

# Desktop PC Power Supply eNSP3-200-S10-H1

Desktop PC Power Supply eNSP3-200-S10-H1

3.5 Inch Bay Size Nonstop Power Supply Corresponds to Ni-MH Battery

BRAIN Power Supply  
Desktop PC Power Supply

Nonstop (Uninterruptible / No Power-interruption) Power Supply



eNSP3-200-S10-H1



[Optional components]  
Ni-MH battery package  
BS03A-H16/2.5L

**RoHS  
Directive**

<b>ATX</b>	
<b>NSP</b> (nonstop power supply)	
Continuous Max. <b>200W</b>	Peak Power —

Model	Description	Stock
eNSP3-200-S10-H1	—	Standard stock

■ Model Name Coding

**eNSP3 - 200 - S10 - H1**

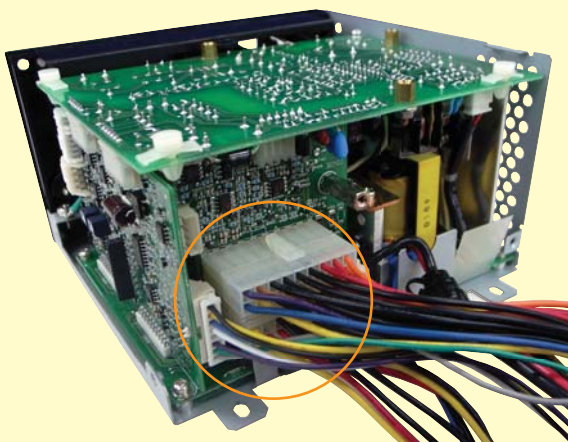
①	②	③	④	⑤	⑥	⑦
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1. Series name	4. DC input voltage (battery voltage) 12V type
2. Output power	5. Modification code
3. Standard	6. Nonstop circuit embedded
	7. Corresponds to RS232C signal

## Features

- With backup function, it protects your PC from blackout.
- This nonstop power supply was designed with a plan to acquire a medical standard, IEC60601-1 (meets the requirement for the distance between the primary and secondary components, etc.).
- Corresponds to 3.5 inch bay size Ni-MH battery package
- 12V connector equipped

Output harnesses can be easily customized to meet various requirements.



Refer to "Product Page Guideline" on p.13

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
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## Automatic shutdown compliant OS

Windows 2000	Windows XP	Windows Vista	Windows 7
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## Input

AC input	85V to 264V (worldwide range)
DC input	16.8V (dedicated battery package*)

\*Battery package is optional (sold separately)

## Output

Output voltage	+3.3V	+5V	+12V	-12V	+5VSB
Max. current/ max. power (continuous)	14A Total 125W	21A Total 185W	10A Total 202.1W	0.8A	1.5A *Peak:2.5A, 5 sec max.
Min. current	0A	1A	0A	0A	0A

\*Total output power shall be 100W or less at battery operation.

## Dimensions

W×H×D (mm)	150×86×140 (PS/2 size)
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## Output connector

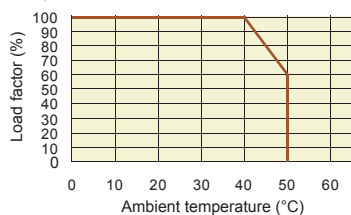
Main 20+4pin	Main 24pin	Main 20pin	AT	AUX	12V 4pin	12V 8pin	PCI-E 6pin	PCI-E 6+2pin	HDD	S-ATA	FDD
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# General Specification Condition: at normal temperature and humidity unless otherwise specified

