Desktop PC Power Supply NSP3-150-F2S

Nonstop Power Supply with 24V Output for Mechanism System

BRAIN Power Supply

Desktop PC Power Supply

Nonstop (Uninterruptible / No Power-interruption) Power Supply

NSP3-150-F2S

RoHS Directive

Other

NSP (nonstop power supply)

Continuous Max.	Peak Power
150W	—

Model	Description	Stock
NSP3-150-F2S	—	Standard stock

■Model Name Coding

NSP3 - 150 - F 2 S
 ①   ②   ③ ④ ⑤

1. Series name
2. Output power
3. +24V output
4. DC input voltage (battery voltage) 24V type
5. Standard

Features

- With backup function, it protects your PC from blackout.
- Output for PC and mechanism system 24V output with insulated GND are integrated, which saves space and cost.
- An active filter is mounted on AC input.
- Worldwide range input
- Each of +5V and +24V has an independent stabilizing circuit.

This unit is a nonstop power supply with 24V output for mechanism system.

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

Automatic shutdown compliant OS

Windows 2000 | Windows XP | Windows Vista | Windows 7

Input

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

*Battery package is optional (sold separately)

Output

Output voltage	+5V	+12V	+24V	-12V	+5VSB
Max. current/ max. power (continuous)	20A	5A	2A	0.5A	1.0A
	Total 152W				
Min. current	1.5A	0A	0A	0A	0A

Dimensions

W×H×D (mm)	150×86×140 (PS/2 size)

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

*20-pin connector of this model has no 3.3V output different from ATX output

95 | NSP3-150-F2S

Specification, design, and prices in the catalog are subject to change without prior notice. Do not copy. Copyright © 2013 Nipron Co., Ltd.

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

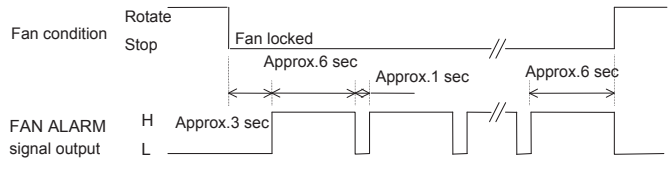|	Items		Specification					Measurement conditions, etc.
AC Input	Rated Voltage		100 - 240 VAC (85 - 264 VAC)					Worldwide range
	Input Frequency		50 / 60Hz					47 - 63Hz
	Efficiency		65% typ. (100 VAC), 70% typ. (240 VAC) *Characteristic data: Fig.1					At rated input/output
	Power Factor		98% typ. (100 VAC), 92% typ. (240 VAC) *Characteristic data: Fig.2					
	Inrush Current		50A peak (100 VAC), 100A peak (240 VAC) *Characteristic data: Fig.3					At rated input/output at cold start (25°C)
	Input VA		245VA max. (100 VAC) *Characteristic data: Fig.2					
DC Input	Rated Voltage		24 VDC (corresponds to dedicated battery package)					No battery startup impossible
	Battery Discharge Cut-off Voltage		17V±1V typ. (shutdown of the battery circuit)					
	Efficiency (at Battery Operation)		67% typ.					At rated input/output
Output	Rated Voltage		+5V	+12V	+24V	-12V	+5VSB	
	Rated Current		15A	3.5A	1A	0.5A	1.0A	
	Max. Current / Power		20A	5A	2A	0.5A	1.0A	Max. output power: 152W
			152W max.					
	Min. Current		1.5A	0A	0A	0A	0A	
	Total Voltage Accuracy (%)		±4 max.	±10 max.	±5 max.	±5 max.	±5 max.	Total accuracy of temperature, input, and load fluctuations
	Max. Ripple Voltage (mVp-p)		50 max.	150 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.14
	Max. Spike Voltage (mVp-p)		100 max.	200 max.	200 max.	200 max.	100 max.	
Protection	Overcurrent Protection	OCP Point (A)	17 min.	4.5 min.	Short protection			All other outputs are at rated input/output.
		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		Automatic recovery			
		At Battery Operation	Reclosing AC input		Automatic recovery		Reclosing AC input	
	Overvoltage Protection	OVP Point (V)	6.0 - 7.0	14 - 15.6	-	-	-	
		Method	All outputs except for +5VSB shutdown All outputs shutdown at battery operation		-	-	-	
	Recovery (Overvoltage)	At AC Operation	Reclosing AC input		-	-	-	
		At Battery Operation	Reclosing AC input		-	-	-	
Charge	Charge Voltage		27.3V typ. (at 25°C, with no load)					
	Charge Current		0.5±0.2A (with 24V battery voltage)					
Environment	Operating Temp. / Humidity		0 to 50°C* / 10 to 90%					
	Storage Temp. / Humidity		-25 to 70°C / 10 to 95%					No condensation
	Vibration		Displacement amplitude: 0.15mm (10-55Hz), Sweep cycles: 10, Test duration: 45 minutes each axis					JIS-C-0040-1995
	Mechanical Shock		Acceleration of 150m/s² for 11ms one time each in the X, Y and Z directions. No malfunction, damage, loosening or coming-off					JIS-C-0041-1995
Insulation	Dielectric Strength		AC input - DC output/FG/DC input: 3000 VAC for 1 sec					At 500 VDC
	Insulation Resistance		AC input - DC output/FG/DC input: 50MΩ min.					
	Leakage Current		0.5mA max. (100 VAC) / 1mA max. (240 VAC) *Characteristic data: Fig.4					YEW. TYPE3226 (1kΩ) or equivalent
EMC	Line Noise Immunity		± 2000V (pulse width: 100/800ns, repetitive cycle: 10-50ms)					Measured with 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.5 and 6					Measured by single unit At rated output
	Harmonic Current Regulation		IEC61000-3-2 Class A, EN61000-3-2 Class A compliant					At rated input/output
Others	Safety Standard		UL1950, CSA C22.2 No.234 (c-UL)					
	Cooling System		Forced air cooling					
	Output Grounding		Capacitor grounding					
	Output Hold-up Time		PWR_OK holds up 30ms min. after AC failure *Characteristic data: Fig.11					At rated output
	Reliability Grade		FA (industrial equipment grade, double-sided through hole PCB)					Follow our standard
	MTBF		102,000H min.					Based on EIAJ RCR-9102
	Weight		1.7kg typ.					
	Warranty		5 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

