Desktop PC Power Supply HNSP9-520P-S20 Series

Model	Description	Stock
HNSP9-520P-S20-H1V	With RS232C signal unit	Standard stock
HNSP9-520P-S20-H2V	With buzzer unit	Contact us
HNSP9-520P-S20-H6V	With USB signal unit	Standard stock
HNSP9-520P-S20-H0V	No signal unit	Standard stock

■Model Name Coding

HNSP9 - 520 P - S 2 0 - H ∗ V
① ② ③ ④⑤⑥ ⑦⑧⑨

1. Series name
2. Output power
3. Peak output compliant
4. Standard
5. DC input voltage (battery voltage) 24V type
6. Modification code
7. Nonstop circuit embedded
8. Type of signal unit (1: RS232C signal unit, 2: buzzer unit 6: USB signal unit, 0: no signal unit)
9. Silent type (thermal-sensing variable speed fan embedded)

Features

- With backup function, it protects your PC from blackout.
- 80PLUS BRONZE certified ATX power supply
- Double-sided PCB with plated through hole suitable for industrial use.
- High efficiency with synchronous rectification circuit
- Min. load current is 0A for all outputs.
- Safety standard certified (IEC/UL/CSA60950-1/CCC)
- By building in the thermal-sensing variable speed fan, noise reduction can be realised.
- Less than 1W standby power complying with ErP directive

News

Additional output unit can be fitted


Additional output unit

By connecting the optional output unit on HNSP9-520P-S20-H∗V, +24V or +48V can be output from isolated ATX outputs simultaneously. Refer to the output specification below.

Output / Dimensions (with additional output unit)

Model	HNSP9-520P-S20-H*V-24V						HNSP9-520P-S20-H*V-48V					
Output voltage	+3.3V	+5V	+12V	-12V	+5VSB	+24V	+3.3V	+5V	+12V	-12V	+5VSB	+48V
Max. current / max. power (continuous)	20A	24A	25A	0.5A	2.0A	8.3A	20A	24A	16.5A	0.5A	2.0A	4.0A
	150W		300W	6W	10W	200W	150W		198W	6W	10W	192W
	300W						199.1W					
	400W						305.1W					
Peak current / peak power (5 sec max.)	30A	30A	35A	0.5A	2.5A	12.5A	30A	30A	35A	0.5A	2.5A	4.0A
	200W		420W	6W	12.5W	300W	200W		420W	6W	12.5W	192W
	507.5W						507.5W					
	520W						520W					
Min. current	0A	0A	0A	0A	0A	0A	0A	0A	0A	0A	0A	0A
Dimensions	150(W)×86(H)×175(D)mm											

Refer to “Product Page Guideline” on p.11

Safety standard / Approval	UL	CSA	EN	CE	CCC
Reliability Grade	HFA	FA	HOA	OA	

Function

DC start | RS 232C | USB | TTL | PFC | Silence | 5VSB FAN | TSFC FAN | Connection | RoHS

*RS232C: only HNSP9-520P-S20-H1V
*USB: only HNSP9-520P-S20-H6V

Automatic shutdown compliant OS

Windows 2000 | Windows XP | Windows Vista | Windows 7

Input

AC input	85 - 264V (worldwide range, PFC mounted)
DC input	24V (dedicated battery package*)

*Battery package is optional (sold separately).

Output

Output voltage	+3.3V	+5V	+12V	-12V	+5VSB
Max. current / max. power (continuous)	20A	24A	30A	0.5A	2A
	Total 150W		360W	6W	10W
	Total 390W				
	Total 400W				
Peak current / peak power (5 sec max.)	30A	30A	35A	0.5A	2.5A
	Total 200W		420W	6W	12.5W
	Total 507.5W				
	Total 520W				
Min. current	0A	0A	0A	0A	0A

Dimensions

W×H×D (mm)	150×86×140 (PS/2 size)

Output connector (optional component)

Main 20+4pin | Main 24pin | Main 20pin | AT | AUX | 12V 4pin | 12V 8pin | PCI-E 6pin | PCI-E 6+2pin | HDD | S-ATA | FDD

Refer to p.17 “Detachable Output Harness” for details

General Specification Condition: at normal temperature and humidity unless otherwise specified

