

Desktop PC Power Supply PCTF-220P Series

Desktop PC Power Supply PCTF-220P Series

Compact & Silent PC Power Supply



PCTF-220P-X2S

RoHS
Directive

TFX*
Continuous Max. **190W** Peak Power **220W**

*Dimension and mounting hole size is different from TFX12V specification.

Model	Description	Stock
PCTF-220P-X2S		Standard stock
PCTF-220P-X2S-02	With output harness	Standard stock

Model Name Coding
PCTF - 220 P - X 2 S - *
 ① ② ③ ④ ⑤ ⑥ ⑦

1. Series name	4. ATX output	7. - : No output harness
2. Output power	5. +3.3V output equipped	02: With output harness
3. Peak output compliant	6. Standard	

Features

- Higher power achievement is fundamental design policy with higher efficiency and lower temperature rise (Efficiency: 75% typ. at 240 VAC)
- Glass epoxy PCB with double-sided through hole is adopted.
- Output harnesses can be easily customized to meet various requirements.
- Side-surface mounting fan to serve as heat exhauster for CPU on a motherboard
- By building in the thermal-sensing variable speed fan, noise reduction can be realized.

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	Conne ction	RoHS
----------	---------	-----	-----	-----	---------	----------	----------	-------------	------

Input

AC input	85 - 264V (worldwide range)
----------	-----------------------------

Output

Output voltage	+3.3V	+5V	+12V	-12V	+5VSB
Max. current / max. power (continuous)	10A Total 66W	10A Total 186W	10A Total 194.1W	0.5A	1.5A
Peak current / peak power (5 sec max.)	16.7A Total 75W	15A Total 200W	12A Total 218.5W	0.5A	2.5A
Min. current	0A	1.0A	0A	0A	0A

Dimensions

W×H×D (mm)	86×65.5×175
------------	-------------

Output connector

PCTF-220P-X2S (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.230 "Detachable output harness" for details											
PCTF-220P-X2S-02											
Main 20+4pin	Main 24pin	Main 20pin	AT	AUX	12V 4pin	12V 8pin	PCI-E 6pin	PCI-E 6+2pin	HDD	S-ATA	FDD

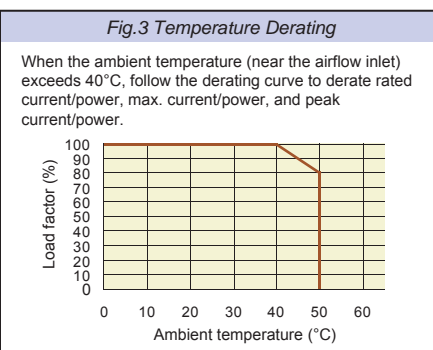
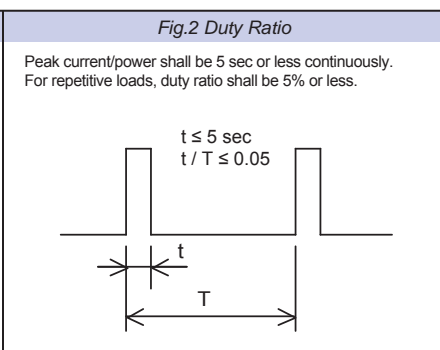
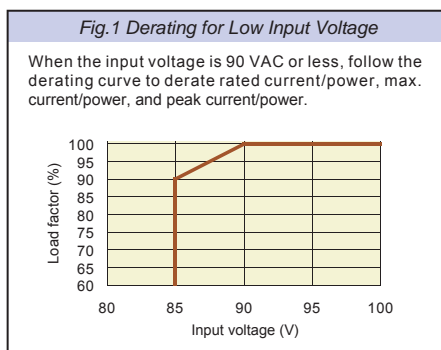
General Specification Condition: at normal temperature and humidity unless otherwise specified

