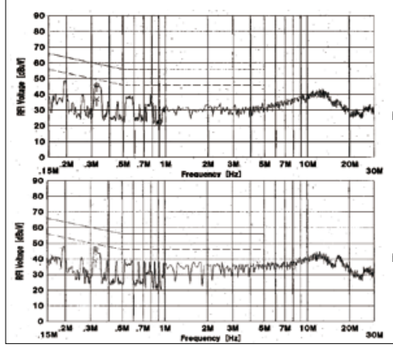
● Fig.9 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak

VCCI Class B

Measuring point: N-FG

Measuring point: L1-FG



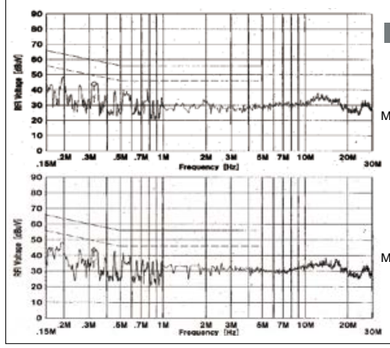
● Fig.10 Conducted Emission at 230V AC

Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B

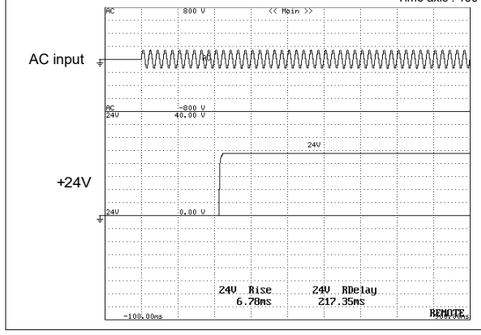
Measuring point: N-FG

Measuring point: L1-FG



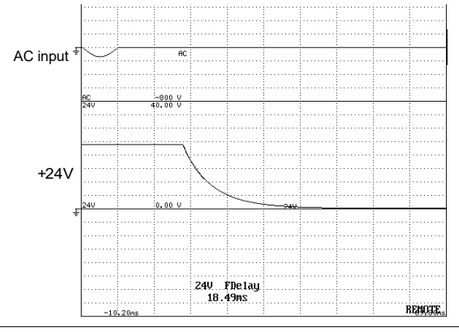
● Fig.11 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



● Fig.12 Falling Characteristics at 100V AC

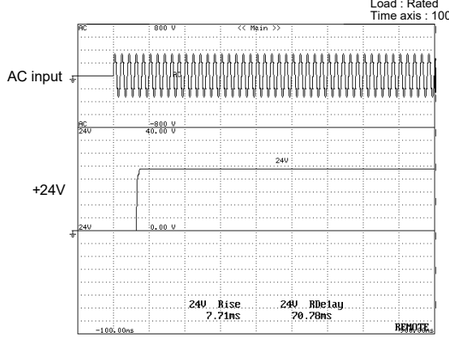
Input : 100V AC
Load : 100 W
Time axis : 10 ms/DIV



Characteristics Data (Typical features of the product series) UZP-120-24-JB0 (Examples of actual measurement)

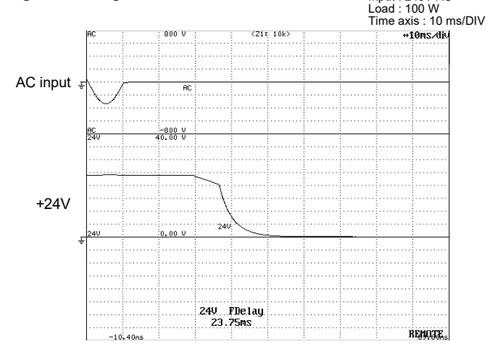
● Fig.13 Rising Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 100 ms/DIV

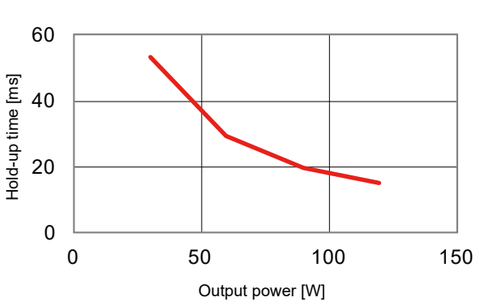


● Fig.14 Falling Characteristics at 240V AC

Input : 240V AC
Load : 100 W
Time axis : 10 ms/DIV

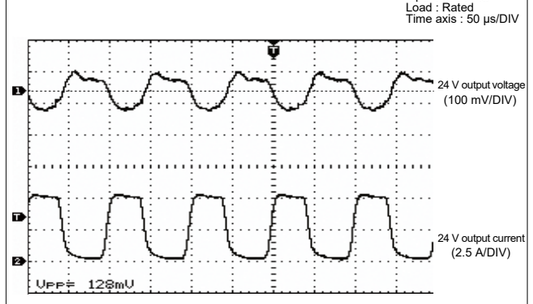


● Fig.15 Output Hold-up Time vs. Output Power

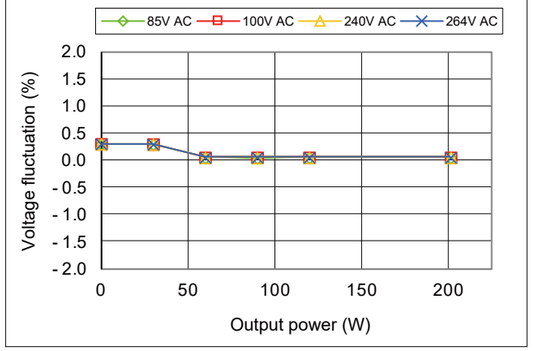


● Fig.16 Dynamic Load Fluctuation Characteristics at 10 kHz

Input : 100V AC
Load : Rated
Time axis : 50 µs/DIV



● Fig.17 Output Voltage Regulation (Load Fluctuation)



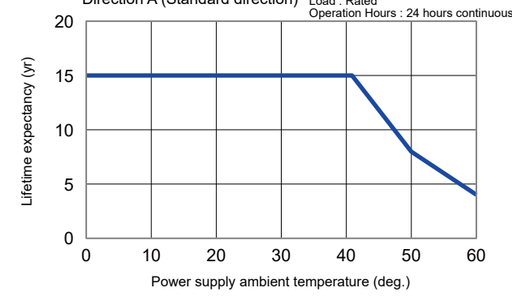
● Fig.18 Ripple and Spike Voltage

Temperature	AC Input voltage	24V					
		Minimum load		50% load		Rated load	
		Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)
-15℃	85V	1.1	3.5	55.7	78.8	88.7	132.4
	100V	1.1	3.9	55.3	78.1	85.3	125.0
	240V	1.3	4.0	53.0	74.0	76.6	114.5
	264V	1.3	5.0	49.2	69.9	76.0	117.2
25℃	85V	1.0	3.4	10.1	23.3	17.8	43.6
	100V	1.2	3.2	10.0	22.6	17.8	43.0
	240V	1.0	4.5	10.4	22.6	17.3	41.0
	264V	1.1	3.9	9.9	24.3	17.5	41.9
45℃	85V	0.7	2.8	5.4	16.8	11.3	34.2
	100V	0.7	2.8	5.5	16.4	11.2	34.6
	240V	0.7	3.5	5.4	16.9	11.0	32.6
	264V	0.8	3.5	5.3	17.6	10.8	33.5
65℃	85V	1.2	3.3	3.5	11.2	6.0	20.5
	100V	1.1	3.0	3.3	11.0	6.0	19.7
	240V	1.2	3.6	3.5	11.5	5.9	20.1
	264V	1.1	3.0	3.3	11.7	6.1	20.8

● Fig.19 Ambient Temperature vs. Lifetime Expectancy

Direction A (Standard direction)

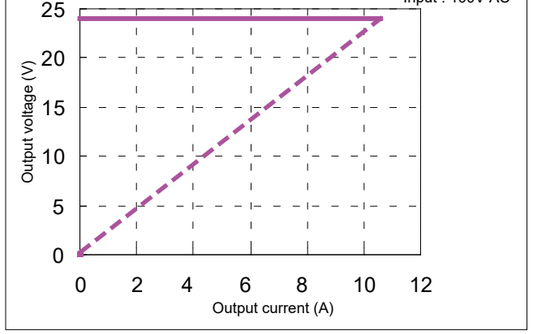
Input : 100V AC
Load : Rated
Operation Hours : 24 hours continuous



*For details of Installation direction A (Standard), refer to Fig.2 "Installation condition."
*The lifetime of electrolytic capacitors shall be 15 years at longest due to to deterioration of sealing plates.

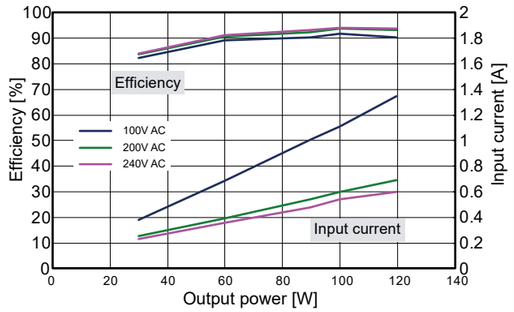
●Fig.20 Overcurrent Protection Characteristics (V - I Characteristics)

Input : 100V AC

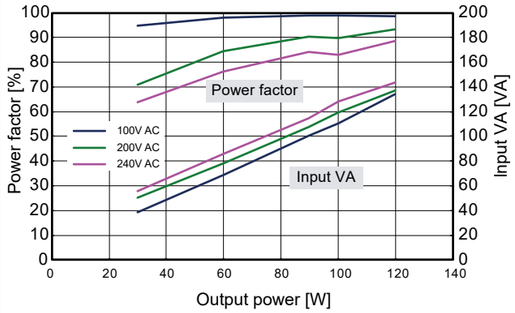


Characteristics Data (Typical features of the product series) UZP-120-24-JBH (Examples of actual measurement)

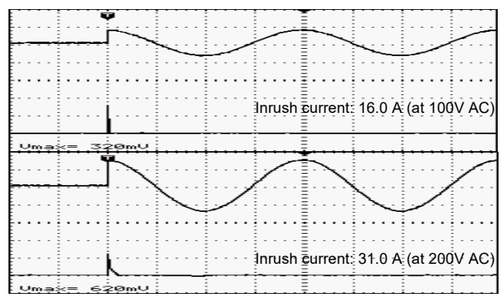
● Fig.5 Efficiency/Input Current vs. Output Power



● Fig.6 Power Factor/Input VA vs. Output Power



● Fig.7 Inrush Current



● Fig.8 Leakage Current

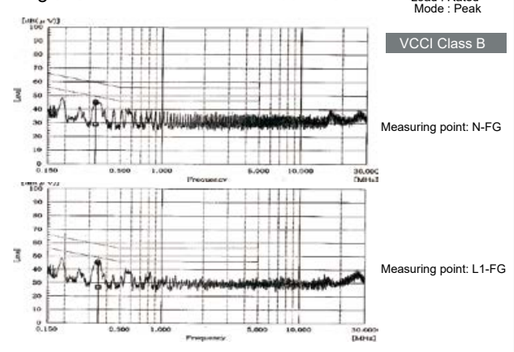
Input : 100, 200V AC, 60 Hz
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.05 mA	0.05 mA
200V AC	0.11 mA	0.11 mA

● Fig.9 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak

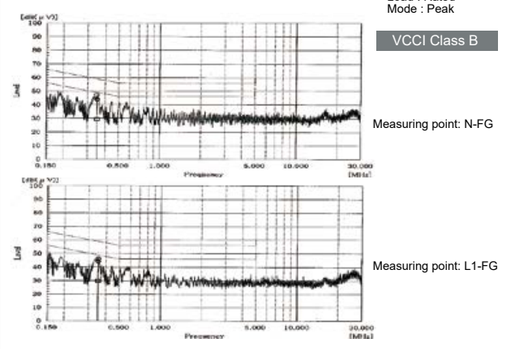
VCCI Class B



● Fig.10 Conducted Emission at 230V AC

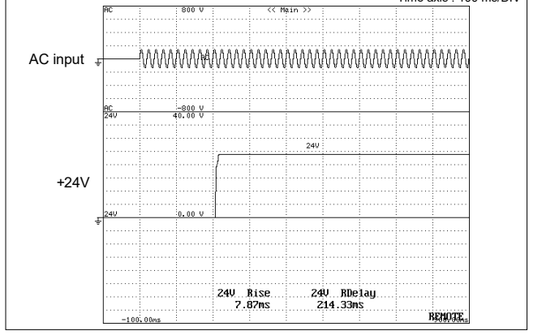
Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B



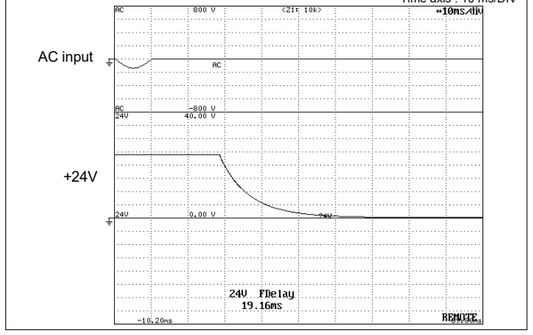
● Fig.11 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



● Fig.12 Falling Characteristics at 100V AC

Input : 100V AC
Load : 100 W
Time axis : 10 ms/DIV

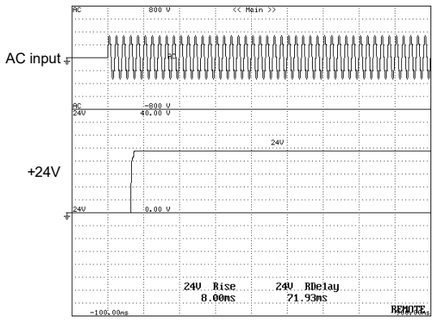


UZP-120 Series

Characteristics Data (Typical features of the product series) UZP-120-24-JBH (Examples of actual measurement)

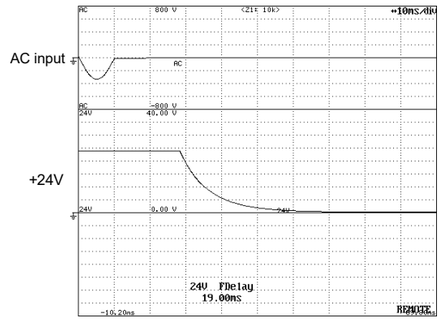
● Fig.13 Rising Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 100 ms/DIV

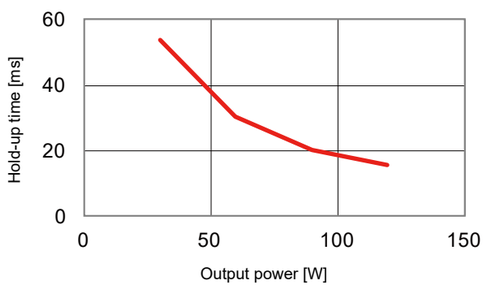


● Fig.14 Falling Characteristics at 240V AC

Input : 240V AC
Load : 100 W
Time axis : 10 ms/DIV

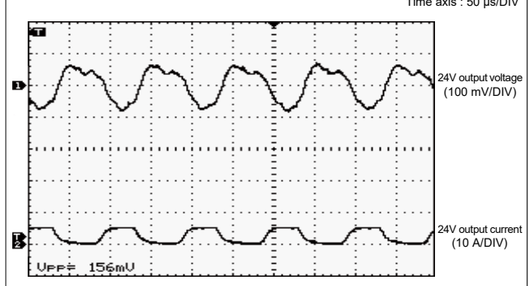


● Fig.15 Output Hold-up Time vs. Output Power

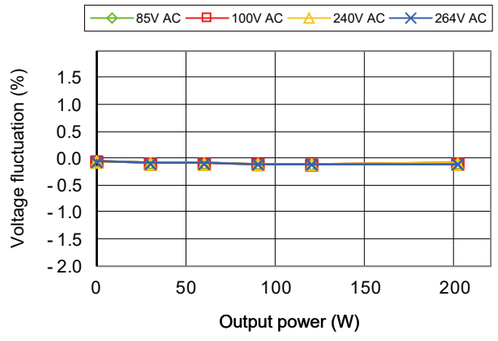


● Fig.16 Dynamic Load Fluctuation Characteristics at 10 kHz

Input : 100V AC
Load : Rated
Time axis : 50 µs/DIV



● Fig.17 Output Voltage Regulation (Load Fluctuation)

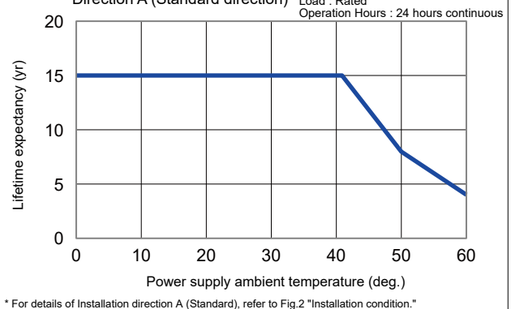


● Fig.18 Ripple and Spike Voltage

Temperature	AC Input voltage	24V					
		Minimum load		50% load		Rated load	
		Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)
-15℃	85V	7.5	14.3	58.1	87.4	91.4	141.3
	100V	7.5	14.4	57.2	85.6	94.8	141.5
	240V	7.4	14.1	51.5	78.2	80.0	120.5
	264V	7.3	14.0	49.1	77.3	74.9	119.8
25℃	85V	7.2	13.6	13.6	38.4	21.8	60.9
	100V	7.3	13.8	13.5	37.4	22.0	59.8
	240V	7.1	13.3	13.0	34.9	21.2	53.1
	264V	7.0	13.5	13.0	35.4	20.7	53.9
45℃	85V	6.7	12.7	12.2	35.9	16.9	55.2
	100V	6.9	12.9	12.1	34.8	16.8	54.5
	240V	6.8	12.9	11.3	32.6	16.0	47.7
	264V	6.7	12.8	10.8	33.7	15.9	48.4
65℃	85V	6.8	12.8	9.7	32.3	12.6	40.1
	100V	6.8	13.0	9.6	33.6	12.5	38.1
	240V	6.8	12.8	9.9	26.8	11.6	35.4
	264V	6.7	12.9	9.8	27.7	11.4	36.4

● Fig.19 Ambient Temperature vs. Lifetime Expectancy

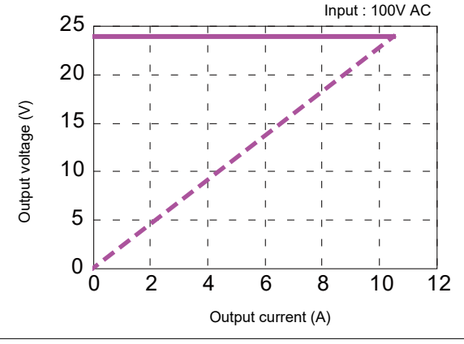
Direction A (Standard direction)
Input : 100V AC
Load : Rated
Operation Hours : 24 hours continuous



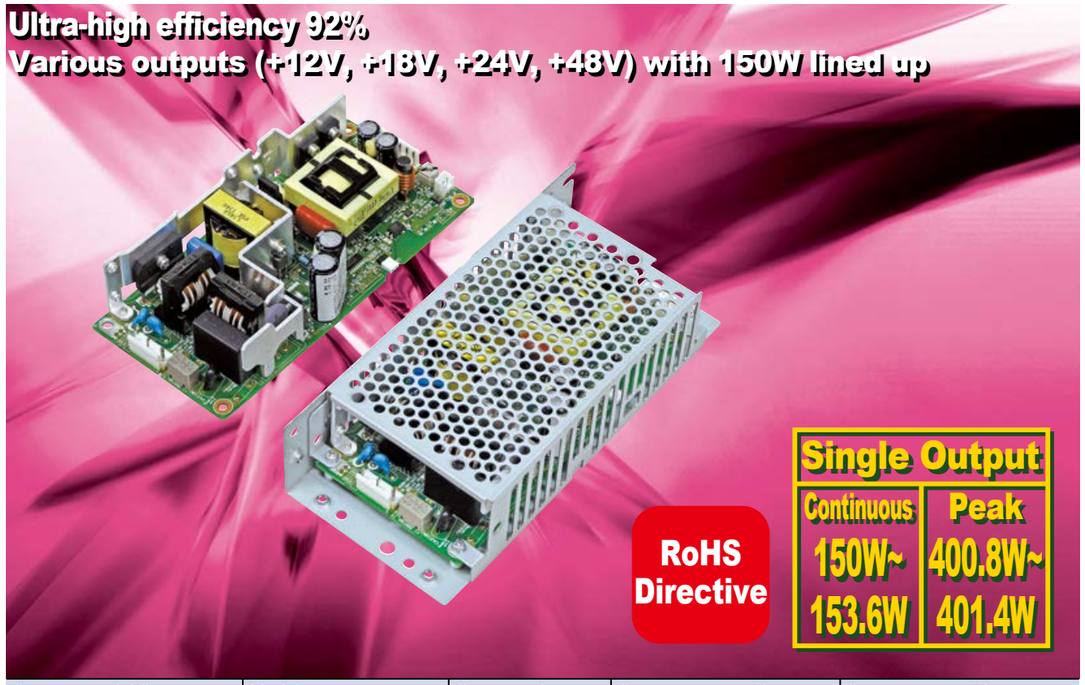
* For details of Installation direction A (Standard), refer to Fig.2 "Installation condition."
*The lifetime of electrolytic capacitors shall be 15 years at longest due to deterioration of sealing plates.

●Fig.20 Overcurrent Protection Characteristics (V - I Characteristics)

Input : 100V AC



Single Output Power Supply UZP-150 series



Structure and I/O connector	Model	Output voltage	Output current *1	Output power *1
Open frame type/ Nylon connector	UZP-150-12-J0E	+12V	12.5A (33.4A)	150W (400.8W)
	UZP-150-18-J0E	+18V	8.4A (22.3A)	151.2W (401.4W)
	UZP-150-24-J0E	+24V	6.3A (16.7A)	151.2W (400.8W)
	UZP-150-48-J0E	+48V	3.2A (8.4A)	153.6W (403.2W)

Structure	Description
With chassis	'-C' is added after open frame model name (Ex: UZP-150-12-J0E-C)
With chassis and cover	'-K' is added after open frame model name (Ex: UZP-150-12-J0E-K)
Input/Output connector type	Model
Screw terminal block	'J' in the nylon connector model become 'T' (Ex: UZP-150-12-T0E)

■Model name coding

UZP-150-*****-*0E*-*
① ② ③ ④ ⑤ ⑥⑦⑧⑨ ⑩

① Series name
② Peak output
③ Output power
④ 12:12V 18:18V 24:24V 48:48V
⑤ S05:5VSB output S12:12VSB output Blank:Without SB output
⑥ Input/Output connector J:Nylon connector T:Screw terminal block
⑦ 0:Without backup function
⑧ Reduction of standby power E:Reduction of standby power function equipped (at RC signal OFF)
⑨ Modification
⑩ Blank:Without chassis and cover C:With chassis K:With chassis and cover

*1 Values in ( ) above show peak current and power.

Features

- Low standby power (at RC signal OFF, 0.02W typ/100V AC, 0.11W typ/240V AC)
- Support ErP directive Lot6 at standby power output equipped type.
- Equipped with a variable resistor to adjust output voltage
- Low noise and low leakage current eliminates the need for an external noise filter.

An amazing high level of efficiency 92% has been achieved for a 24V output type.
(*At 230V AC input, 150W load)

400W peak power, approx. 260% higher than continuous rated.

Standby power output (5VSB/12VSB) equipped model is also added.

Safety standard	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

●Function

TTL PFC RoHS Directive

●Input

AC input	85-264V AC (Worldwide range)

●Dimension

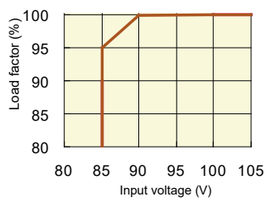
W×H×D (mm)	Without chassis and cover	75×35×160
	With chassis and cover	83.8×45×188

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items		Specification				Measurements conditions, etc.
AC Input	Rated Voltage		100-240VAC (85*-264VAC)				Worldwide range *See <Fig.1> Low input voltage derating below.
	Input Frequency		50-60Hz				Frequency range 47-63Hz
	Efficiency	100VAC	88.0% typ (12V/18V output), 88.5% typ (24V/48V output)				At rated output (convection cooling) *Characteristic data: Fig.5
		200VAC	91.0% typ (12V/18V output), 91.5% typ (24V/48V output)				
	Power Factor	100VAC	99% typ *Characteristic data: Fig.6				At rated output (convection cooling)
		200VAC	90% typ				
	Inrush Current		17A typ (100VAC), 34A typ (200VAC) *Characteristic data: Fig.7				Power thermistor system at cold start (25°C)
	Input Current	100VAC	1.7A typ (at convection cooling) 2.9A typ (at 12V/18V output, forced air cooling), 3.1A typ (at 24V/48V output, forced air cooling) *Characteristic data: Fig.5				At rated output
		200VAC	0.9A typ (at convection cooling) 1.5A typ (at 12V/18V output, forced air cooling), 1.6A typ (at 24V/48V output, forced air cooling)				
Output	Model		UZP-150-12	UZP-150-18	UZP-150-24	UZP-150-48	
	Rated Voltage		+12V	+18V	+24V	+48V	
	Continuous Rated Output1 (convection cooling)		12.5A	8.4A	6.3A	3.2A	At rated input Refer to <Fig.4> output derating on the following page.
			150W	151.2W	151.2W	153.6W	
	Continuous Rated Output2 (forced air cooling)		21A	14A	11.3A	5.7A	
			252W	252W	271.2W	273.6W	
	Peak Current/Power		33.4A	22.3A	16.7A	8.4A	*Refer to peak output power condition below. Natural air cooling and forced air cooling
			400.8W*	401.4W*	400.8W*	403.2W*	
	Factory Setting		12V±2%	18V±2%	24V±2%	48V±2%	At rated output
	Adjustable Voltage Range		-5%, +10%	-5%, +10%	-5%, +10%	-5%, +10%	At continuous rated output1
	Static Input Regulation		48mV max.	72mV max.	94mV max.	192mV max.	
	Static Load Regulation		100mV max.	125mV max.	150mV max.	300mV max.	
	Temperature Regulation		0.02%/°C max.				
	Max. Ripple Voltage	0-70°C	120mV max.			150mV max.	Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band.
		-10-0°C	160mV max.			200mV max.	
	Max. Spike Voltage	0-70°C	150mV max.			250mV max.	
		-10-0°C	180mV max.			400mV max.	
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current				
		Method	Blocking oscillation *Characteristic data: Fig.20				
		Recovery	Automatic recovery				
	Over Voltage Protection	OVP point (V)	13.8-16.2V	22.0-26.0V	30.0-35.0V	56.2-63.0V	
		Method	Output shutdown (latch lock)				
		Recovery	Reclosing of AC input				
Environment	Operating Temp./ Humidity	Open Frame	-10-70°C (at convection cooling), -10-70°C (at forced air cooling) */20-90%				*<Fig.3> on the next page shows the guideline of forced air cooling. Refer to <Fig.4> output derating.
		With Chassis and Cover	-10-60°C (at convection cooling),-10-70°C (at forced air cooling) */20-90%				
	Storage Temp./Humidity		-20-85°C/10-95%				There shall be no condensation
	Vibration		To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.				Follow JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3times for each of four bottom edges, and no malfunction shall be observed.				Follow JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		3kVAC/1minute between input and output/RC				Cut-off current 10mA
			2kVAC/1minnute between input and FG				Cut-off current 10mA
			500VAC/1minute between each output /RC/FG				Cut-off current 100mA
	Insulation Resistance		50MΩmin. between each input/output/RC/FG				At 500VDC
	Leakage Current		0.06mA typ (100VAC), 0.12mA typ (200VAC) *Characteristic data: Fig.8				
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000nS,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)				Measurement by INS-410 There shall be no fluctuation of DC output or malfunction.
	Electrostatic Discharge		EN61000-4-2 compliant				Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency, Electromagnetic Field		EN61000-4-3 compliant				
	Fast Transient Burst		EN61000-4-4 compliant				
	Lightning Surge		EN61000-4-5 compliant				
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant				
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant				
	Voltage dips/Regulation		EN61000-4-11 compliant				
	Conducted Emmision		VCCI-B, FCC-B, CISPR22-B, EN55022-B compliant *Characteristic data: Fig.9, 10				At rated input and rated output (convection cooling), with chassis
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) class D, EN61000-3-2 (A14) class D compliant.				At rated input/output
Others	Safety Standards		UL60950-1, CSA60950-1(c-UL), CCC (GB4943.1 standard), CE Marking (IEC62368-1) PSE (ordinance clause 2) compliant				
	Cooling System		Convection cooling/Forced air cooling				
	Output Grounding		Capacitor grounding				
	Output Hold-up Time		AC cut-off → 90% of rated voltage within 16ms min.				At rated input, 150W output
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)				Following our standard
	Weight		300g typ (without chassis and cover), 520g typ (with chassis and cover)				
	Warranty		Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.				Except for errors caused by operation not specified in this specification.

<Fig.1> Low input voltage derating

Follow the derating below to derate rated current/power.

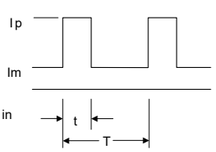


Peak output power condition

- Duty ratio of peak current shall be 30% or less.
- Energized period of peak current shall be 10 seconds or less.
- Energized period of peak current shall be 5 seconds or less at convection cooling and 50 deg. or higher of ambient temperature.
- The value resulting from the formula below shall not exceed continuous rated current, Io, after derating specified in the output derating on the following page.

$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$

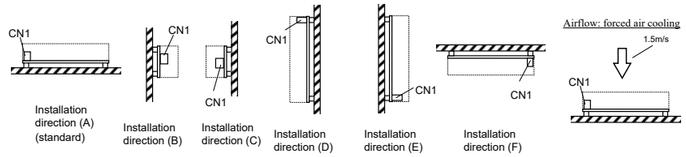
Ip=Peak current value
Im= Min. current value
D= Duty ratio, t/T
t= Pulse width of peak current
T= Cycle
Io= Continuous rated current specified in output derating



(Note) If the temperature of the power thermistor for limiting inrush current does not rise enough (and its resistance value is too large), such as when the normal average load power is small, the output voltage at peak output might drop about 100 ms. If this might cause any problem, please check the output voltage waveform while the power supply is installed on an actual device at operation.

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.2> Installation/Air cooling



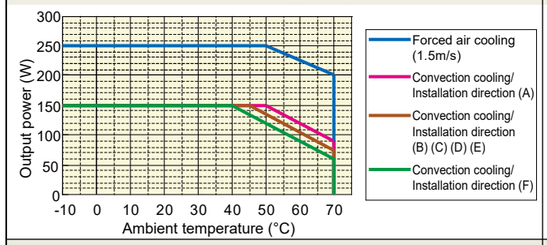
<Fig.3> Guideline for forced air cooling

Please contact us about the guideline for temperature rise of each component at forced air cooling.

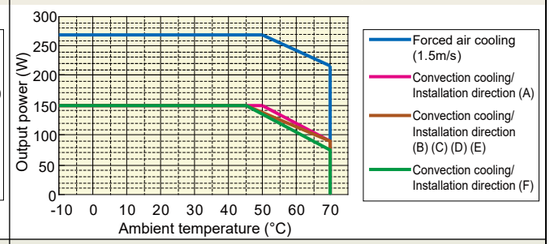
<Fig.4> Output derating

Follow the derating diagram below for output according to ambient temperature and installation direction. In case of using the type with chassis and cover, input voltage range shall be 90V AC or higher, and shall not use in direction (F). Also, forced air cooling condition in the diagram shall be provided that the air flow of 1.5 m/s is applied from the direction shown <Fig.2>.