Internal Structure

Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified
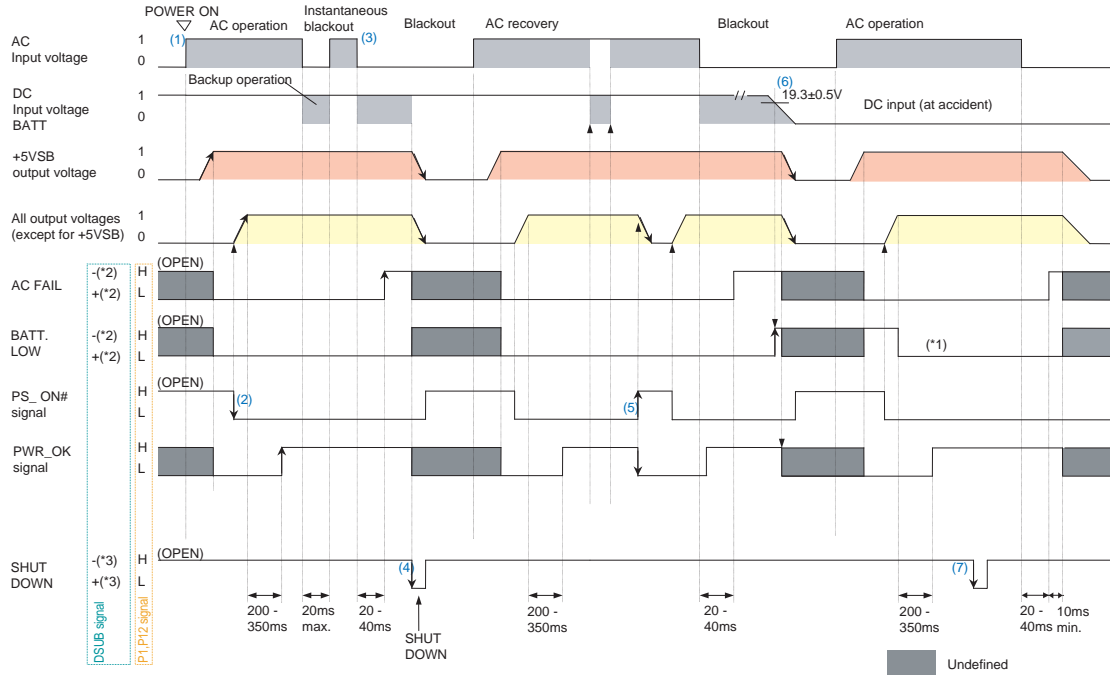
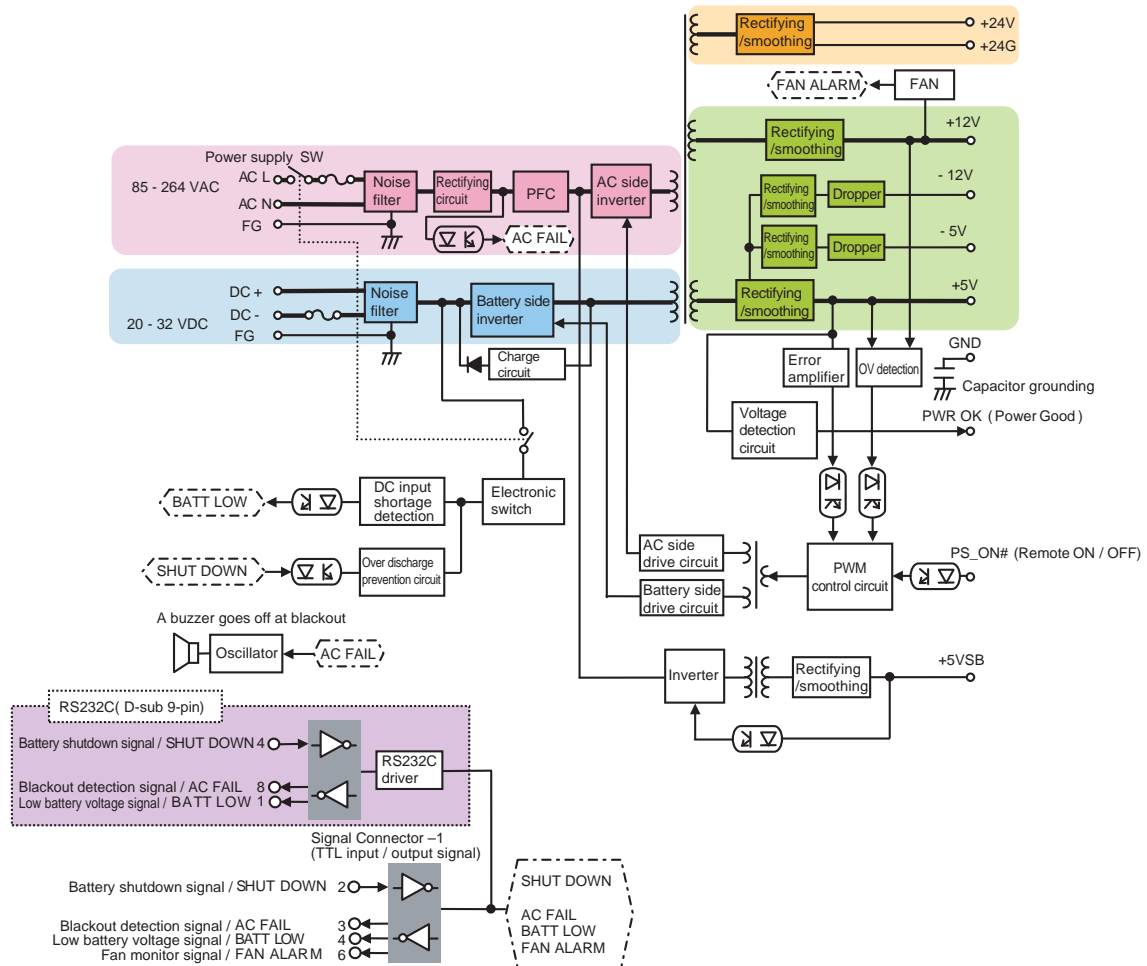|	Items	Specification	Note
Input Signal	Output ON / OFF Control Signal (PS_ON#)	+5V, +12V, +24V, and -12V outputs shutdown with 'H' or 'OPEN' input (During the backup operation, battery connection is shut off with 'H' or 'OPEN' input.)	Signal input between the pin 14 of P1 connector and COM pin
	Battery Shutdown Signal for TTL (SHUT DOWN_T)	Battery connection is shutdown with 'L' input. (available only during the backup operation)	Signal input between the pin 2 of P12 connector and COM pin
	Battery Shutdown Signal for RS232C (SHUT DOWN_R)	Battery connection is shutdown with 'positive (+2.4V 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 at normal output (detection delay time: 200 - 350ms).	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). (detection voltage: 80 VAC typ., detection delay time: 20 - 40ms after AC input failure)	The pin 3 of P12 connector
	Blackout Detection Signal for RS232C (AC FAIL_R)	'Negative (-9V typ.)' is delivered at low AC input voltage and blackout detection. (detection voltage: 80 VAC typ., detection delay time: 20 - 40ms after AC input failure)	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 $19.3 \pm 0.5V$ typ. (open collector output). ('L' is delivered if the battery package is not connected. At PS_ON# 'H' or 'OPEN' input, the signal goes 'OPEN' regardless of the battery connection or voltage level.)	The pin 4 of P12 connector
	Low Battery Voltage Signal for RS232C (BATT LOW_R)	'Negative (-9V typ.)'(DSUB) is delivered when the battery terminal voltage decreases to $19.3 \pm 0.5V$ typ. ('positive(+9V typ.)' is delivered if the battery package is not connected. At PS_ON# 'H' or 'OPEN' input, 'Negative(-9V typ.)' is delivered regardless of the battery connection or voltage level.)	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 P12 connector

