Desktop PC Power Supply NSP7-100 Series

Model	Description	Stock	Standard Price (Before Tax)
NSP7-100-X2S	—	Standard stock	¥18, 400
NSP7-100-X2S1	All outputs shut down one minute after blackout (no DC startup)	1 to 5 units:30 days before delivery, 6 units or more:100 days before delivery	¥18, 400
NSP7-100-X2S2	Dedicated to Windows2000/XP (no DC startup)	Standard stock	¥18, 400

■Model Name Coding

NSP7 – 100 – X 2 S ＊
① ② ③④⑤⑥

① Series name
② Output power
③ ATX output
④ With +3.3V output
⑤ Standard
⑥ Modification code

Features

●With double-input of AC＋DC, the unit is suitable for advanced information system equipment, which requires uninterruptible operation !

●With a DC startup harness（WH2731） connected, the unit operates with DC input (24V) only (NSP7-100-X2S).

●Since the output harness cable has a detachable connector system, the unit can be customized easily.

●With a timer, the unit completely shuts down automatically after blackout (NSP7-100-X2S1).

The unit can be used as DC 12V input power supply by mounting an optional boosting unit, PS2803.

24V lead battery can be used with a lead battery charger unit, PS2697 mounted to the power supply.

Since DC input terminal is independent, an external battery (lead) can operate multiple units jointly (long-term continuous operation is possible). The battery can be shared with NSP2-250/NSP2-375.

Refer to "Product Page Guideline" on page B-B1 for icons.

Acquired safety standard	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 | Fit for Pen4 | RoHS Directive

※DC startup is only available with NSP7-100-X2S.
※DC startup harness, WH2731 is needed for DC startup. See B-G51.

●Automatic shutdown compliant OS

Windows 95/98 | Windows NT | Windows 2000 | Windows XP | Windows Vista

※ Windows2000 and XP only correspond to NSP7-100-X2S2.
※ See D-29 "power supply monitoring software" for details of automatic shutdown.
※ See D-45 "Q96" for operation on linux.

●Input

AC input	85V to 135V/170 to 264V（switching system）
DC output	20V to 32V（battery package can be connected, DC startup possible）

※DC startup is only available with NSP7-100-X2S.
※DC startup harness, WH2731 is needed for DC startup. See B-G51.

●Output

Output voltage	+3.3V	+5V	+12V	-12V	+5VSB
Max current/ max power(continuous)	6A	15A	6A	0.2A	0.72A
	Total 100W				
Minimum current	0A	1A	0A	0A	0A

●Dimensions

W×H×D（mm）	100×63.5×125（SFX12V APPENDIX D size）

●Output connector

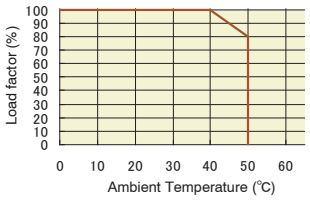
20 Pin | 24 Pin | AT | 12V | AUX | Processor | ×3 | ×1 | S-ATA | PCI-E

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

	Page	Items		Specification					Measurement conditions, etc.
AC Input	D-6(1)	Rated voltage		AC100-120V (AC85-135V)/AC200-240V (AC170-264V) Characteristics data (B-C119 Fig.10-11)					Switching system
	D-6(2)	Input frequency		50/60Hz					47-63Hz
	D-6(3)	Efficiency		50% min (AC100V), 50% min (AC240V) Characteristics data (B-C118 Fig.2)					With rated input/output
	D-6(4)	Power factor		75% typical (AC 100V), 72% typical (AC240V) Characteristics data (B-C118 Fig.3)					
	D-6(5)	Inrush current		50A peak(AC100V),100A peak (AC240V) Characteristics data (B-C118 Fig.4)					With rate input/output at cold start (25℃)
	D-6(6)	Input VA		290VA max(AC100V) Characteristics data (B-C118 Fig.3)					With rated input
DC Input	D-6(1)	Rated voltage		DC 26.4V					DC startup available(NSP7-100-X2S only) ※DC startup harness, WH2731 is needed for DC startup (the harness is not necessary if using a dedicated battery package). See B-G51 for details.
	D-6(3)	Efficiency		50% min					With rated input/output
Output	—	Rated voltage		+3.3V	+5V	+12V	-12V	+5VSB	
	—	Rated current		6A	10A	1.5A	0.2A	0.72A	
	D-6(8)	Max current/power		6A	15A	6A	0.2A	0.72A	Max output power is 100W.
				100W max					
	D-6(10)	Minimum current		0A	1A	0A	0A	0A	
	D-6 (11)-⑧	Total voltage accuracy (%)		±5 max	±5 max	±10 max	±10 max	±5 max	Sum of temperature, input, and load regulations.
	D-7(12)	Max ripple voltage (mVp-p)		50 max	50 max	120 max	120 max	70 max	Connect two wires to the output connector. Put a 47uF capacitor to measure.
	D-7(12)	Max spike voltage (mVp-p)		100 max	100 max	200 max	200 max	150 max	Characteristic data (B-C121 Figure 29)
Protection	D-7(13)	Over Current Protection	OCP point (A)	6.3 min	16.5 min	7 min	0.4 min	1 min	Other outputs have minimum loads.
			Method	All outputs shut down*		All outputs shut down	Foldback current limiting	Outputs except for -12V shut down	*All outputs shut down with low voltage after over current.
		Recovery (over current)	At AC operation	Reclosing input			Automatic recovery		+12V output may recover automatically depending on the condition.
			At DC operation	Reclosing input			Automatic recovery		
	D-7(14)	Over Voltage Protection	OVP point (V)	3.7 to 4.3	6.0 to 7.0	14 to 15.6	—	—	
			Method	All outputs shut down			—	—	
		Recovery (over voltage)	At AC operation	Reclosing input			—	—	
			At DC operation	Reclosing input			—	—	
Environment	D-7(16)	Operating temperature/humidity		0-50℃*/10-90%					*Refer to <Figure 1>. There shall be no condensation.
	D-7(17)	Storage temperature/humidity		-25-70℃/10-95%					There shall be no condensation.
	D-7(18	Vibration		Displacement amplitude of 0.15mm with a vibration frequency of 10-55Hz for 10 sweep cycles in the X-Y-Z directions for 45 minutes.					JIS-C-0040-1995
	D-7(19)	Mechanical shock		Acceleration of 150m/s^2 for 11ms one time each in the X, Y, Z directions. No malfunction, damage, loosening, or coming-off.					JIS-C-0043-1995
Insulation	D-7(20)	Dielectric strength		AC3000V for one second between AC input and DC output/FG/DC input					
	D-7(21)	Insulation resistance		50MΩ min between AC input and DC output/FG/DC input					DC500V Normal temperature and humidity
				50MΩ min between DC input and DC output/FG					
	D-7(22)	Leakage current		1mA max(AC100V)/2mA max (AC240V)					YEW. TYPE3226 (1kΩ) or equivalent
EMC	D-7(23)	Line noise immunity		±2000V (pulse width:100ns and 800ns, repetitive cycle:10-50ms)					It shall follow the DC output specification. There shall be no malfunction.
	D-7(24)	Electrostatic discharge		EN61000-4-2 compliant					
	D-7(25)	Radiated,radio-frequency EM field		EN61000-4-3 compliant					
	D-7(26)	Fast transient burst		EN61000-4-4 compliant					
	D-7(27)	Lightning surge		EN61000-4-5 compliant					
	D-7(28)	Conducted disturbances induced by radio-frequency		EN61000-4-6 compliant					
	D-7(29)	Power source frequency magnetic field		EN61000-4-8 compliant					
	D-8(30)	Voltage dip/regulation		EN61000-4-11 compliant Characteristic data (B-C120 Fig.22-23)					
	D-8(31)	Conducted emission		VCCI-B, FCC-B, and EN55022-B compliant					Measured with the unit embedded to our EMC measuring PC.
	D-8(32)	Harmonic current regulation		IEC-1000-3-2 Class D and EN61000-3-2 Class D compliant Characteristic data (B-C118 Fig.6-7)					With rated input/output
Other	D-8[1-6]	Safety standard		UL60950, CSA C22.2 No.60950(c-UL), EN60950					
	D-8(34)	Cooling system		Forced-air cooling					With PS_ON# 'H,' the fan rotates at low speed.
	D-8(35)	Outpout GND terminal		Capacitor grounding					
	F-3	Reliability Grade		FA (Industrial equipment grade, double-sided PWB with through holes)					It is to follow our standard.
	D-8(41)	MTBF		89,000 H min					Based on EIAJ RCR-9102
	—	Weight		1.2kg typical					
	F-3	Warranty		Three 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.

