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

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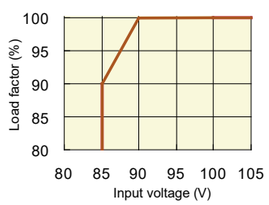
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	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

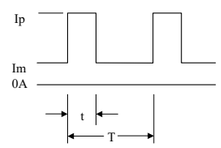
Follow the derating below to derate rated current/power.



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.

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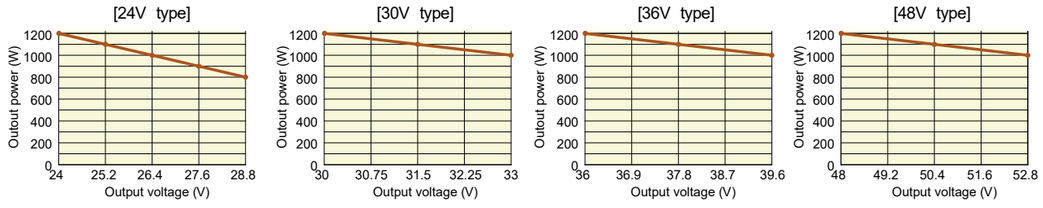
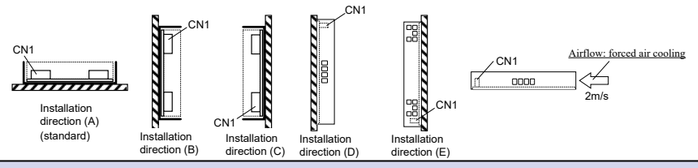
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<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

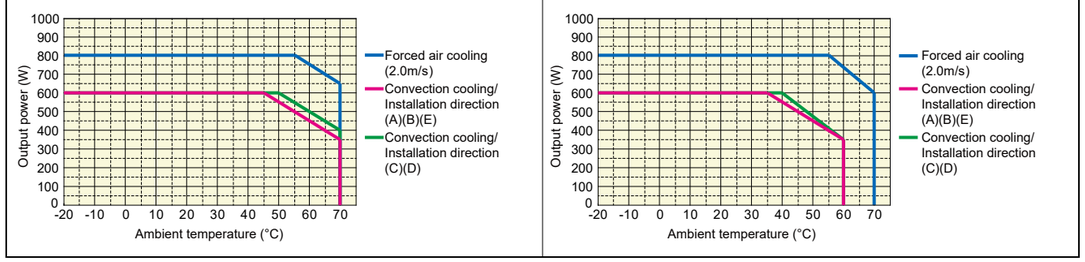


<Fig.4> Guideline for forced air cooling

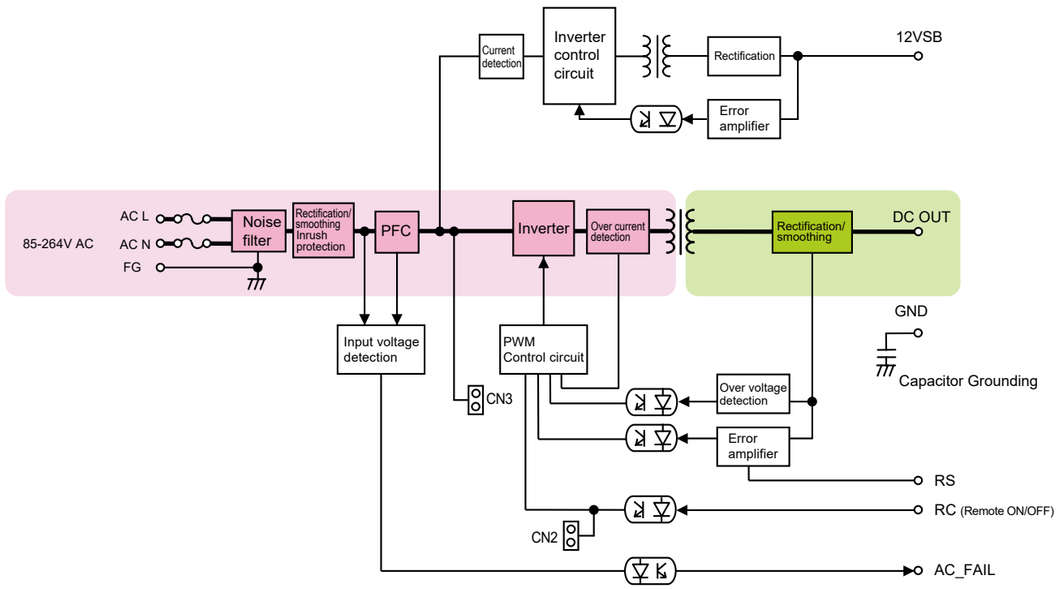
Please contact us about the guideline for temperature rise of each component at forced air cooling.

