Desktop PC Power Supply HPCSA-1000P-E2S

Model	Description	Stock
HPCSA-1000P-E2S	———	Standard stock

■Model Name Coding

HPCSA - 1000 P - E 2 S
① ② ③ ④ ⑤ ⑥

1. Series name
2. Output power
3. Peak power available
4. EPS output
5. +3.3V output equipped
6. Standard

Features

- 80PLUS SILVER approved ATX power supply
- Double-sided PCB with plated through hole suitable for industrial use.
- High efficiency with SiC diode and synchronous rectification circuit
- Min. load current is 0A for all outputs.
- Safety standards certified (IEC/UL/CSA60950-1)
- Medical standards IEC60601-1 3rd complied design
- By building in the thermal-sensing variable speed fan, noise reduction can be realised.
- 85 mm height mountable into 2U dimension chassis (Location of mounting holes is complying with PS/2 standard)

Ready to use with full option ! 'Mina-Motto san' series

Set contents

Contents	Name of article and quantity
Power supply	HPCSA-1000P-E2S: 1pc.
AC power cable *2P conversion plug* *AC power cord retention clamp* *Instruction manual*	each 1pc.
Mounting screws	-Power mounting screw- M3 6mm screw (black) /12 (include spares)
Output harness	-Main power cable- WH-M2422-500 (24-pin): 1 pc. -12V power cable- WH-V0408-500: 1 pc. WH-V0808-500: 1 pc. WH-G0808-500: 2 pcs. WH-GG208-500: 2 pcs. -HD power cable- WH-PS610-850: 1 pc. WH-PS710-850: 2 pcs.

HPCSA-1000P-E2S-MN

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

Input

AC input	85 - 264V (worldwide range, PFC mounted)

Output

Output voltage	*+3.3V*	*+5V*	*+12V1*	*+12V2*	*+12V3*	*+12V4*	*-12V*	*+5VSB*
Max. current / max. power (continuous)	25A	25A	18A	18A	18A	18A	0.4A	3A
	Total 207.5W		Total 792W				4.8W	15W
	Total 822W							
Peak current / peak power (5 sec max.)	30A	30A	25A	25A	25A	25A	0.6A	4A
	Total 249W		Total 1000W				7.2W	20W
	Total 1000W							
Min. current	0A	0A	0A	0A	0A	0A	0A	0A