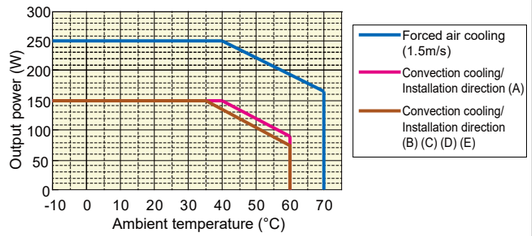
For open frame (12/18V)



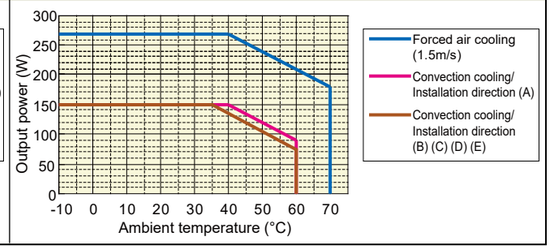
For open frame (24/48V)



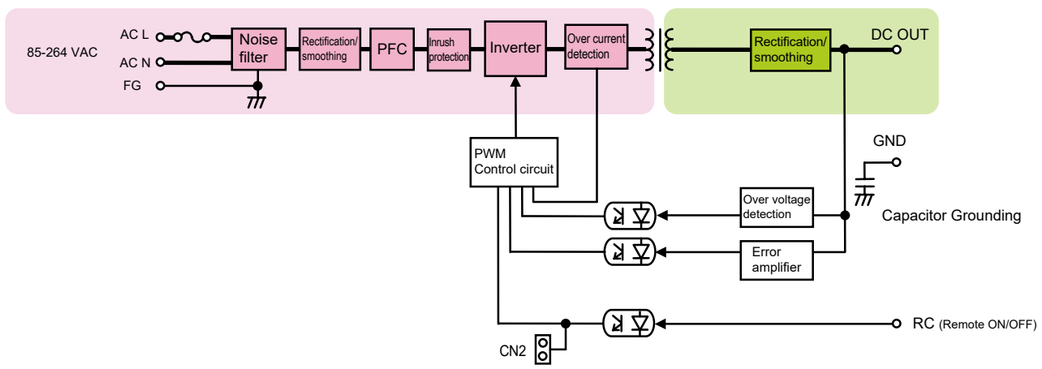
With chassis and cover (12/18V)



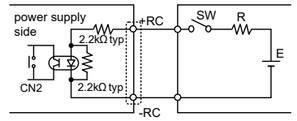
With chassis and cover (24/48V)



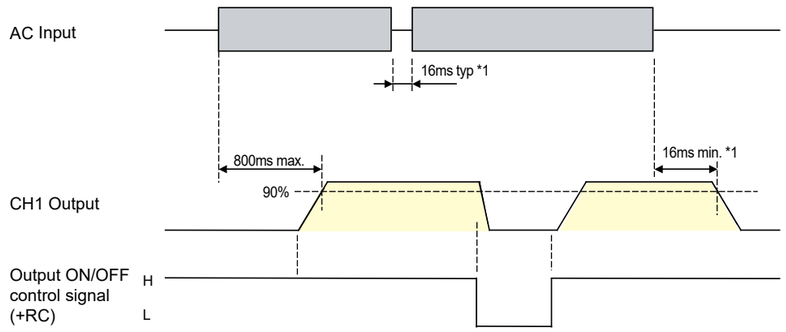
Block Diagram



Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Note
Input Signal	Output ON/OFF control signal (RC signal) * Remove the shorting plug of CN2 in using RC signal.	Operating mode Between +RC and -RC: Output SW ON (4.5V or higher): ON SW OFF (0.8V or lower): OFF External power supply and Load-limiting resistor External power supply: E / Load-limiting resistor: R 4.5 ~ 12.5Vdc: Not required 12.5 ~ 30Vdc: 1.5kΩ 30 ~ 48Vdc: 8.2kΩ	Shorting Plug With shorting plug (CN2) connected, output starts up when AC input is applied regardless of RC signal. To control Start/Stop of output by RC signal, uncap shorting plug of CN2. Note: Shorting plug (CN2) is primary circuit components. Make sure to operate the plug after the AC input is turned off.
Input Signal Circuit	Signal Circuit (RC signal) Connection example: using external power supply		

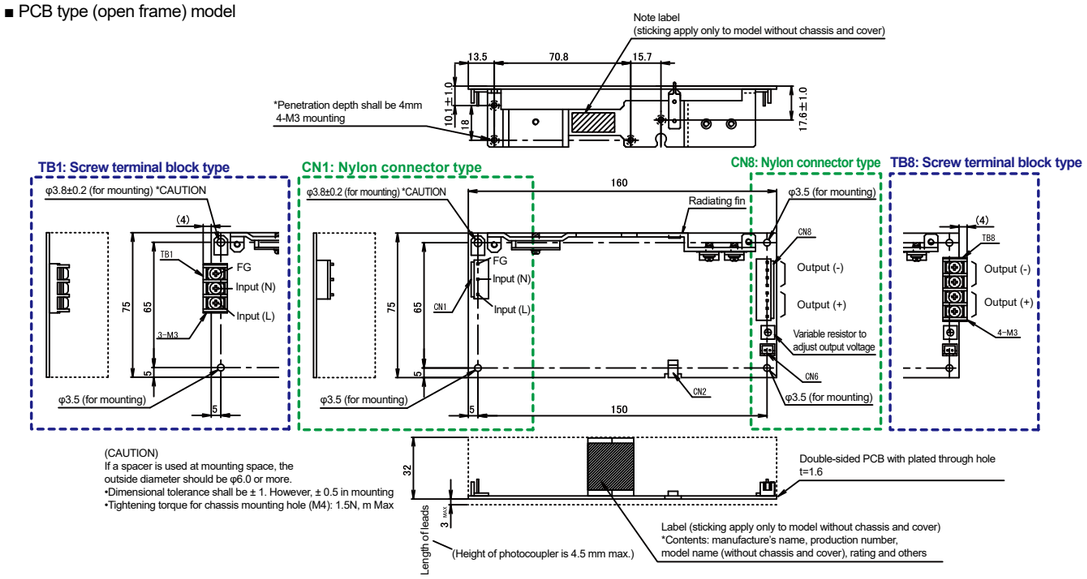
Sequence Timing Chart



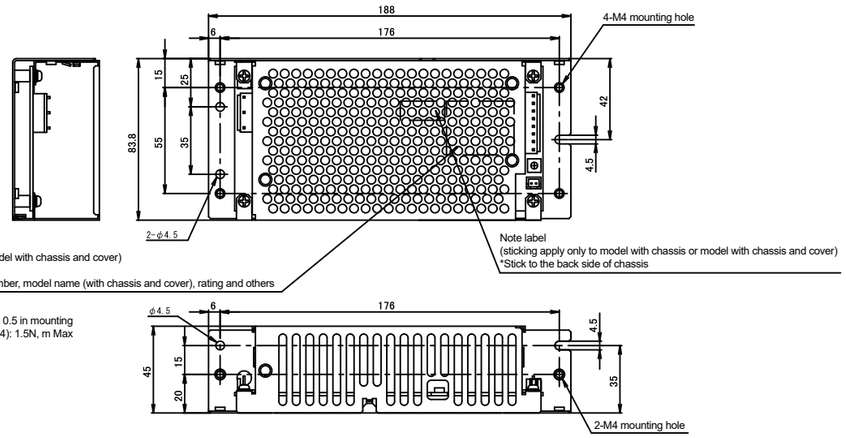
*1 At rated input, 150 W output

Outline Drawing

■ PCB type (open frame) model



■ With chassis and cover
(Screw terminal block is also available for I/O connector)



■ Connector pin allocation

Nylon connector type	Screw terminal block type
5 3 1 CN1 (Input) PIN No. / FUNCTION / CONNECTOR TYPE 1 AC(L) 2 3 AC(N) B3P5-VH (JST) 4 5 FG *CN1 Applicable housing: VHR-5N (JST) Applicable terminals: Reel: SVH-21T-P1.1(JST) Bulk: BVH-21T-P1.1(JST)	TB1 (INPUT) See the upper outline drawing
8 1 CN8 (Output) PIN No. / FUNCTION / CONNECTOR TYPE 1~4 −DC B8P-VH (JST) 5~8 +DC *CN8 Applicable housing: VHR-8N (JST) Applicable terminals: Reel: SVH-21T-P1.1(JST) Bulk: BVH-21T-P1.1(JST)	TB8 (OUTPUT) See the upper outline drawing
2 1 CN6 (ON/OFF Control) PIN No. / FUNCTION / CONNECTOR TYPE 1 +RC B2B-XH-A 2 −RC (JST) *CN6 Applicable housing: XHP-2 (JST) Applicable terminals: Reel: SXH-001T-P0.6(JST) Bulk: BXH-001T-P0.6(JST)	

Options (Sold separately)

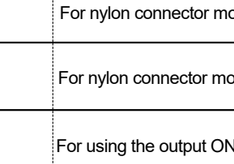
Cable			
Photos	Model	Category	Description
	WH-C05VH-800	Input harness	For nylon connector models
	WH-C05VH-800-01	Input harness (with ferrite core)	For nylon connector models
	WH-C08VH-500	Output harness	For nylon connector models
	WH-02XH02XH-500	Signal harness for RC signal	For using the output ON/OFF control signal (RC signal)

Connection in Series and Parallel

■ Series operation
Series connection is available as in figure (1) and (2) on the right.
Series connection between different output voltages is available, such as 12 V and 24 V.

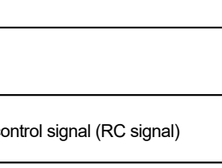
Note: In the case that different voltages are connected in series as in figure (1) on the right;
1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.
2. Connect diodes for protection as show in the figure (1).
The rated current of the diodes shall be 1.5 times or more of the peak output current of the power supply which has larger peak output current among PSU1 and PSU2.
Also, use Schottky diodes whose forward voltage is lower than the forward voltage of the diodes used in the PSU.

(1)



In the case of series connection of different output voltages, connect diodes shown as above.

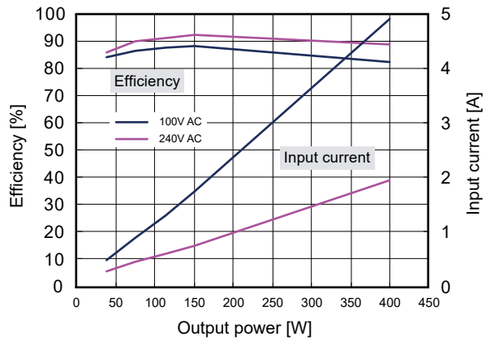
(2)



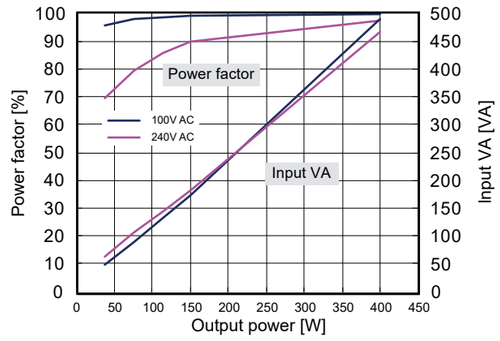
■ Parallel operation
Parallel operation is not possible.

Characteristics Data (Typical features of the product series) UZP-150-24 (Examples of actual measurement)

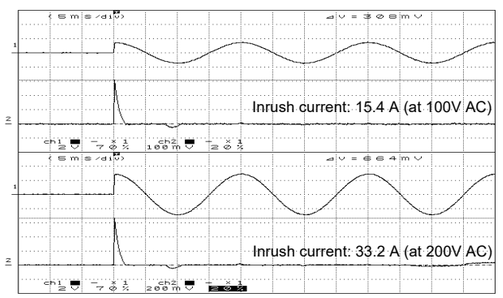
● Fig.5 Efficiency/Input Current vs. Output Power



● Fig.6 Power Factor/Input VA vs. Output Power



● Fig.7 Inrush Current



● Fig.8 Leakage Current

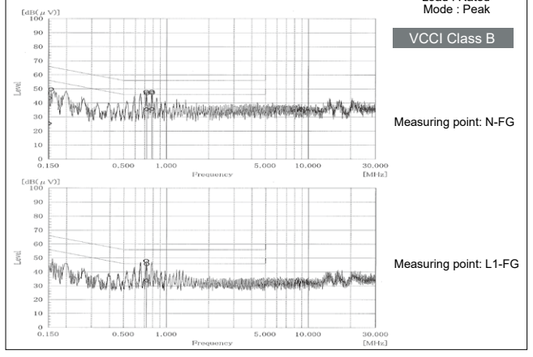
Input : 100, 200, 240V AC
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.05 mA	0.06 mA
200V AC	0.12 mA	0.12 mA
240V AC	0.14 mA	0.14 mA

● Fig.9 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak

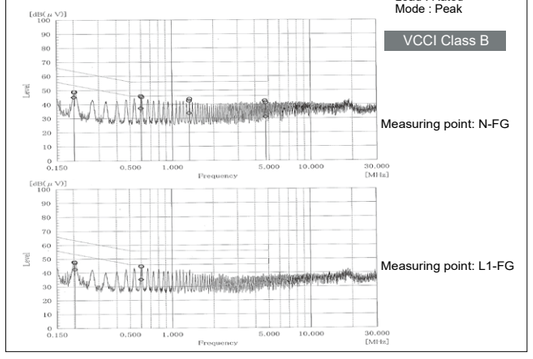
VCCI Class B



● Fig.10 Conducted Emission at 230V AC

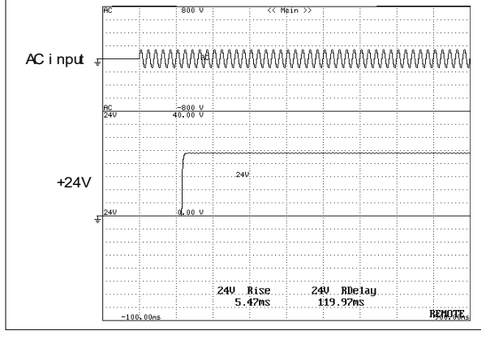
Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B



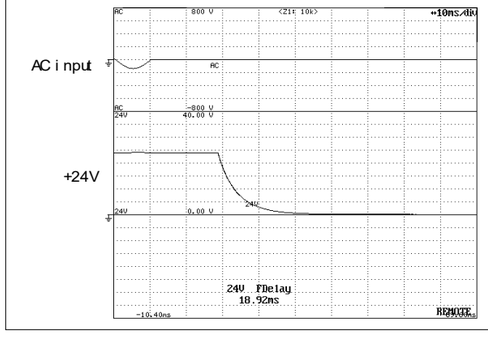
● Fig.11 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



● Fig.12 Falling Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 10 ms/DIV

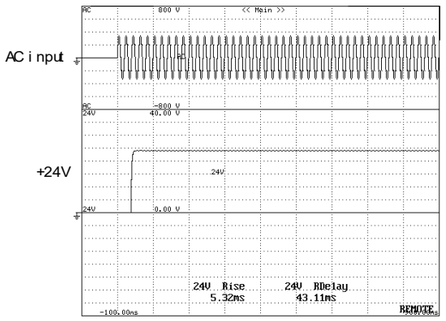


UZP-150 Series

Characteristics Data (Typical features of the product series) UZP-150-24 (Examples of actual measurement)

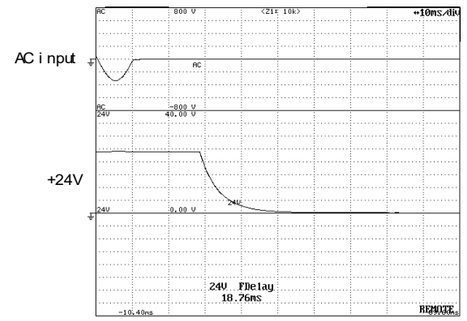
● Fig.13 Rising Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 100 ms/DIV

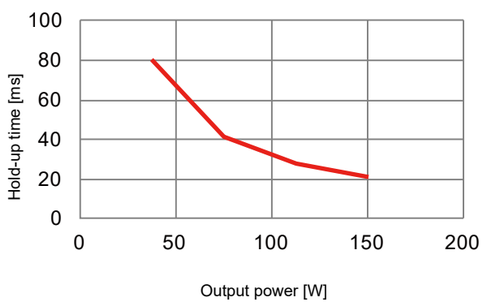


● Fig.14 Falling Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 10 ms/DIV

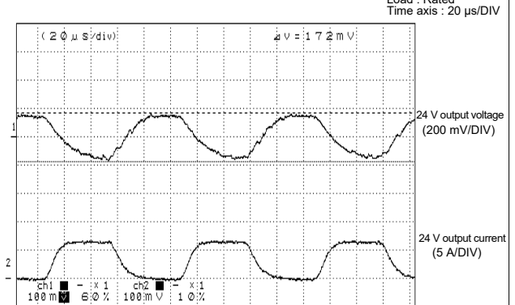


● Fig.15 Output Hold-up Time vs. Output Power

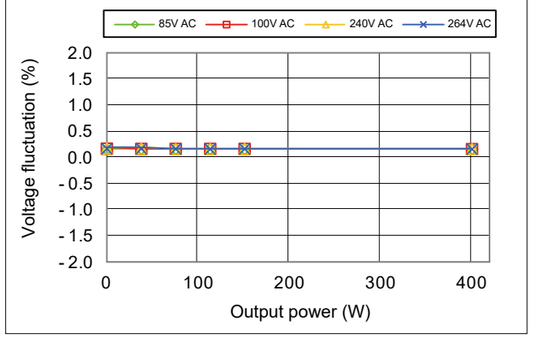


● Fig.16 Dynamic Load Fluctuation Characteristics at 10 kHz

Input : 100 VAC
Load : Rated
Time axis : 20 µs/DIV



● Fig.17 Output Voltage Regulation (Load Fluctuation)



● Fig.18 Ripple and Spike Voltage

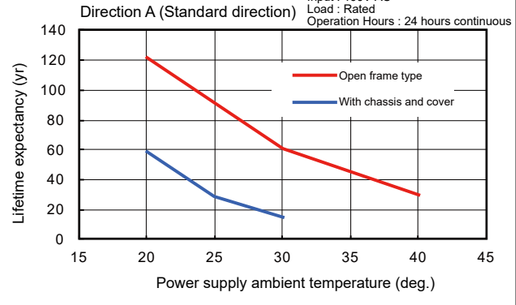
Spike voltage
Load : Rated

Temperature	Input voltage	24V
-15°C	100V AC	33.4 mV
	240V AC	31.6 mV
25°C	100V AC	12.1 mV
	240V AC	12.2 mV
55°C	100V AC	11.5 mV
	240V AC	11.4 mV
75°C	100V AC	6.8 mV
	240V AC	6.8 mV

Temperature	Input voltage	24V
- 15°C	100V AC	128.9 mV
	240V AC	133.6 mV
25°C	100V AC	106.7 mV
	240V AC	111.9 mV
55°C	100V AC	115.6 mV
	240V AC	118.5 mV
75°C	100V AC	65.8 mV
	240V AC	70.8 mV

● Fig.19 Ambient Temperature vs. Lifetime Expectancy

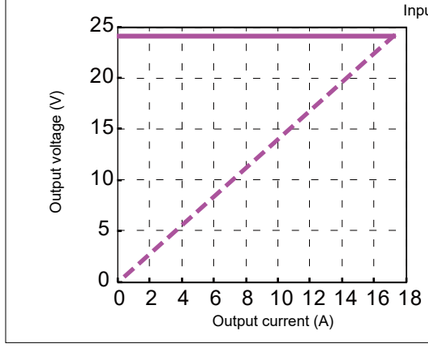
Direction A (Standard direction)
Input : 100V AC
Load : Rated
Operation Hours : 24 hours continuous



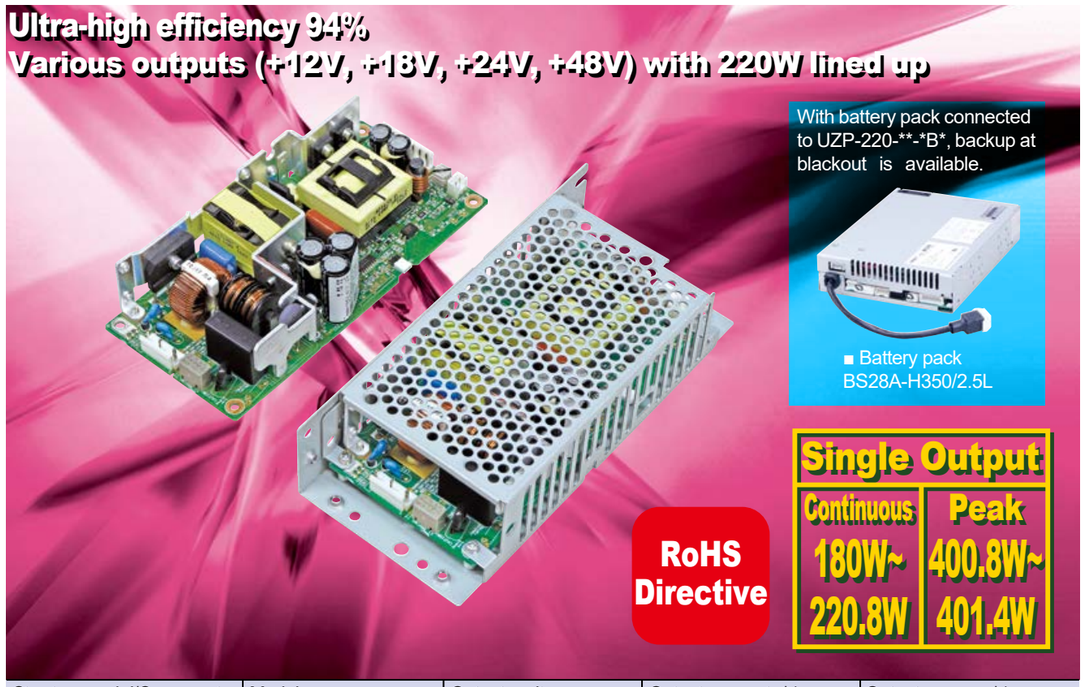
*For details of Installation direction A (Standard), refer to Fig.2 "Installation condition."
*The lifetime of electrolytic capacitors shall be 15 years at longest due to deterioration of sealing plates.

●Fig.20 Overcurrent Protection Characteristics (V - I Characteristics)

Input : 100V AC



Single Output Power Supply UZP-220 series



Structure and I/O connector	Model	Output voltage	Output current *1	Output power *1
Open frame type/ Nylon connector	UZP-220-12-JBE	+12V	15A (33.4A)	180W (400.8W)
	UZP-220-18-JBE	+18V	10A (22.3A)	180W (401.4W)
	UZP-220-24-JBE	+24V	9.2A (16.7A)	220.8W (400.8W)
	UZP-220-48-JBE	+48V	4.6A (8.35A)	220.8W (400.8W)
Structure	Model			
With chassis	'-C' is added after open frame model name (Ex: UZP-220-12-JBE-C)			
With chassis and cover	'-K' is added after open frame model name (Ex: UZP-220-12-JBE-K)			
Input/Output connector type	Model			
Screw terminal block	'J' in the nylon connector model become 'T' (Ex: UZP-220-12-TBE)			

■Model name coding

UZP-220-*****-*BE*-*
① ② ③ ④ ⑤ ⑥⑦ ⑧⑨ ⑩

① Series name
② Peak output
③ Output power
④ 12:12V 18:18V 24:24V 48:48V
⑤ S05:5VSB output S12:12VSB output Blank:Without SB output
⑥ Input/Output connector J:Nylon connector T:Screw terminal block
⑦ 0:Without backup function B:With backup function
⑧ Reduction of standby power: E:Reduction of standby power function equipped (at RC signal OFF)
⑨ Modification
⑩ Blank:Without chassis and cover C:With chassis K:With chassis and cover

*1 Values in ( ) above show peak current and power.

Features

- ●Blackout backup is possible.
- ●Low standby power (at RC signal OFF, 0.02Wtyp/100V AC, 0.09Wtyp/200V AC)
- ●Support ErP directive Lot6 at standby power output equipped type.
- ●Equipped with a variable resistor to adjust output voltage.
- ●Low noise and low leakage current eliminates the need for an external noise filter.

An amazing high level of efficiency 94% has been achieved for a 24V output type.
(*At 230V AC input, 220W load)

400W peak power, approx. over 180% higher than continuous rated.

Standby power output (5VSB/12VSB) equipped model is also added.

Safety standard	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

●Function

TTL PFC RoHS Directive

●Input

AC input	85-264V AC (Worldwide range)

*Some DC input-only types are also available. (Please contact us for details.)

●Dimension

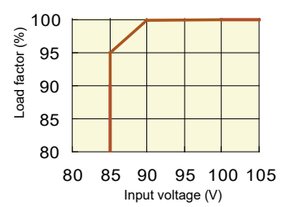
W×H×D (mm)	Without chassis and cover	75×36×160
	With chassis and cover	83.8×45×188

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items		Specification				Measurements conditions, etc.
AC Input	Rated Voltage		100-240VAC (85*-264VAC)				Worldwide range *See <Fig.1> Low input voltage derating below.
	Input Frequency		50-60Hz				Frequency range 47-63Hz
	Efficiency	100VAC	90.0% typ (12V/18V output), 91.5% typ (24V/48V output)				At 180W output (convection cooling) *Characteristic data: Fig.5
		200VAC	92.0% typ (12V/18V output), 93.5% typ (24V/48V output)				
	Power Factor	100VAC	99% typ *Characteristic data: Fig.6				At rated output (convection cooling)
		200VAC	90% typ				
	Inrush Current		17A typ (100VAC), 34A typ (200VAC) *Characteristic data: Fig.7				Power thermistor system at cold start (25°C)
	Input Current	100VAC	2.1A typ (at 12V/18V output, convection cooling), 2.4A typ (at 24V/48V output, convection cooling) 3.0A typ (at 12V/18V output, forced air cooling), 3.8A typ (at 24V/48V output, forced air cooling) *Characteristic data: Fig.5				At rated output
		200VAC	1.1A typ (at 12V/18V output, convection cooling), 1.2A typ (at 24V/48V output, convection cooling) 1.6A typ (at 12V/18V output, forced air cooling), 1.5A typ (at 24V/48V output, forced air cooling)				
Output	Model		UZP-220-12	UZP-220-18	UZP-220-24	UZP-220-48	
	Rated Voltage		+12V	+18V	+24V	+48V	
	Continuous Rated Output1 (convection cooling)		15A	10A	9.2A	4.6A	At rated input Refer to <Fig.4> output derating on the following page.
			180W	180W	220.8W	220.8W	
	Continuous Rated Output2 (forced air cooling)		21A	14A	13.8A	6.9A	
			252W	252W	331.2W	331.2W	
	Peak Current/Power		33.4A	22.3A	16.7A	8.35A	*Refer to peak output power condition below. Convection cooling and forced air cooling
			400.8W*	401.4W*	400.8W*	400.8W*	
	Factory Setting		12V±2%	18V±2%	24V±2%	48V±2%	At rated output
	Adjustable Voltage Range		-5%,+10%	-5%,+10%	-5%,+20%	-5%,+10%	At continuous rated output1
	Static Input Regulation		48mV max.	72mV max.	94mV max.	192mV max.	
	Static Load Regulation		100mV max.	125mV max.	150mV max.	300mV max.	
	Temperature Regulation		0.02%/°C max.				
	Max. Ripple Voltage	0-70°C	120mV max.			150mV max.	Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band.
		-10-0°C	160mV max.			200mV max.	
	Max. Spike Voltage	0-70°C	150mV max.			250mV max.	
		-10-0°C	180mV max.			400mV max.	
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current				
		Method	Blocking oscillation *Characteristic data: Fig.20				
		Recovery	Automatic recovery				
	Over Voltage Protection	OVP point (V)	13.8-16.2V	22.0-26.0V	30.0-35.0V	56.2-63.0V	
		Method	Output shutdown (latch lock)				
		Recovery	Reclosing of AC input				
Environment	Operating Temp./ Humidity	Open Frame	-10-70°C (at convection cooling), -10-70°C (at forced air cooling) */20-90%				*<Fig.3> on the next page shows the guideline of forced air cooling. Refer to <Fig.4> output derating.
		With Chassis and Cover	-10-60°C (at convection cooling),-10-70°C (at forced air cooling) */20-90%				
	Storage Temp./Humidity		-20-85°C/10-95%				There shall be no condensation
	Vibration		To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.				Follow JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3times for each of four bottom edges, and no malfunction shall be observed.				Follow JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		3kVAC/1minute between input and output/RC				Cut-off current 10mA
			2kVAC/1minnute between input and FG				Cut-off current 10mA
			500VAC/1minute between each output /RC/FG				Cut-off current 100mA
	Insulation Resistance		50MΩmin. between each input/output/RC/FG				At 500VDC
	Leakage Current		0.06mA typ (100VAC), 0.12mA typ (200VAC) *Characteristic data: Fig.8				
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000nS,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)				Measurement by INS-410 There shall be no fluctuation of DC output or malfunction.
	Electrostatic Discharge		EN61000-4-2 compliant				Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency, Electromagnetic Field		EN61000-4-3 compliant				
	Fast Transient Burst		EN61000-4-4 compliant				
	Lightning Surge		EN61000-4-5 compliant				
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant				
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant				
	Voltage dips/Regulation		EN61000-4-11 compliant				
	Conducted Emmision		VCCI-B, FCC-B, CISPR22-B, EN55022-B compliant *Characteristic data: Fig.9, 10				At rated input and rated output (convection cooling), with chassis
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) class D, EN61000-3-2 (A14) class D compliant.				At rated input/output
Others	Safety Standards		UL60950-1, CSA60950-1 (c-UL), CCC (GB4943.1 standard), CE Marking (IEC62368-1) PSE (ordinance clause 2) compliant				
	Cooling System		Convection cooling/Forced air cooling				
	Output Grounding		Capacitor grounding				
	Output Hold-up Time		AC cut-off → 90% of rated voltage within 16ms min.				At rated input, output: 200W (at 24V, 48V), 180W (at 12V, 18V)
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)				Following our standard
	Weight		310g typ (without chassis and cover), 530g typ (with chassis and cover)				
	Warranty		Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.				Except for errors caused by operation not specified in this specification.

<Fig.1> Low input voltage derating

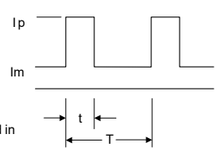
Follow the derating below to derate rated current/power.



Peak output power condition

- ●Duty ratio of peak current shall be 30% or less.
- ●Energized period of peak current shall be 10 seconds or less.
- ●Energized period of peak current shall be 5 seconds or less at convection cooling and 50 deg. or higher of ambient temperature.
- ●The value resulting from the formula below shall not exceed continuous rated current, Io, after derating specified in the output derating on the following page.

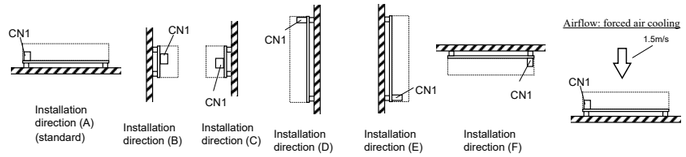
$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$
Ip=Peak current value
Im= Min. current value
D= Duty ratio, t/T
t= Pulse width of peak current
T= Cycle
Io= Continuous rated current specified in output derating



(Note) If the temperature of the power thermistor for limiting inrush current does not rise enough (and its resistance value is too large), such as when the normal average load power is small, the output voltage at peak output might drop about 100 ms. If this might cause any problem, please check the output voltage waveform while the power supply is installed on an actual device at operation.

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.2> Installation/Air cooling



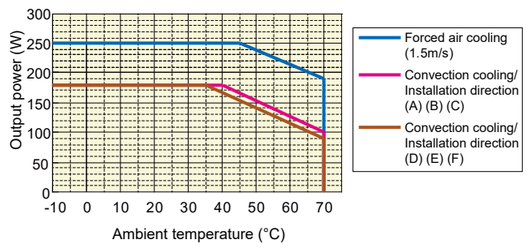
<Fig.3> Guideline for forced air cooling

Please contact us about the guideline for temperature rise of each component at forced air cooling.

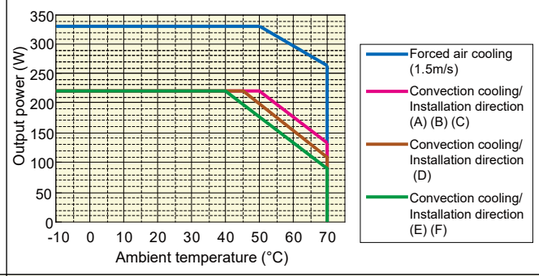
<Fig.4> Output derating

Follow the derating diagram below for output according to ambient temperature and installation direction. In case of using the type with chassis and cover, input voltage range shall be 90V AC or higher, and shall not use in direction (F). Also, forced air cooling condition in the diagram shall be provided that the air flow of 1.5 m/s is applied from the direction shown <Fig.2>.