<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



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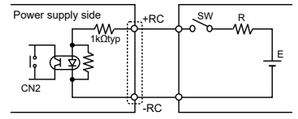
Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	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.	

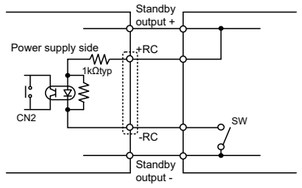
Signal Circuit

Input Signal Circuit

(RC signal)
Connection example: using external power supply



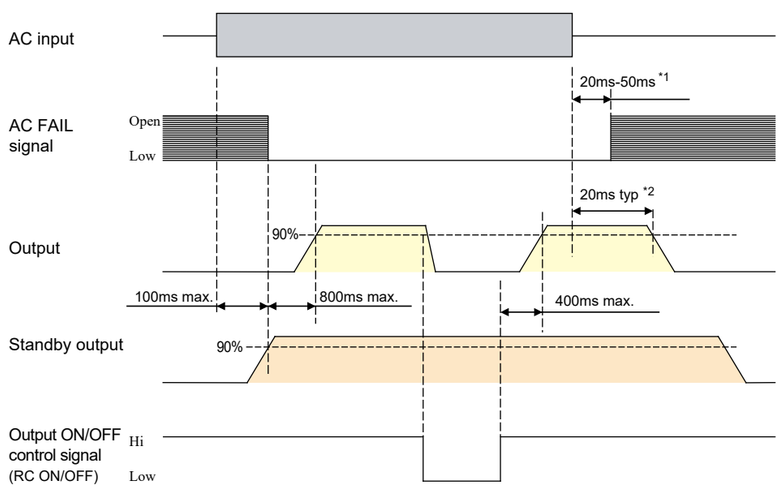
(RC signal)
Connection example: using standby output



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

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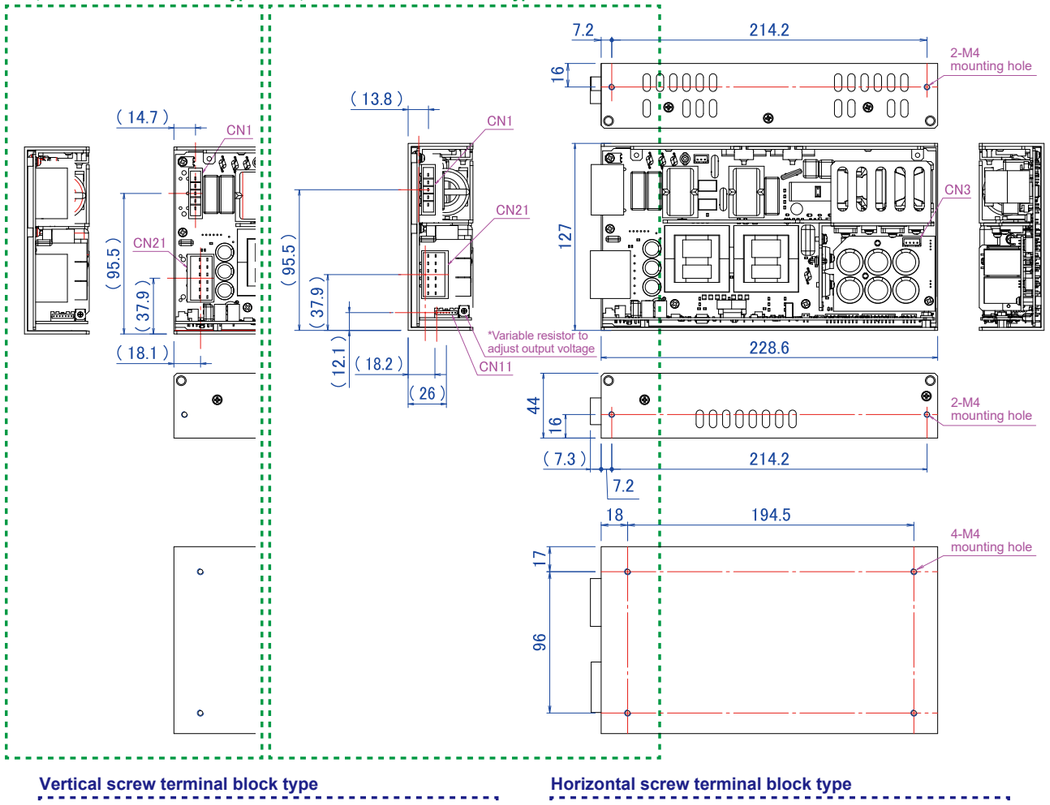
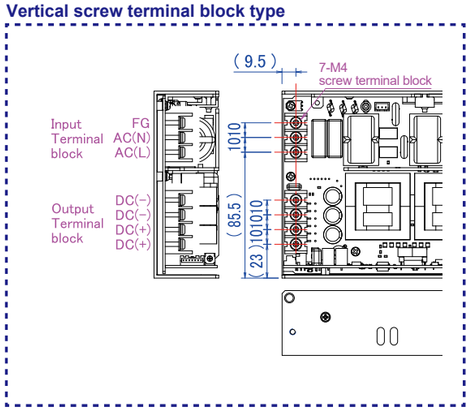
Outline Drawing