Dimensions

W×H×D (mm)	150×85×190 (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.107 "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		84% typ. (100 VAC), 88% typ. (240 VAC) *Characteristic data: Fig.4								At rated input/output, 80PLUS SILVER approved
	Power Factor		96% min. (100 VAC), 90% min. (240 VAC) *Characteristic data: Fig.5								At rated input/output
	Inrush Current		15A peak (100 VAC), 36A peak (240 VAC) *Characteristic data: Fig.6								Reclosing interval should be 15 sec. or longer at rated input/output. The inrush current into X-capacitor of input noise filter is not specified unless its period is more than 100μs.
	Input Current		9.6A typ. (100 VAC), 4.0A typ. (240 VAC) *Characteristic data: Fig.4								
Output	Rated Voltage		+3.3V	+5V	+12V1	+12V2	+12V3	+12V4	-12V	+5VSB	
	Rated Current		10A	10A	15A	15A	15A	15A	0.3A	3A	Reference value during the measurement of input/output characteristics
	Max. Current / Power		25A	25A	18A	18A	18A	18A	0.4A	3A	Max. output power: 822W
			82.5W	125W	216W	216W	216W	216W	4.8W	15W	
			207.5W max.		792W max.						
			Total 822W max.								
	Peak Current / Power		30A	30A	25A	25A	25A	25A	0.6A	4A	Peak output power: 1000W Time: 5 sec or less Duty ratio of repetitive load: 10% or less *Refer to Fig.2
			99W	150W	264W	264W	264W	264W	7.2W	20W	
			249W max.		1000W max.						
			Total 1000W max.								
	Min. Current		0A	0A	0A	0A	0A	0A	0A	0A	
	Total Voltage Accuracy (%)		±4 max.	±4 max.	±4 max.	±4 max.	±4 max.	±4 max.	±4 max.	±4 max.	Total accuracy of temperature, input, and load fluctuations
	Max. Ripple Voltage (mVp-p)		50 max.	50 max.	80 max.	80 max.	80 max.	80 max.	80 max.	50 max.	Two wires are coming out from the output connector and connected into one at the edge of 150mm max. long. 47μF electrolytic capacitor and 0.1μF ceramic capacitor are placed on it and it is measured by the 100MHz oscilloscope. *Characteristic data: Fig.17
	Max. Spike Voltage (mVp-p)		100 max.	100 max.	200 max.	200 max.	200 max.	200 max.	200 max.	100 max.	
Protection	Overcurrent Protection	OCP Point (A)	31 min.	31 min.	26 min.	26 min.	26 min.	26 min.	Short protection		Measuring at no load except the measured output
		Method	All outputs except for +5VSB shutdown						Hold down current limiting	All outputs shutdown	
		Recovery	Reclosing AC input, or switching PS_ON# signal from 'H' to 'L'						Automatic recovery		Reclosing interval shall be 1 minute., or longer
	Overvoltage Protection	OVP Point (V)	3.8 - 4.3	5.74 - 7.0	13.4 - 15.6	13.4 - 15.6	13.4 - 15.6	13.4 - 15.6	-	5.7 - 7.5	
		Method	All outputs except for +5VSB shutdown						-	All outputs shutdown	
		Recovery	Reclosing AC input, or switching PS_ON# signal from 'H' to 'L'						-	Reclosing AC input	Reclosing interval shall be 1 minute., or longer (At the OVP of +5VSB operation, AC input reclosing interval should be 10 minutes or longer.)
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 input - FG/DC output: 1500 VAC for 1 minute								Cut-off current: 10mA
	Insulation Resistance		AC input - FG/DC output: 50MΩ min.								At 500 VDC
	Leakage Current		0.2mA max. (100 VAC) / 0.4mA max. (200 VAC) / 0.5mA max. (240 VAC) *Characteristic data: Fig.7								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 / FCC / CISPR22-B, EN55022-B compliant *Characteristic data: Fig.8 and 9								Measured by single unit
	Harmonic Current Regulation		IEC61000-3-2 Class D compliant								At rated input/output
Others	Safety Standards		UL60950-1, CSA60950-1, CCC approved CE Marking (IEC62368-1), PSE compliant.								
	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)*								
	Output Hold-up Time		PWR_OK holds up 16ms min. after AC failure *Characteristic data: Fig.14								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		2.4kg 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 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.

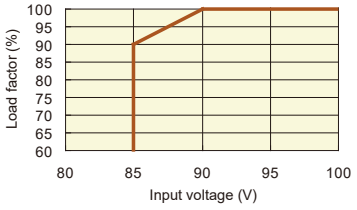


Fig.2 Duty Ratio

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

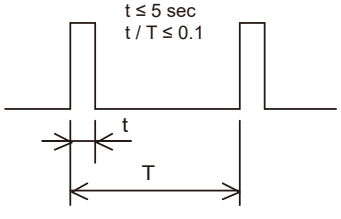
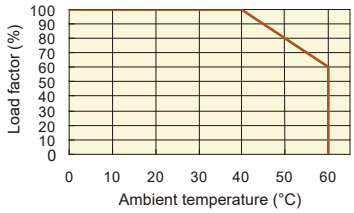
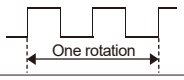


Fig.3 Temperature Derating

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



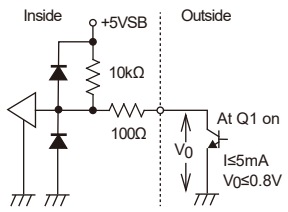
Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

	Items	Specification	Note
Input Signal	Output ON / OFF ControlSignal (PS_ON#)	+3.3V, +5V, +12V1, +12V2, +12V3, +12V4, and -12V outputs are delivered with 'L' input. +3.3V, +5V, +12V1, +12V2, +12V3, +12V4, and -12V outputs shutdown with 'H' or 'OPEN' input.	The pin 22 of MAIN1 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
	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 (AC FAILT)	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 1 of SIG connector

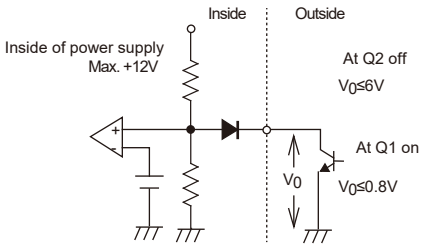
Signal Circuit

Input Signal Circuit

(PS_ON#)