<Figure 1> Temperature Derating

When the ambient temperature (near the airflow inlet) exceeds 40℃, follow the curve below to derate rated current/power and max current/power.



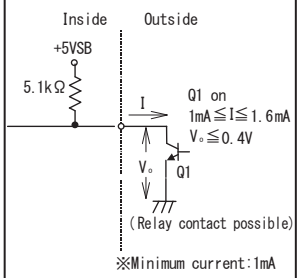
Signal Input/Output (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Note
Input Signal	Output ON/OFF control signal (PS_ON#)	With 'L' (CLOSE) input, +3.3V, +5V, +12V, -12V, and +5VSB are delivered. With 'H' (OPEN) input, +3.3V, +5V, +12V, and -12V are shut down.	Signal input between P1 connector 14-pin and COM pin
	+3.3V SENSE	The input terminal for detecting the voltage of +3.3V output. By connecting to the load terminal, only the line drop of the + side of output cable is compensated.	P1 connector 11-pin
	Battery shutdown signal (SHUT DOWN)	When the photo-coupler remains on for 5 to 7s or more (4.7V min is put on both terminals) battery (DC) connection is shut off (only available at battery backup (DC) operation).	RS232C connector 4-pin
	Operation shifting control (BATT CHECK)	When the photo-coupler is on (4.7V min is put on both terminals), AC inverter is forcibly shut down to switch to DC operation, and make a pseudo blackout.	P12 connector 5-pin
Output Signal	Normal output signal (PWR_OK)	When +5V is normal, 'H'is delivered (detection delay time: 150 to 450ms).	P1 connector 8-pin
	Blackout detection signal (AC FAIL)	Photo-coupler is turned off at low AC input voltage and blackout detection. Detection voltage: 50V typical (input shifting switch: 115V), 100V typical (input shifting switch: 230V), detection delay time: 10ms min after AC failure.	RS232 connector 8-pin
	Low battery voltage signal (BATT LOW)	Photo-coupler is turned off when the low terminal voltage signal is delivered from the battery package.	RS232C connector 1-pin
	Fan alarm signal (FAN ALARM)	Photo-coupler is turned off when the fan lock status remains.	

Signal Circuit

Input Signal Circuit

(PS_ON#)



When the photo-coupler output is ON, max current:5mA, voltage: 0.4V max.
When it is OFF, max voltage: 20V

Output Signal Circuit

(PWR_OK)

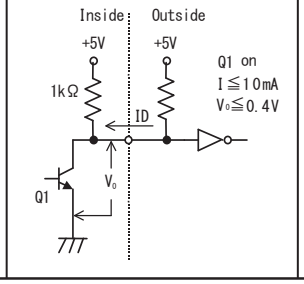
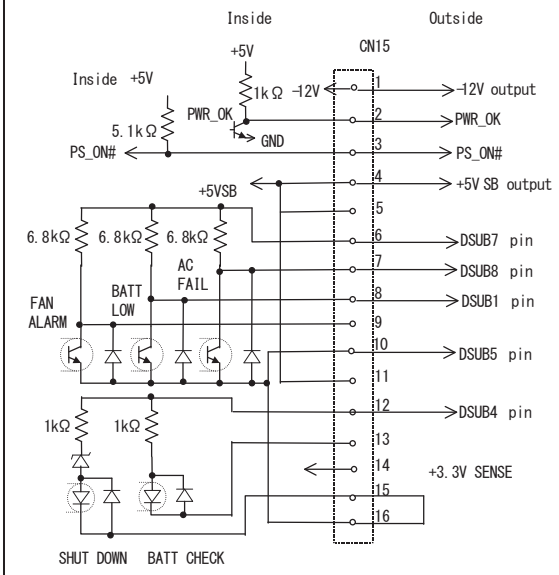
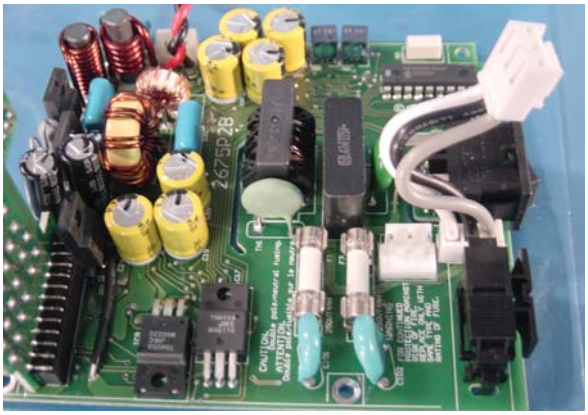