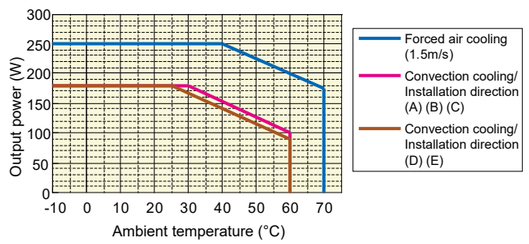
For open frame (12/18V)



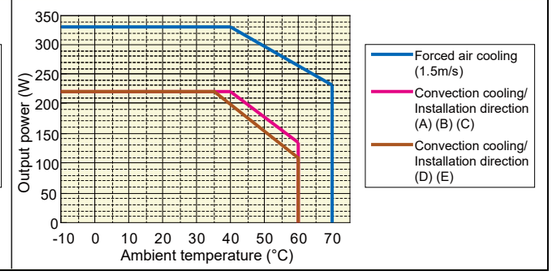
For open frame (24/48V)



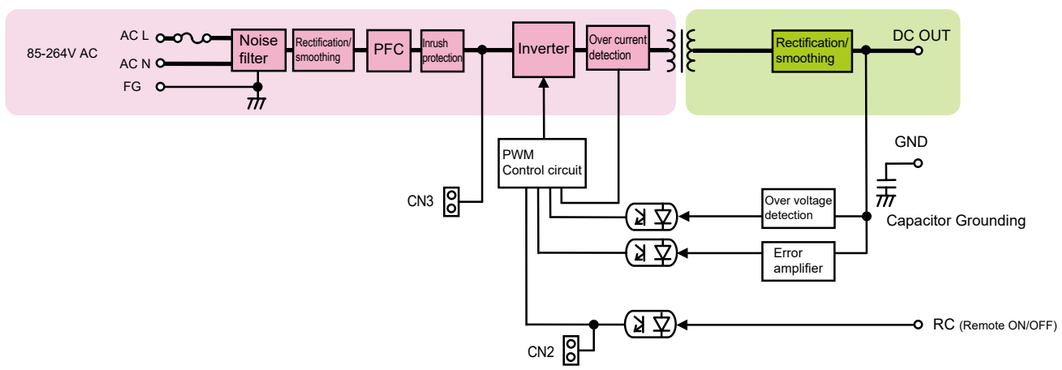
With chassis and cover (12/18V)



With chassis and cover (24/48V)



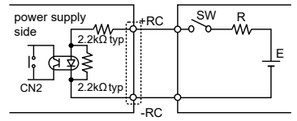
Block Diagram



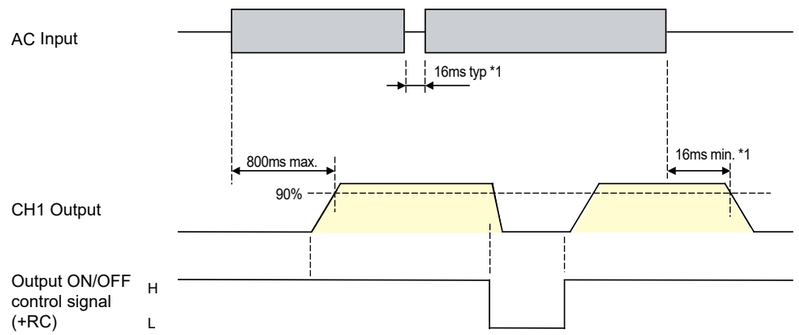
Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Note
Input Signal	Output ON/OFF control signal (RC signal) *Remove the shorting plug of CN2 in using RC signal.	Operating mode Between +RC and -RC: Output SW ON (4.5V or higher): ON SW OFF (0.8V or lower): OFF External power supply and Load-limiting resistor External power supply: E / Load-limiting resistor: R 4.5 ~ 12.5Vdc: Not required 12.5 ~ 30Vdc: 1.5kΩ 30 ~ 48Vdc: 8.2kΩ	Shorting Plug With shorting plug (CN2) connected, output starts up when AC input is applied regardless of RC signal. To control Start/Stop of output by RC signal, uncap shorting plug of CN2. Note: Shorting plug (CN2) is primary circuit components. Make sure to operate the plug after the AC input is turned off.
Input Signal Circuit	Signal Circuit		

(RC signal)
Connection example:
using external power supply



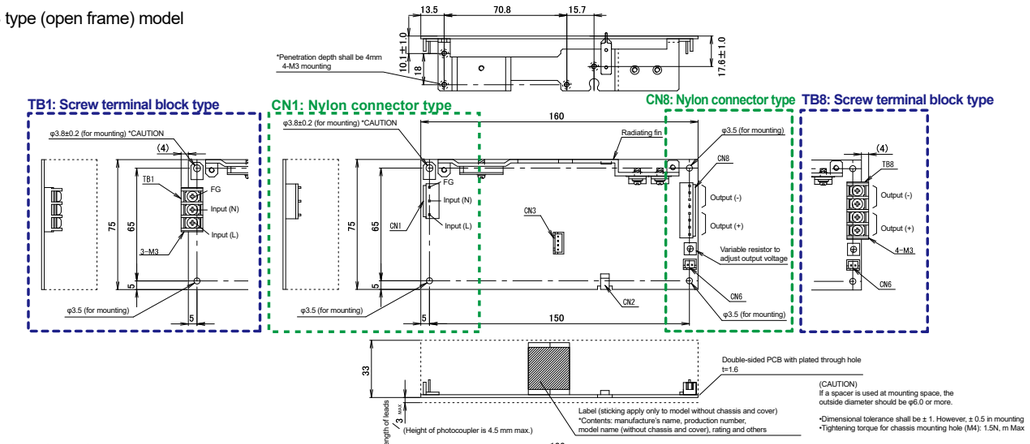
Sequence Timing Chart



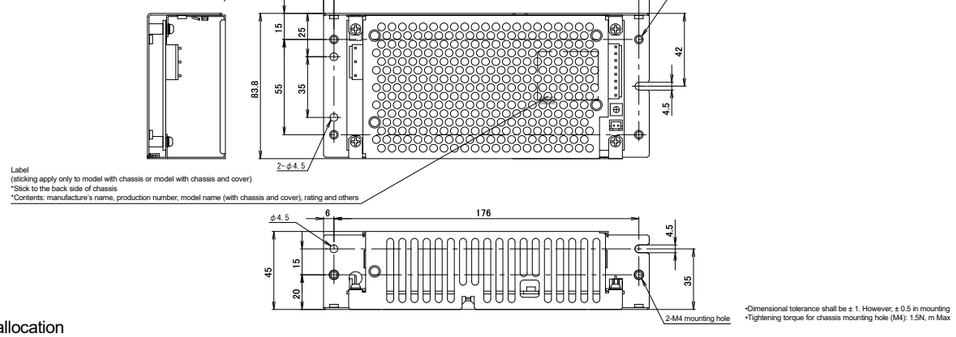
*1 At rated input, output: 200W (at 24V, 48V) /180W (at 12V, 18V)

Outline Drawing

■ PCB type (open frame) model



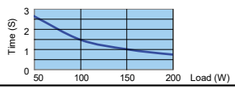
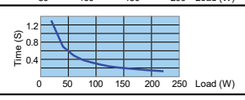
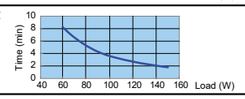
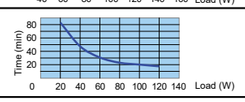
■ With chassis and cover
(Screw terminal block is also available for I/O connector)



■ Connector pin allocation

Nylon connector type	Screw terminal block type	Common
CN1 (Input) PIN No. 1: AC(L), 2, 3: AC(N), 4, 5: FG; CONNECTOR TYPE: B3P5-VH (JST) *CN1 Applicable housing: VHR-5N (JST) Applicable terminals: Reel: SVH-21T-P1.1(JST) Bulk: BVH-21T-P1.1(JST)	TB1 (INPUT) See the upper outline drawing	CN6 (ON/OFF Control) PIN No. 1: +RC, 2: −RC; CONNECTOR TYPE: B2B-XH-A (JST) *CN6 Applicable housing: XHP-2 (JST) Applicable terminals: Reel: SXH-001T-P0.6(JST) Bulk: BXH-001T-P0.6(JST)
CN8 (Output) PIN No. 1~4: −DC, 5~8: +DC; CONNECTOR TYPE: B8P-VH (JST) *CN8 Applicable housing: VHR-8N (JST) Applicable terminals: Reel: SVH-21T-P1.1(JST) Bulk: BVH-21T-P1.1(JST)	TB8 (OUTPUT) See the upper outline drawing	CN3 (Capacitor package Input/Output) PIN No. 1: 380VP-P, 2, 3, 4: 0VP-P; CONNECTOR TYPE: B4B-XH-A (JST) *CN3 Applicable housing: XHP-4 (JST) Applicable terminals: Reel: SXH-001T-P0.6(JST) Bulk: BXH-001T-P0.6(JST)

Options (Sold separately)

Capacitor packs and Battery packs				
Photos	Model	Type	Description	Backup time
	BS13A-EC400/422F	Capacitor pack	5 inch bay size	*1 
	CB03A-EC400/801F	Capacitor unit		*1 
	BS27A-P350/12V	Charging/discharging board for lead-acid battery	Supported a lead acid battery of up to 12V 5Ah	*1, 2 
	BS28A-H350/2.5L	Ni-MH	5 inch bay size	*1 

*Backup time is just a guideline for first use, and not guaranteed.

*1 The backup time is reference *2 Reference when GS Yuasa's lead-acid battery, PXL12023 is connected

Options (Sold separately)

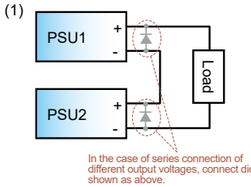
Cable			
Photos	Model	Category	Description
	WH-C05VH-800	Input harness	For nylon connector models
	WH-C05VH-800-01	Input harness (with ferrite core)	For nylon connector models
	WH-C08VH-500	Output harness	For nylon connector models
	WH-02XH02XH-500	Signal harness for RC signal	For using the output ON/OFF control signal (RC signal)
	WH-03ELP04XH-200	Power harness for the capacitor pack	For connecting the power supply to the capacitor pack (BS13A-EC400/422F).
	WH-03XH03XH-115	Power harness for the capacitor unit	For connecting the power supply to the capacitor unit (CB03A-EC400/801F). Length: 115mm
	WH-03XH04XH-350	Power harness for the charging/ discharging board	For connecting the power supply to the charging/discharging board (BS27A-P350/12V) or the capacitor unit (CB03A-EC400/801F). Length: 350mm
	ACC6198	Shorting connector for startup	For enabling blackout backup (operation of the discharging circuit) by connecting to the charging/discharging board (BS27A-P350/12V).
	WH-09ELP04XH-200	Power harness for connecting the battery pack	For connecting the power supply to the battery pack (BS28A-H350/2.5L).
	WH-S0610-500	Harness for TTL communication	For automatically shutting down the system at blackout. Connect to the battery pack (BS28A-H350/2.5L).
	WH-S1005-500-02	Harness for RS232C communication	For automatically shutting down the system at blackout. Connect to the battery pack (BS28A-H350/2.5L). *The pin allocation is different from "WH-S1005-500-03". (See P10 for details.)
	WH-S1005-500-03	Harness for RS232C communication	For automatically shutting down the system at blackout. Connect to the battery pack (BS28A-H350/2.5L). *The pin allocation is different from "WH-S1005-500-02". (See P10 for details.)

Connection in Series and Parallel

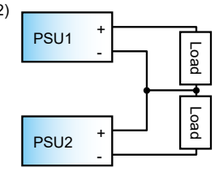
■ Series operation
Series connection is available as in figure (1) and (2) on the right.
Series connection between different output voltages is available, such as 12 V and 24 V.

Note: In the case that different voltages are connected in series as in figure (1) on the right;
1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.
2. Connect diodes for protection as show in the figure (1).
The rated current of the diodes shall be 1.5 times or more of the peak output current of the power supply which has larger peak output current among PSU1 and PSU2.
Also, use Schottky diodes whose forward voltage is lower than the forward voltage of the diodes used in the PSU.

(1)



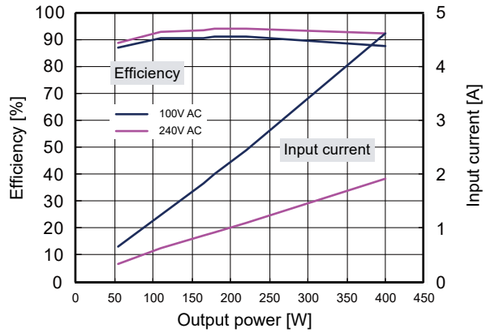
(2)



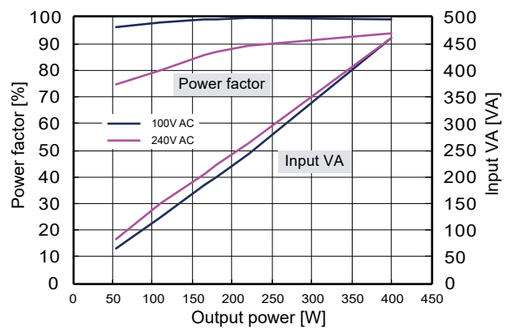
■ Parallel operation
Parallel operation is not possible.

Characteristics Data (Typical features of the product series) UZP-220-24 (Examples of actual measurement)

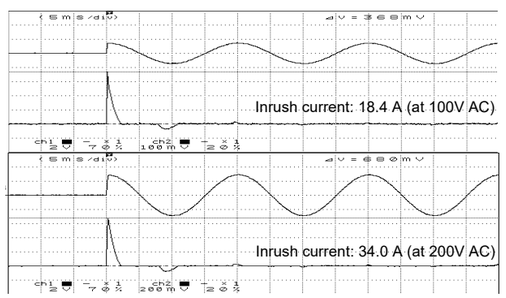
● Fig.5 Efficiency/Input Current vs. Output Power



● Fig.6 Power Factor/Input VA vs. Output Power



● Fig.7 Inrush Current



● Fig.8 Leakage Current

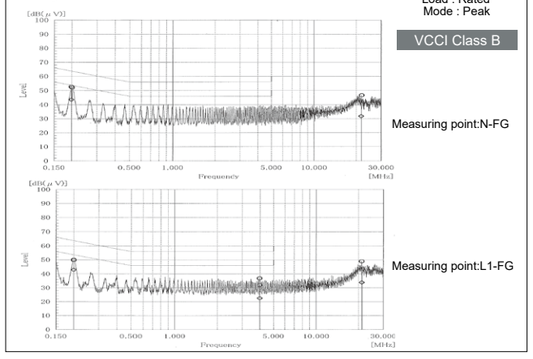
Input : 100, 200, 240V AC
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.05 mA	0.06 mA
200V AC	0.11 mA	0.12 mA
240V AC	0.14 mA	0.14 mA

● Fig.9 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak

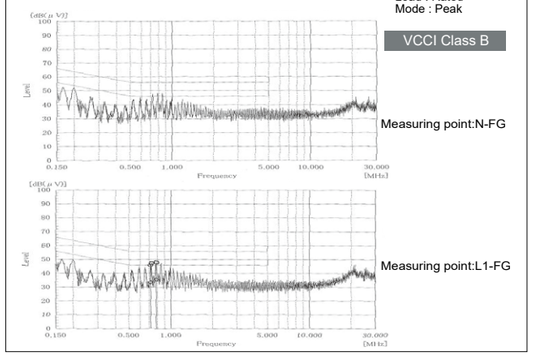
VCCI Class B



● Fig.10 Conducted Emission at 230V AC

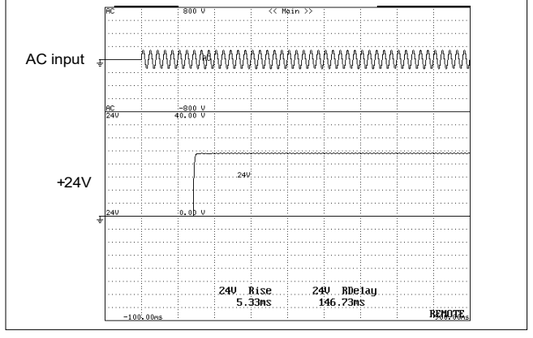
Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B



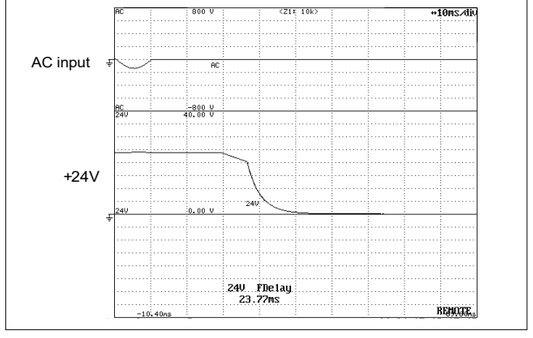
● Fig.11 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



● Fig.12 Falling Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 10 ms/DIV

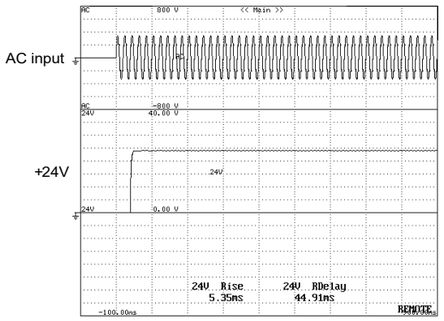


UZP-220 Series

Characteristics Data (Typical features of the product series) UZP-220-24 (Examples of actual measurement)

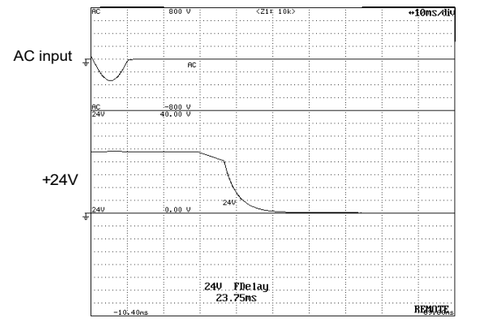
● Fig.13 Rising Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 100 ms/DIV

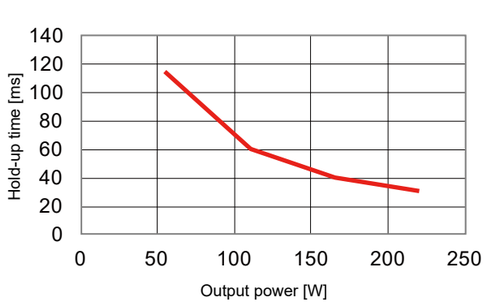


● Fig.14 Falling Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 10 ms/DIV

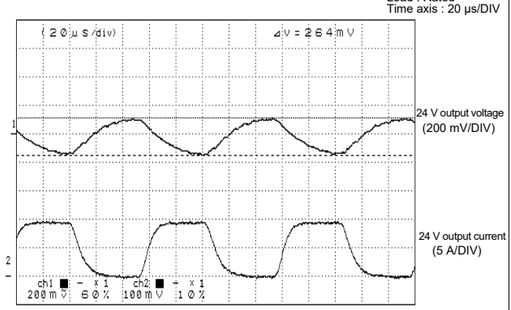


● Fig.15 Output Hold-up Time vs. Output Power

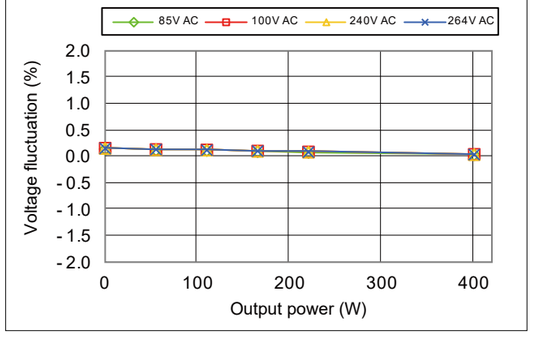


● Fig.16 Dynamic Load Fluctuation Characteristics at 10 kHz

Input : 100V AC
Load : Rated
Time axis : 20 µs/DIV



● Fig.17 Output Voltage Regulation (Load Fluctuation)



● Fig.18 Ripple and Spike Voltage

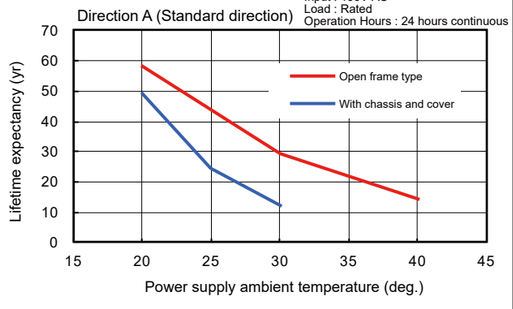
Spike voltage
Load : Rated

Temperature	Input voltage	24V
- 15°C	100V AC	40.4 mV
	240V AC	31.7 mV
25°C	100V AC	13.6 mV
	240V AC	12.1 mV
55°C	100V AC	9.5 mV
	240V AC	9.2 mV
75°C	100V AC	5.8 mV
	240V AC	5.8 mV

Temperature	Input voltage	24V
- 15°C	100V AC	121.0 mV
	240V AC	110.9 mV
25°C	100V AC	99.8 mV
	240V AC	95.3 mV
55°C	100V AC	101.7 mV
	240V AC	97.5 mV
75°C	100V AC	66.2 mV
	240V AC	64.5 mV

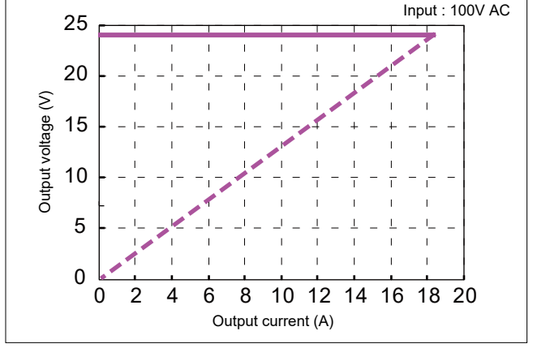
● Fig.19 Ambient Temperature vs. Lifetime Expectancy

Input : 100V AC
Load : Rated
Operation Hours : 24 hours continuous



*For details of Installation direction A (Standard), refer to Fig.2 "Installation condition."
*The lifetime of electrolytic capacitors shall be 15 years at longest due to deterioration of sealing plates.

●Fig.20 Overcurrent Protection Characteristics (V - I Characteristics)



Single Output Power Supply OZP-350 series

Structure and I/O connector	Model	Output voltage	Output current *1	Output power *1
Open frame type/ Nylon connector	OZP-350-12-JSE	+12V	25A (42A)	300W (504W)
	OZP-350-15-JSE	+15V	20A (40A)	300W (600W)
	OZP-350-24-JSE	+24V	14.6A (25A)	350.4W (600W)
	OZP-350-30-JSE	+30V	11.7A (20A)	351W (600W)
	OZP-350-36-JSE	+36V	9.8A (16.7A)	352.8W (601W)
	OZP-350-48-JSE	+48V	7.3A (12.5A)	350.4W (600W)

Structure	Model
With chassis	'-C' is added after open frame model name (Ex: OZP-350-12-JSE-C)
With chassis and cover	'-K' is added after open frame model name (Ex: OZP-350-12-JSE-K)
Input/Output connector type	Model
Screw terminal block	'J' in the nylon connector model become 'T' (Ex: OZP-350-12-TSE)

■Model name coding

OZP-350-**-*SE*-*
① ② ③ ④ ⑤⑥ ⑦⑧ ⑨

① Series name
② Peak output
③ Output power
④ 12:12V, 15:15V, 24:24V, 30:30V, 36:36V, 48:48V
⑤ Input/Output connector J:Nylon connector T:Screw terminal block
⑥ S:With current balance function
⑦ Reduction of standby power: E:Reduction of standby power function equipped (at RC signal OFF)
⑧ Modification B:capacitor backup unit (CB01A) is possible to connect
⑨ Blank:Without chassis and cover C:With chassis K:With chassis and cover

*1 Values in ( ) above show peak current and power.

Features

- Low standby power (at RC signal OFF, 0.05Wtyp/100V AC, 0.2Wtyp/200V AC)
- Expected life of more than 10 years
- Equipped with a variable resistor to adjust output voltage
- Low noise and low leakage current eliminates the need for an external noise filter.

An amazing high level of efficiency 95% has been achieved for a 24V output type.
(*At 230V AC input, 350W load)

Rated 350W output is possible with the same size compared with competitors' 300W equivalent models. Peak power, approx. over 160% higher than continuous rated.

Parallel operation is also available by current balance operation circuit.

Safety standard	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

●Function

TTL PFC RoHS Directive

●Input

AC input	85-264V AC (Worldwide range)

*Some DC input-only types are also available. (Please contact us for details.)

●Dimension

W×H×D (mm)	Without chassis and cover	95×47×222
	With chassis and cover	107×57×252

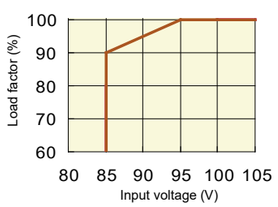
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items		Specification	Measurements conditions, etc.
AC Input	Rated Voltage		100-240VAC (AC85*-264V)	Worldwide range *See <Fig.1> Low input voltage derating below.
	Input Frequency		50-60Hz	Frequency range 47-63Hz
	Efficiency	100VAC	90% typ (12V/15V output), 92% typ (24V/30V/36V/48V output)	At 300W load *Characteristic data: Fig.6
		200VAC	92% typ (12V/15V output), 94% typ (24V/30V/36V/48V output)	
	Power Factor	100VAC	99% typ	At rated input/output (convection cooling) *Characteristic data: Fig.7
		200VAC	96% typ	
	Inrush Current		14A typ (100VAC), 28A typ (200VAC) *Characteristic data: Fig.8	At rated output
	Input Current	100VAC	3.3A typ (at 12V/15V output, convection cooling), 3.8A typ (at 24V/30V/36V/48V output, convection cooling) 4.8A typ (at 12V/15V output, forced air cooling), 5.5A typ (at 24V/30V/36V/48V output, forced air cooling)	At rated output *Characteristic data: Fig.6
		200VAC	1.7A typ (at 12V/15V output, convection cooling), 2.0A typ (at 24V/30V/36V/48V output, convection cooling) 2.5A typ (at 12V/15V output, forced air cooling), 2.9A typ (at 24V/30V/36V/48V output, forced air cooling)	
Output	Model		OZP-350-12 / OZP-350-15 / OZP-350-24 / OZP-350-30 / OZP-350-36 / OZP-350-48	
	Rated Voltage		+12V / +15V / +24V / +30V / +36V / +48V	
	Rated Current/Power (convection cooling)		25A / 20A / 14.6A / 11.7A / 9.8A / 7.3A 300W / 300W / 350.4W / 351W / 352.8W / 350.4W	At rated input Refer to <Fig.4> output derating on the following page.
	Rated Current/Power (forced air cooling)		36A / 29A / 21A / 16.8A / 14A / 10.5A 432W / 435W / 504W / 504W / 504W / 504W	
	Peak Current/Power		42A / 40A / 25A / 20A / 16.7A / 12.5A 504W* / 600W* / 600W* / 600W* / 601W* / 600W*	At rated input/output voltage *Refer to peak output power condition below. Convection cooling and forced air cooling
	Factory Setting		12V±2% / 15V±2% / 24V±2% / 30V±2% / 36V±2% / 48V±2%	At rated output
	Adjustable Voltage Range		±10% / -14%,+10% / ±10% / ±10% / ±10% / ±10%	At a setting higher than rated voltage, use it within rated output power.
	Static Input Regulation		48mV max. / 60mV max. / 94mV max. / 120mV max. / 144mV max. / 192mV max.	
	Static Load Regulation		100mV max. / 120mV max. / 150mV max. / 180mV max. / 220mV max. / 300mV max.	
	Temperature Regulation		0.02%/°C max.	
	Max. Ripple Voltage	0-70°C	120mV max. / 150mV max.	Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band. *Characteristic data: Fig.19 Ripple/Spike voltage is 200mV/400mV max. at 70W max. output power.
		-10-0°C	160mV max. / 200mV max.	
	Max. Spike Voltage	0-70°C	150mV max. / 250mV max.	
		-10-0°C	180mV max. / 400mV max.	
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current	
		Method	Hold-down current limiting→Blocking oscillation *Characteristic data: Fig.21	
		Recovery	Automatic recovery	
	Over Voltage Protection	OVP point (V)	13.8-16.2V / 17.3-20.3V / 30.0-35.0V / 34.5-40.5V / 43.2-49.4V / 56.2-63.0V	
		Method	Output shutdown	
		Recovery	Reclosing of AC input or RC signal OFF→ON	
Environment	Operating Temp./ Humidity	Open Frame	-10-60°C (at convection cooling), -10-70°C (at forced air cooling) */20-90%	*<Fig.3> on the next page shows the guideline of forced air cooling. Refer to <Fig.4> output derating.
		With Chassis and Cover	-10-55°C (at convection cooling), -10-70°C (at forced air cooling) */20-90%	
	Storage Temp./Humidity		-20-75°C/10-95%	There shall be no condensation
	Vibration		To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.	Follow JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3times for each of four bottom edges, and no malfunction shall be observed.	Follow JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		3kVAC/1minute between input and output/RC/AC_FAIL	Cut-off current 10mA
			2kVAC/1minnute between input and FG	Cut-off current 10mA
			500VAC/1minute between each output /RC/AC_FAIL/FG	
	Insulation Resistance		50MΩmin. between each input/output/RC/AC_FAIL/FG	At 500VDC
	Leakage Current		Refer to <Fig.5> Parallel connected units and leakage current on the next page. *Characteristic data: Fig.9	
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000nS,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)	Measurement by INS-410 There shall be no fluctuation of DC output or malfunction.
	Electrostatic Discharge		EN61000-4-2 compliant	Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency, Electromagnetic Field		EN61000-4-3 compliant	
	Fast Transient Burst		EN61000-4-4 compliant	
	Lightning Surge		EN61000-4-5 compliant	
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant	
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant	
	Voltage dips/Regulation		EN61000-4-11 compliant	
	Conducted Emmision		VCCI-B, FCC-B, CISPR22-B, EN55022-B compliant *Characteristic data: Fig.10, 11	At rated input and rated output (convection cooling), with chassis*
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) class D, EN61000-3-2 (A14) class D compliant.	At rated input/output
Others	Safety Standards		UL60950-1, CSA60950-1(c-UL), CE Marking (IEC62368-1), CCC PSE (ordinance clause 2) compliant	CCC is only available for 36V type.
	Cooling System		Convection cooling/Forced air cooling	
	Output Grounding		Capacitor grounding	
	Output Hold-up Time		AC cut-off → 90% of rated voltage within 22ms min. *Characteristic data: Fig.16	At rated input, 300W output
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)	Following our standard
	Weight		650g typ (without chassis and cover), 1050g typ (with chassis and cover)	
	Warranty		Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.	The unit shall be operated at normal temperature and humidity. Except for lifetime of electrolytic capacitors due to operating environment.

*For the reduction of radiated noise, the input harness "WH-C05VH-800-02" (with ferrite core type) is recommended.

<Fig.1> Low input voltage derating

Follow the derating below to derate rated current/power.

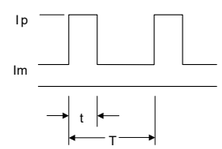


Peak output power condition

- Duty ratio of peak current shall be 45% or less.
- Energized period of peak current shall be 10 seconds or less.
- Energized period of peak current shall be 5 seconds or less at convection cooling and 50 deg. or higher of ambient temperature.
- The value resulting from the formula below shall not exceed continuous rated current, Io, after derating specified in the output derating on the following page.

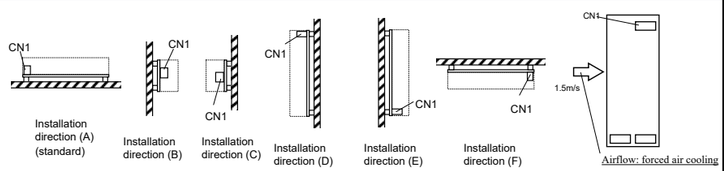
$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$

Ip=Peak current value
Im= Min. current value
D= Duty ratio, t/T
t= Pulse width of peak current
T= Cycle
Io= Continuous rated current specified in output derating



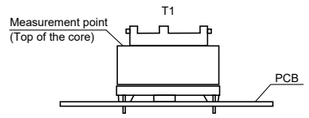
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.2> Installation/Air cooling



<Fig.3> Guideline for forced air cooling

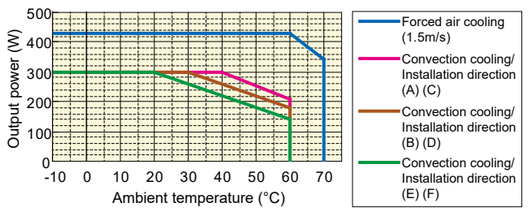
Set the core surface temperature of the transformer (T1) to 80°C or lower.



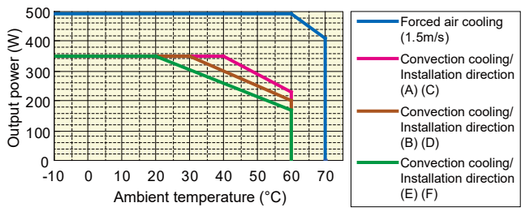
<Fig.4> Output derating

Follow the derating diagram below for output according to ambient temperature and installation direction. In case of using the type with chassis and cover, input voltage range shall be 90V AC or higher. Also, forced air cooling condition in the diagram shall be provided that the air flow of 1.5 m/s is applied from the direction shown <Fig.2>.