Signal Circuit	
Input Signal Circuit	

(PS_ON#), (SHUT DOWN_T)	(SHUT DOWN_R)

(PWR_OK)	(AC FAIL_T), (FAN ALARM), (BATT LOW_T)	(AC FAIL_R), (BATT LOW_R)

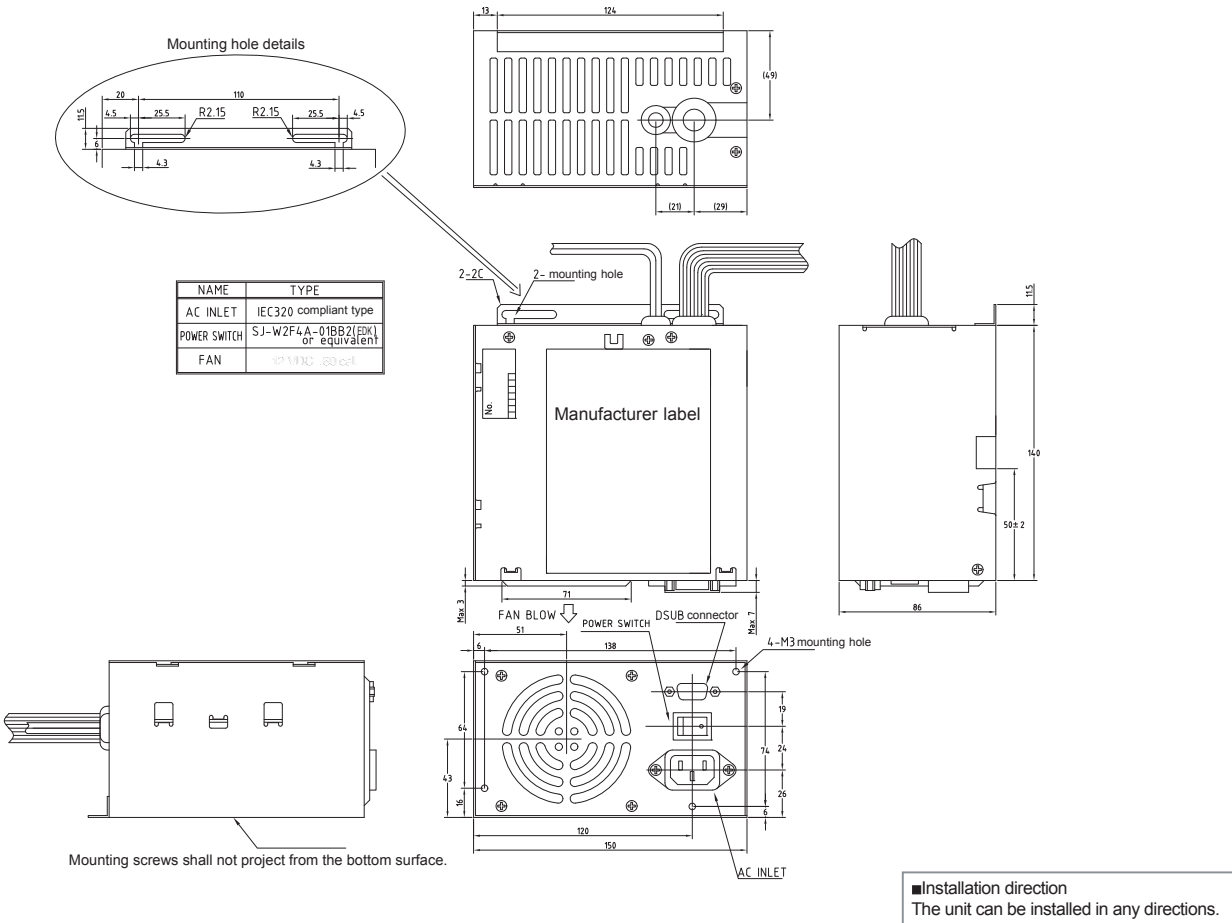# **S**equence Diagram NSP3-150-F2S connected w/ dedicated battery package