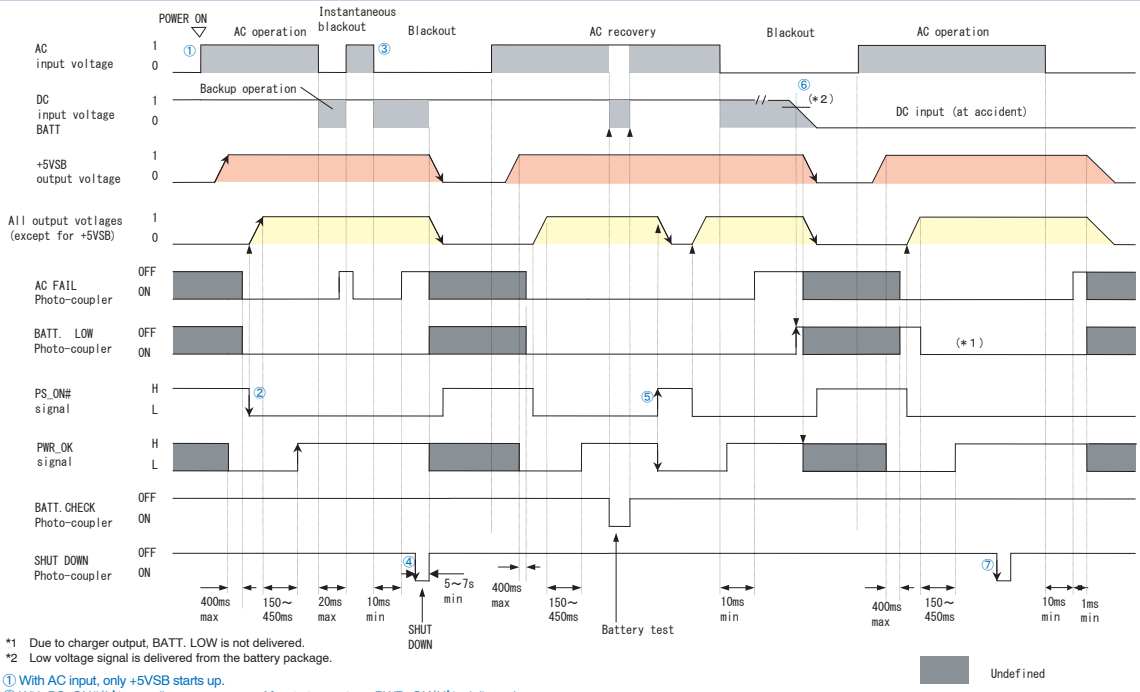
Photo-coupler input
ON: Max voltage is 1.5V.
OFF: Max voltage is 1.2V.



Interior View



Power Supply Timing (Provided that a dedicated battery package is connected to NSP7-100 series.)

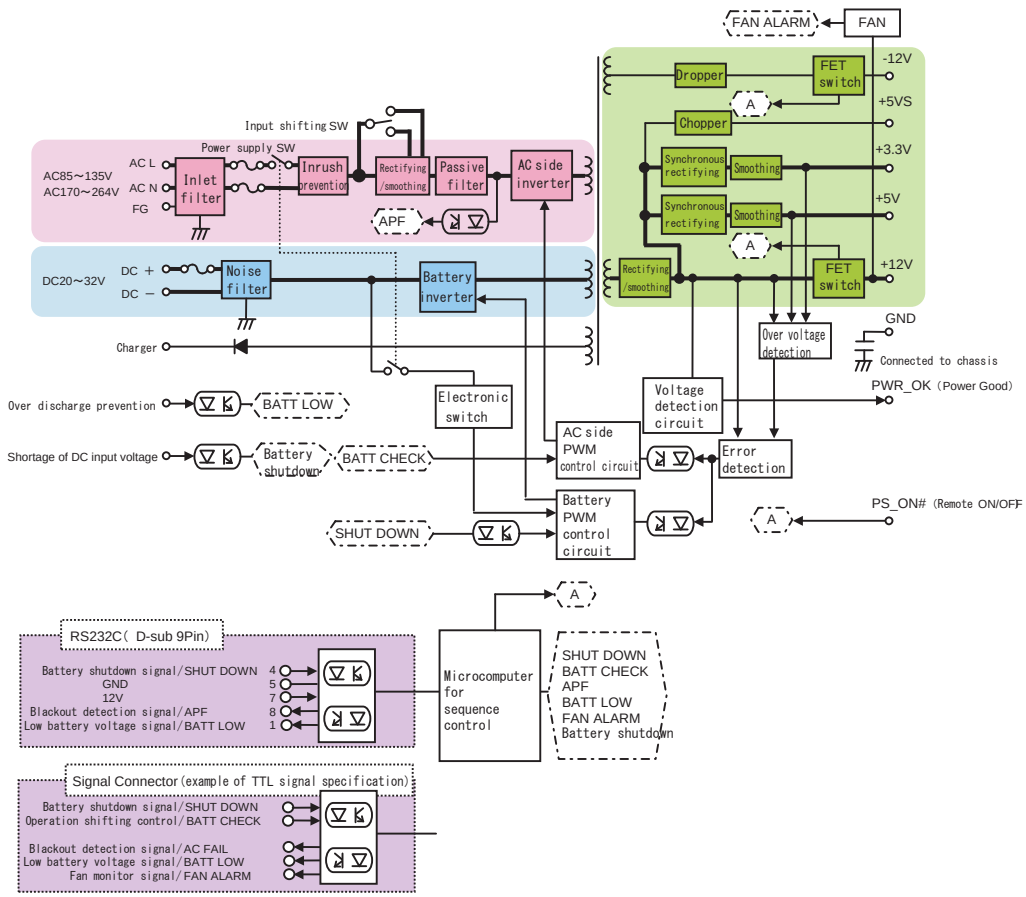


*1 Due to charger output, BATT. LOW is not delivered.
*2 Low voltage signal is delivered from the battery package.

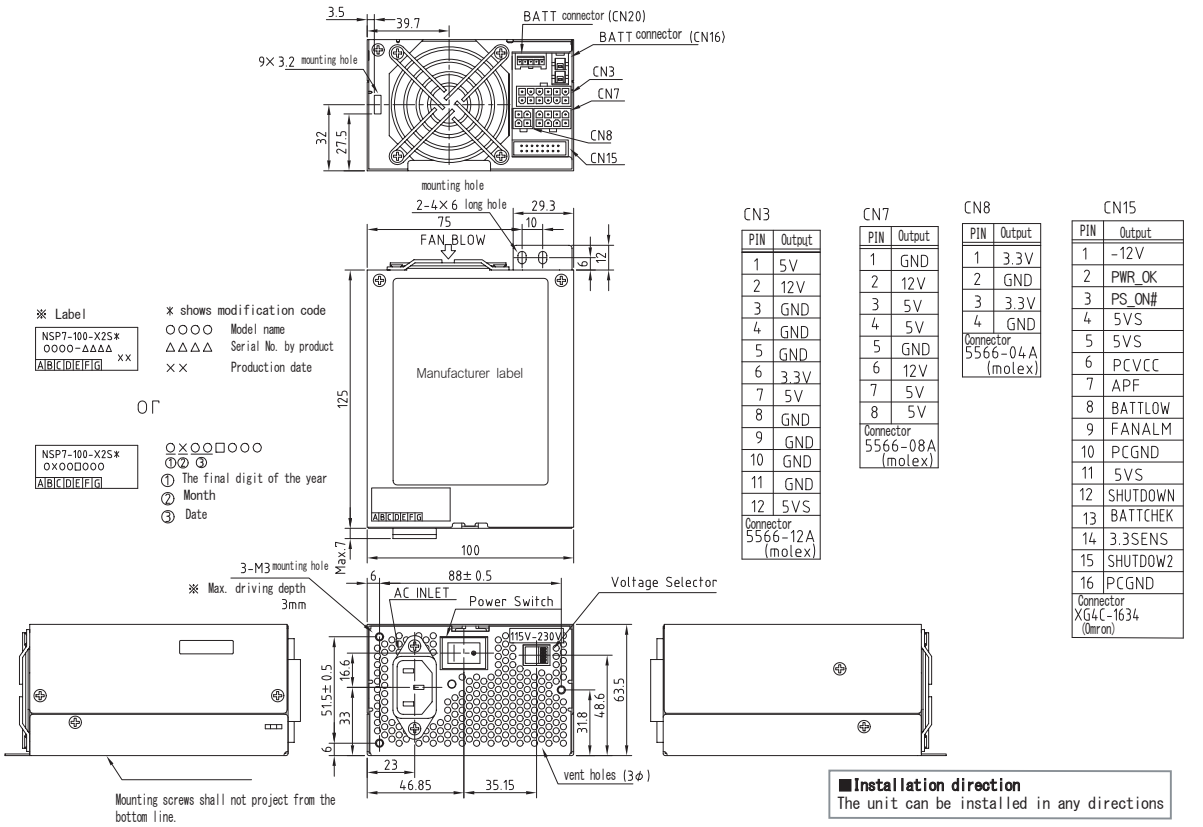
① With AC input, only +5VSB starts up.
② With PS_ON# 'L' input, all outputs start up. After 150 to 450ms, PWR_OK 'H' is delivered.
③ 10ms min after blackout, AC FAIL is delivered and photo-coupler is turned off.
④ SHUT DOWN signal is delivered at blackout. When the photo-coupler remains 5 to 7s min, all outputs, including 5VSB shut down.
⑤ When AC input and all outputs, including 5VSB are turned on, all outputs except for 5VSB shut down with PS_ON# 'H' input.
⑥ When the battery voltage decreases at backup operation. BATT LOW is delivered from the battery package and photo-coupler is turned off. After that, all outputs including 5VSB shut down.
⑦ At AC input, the output does not change by turning on the photo-coupler with SHUT DOWN.