■Open frame model

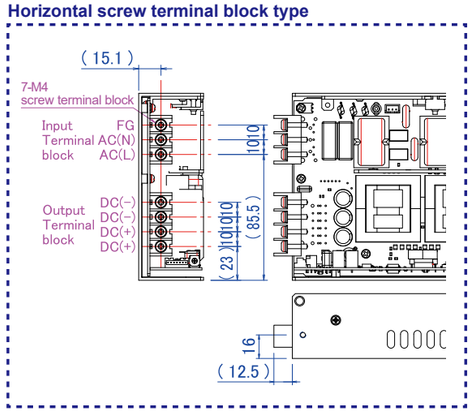
CN1,CN21: Vertical connector type　CN1,CN21: Horizontal connector type



Vertical screw terminal block type



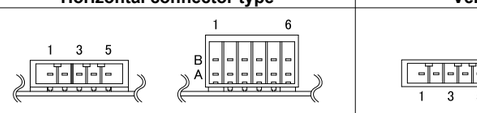
Horizontal screw terminal block type



*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

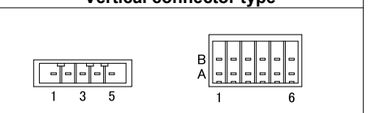
Horizontal connector type



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

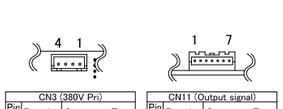
CN21 (Output)		
Pin No.	Function	Connector Type
A−1 ～ A−6	DC(−)	SC12B-F35DK-GGR
B−1 ～ B−6	DC(+)	

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	

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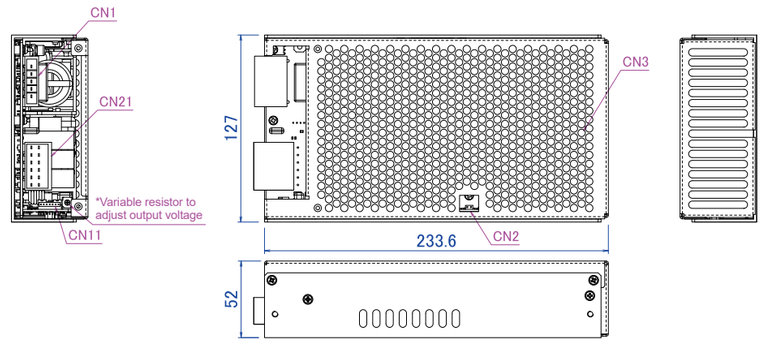
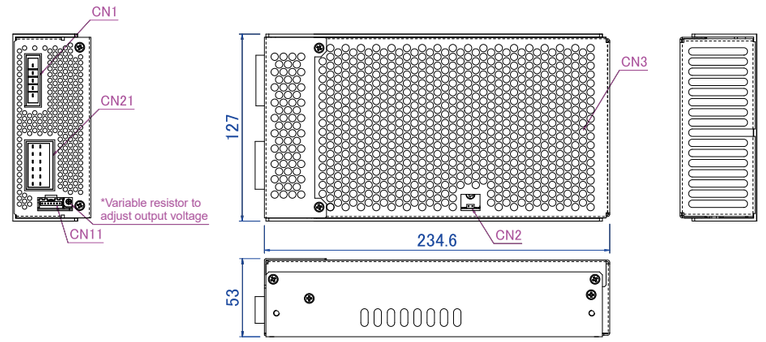
Outline Drawing

■With cover (horizontal connector type as an example)



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



Options (Sold separately)

Cable

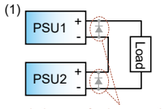
Photos	Model	Category	Description
	WH-C05JFAS-800	Input harness	For nylon connector models
	WH-C04JFAD-500	Output harness (4 pins type)	For nylon connector models (connectable up to 3 harnesses)
	WH-C07PA-500	Signal harness	For using the output ON/OFF control signal (RC signal), AC_FAIL or +12VSB

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.