(*1)
Due to charger output, BATT.LOW is not delivered.
(*2)
Negative signal output is -9V typ.
Positive signal output is +9V typ.
(*3)
Negative signal input should be +0.4V to -30V.
Positive signal output should be +2.8V to +30V.

(1) With AC input, only +5VSB starts up.
(2) With PS_ON# 'L' input, all outputs start up. After 200 - 350ms, PWR_OK goes 'H'.
(3) AC FAIL 'negative (RS232C)' and 'H (TTL)' are delivered 20 - 40ms 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 are turned on, all outputs except for +5VSB shutdown with PS_ON# 'H' (OPEN) input.
(6) When the battery voltage decreases to 19.3±0.5V or less at backup operation, BATT LOW 'negative (RS232C)' and '(OPEN)(TTL)' is delivered; after it decreases to 17±1V or less, all outputs, including +5VSB shutdown.
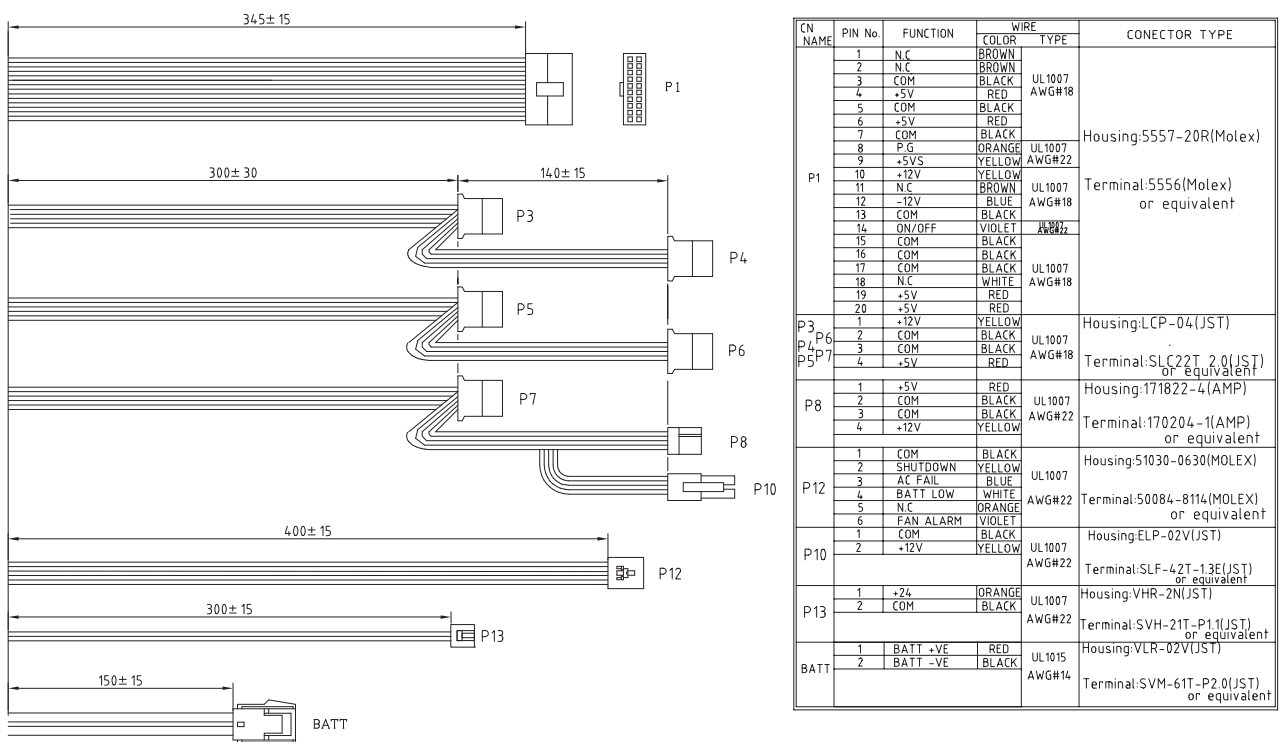(7) At AC input, the output does not change even SHUT DOWN 'positive (RS232C)' or 'L (TTL)' input.
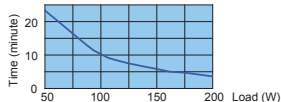
Block Diagram