[NSP7-100-X2S]
・At battery operation (DC operation), all outputs except for 5VSB shut down with PS_ON# 'H' input
[NSP7-100-X2S1]
・At battery operation, all outputs including 5VSB shut down with PS_ON#' H' input.
・With battery operation, all outputs including 5VSB shut down one minute after blackout.
[NSP7-100-X2S2]
・At battery operation, all outputs including 5VSB shut down with PS_ON#' H' input.

Block Diagram



Outline Drawing



CN3

PIN	Output
1	5V
2	12V
3	GND
4	GND
5	GND
6	3.3V
7	5V
8	GND
9	GND
10	GND
11	GND
12	5VS

Connector 5566-12A (molex)

CN7

PIN	Output
1	GND
2	12V
3	5V
4	5V
5	GND
6	12V
7	5V
8	5V

Connector 5566-08A (molex)

CN8

PIN	Output
1	3.3V
2	GND
3	3.3V
4	GND

Connector 5566-04A (molex)

CN15

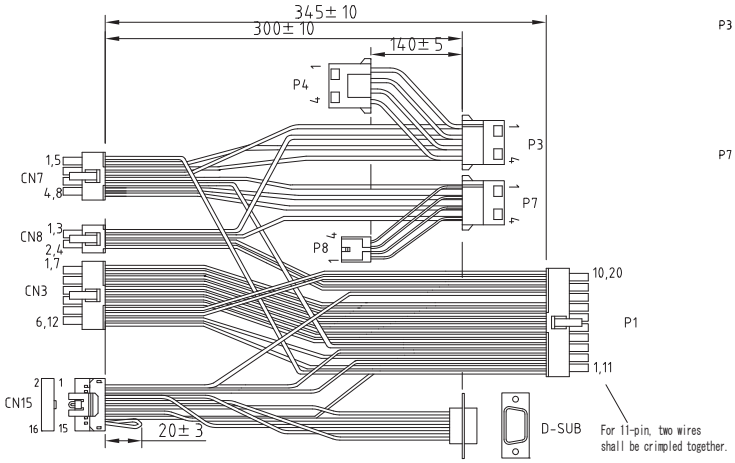
PIN	Output
1	-12V
2	PWR_OK
3	PS_ON#
4	5VS
5	5VS
6	PCVCC
7	APF
8	BATTLOW
9	FANALM
10	PCGND
11	5VS
12	SHUTDOWN
13	BATTCHEK
14	3.3SENS
15	SHUTDOW2
16	PCGND

Connector XG4C-1634 (Omron)

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

※ Dimensional tolerance shall be ±1.0 unless otherwise specified.

Output Harness



P3

PIN	Output	Color	Type	Connecting to
1	12V	Yellow	UL1007 AWG18 /AWG18	P4-1/CN7-6
2	GND	Black		P4-2/CN8-4
3	GND	Black		P4-3/CN7-5
4	5V	Red		P4-4/CN7-7

Housing LCP-04 (JST)
Pin SLC-22T-2.0 (JST)

P4

PIN	Output	Color	Type	Connecting to
1	12V	Yellow	UL1007 AWG18	P3-1
2	GND	Black		P3-2
3	GND	Black		P3-3
4	5V	Red		P3-4

Housing LCP-04 (JST)
Pin SLC-21T-2.0 (JST)

P7

PIN	Output	Color	Type	Connecting to
1	12V	Yellow	UL1007 AWG18 /AWG20	P8-4/CN7-2
2	GND	Black		P8-2/CN8-2
3	GND	Black		P8-3/CN7-1
4	5V	Red		P8-1/CN7-3

Housing LCP-04 (JST)
Pin SLC-22T-2.0 (JST)

P8

PIN	Output	Color	Type	Connecting to
1	5V	Red	UL1007 AWG20	P7-4
2	GND	Black		P7-2
3	GND	Black		P7-3
4	12V	Yellow		P7-1

Housing 171822-4 (AMP)
Pin 170204-1 (AMP)

D-sub

PIN	Output	Color	Type	Connecting to
1	BATT LOW	Yellow	UL1061 AWG24	CN15-8
2	NC			
3	NC			
4	SHUT DOWN	Red	UL1061 AWG24	CN15-12
5	GND	Black		CN15-10
6	NC			
7	12V	Orange	UL1061 AWG24	CN15-6
8	APF	White		CN15-7
9	NC			

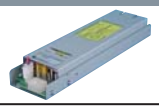
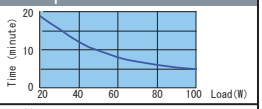
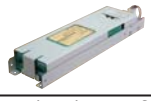
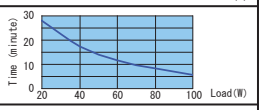
Plug JEC-9P (JST)
Pin J-SP~~1190~~ 2140 (JST)

P1

PIN	Output	Color	Type	Connecting to
1	3.3V	Brown	UL1007 AWG18	CN8-1
2	3.3V	Brown		CN8-3
3	GND	Black		CN3-9
4	5V	Red		CN7-8
5	GND	Black		CN3-10
6	5V	Red		CN7-4
7	GND	Black		CN3-5
8	PWR OK	Orange	UL1061 AWG24	CN15-2
9	5VS	Yellow	UL1007 AWG18	CN3-12
10	12V	Yellow		CN3-2
11	3.3V	Brown	UL1007 AWG22	CN3-6
		Brown	UL1061 AWG24	CN15-14
12	-12V	Blue	UL1061 AWG24	CN15-1
13	GND	Black	UL1007 AWG18	CN3-3
14	PS ON#	Purple	UL1061 AWG24	CN15-3
15	GND	Black	UL1007 AWG18	CN3-4
16	GND	Black		CN3-11
17	GND	Black		CN3-8
18	NC			
19	5V	Red	UL1007 AWG18	CN3-1
20	5V	Red		CN7-7

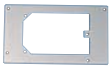
Housing 5557-20R (molex)
Pin 5556 (molex)

Optional Components (Sold separately)

Battery package					
Page	Picture	Model	Battery type	Shape (size)	Backup time
B-G27		BS04A-NC24/0.7	Ni-MH	Small-scale size (W×D×H=58×228×31 mm)	
B-G26		BS07A-H24/1.1	Ni-MH	Small-scale size (W×D×H=58×228×31 mm)	

※The backup time is a reference value at initial use; it is not a guaranteed value.
※Lead battey package can be used by using a lead battery charger, PS2697.