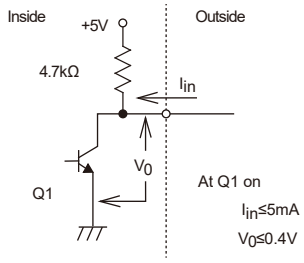


(FAN C)

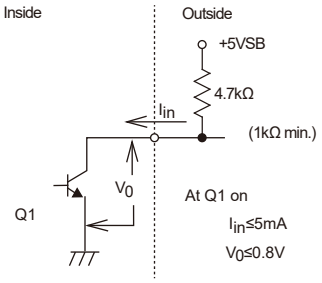


Output Signal Circuit

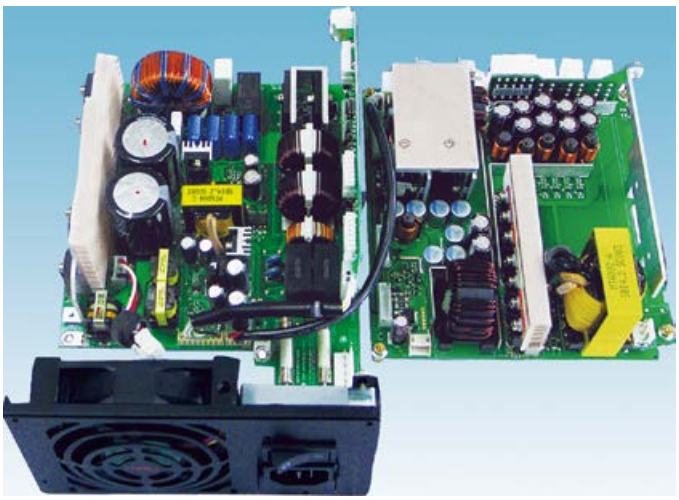
PWR_OK Signal Output Circuite