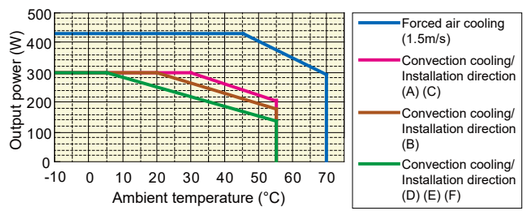
For open frame (12/15V)



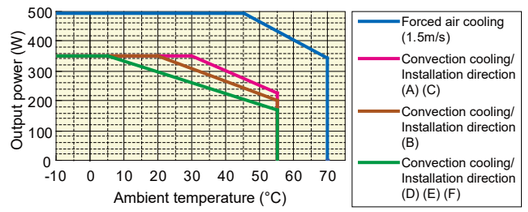
For open frame (24/30/36/48V)



With chassis and cover (12/15V)

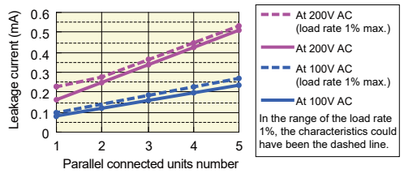


With chassis and cover (24/30/36/48V)

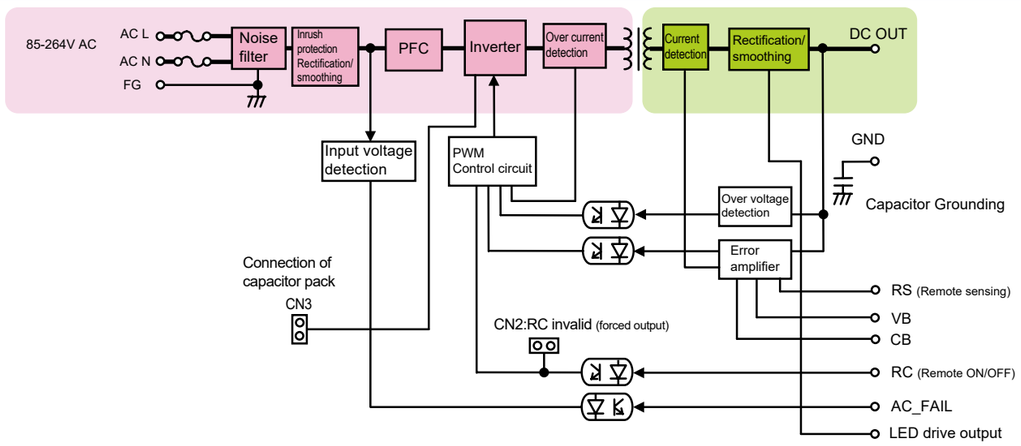


<Fig.5> Parallel connected units and leakage current

Parallel connected units and leakage current (typ.)



Block Diagram



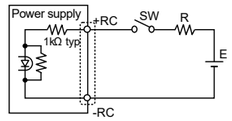
Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Note
Input Signal	Output ON/OFF control signal (RC signal) *Remove the shorting plug of CN2 in using RC signal.	Operating mode Between +RC and -RC: Output SW ON (4.5V or higher): ON SW OFF (0.8V or lower): OFF External power supply and Load-limiting resistor External power supply: E / Load-limiting resistor: R 4.5 ~ 12.5Vdc: Not required 12.5 ~ 30Vdc: 1.5kΩ 30 ~ 48Vdc: 8.2kΩ	Shorting Plug With shorting plug (CN2) connected, output starts up when AC input is applied regardless of RC signal. To control Start/Stop of output by RC signal, uncap shorting plug of CN2. Note: Shorting plug (CN2) and radiating fin next to it are primary circuit components. Make sure to operate the plug after the AC input is turned off.
	Remote sensing signal (RS signal)	Input terminal for detection of output voltage. Connecting RS signal to positive side of devices, it shall compensate line-drop at positive side such as output cable.	
	Current balance signal (CB signal)	Input terminal on current balance circuit. During parallel operation, connect CB signal terminals of each power supply.	Total output current at connecting N units in parallel shall be within "rated output current×N×0.9"A. (N ≦ 5)
	Voltage balance signal (VB signal)	Input terminal on voltage balance circuit. For parallel operation, connect VB signal terminals of each power supply.	Higher VR setting value of output voltage shall be preferential
Output Signal	Blackout detection signal (AC_FAIL)	The signal goes "OPEN" at low AC input voltage and power failure detection. Undefined at RC signal OFF. Detection voltage: 80 VAC typ. Detection delay time: 20-50 ms after AC input failure.	
	LED drive output	Delivers "Hi" when main inverter circuit is operating and an external LED on PCB will light. The LED light turn off during main inverter circuit is shut down, such as circuit failure, AC fail, or OFF operation by "output ON/OFF control signal". (In parallel operation, with connecting redundant diode to the output end, the operating condition of each power supply can be confirmed.)	Open voltage: 12 V typ. Max current: 7 mA max. (Built in 1.7 kΩ or equivalent)

Signal Circuit

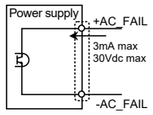
Input Signal Circuit

(RC Signal)

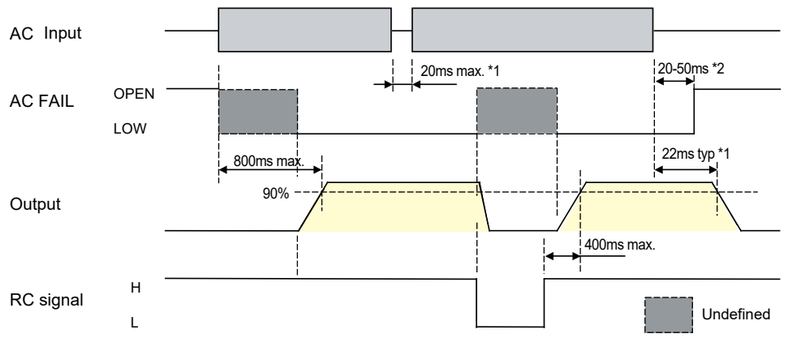


Output Signal Circuit

(AC_FAIL)



Sequence Timing Chart

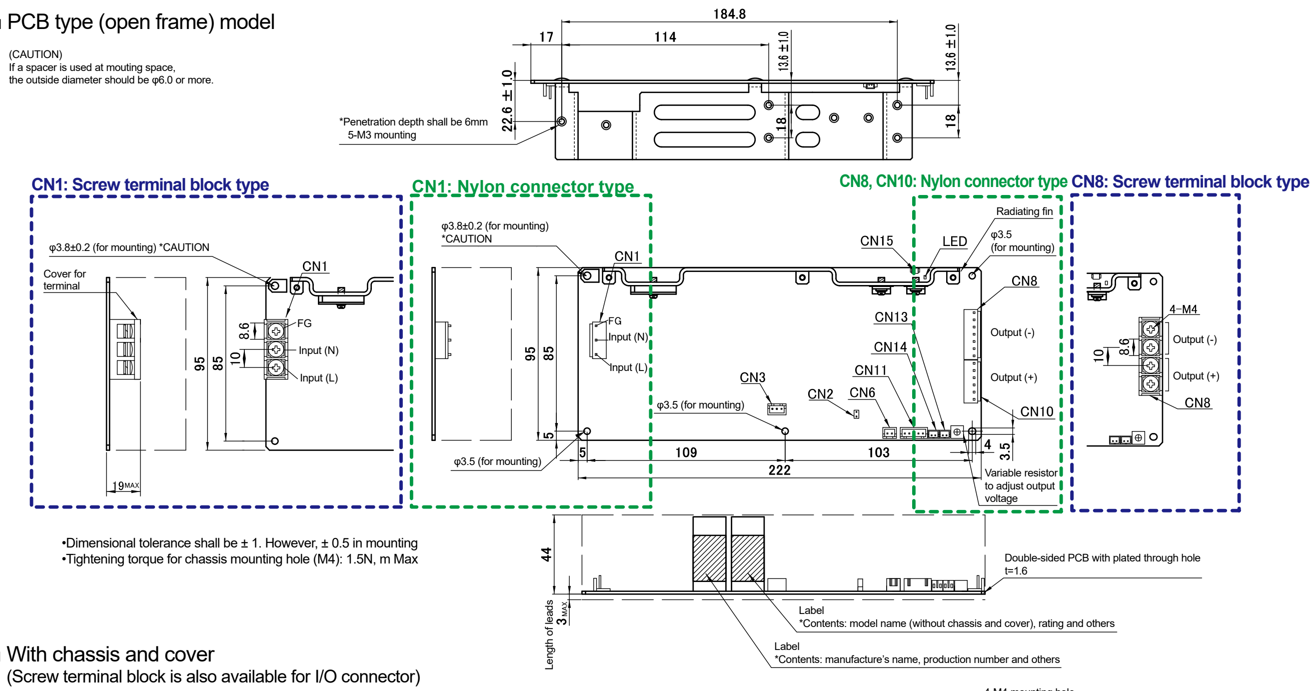


*1: At rated input, 300W output
*2: If the output power is less than 10%, the input voltage is the maximum 150 ms in the range of 150V AC or more.

Outline Drawing

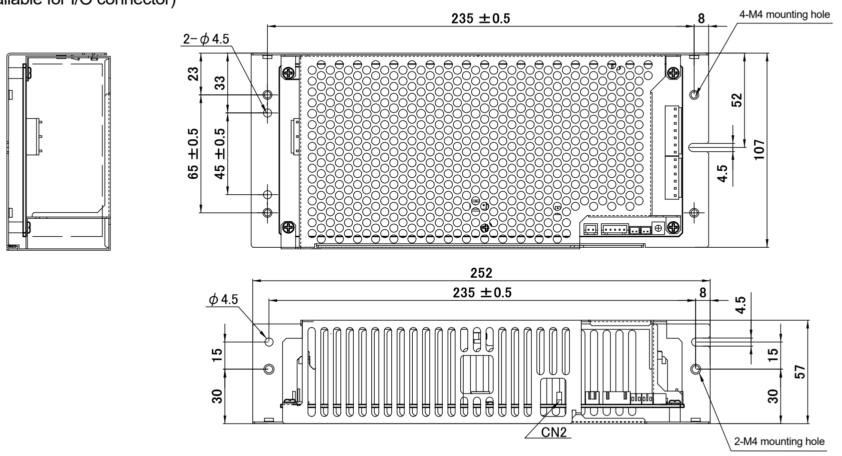
■ PCB type (open frame) model

(CAUTION)
If a spacer is used at mouting space, the outside diameter should be φ6.0 or more.

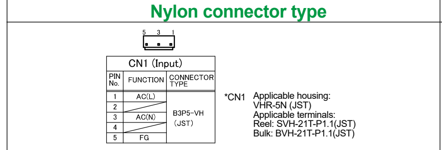
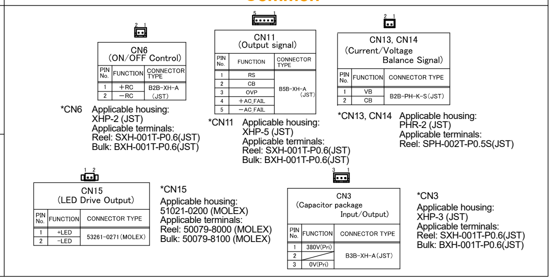
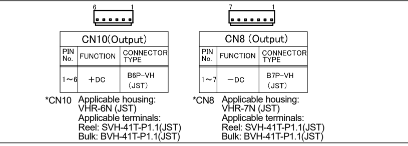


•Dimensional tolerance shall be ± 1. However, ± 0.5 in mounting
•Tightening torque for chassis mounting hole (M4): 1.5N, m Max

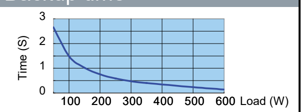
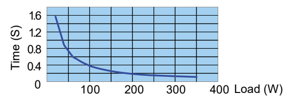
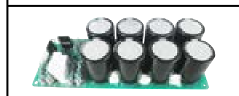
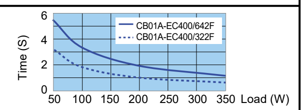
■ With chassis and cover
(Screw terminal block is also available for I/O connector)



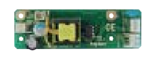
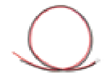
■ Connector pin allocation

Nylon connector type	Screw terminal block type	Common
	CN1(INPUT) See the upper outline drawing	
	CN8(OUTPUT) See the upper outline drawing	

Options (Sold separately)

Capacitor pack				
Photos	Model	Type	Shape (size)	Backup time
	BS13A-EC400/422F	Capacitor pack	(W×D×H=146×200×38mm)	
	CB03-EC400/801F	Capacitor unit	(W×D×H=60×50×50mm)	
 CB01A-EC400-642F	CB01A-EC400/322F CB01A-EC400/642F	Capacitor backup unit (4 capactiors model) Capacitor backup unit (8 capactiors model)	(W×D×H=83×222×53mm)	

*Backup time is just a guideline for first use of capacitor package, and not guaranteed.
*CB01A series connectable for the model (OSP-350-**-*SEB type) of the power supply. Please contact us for details.

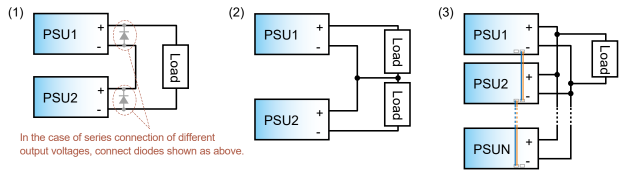
Parts/Units			
Photos	Model	Category	Description
 *Example	PS-10WP-5VSB (5V output) PS-10WP-12VSB (12V output)	Standby power supply units	Available as standby power supply and power supply for remote ON/OFF by mounting for OZP-350.
	WH-C02XA-500	Output harness	For standby power supply units.

Cable			
Photos	Model	Category	Description
	WH-C05VH-800	Input harness	For nylon connector models *For the reduction of radiated noise, the input harness: "WH-C05VH-800-02" (with ferrite core type) is recommended.
	WH-C06VH-500	Output (+) harness	(+) harness For nylon connector models
	WH-C07VH-500	Output (-) harness	(-) harness For nylon connector models
	WH-02XH02XH-500	Signal harness for RC signal	For using the output ON/OFF control signal (RC signal)
	WH-05XH05XH-500	Signal harness for RS, AC_FAIL signal	For using remote sensing (RS) or AC_FAIL signal.
	WH-02PH02PH-200	Signal harness for parallel operation	For connecting OZP-350 in parallel. (Refer to the connection diagram below)
	WH-03ELP03XH-200	Connection harness for capacitor pack	For using BS13A-EC400/422F.
	WH-03XH03XH-115	Connection harness for standby power supply unit	For connecting the power supply to the standby power supply unit (PS-10WP) or the capacitor unit (CB03A-EC400/801F). Length: 115mm
	WH-03XH03XH-350	Power harness for the charging/ discharging board	For connecting the power supply to the standby power supply unit (PS-10WP) or the capacitor unit (CB03A-EC400/801F). Length: 350mm
	WH-07XH0306XH-300	Connection harness for capacitor backup unit	For connecting between OZP-350 and CB01A series.

Connection in Series and Parallel

■ Series operation

Series connection is available as in figure (1) and (2) on the right.
•Series connection between different output voltages is available, such as 12 V and 24 V.



In the case of series connection of different output voltages, connect diodes shown as above.

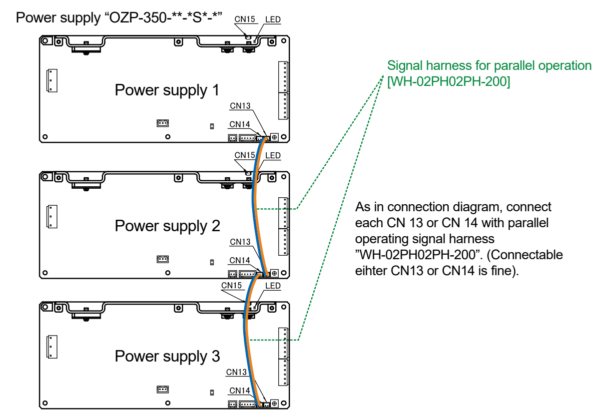
Note: In the case that different voltages are connected in series as in figure (1) on the right;
1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.
2. Connect diodes for protection as show in the figure (1).
The rated current of the diodes shall be 1.5 times or more of the peak output current of the power supply which has larger peak output current among PSU1 and PSU2.
Also, use Schottky diodes whose forward voltage is lower than the forward voltage of the diodes used in the PSU.

■ Parallel operation

Parallel connection is available as in figure (3) on the right.
•By connecting the outputs of "N" power supplies in parallel, output capacity "rated output×N units×0.9" will be obtained. (N≦5) In this case, please note the points written below.

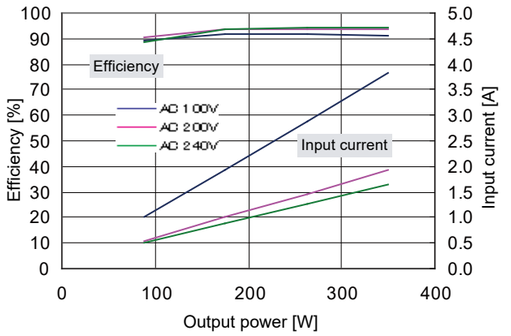
1. Please connect the dedicated cable (Model name: WH-02PH02PH-200) between the connectors "CN13" or "CN14" on the PCB of both power supplies connected in parallel. By connecting between these connectors, output current balances for each power supply are controlled to be equal.
2. Please equalize the impedance of the load wires from each power supply as much as possible.
3. Adjust output voltage by the variable resistor of the power supply while the variable resistor of either one of the power supply is set minimum by turning it to hard left.
4. There might be heat increasing caused by installation interval, direction, and any shielding materials around power supply units when you connect in parallel. To avoid the heat increasing, please check temperature increasing with equipping actual device and operation. In case of the temperature of transformer (T1) exceeds 80°C (indication value), please change the installation interval, direction, or cut down the output power to reduce the heat.
5. LED on the PCB light green when the main inverter circuit is operating. It blacks out at circuit failure, at AC input failure, or when the main inverter circuit stops by turning off the "Output ON/OFF control signal".
6. A redundant diode is not embedded at the output of the power supply, therefore output power does not hold when one of the power supplies is damaged due to short mode etc. In addition, the output power does not hold normally when the power supply in operation is connected to the other power supply in non-operation in parallel.

■Connection diagram of signal harnesses for parallel operation
(In case of connecting three power supplies, OZP-350-**-*S*-*, in parallel)

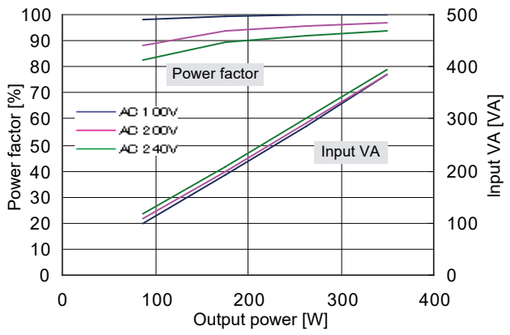


Characteristics Data (Typical features of the product series) OZP-350-24 (Examples of actual measurement)

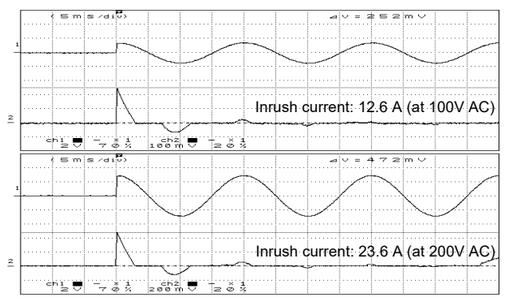
● Fig.6 Efficiency/Input Current vs. Output Power



● Fig.7 Power Factor/Input VA vs. Output Power



● Fig.8 Inrush Current



● Fig.9 Leakage Current

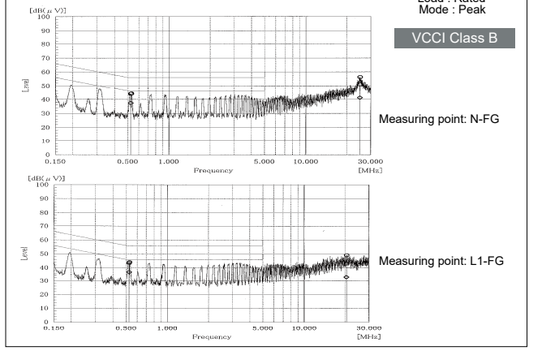
Input : 100, 200V AC
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.05 mA	0.06 mA
200V AC	0.11 mA	0.14 mA

● Fig.10 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak

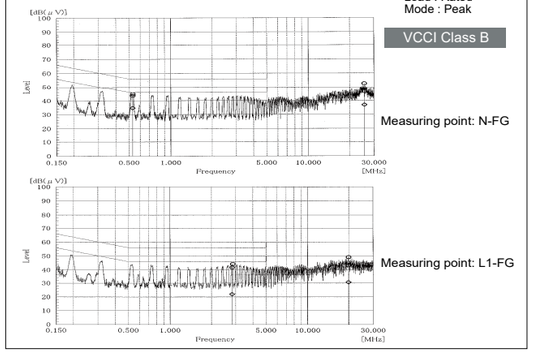
VCCI Class B



● Fig.11 Conducted Emission at 230V AC

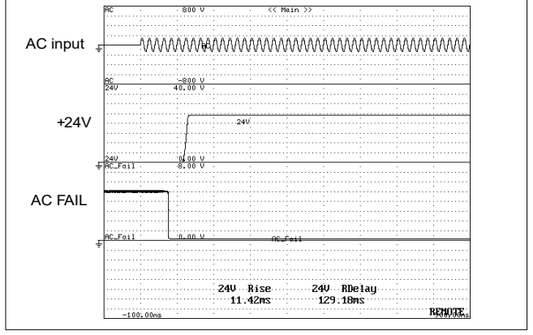
Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B



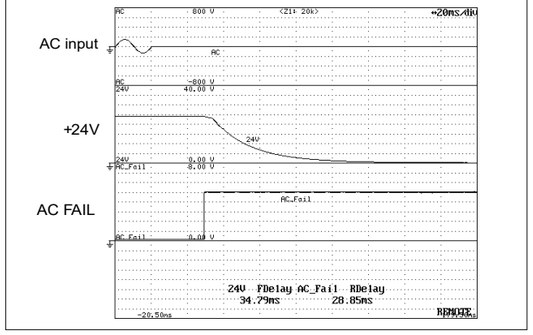
● Fig.12 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



● Fig.13 Falling Characteristics at 100V AC

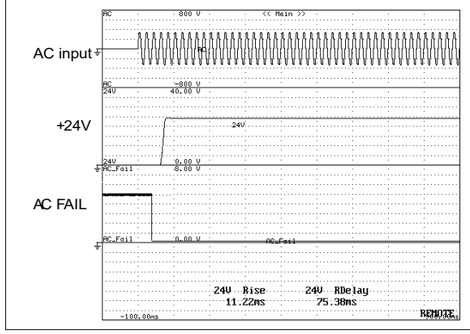
Input : 100V AC
Load : Rated
Time axis : 20 ms/DIV



Characteristics Data (Typical features of the product series) OZP-350-24 (Examples of actual measurement)

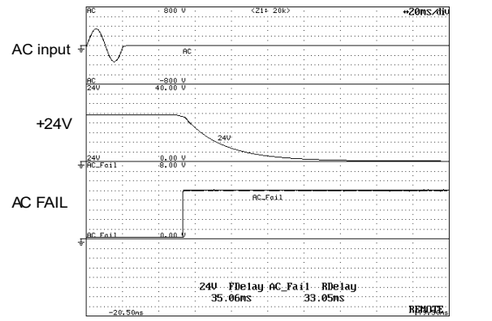
● Fig.14 Rising Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 100 ms/DIV



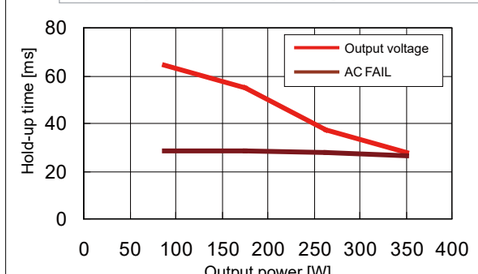
● Fig.15 Falling Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 20 ms/DIV



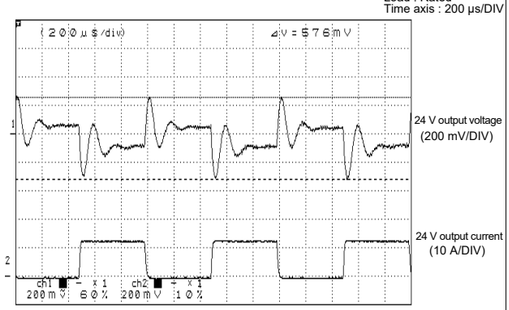
● Fig.16 Output Hold-up Time vs. Output Power

AC FAIL: the point that AC FAIL signal is delivered.
Output voltage: the point that output voltage fails down to 90%.

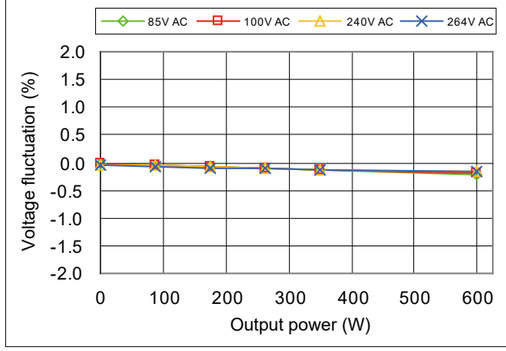


● Fig.17 Dynamic Load Fluctuation Characteristics at 1 kHz

Input : 100V AC
Load : Rated
Time axis : 200 µs/DIV

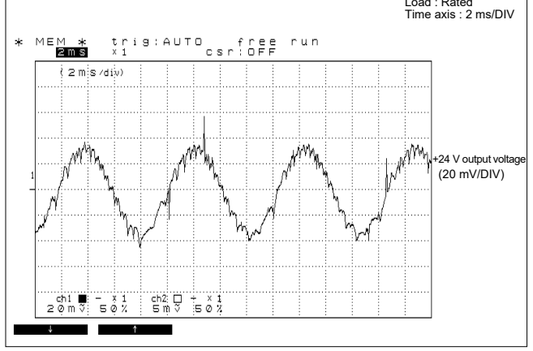


● Fig.18 Output Voltage Regulation (Load Fluctuation)



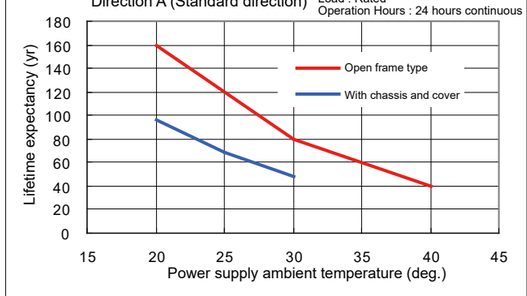
● Fig.19 Ripple and Spike Voltage

Input : 100V AC
Load : Rated
Time axis : 2 ms/DIV



● Fig.20 Ambient Temperature vs. Lifetime Expectancy

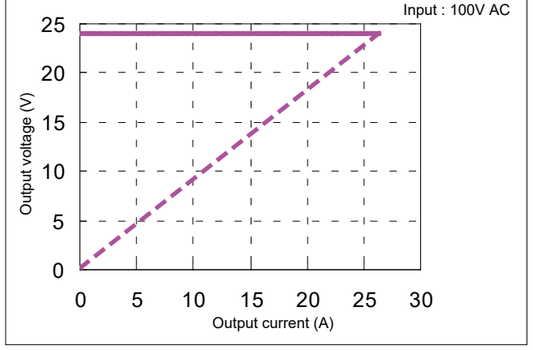
Direction A (Standard direction)
Input : 100V AC
Load : Rated
Operation Hours : 24 hours continuous



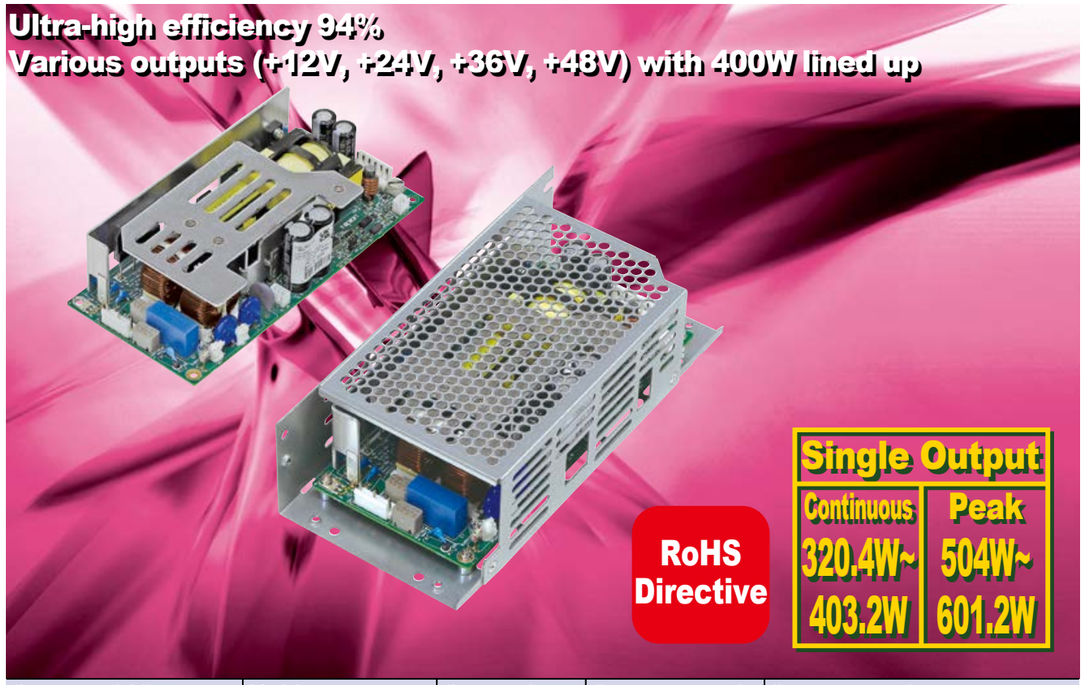
*For details of Installation direction A (Standard), refer to Fig.2 "Installation condition."
*The lifetime of electrolytic capacitors shall be 15 years at longest due to deterioration of sealing plates.

●Fig.20 Overcurrent Protection Characteristics (V - I Characteristics)

Input : 100V AC



Single Output Power Supply UZP-400 series



Structure and I/O connector	Model	Output voltage	Output current *1	Output power *1
Open frame type/ Nylon connector	UZP-400-A12-JBH	+12V	26.7A (42A)	320.4W (504W)
	UZP-400-A24-JBH	+24V	16.8A (25A)	403.2W (600W)
	UZP-400-A36-JBH	+36V	11.2A (16.7A)	403.2W (601.2W)
	UZP-400-A48-JBH	+48V	8.4A (12.5A)	403.2W (600W)
Structure	Description			
With chassis	'-C' is added after open frame model name (Ex: UZP-400-A12-JBH-C)			
With chassis and cover	'-K' is added after open frame model name (Ex: UZP-400-A12-JBH-K)			
Input/Output connector type	Model			
Screw terminal block	'J' in the nylon connector model become 'T' (Ex: UZP-400-A12-TBH)			

■ Model name coding

UZP-400-A**-JBH*-*
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series name
② Peak output
③ Output power
④ Arrestor A: With arrestor
⑤ 12:12V 24:24V 36:36V 48:48V
⑥ Input/Output connector type J: Nylon connector T:Screw terminal block
⑦ Optional joint connector B: With backup connector
⑧ Presence or absence of function H: High-efficiency type
⑨ Modification
⑩ Blank:Without chassis and cover C:With chassis K:With chassis and cover

*1 Values in ( ) above show peak current and power.

Features

- Backup for blackout and momentary power failure is available
- The built-in arrestor to avoid/mitigate the risk of lightning damage
- Equipped with a variable resistor to adjust output voltage
- Low noise and low leakage current eliminates the need for an external noise filter.

An amazing high level of efficiency 94%* has been achieved for a 24V output type*
(*At 230V AC input)
Peak power output, approx. 150% higher than continuous max.