Items		Specification					Measurement conditions, etc.	
AC Input	Rated Voltage	100 - 240 VAC (85 - 264 VAC)					Worldwide range	
	Input Frequency	50 / 60Hz					47 - 63Hz	
	Efficiency	65% typ. (100 VAC), 70% typ. (240 VAC) *Characteristic data: Fig.2					At rated input/output with fully-charged battery	
	Power Factor	98% typ. (100 VAC), 92% typ. (240 VAC) *Characteristic data: Fig.3						
	Inrush Current	50A peak (100 VAC), 100A peak (240 VAC) *Characteristic data: Fig.4					At rated input/output at cold start (25°C)	
DC Input	Input VA	330VA max. (100 VAC) *Characteristic data: Fig.3					At rated input/output	
	Rated Voltage	16.8 VDC (corresponds to dedicated battery package)					No battery startup	
	Battery Discharge Cut-off Voltage	12V typ. (shutdown of the battery circuit)						
Output	Efficiency (at Battery Operation)	65% typ.					At rated input/output	
	Rated Voltage	+3.3V	+5V	+12V	-12V	+5VSB		
	Rated Current	9.4A	14A	7A	0.8A	1.5A		
	Max. Current / Power	14A	21A	10A	0.8A	1.5A (2.5A*)	Max. output power: 202.1W Note: Total output shall be 100W or less at battery operation *Peak output current (time shall be 5 sec or less. Interval between peak currents shall be at least 3 minutes)	
		125W max.						
	Min. Current	185W max.						
		0A	1A	0A	0A	0A		
	Total Voltage Accuracy (%)	±4 max.	±4 max.	±4 max.	±5 max.	±5 max.	Total accuracy of temperature, input, and load fluctuations	
	Max. Ripple Voltage (mVp-p)	50 max.	50 max.	150 max.	100 max.	50 max.	Two wires are coming out from the output connector and connected into one at the edge. 47µF capacitor is placed on it and it is measured. *Characteristic data: Fig.15	
	Max. Spike Voltage (mVp-p)	100 max.	100 max.	200 max.	200 max.	100 max.		
Protection	Overcurrent Protection	OCP Point (A)	14 min.	20 min.	10.5 min.	Short protection		
		Method	All outputs except for +5VSB shutdown All outputs shutdown at battery operation			Fold back 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	Charge Voltage	23V typ.					Charge time shall be 15 hours max.	
	Charge Current	0.25A typ.						
	Environment	Operating Temp. / Humidity	0 to 50°C* / 10 to 90%					*Refer to Fig.1 No condensation
		Storage Temp. / Humidity	-25 to 70°C / 10 to 95%					No condensation
Vibration		Displacement amplitude: 0.075mm (10-55Hz), Sweep cycles: 10, Test duration: 45 minutes each axis					JIS-C-0040-1999	
Mechanical Shock		Lift one bottom edge up to 50mm and let it fall. Number of bumps: 3 each of 4 edges					JIS-C-0043-1995	
Insulation	Dielectric Strength	AC input - DC output/FG/DC input: 1500 VAC for 1 minute						
	Insulation Resistance	AC input - DC output/FG/DC input: 50MΩ min.					At 500 VDC	
	Leakage Current	0.5mA max. (100 VAC) / 1mA max. (240 VAC) *Characteristic data: Fig.5					YEW. TYPE3226 (1kΩ) or equivalent	
EMC	Line Noise Immunity	± 2000V (pulse width: 100/800ns, repetitive cycle: 10-50ms)					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, CISPR22-B compliant *Characteristic data: Fig.6 and 7					Measured by power supply single body At rated output	
	Harmonic Current Regulation	IEC61000-3-2 Class A, EN61000-3-2 Class A compliant					At rated input/output	
Others	Safety Standard	UL60950, CSA C22.2 No.60950 (c-UL), EN60950, CE Marking (LVD, EMC)						
	Cooling System	Forced air cooling					At PS_ON# 'H', fan rotates at low speed	
	Output Grounding	Connected to chassis (FG)*					*It can be customized to connect to the capacitor	
	Output Hold-up Time	*Characteristic data: Fig.12						
	Reliability Grade	FA (industrial equipment grade, double-sided through hole PCB)					Follow our standard	
	MTBF	100,000H min.					Based on EIAJ RCR-9102	
	Weight	1.8kg typ.						
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 Temperature Derating

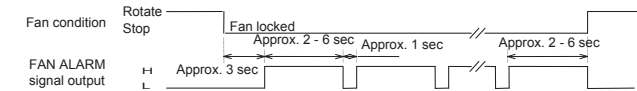
When the ambient temperature (near the airflow inlet) exceeds 40°C, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.



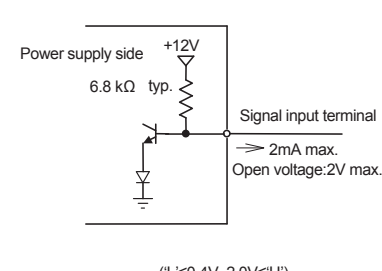
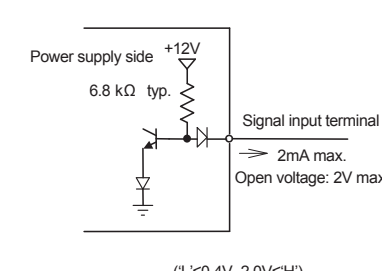
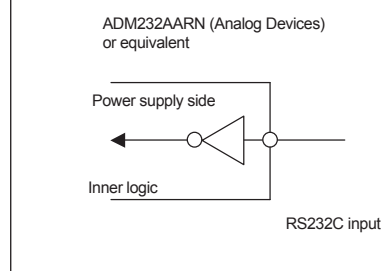
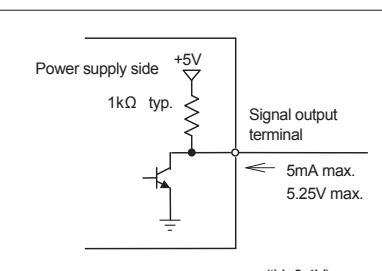
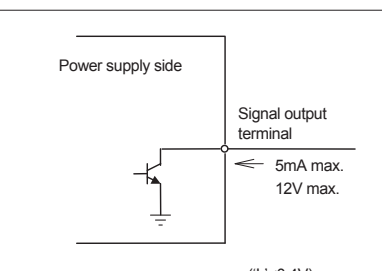
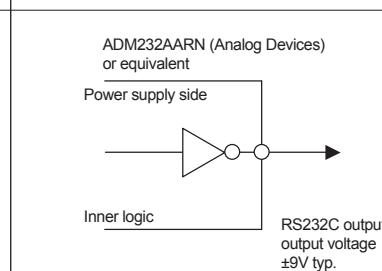
# Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