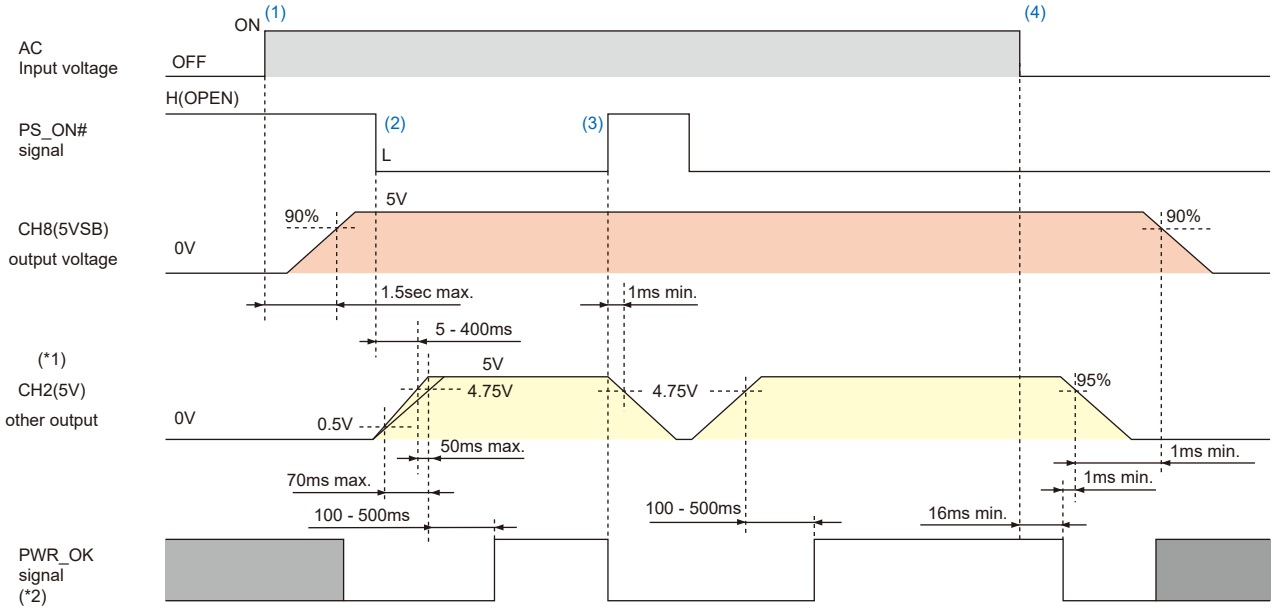
FAN_M Signal Output Circuit



Internal Structure



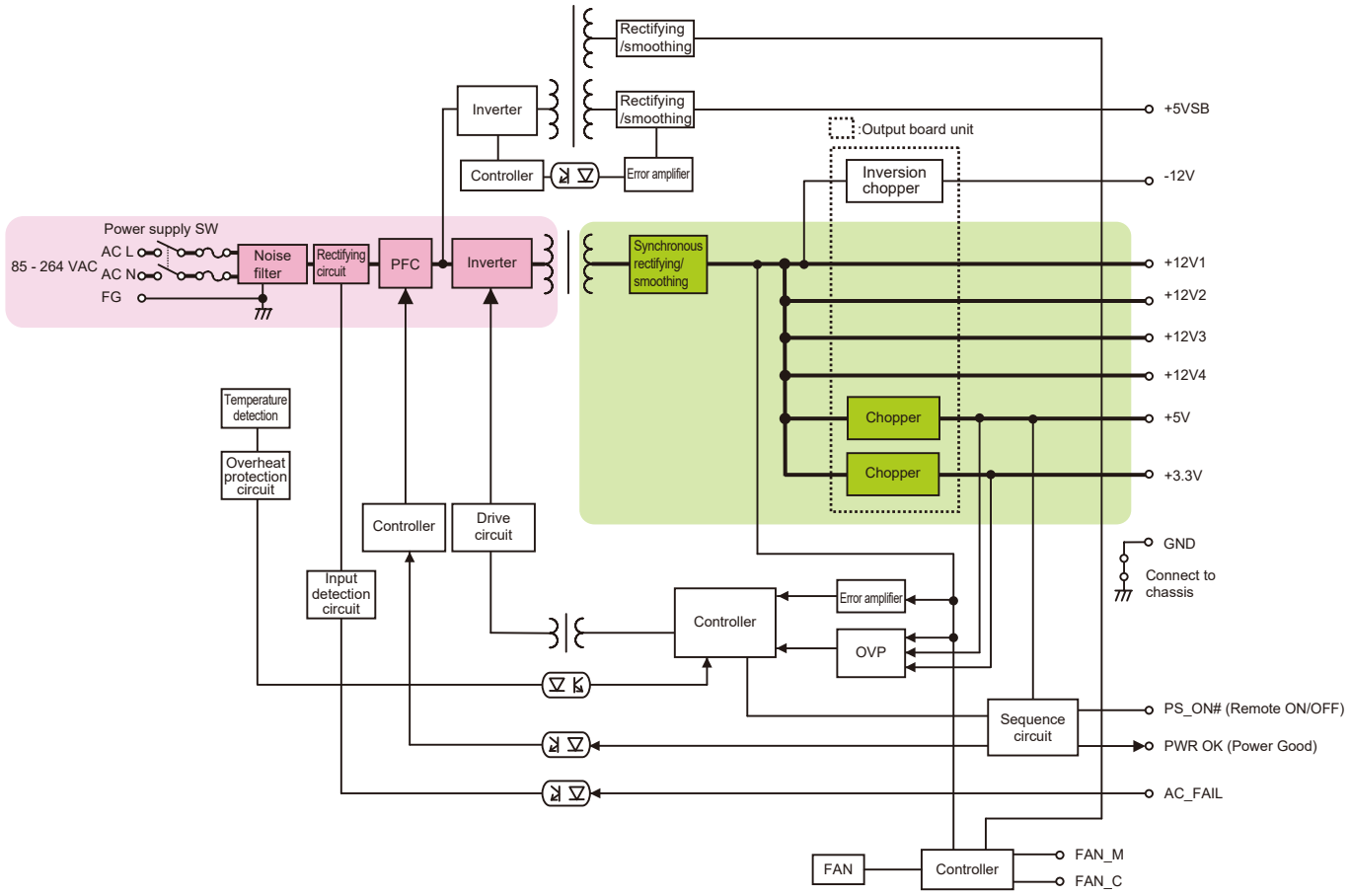
Sequence Diagram (Follow the rated input / output condition.)