Safety standard	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

●Function

TTL PFC RoHS Directive

●Input

AC input	85-264V AC (Worldwide range)

●Dimension

W×H×D (mm)	Without chassis and cover	84×45×180
	With chassis and cover	97.2×57.5×212

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items		Specification				Measurements conditions, etc.
AC Input	Rated Voltage		100-240VAC (85*-264VAC)				Worldwide range *See <Fig.1> Low input voltage derating.
	Input Frequency		50-60Hz				Frequency range 47-63Hz
	Efficiency	100VAC	90% typ (12V output), 92% typ (24V,36V,48V output)				At 300W load *Characteristic data: Fig.5
		200VAC	92% typ (12V output), 94% typ (24V,36V,48V output)				
	Power Factor	100VAC	99% typ				At rated output (convection cooling) *Characteristic data: Fig.6
		200VAC	92% typ(12V output), 94% typ (24V,36V,48V output)				
	Inrush Current	100VAC	18A typ				Power thermistor system at cold start (25°C) *Characteristic data: Fig.7
		200VAC	35A typ				
	Input Current	100VAC	3.6A typ (12V output at convection cooling), 4.4A typ (24V,36V,48V output at convection cooling)				At rated output
			5.0A typ (12V output at forced air cooling), 5.5A typ (24V,36V,48V output at forced air cooling)				
		200VAC	1.9A typ (12V output at convection cooling), 2.4A typ (24V,36V,48V output at convection cooling)				
			2.6A typ (12V output at forced air cooling), 3.0A typ (24V,36V,48V output at forced air cooling)				
Output	Model		UZP-400-A12	UZP-400-A24	UZP-400-A36	UZP-400-A48	
	Rated Voltage		+12V	+24V	+36V	+48V	
	Continuous Rated Output1 (convection cooling)		26.7A	16.8A	11.2A	8.4A	At rated input Refer to <Fig.4> output derating on the next page.
			320.4W	403.2W	403.2W	403.2W	
	Continuous Rated Output2 (forced air cooling)		36A	21A	14A	10.5A	
			432W	504W	504W	504W	
	Peak Current/Power		42A	25A	16.7A	12.5A	*Refer to peak output power condition on the next page. Convection cooling and forced air cooling
			504W*	600W*	601.2W*	600W*	
	Factory Setting		12V±2%	24V±2%	36V±2%	48V±2%	At continuous rated output1
	Adjustable Voltage Range		-5%,+10%	-5%,+10%	-5%,+10%	±5%	
	Static Input Regulation		48mV max.	94mV max.	144mV max.	192mV max.	
	Static Load Regulation		100mV max.	150mV max.	220mV max.	300mV max.	
	Temperature Regulation		0.02%/°C max.				
	Ripple Voltage	0-70°C	120mV max.			150mV max.	Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band. At rated output
		-10-0°C	160mV max.			200mV max.	
	Spike Noise Voltage	0-70°C	150mV max.			250mV max.	
		-10-0°C	180mV max.			400mV max.	
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current				
		Method	Blocking oscillation *Characteristic data: Fig.20				
		Recovery	Automatic recovery				
	Over Voltage Protection	OVP point (V)	13.8-16.2V	30.0-35.0V	41.4-49.4V	55.2-64.8V	
		Method	Output shutdown				
		Recovery	Reclosing of AC input				
Environment	Operating Temp./ Humidity	Open Frame	-10-70°C (at convection cooling), -10-70°C (at forced air cooling)*/20-90%RH				*Refer to <Fig.3> the guideline of forced air cooling and <Fig.4> output derating on the next page.
		With Chassis and Cover	-10-60°C (at convection cooling), -10-70°C (at forced air cooling)*/20-90%RH				
	Storage Temp./Humidity		-20-75°C/10-95%RH				There shall be no condensation
	Vibration		To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.				Follow JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3times for each of four bottom edges, and no malfunction shall be observed.				Follow JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		1.5kVAC/1minute between input and output/RC (*1)	3kVAC/1minute between input and output/RC		1.5kVAC/1minute between input and output/RC (*1)	Cut-off current 10mA
			1.5kVAC/1minnute between input and FG (*2)				Cut-off current 10mA
			500VAC/1minute between each output /RC/FG				Cut-off current 10mA
	Insulation Resistance		50MΩmin. between each input/output/RC/FG				At 500VDC
	Leakage Current		0.06mA typ (100VAC), 0.12mA typ (200VAC) *Characteristic data: Fig.8				
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000ns,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)				There shall be no fluctuation of DC output or malfunction.
	Electrostatic Discharge		EN61000-4-2 compliant				Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency, Electromagnetic Field		EN61000-4-3 compliant				
	Fast Transient Burst		EN61000-4-4 compliant				
	Lightning Surge		EN61000-4-5 compliant				With arrestor
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant				
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant				
	Voltage dips/Regulation		EN61000-4-11 compliant				
	Conducted Emmision		VCCI-B, FCC-B, CISPR32-B, EN55032-B compliant *Characteristic data: Fig.9, 10				At rated input and rated output (convection cooling), with chassis
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) classA, EN61000-3-2 (A14) classA compliant				At rated input and rated output (convection cooling)
Others	Safety Standards		UL62368-1, CSA62368-1(c-UL)certified, CE Marking, UKCA Marking EN62477-1, OVCⅢ, PSE (ordinance clause 2) compliant				
	Cooling System		Convection cooling/ forced air cooling				
	Output Grounding		Capacitor grounding				
	Output Hold-up Time		Refer to <Fig.15> Output Hold-up Time vs. Output Power				
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)				Following our standard
	Weight		550g typ (without chassis and cover), 870g typ (with chassis and cover)				
	Warranty		Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.				Except for errors caused by operation not specified in this specification.

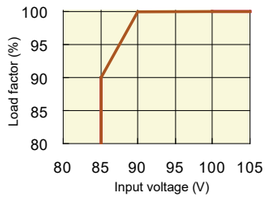
*1 The dielectric strength between input and output/RC is 3kV AC for 1 min, but please refer to the above specifications to prevent the arrester from operating due to the voltage dividing effect of the grounding capacitor's capacitance (between input, FG/output, and FG).

*2 The dielectric strength between input and FG is 2kV AC for 1min, but please refer to the above specifications because an arrester is installed between input and FG.

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.1> Low input voltage derating

Follow the derating below to derate rated current/power.

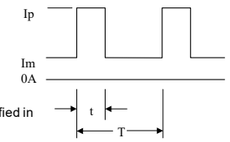


Peak output power condition

- Duty ratio of peak current shall be 30% or less.
- Energized period of peak current shall be 10 seconds or less.
- In the case that the ambient temperature is 50°C or higher with convection cooling, the energized period of peak current shall be 5 seconds or less.
- The value resulting from the formula below shall not exceed the continuous rated current, Io, after derating specified in the clause, "Output derating."

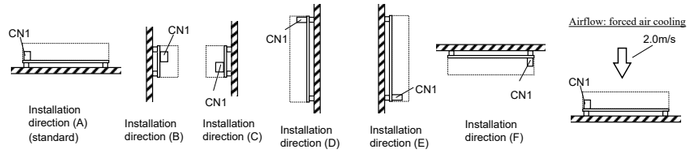
$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$

Ip=Peak current value
Im= Min. current value
D= Duty ratio, t/T
t= Pulse width of peak current
T= Cycle
Io= Continuous rated current specified in the clause"Output derating"



(Note) If the temperature of the power thermistor for limiting inrush current does not rise enough (and its resistance value is too large), such as when the normal average load power is small, the output voltage at peak output might drop about 100 ms. If this might cause any problem, please check the output voltage waveform while the power supply is installed on an actual device at operation.

<Fig.2> installation direction and cooling condition



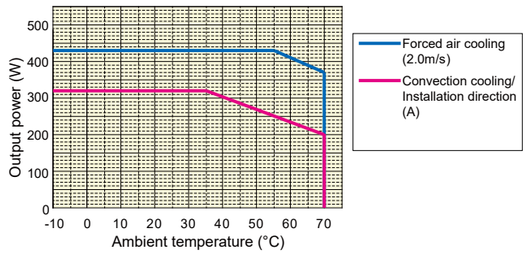
<Fig.3> Guideline for forced air cooling

Please contact us about the guideline for temperature rise of each component at forced air cooling.

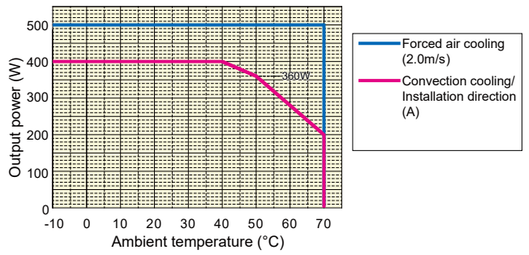
<Fig.4> Output derating

Follow the derating diagram below for output according to ambient temperature and installation direction.
For the mounting direction (A), follow the derating diagram below depending on the ambient temperature of the power supply.
For the mounting direction (B)-(E), please contact us. Also, the airflow shall be 2.0m/s for the forced air cooling as shown <Fig.2>.

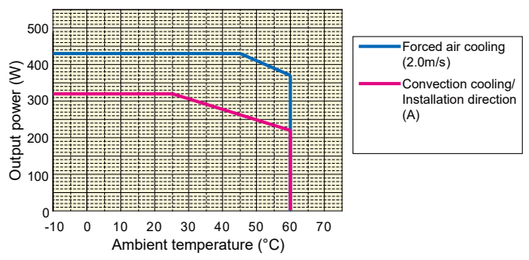
For open frame (12V)



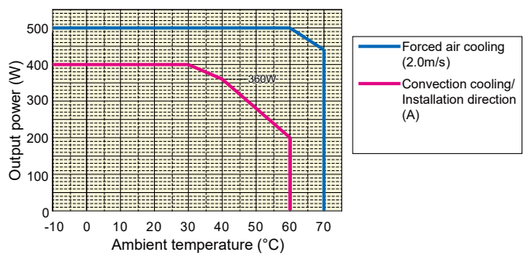
For open frame (24/36/48V)



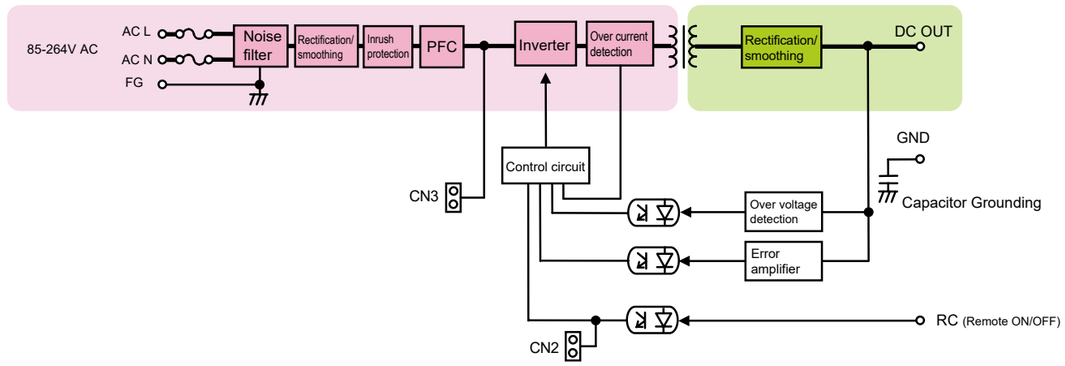
With chassis and cover (12V)



With chassis and cover (24/36/48V)



Block Diagram



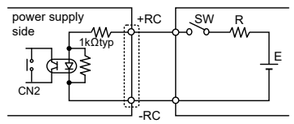
Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Note
Input Signal	Output ON/OFF control signal (RC signal)	Operating mode Between +RC and -RC: Output SW ON (4.5V or higher): ON SW OFF (0.8V or lower): OFF External power supply and Load-limiting resistor External power supply: E / Load-limiting resistor: R 4.5 - 12.5Vdc: Not required 12.5 - 30Vdc: 1.5kΩ 30 - 48Vdc: 8.2kΩ	Shorting Plug With shorting plug (CN2) connected, output starts up when AC input is applied regardless of RC signal. To control Start/Stop of output by RC signal, uncap shorting plug of CN2. Note: Shorting plug (CN2) is primary circuit components. Make sure to operate the plug after the AC input is turned off.

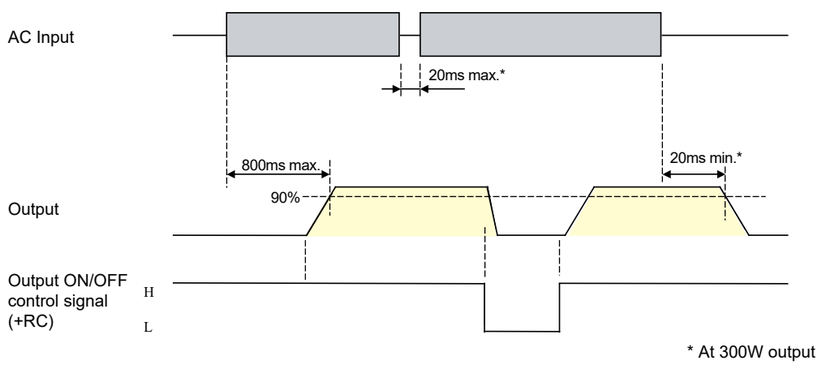
Signal Circuit

Input Signal Circuit

(RC signal)
Connection example:
using external power supply



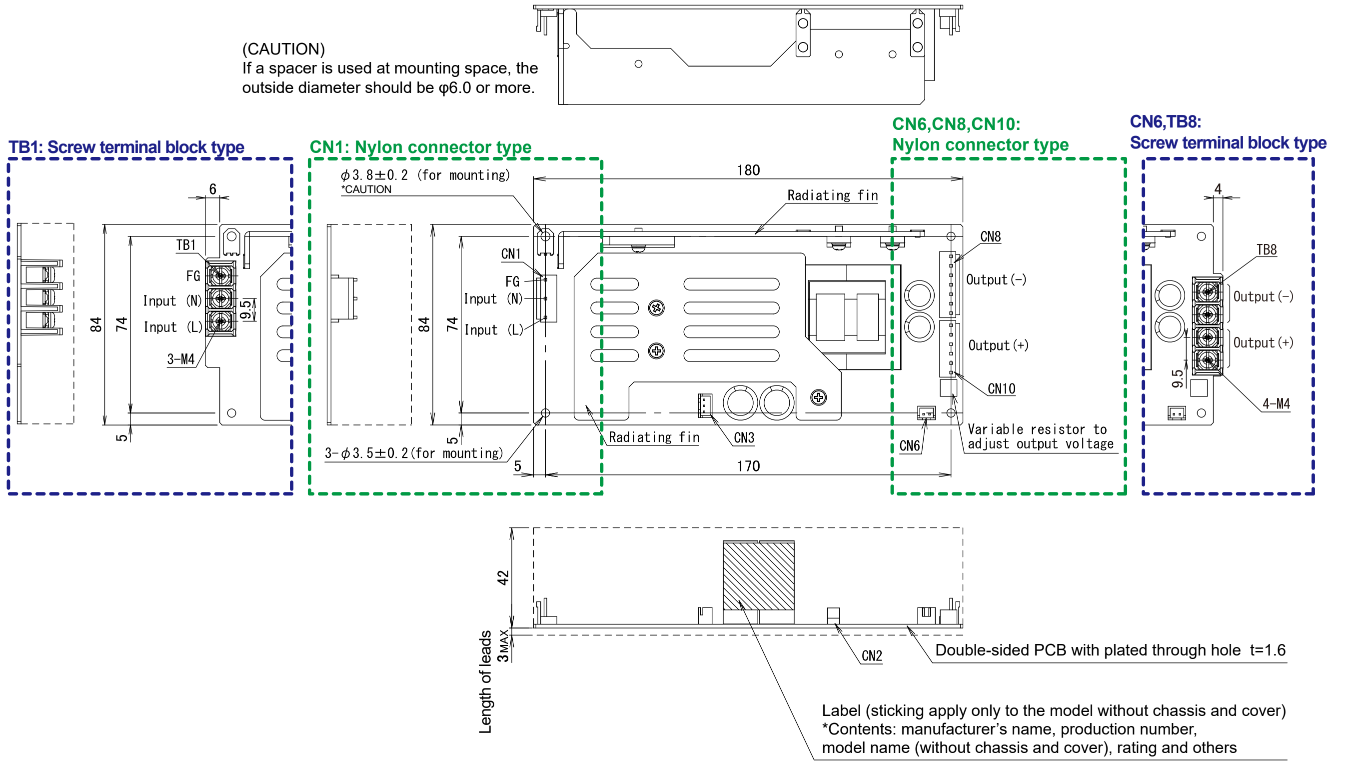
Sequence Timing Chart



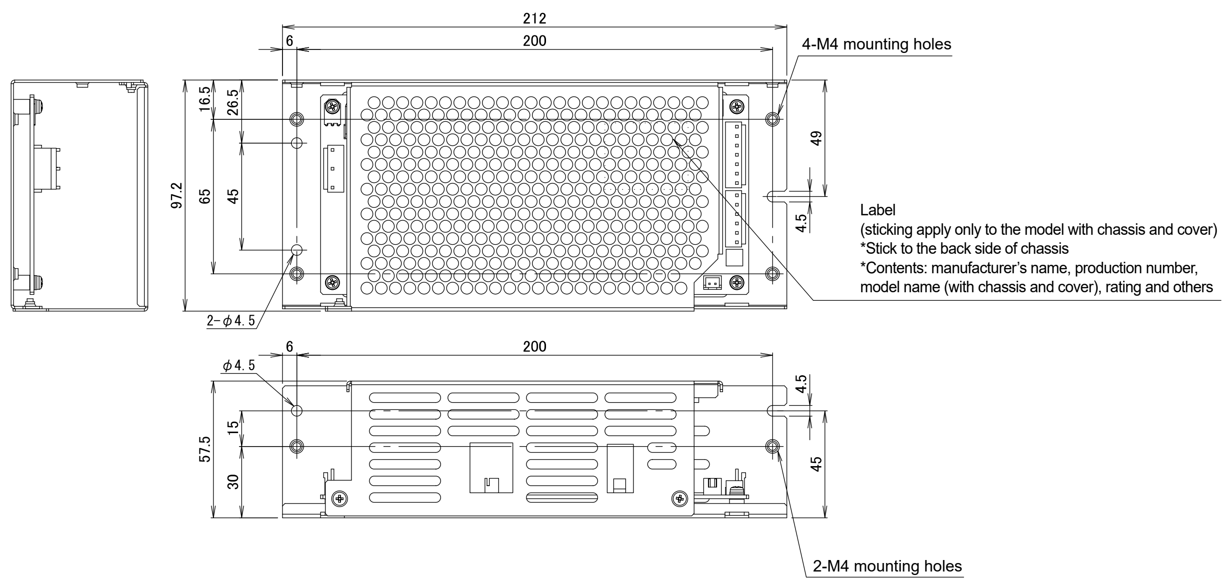
* At 300W output

Outline Drawing

■ PCB type (open frame) model



■ With chassis and cover



■ Connector pin allocation

Nylon connector type

CN1 (Input)

PIN No.	FUNCTION	CONNECTOR TYPE
1	AC(L)	B3P5-VH (JST)
2		
3	AC(N)	
4		
5	FG	

*CN1 Applicable housing: VHR-5N (JST)
Applicable terminals:
Reel: SVH-21T-P1.1 (JST)
Bulk: BVH-21T-P1.1 (JST)

CN10 (Output)

PIN No.	FUNCTION	CONNECTOR TYPE
1~6	+DC	B6P-VH (JST)

*CN10 Applicable housing: VHR-6N (JST)
Applicable terminals:
Reel: SVH-41T-P1.1 (JST)
Bulk: BVH-41T-P1.1 (JST)

CN8 (Output)

PIN No.	FUNCTION	CONNECTOR TYPE
1~7	−DC	B7P-VH (JST)

*CN8 Applicable housing: VHR-7N (JST)
Applicable terminals:
Reel: SVH-41T-P1.1 (JST)
Bulk: BVH-41T-P1.1 (JST)

Screw terminal block type

TB1(INPUT)
See the upper outline drawing

TB8(OUTPUT)
See the upper outline drawing

Common

CN3 (Capacitor package Input/Output)

PIN No.	FUNCTION	CONNECTOR TYPE
1	380V(Pri)	B3B-XH-A(JST)
2		
3	0V(Pri)	

*CN3 Applicable housing: XHP-3 (JST)
Applicable terminals:
Reel: SXH-001T-P0.6 (JST)
Bulk: BXH-001T-P0.6 (JST)

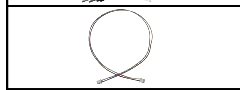
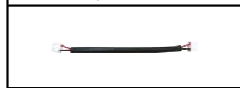
CN6 (ON/OFF Control)

PIN No.	FUNCTION	CONNECTOR TYPE
1	+RC	B2B-XH-A (JST)
2	−RC	

*CN6 Applicable housing: XHP-2 (JST)
Applicable terminals:
Reel: SXH-001T-P0.6 (JST)
Bulk: BXH-001T-P0.6 (JST)

Options (Sold separately)

Cable

Photos	Model	Category	Description
	WH-C05VH-800	Input harness	For nylon connector models
	WH-C05VH-800-01	Input harness (with ferrite core)	For nylon connector models
	WH-C06VH-500	Output (+) harness	Output (+) harness For nylon connector models
	WH-C07VH-500	Output (-) harness	Output (-) harness For nylon connector models
	WH-02XH02XH-500	Signal harness for RC signal	For using the output ON/OFF control signal (RC signal)
	WH-03XH03XH-115	Power harness for the capacitor unit	For connecting the power supply to the capacitor unit (CB03A-EC400/801F). Length: 115mm
	WH-03XH03XH-350	Power harness for the capacitor unit	For connecting the power supply to the capacitor unit (CB03A-EC400/801F). Length: 350mm
	WH-09ELP03XH-200	Power harness for connecting the battery pack	For connecting the power supply to the battery pack (BS28A-H350/2.5L).

Capacitor pack and Battery pack

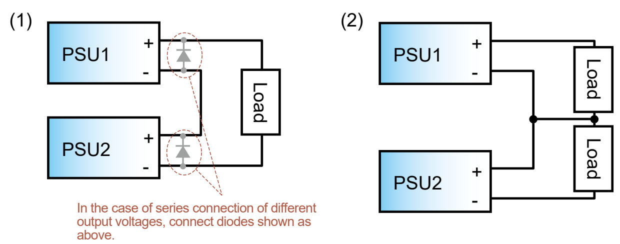
Photos	Model	Type	Description
	CB03A-EC400/801F	Capacitor unit	
	BS28A-H350/2.5L	Ni-MH	5 inch bay size

Connection in Series and Parallel

■ Series operation

Series connection is available as in figure (1) and (2) on the right. Series connection between different output voltages is available, such as 12 V and 24 V.

Note: In the case that different voltages are connected in series as in figure (1) on the right;
1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.
2. Connect diodes for protection as show in the figure (1). The rated current of the diodes shall be 1.5 times or more of the peak output current of the power supply which has larger peak output current among PSU1 and PSU2. Also, use Schottky diodes whose forward voltage is lower than the forward voltage of the diodes used in the PSU.

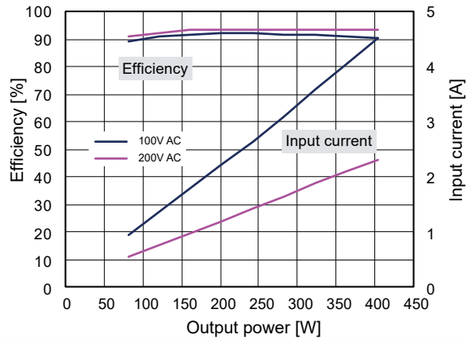


■ Parallel operation

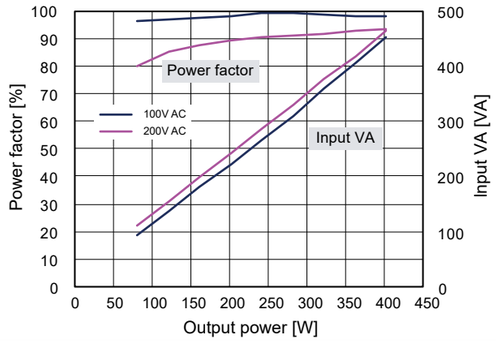
Parallel operation is not possible.

Characteristics Data (Typical features of the product series) UZP-400-A24 (Examples of actual measurements)

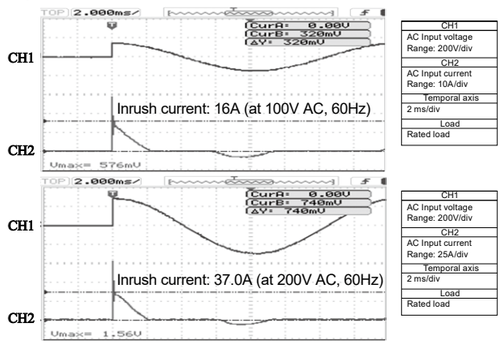
● Fig.5 Efficiency/Input Current vs. Output Power



● Fig.6 Power Factor/Input VA vs. Output Power



● Fig.7 Inrush Current



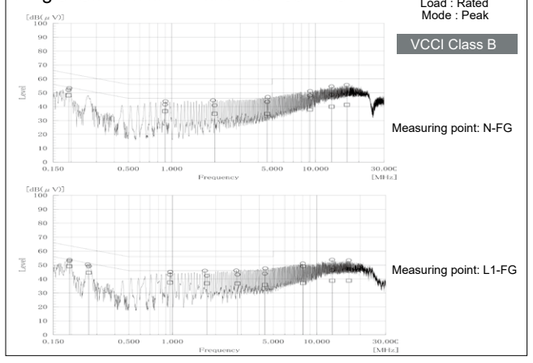
● Fig.8 Leakage Current

Input : 100, 200V AC
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.05 mA	0.05 mA
200V AC	0.11 mA	0.11 mA

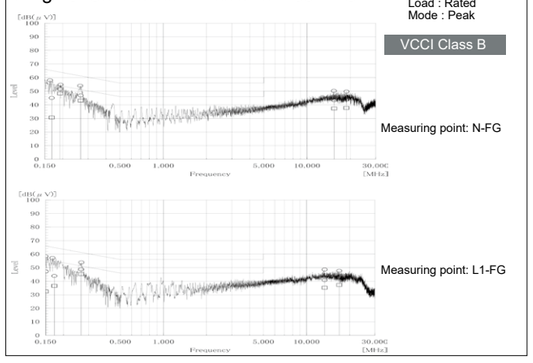
● Fig.9 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak



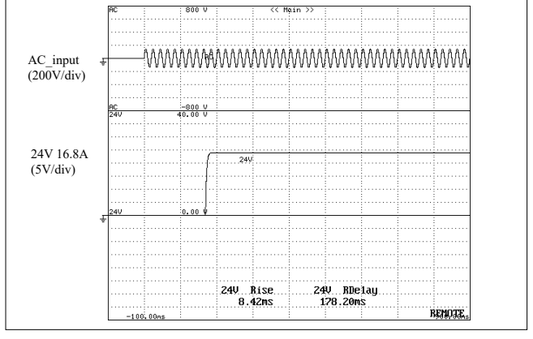
● Fig.10 Conducted Emission at 230V AC

Input : 230V AC
Load : Rated
Mode : Peak



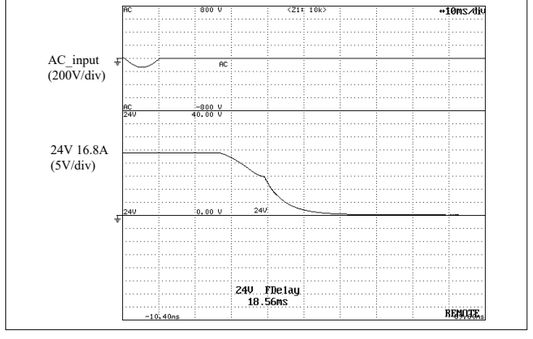
● Fig.11 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



● Fig.12 Falling Characteristics at 100V AC

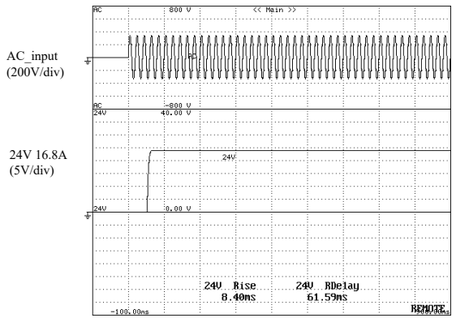
Input : 100V AC
Load : Rated
Time axis : 10 ms/DIV



Characteristics Data (Typical features of the product series) UZP-400-A24 (Examples of actual measurements)

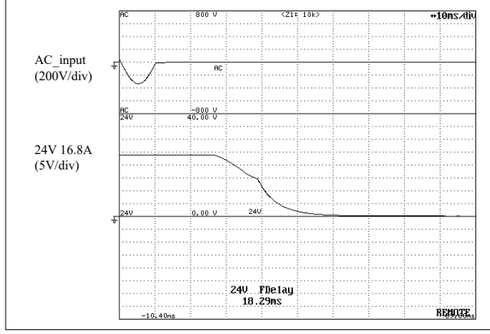
● Fig.13 Rising Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 100 ms/DIV

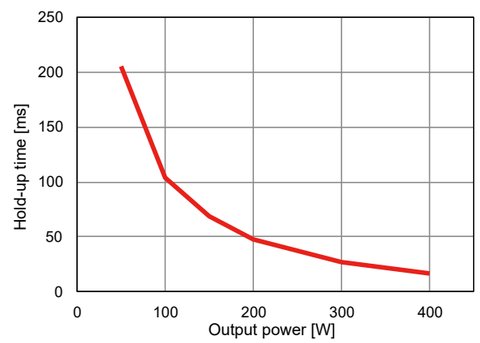


● Fig.14 Falling Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 10 ms/DIV

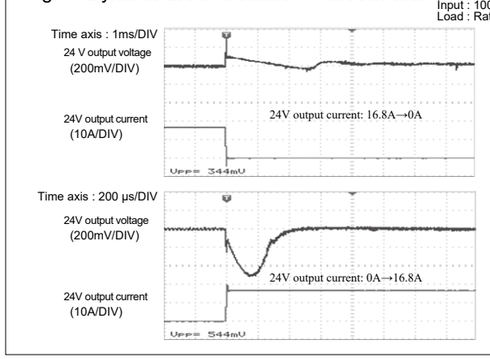


● Fig.15 Output Hold-up Time vs. Output Power

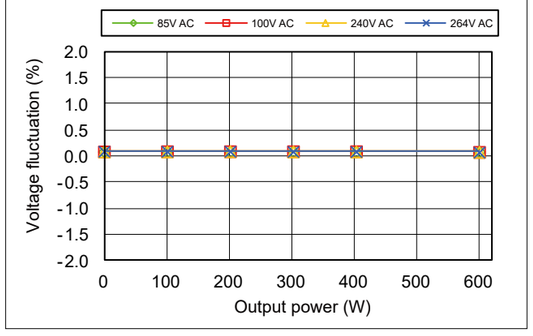


● Fig.16 Dynamic Load Fluctuation Characteristics

Input : 100V AC
Load : Rated



● Fig.17 Output Voltage Regulation (Load Fluctuation)

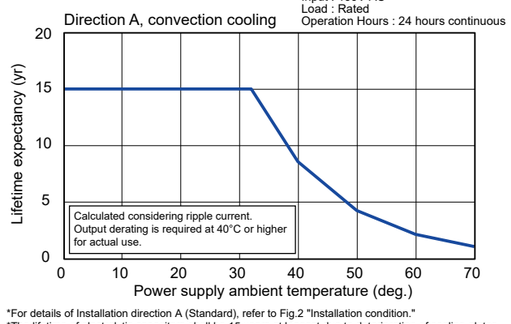


● Fig.18 Ripple and Spike Voltage

Temperature	AC Input voltage	CH1 24V					
		Minimum load		50% load		Rated load	
		Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)
-15°C	85V	3.5	7.7	13.2	24.9	23.8	43.2
	100V	3.6	7.8	12.6	24.9	23.3	42.1
	240V	3.3	7.9	11.7	21.7	21.8	38.9
	264V	3.4	8.0	11.4	22.0	21.8	38.9
25°C	85V	3.1	7.0	11.0	24.4	16.7	35.8
	100V	3.2	7.0	11.2	24.8	16.7	33.6
	240V	3.0	9.5	10.9	22.0	16.2	30.1
	264V	3.0	9.3	10.5	22.5	16.2	30.4
45°C	85V	3.2	7.0	10.4	25.0	18.7	39.2
	100V	3.2	6.5	10.6	23.5	19.1	37.7
	240V	3.1	6.9	11.2	23.7	18.4	34.0
	264V	3.1	7.0	11.4	23.1	17.5	32.6
55°C	85V	3.2	7.0	10.3	22.6	17.1	32.2
	100V	3.1	7.1	10.3	22.9	15.4	33.0
	240V	2.9	6.4	9.8	21.2	15.1	27.6
	264V	3.0	6.5	9.9	21.0	15.1	27.5
75°C	85V	3.0	7.0	6.3	14.5	12.4	26.6
	100V	3.1	6.5	6.4	14.3	12.5	26.0
	240V	3.0	6.4	6.2	13.7	12.0	24.6
	264V	3.0	6.3	6.1	13.7	12.5	24.4

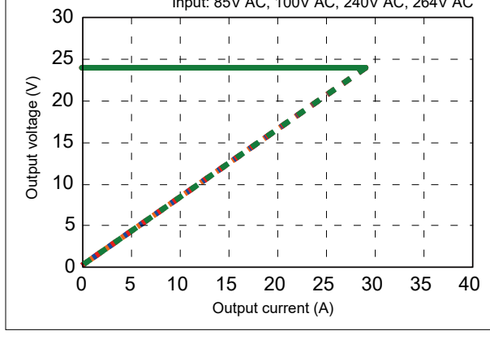
● Fig.19 Ambient Temperature vs. Lifetime Expectancy

Input : 100V AC
Load : Rated
Operation Hours : 24 hours continuous

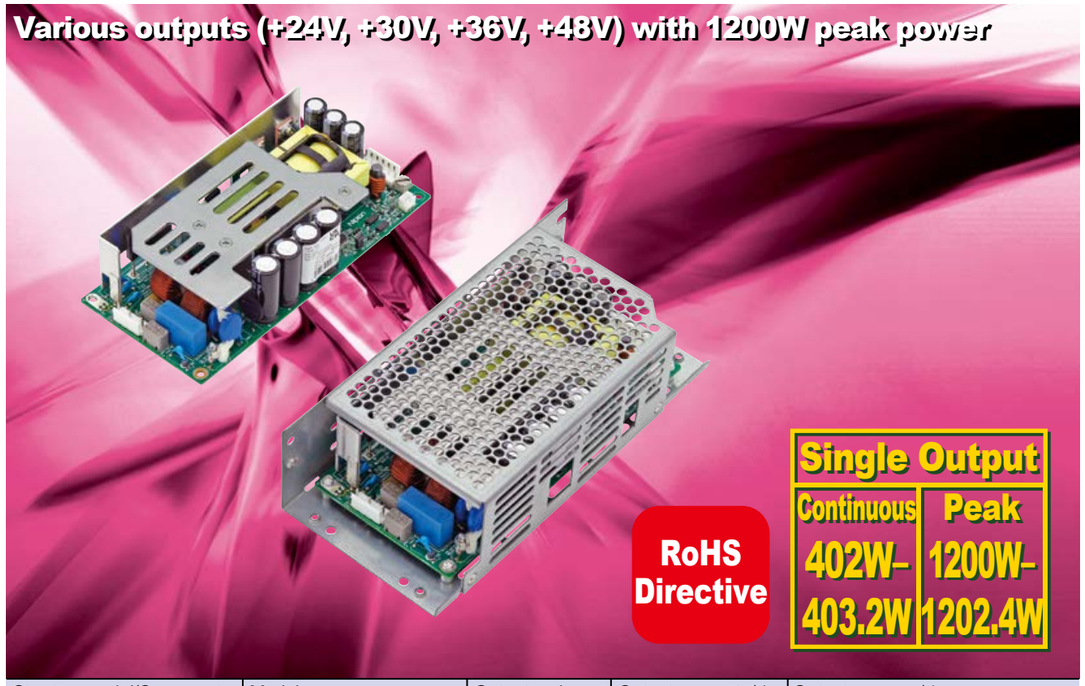


*For details of Installation direction A (Standard), refer to Fig.2 "Installation condition."
*The lifetime of electrolytic capacitors shall be 15 years at longest due to deterioration of sealing plates.