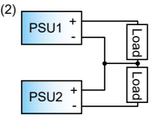
Note: In the case that different voltages are connected in series as in figure (1) on the right;
1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.
2. Connect diodes for protection as show in the figure (1).
The rated current 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.

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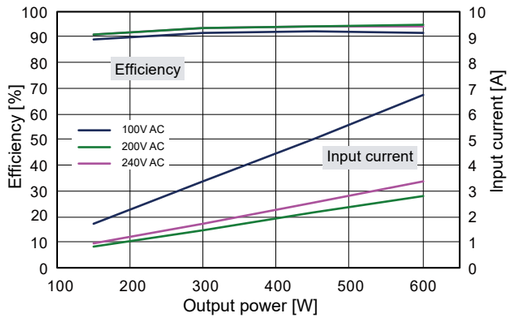
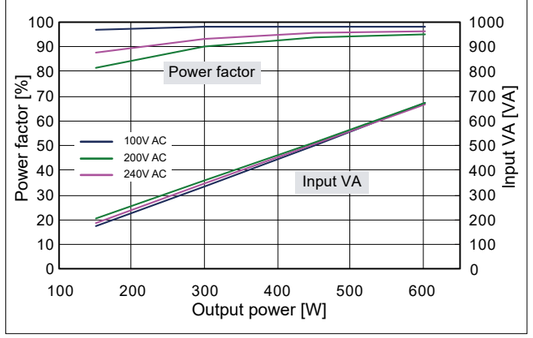
Characteristics Data (Typical features of the product series) UZP-600-A24 (Examples of actual measurement)

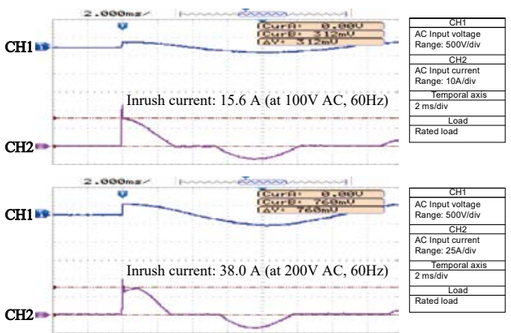
● Fig.6 Efficiency/Input Current vs. Output Power



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



● Fig.8 Inrush Current



● Fig.9 Leakage Current

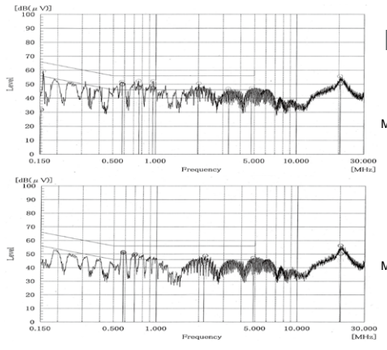
Input : 100, 200V AC
Load : Rated load and Min. load

	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

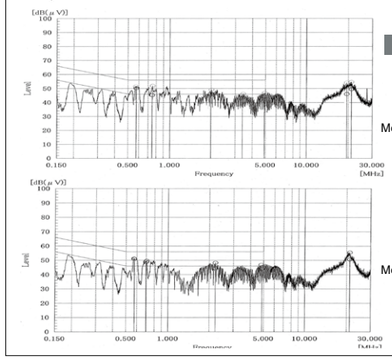
VCCI Class B



● Fig.11 Conducted Emission at 230V AC

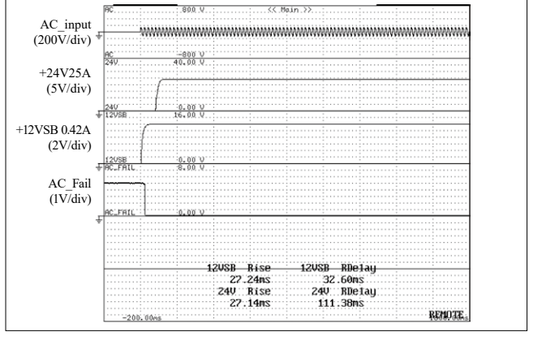
Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B