(*1) All other outputs except for CH2 (+5V) shall follow this timing and the rising time difference from CH2 (+5V) should be 50ms or less. In addition, output voltage level of CH2 (+5V) and CH3 (12V1) - CH6 (12V4) at rising should be more than the voltage level of +3.3V. The order of each output voltages of fall time or the difference level of output voltages is unregulated.
(*2) A rise and a fall time of PWR_OK signal shall be less than 100µs at the time of the capacitive load is not connected to signal output.

(1) With PS_ON# 'H', only +5VSB output starts up at AC input.
(2) All outputs start up at PS_ON# 'L' input. Also, PWR_OK goes to 'H' at 100 - 500ms after the +5V output has risen.
(3) At PS_ON# 'H' input, outputs except for +5VSB shut down.
(4) PWR_OK turns to 'L' after 16ms or longer from blackout. 1ms later than this event, the +5V output shuts down and another 1ms later followed by +5VSB shutdown.

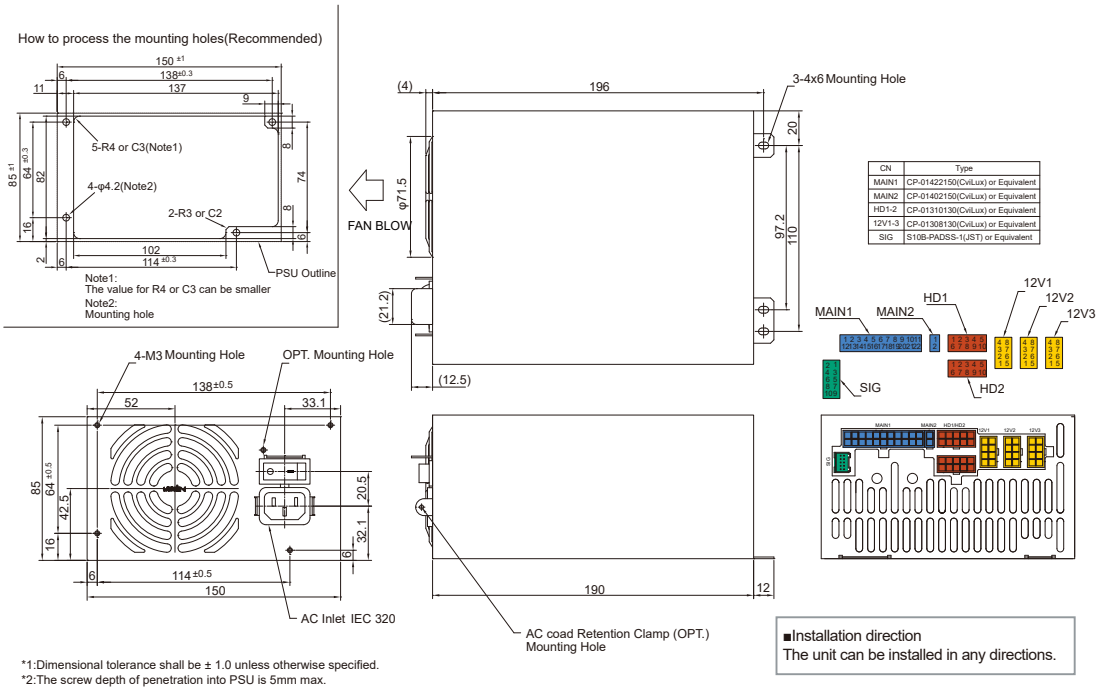
Block Diagram



Outline Drawing

CN Name	PIN No.	FUNCTION	MAX CURRENT
MAIN1	1	+3.3V	6 A
	2	+3.3V SE	-
	3	+12V4	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	0.6A
	11	+5VSB	4 A
	12	+3.3V	6 A
	13	+3.3V	6 A
	14	+12V4	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	-
	22	PS_ON	-
MAIN2	1	+5V	6 A
	2	+3.3V	6 A

CN Name	PIN No.	FUNCTION	MAX CURRENT
12V 1-3	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 1-2	1	+3.3V	6 A
	2	+5V	6 A
	3	COM	6 A
	4	COM	6 A
	5	+12V4	6 A
	6	+3.3V	6 A
	7	+5V	6 A
	8	COM	6 A
	9	COM	6 A
	10	+12V4	6 A
SIG	1	AC_FAIL	5 mA
	2	NC	-
	3	NC	-
	4	FAN_C	-
	5	FAN_M	5 mA
	6	PS_ON	5 mA
	7	COM	2 A
	8	+3.3V SE	-
	9	NC	-
	10	+5VSB	2 A

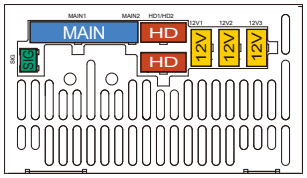


*1:Dimensional tolerance shall be ± 1.0 unless otherwise specified.
*2:The screw depth of penetration into PSU is 5mm max.