	Items		Specification					Measurement conditions, etc.
AC Input	Rated Voltage		100 - 240 VAC (85* - 264 VAC)					Worldwide range, *Refer to Fig.1
	Input Frequency		50 / 60Hz					47 - 63Hz
	Efficiency		80% typ. (100 VAC), 85% typ. (240 VAC) *Characteristic data: Fig.5					At rated input/output, 80PLUS BRONZE certified
	Power Factor		96% min. (100 VAC), 90% min. (240 VAC) *Characteristic data: Fig.6					At rated input/output
	Inrush Current		31A peak (100 VAC), 75A peak (240 VAC) *Characteristic data: Fig.7					At rated input/output at cold start (25°C). The inrush current into X-capacitor of input noise filter is not specified unless its period is more than 100µs.
	Input Current		4.8A typ. (100 VAC), 2.1A typ. (240 VAC) *Characteristic data: Fig.5					
DC Input	Rated Voltage		24 VDC (corresponds to dedicated battery package)					
	Battery Discharge Cut-off Voltage		17V typ. (shutdown of battery circuit)					
	Efficiency (at Battery Operation)		80% typ					At rated input/output
Output	Rated Voltage		+3.3V	+5V	+12V	-12V	+5VSB	
	Rated Current		10A	10A	25A	0.5A	2A	Reference value during the measurement of input/output characteristics
	Max. Current / Power		20A	24A	30A	0.5A	2A	Max. output power: 400W *Refer to Fig.1
			150W max.		360W	6W	10W	
			390W max.					
			400W max.					
	Peak Current / Power		30A	30A	35A	0.5A	2.5A	Peak output power: 520W Time: 5 sec or less Duty ratio of repetitive load: 10% or less *Refer to Fig.2
			200W max.		420W	6W	12.5W	
			507.5W max.					
			520W max.					
	Min. Current		0A	0A	0A	0A	0A	
	Total Voltage Accuracy (%)		±5 max.	±5 max.	±5 max.	±5 max.	±5 max.	*Refer to Fig.4
	Max. Ripple Voltage (mVp-p)		50 max.	50 max.	120 max.	120 max.	50 max.	Two wires are coming out from the output connector and connected into one at the edge. 47µF electrolytic capacitor and 0.1µF ceramic capacitor are placed on it and it is measured. *Characteristic data: Fig.18
	Max. Spike Voltage (mVp-p)		100 max.	100 max.	170 max.	170 max.	100 max.	
Protection	Overcurrent Protection	OCP Point (A)	27 min.	31 min.	37 min.	Short protection		3.3V: 5V max., others no load 5V: 3.3V max., others no load Others: all CHs rated load
		Method	All outputs except for +5VSB shutdown. All outputs shutdown at battery operation			Hold down current limiting	All outputs shutdown	
	Recovery (Overcurrent)	At AC Operation	Reclosing AC input, or switching PS_ON# signal from 'H' to 'L'			Automatic recovery		
		At Battery Operation	Reclosing AC input			Automatic recovery	Reclosing AC input	
	Overvoltage Protection	OVP Point (V)	3.76 - 4.3	5.74 - 7.0	13.4 - 15.6	-	-	
		Method	All outputs except for +5VSB shutdown. All outputs shutdown at battery operation			-	-	
	Recovery (Overvoltage)	At AC Operation	Reclosing AC input, or switching PS_ON# signal from 'H' to 'L'			-	-	
		At Battery Operation	Reclosing AC input			-	-	
Charge	With Dedicated Ni-MH Battery Connected		Charge voltage	35V max. (automatically switches to the voltage that complies with the dedicated battery)				
			Charge current	0.7A max. (microcomputer with charge control function is embedded on the battery.)				
	With Dedicated Lead Battery Connected		Charge voltage	27.3V typ. (at 25°C with fully-charged battery, thermal compensation)				
			Charge current	0.5±0.2A (at 24V battery voltage)				
Environment	Operating Temp. / Humidity		0 to 60°C* / 10 to 90%					No condensation *Refer to Fig.3
	Storage Temp. / Humidity		-20 to 70°C / 10 to 95%					No condensation
	Vibration		Acceleration amplitude: 2g (10-55Hz), Sweep cycles: 10, Test duration: 45 minutes each axis					JIS-C-60068-2-6, at no operation
	Mechanical Shock		Lift one bottom edge up to 50mm and let it fall. Number of bumps: 3 each of 4 edges					JIS-C-60068-2-31, at no operation
Insulation	Dielectric Strength		AC/DC input - FG/DC output: 1500 VAC for 1 minute					Cut-off current: 10mA
	Insulation Resistance		AC/DC input - FG/DC output: 50MΩ min.					At 500 VDC
	Leakage Current		0.5mA max. (100 VAC) / 1mA max. (200 VAC) / 1.2mA max. (240 VAC) *Characteristic data: Fig.8					YEW. TYPE3226 (1kΩ) or equivalent
EMC	Line Noise Immunity		±2000V (pulse width: 100/1000ns, repetitive cycle: 30-100Hz, normal/common mode with pos./neg. polarity for 10 minutes each)					Measured by INS-410 No fluctuation of DC output or malfunction
	Electrostatic Discharge		EN61000-4-2 compliant					
	Radiated, Radio-Frequency EM Field		EN61000-4-3 compliant					
	Fast Transient Burst		EN61000-4-4 compliant					
	Lightning Surge		EN61000-4-5 compliant					
	RF Conducted Immunity		EN61000-4-6 compliant					
	Magnetic Field Immunity		EN61000-4-8 compliant					
	Voltage Dip / Regulation		EN61000-4-11 compliant					
	Conducted Emission		VCCI-B, FCC-B, EN55022-B compliant *Characteristic data: Fig.9 and 10					Measured by single unit
	Harmonic Current Regulation		IEC61000-3-2 (Ver.2.1) Class D, EN61000-3-2 (A14) Class D compliant					At rated input/output
Others	Safety Standards		UL60950-1, CSA C22.2 No.60950-1, CE Marking (LVD, EMC), CCC certified					
	Cooling System		Forced air cooling: thermal-sensing variable speed fan embedded					Fan rotates at low speed depending on the internal temperature of power supply even PS_ON# signal 'H'.
	Output Grounding		Connected chassis (FG)*					*It can be customized to connect to capacitor.
	Output Hold-up time		PWR_OK holds up 16ms min. after AC failure *Characteristic data: Fig.15					At rated output
	Reliability Grade		FA (industrial equipment grade, double-sided PCB with plated through hole)					Follow our standard
	MTBF		70,000H min.					Based on EIAJ RCR-9102
	Weight		1.8 kg					
	Warranty		3 years after delivery. If any faults belong to us, the defective unit shall be repaired or replaced at our cost.					Except for errors caused by operation not listed

Fig.1 Derating for Low Input Voltage

When the input voltage is 90 VAC or less, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.

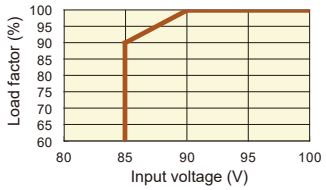


Fig.2 Duty Ratio

Peak current/power shall be 5 sec or less continuously. For repetitive loads, duty ratio shall be 10% or less.

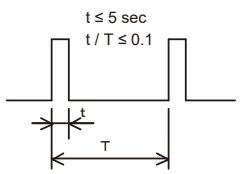


Fig.3 Temperature Derating

When the ambient temperature (near the airflow inlet) exceeds 45°C, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.