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	65% min. (100 VAC), 70% min. (240 VAC) *Characteristic data: Fig.4					At rated input/output
	Power Factor	96% min. (100 VAC), 90% min. (240 VAC) *Characteristic data: Fig.5					
	Inrush Current	50A peak (100 VAC), 100A peak (240 VAC) *Characteristic data: Fig.6					At rated input/output at cold start (25°C)
	Input VA	300VA max. *Characteristic data: Fig.5					At rated input and max. output
Output	Rated Voltage	+3.3V	+5V	+12V	-12V	+5VSB	
	Rated Current	10A	6A	10A	0.3A	1.5A	
	Max. Current / Power	10A	10A	10A	0.5A	1.5A	Max. output power: 194.1W
		66W max.		186W max.			
	Peak Current / Power	16.7A	15A	12A	0.5A	2.5A	Peak output power: 218.5W Time: 5 sec or less Duty ratio of repetitive load: 5% or less *Refer to Fig.2
		75W max.		200W max.			
	Min. Current	0A	1.0A	0A	0A	0A	Min. load to perform voltage regulation
	Total Voltage Accuracy (%)	±5 max.	±5 max.	±5 max.	±5 max.	±5 max.	Total accuracy of temperature, input, and load fluctuations
	Max. Ripple Voltage (mVp-p)	50 max.	50 max.	120 max.	120 max.	50 max.	Two wires are coming out from the output connector and connected into one at the edge of 50cm max. long. 47µF electrolytic capacitor and 0.1µF film capacitor are placed on it and it is measured by the 20MHz oscilloscope. *Characteristic data: Fig.17
Max. Spike Voltage (mVp-p)	100 max.	100 max.	170 max.	170 max.	100 max.		
Protection	Overcurrent Protection	OCP Point (A)	13 min.	9 min.	13 min.	Short protection	
		Method	All outputs except for +5VSB shutdown			Fold back current limiting	All outputs shut down
		Recovery	Reclosing AC input (5 sec min. interval)			Automatic recovery	
	Overvoltage Protection	OVP Point (V)	3.74 - 4.3	5.76 - 7.0	13.4 - 15.6	-	-
Method		All outputs except for +5VSB shutdown			-	-	
Recovery		Reclosing AC input (5 sec min. interval)			-	-	
Environment	Operating Temp. / Humidity	0 to 50°C* / 10 to 90%					*Refer to Fig.3 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 at no operation
Insulation	Dielectric Strength	AC input - DC output/FG: 1500 VAC for 1 minute					Cut-off current: 10mA (humidity: 60% max.)
	Insulation Resistance	AC input - DC output/FG: 50MΩ min.					At 500 VDC (humidity: 60% max.)
	Leakage Current	0.5mA max. (100 VAC) / 1mA max. (240 VAC) *Characteristic data: Fig.7					YEW. TYPE3226 (1kΩ) or equivalent
EMC	Line Noise Immunity	± 2000V (pulse with: 100/800ns, repetitive cycle: 10-50ms)					No 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 compliant *Characteristic data: Fig.8 and 9					
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. 950 (c-UL), IEC60950, EN60950-1					
	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 through hole PCB)					Follow our standard
	MTBF	80,000 H min.					Based on EIAJ RCR-9102
	Weight	1.1 kg 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 no listed	