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, 150±15	peripheral (HD)
WH-PS610-850	HD 550±15 → 150±15, 150±15, 150±15	FD
WH-PS710-850	HD 550±15 → 150±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	3 models	2 models	1 model

Optional Components Sold Separately

Cable

Picture	Model	Type	Description
	WH6167	AC power cord	125 VAC 15A [PSE]

Parts

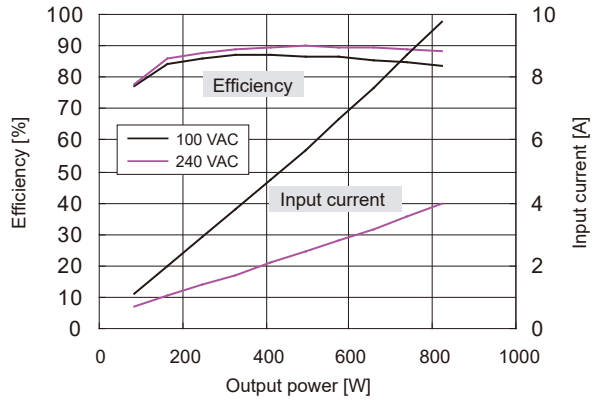
Photos	Model	Category	Description
	ACC3027	AC power cord retention clamp	AC power cord (WH6217) retention clamp

Other Optional Components

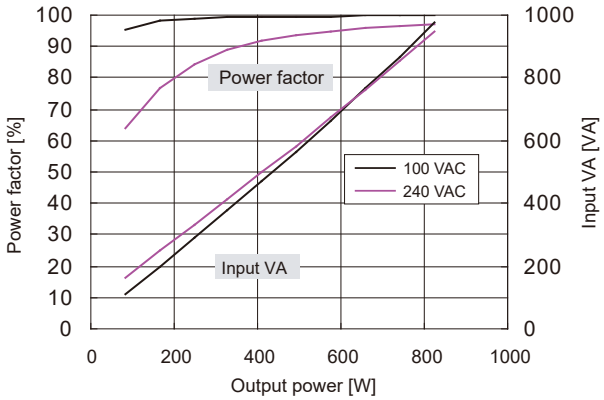
Model	Description	Model	Description
ACC2637	Automatic startup unit	WH5105	12V 4-pin connector conversion harness (80mm)
WH2820	20-pin extension harness (600mm)	WH5105-02	12V 4-pin connector conversion harness (320mm)
WH2747	20-pin extension harness (450mm)	WH5055	AT connector conversion harness
WH2892-02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

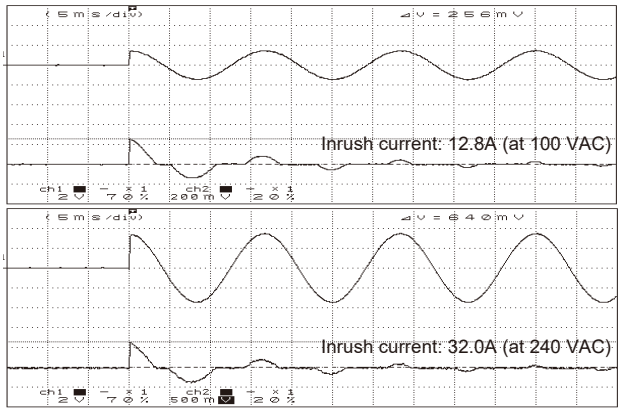
● Fig.4 Efficiency / Input Current vs. Output Power