●Fig.20 Overcurrent Protection Characteristics (V - I Characteristics)



Single Output Power Supply UZP-400/1200 series



Structure and I/O connector	Model	Output voltage	Output current *1	Output power *1
Open frame type/ Nylon connector	UZP-400/1200P-A24-J0H	+24V	16.8A (50A)	403.2W (1200W)
	UZP-400/1200P-A30-J0H	+30V	13.4A (40A)	402W (1200W)
	UZP-400/1200P-A36-J0H	+36V	11.2A (33.4A)	403.2W (1202.4W)
	UZP-400/1200P-A48-J0H	+48V	8.4A (25A)	403.2W (1200W)
Structure	Description			
With chassis	'-C' is added after open frame model name (Ex: UZP-400/1200P-A24-J0H-C)			
With chassis and cover	'-K' is added after open frame model name (Ex: UZP-400/1200P-A24-J0H-K)			

■ Model name coding

UZP-400/1200P-A**-J0H*-*
① ② ③ ④ ⑤ ⑥ ⑦⑧⑨⑩ ⑪

① Series name
② Support peak output
③ Continuous output power
④ Peak output power
⑤ Arrestor A: With arrestor
⑥ 24:24V 30:30V 36:36V 48:48V
⑦ Input/Output connector type J: Nylon connector
⑧ Optional joint connector B: Without optional connector
⑨ Presence or absence of function H: High-efficiency type
⑩ Modification
⑪ Blank:Without chassis and cover C:With chassis K:With chassis and cover

*1 Values in ( ) above show peak current and power.

Features

- Able to peak output max. three times the continuous power.
- The built-in arrestor to avoid/mitigate the risk of lightning damage
- Equipped with a variable resistor to adjust output voltage
- Low noise and low leakage current eliminates the need for an external noise filter.

Achieved high efficiency 94%* with 24 V output type
(*At 200V AC input, 300W output)
Peak power, approx. 300% higher than continuous max.

Safety standard	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

●Function

TTL PFC RoHS Directive

●Input

AC input	170–264V AC

●Dimension

W×H×D (mm)	Without chassis and cover	84×45×180
	With chassis and cover	97.2×57.5×212

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

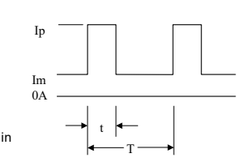
	Items		Specification				Measurements conditions, etc.
AC Input	Rated Voltage		200-240VAC (170*-264VAC)				
	Input Frequency		50-60Hz				Frequency range 47-63Hz
	Efficiency	200VAC	94% typ				At 300W load *Characteristic data: Fig.4
	Power Factor	200VAC	96% typ				At rated output (convection cooling) *Characteristic data: Fig.5
	Inrush Current	200VAC	57A typ				Power thermistor system at cold start (25°C) *Characteristic data: Fig.6
	Input Current	200VAC	2.3A typ				At rated output (convection cooling)
			2.8A typ				At rated output (forced air cooling)
Output	Model		UZP-400/1200P-A24	UZP-400/1200P-A30	UZP-400/1200P-A36	UZP-400/1200P-A48	
	Rated Voltage		+24V	+30V	+36V	+48V	
	Continuous Rated Output1 (convection cooling)		16.8A	13.4A	11.2A	8.4A	At rated input Refer to <Fig.3> output derating on the next page.
			403.2W	402W	403.2W	403.2W	
	Continuous Rated Output2 (forced air cooling)		21A	16.8A	14A	10.5A	
			504W	504W	504W	504W	
	Peak Current/Power		50A	40A	33.4A	25A	*Refer to peak output power condition. Convection cooling and forced air cooling
			1200W*	1200W*	1202.4W*	1200W*	
	Factory Setting		24V±2%	30V±2%	36V±2%	48V±2%	At rated input
	Adjustable Voltage Range		24V±5%	30V±5%	36V±5%	48V±5%	
	Static Input Regulation		94mV max.	120mV max.	144mV max.	192mV max.	
	Static Load Regulation	Rated Load	150mV max.	180mV max.	220mV max.	300mV max.	
		Peak Load	250mV max.	300mV max.	370mV max.	500mV max.	
	Temperature Regulation		0.02%/°C max.				
	Ripple Voltage	0-70°C	120mV max.			150mV max.	Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band. At rated output
		-10-0°C	160mV max.			200mV max.	
	Spike Noise Voltage	0-70°C	150mV max.			250mV max.	
		-10-0°C	180mV max.			400mV max.	
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current				
		Method	Blocking oscillation *Characteristic data: Fig.18				
		Recovery	Automatic recovery				
	Over Voltage Protection	OVP point (V)	28.0-35.0V	34.5-40.5V	41.4-49.4V	55.2-64.8V	
		Method	Output shutdown				
		Recovery	Reclosing of AC input				
Environment	Operating Temp./ Humidity	Open Frame	-10-70°C (at convection cooling), -10-70°C (at forced air cooling)*/20-90%RH				*Refer to <Fig.3> output derating on the next page.
		With Chassis and Cover	-10-60°C (at convection cooling), -10-70°C (at forced air cooling)*/20-90%RH				
	Storage Temp./Humidity		-20-75°C/10-95%RH				There shall be no condensation
	Vibration		To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.				Follow JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3times for each of four bottom edges, and no malfunction shall be observed.				Follow JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		1.5kVAC/1minute between input and output/RC (*1)				Cut-off current 10mA
			1.5kVAC/1minnute between input and FG (*2)				Cut-off current 10mA
			500VAC/1minute between each output /RC/FG				Cut-off current 10mA
	Insulation Resistance		50MΩmin. between each input/output/RC/FG				At 500VDC
	Leakage Current		0.12mA typ (200VAC) *Characteristic data: Fig.7				
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000ns,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)				
	Electrostatic Discharge		EN61000-4-2 compliant				Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency, Electromagnetic Field		EN61000-4-3 compliant				
	Fast Transient Burst		EN61000-4-4 compliant				
	Lightning Surge		EN61000-4-5 compliant				With arrestor
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant				
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant				
	Voltage dips/Regulation		EN61000-4-11 compliant				
	Conducted Emmision		VCCI-B, FCC-B, CISPR32-B, EN55032-B compliant				At rated input and rated output (convection cooling), with chassis
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) classA, EN61000-3-2 (A14) classA compliant				At rated input and rated output (convection cooling)
Others	Safety Standards		UL62368-1,CSA62368-1(c-UL) certified, CE Marking, UKCA Marking EN62477-1 OVC III /PSE (ordinance clause 2) compliant				
	Cooling System		Convection cooling/ forced air cooling				
	Output Grounding		Capacitor grounding				
	Output Hold-up Time		50ms min. *Characteristic data: Fig.13				At 300W output
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)				Following our standard
	Weight		550g typ (without chassis and cover), 870g typ (with chassis and cover)				
	Warranty		Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.				Except for errors caused by operation not specified in this specification.

*1 The dielectric strength between input and output/RC is 3kV AC for 1 min., but please refer to the above specifications to prevent the arrester from operating due to the voltage dividing effect of the grounding capacitor's capacitance (between input, FG/output, and FG).
*2 The dielectric strength between input and FG is 2kV AC for 1min., but please refer to the above specifications because an arrester is installed between input and FG.

Peak output power condition

- Duty ratio of peak current shall be 50% or less.
- Energized period of peak current shall be 10 seconds or less.
- The value resulting from the formula below shall not exceed the continuous rated current, Io, after derating specified in the clause, "Output derating."

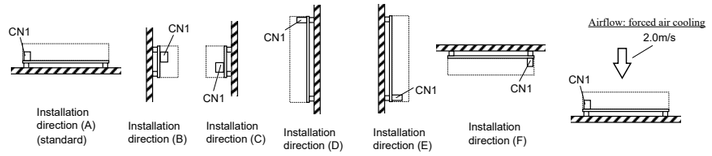
$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$
Ip=Peak current value
Im= Min. current value
D= Duty ratio, t/T
t= Pulse width of peak current
T= Cycle
Io= Continuous rated current specified in the clause"Output derating"



(Note) If the temperature of the power thermistor for limiting inrush current does not rise enough (and its resistance value is too large), such as when the normal average load power is small, the output voltage at peak output might drop about 100 ms. If this might cause any problem, please check the output voltage waveform while the power supply is installed on an actual device at operation.

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.1> installation direction and cooling condition



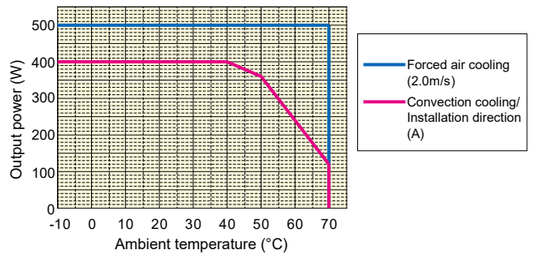
<Fig.2> Guideline for forced air cooling

Please contact us about the guideline for temperature rise of each component at forced air cooling.

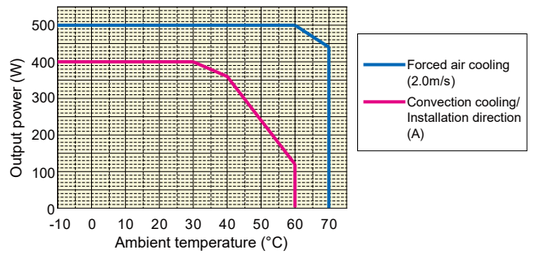
<Fig.3> Output derating

Follow the derating diagram below for output according to ambient temperature and installation direction.
For the mounting direction (A), follow the derating diagram below depending on the ambient temperature of the power supply.
For the mounting direction (B)-(E), please contact us. Also, the airflow shall be 2.0m/s for the forced air cooling as shown <Fig.1>.

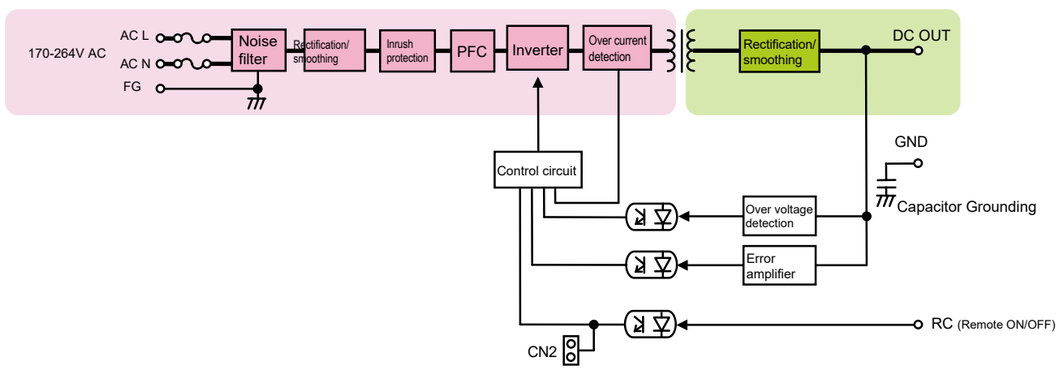
For open frame (24/30/36/48V)



With chassis and cover (24/30/36/48V)



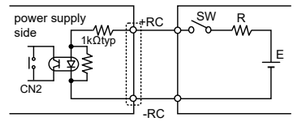
Block Diagram



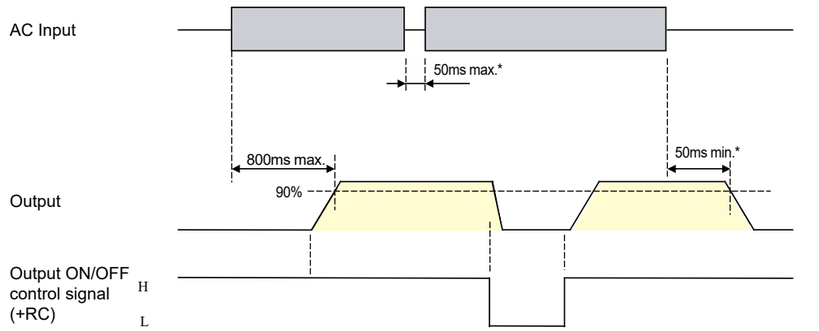
Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Note
Input Signal	Output ON/OFF control signal (RC signal)	Operating mode: Between +RC and -RC: Output; SW ON (4.5V or higher): ON; SW OFF (0.8V or lower): OFF External power supply and Load-limiting resistor: External power supply: E / Load-limiting resistor: R; 4.5 - 12.5Vdc: Not required; 12.5 - 30Vdc: 1.5kΩ; 30 - 48Vdc: 8.2kΩ	Shorting Plug With shorting plug (CN2) connected, output starts up when AC input is applied regardless of RC signal. To control Start/Stop of output by RC signal, uncap shorting plug of CN2. Note: Shorting plug (CN2) is primary circuit components. Make sure to operate the plug after the AC input is turned off.
Input Signal Circuit	Signal Circuit		

(RC signal)
Connection example:
using external power supply



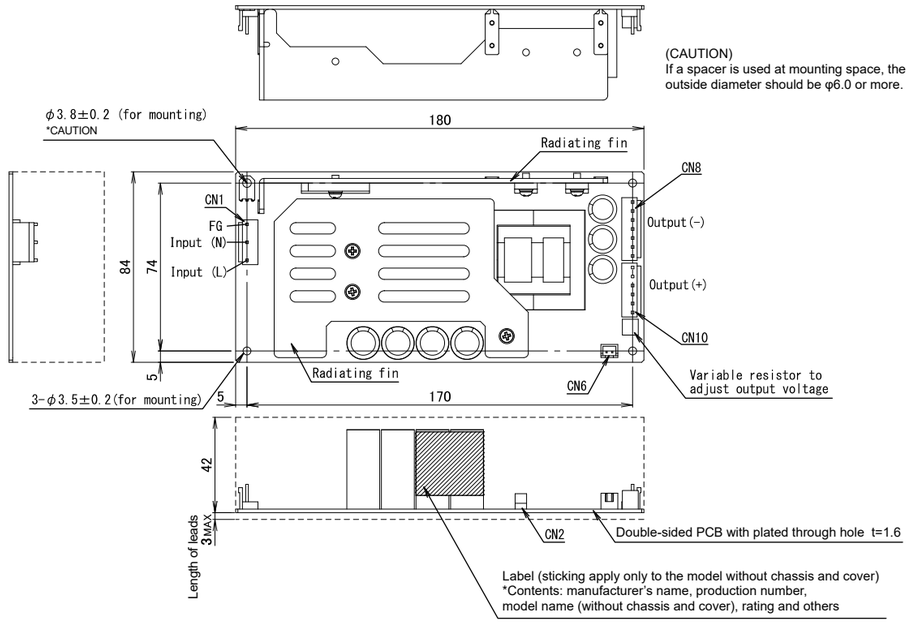
Sequence Timing Chart



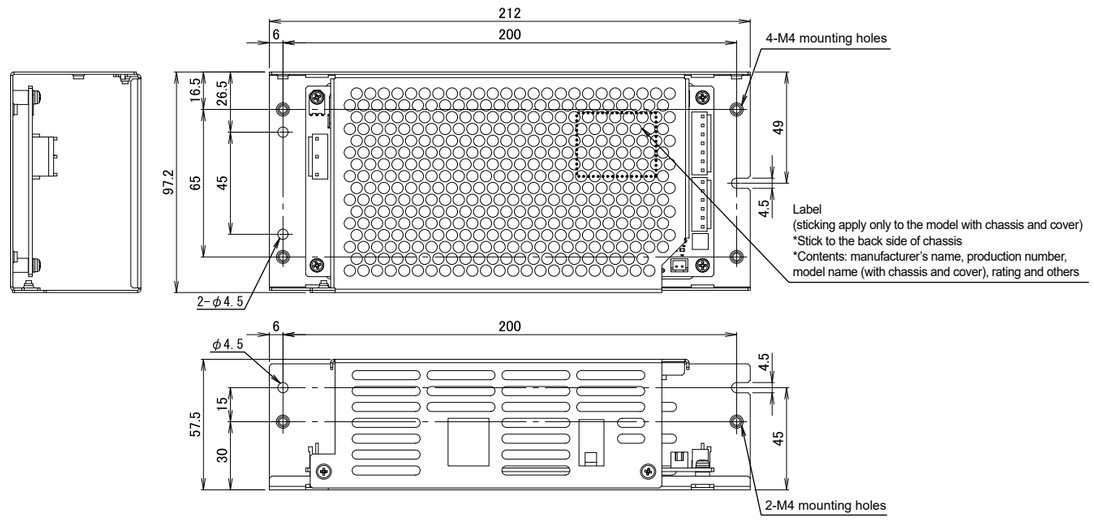
* At 300W output

Outline Drawing

■ PCB type (open frame) model



■ With chassis and cover



■ Connector pin allocation

CN1 (Input)		
PIN No.	FUNCTION	CONNECTOR TYPE
1	AC(L)	B3P5-VH (JST)
2		
3	AC(N)	
4		
5	FG	

*CN1 Applicable housing: VHR-5N (JST)
Applicable terminals: Reel: SVH-21T-P1.1 (JST) Bulk: BVH-21T-P1.1 (JST)

CN10 (Output)		
PIN No.	FUNCTION	CONNECTOR TYPE
1～6	+DC	B6P-VH (JST)

*CN10 Applicable housing: VHR-6N (JST)
Applicable terminals: Reel: SVH-41T-P1.1 (JST) Bulk: BVH-41T-P1.1 (JST)

CN8 (Output)		
PIN No.	FUNCTION	CONNECTOR TYPE
1～7	-DC	B7P-VH (JST)

*CN8 Applicable housing: VHR-7N (JST)
Applicable terminals: Reel: SVH-41T-P1.1 (JST) Bulk: BVH-41T-P1.1 (JST)

CN6 (ON/OFF Control)		
PIN No.	FUNCTION	CONNECTOR TYPE
1	+RC	B2B-XH-A (JST)
2	−RC	

*CN6 Applicable housing: XHP-2 (JST)
Applicable terminals: Reel: SXH-001T-P0.6 (JST) Bulk: BXH-001T-P0.6 (JST)

Options (Sold separately)

Cable			
Photos	Model	Category	Description
	WH-C05VH-800	Input harness	For nylon connector models
	WH-C05VH-800-01	Input harness (with ferrite core)	For nylon connector models
	WH-C06VH-500	Output (+) harness	(+) harness For nylon connector models
	WH-C07VH-500	Output (-) harness	(-) harness For nylon connector models
	WH-02XH02XH-500	Signal harness for RC signal	For using the output ON/OFF control signal (RC signal)

Connection in Series and Parallel

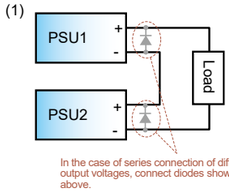
■ Series operation

Series connection is available as in figure (1) and (2) on the right.
Series connection between different output voltages is available, such as 12 V and 24 V.

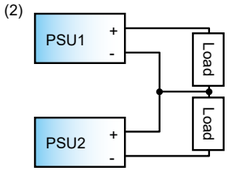
Note: In the case that different voltages are connected in series as in figure (1) on the right;

1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.
2. Connect diodes for protection as show in the figure (1).
   The rated current of the diodes shall be 1.5 times or more of the peak output current of the power supply which has larger peak output current among PSU1 and PSU2.
   Also, use Schottky diodes whose forward voltage is lower than the forward voltage of the diodes used in the PSU.

(1)



(2)

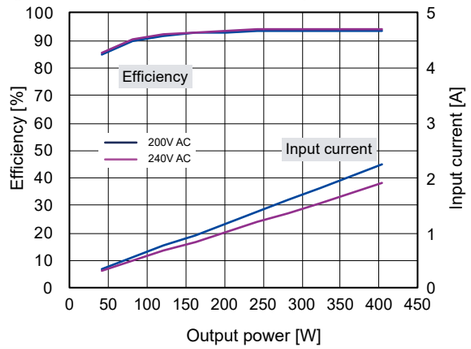


■ Parallel operation

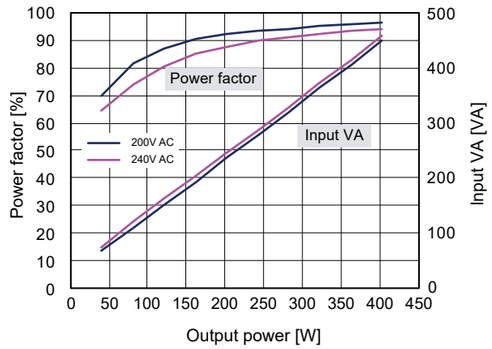
Parallel operation is not possible.

Characteristics Data (Typical features of the product series) UZP-400/1200P-A24 (Examples of actual measurements)

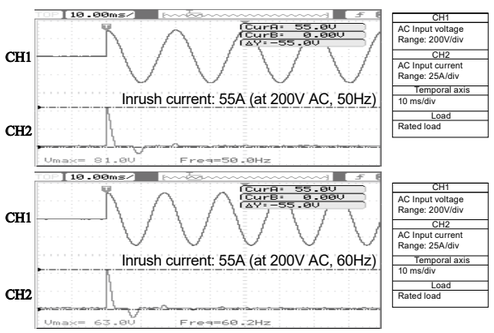
● Fig.4 Efficiency/Input Current vs. Output Power



● Fig.5 Power Factor/Input VA vs. Output Power



● Fig.6 Inrush Current



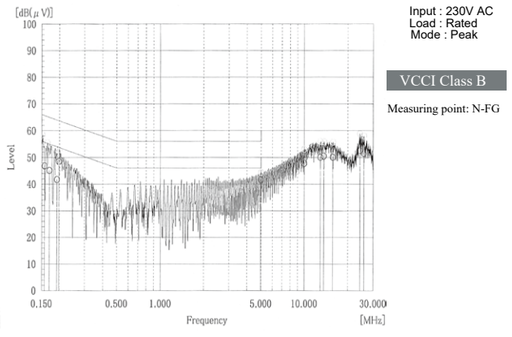
● Fig.7 Leakage Current

Input : 200, 240V AC

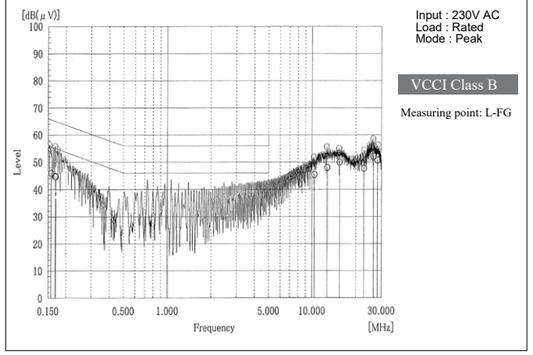
Load : Rated load and Min. load

	Rated load	Min. load
200V AC	0.12mA	0.12mA
240V AC	0.14mA	0.14mA

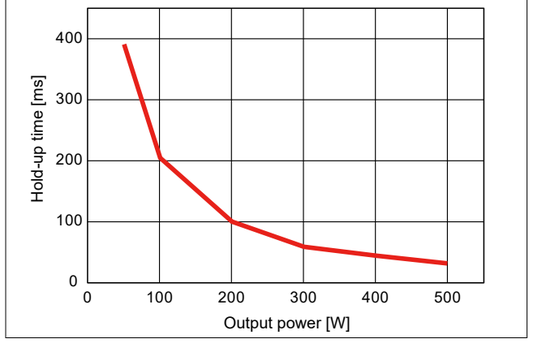
● Fig.8 Conducted Emission at 230V AC



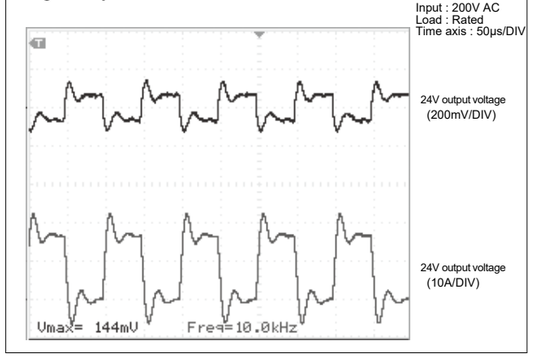
● Fig.9 Conducted Emission at 230V AC



● Fig.10 Output Hold-up Time vs. Output Power



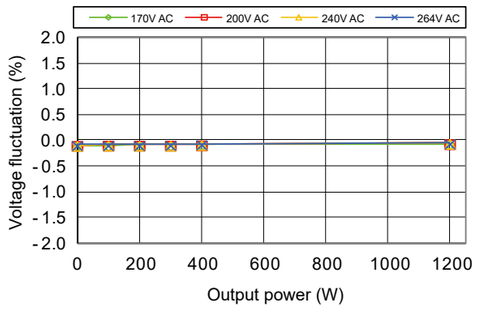
● Fig.11 Dynamic Load Fluctuation Characteristics



UZP-400/1200P Series

Characteristics Data (Typical features of the product series) UZP-400/1200P-A24 (Examples of actual measurements)

● Fig.12 Output Voltage Regulation (Load Fluctuation)



● Fig.13 Ripple and Spike Voltage

Temperature	AC Input voltage	CH1 24V					
		Minimum load		50% load		Rated load	
		Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)
-15°C	170V	7.1	14.9	25.2	40.8	35.0	51.6
	200V	6.4	14.3	24.5	40.8	34.8	51.0
	240V	6.2	14.2	24.3	40.4	34.3	50.6
	264V	6.2	14.0	24.9	41.1	34.2	50.3
25°C	170V	5.6	11.4	24.8	35.5	32.2	49.3
	200V	5.1	11.2	24.1	35.6	32.1	48.4
	240V	5.2	11.1	24.3	35.4	32.0	48.8
	264V	5.1	11.0	24.7	35.7	32.2	48.8
45°C	170V	5.2	11.2	30.2	37.9	36.4	50.5
	200V	5.2	11.2	29.4	38.0	36.1	50.4
	240V	5.4	10.8	29.9	37.4	35.9	49.7
	264V	5.3	10.8	30.2	37.2	36.1	49.7
55°C	170V	11.2	23.9	30.9	45.3	47.5	61.7
	200V	12.8	24.3	30.6	45.1	47.3	60.0
	240V	10.6	24.1	31.0	45.4	47.6	60.2
	264V	10.1	22.6	31.2	45.4	47.0	60.4
75°C	170V	5.1	10.5	17.4	22.3	25.5	30.1
	200V	4.9	10.5	17.3	22.1	25.5	30.0
	240V	4.9	10.5	17.2	22.0	25.6	30.1
	264V	5.0	10.4	17.3	21.9	25.8	30.0

● Fig.14 Ambient Temperature vs. Lifetime Expectancy

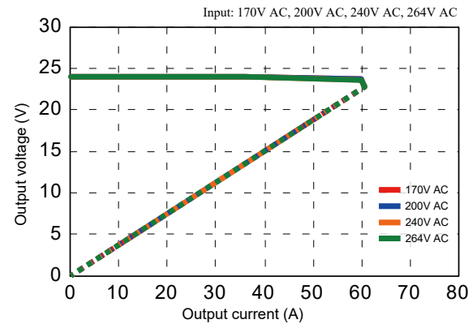
Input : 200V AC
Load : Rated

■Electrolytic capacitors

Ambient temperature	25°C	40°C
Lifetime expectancy	Approx. 15 years	Approx. 11.2 years

* The lifetime shall be 15 years at longest due to deterioration of the sealing rubber characteristics.

●Fig.15 Overcurrent Protection Characteristics (V - I Characteristics)



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Single Output Power Supply UZP-600 series

Structure and I/O connector	Model	Output voltage	Output current *1	Output power *1
Without Cover type/ Horizontal nylon connector	UZP-600-A24-JH0	+24V	25A (50A)	600W (1200W)
	UZP-600-A30-JH0	+30V	20A (40A)	600W (1200W)
	UZP-600-A36-JH0	+36V	16.7A (33.4A)	601.2W (1202.4W)
	UZP-600-A48-JH0	+48V	12.5A (25A)	600W (1200W)
Structure	Model			
With Cover	'-K' is added after without cover model name (Ex: UZP-600-A24-JH0-K)			
With Cover and front panel *2	'-U' is added after without cover model name (Ex: UZP-600-A24-JH0-U)			
Input/Output connector type	Model			
Vertical nylon connector	'JH' in the horizontal nylon connector model become 'JV' (Ex: UZP-600-A24-JV0)			
Horizontal screw terminal block	'JH' in the horizontal nylon connector model become 'TH' (Ex: UZP-600-A24-TH0)			
Vertical screw terminal block	'JH' in the horizontal nylon connector model become 'TV' (Ex: UZP-600-A24-TV0)			

■ Model name coding

UZP-600-A**-**0*-*
① ② ③ ④ ⑤ ⑥⑦⑧⑨ ⑩

① Series name
② Peak output
③ Output power
④ Arrestor A: With arrestor
⑤ 24: 24V 30: 30V 36: 36V 48: 48V
⑥ Input/Output connector type J: Nylon connector T: Screw terminal block
⑦ Input/Output connector direction H: Horizontal V: Vertical
⑧ Optional function
⑨ Modification
⑩ Blank: Without cover K: With cover

*1 Values in ( ) above show peak current and power. *2 Only horizontal nylon connector

Features
- Comes with a +12 V standby output
- Equipped with a variable resistor to adjust output voltage
- Enhanced resistance to lightning surges (Common mode: actual performance ± 8 kV)
- Connector type and screw terminal block type are available

An amazing high level of efficiency 95% has been achieved for a 24V output type*
(*At 230V AC input, 450W load)

1200W peak power , approx. 200% higher than continuous max.