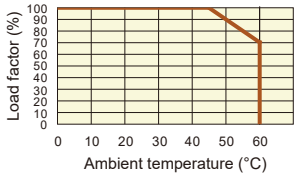
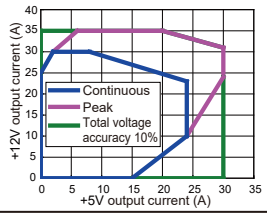
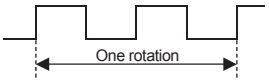


Fig.4 Cross Regulation

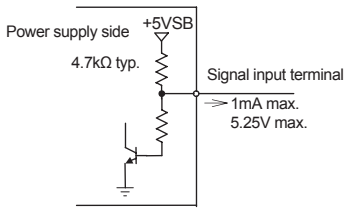
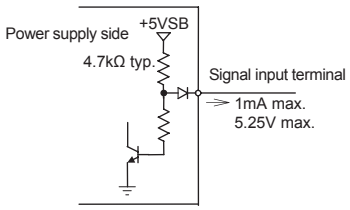
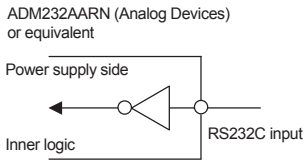
The total output voltage accuracy of CH2 (5V) and CH3 (12V) is defined by the combinatorial range shown the figure in Cross Regulation. It should be used within the combinatorial power between each CH.

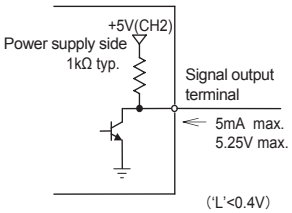
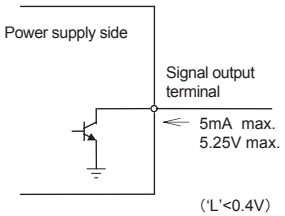
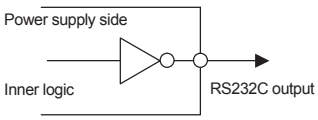


Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

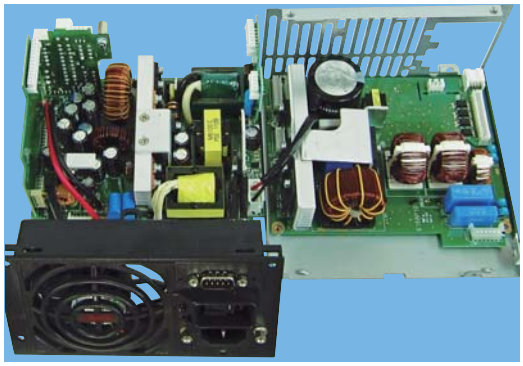
	Items	Specification	Note
Input Signal	Output ON / OFF Control Signal (PS_ON#)	+3.3V, +5V, +12V, and -12V outputs shutdown with 'H' or 'OPEN' input. (During the backup operation, battery connection is shut off with 'H' or 'OPEN' input.)	The pin 22 of MAIN1 connector, the pin 6 of SIG connector
	+3.3V SENSE	The input terminal to detect the voltage of +3.3V output; by connecting to the load terminal, only the line drop of the + side of the output cable is compensated.	The pin 2 of MAIN1 connector
	Battery Shutdown Signal for TTL (SHUT DOWN_T)	Battery connection is shut down with 'L' input (60ms min. input). (available only during the backup operation)	The pin 2 of SIG connector
	Battery Shutdown Signal for RS232C (SHUT DOWN_R)	Battery connection is shut down with 'positive (+2.4V min.)' input (60ms min. input). (available only during the backup operation)	Apply to only HNSP9-520P-S20-H1V The pin 4 of front panel RS232C connector
	Fan Control Signal (FAN_C)	The control terminal of fan motor; the fan motor is forcibly rotated at full speed at 'L' input.	The pin 4 of SIG connector
Output Signal	Normal Output Signal (PWR_OK)	'H'signal is delivered at normal output (detection delay time: 100 - 500ms).	The pin 21 of MAIN1 connector
	Fan Monitor Signal (FAN_M)	Two cycle pulses per one rotation of the fan motor are delivered (open collector output). Duty ratio of the pulse shall be 0.5 typ. (Interval between the signals becomes longer at low speed and shorter at high speed.) The signal remains 'L' or 'OPEN' when the fan stops caused by any failure or malfunction.	The pin 5 of SIG connector 
	Blackout Detection Signal for TTL (AC FAIL_T)	The signal goes 'OPEN' at low AC input voltage and blackout detection (open collector output). (detection voltage: 75 VAC typ., detection delay time: 16 - 40ms after AC input failure at rated input/output)	The pin 1 of SIG connector
	Blackout Detection Signal for RS232C (AC FAIL_R)	'Negative (-9V typ.)' is delivered at low AC input voltage and blackout detection. (detection voltage: 75 VAC typ., detection delay time: 16 - 40ms after AC input failure at rated input/output)	Apply to only HNSP9-520P-S20-H1V The pin 8 of front panel RS232C connector
	Blackout Detection Signal for USB (AC FAIL_U)	The equivalent data signal of AC FAIL_R 'negative' is delivered at low AC input voltage and blackout detection. (detection voltage: 75 VAC typ., detection delay time: 16 - 40ms after AC input failure at rated input/output)	Apply to only HNSP9-520P-S20-H6V Front panel USB connector
	Low Battery Voltage Signal for TTL (BATT LOW_T)	The signal goes 'OPEN' when the battery terminal voltage decreases to 19V typ. (open collector output). 'L' is delivered when the battery package is not connected.	The pin 3 of SIG connector
	Low Battery Voltage Signal for RS232C (BATT LOW_R)	'Negative (-9V typ.)' is delivered when the battery terminal voltage decreases to 19V typ. ('positive (+9V typ.)' is delivered when the battery package is not connected.)	Apply to only HNSP9-520P-S20-H1V The pin 1 of front panel RS232C connector
	Low Battery Voltage Signal for USB (BATT LOW_U)	The equivalent data signal of BATT LOW_R 'negative' is delivered when the battery terminal voltage decreases to 19V typ. (The equivalent data signal of BATT LOW_R 'positive' is delivered when the battery package is not connected.)	Apply to only HNSP9-520P-S20-H6V Front panel USB connector
	Buzzer Noise	Buzzer noise is delivered at blackout (the volume can be adjusted). Note: The buzzer may go off for a few seconds when AC input is turned on or interrupted.	Apply to only HNSP9-520P-S20-H2V