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Desktop PC Power Supply

Nonstop (Uninterruptible / No Power-interruption) Power Supply

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.)	Signal input between the pin 14 of P1 connector and COM pin
	+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 11 of P1 connector
	Battery Shutdown Signal for TTL (SHUT_DOWN_T)	Battery connection is shutdown with 'L' input (5ms min. input). (available only during the backup operation)	Signal input between the pin 2 of P10 connector and COM pin
	Battery Shutdown Signal for RS232C (SHUT_DOWN_R)	Battery connection is shutdown with 'positive (+2.4V min.)' input (5ms min. input). (available only during the backup operation)	The pin 4 of front panel RS232C connector
Output Signal	Normal output signal (PWR_OK)	'H' signal is delivered when the +5V output is normal (detection delay time: 200 - 500ms).	The pin 8 of P1 connector
	Blackout Detection Signal for TTL (AC_FAIL_T)	The signal goes 'OPEN' at low AC input voltage and blackout detection (open collector output).	The pin 3 of P10 connector
	Blackout Detection Signal for RS232C (AC_FAIL_R)	'Negative (-9V typ.)' is delivered at low AC input voltage and blackout detection.	The pin 8 of front panel RS232C connector
	Low Battery Voltage Signal for TTL (BATT_LOW_T)	The signal goes 'OPEN' when the battery terminal voltage decreases to 13V typ. (open collector output).	The pin 4 of P10 connector
	Low Battery Voltage Signal for RS232C (BATT_LOW_R)	'Negative (-9V typ.)' is delivered when the battery terminal voltage decreases to 13V typ.	The pin 1 of front panel RS232C connector
	Fan Alarm Signal (FAN_ALARM)	When the fan lock status continues, square waves, as shown below, are delivered constantly. 	The pin 6 of P10 connector

## Signal Circuit

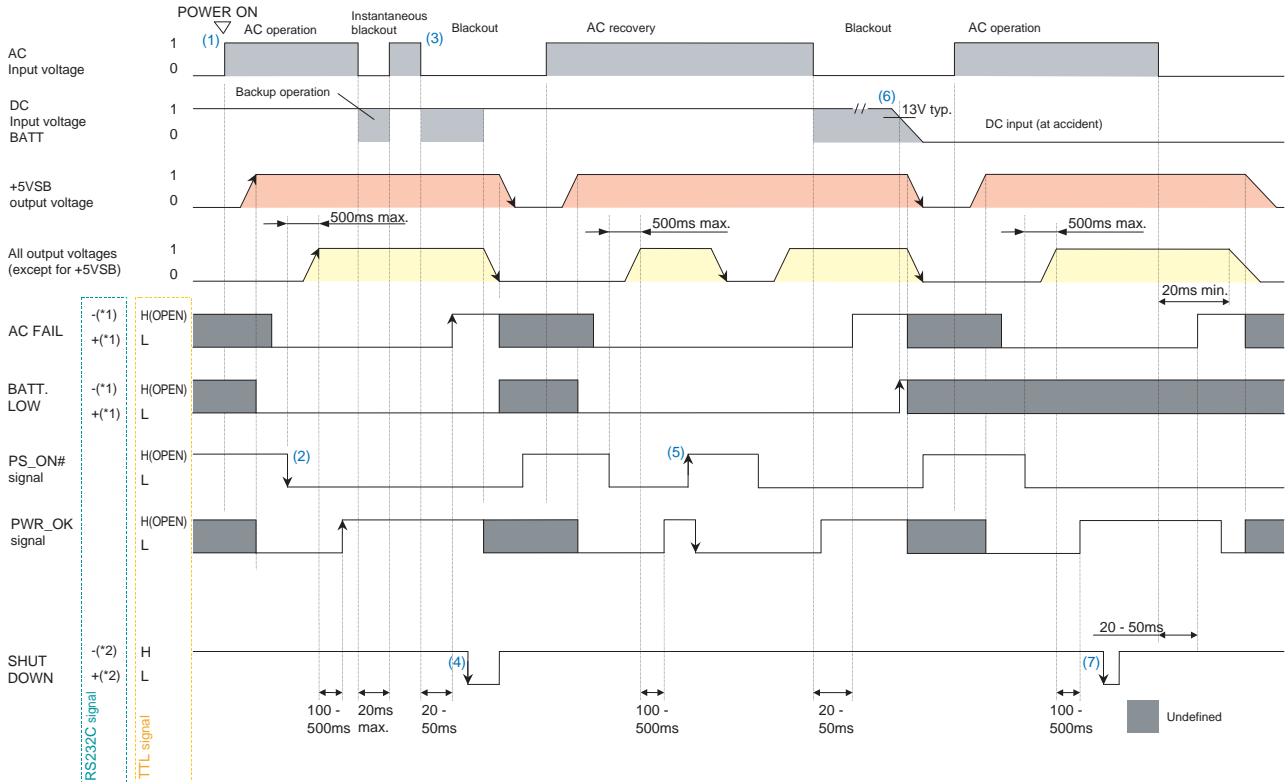
	(PS_ON#)	(SHUT_DOWN_T)	(SHUT_DOWN_R)
Input Signal Circuit	 <p>(<math>L' &lt; 0.4V, 2.0V \leq H</math>)</p>	 <p>(<math>L' &lt; 0.4V, 2.0V \leq H</math>)</p>	 <p>ADM232AARN (Analog Devices) or equivalent RS232C input</p>
Output Signal Circuit	 <p>(<math>L' &lt; 0.4V</math>)</p>	 <p>(<math>L' &lt; 0.4V</math>)</p>	 <p>ADM232AARN (Analog Devices) or equivalent RS232C output output voltage <math>\pm 9V</math> typ.</p>