Outline Drawing

Mounting hole details

NAME	TYPE
AC INLET	IEC320 compliant type
POWER SWITCH	SJ-W2F4A-01BB2(EDK) or equivalent
FAN	12VDC 30cfl

Manufacturer label

2-2C   2- mounting hole

FAN BLOW   POWER SWITCH   DSUB connector   4-M3 mounting hole

Mounting screws shall not project from the bottom surface.

AC INLET

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

Output Harness

345± 15

P1

300± 30   140± 15

P3
P4
P5
P6
P7
P8
P10

400± 15

P12

300± 15

P13

150± 15

BATT

CN NAME	PIN No.	FUNCTION	WIRE COLOR	TYPE	CONECTOR TYPE
P1	1	N.C	BROWN	UL1007 AWG#18	Housing:5557-20R(Molex)
	2	N.C	BROWN		
	3	COM	BLACK		
	4	+5V	RED		
	5	COM	BLACK		
	6	+5V	RED		
	7	COM	BLACK		
	8	P.G	ORANGE	UL1007 AWG#22	
	9	+5VS	YELLOW		
	10	+12V	YELLOW		Terminal:5556(Molex) or equivalent
	11	N.C	BROWN	UL1007 AWG#18	
	12	-12V	BLUE		
	13	COM	BLACK		
	14	ON/OFF	VIOLET	UL1007 AWG#22	
	15	COM	BLACK		
	16	COM	BLACK		
	17	COM	BLACK	UL1007 AWG#18	
	18	N.C	WHITE		
	19	+5V	RED		
	20	+5V	RED		
P3 P4 P5 P6 P7	1	+12V	YELLOW	UL1007 AWG#18	Housing:LCP-04(JST)
	2	COM	BLACK		
	3	COM	BLACK		Terminal:SLC22T 2.0(JST) or equivalent
	4	+5V	RED		
P8	1	+5V	RED	UL1007 AWG#22	Housing:171822-4(AMP)
	2	COM	BLACK		
	3	COM	BLACK		Terminal:170204-1(AMP) or equivalent
	4	+12V	YELLOW		
P12	1	COM	BLACK	UL1007 AWG#22	Housing:51030-0630(MOLEX)
	2	SHUTDOWN	YELLOW		
	3	AC FAIL	BLUE		
	4	BATT LOW	WHITE		Terminal:50084-8114(MOLEX) or equivalent
	5	N.C	ORANGE		
	6	FAN ALARM	VIOLET		
P10	1	COM	BLACK	UL1007 AWG#22	Housing:ELP-02V(JST)
	2	+12V	YELLOW		Terminal:SLF-42T-1.3E(JST) or equivalent
P13	1	+24	ORANGE	UL1007 AWG#22	Housing:VHR-2N(JST)
	2	COM	BLACK		Terminal:SVH-21T-P1.1(JST) or equivalent
BATT	1	BATT +VE	RED	UL1015 AWG#14	Housing:VLR-02V(JST)
	2	BATT -VE	BLACK		Terminal:SVM-61T-P2.0(JST) or equivalent

NSP3-150-F2S

Optional Components Sold Separately

Battery Package

Page	Picture	Model	Type	Shape (size)	Backup Time
P.401		BS05A-P24/2.2L	Lead	5-inch bay fixed type (W×D×H=146×190×37mm)	
P.403		RBS01A-P24/2.2L	Lead	5-inch bay fixed, removable type (W×D×H=146×245×42mm)	
P.407		BS06A-H24/2.5L (for standby use) BS06B-H24/2.5L (with fan, for cycle use)	Ni-MH	5-inch bay fixed type (W×D×H=146×181×38mm)	

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

*Safety standard for the battery package is acquired as an optional component of power supply.
BS06A-H24/2.5L and BS06B-H24/2.5L have not acquired safety standard as an optional component of NSP3-150 series.