Signal Circuit

	(PS_ON#)	(SHUT DOWN_T)	(SHUT DOWN_R) Apply to only HNSP9-520P-S20-H1V
Input Signal Circuit	 ('L'≤0.8V, 2.0V≤'H')	 ('L'≤0.4V, 2.4V≤'H')	

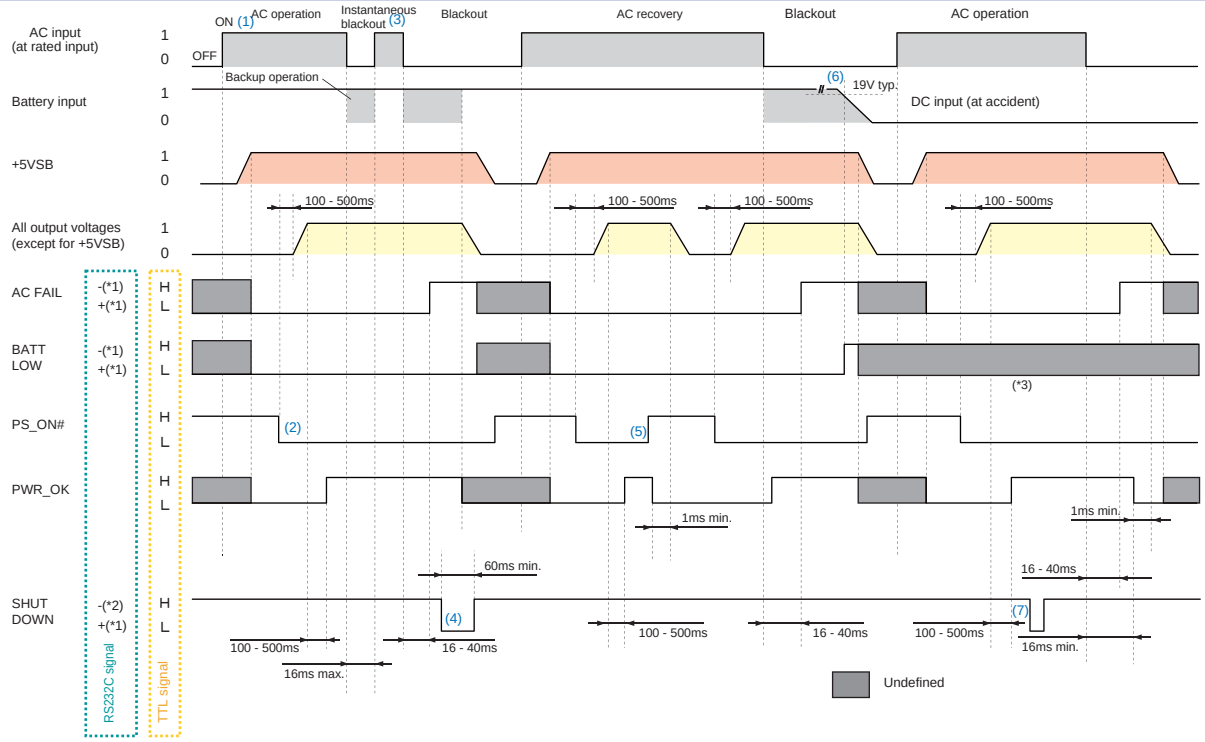
	(PWR_OK)	(AC FAIL_T), (FAN M), (BATT LOW_T)	(AC FAIL_R), (BATT LOW_R) Apply to only HNSP9-520P-S20-H1V	(AC FAIL_U), (BATT LOW_U) Apply to only HNSP9-520P-S20-H6V
Output Signal Circuit	 ('L'<0.4V)	 ('L'<0.4V)		USB1.1 standard compliant (B type connector) *Dedicated driver software needs to be installed to the PC (Existing UPS services or other softwares that use RS232C signal can be used with USB signal).

Internal Structure



Additional Output Unit

Sequence Diagram HNSP9-520P-S20-H1V connected w/ dedicated RS232C signal unit: 'SU-RS' and dedicated battery package



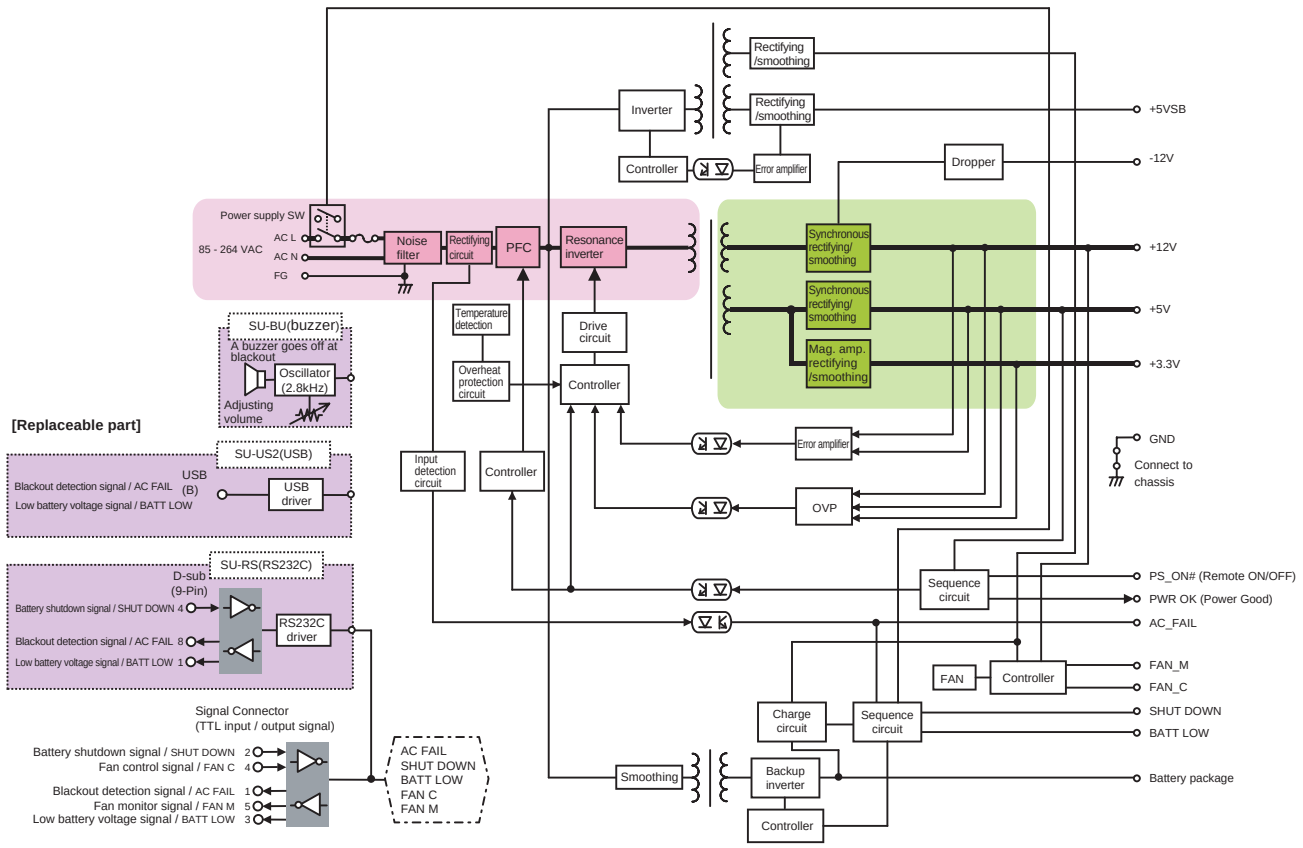
(*1)
Negative signal output is -9V typ.
Positive signal output is +9V typ.