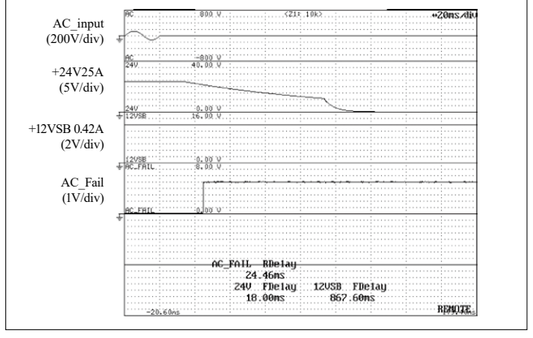
● Fig.12 Rising Characteristics at 100V AC

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



● Fig.13 Leakage Current

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



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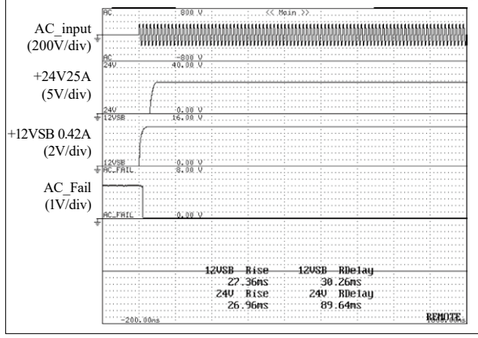
UZP-600 Series

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

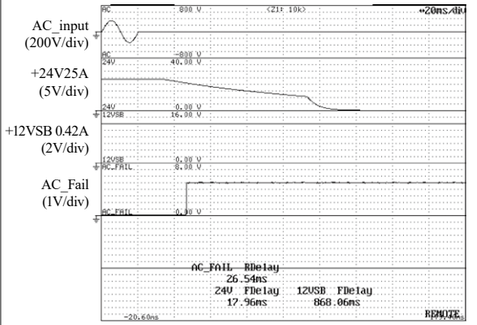
● Fig.14 Rising Characteristics at 240V AC

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

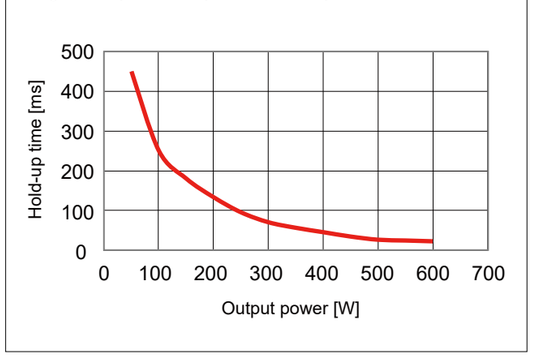


● Fig.15 Falling Characteristics at 240V AC

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

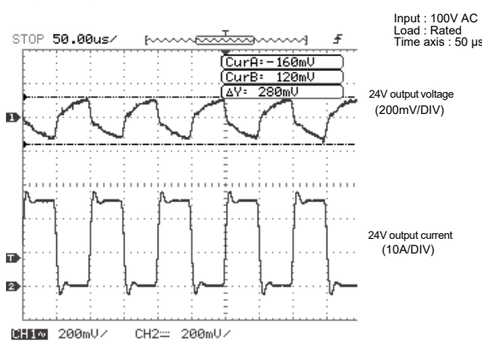


● Fig.16 Output Hold-up Time vs. Output Power

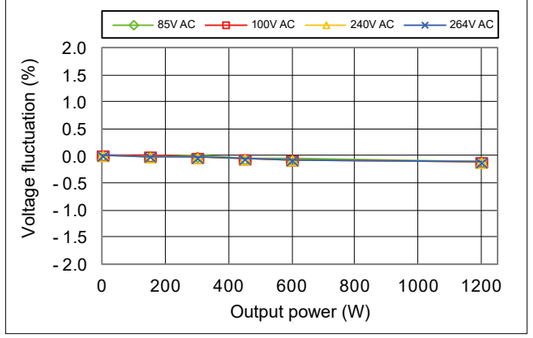


● Fig.17 Dynamic Load Fluctuation Characteristics at 10kHz

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



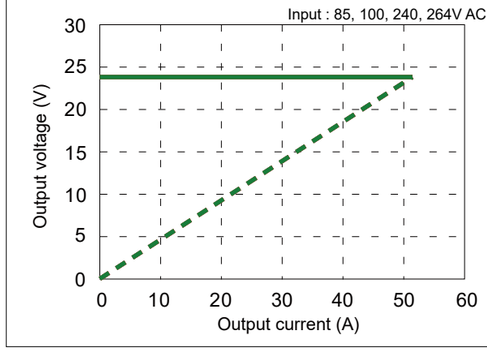
● Fig.18 Output Voltage Regulation (Load Fluctuation)



● 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)



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