BRAIN Power Supply

Desktop PC Power Supply

Non-backup Power Supply



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

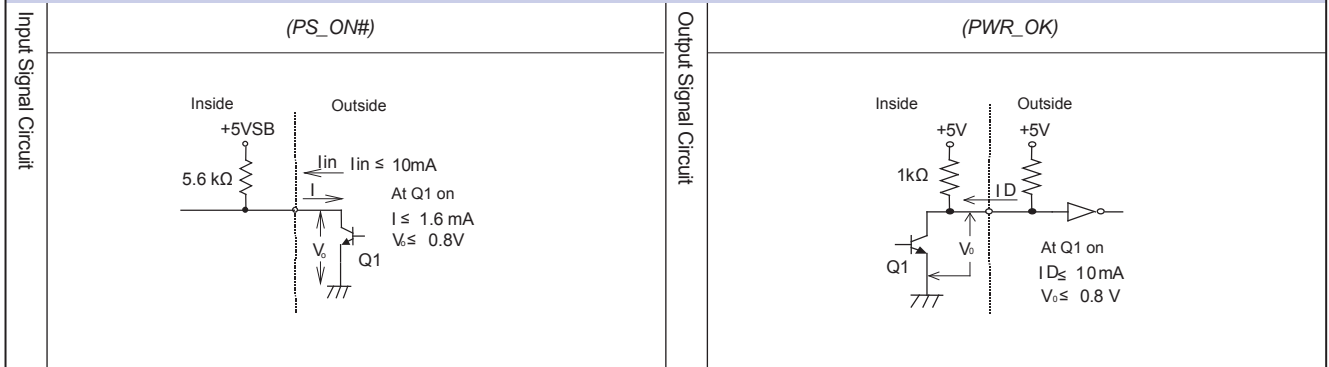
BRAIN
Power
Supply

Desktop PC Power Supply

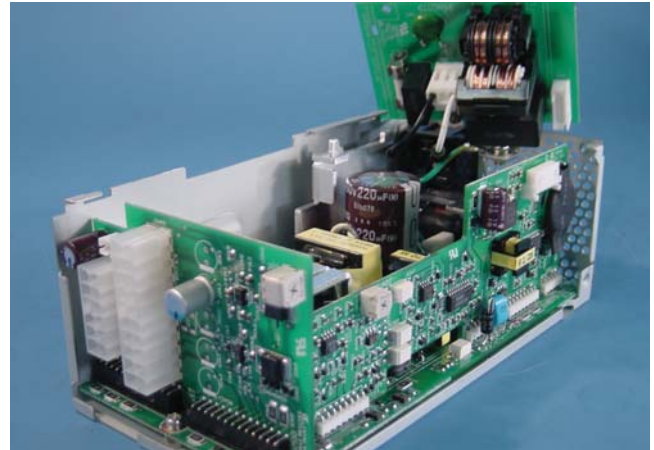
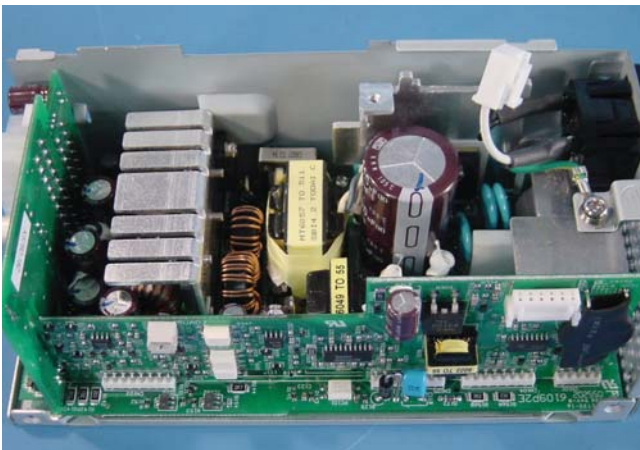
Non-backup power supply

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.	Signal input between the pin 14 of MAIN 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 MAIN connector
Output Signal Normal Output Signal (PWR_OK)	'H' signal is delivered when the +5V output is normal (detection delay time: 100 - 500ms).	The pin 8 of MAIN connector