(*2)
Negative signal input should be +0.4V to -20V.
Positive signal output should be +2.8V to +20V.

(*3)
BATT LOW might not be delivered because of the charging output and depending on bettery terminal voltage

(1) With AC input, only +5VSB starts up.
(2) With PS_ON# 'L' input, all outputs start up. After 100 - 500ms, PWR_OK goes 'H'.
(3) AC FAIL 'negative (RS232C)' and 'H (TTL)' are delivered 16 - 40ms after blackout.
(4) At blackout, all outputs including +5VSB shutdown with SHUT DOWN 'positive (RS232C)' or 'L (TTL)' input of 60ms min.
(5) When AC input and all outputs including +5VSB start up, all outputs except for +5VSB shutdown with PS_ON# 'H'.
(6) When the battery voltage decreases to 19V typ. at backup operation, BATT LOW 'negative (RS232C)' and 'H (TTL)' are delivered; after it decreases to 17V typ., all outputs including +5VSB shutdown.
(7) At AC input, the output does not change even SHUT DOWN 'positive (RS232C)' or 'L (TTL)' input.

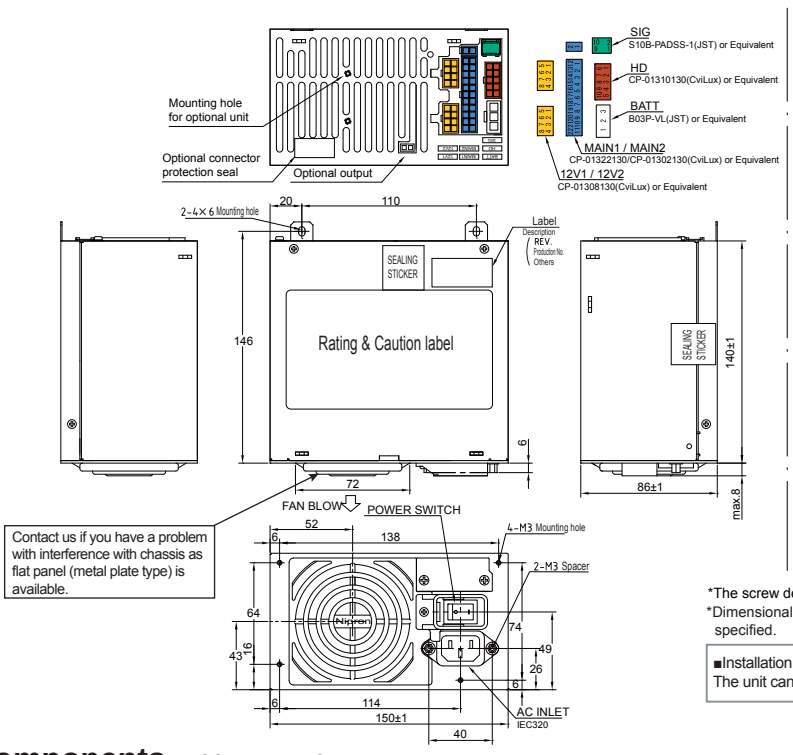
Block Diagram



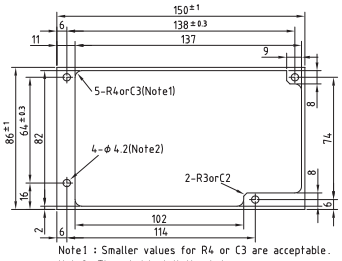
Outline Drawing

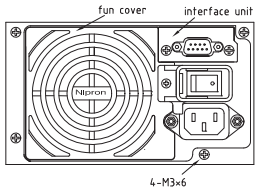
CN Name	PIN No.	FUNCTION	MAX CURRENT
MAIN1	1	+3.3V	6 A
	2	+3.3V SE	-
	3	+12V	6 A
	4	+5V	6 A
	5	+5V	6 A
	6	COM	6 A
	7	COM	6 A
	8	COM	6 A
	9	COM	6 A
	10	-12V	0.5A
	11	+5VSB	4 A
	12	+3.3V	6 A
	13	+3.3V	6 A
	14	+12V	6 A
	15	+5V	6 A
	16	+5V	6 A
	17	COM	6 A
	18	COM	6 A
	19	COM	6 A
	20	COM	6 A
	21	PWR_OK	5 mA
	22	PS_ON	1 mA
MAIN2	1	+5V	6 A
	2	+3.3V	6 A