Cable				
Page	Picture	Model	Type	Description
B-G46		WH2753	AC power code	AC125V 12A 【PSE】
B-G51		WH2731	DC startup harness	The harness is used to start up NSP7 with an external DC power supply.

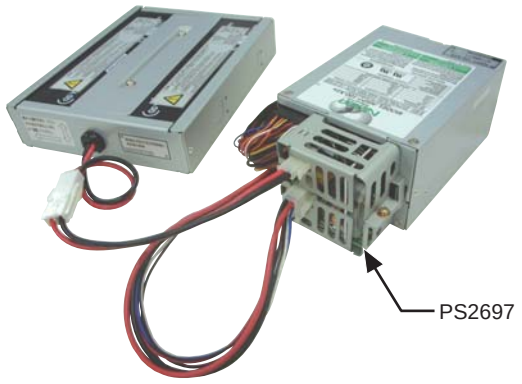
Parts/unit				
Page	Picture	Model	Type	Description
B-G55		ACC2837	Attachment panel	The attachment panel for ATX power supply (PS/2 size) mounting surface (W×H[mm]=150×86)
B-G57		PS2697	Lead battery charger	Using PS2697 enables to use BS05A-P24/2.2L(B-G2) and RBS01A-P24/2.2L(B-G4).

Software				
Page	Picture	Model	Type	Description
B-G60		NSP Pro for 95/98	Automatic shutdown software	Dedicated to Windows 95/98 RS232C cables, WH2601-01 and WH2601-02 (accessories)
B-G60		NSP Pro for NT	Automatic shutdown software	Dedicated to Windows NT RS232C cable, WH2601-01 (accessory)

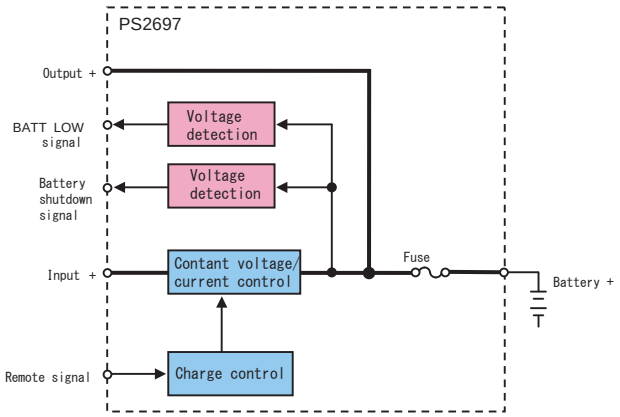
※Windows 2000 and XP can be used with UPS service with standard OS. See D-44 "nonstop power supply management software" for more details of UPS service.
※Windows 2000 and XP only correspond to NSP7-100-X2S2.

Other optional components					
Page	Model	Description	Page	Model	Description
B-G52	ACC2637	Automatic startup unit	B-G50	WH5105	12V 4-pin connector conversion harness(80mm)
B-G49	WH2820	20-pin extension harness (600mm)	B-G50	WH5105-02	12V 4-pin connector conversion harness(320mm)
B-G49	WH2747	20-pin extension harness (450mm)	B-G47	WH5055	AT connector conversion harness
B-G49	WH2892-02	20-pin extension harness (200mm)	B-G47	ACC5046	Harness with PS_ON switch
B-G51	WH2812	PCI-E 6-pin connector conversion harness	B-G48	ACC5077	PS_ON terminal short connector
			B-G48	WH5073	PS_ON short terminal 20-pin harness

PS2697 (Lead battery charger)



PS2697 Block Diagram



Characteristic Data NSP7-100-X2S （Examples of actual measurement）

Fig.2 Efficiency/Input Current Vs. Output Power

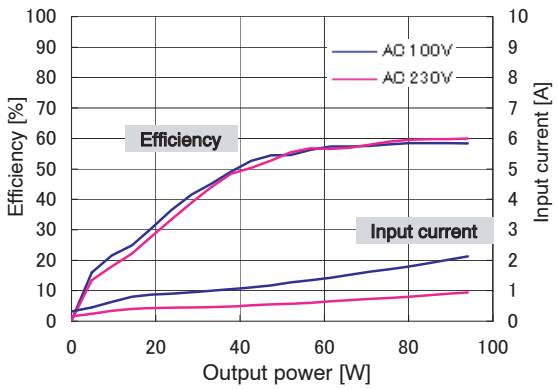


Fig.3 Power Factor/Input VA Vs. Output Power

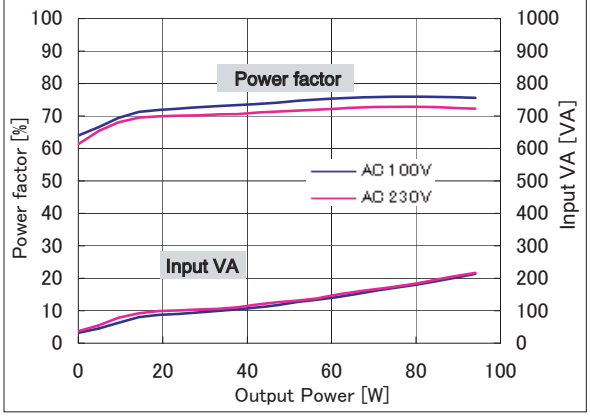


Fig.4 Inrush Current

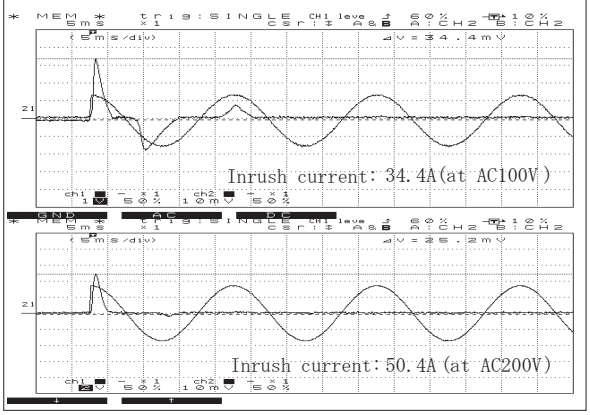


Fig.5 Leakage Current

Input : AC100, 115, 230, 240V
Load : Rated load and Min. load

	Rated load	Min. load
AC100V	0.34mA	0.34mA
AC115V	0.38mA	0.39mA
AC230V	0.70mA	0.72mA
AC240V	0.74mA	0.75mA