● Fig.5 Power Factor / Input VA vs. Output Power



● Fig.6 Inrush Current



● Fig.7 Leakage Current

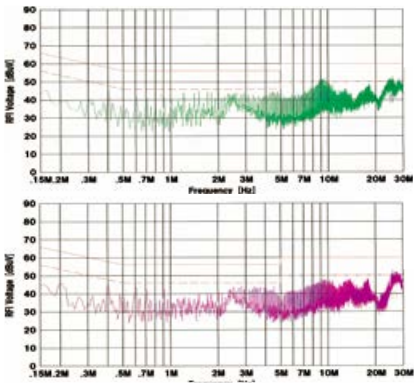
Input: 100 / 200 / 240 VAC
Load: Rated and min. load
Measurement conditions: IEC60950 compliant

	Rated load	Min. load
100 VAC	0.22mA	0.21mA
200 VAC	0.41mA	0.42mA
240 VAC	0.50mA	0.53mA

● Fig.8 Conducted Emission at 100 VAC

Input: 100 VAC
Load: Rated
Mode: Peak

VCCI Class B



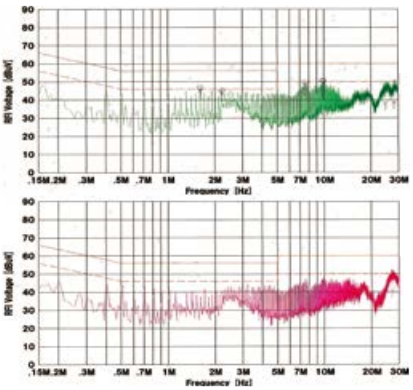
Measuring point: N-FG

Measuring point: L-FG

● Fig.9 Conducted Emission at 230 VAC

Input: 230 VAC
Load: Rated
Mode: Peak

VCCI Class B

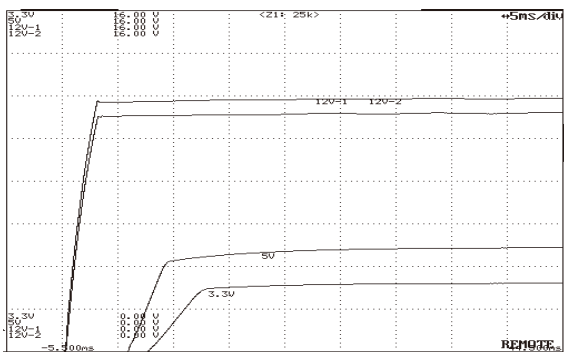


Measuring point: N-FG

Measuring point: L-FG

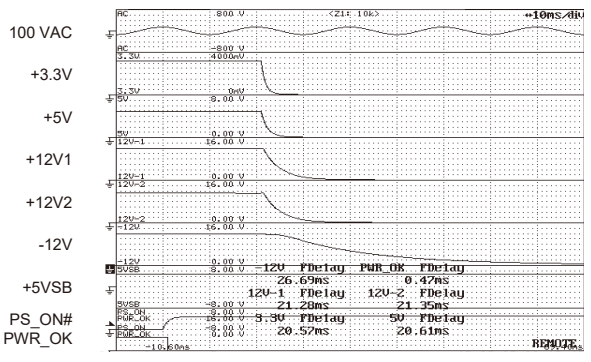
● Fig.10 Rising Characteristics at 100 VAC

Input: 100 VAC
Load: Rated
Time axis: 5ms/DIV



● Fig.11 Falling Characteristics at 100 VAC when REMOTE goes Off

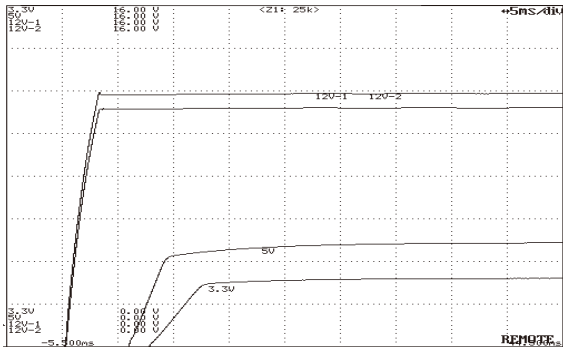
Input: 100 VAC
Load: Rated
Time axis: 10ms/DIV



Characteristics Data (Examples of actual measurement)