CN Name	PIN No.	FUNCTION	MAX CURRENT
12V1-2	1	COM	6 A
	2	COM	6 A
	3	COM	6 A
	4	COM	6 A
	5	+12V	6 A
	6	+12V	6 A
	7	+12V	6 A
	8	+12V	6 A
HD	1	+3.3V	6 A
	2	+5V	6 A
	3	COM	6 A
	4	COM	6 A
	5	+12V	6 A
	6	+3.3V	6 A
	7	+5V	6 A
	8	COM	6 A
	9	COM	6 A
	10	+12V	6 A
SIG	1	AC_FAIL	5 mA
	2	SHUT DOWN T	1 mA
	3	BATT LOW T	5 mA
	4	FAN_C	-
	5	FAN_M	5 mA
	6	PS_ON	1 mA
	7	COM	2 A
	8	+3.3V SE	-
	9	NC	-
	10	+5VSB	2 A



How to process the mounting holes(Recommended)





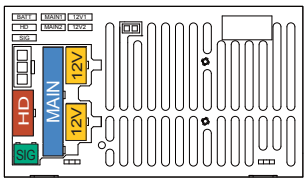
*The screw depth of penetration into PSU is 12mm max.
*Dimensional tolerance shall be ±0.5 unless otherwise specified.

■Installation direction
The unit can be installed in any directions.

Optional Components Sold Separately

Detachable Output Harness

Model	Length and Type of Connector	Output Port Allocation
Main power cable MAIN		
WH-M2022-500	MAIN 500±10 20-pin	
WH-M2022-300	MAIN 300±10 20-pin	
WH-M2422-500	MAIN 500±15 24-pin	
12V power cable 12V		
WH-V0808-500	12V 500±15 12V 8-pin	
WH-V0408-500	12V 500±15 12V 4-pin	
WH-VG208-500	12V 500±15 12V 4-pin, PCI-E 6-pin	
WH-VV208-500-02	12V 500±10 12V 8-pin, 12V 8-pin	
WH-VG208-500-02	12V 500±10 12V 8-pin, PCI-E 6-pin	
WH-G0808-500	12V 500±10 PCI-E 6+2-pin	
WH-GG208-500	12V 500±10 PCI-E 6-pin, PCI-E 6+2-pin	
HD power cable HD		
WH-PP610-850	HD 550±15, 150±15, 150±15	peripheral (HD)
WH-PS610-850	HD 550±15, 150±15, 150±15	FD
WH-PS710-850	HD 550±15, 150±15, 150±15, 850±15	S-ATA
SIG cable SIG		
WH-S0610-500	SIG 500±15 SIG-1	
WH-S0610-500-01	SIG 500±15 SIG-2	
WH-S0310-500	SIG 500±15 SIG-3	

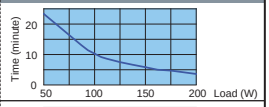
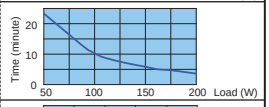
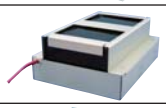
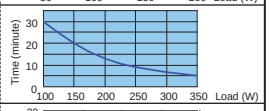
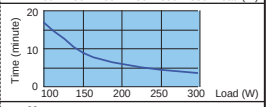
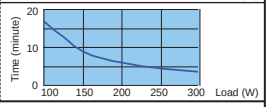


Acceptable cable(s)

MAIN	12V	HD	SIG
1 model	2 models	1 model	1 model

Optional Components Sold Separately

Battery package

Page	Picture	Model	Type	Shape (size)	Backup Time
P.402		BS11A-P24/2.3L	Lead	5-inch bay fixed type (W×D×H=146×190×37mm)	
P.404		RBS02A-P24/2.3L	Lead	5-inch bay fixed, removable type (W×D×H=146×245×42mm)	
P.405		BS12A-P24/5.0L	Lead	5-inch bay 2-unit fixed type (W×D×H=146×190×74.9mm)	
P.409		BS10A-H24/2.0L	Ni-MH	5-inch bay fixed type (W×D×H=146×200×38mm)	
P.413		BS22A-H24/2.0L	Ni-MH	5-inch bay fixed type (W×D×H=146×210×41mm)	

*The backup time is a reference value at initial use; it is not a guaranteed value.

Cable

Picture	Model	Type	Description
	WH2601-02	RS232C communication cable	Dedicated to Windows 2000 / XP / Vista / 7. The cable can be used with power supplies equipped with SU-RS (RS232C signal unit). [RoHS]
 *reference image	WH2967	USB communication cable	USB communication cable The cable can be used with power supplies equipped with SU-US2 (USB signal unit). [RoHS]
	WH2753	AC power cord	125 VAC 12A [PSE]
	WH2753-02	AC power cord	125 VAC 12A (tracking resistance type) [PSE]

Parts / Unit

Picture	Model	Type	Description
	SU-RS	RS232C signal unit	Automatic shutdown is possible with RS232C. (standard equipment for HNSP9-520P-S20-H1V)
	SU-US2	USB signal unit	Automatic shutdown is possible with USB. (standard equipment for HNSP9-520P-S20-H6V)
	SU-BU	Buzzer unit	Buzzer noise is delivered at blackout (the volume can be adjusted). (standard equipment for HNSP9-520P-S20-H2V)
	ACC2734	AC power cord retention clamp	It prevents the slipping of AC power cord (WH2753, WH2753-02) and operational Mistakes of power switch. *In some cases, the clamp (ACC2734) might not be possible mounted to a commercial AC power cord.