Signal Circuit



Internal Structure



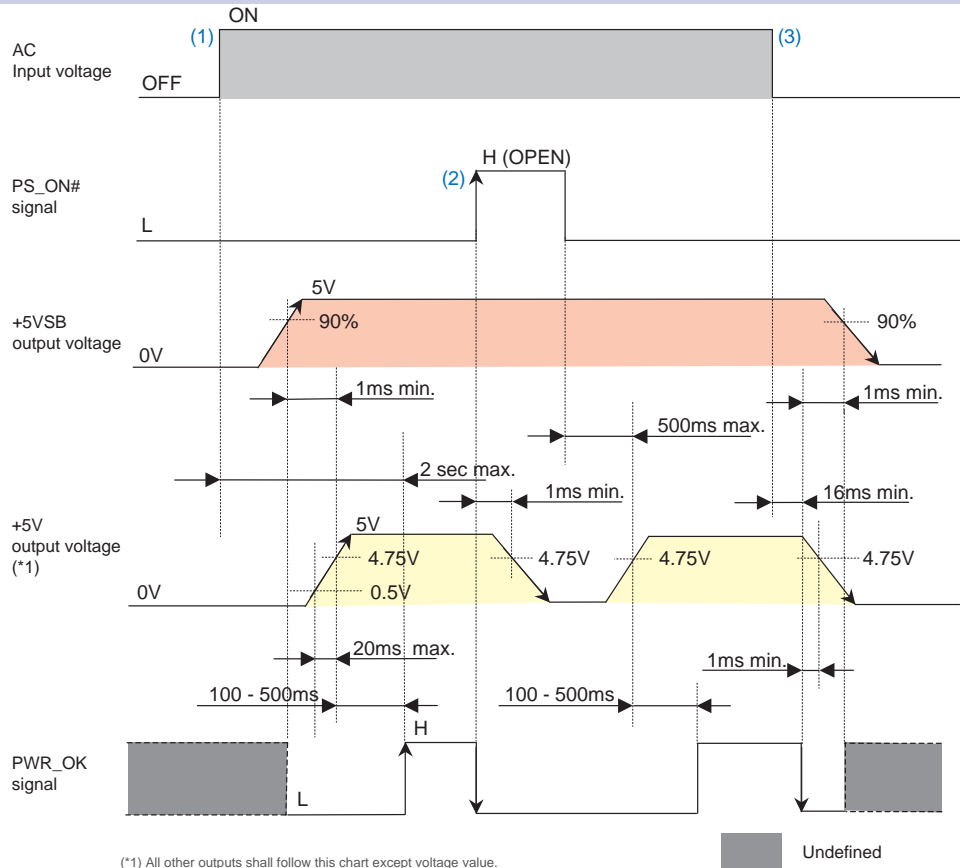
PC case for sale

PCTF-220P-X2S



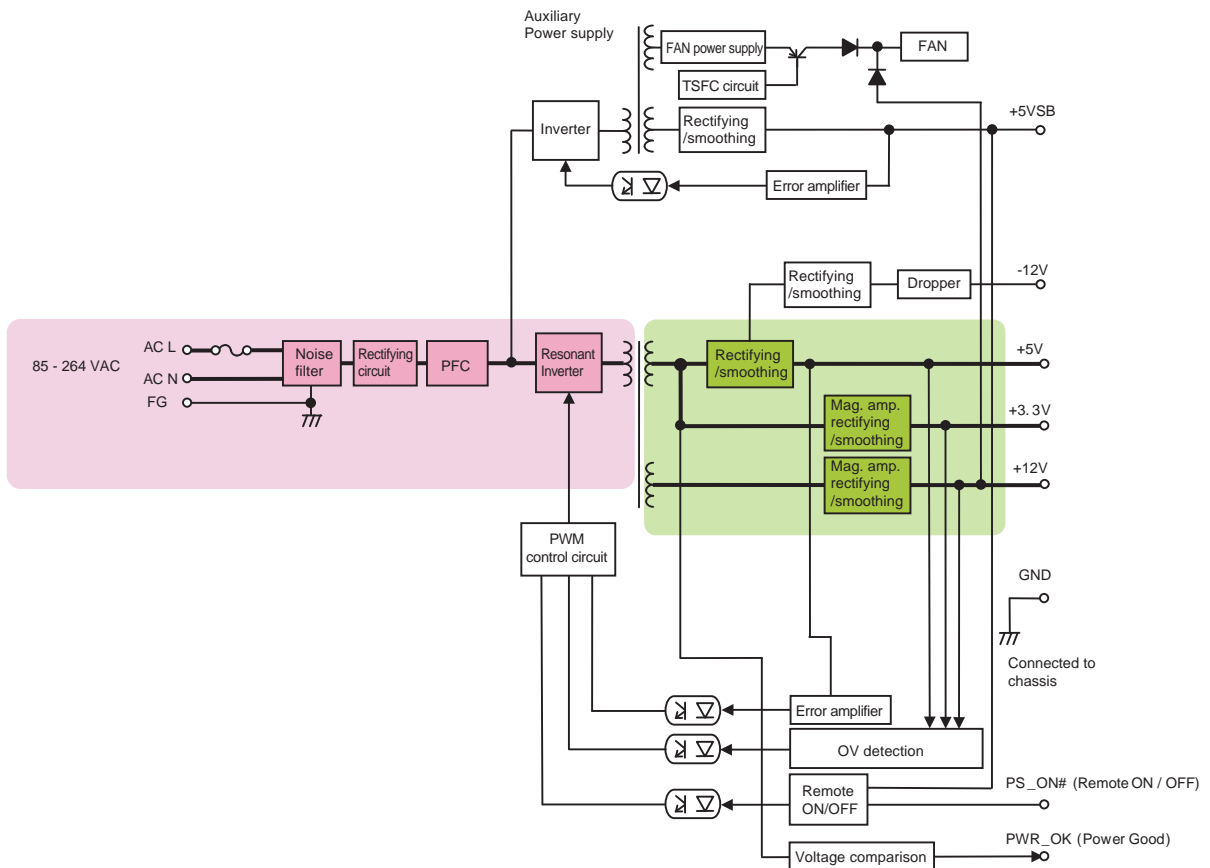
PC case with PCTF-220P-X2S mounted is available.
Model: NP-7K09IVNP-TF