## Internal Structure





# Sequence Diagram

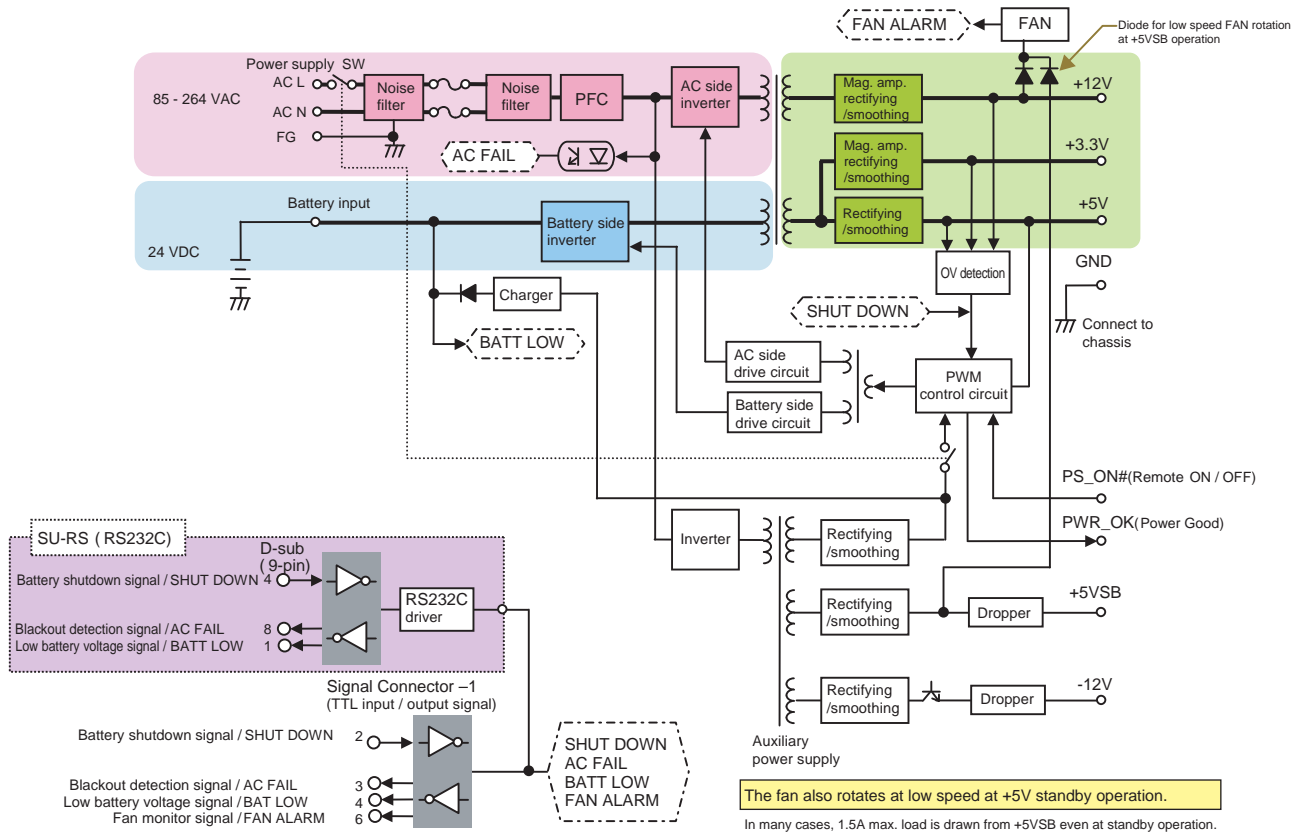


- (1) With AC input, only +5VSB starts up.
- (2) With PS\_ON# 'L' input, all outputs start up. After 100 - 500ms, PWR\_OK goes 'H'.
- (3) AC FAIL 'negative (RS232C)' and 'H (OPEN)'(TTL) are delivered 20 - 50ms after blackout.
- (4) At blackout, all outputs including +5VSB shut down with SHUT DOWN 'positive (RS232C)' or 'L (TTL)' input.
- (5) When AC input and all outputs including +5VSB start up, all outputs except for +5VSB shutdown with PS\_ON# 'H (OPEN)' input.
- (6) When the battery voltage decreases to 13V typ. at backup operation, BATT LOW 'negative (RS232C)' and 'H (OPEN)'(TTL)' are delivered; after it decreases to 12V typ., all outputs including +5VSB shutdown.
- (7) At AC input, the output does not change even SHUT DOWN 'positive (RS232C)' or 'L (TTL)' input.

(\*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.