Software

Picture	Model	Type	Description
	NSP Pro 2	Automatic shutdown software	Dedicated to Windows 2000 / XP / Vista / 7

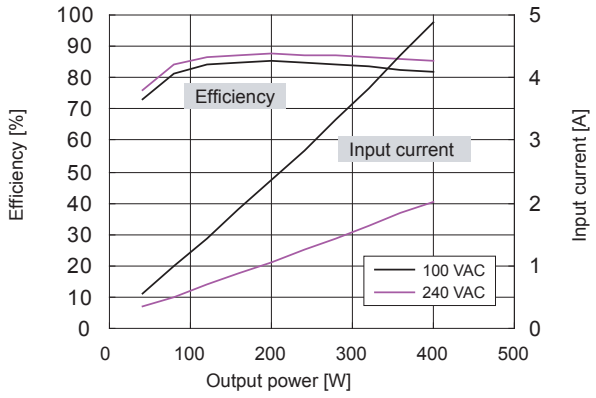
*Free software "NSP Pro 2" available at our web-site
*The UPS service of Windows 2000 and XP available

Other Optional Components

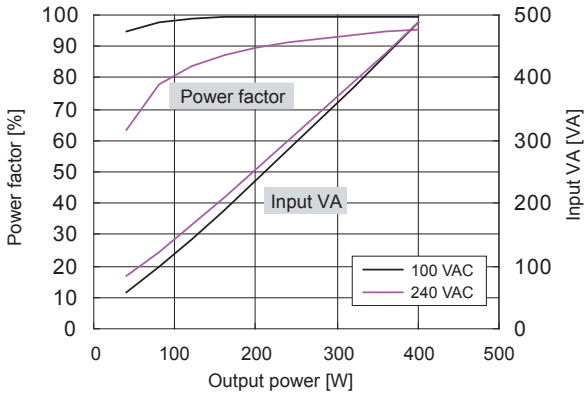
Model	Description	Model	Description
ACC2637	Automatic startup unit	WH5105	12V 4-pin connector conversion harness (80mm)
WH2820	20-pin extension harness (600mm)	WH5105-02	12V 4-pin connector conversion harness (320mm)
WH2747	20-pin extension harness (450mm)	WH5055	AT connector conversion harness
WH2892-02	20-pin extension harness (200mm)	ACC5046	Harness with PS_ON switch
WH2884	Battery extension cable (450mm)	ACC5077	PS_ON terminal short connector
WH2812	PCI-E 6-pin connector conversion harness	WH5073	PS_ON terminal short 20-pin harness

Characteristics Data HNSP9-520P-S20-H1V (Examples of actual measurement)

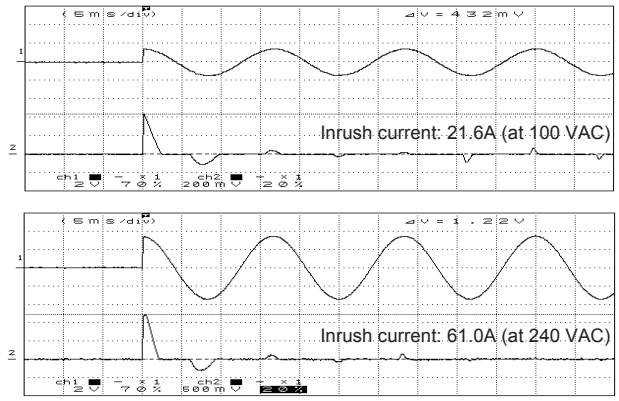
● Fig.5 Efficiency / Input Current vs. Output Power



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



● Fig.7 Inrush Current



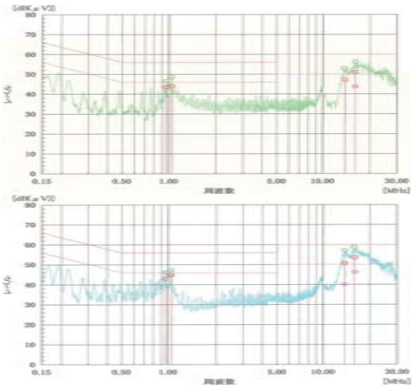
● Fig.8 Leakage Current

Input: 100 / 200 / 240 VAC
Load: Rated and min. load
Measurement conditions: IEC60950 compliant

	Rated load	Min. load
100 VAC	0.18mA	0.17mA
200 VAC	0.30mA	0.29mA
240 VAC	0.35mA	0.35mA

● Fig.9 Conducted Emission at 100 VAC

Input: 100 VAC
Load: Rated
Mode: Peak



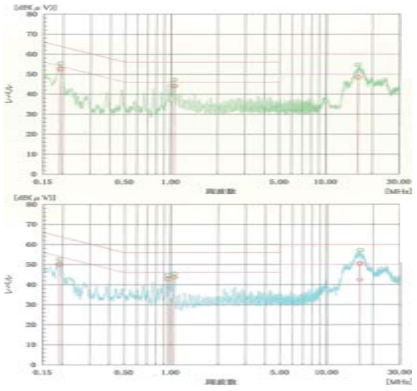
VCCI Class B

Measuring point: N-FG

Measuring point: L-FG

● Fig.10 Conducted Emission at 230 VAC

Input: 230 VAC
Load: Rated
Mode: Peak



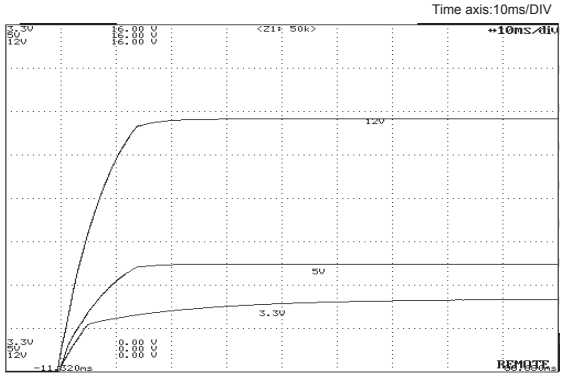
VCCI Class B

Measuring point: N-FG

Measuring point: L-FG

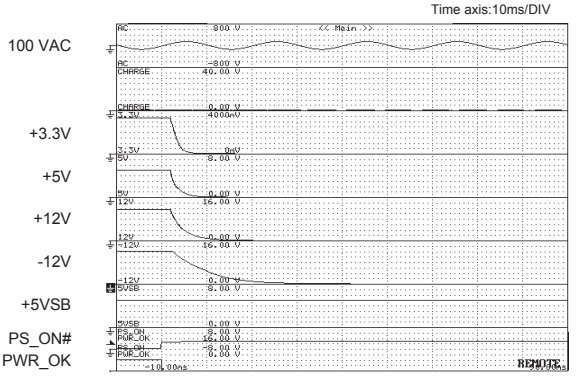
● Fig.11 Rising Characteristics at 100 VAC