Sequence Diagram



- (1) All outputs start up by being supplied AC input under the condition of PS_ON# 'L'. PWR_OK goes to 'H' at 100 - 500ms after +5V output has risen.
- (2) At PS_ON# 'H (OPEN)' input, outputs except for +5VSB shut down.
- (3) PWR_OK turns to 'L' after 16ms or longer from blackout. 1ms later than this event, the +5V output shuts down.

Block Diagram



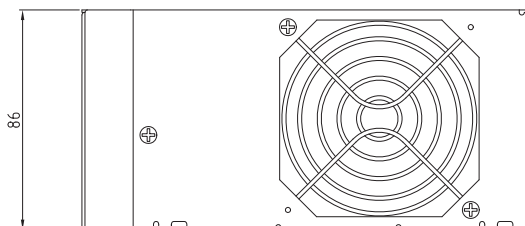
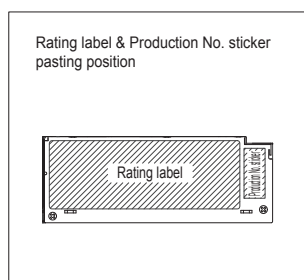
Outline Drawing

PCTF-220P-X2S

BRAIN
Power
Supply

Desktop PC Power Supply

Non-backup Power Supply



20Pin output connector (MAIN connector)

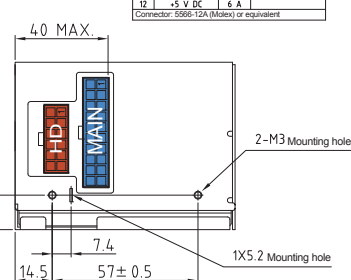
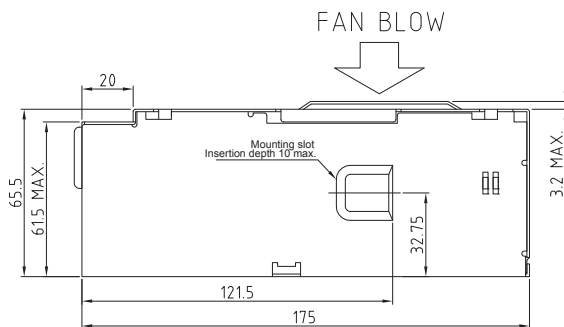
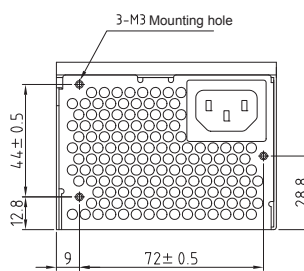
Pin	Output	Rating	Wire gauge
1	+3.3V DC	6 A	
2	+3.3V sense	6 A	
3	COM	6 A	
4	+5V DC	6 A	UL1007 AWG#18
5	COM	6 A	
6	+5V DC	6 A	
7	COM	6 A	
8	PWR_OK	10 mA	UL1007 AWG#22
9	+5VSB	15 A	
10	+12V DC	6 A	
11	+3.3V sense	6 A	UL1007 AWG#18
12	+12V DC	0.3 A	
13	COM	6 A	
14	PS_ON#	10 mA	UL1007 AWG#22
15	COM	6 A	
16	COM	6 A	UL1007 AWG#18
17	COM	6 A	
18	N.C.	-	
19	+5V DC	6 A	UL1007 AWG#18
20	+5V DC	6 A	UL1007 AWG#18