Safety standards	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

*30V/36V output type, with cover/with cover and front panel type is safety standards compliant.

●Function

TTL PFC RoHS Directive

●Input

AC input	85–264V AC (Worldwide range)

●Dimension

W×H×D (mm)	Without cover	127×44×228.6
	With cover	127×52×233.6
	Without cover and front panel	127×53×234.6

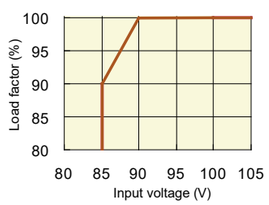
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items		Specification					Measurements conditions, etc.
AC Input	Rated Voltage		100-240VAC (85*-264VAC)					Worldwide range *See <Fig.1> Low input voltage derating below.
	Input Frequency		50-60Hz					Frequency range 47-63Hz
	Efficiency	115VAC	93% typ					At rated output (convection cooling), the standby output is at no load, fan output is at no load *Characteristic data: Fig.6
		230VAC	95% typ					
	Power Factor	115VAC	98% typ					At rated output (convection cooling) *Characteristic data: Fig.7
		230VAC	96% typ					
	Inrush Current	100VAC	18A typ					Power thermistor system at cold start (25°C) *Characteristic data: Fig.8
		200VAC	36A typ					
	Input Current	115VAC	5.8A typ (at convection cooling), 7.8A typ (at forced air cooling)					
		230VAC	2.9A typ (at convection cooling), 3.9A typ (at forced air cooling)					
Output	Model		UZP-600-A24	UZP-600-A30	UZP-600-A36	UZP-600-A48	Common specifications	
	Rated Voltage		+24V	+30V	+36V	+48V	+12VSB	
	Continuous Rated Output1 (Convection cooling)		25A	20A	16.7A	12.5A	0.42A	At rated input Refer to <Fig.5> output derating on the following page.
			600W	600W	601.2W	600W	5W	
	Continuous Rated Output2 (Forced air cooling)		33.4A	26.7A	22.3A	16.7A	–	
			801.6W	801W	802.8W	801.6W	–	
	Peak Current/Power		50A	40A	33.4A	25A	–	*Refer to peak output power condition below. Convection cooling and forced air cooling
			1200W*	1200W*	1202.4W*	1200W*	–	
	Factory Setting		24V±2%	30V±2%	36V±2%	48V±2%	12V±5%	At continuous rated output1
	Adjustable Voltage Range		-2%,+10%	-5%,+10%	-5%,+10%	-2%,+10%	–	
	Static Input Regulation		94mV max.	120mV max.	144mV max.	192mV max.	47mV max.	
	Static Load Regulation	Rated Load	150mV max.	180mV max.	220mV max.	300mV max.	75mV max.	
		Peak Load	250mV max.	300mV max.	370mV max.	500mV max.	75mV max.	
	Temperature Regulation	0-70°C	0.02%/°C max.					
		-20-0°C	0.04%/°C max.					
	Ripple Voltage	0-70°C	130mVp-p max.	160mVp-p max.	195mVp-p max.	260mVp-p max.	120mV max.	Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band.
		-20-0°C	175mVp-p max.	300mVp-p max.	320mVp-p max.	350mVp-p max.	160mV max.	
	Spike Voltage	0-70°C	150mVp-p max.	190mVp-p max.	225mVp-p max.	300mVp-p max.	150mV max.	
		-20-0°C	200mVp-p max.	350mVp-p max.	375mVp-p max.	400mVp-p max.	180mV max.	
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current				0.44A max.	
		Method	Blocking oscillation *Characteristic data: Fig.20					
		Recovery	Automatic recovery					
	Over Voltage Protection	OCP point (V)	28.0-33.0V	34.5-40.5V	43.2-49.4V	56.2-63.0V	–	
		Method	Output shutdown (latch lock)				–	
		Recovery	Reclosing of AC input				–	
Environment	Operating Temp./ Humidity	Open frame	-20-70°C (at convection cooling), -20-70°C (at forced air cooling) */20-90%RH					*<Fig.4> on the next page shows the guideline of forced air cooling. Refer to <Fig.5> output derating.
		With cover	-20-60°C (at convection cooling), -20-70°C (at forced air cooling) */20-90%RH					
	Storage Temp./Humidity		-20-85°C/10-95%RH					There shall be no condensation
	Vibration		To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.					Follow JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat 3times for each of four bottom edges, and no malfunction shall be observed.					Follow JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		1.5kVAC/1minnute between input and output/standby output/RC/AC_FAIL					Cut-off current 10mA *1
			1.5kVAC/1minnute between input and FG					Cut-off current 10mA
			500VAC/1minute between output /standby output/RC/AC_FAIL/FG					Cut-off current 100mA
			500VAC/1minute between each output /standby output/RC/AC_FAIL					
			100VAC/1minute between output /standby output					
	Insulation Resistance		50MΩmin. between each input/output/RC/AC_FAIL/FG					At 500VDC
	Leakage Current		0.06mA typ (100VAC), 0.12mA typ (200VAC) *Characteristic data: Fig.9					
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000ns,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)					There shall be no fluctuation of DC output or malfunction.
	Electrostatic Discharge		EN61000-4-2 compliant					Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency, Electromagnetic Field		EN61000-4-3 compliant					
	Fast Transient Burst		EN61000-4-4 compliant					
	Lightning Surge		EN61000-4-5 compliant					With arrestor
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant					
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant					
	Voltage dips/Regulation		EN61000-4-11 compliant					
	Conducted Emmision		VCCI-B, FCC-B, CISPR32-B, EN55032-B compliant *Characteristic data: Fig.10,11					At rated input and rated output (convection cooling)
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) classD, EN61000-3-2 (A14) classD compliant.					At rated input/output , continuous rated output
Others	Safety Standard		UL62368(c-UL) certified, CE Marking* PSE (ordinance clause 2) compliant					*30V/36V output type, with cover/with cover and front panel type is safety standards compliant.
	Cooling System		Convection cooling/Forced air cooling					
	Output Grounding		Capacitor grounding					
	Output Hold-up Time		Refer to <Fig.16> Output Hold-up Time vs. Output Power.					*Characteristic data: Fig.16
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)					Following our standard
	Weight		1300g typ (open frame), 1450g typ (with cover)					
	Warranty		Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.					Except for errors caused by operation not specified in this specification.

*1 The original dielectric strength between the input and output/RC/AC_FAIL is 3kV AC for 1minute. However, because an arrestor is mounted between the input terminal and frame ground (FG), the actual dielectric strength between them is in specification as written above.

<Fig.1> Low input voltage derating

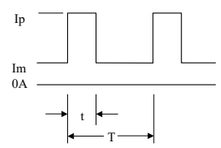
Follow the derating below to derate rated current/power.



Peak output power condition

- Duty ratio of peak current shall be 30% or less.
- Energized period of peak current shall be 5 seconds or less.
- The value resulting from the formula below shall not exceed the continuous rated current, Io, after derating specified in the clause, "Output derating".

$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$
Ip=Peak current value
Im= Min. current value
D= Duty ratio, t/T
t= Pulse width of peak current
T= Cycle
Io= Continuous rated current specified in output derating

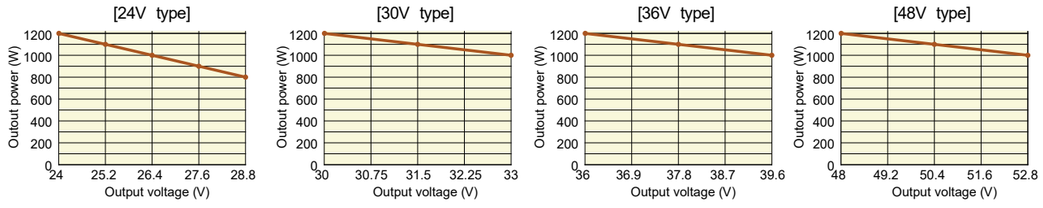


(Note) If the temperature of the power thermistor for limiting inrush current does not rise enough (and its resistance value is too large), such as when the normal average load power is small, the output voltage at peak output might drop about 100 ms. If this might cause any problem, please check the output voltage waveform while the power supply is installed on an actual device at operation.

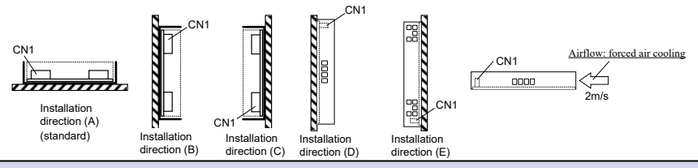
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.2> Peak output derating

●Use this product by reducing the peak power according to the present output voltage, as shown in the derating diagram shown below.



<Fig.3> Installation/Air cooling

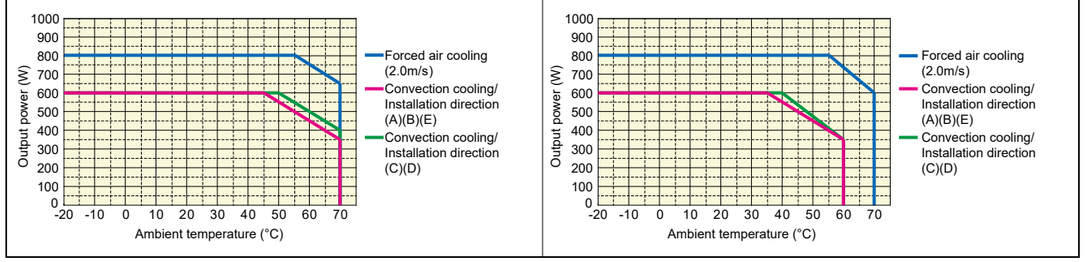


<Fig.4> Guideline for forced air cooling

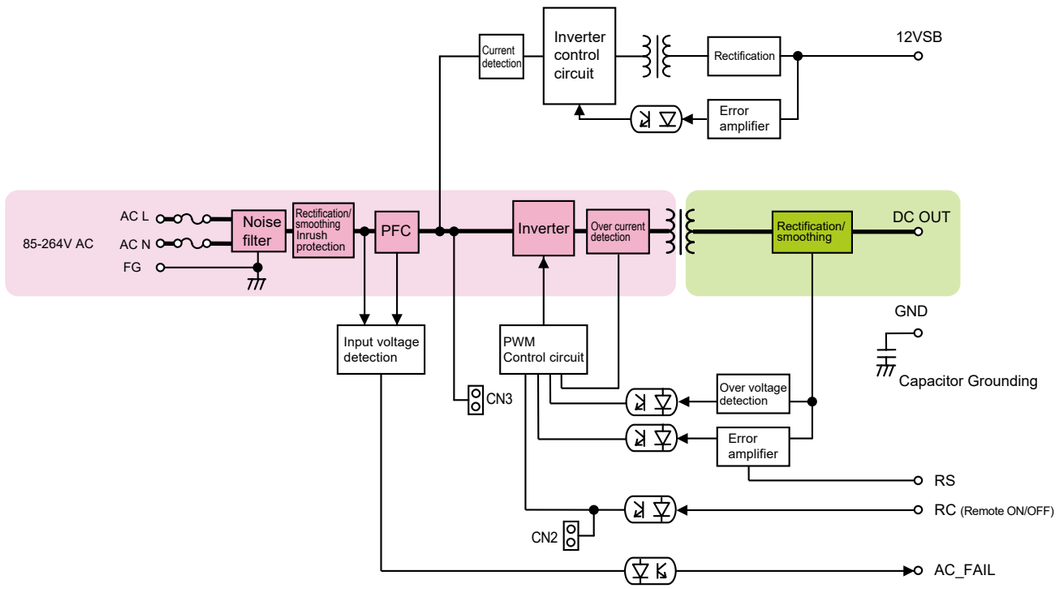
Please contact us about the guideline for temperature rise of each component at forced air cooling.

<Fig.5> Output derating

The following figure shows the required output derating diagram with the mounting holes (4 locations) on the bottom of the power supply installed on a 1.6 mm thick steel plate.
As for installation direction (A), reduce the output power according to the derating diagram below according to the ambient temperature of the power supply.
Also, forced air cooling condition in the diagram shall be provided the air flows of 2 m/s.



Block Diagram



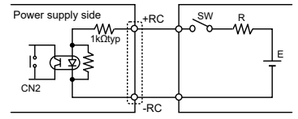
Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Note
Input Signal	Output ON/OFF control signal (RC signal)	Operating mode Between +RC and -RC: Output SW ON (4.5V or higher): ON SW OFF (0.8V or lower): OFF External power supply and Load-limiting resistor External powersupply: E / Load-limiting resistor: R 4.5 ~ 12.5Vdc: Not required 12.5 ~ 30Vdc: 1.5kΩ 30 ~ 48Vdc: 8.2kΩ	Shorting Plug With shorting plug (CN2) connected, output starts up when AC input is applied regardless of RC signal. To control Start/Stop of output by RC signal, uncap shorting plug of CN2. Note: Shorting plug (CN2) is primary circuit components. Make sure to operate the plug after the AC input is turned off.
Input Signal	Remote sensing signal (RS signal)	Input terminal for detection of output voltage. Connecting RS signal to positive side of devices, it shall compensate line-drop at positive side such as output cable.	
Output Signal	Blackout detection signal (AC_FAIL)	The signal goes “OPEN” at low AC input voltage and power failure detection. Detection voltage: 80V AC typ. Detection delay time: 20 to 50 ms after AC input failure.	

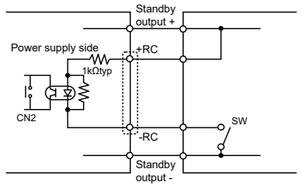
Signal Circuit

Input Signal Circuit

(RC signal)
Connection example: using external power supply



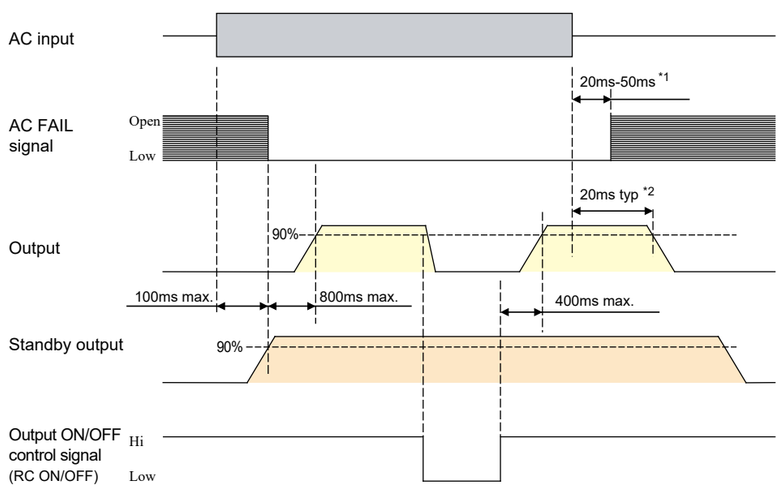
(RC signal)
Connection example: using standby output



Output Signal Circuit

(AC_FAIL)

Sequence Timing Chart

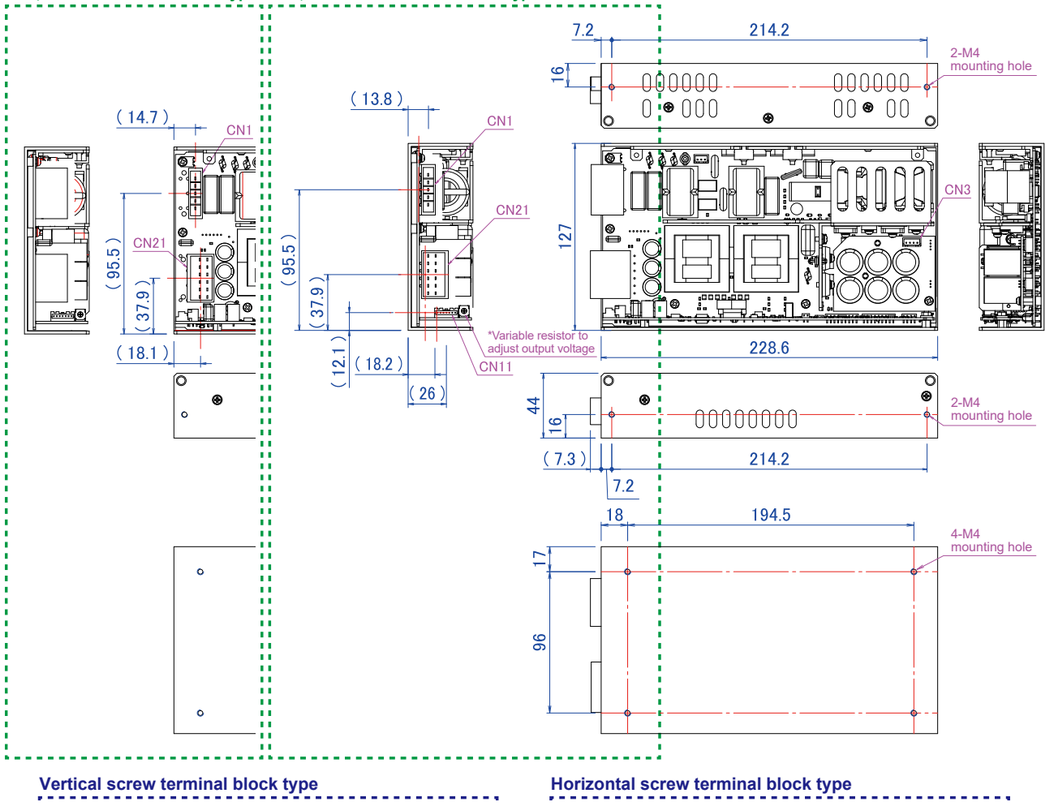


*1 When output power is under 10% and input voltage is higher than 150V AC, it shall be 150ms max.
*2 At rated input, 600W output

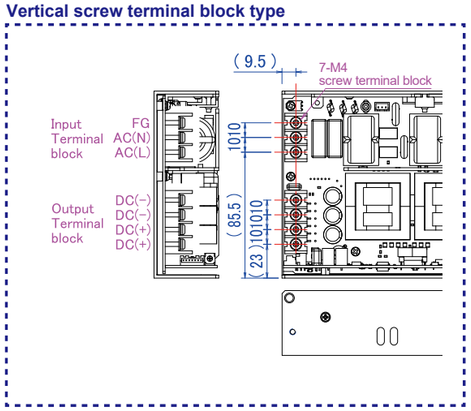
Outline Drawing

■Open frame model

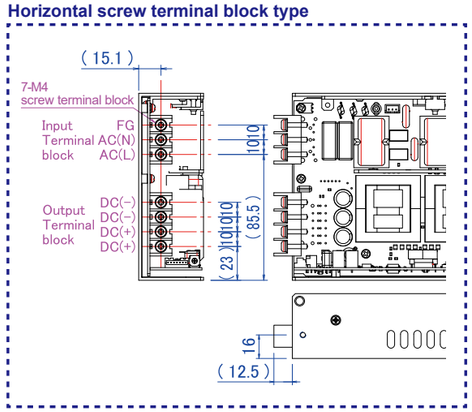
CN1,CN21: Vertical connector type　CN1,CN21: Horizontal connector type



Vertical screw terminal block type



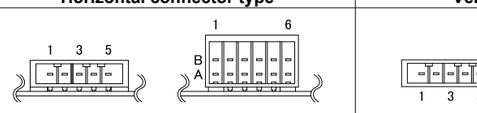
Horizontal screw terminal block type



*1 Design tolerance of dimensions is ± 1 mm.
*2 The screw depth of penetration into power supply is 4 mm max.
*3 Design tolerance of mounting dimensions is ± 0.5 mm.

■Connector pin allocation

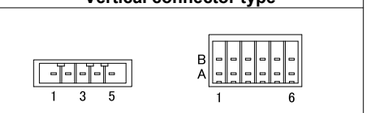
Horizontal connector type



CN1 (Input)			
Pin No.	Function	Connector Type	
1	FG	S05B-F32SK-GGXR	
2			
3	AC(N)		
4			
5	AC(L)		

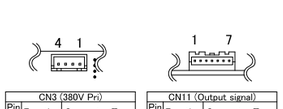
CN21 (Output)		
Pin No.	Function	Connector Type
A−1 ～ A−6	DC(−)	SC12B-F35DK-GGR
B−1 ～ B−6	DC(+)	

Vertical connector type



CN1 (Input)		
Pin No.	Function	Connector Type
1	FG	B05B-F32SK-GGXR
2		
3	AC(N)	
4		
5	AC(L)	

CN21 (Output)		
Pin No.	Function	Connector Type
A−1 ～ A−6	DC(−)	BC12B-F35DK-GGR
B−1 ～ B−6	DC(+)	

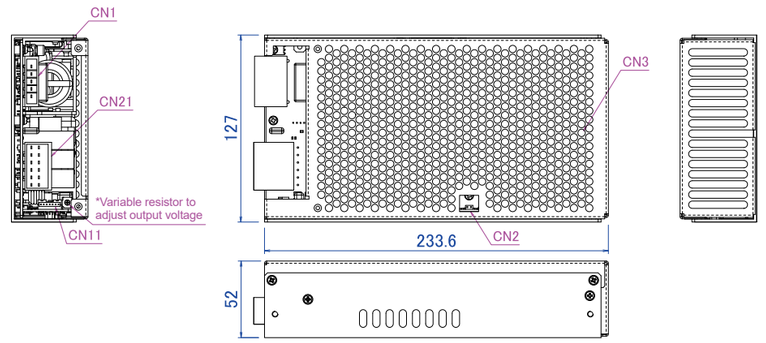


CN3 (380V Pri)		
Pin No.	Function	Connector Type
1	380V(Pri)	B4B-XH-A
2		
3	Vcc	
4	0V(Pri)	

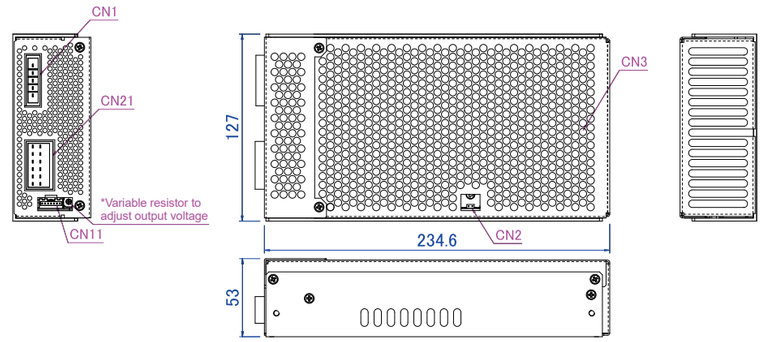
CN11 (Output signal)		
Pin No.	Function	Connector Type
1	RS	S07B-PASK-2
2	AC Fail +	
3	AC Fail −	
4	RC +	
5	RC −	
6	GND	
7	+12VSB	

Outline Drawing

■With cover (horizontal connector type as an example)



■With cover and front panel (only for horizontal connector type)



Options (Sold separately)

Cable

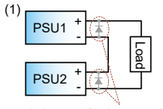
Photos	Model	Category	Description
	WH-C05JFAS-800	Input harness	For nylon connector models
	WH-C04JFAD-500	Output harness (4 pins type)	For nylon connector models (connectable up to 3 harnesses)
	WH-C07PA-500	Signal harness	For using the output ON/OFF control signal (RC signal), AC_FAIL or +12VSB

Connection in Series and Parallel

■ Series operation
Series connection is available as in figure (1) and (2) on the right.
Series connection between different output voltages is available, such as 24 V and 48 V.

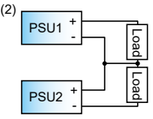
Note: In the case that different voltages are connected in series as in figure (1) on the right;
1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.
2. Connect diodes for protection as show in the figure (1).
The rated current of the diodes shall be 1.5 times or more of the peak output current of the power supply which has larger peak output current among PSU1 and PSU2.
Also, use Schottky diodes whose forward voltage is lower than the forward voltage of the diodes used in the PSU.

(1)



In the case of series connection of different output voltages, connect diodes shown as above.

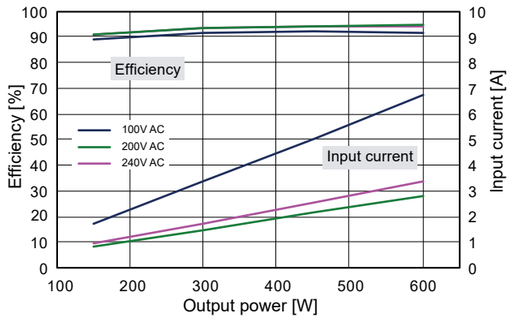
(2)



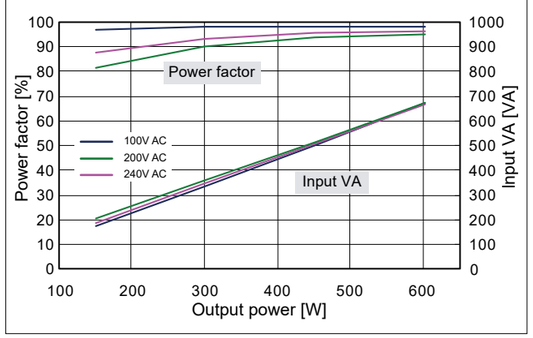
■ Parallel operation
Parallel operation is not possible.

Characteristics Data (Typical features of the product series) UZP-600-A24 (Examples of actual measurement)

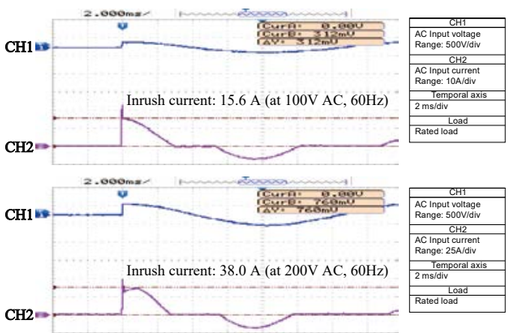
● Fig.6 Efficiency/Input Current vs. Output Power



● Fig.7 Power Factor/Input VA vs. Output Power



● Fig.8 Inrush Current



● Fig.9 Leakage Current

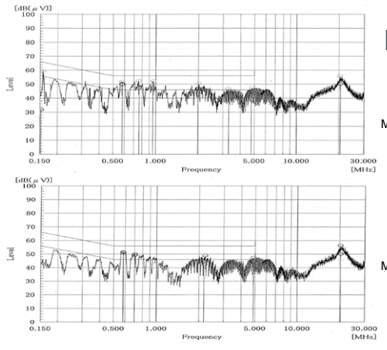
Input : 100, 200V AC
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.05mA	0.06mA
200V AC	0.12mA	0.12mA

● Fig.10 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak

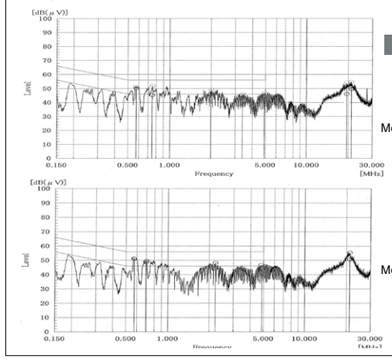
VCCI Class B



● Fig.11 Conducted Emission at 230V AC

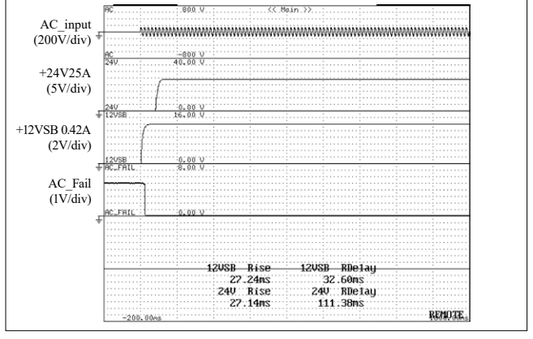
Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B



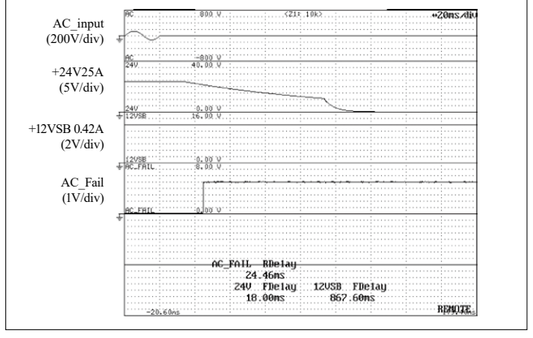
● Fig.12 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 200 ms/DIV



● Fig.13 Leakage Current

Input : 100V AC
Load : Rated
Time axis : 20 ms/DIV

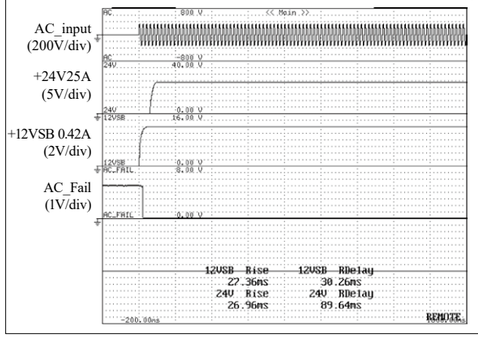


UZP-600 Series

Characteristics Data (Typical features of the product series) UZP-600-A24 (Examples of actual measurement)

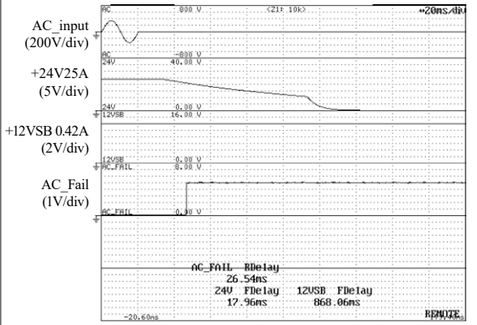
● Fig.14 Rising Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 200ms/DIV

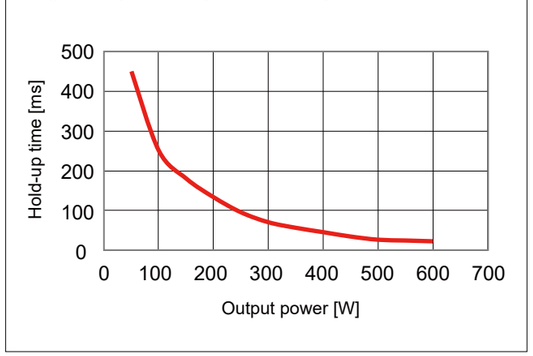


● Fig.15 Falling Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 20ms/DIV

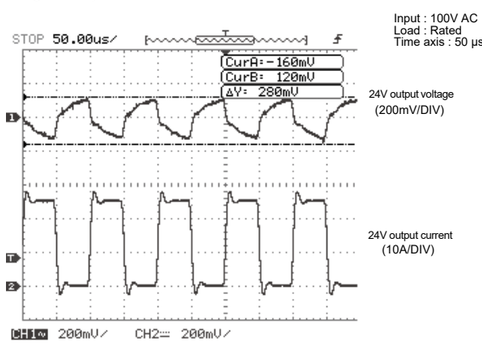


● Fig.16 Output Hold-up Time vs. Output Power

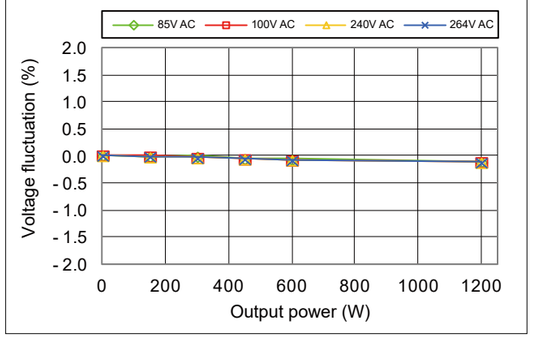


● Fig.17 Dynamic Load Fluctuation Characteristics at 10kHz

Input : 100V AC
Load : Rated
Time axis : 50 µs/DIV



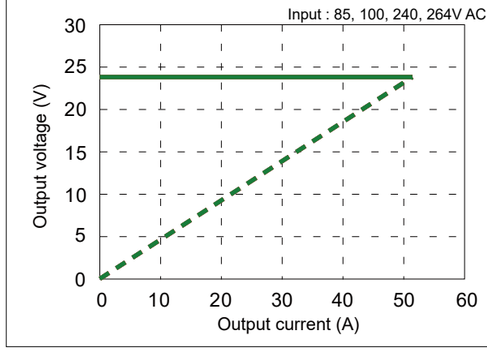
● Fig.18 Output Voltage Regulation (Load Fluctuation)



● Fig.19 Ripple and Spike Voltage

Temperature	AC Input voltage	24V Minimum load Ripple(mV)	24V Minimum load Noise(mV)	24V 50% load Ripple(mV)	24V 50% load Noise(mV)	24V Rated load Ripple(mV)	24V Rated load Noise(mV)
-25℃	85V	2.9	30.1	32.6	75.4	39.5	120.5
	100V	2.7	29.5	34.8	73.5	37.1	111.7
	240V	2.8	27.2	25.9	57.2	40.5	73.9
	264V	2.9	26.5	21.3	56.3	36.3	69.1
25℃	85V	2.4	23.8	20.5	57.0	33.1	65.5
	100V	2.3	23.5	21.1	56.6	34.3	67.3
	240V	2.3	21.5	12.7	53.8	18.2	57.8
	264V	2.1	21.2	12.2	54.0	17.1	56.7
50℃	85V	1.2	19.2	19.4	56.0	29.2	64.9
	100V	1.8	18.5	17.2	54.3	27.7	62.6
	240V	1.6	16.9	14.4	51.6	17.6	57.5
	264V	1.6	16.7	12.6	50.6	15.9	54.9
75℃	85V	1.4	14.6	26.1	49.3	19.2	53.4
	100V	1.1	14.5	20.5	51.1	19.0	54.8
	240V	1.2	13.7	11.1	46.9	13.4	51.3
	264V	0.9	13.1	9.7	42.9	12.7	50.0

●Fig.20 Overcurrent Protection Characteristics (V - I Characteristics)



Battery Pack BS13A-EC400/422F

Model	Description
BS13A-EC400/422F	—

■Model name coding

BS13 A - EC 400 / 422F
① ② ③ ④ ⑤

① Series name
② Modification
③ Electrolytic capacitor
④ Output voltage
⑤ Capacity 4,200μF

Compatible Power Supply

- ●OZP-350 series
- ●UZP-120/220 series

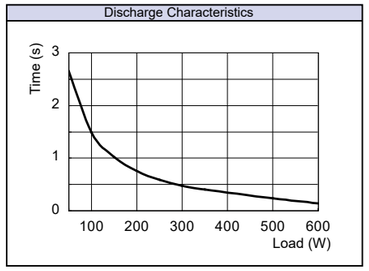
Features

By using electrolytic capacitors, instead of a battery pack, the unit has 12 years min. (at 40°C) life expectancy. No need for maintenance.