Cable

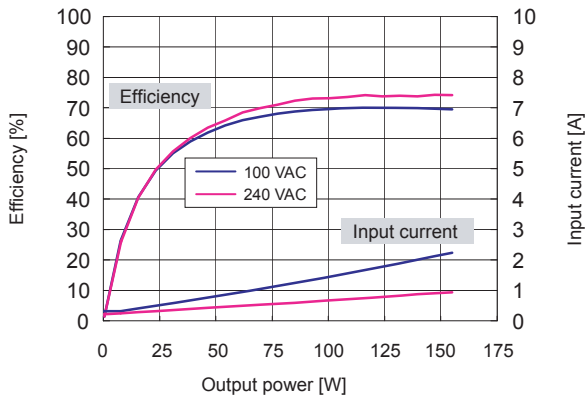| Picture	Model	Type	Description
	WH2601-02	RS232C communication cable	Dedicated to Windows 2000 / XP / Vista / 7 [RoHS]
	WH2753	AC power cord	125 VAC 12A [PSE]
	WH2753-02	AC power cord	125 VAC 12A (tracking resistance type) [PSE]

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
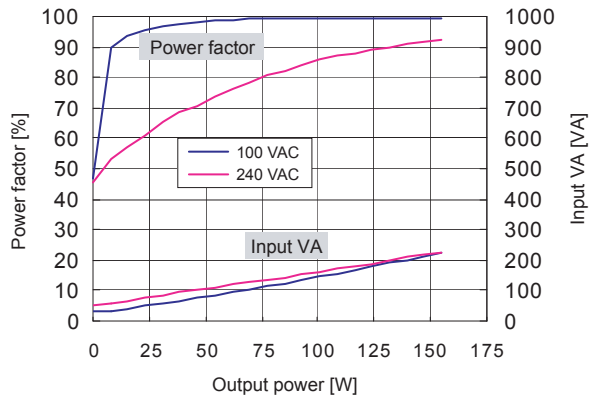*The UPS service of Windows 2000 and XP available

Other Optional Components

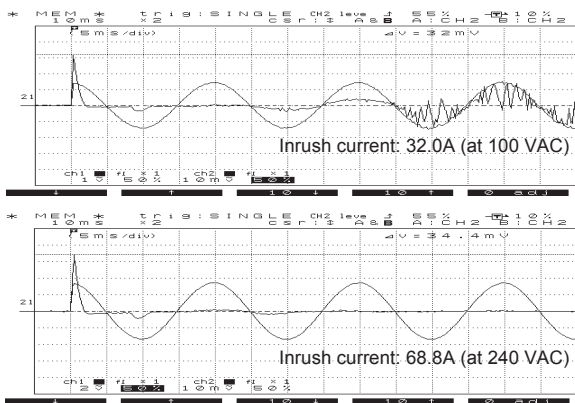| Model	Description	Model	Description
ACC2637	Automatic startup unit	WH5105	12V 4-pin connector conversion harness (80mm)
WH2820	20-pin extension harness (600mm)	WH5105-02	12V 4-pin connector conversion harness (320mm)
WH2747	20-pin extension harness (450mm)	WH5055	AT connector conversion harness
WH2892-02	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

Characteristics Data (Examples of actual measurement)

● Fig.1 Efficiency / Input Current vs. Output Power

● Fig.2 Power Factor / Input VA vs. Output Power
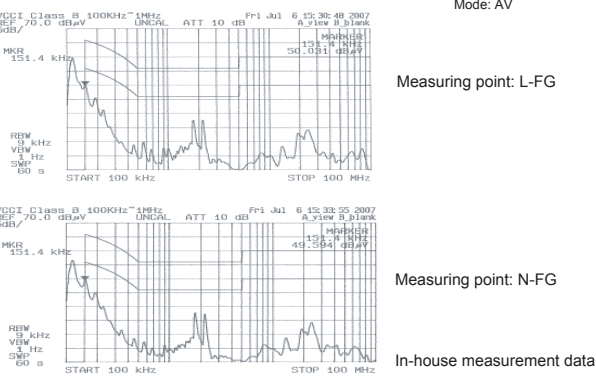

● Fig.3 Inrush Current

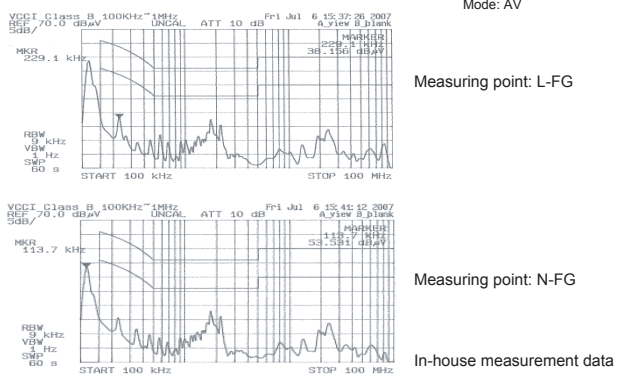Inrush current: 32.0A (at 100 VAC)