Fig.6 Harmonic Current At AC 100V

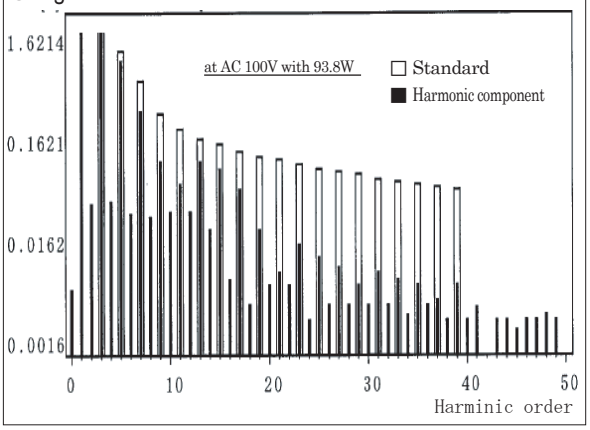


Fig.7 Harmonic Current At AC 240V

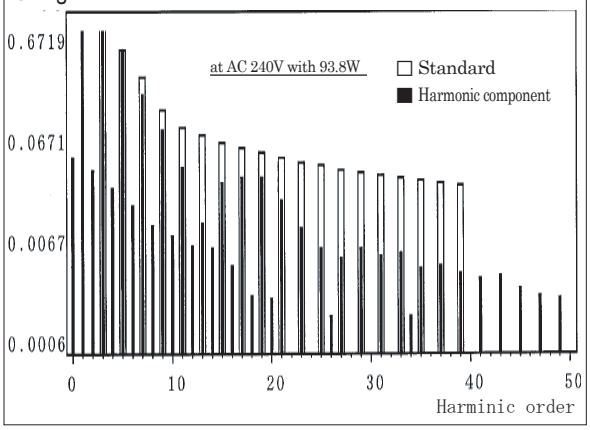
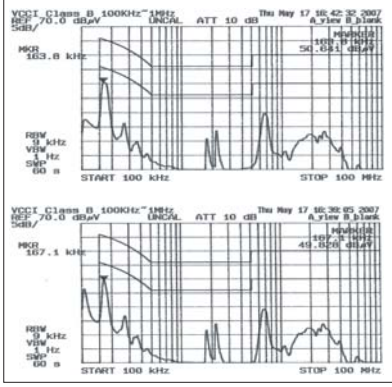


Fig.8 Conducted Emission At 100V

Input : AC100V
Load : Rated
Mode :AV



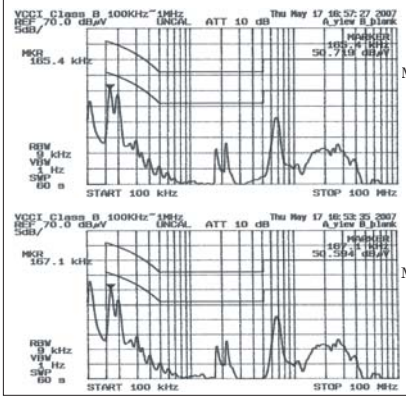
Measuring point : L−FG

Measuring point : N−FG

In-house measurement data

Fig.9 Conducted Emission At 240V

Input : AC230V
Load : Rated
Mode :AV



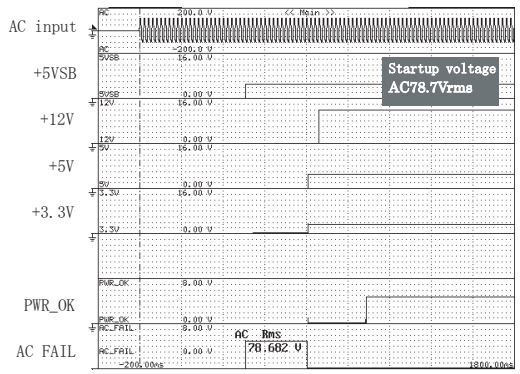
Measuring point : L−FG

Measuring point : N−FG

In-house measurement data

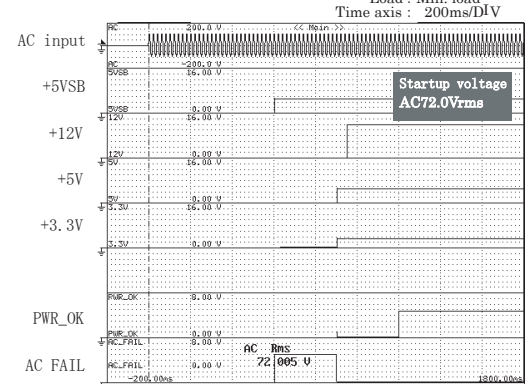
● Fig.10 AC Startup Voltage (Rated load)

Load : Rated
Time axis : 200ms/DIV



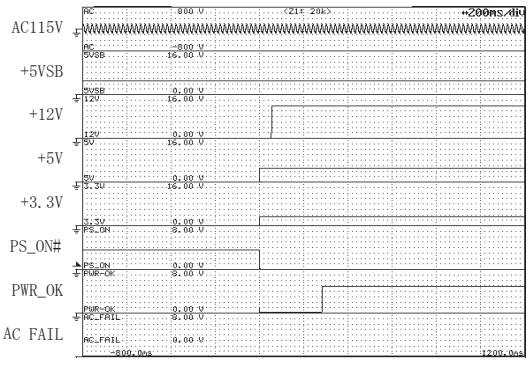
● Fig.11 AC Startup Voltage (Min. load)

Load : Min. load
Time axis : 200ms/DIV



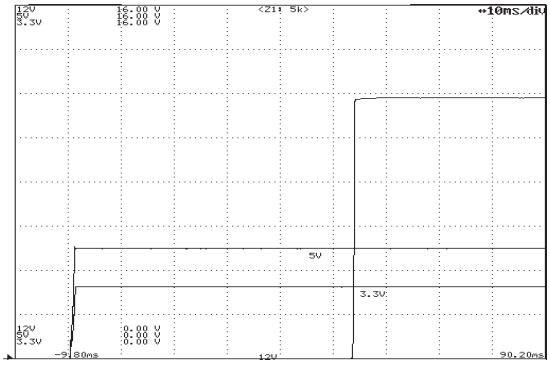
● Fig.12 Rising Sequence At AC 115V

Input : AC115V
Load : Rated
Time axis : 200ms/DIV



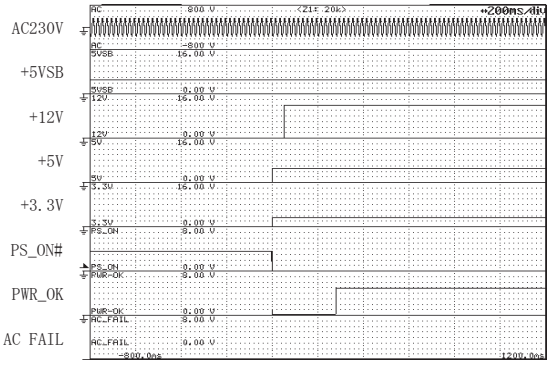
● Fig.13 Rising Characteristics At AC 115V