Connector: 5566-20A (Molex) or equivalent

12Pin output connector (HD connector)

Pin	Output	Rating	Wire gauge
1	COM	6 A	
2	+12V DC	6 A	
3	COM	6 A	
4	COM	6 A	
5	+12V DC	6 A	
6	+5V DC	6 A	UL1007 AWG#18
7	COM	6 A	
8	+12V DC	6 A	
9	COM	6 A	
10	COM	6 A	
11	+12V DC	6 A	
12	+5V DC	6 A	

Connector: 5566-12A (Molex) or equivalent

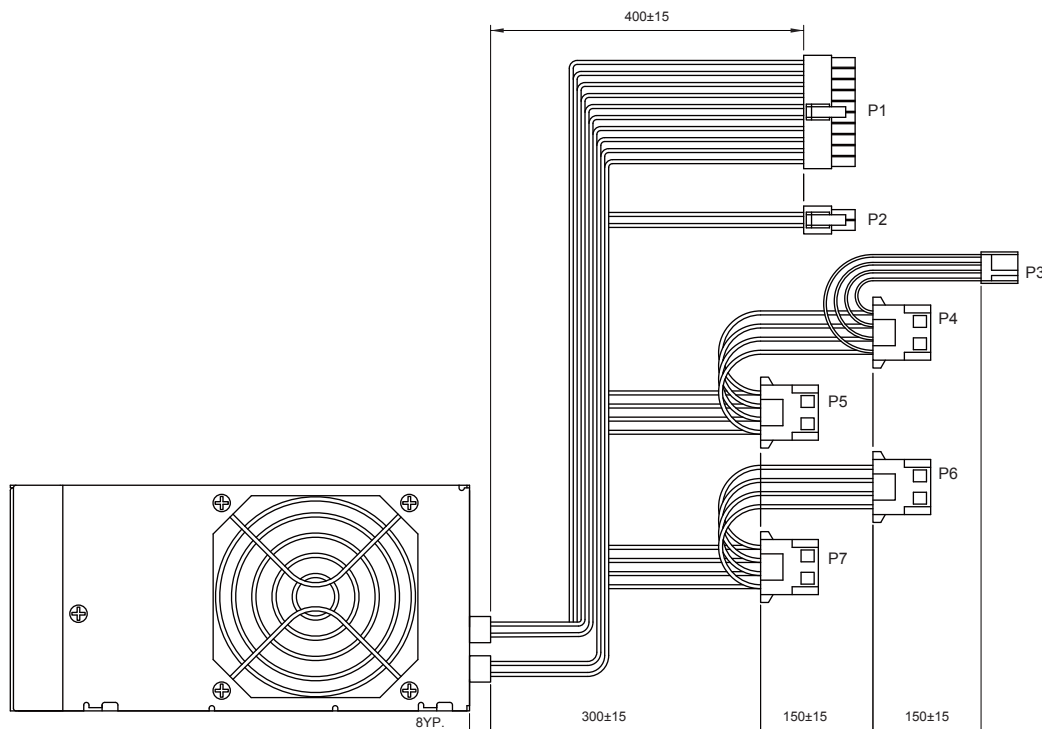


Note: Driving depth of screws shall be 6mm max. inside power supply.
Dimensional tolerance shall be ± 1 unless otherwise specified.
When output harness(es) are made, +3.3V sense terminal shall be shortened with +3.3V terminal at output terminal end.