Inrush current: 68.8A (at 240 VAC)

● Fig.4 Leakage Current

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

	Rated load	Min. load
100 VAC	0.38mA	0.39mA
240 VAC	0.89mA	0.87mA

● Fig.5 Conducted Emission at 100 VAC

Input: 100 VAC
Load: Rated
Mode: AV

Measuring point: L-FG

Measuring point: N-FG

In-house measurement data

● Fig.6 Conducted Emission at 240 VAC

Input: 240 VAC
Load: Rated
Mode: AV

Measuring point: L-FG

Measuring point: N-FG

In-house measurement data

● Fig.7 Rising Characteristics at 100 VAC

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

● Fig.8 Falling Characteristics at 100 VAC when REMOTE goes Off

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

100 VAC

+5VSB

+24V

+12V

+5V

PS_ON#

PWR_OK

Characteristics Data   (Examples of actual measurement)

● Fig.9 Rising Characteristics at 240 VAC

Input: 240 VAC
Load: Rated
Time axis: 2ms/DIV

● Fig.10 Falling Characteristics at 240 VAC when REMOTE goes Off

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

240 VAC
+5VSB
+24V
+12V
+5V
PS_ON#
PWR_OK

● Fig.11 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.12 Dynamic Load Fluctuation Characteristics at 1kHz

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

+12V output voltage (200mV/DIV)
+5V output voltage (10mV/DIV)
+24V output voltage (50mV/DIV)
+12V output current (5 A/DIV)

● Fig.13 Output Voltage Regulation

Output	Min. load	Rated load
+12V output	0A	3.5A
+5V output	1.5A	15A
+24V output	0A	1A

AC input voltage	85 VAC	100 VAC	132 VAC	176 VAC	240 VAC	264 VAC
+12V output (min. load)	11.803 V	11.803 V	11.803 V	11.802 V	11.803 V	11.803 V
+12V output (rated load)	12.138 V	12.136 V	12.135 V	12.135 V	12.134 V	12.135 V
+5V output (min. load)	5.143 V	5.142 V	5.142 V	5.142 V	5.142 V	5.142 V
+5V output (rated load)	5.113 V	5.113 V	5.113 V	5.113 V	5.113 V	5.113 V
+24V output (min. load)	24.891 V	24.892 V	24.891 V	24.891 V	24.892 V	24.891 V
+24V output (rated load)	24.822 V	24.823 V	24.824 V	24.823 V	24.823 V	24.823 V

● Fig.14 Ripple and Spike Voltage

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

+12V output voltage (10mV/DIV)
+5V output voltage (10mV/DIV)
+24V output voltage (50mV/DIV)

● Fig.15 Ambient Temperature vs. Expected Service Life

■ Electrolytic capacitors

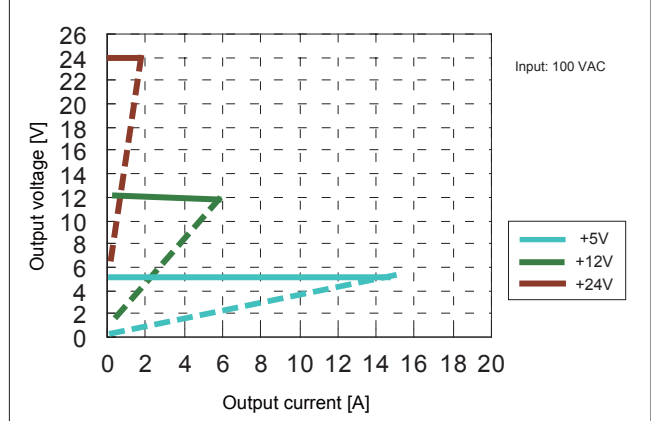Input: 100 VAC
Load: Rated
Operating time: 24 consecutive hours

Intake air temp.	20°C	30°C	40°C	50°C
Expected service life (yr)	approx. 67	approx. 34	approx. 17	approx. 8.4

※ 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.16 Over Current Protection (V-I Characteristic)

Input: 100 VAC

+5V
+12V
+24V