- Advantages of a capacitor pack
  - Maintenance free (no need for replacement)
  - Low and high operating temperature (0°C to 60°C)
  - 2 minutes quick charge (deals with frequent blackout)
  - Light 1.4kg typ. (approximately half the weight as compared to our 5-inch bay embedded type)

Battery Charge/Discharge Characteristics (Measured with OZP-350-24-JSE)

(Be aware that it is a reference value at initial use of the battery pack; it is not a guaranteed value.) (Examples of actual measurement)

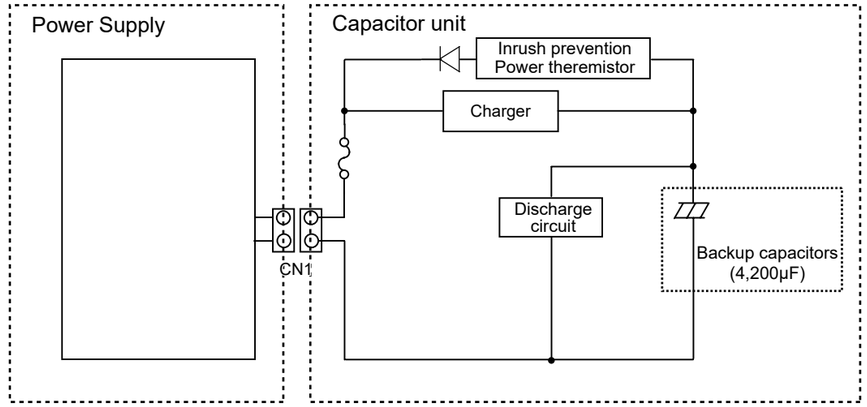


General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

Items	Specification	Measurement condition, etc.
Capacitor	400V 150μF (28 connected in parallel)	
Nominal Capacitor Capacity	4200μF	
Embedded Fuse Rating	250V 6.3A	Do not replace fuse
Operating Temp. / Humidity	0 to 60°C / 20 to 90%	No condensation
Storage Temp. / Humidity	-20 to 70°C / 10 to 95%	No condensation
Weight	1.4 kg max.	
Capacitor Charge Current	20mA typ.	Constant current charge
Capacitor Charge Time	120 sec max.	Time until the capacitor reaches 360V after the power supply is turned on.
Self-discharge Time	200 sec max.	Time until the capacitor voltage decreases to 30V in the case that the connection with the power supply goes open at full charge.
Charge Lamp	30V min.	If capacitor voltage is 30V or more, red LED turns on.
Vibration	To endure the displacement amplitude of 0.075mm with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction for 45 minutes.	JIS-C-60068-2-6, at no operation
Mechanical Shock	Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat three times for each of four bottom edges.	JIS-C-60068-2-31, at no operation
Insulation Resistance	Input - FG: 100MΩ min.	At 500V DC
Dielectric Strength	Input - FG: 1500V DC for 1 minute	It can be shortened to 1.8kV/s, current: 10mA max.
Reliability Grade	FA (industrial equipment grade, double-sided PCB with plated through hole)	Follow our standard
MTBF	500,000H min.	
Life Expectancy*	12 years min.	Environmental temperature: 40°C Based on the calculation of the actual life of an electrolytic capacitor.
Warranty	Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.	Except for errors caused by operation not specified in this specification.

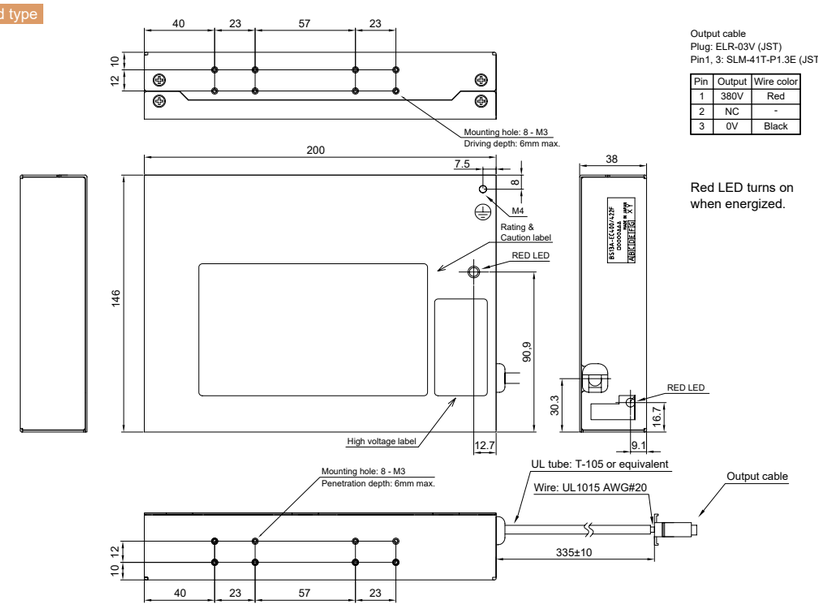
*Life expectancy is a reference value. It is not a guaranteed value.

Block Diagram



Outline Drawing

5-inch bay fixed type



Output cable
Plug: ELR-03V (JST)
Pin1, 3: SLM-41T-P1.3E (JST) or equivalent

Pin	Output	Wire color
1	380V	Red
2	NC	-
3	0V	Black

Red LED turns on when energized.

Capacitor Board CB03*-EC400/801F

Model	Description
CB03-EC400/801F	—
CB03A-EC400/801F	with blackout detection signal (AC_FAIL)

■Model name coding

CB03 A - EC 400 / 801F
① ② ③ ④ ⑤

① Series name
② Modification
A: with blackout detection signal
③ Electrolytic capacitor
④ Output voltage
⑤ Capacity

Compatible Power Supply

- ●UZP-120 series (CB03A-EC400/801F)
- ●UZP-220 series (CB03A-EC400/801F)
- ●OZP-350 series (CB03-EC400/801F)
- ●UZP-400 series (CB03A-EC400/801F)

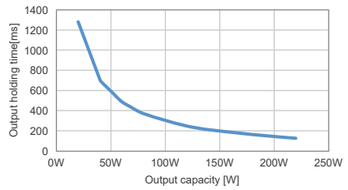
Features

- ● About 15 years expected life (at 40°C)
  Maintenance free (periodic replacement not required)
- ●Low and high operating temperature (-10°C to 70°C)

Capacitor Discharge Characteristics (Measured with UZP-220-24, 100V AC input)

(Be aware that it is a reference value at initial use of the capacitor board; it is not a guaranteed value.)

Discharge Characteristics (an example measurement)

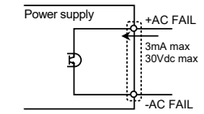


General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

Items	Specification	Measurement condition, etc.
Capacitor	420V 800uF typ	2000 hrs. used at 105°C
Operating Temp./Humidity	-10°C to 70°C/20 to 90% RH	There shall be no condensation
Storage Temp./Humidity	-20°C to 75°C/10 to 95% RH	There shall be no condensation
Weight	90g typ	
Capacitor Charging Time	0.5s max. (CB03-EC400/801F) 5s max. (CB03B-EC400/801F)	Time until the capacitor reaches 340V after the power supply is turned on.
Self-discharge Time	About 5 min	Time until the capacitor voltage decreases to 60V in the case that the connection with the power supply goes open at full charge.
Vibration	To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.	Follow JIS-C-60068-2-6 at no operation
Mechanical Shock	Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat three times for each of four bottom edges.	Follow JIS-C-60068-2-31 at no operation
Insulation Resistance (only for CB03A-EC400/801F)	50MΩ min. between each input and AC_FAIL and FG	At 500V DC
Dielectric Strength (only for CB03A-EC400/801F)	3kV AC/1minnute between input and AC_FAIL *1	Cut-off current 10mA
	2kV AC/1minnute between input and FG *2	Cut-off current 10mA
Reliability Grade	FA (Industrial equipment grade to use double-sided PCB with plated through hole)	Following our standard
Expected Life*	About 15 years	Environmental temperature: 40°C Based on the calculation of the actual life of an electrolytic capacitor.
Warranty	Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.	Except for errors caused by operation not specified in this specification.

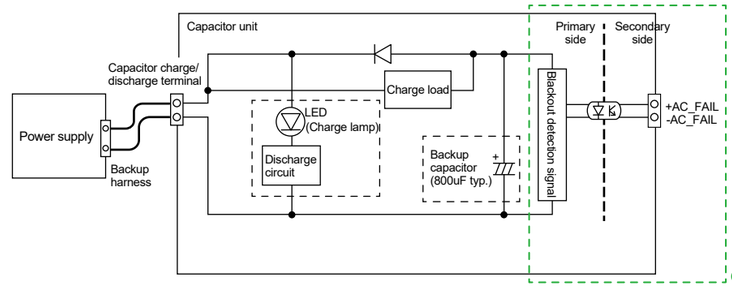
* Be aware that expected life is a reference value; it is not a guaranteed value.
(*1) Input should be primary side and AC_FAIL should be secondary side. (*2) FG shall be the mounting holes on the 4 corners of the board.

Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Signal Circuit
Output Signal	Blackout detection signal* (AC_FAIL)	The signal goes "OPEN" at low AC input voltage and power failure detection. However, when the RC signal is OFF, the output is OPEN regardless of the presence or absence of input voltage. (Detects a drop in voltage of the input smoothing capacitor inside the power supply, short and long of the detection time depends on small and big of the output power.)	

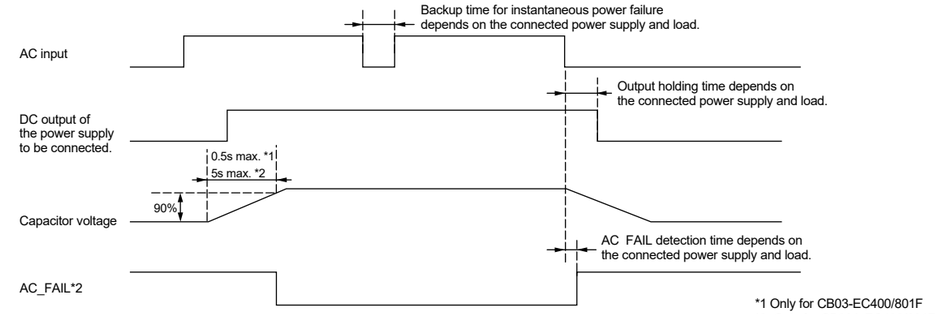
* Only for CB03A-EC400/801F

Block Diagram



Only for CB03A-EC400/801F

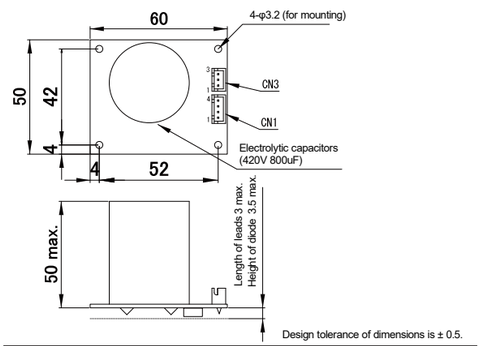
Sequence Timing Chart



*1 Only for CB03-EC400/801F
*2 Only for CB03A-EC400/801F

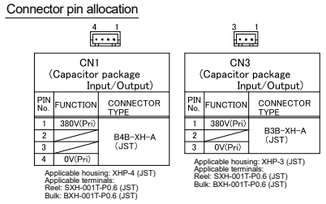
Outline Drawing

• CB03-EC400/801F



Design tolerance of dimensions is ± 0.5.

Connector pin allocation



CN1 (Capacitor package Input/Output)

PIN No.	FUNCTION	CONNECTOR TYPE
1	380V(Pri)	B4B-XH-A (JST)
2		
3		
4	0V(Pri)	

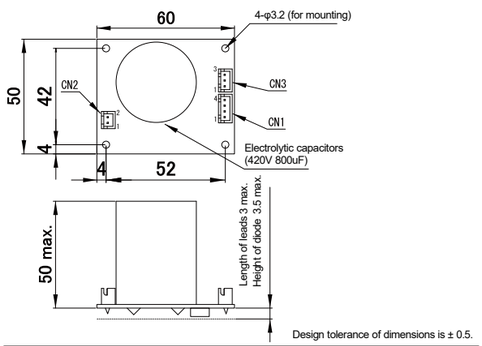
Applicable housing: XHP-4 (JST)
Applicable terminals:
Reel: SXH-001T-P0.6 (JST)
Bulk: BXH-001T-P0.6 (JST)

CN3 (Capacitor package Input/Output)

PIN No.	FUNCTION	CONNECTOR TYPE
1	380V(Pri)	B3B-XH-A (JST)
2		
3	0V(Pri)	

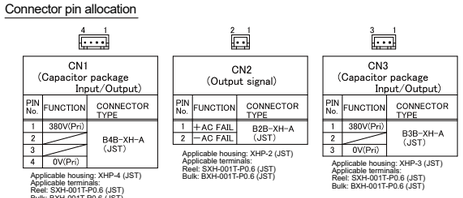
Applicable housing: XHP-3 (JST)
Applicable terminals:
Reel: SXH-001T-P0.6 (JST)
Bulk: BXH-001T-P0.6 (JST)

• CB03A-EC400/801F



Design tolerance of dimensions is ± 0.5.

Connector pin allocation



CN1 (Capacitor package Input/Output)

PIN No.	FUNCTION	CONNECTOR TYPE
1	380V(Pri)	B4B-XH-A (JST)
2		
3		
4	0V(Pri)	

Applicable housing: XHP-4 (JST)
Applicable terminals:
Reel: SXH-001T-P0.6 (JST)
Bulk: BXH-001T-P0.6 (JST)

CN2 (Output signal)

PIN No.	FUNCTION	CONNECTOR TYPE
1	+AC FAIL	B2B-XH-A (JST)
2	−AC FAIL	

Applicable housing: XHP-2 (JST)
Applicable terminals:
Reel: SXH-001T-P0.6 (JST)
Bulk: BXH-001T-P0.6 (JST)

CN3 (Capacitor package Input/Output)

PIN No.	FUNCTION	CONNECTOR TYPE
1	380V(Pri)	B3B-XH-A (JST)
2		
3	0V(Pri)	

Applicable housing: XHP-3 (JST)
Applicable terminals:
Reel: SXH-001T-P0.6 (JST)
Bulk: BXH-001T-P0.6 (JST)

Battery Pack CB01A-EC400 series

Model	Description
CB01A-EC400/322F	Discharge characteristics are different
CB01A-EC400/642F	Discharge characteristics are different

■Model name coding

CB01 A - EC 400 / ***F
① ② ③ ④ ⑤

① Series name
② Modification
③ Electrolytic capacitor
④ Output voltage
⑤ Capacity

Compatible Power Supply

●OZP-350-**-*SEB

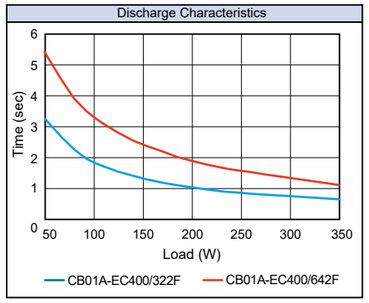
Features

By using electrolytic capacitors, instead of a battery pack, the unit has 10 years min. (at 40°C) life expectancy. No need for maintenance.

- Advantages of a capacitor pack
  - Maintenance free (no need for replacement)
  - Low and high operating temperature (0 to 60°C)

Battery Charge/Discharge Characteristics

(Be aware that it is a reference value at initial use of CB01 series; it is not a guaranteed value.) (Examples of actual measurement)

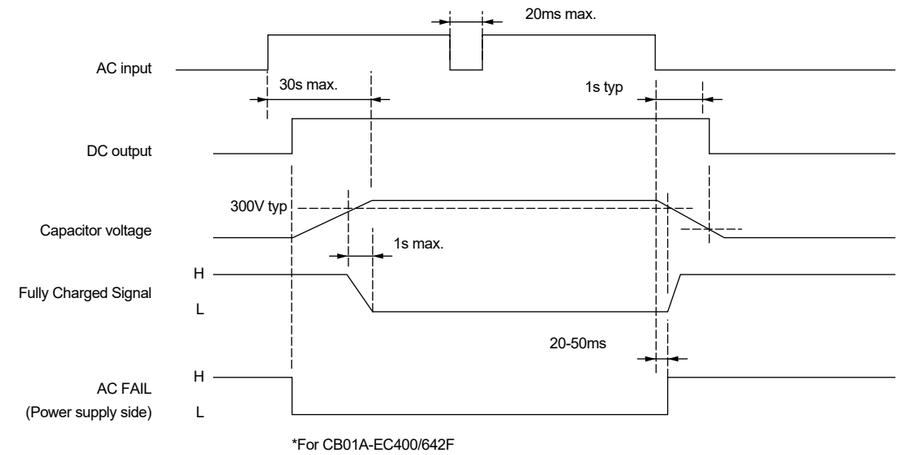


General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

Items	Specification		Measurement condition, etc.
Model	CB01A-EC400/322F	CB01A-EC400/642F	
Capacitor	420V 800uF (4 capactiors in parallel)	420V 800uF (8 capactiors in parallel)	
Nominal Capacitor Capacity	3200uF	6400uF	
Capacitor Charging Time	30s max.		Time until the capacitor reaches 340V after the power supply is turned on.
Backup Time	About 0.5s	About 1s	At 350W load
Self-discharge Time 1	About 5min	About 10min	Time until the capacitor voltage decreases to 30V in the case that the connection with the power supply goes open at full charge.
Fully Charged Signal	Output open collector signal "L", when capacitor voltage detect over 300V.		Input current shall be less than 15mA at collector ON. ON voltage is 12V max. Collector voltage shall be less than 30V at OFF. Output "H" signal when cables are disconnected or unconnected.
Operating Temp./Humidity	0 to 60°C/20-90% RH		There shall be no condensation.
Storage Temp./Humidity	-20 to 70°C/10-95%RH		There shall be no condensation.
Weight	0.4kg typ	0.72kg typ	
Vibration	To endure the displacement amplitude of 0.075mm with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction for 45 minutes.		JIS-C-60068-2-6, at no operation
Mechanical Shock	Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat three times for each of four bottom edges.		JIS-C-60068-2-31, at no operation
Insulation Resistance	Input - FG: 10MΩ min.		At 500V DC
Dielectric Strength	Input - FG: 1.5kV for 1 minute		It can be shortened to 1.8kV/s, current: 10mA max.
Safety Standards	UL60950-1, CSA60950-1 (c-UL), PSE (ordinance clause 2) compliant		Approved by in combination with a power supply
Reliability Grade	FA (industrial equipment grade, double-sided PCB with plated through hole)		Following our standard
Expected Life*	10 years min.		Environmental temperature: 40°C Based on the calculation of the actual life of an electrolytic capacitor.
Warranty	Three years after delivery. If any defects belong to us, the defective unit shall be repaired or replaced at our cost.		Except for errors caused by operation not specified in this specification.

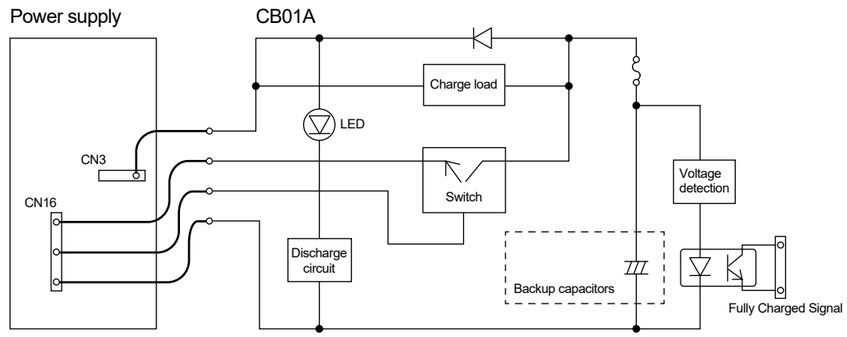
* Life expectancy is a reference value. It is not a guaranteed value.

Sequence Timing Chart

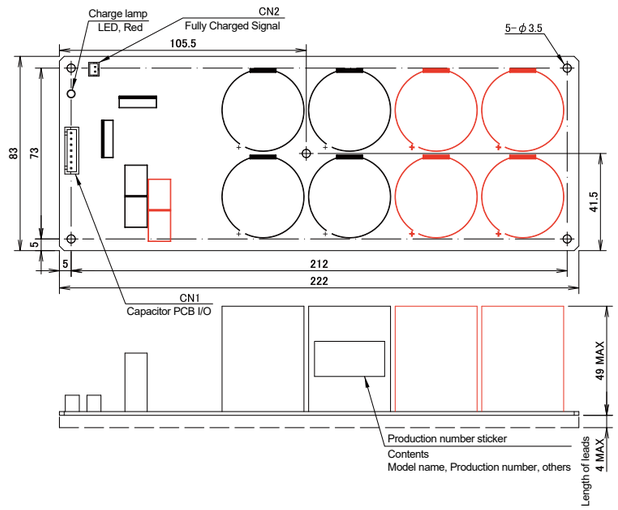


*For CB01A-EC400/642F

Block Diagram



Outline Drawing



CN1		
PIN No.	FUNCTION	CONECTOR TYPE
1	380V (Pri)	B7B-XH-A (JST)
2		
3	CAP+	
4	GATE	
5		
6	CAP−	
7		

642F type

CN2		
PIN No.	FUNCTION	CONECTOR TYPE
1	+ Fully Charged	B2B-XH-A (JST)
2	- Fully Charged	

Battery Pack BS28A-H350/2.5L

Model	Description
BS28A-H350/2.5L	—

■Model name coding

BS28 A - H 350 / 2.5 L
① ② ③ ④ ⑤ ⑥

① Series name
② Modification
③ Ni-MH
④ Output voltage
⑤ Capacity
⑥ Long life battery

Supported power supply

- ●UZP-120 series
(Supported to UZP-120-**-*B*)
- ●UZP-220 series
- ●UZP-400 series

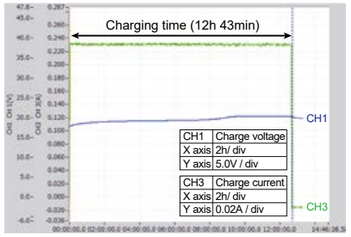
Features

- ●The battery pack can be fixed to a 5-inch bay.
- ●Ni-MH battery
- ●Built-in heater prevents capacity loss at low temperatures.
- ●It is possible to output the status of the battery pack (notification of remaining battery level and battery replacement time).
- ●Low standby power

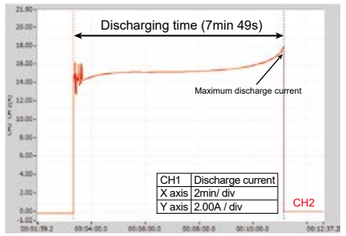
Battery Charge/Discharge Characteristics (Measured with UZP-220-24)

(Be aware that it is a reference value at initial use of the battery pack; it is not a guaranteed value.) (Examples measurement)

[Charge Characteristics]
Temperature: 20°C
load condition: no load



[Discharge Characteristics]
Temperature: 20°C
load condition: At 220W (at rated load of UZP-220-24)

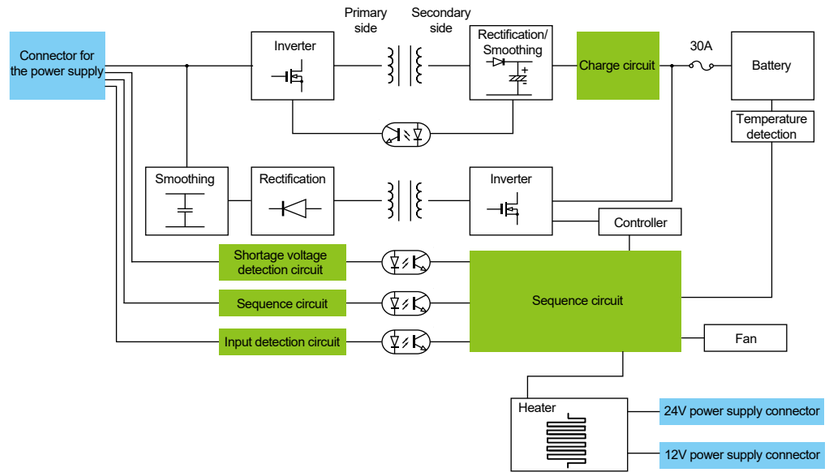


General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

Items	Specification	Measurement condition, etc.
Battery	16.8V 2.5Ah	Sealed nickel hydoride battery
Nominal Battery Power Voltage	16.8V	
Rated Capacity	2.5Ah	10 hours rate
Max. Output Capacity	230W (Peak 380W)	Peak output within 10ms. (time ratio 10%) The effective value should not exceed 230W.
Over Discharge Protection	11.2V typ	Backup operation shut down
Charge Specification	0.25A typ	27V max.
Heater	The elements operates at battery temperature 20°C (typ.) or less. (It warm up in order to improve the battery discharging characteristics at low temperature. The warm up time is about 1 hour from 0°C.) (Heater consumption power at operation: 10W typ)	It is valid when AC input is available, regardless of the PS_ON# signal of the power supply unit.
Built-in Fuse rating	30A	
Operating Temp./Humidity	0-50°C, 20-90%	There shall be no condensation. Internal heater will operate at 20°C typ. or less.
Storage Temp./Humidity	-20-65°C, 20-90%	
Vibration	To endure the vibration acceleration of 2G with vibration frequency of 10 to 55Hz for 10 sweep cycles in each X, Y, Z direction.	Follow JIS-C-60068-2-6 at no operation (With the normal packaging)
Mechanical Shock	Lift one bottom edge of the unit 50mm high with the opposite edge placed on the test bench, and let it fall. Repeat three times for each of four bottom edges.	Follow JIS-C-60068-2-31 at no operation (With the normal packaging)
Weight	1.8 kg typ	
Reliability Grade	FA	Following our standard
Expected Life*	About 9-10 years (5 times/year discharge), about 3-4 year (1 time/day discharge)	Environmental temp. 30°C, 100W 3min discharge at a time
Storage condition	Recharging once at least per year (or 6 months if available) is required for 6 months or longer storage. Storage within 1 year: -20 to +30°C or less / humidity 10-95% Storage within 90 days: -20 to +40°C or less / humidity 10-95% Storage within 30 days: -20 to +50°C or less / humidity 10-95%	When recharging is not conducted beyond the period on the left, the battery may not recover its capacity completely. Approximately 19 hours of charging time may be required in such a case.
Warranty	One year after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost. Except for failure by over discharge.	Except for errors caused by operation not specified in this specification.

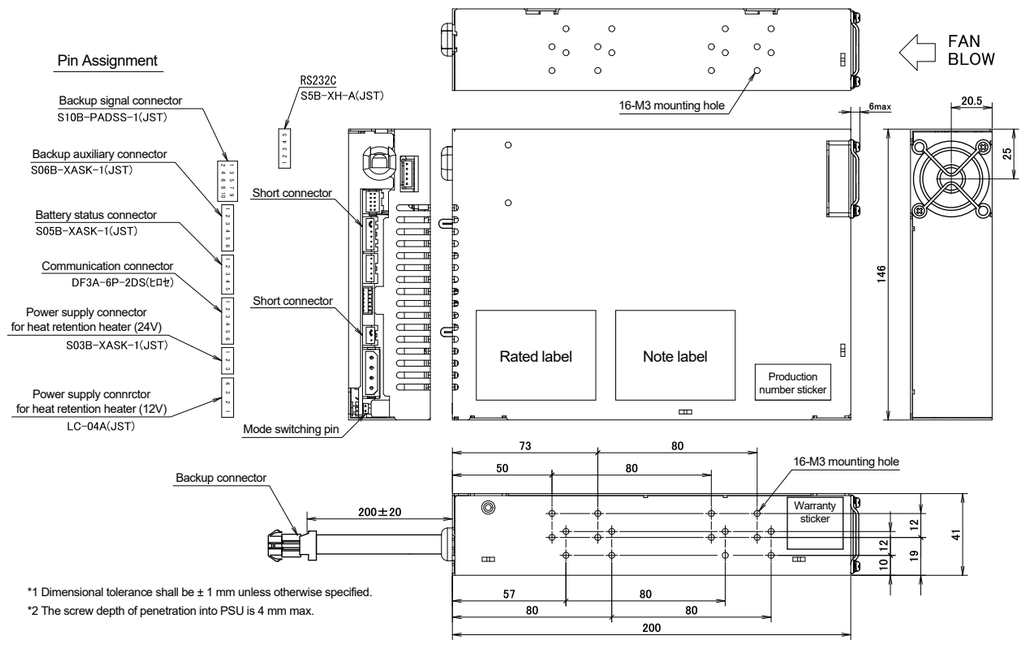
*Life expectancy is a reference value. It is not a guaranteed value.

Block Diagram



Outline Drawing

5-inch bay fixed type



*1 Dimensional tolerance shall be ± 1 mm unless otherwise specified.
*2 The screw depth of penetration into PSU is 4 mm max.

Connector pin allocation

Connector	Pin#	Signal name	Note
Backup signal connector (SIG_T)	1	AC_FAIL_T	
	2	SHUT_DOWN_T	
	3	BATT_LOW_T	
	4	-	
	5	FAN_M	
	6	-	
	7	GND	
	8	-	
	9	-	
	10	VCC5V	Total output of VCC 5V: 0.02A max

Connector	Pin#	Signal name	Note
Backup auxiliary connector	1	VCC5V	Total output of VCC 5V: 0.02A max
	2	R_ON	
	3	-	
	4	GND	
	5	Reserved	
	6	BATT+	Max. 0.02A

Connector	Pin#	Signal name	Note
Battery status connector	1	VCC5V	Total output of VCC 5V: 0.02A max
	2	BATT_E0	
	3	BATT_E1	
	4	BATT_E2	
	5	BATT_LIFE	

Connector	Pin#	Signal name	Note
Communication connector	1	VCC5V	Total output of VCC 5V: 0.02A max
	2	Reserved	
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	GND	

Connector	Pin#	Signal name	Note
RS232C	1	VCC5V	Total output of VCC 5V: 0.02A max
	2	GND	
	3	BATT_LOW_R	
	4	SHUT_DOWN_R	
	5	AC_FAIL_R	

Connector	Pin#	Signal name	Note
Power supply connector for heat retention heater (12V)	1	Power input for 12V heater	12V ± 5%
	2	GND	
	3	GND	
	4	-	

Connector	Pin#	Signal name	Note
Power supply connector for heat retention heater (24V)	1	Power input for 24V heater	24V ± 5%
	2	GND	
	3	-	

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