Input : AC115V
Load : Rated load
Time axis : 10ms/DIV



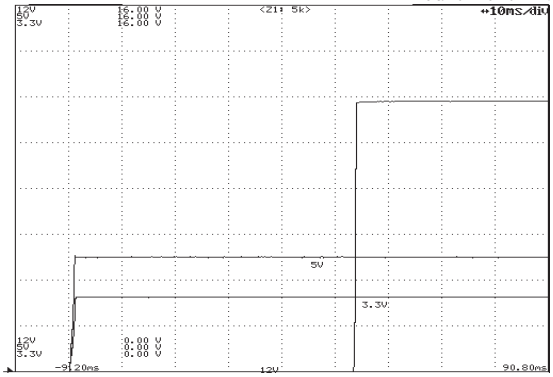
● Fig.14 Rising Sequence At AC 230V

Input : AC230V
Load : Rated load
Time axis : 200ms/DIV



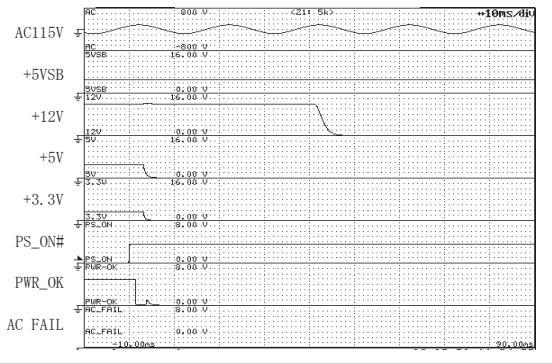
● Fig.15 Rising Characteristics At AC 230V

Input : AC230V
Load : Rated load
Time axis : 10ms /DIV



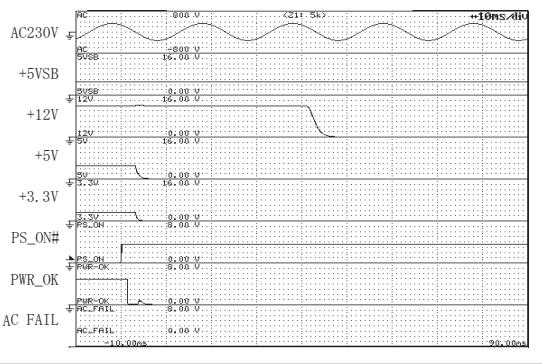
● Fig.16 Falling Characteristics At AC 115V When REMOTE Is Off

Input : AC115V
Load : Rated
Time axis : 10ms/DIV



● Fig.17 Falling Characteristics At AC 230V When REMOTE Is Off

Input : AC230V
Load : Rated
Time axis : 10ms/DIV



Characteristic Data NSP7-100-X2S （Examples of actual measurement）

Fig.18 Falling Characteristics At AC 115V When AC Goes Off

Input : AC115V
Load : Rated load
Time axis : 10ms/DIV

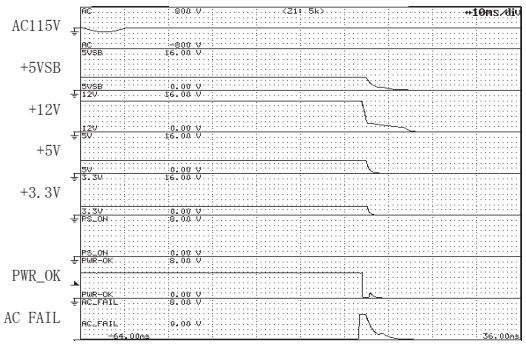


Fig.19 Falling Characteristics At AC 230V When AC Goes Off

Input : AC230V
Load : Rated load
Time axis : 10ms/DIV

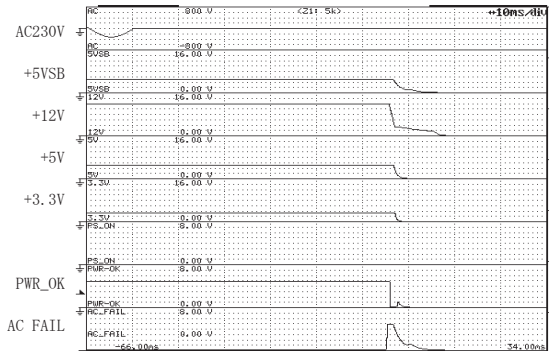


Fig.20 Output Hold-up Time Vs. Output Power

PWR_OK : the point that PWR_OK signal goes to "L".
Output voltage : the point that any output voltage except 5VSB decreases to 95%.
AC FAIL : the point that Photo-coupler turns off.

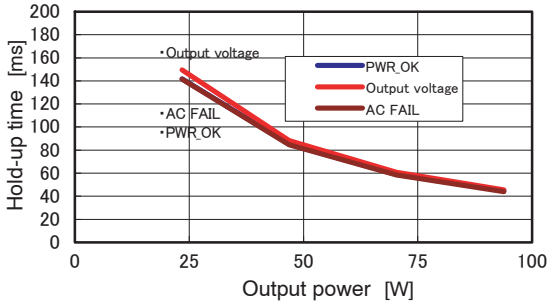


Fig.21 Instantaneous Blackout

Input : AC115V
Load : Rated
Blackout period : 61ms
Time axis : 20ms/DIV

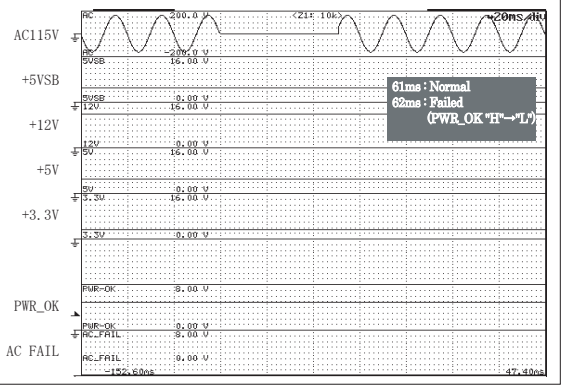


Fig.22 Voltage Dips By 60%

Input : AC115V ⇄ AC 46V
Load condition : Rated
Dipping period : 47ms
1 cycle : (20ms)
Time axis : 20ms/DIV

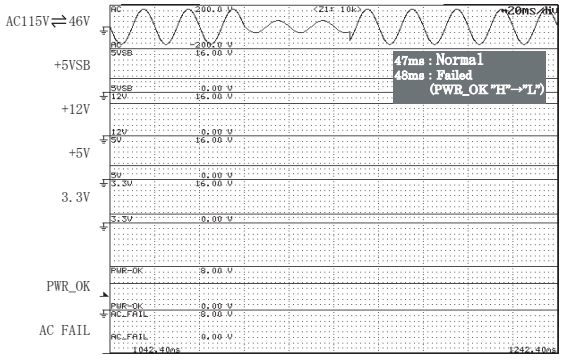


Fig.23 Voltage Dips By 30%

Input : AC115V ⇄ AC 80.5V
Load condition : Rated
Dipping period : 47ms
1 cycle : (20ms)
Time axis :500ms /DIV

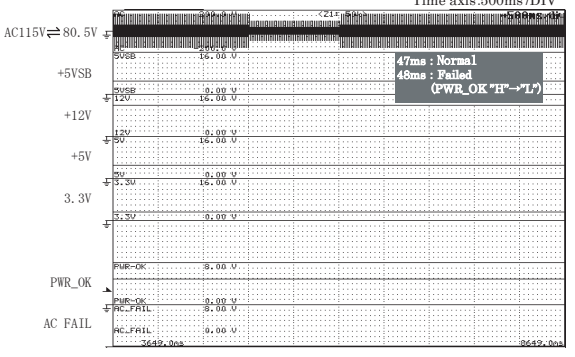


Fig.24 AC Input Voltage Slow Fluctuation Vs. Output Shutdown

Slow fluctuation period : 10V/1s (1s/DIV)