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

Output Harness

PCTF-220P-X2S-02



P1

Pin	Output	Color	Wire gauge
1	+3.3V DC	Orange	
2	+3.3V sense	Orange	
3	+3.3V DC	Orange	
4	COM	Black	
5	+5V DC	Red	
6	COM	Black	
7	+5V DC	Red	
8	COM	Black	
9	PWR_OK	Gray	
10	+5VSB	Purple	UL 1007 AWG#18
11	+12V DC	Yellow	
12	+12V DC	Blue	
13	COM	Black	
14	PS_ON#	Green	
15	COM	Black	
16	COM	Black	
17	COM	Black	
18	N.C.	White	
19	+5V DC	Red	
20	+5V DC	Red	

Housing: CP-01120030(CivLUX) or equivalent
Contact 1 to 10, 12 to 20 : CP-01100102(CivLUX) or equivalent
Pin 11 terminal: CP-01100105(CivLUX) or equivalent

P2

Pin	Output	Color	Wire gauge
1	COM	Black	
2	COM	Black	
3	+12V DC	Yellow	UL 1007 AWG#18
4	+12V DC	Yellow	

Housing: 5557-04R(MOLEX) or equivalent
Contact: 5566 (MOLEX) or equivalent

P3

Pin	Output	Color	Wire gauge
1	+5V DC	Red	
2	COM	Black	UL 1007 AWG#20
3	COM	Black	
4	+12V DC	Yellow	

Housing: 171822-04(AMP) or equivalent
Contact: 170204 (AMP) or equivalent

P4

Pin	Output	Color	Wire gauge
1	+12V DC	Yellow	UL 1007 AWG#18
2	COM	Black	
3	COM	Black	
4	+5V DC	Red	UL 1007 AWG#20

Housing: LCP-04(JST) or equivalent
Contact: SL C22T (JST) or equivalent

P5, P7

Pin	Output	Color	Wire gauge
1	+12V DC	Yellow	UL 1007 AWG#18
2	COM	Black	
3	COM	Black	
4	+5V DC	Red	UL 1007 AWG#18

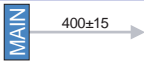
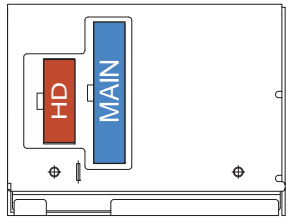
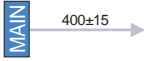

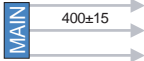
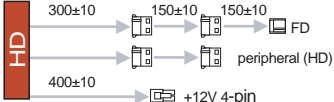
Housing: LCP-04(JST) or equivalent
Contact: SL C22T-2.0(JST) or equivalent

P6

Pin	Output	Color	Wire gauge
1	+12V DC	Yellow	
2	COM	Black	UL 1007 AWG#18
3	COM	Black	
4	+5V DC	Red	

Housing: LCP-04(JST) or equivalent
Contact: SL C22T-2.0(JST) or equivalent



Optional Components Sold Separately

Detachable Output Harness						
Model	Length and Type of Connector	Output Port Allocation				
Main power cable MAIN						
WH-M2420-400	 400±15 → 24-pin	 <p>Acceptable cable (s)</p> <table border="1"> <tr> <td style="background-color: #0056b3; color: white; padding: 2px;">MAIN</td> <td style="background-color: #800000; color: white; padding: 2px;">HD</td> </tr> <tr> <td style="text-align: center;">1 model</td> <td style="text-align: center;">1 model</td> </tr> </table>	MAIN	HD	1 model	1 model
MAIN	HD					
1 model	1 model					
WH-M2020-400	 400±15 → 20-pin					
WH-M2020-192	 192±15 → 20-pin					
WH-MAT20-400	 400±15 → AT for +3.3V					
HD power cable HD						
WH-PV612-600	 300±10 → 150±10 → 150±10 → FD 400±10 → peripheral (HD) +12V 4-pin					

BRAIN
Power
Supply

Desktop PC Power Supply

Non-backup Power Supply

Cable			
Picture	Model	Type	Description
	WH2753	AC power cord	125 VAC 12A [PSE]
	WH2753-02	AC power cord	125 VAC 12A (tracking resistance type) [PSE]

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	

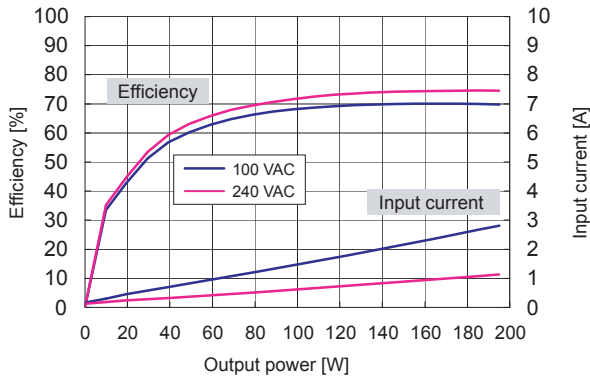
Characteristics Data (Examples of actual measurement)