# Block Diagram



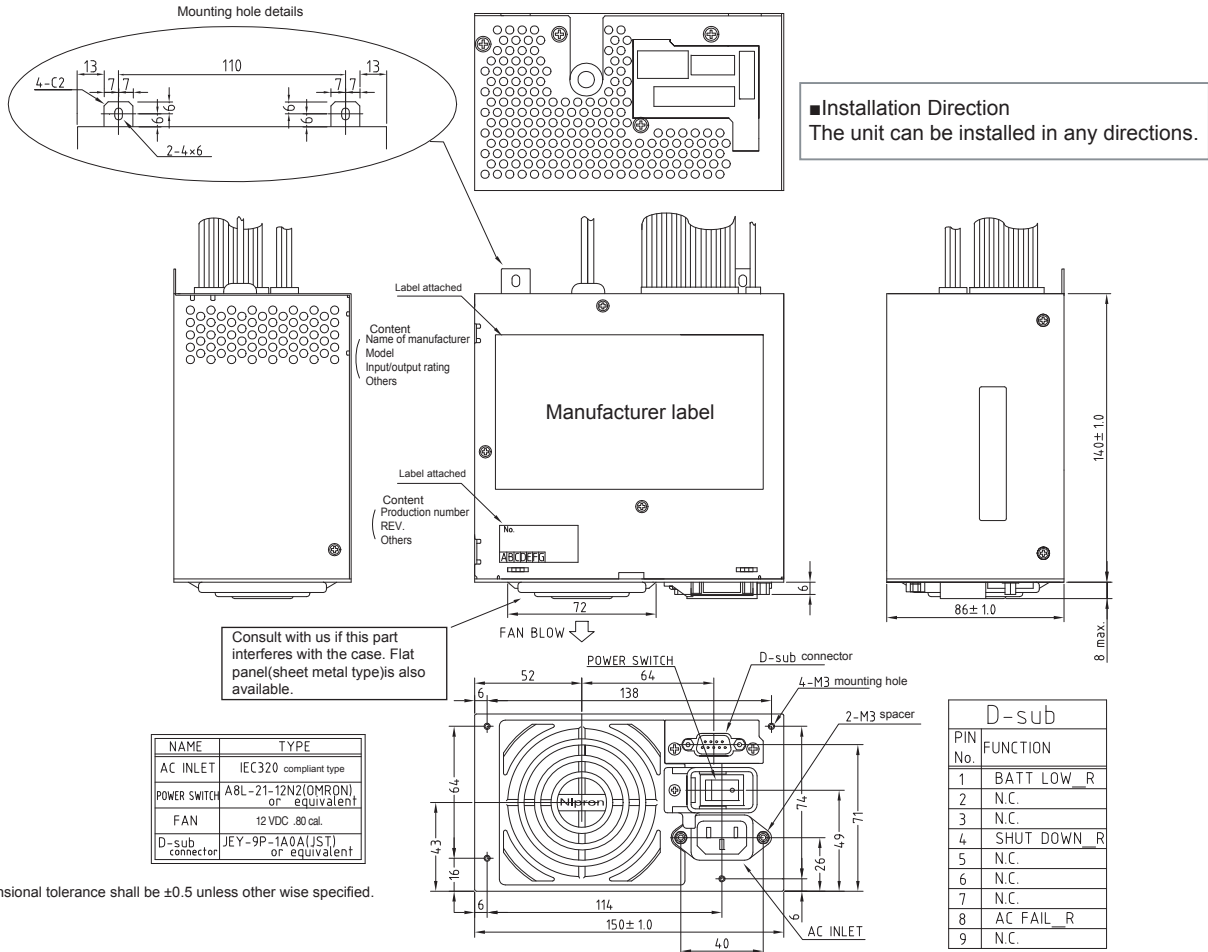
The fan also rotates at low speed at +5V standby operation.

In many cases, 1.5A max. load is drawn from +5VSB even at standby operation. In order to prevent shortening the power supply's life span caused by heat, the fan rotates at low speed to cool down the temperature inside the power supply. (If this function is not preferred, please contact us.)