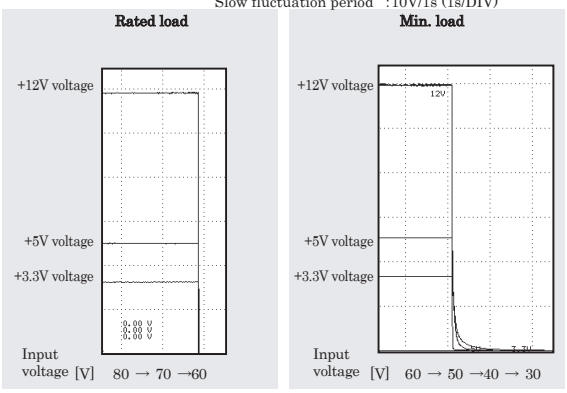


Fig.25 Dynamic Load Fluctuation Characteristics At 10kHz

Input : AC115V
Load : Rated
Time axis : 20 μ s/DIV

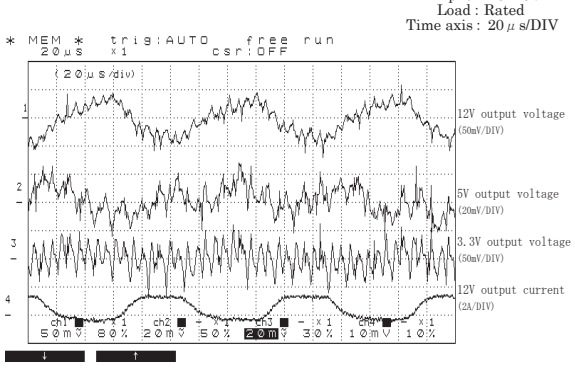


Fig.26 Dynamic Load Fluctuation Characteristics At 1kHz

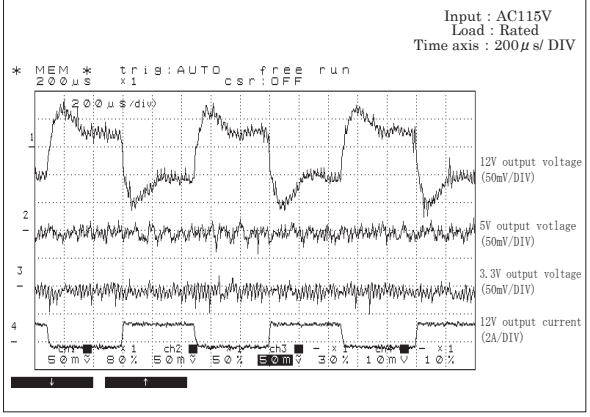


Fig.27 Dynamic Load Fluctuation Characteristics At 100Hz

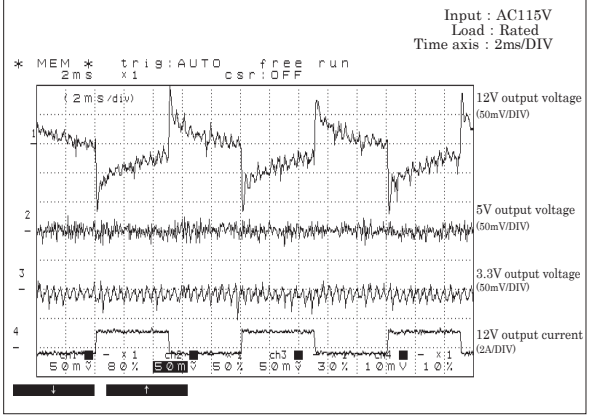


Fig.28 Output Voltage Regulation

Output	Min. load	Rated load
12V output	0A	1.5A
5V output	1A	10A
3.3V output	0A	6A

AC input	AC 85V	AC 100V	AC 132V	AC 176V	AC 240V	AC 264V
12V output (min.)	11.934 V	11.926 V	11.924 V	11.931 V	11.922 V	11.923 V
12V output (rated)	11.854 V	11.848 V	11.814 V	11.852 V	11.835 V	11.819 V
5V output (min.)	5.078 V	5.078 V	5.078 V	5.079 V	5.078 V	5.079 V
5V output (rated)	5.040 V	5.040 V	5.040 V	5.040 V	5.040 V	5.040 V
3.3V output (min.)	3.333 V	3.333 V	3.333 V	3.333 V	3.333 V	3.333 V
3.3V output (rated)	3.285 V	3.285 V	3.285 V	3.285 V	3.285 V	3.285 V

Fig.29 Ripple and Spike Voltage

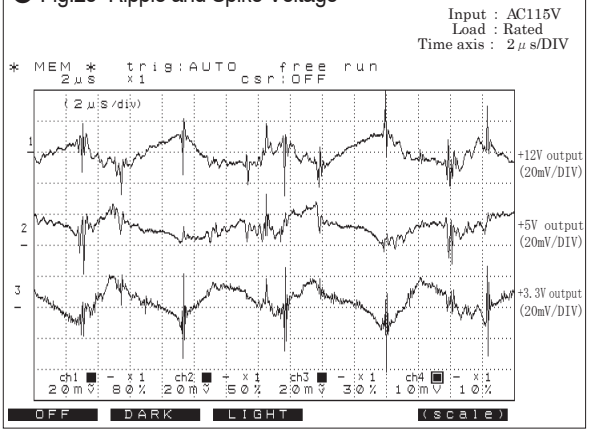
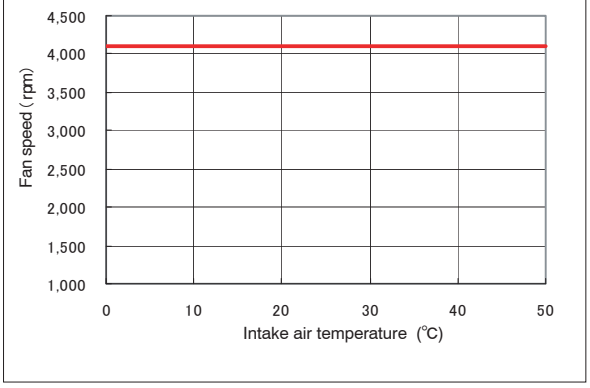


Fig.30 Intake Air Temperature Vs. Fan Speed



Column 5

Differences between Ni-Cd battery and Ni-MH battery

Characteristics of Ni-Cd batteries are:
- Discharge for large output is possible
- Durable to over charge
- Large amount of natural discharge
- Shows prominently memory effect

In addition, Ni-Cd batteries contains cadmium that has harmful effects to the environment such as "itai-itai" disease.

On the other hand, Ni-MH batteries use hydrogen-occlusion alloy instead of cadmium and are environmentally friendly, highly effective batteries.
Other characteristics are:
- Approximately twice the electric capacity of Ni-Cd batteries
- Displays less memory effect as compared to Ni-Cd batteries
- Light weight and little inner resistance
- Good discharge characteristics