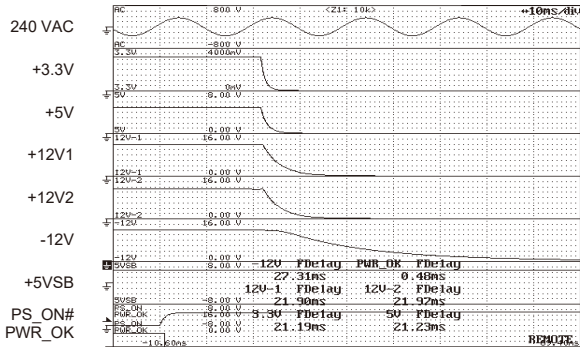
● Fig.12 Rising Characteristics at 240 VAC

Input: 240 VAC
Load: Rated
Time axis: 5ms/DIV



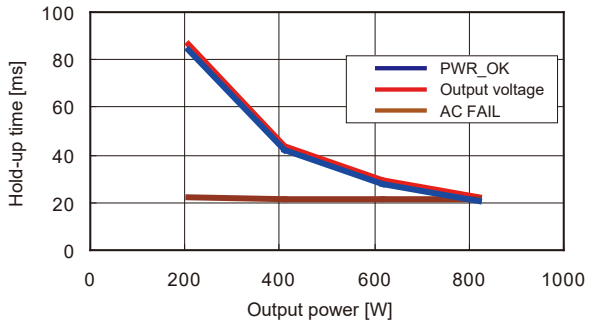
● Fig.13 Falling Characteristics at 240 VAC when REMOTE goes Off

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



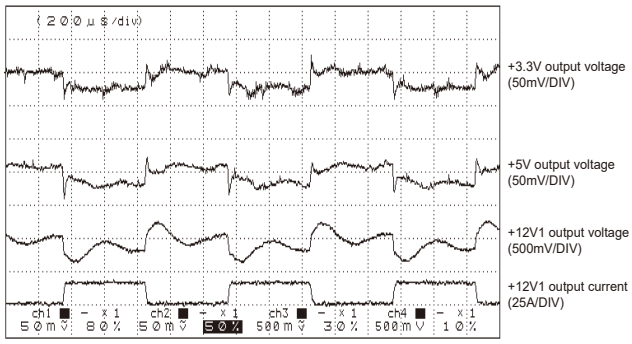
● Fig.14 Output Hold-up Time vs. Output Power

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.15 Dynamic Load Fluctuation Characteristics at 1kHz

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



● Fig.16 Output Voltage Regulation

Output	Min. load	Rated load
+12V1 output	0A	15A
+12V2 output	0A	15A
+12V3 output	0A	15A
+12V4 output	0A	15A
+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)	3.377 V	3.377 V	3.376 V	3.372 V	3.372 V	3.372 V
+3.3V output (rated load)	3.346 V	3.346 V	3.345 V	3.349 V	3.349 V	3.349 V
+5V output (min. load)	5.096 V	5.095 V	5.095 V	5.089 V	5.089 V	5.090 V
+5V output (rated load)	5.061 V	5.061 V	5.060 V	5.061 V	5.060 V	5.061 V
+12V1 output (min. load)	12.053 V	12.049 V	12.042 V	12.027 V	12.024 V	12.024 V
+12V1 output (rated load)	11.979 V	11.979 V	11.979 V	11.971 V	11.967 V	11.970 V
+12V2 output (min. load)	12.058 V	12.053 V	12.050 V	12.035 V	12.032 V	12.031 V
+12V2 output (rated load)	12.000 V	11.999 V	11.999 V	12.000 V	12.001 V	12.001 V
+12V3 output (min. load)	12.050 V	12.046 V	12.043 V	12.027 V	12.025 V	12.024 V
+12V3 output (rated load)	11.923 V	11.923 V	11.922 V	11.920 V	11.919 V	11.918 V
+12V4 output (min. load)	12.051 V	12.045 V	12.042 V	12.027 V	12.025 V	12.025 V
+12V4 output (rated load)	11.943 V	11.942 V	11.942 V	11.940 V	11.940 V	11.939 V

● Fig.17 Ripple and Spike Voltage

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

● Fig.18 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. 24.9	approx. 12.5	approx. 6.2

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

■ Fan

Ambient temp.	20°C	30°C	40°C
Expected service life (yr)	approx. 17	approx. 17	approx. 17

● Fig.19 Over Current Protection (V-I Characteristic)

Input: 100 VAC