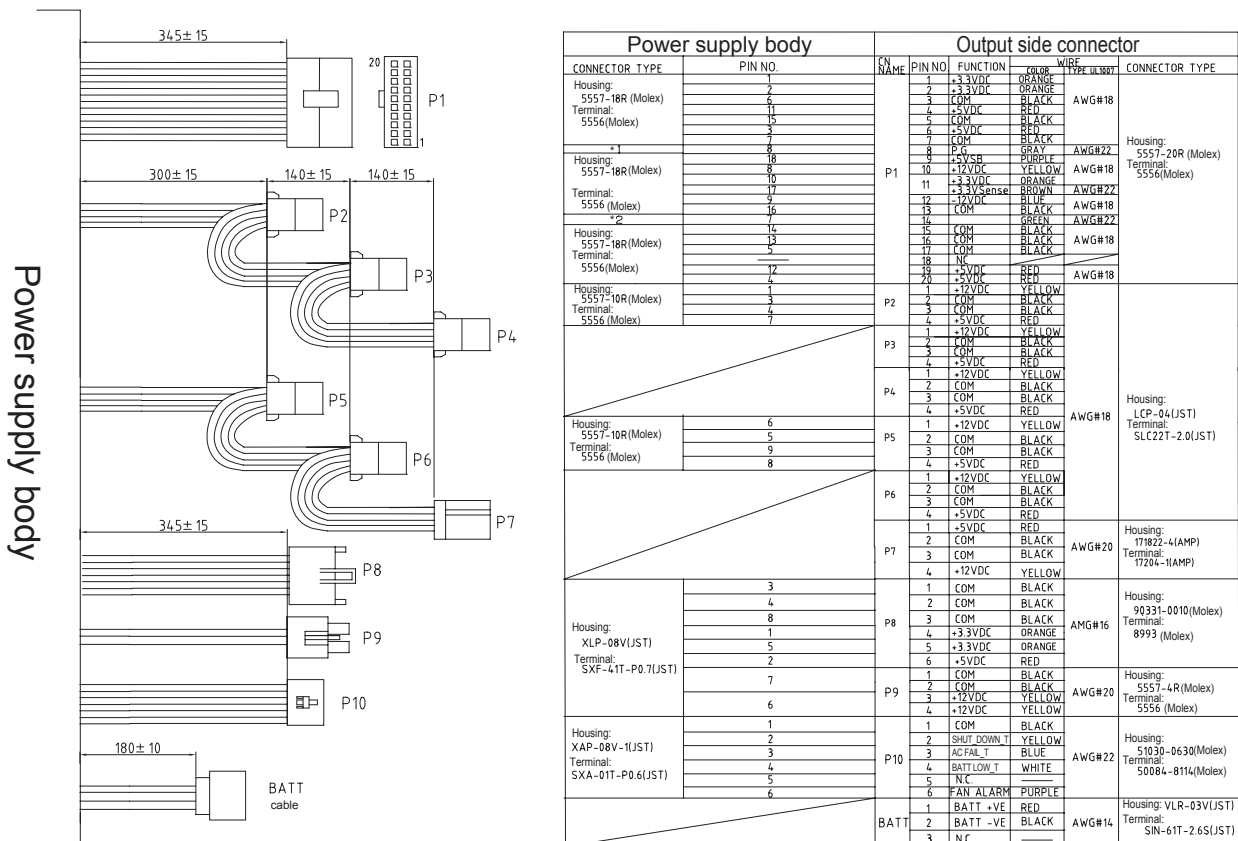
# Outline Drawing

BRAIN Power Supply  
Desktop PC Power Supply


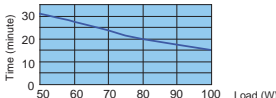

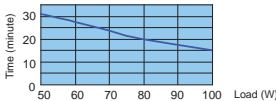
Nonstop (Uninterruptible / No Power-interruption) Power Supply






# Output Harness




## Optional Components Sold Separately


Battery Package					
Page	Picture	Model	Type	Shape (size)	Backup Time
P.406		BP03A-H16/2.5L (no case)	Ni-MH	3.5 inch bay size (WxDxH=92.5x159.5x23.7 mm)	
P.406		BS03A-H16/2.5L (with case)	Ni-MH	3.5-inch bay fixed type (WxDxH=101.5x180x26.5 mm)	

\*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 [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
	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.

\*With this power supply, the signal unit cannot be replaced.

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

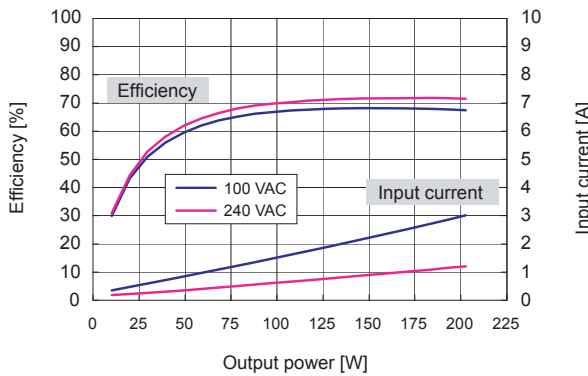
Other Optional Components			
Model	Description	Model	Description
ACC2637	Automatic startup unit	WH5105	12V 4-pin connector conversion harness (80mm)
WH2820	20-pin extension harness (600mm)	WH5105-02	12V 4-pin connector conversion harness (320mm)
WH2747	20-pin extension harness (450mm)	WH5055	AT connector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

## Modified Products on Their Way

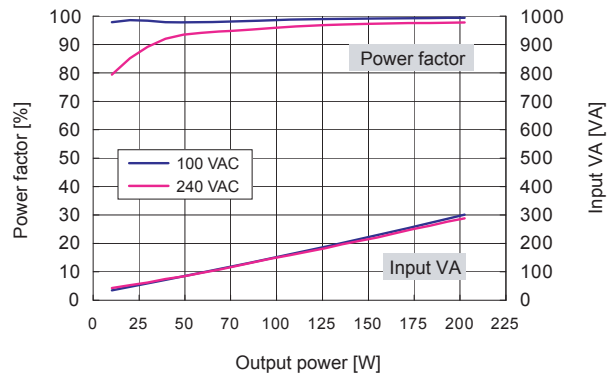
Model	Description
eNSP3-200-S10-H1	Standard model
eNSP3-200-S11-H1	The fan stops at 5VSB operation, customized output harness, battery cable: 130mm
eNSP3-200-S12-H0	The fan stops at 5VSB operation, delivers FAN_M signal, customized output harness, no signal unit, battery cable 190mm
eNSP3-200-S13-H0	Output GND, capacitor grounding, no output harness, no signal unit

# Characteristics Data (Examples of actual measurement)

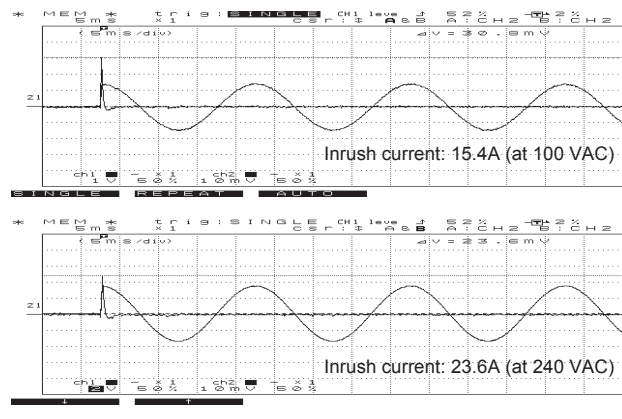
• Fig.2 Efficiency / Input Current vs. Output Power