Input: 100 VAC
Load: Rated
Time axis:10ms/DIV



● Fig.12 Falling Characteristics at 100 VAC when REMOTE goes Off

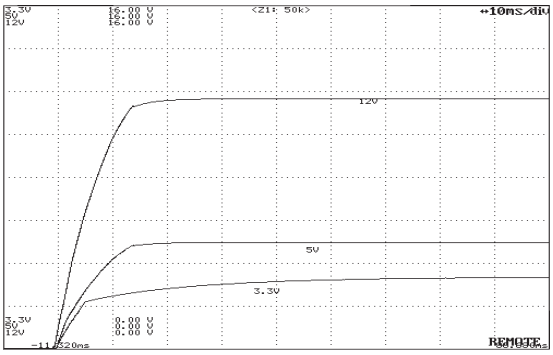
Input: 100 VAC
Load: Rated
Time axis:10ms/DIV



Characteristics Data HNSP9-520P-S20-H1V (Examples of actual measurement)

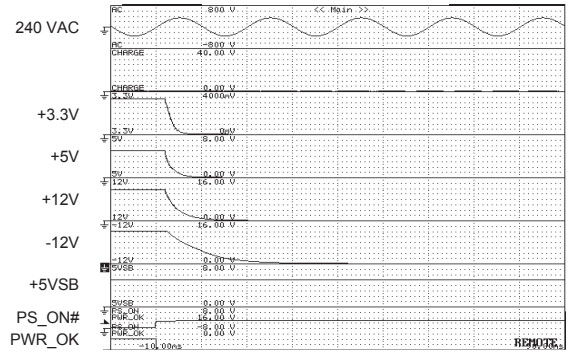
● Fig.13 Rising Characteristics at 240 VAC

Input: 240 VAC
Load: Rated
Time axis: 10ms/DIV



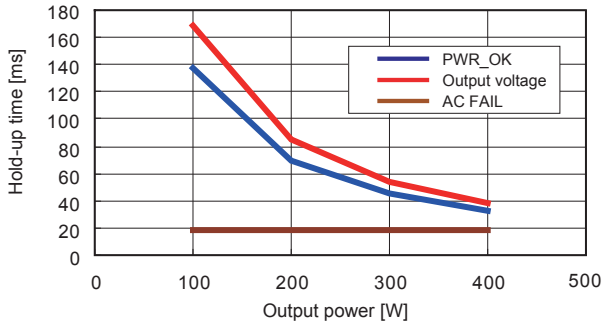
● Fig.14 Falling Characteristics at 240 VAC when REMOTE goes Off

Input: 240 VAC
Load: Rated
Time axis: 10ms/DIV



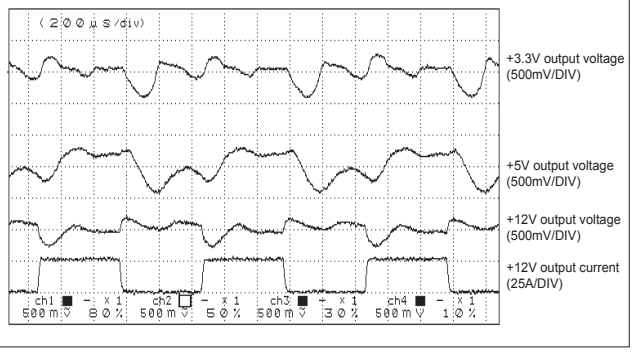
● Fig.15 Output Hold-up Time vs. Output Power

PWR_OK: the point that PWR_OK signal goes to "L"
Output voltage: the point any output voltage decreases to 95% except +5VSB
AC FAIL: the point that AC FAIL signal is delivered



● Fig.16 Dynamic Load Fluctuation Characteristics at 1kHz

Input: 100 VAC
Load: Rated
Time axis: 200μs/DIV



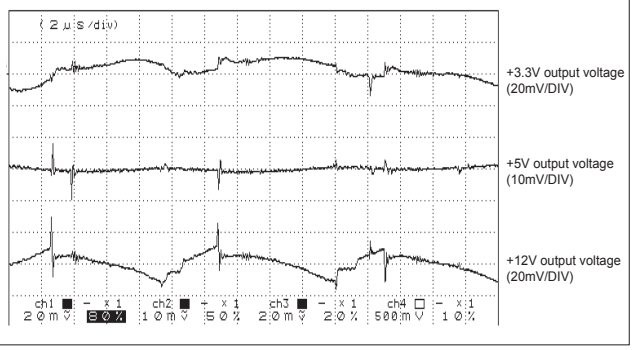
● Fig.17 Output Voltage Regulation

Output	Min. load	Rated load
+12V output	0A	25A
+5V output	0A	10A
+3.3V output	0A	10A

AC input voltage	85 VAC	100 VAC	132 VAC	176 VAC	240 VAC	264 VAC
+3.3V output (min. load)	3.311 V	3.311 V	3.311 V	3.308 V	3.308 V	3.308 V
+3.3V output (rated load)	3.303 V	3.303 V	3.303 V	3.299 V	3.298 V	3.298 V
+5V output (min. load)	5.072 V	5.073 V	5.073 V	5.073 V	5.072 V	5.072 V
+5V output (rated load)	5.009 V	5.009 V	5.010 V	5.008 V	5.009 V	5.009 V
+12V output (min. load)	12.028 V	12.027 V	12.026 V	12.014 V	12.015 V	12.014 V
+12V output (rated load)	11.982 V	11.982 V	11.980 V	11.978 V	11.976 V	11.976 V

● Fig.18 Ripple and Spike Voltage

Input: 100 VAC
Load: Rated
Time axis: 2μs/DIV



● Fig.19 Ambient Temperature vs. Expected Service Life

■ Electrolytic capacitors

Input: 100 VAC
Load: Rated
Operating time: 24 consecutive hours

Intake air temp.	20°C	30°C	40°C	45°C
Expected service life (yr)	approx. 48	approx. 24	approx. 12	approx. 8.6

※ Lifetime shall be 15 years at longest due to deterioration of sealing plates.

■ Fan

Ambient temp.	20°C	30°C	40°C	45°C
Expected service life (yr)	approx. 13	approx. 13	approx. 13	approx. 11

● Fig.20 Over Current Protection (V-I Characteristic)