• Fig.3 Power Factor / Input VA vs. Output Power



• Fig.4 Inrush Current

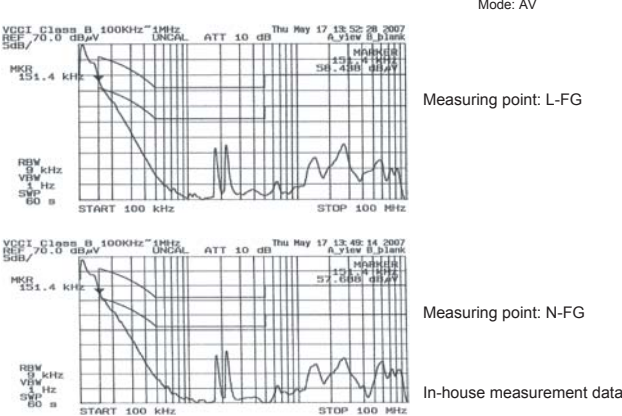


• Fig.5 Leakage Current

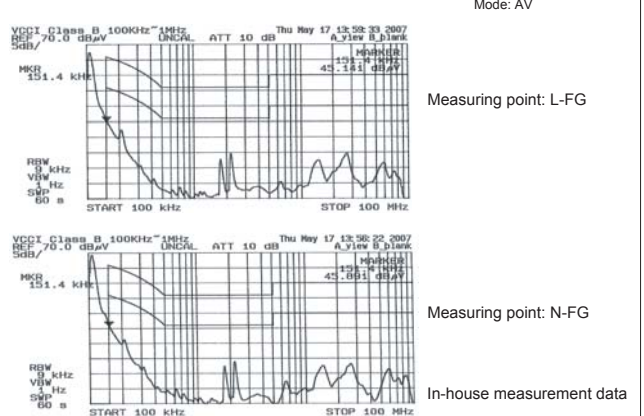
Input: 100 / 240 VAC  
Load: Rated and min. load

	Rated load	Min. load
100 VAC	0.38mA	0.31mA
240 VAC	0.72mA	0.75mA

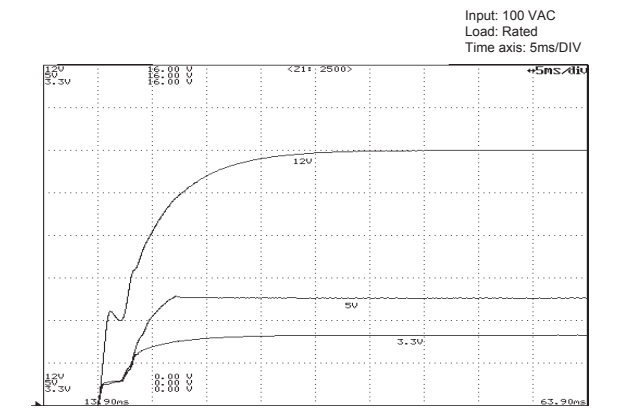
• Fig.6 Conducted Emission at 100 VAC



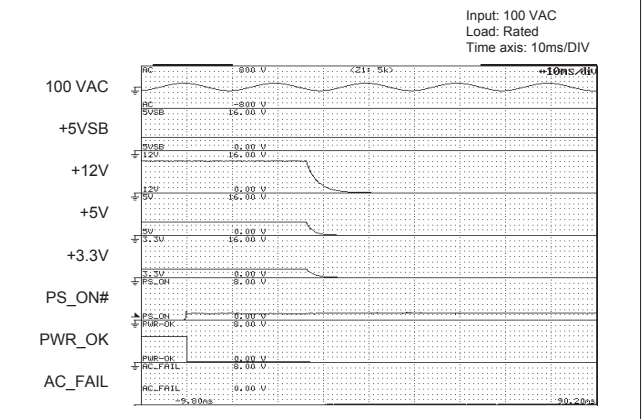
• Fig.7 Conducted Emission at 240 VAC



• Fig.8 Rising Characteristics at 100 VAC

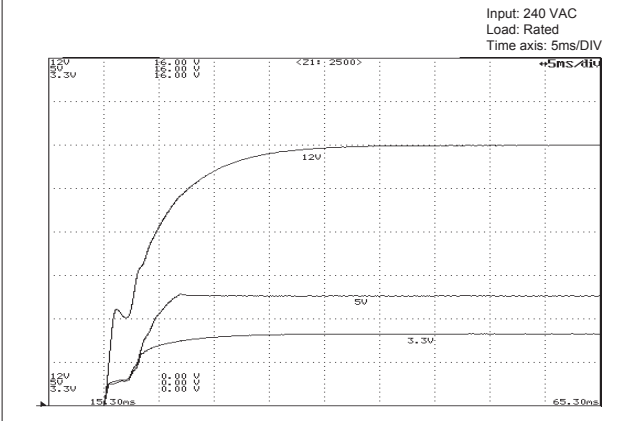


• Fig.9 Falling Characteristics at 100 VAC when REMOTE goes Off

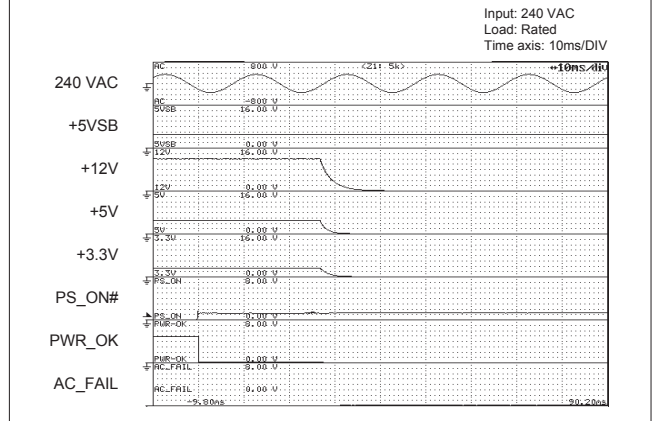


# Characteristics Data (Examples of actual measurement)

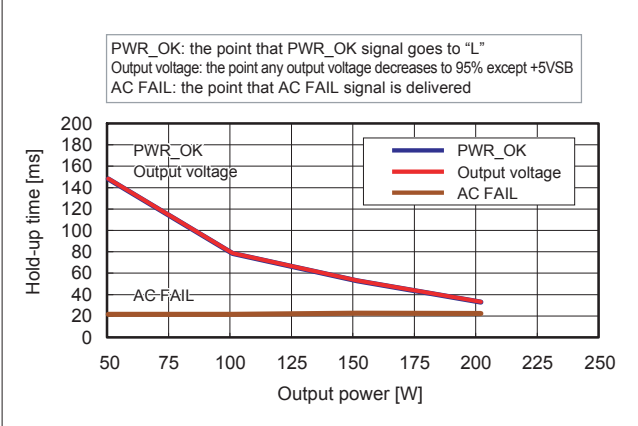
● Fig.10 Rising Characteristics at 240 VAC



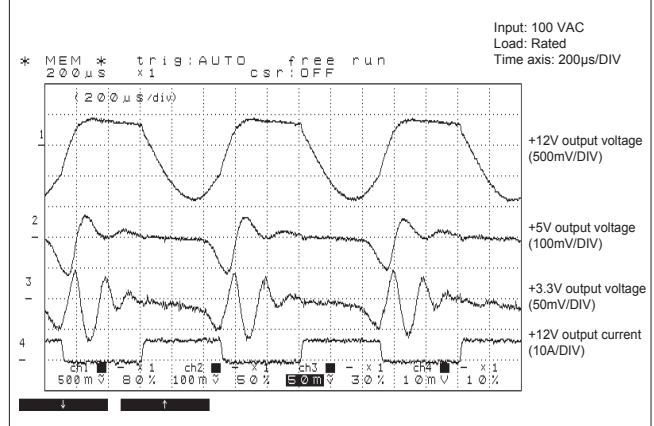
● Fig.11 Falling Characteristics at 240 VAC when REMOTE goes Off



● Fig.12 Output Hold-up Time vs. Output Power



● Fig.13 Dynamic Load Fluctuation Characteristics at 1kHz



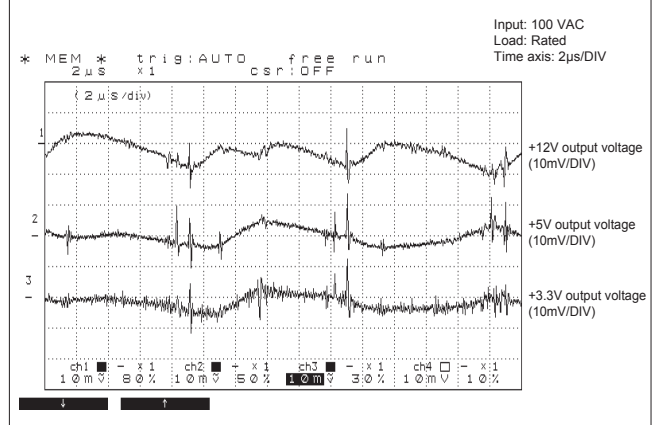
● Fig.14 Output Voltage Regulation

Output	Min. load	Rated load
+12V output	0A	7A
+5V output	1A	14A
+3.3V output	0A	9.4A

AC input voltage	85 VAC	100 VAC	132 VAC	176 VAC	240 VAC	264 VAC
+12V output (min. load)	12.121 V	12.120 V	12.120 V	12.120 V	12.121 V	12.122 V
+12V output (rated load)	11.995 V	11.994 V	11.992 V	11.992 V	11.992 V	11.992 V
+5V output (min. load)	5.120 V	5.121 V	5.121 V	5.121 V	5.121 V	5.121 V
+5V output (rated load)	5.033 V	5.034 V	5.034 V	5.034 V	5.034 V	5.034 V
+3.3V output (min. load)	3.374 V	3.374 V	3.374 V	3.374 V	3.374 V	5.374 V
+3.3V output (rated load)	3.307 V	3.307 V	3.307 V	3.307 V	3.308 V	3.307 V

● Fig.15 Ripple and Spike Voltage



● Fig.16 Ambient Temperature vs. Expected Service Life

■ Electrolytic capacitors

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

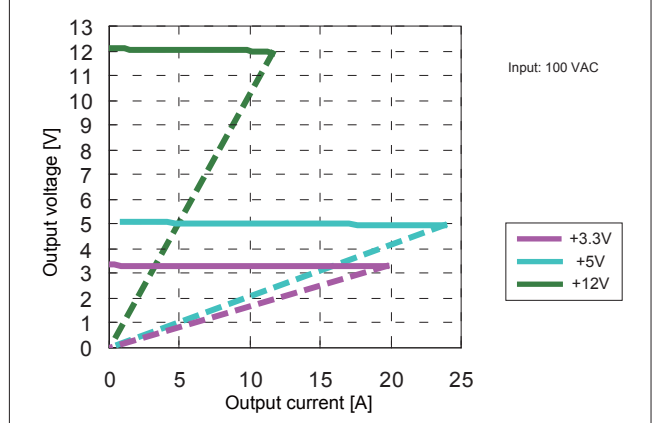
Intake air temp.	20°C	30°C	40°C
Expected service life (yr)	approx. 30	approx. 15	approx. 7.5

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

■ Fan

Ambient temp.	20°C	30°C	40°C	50°C
Expected service life (yr)	approx. 8.1	approx. 8.1	approx. 8.1	approx. 8.1

● Fig.17 Over Current Protection (V-I Characteristic)



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