BRAIN
Power
Supply

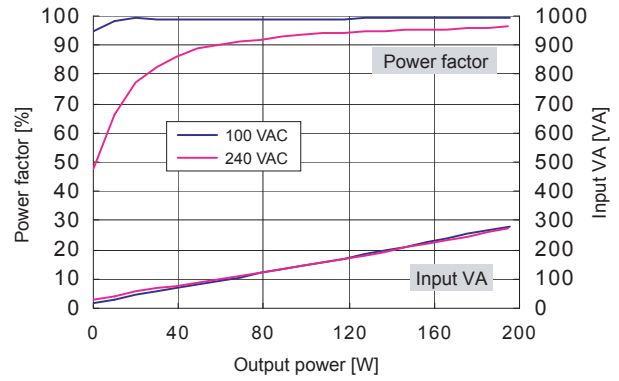
Desktop PC Power Supply

Non-backup Power Supply

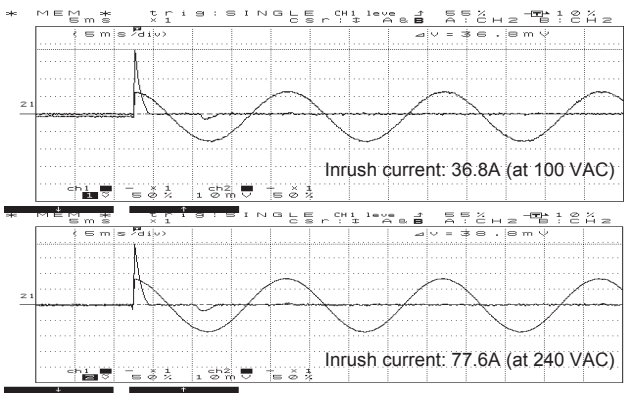
• Fig.4 Efficiency / Input Current vs. Output Power



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



• Fig.6 Inrush Current

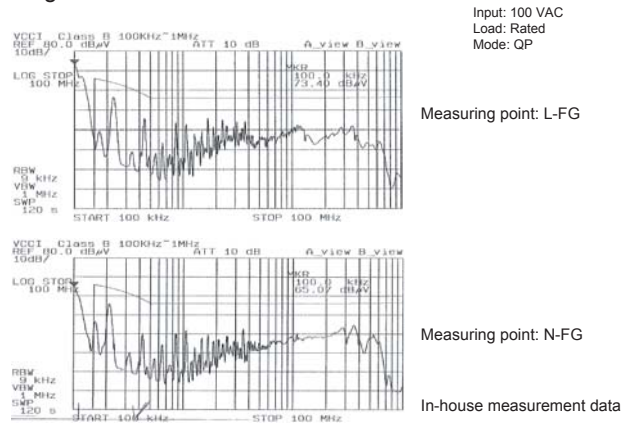


• Fig.7 Leakage Current

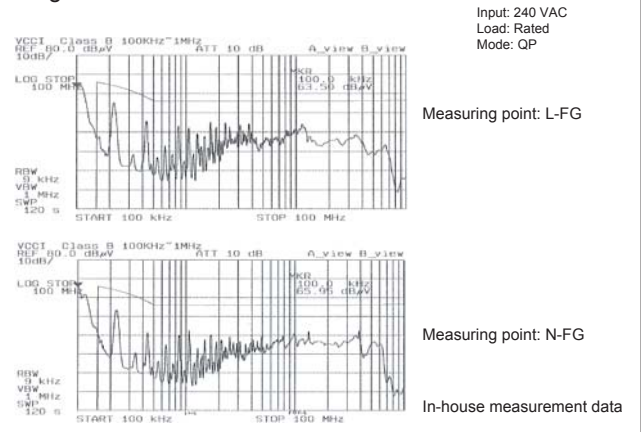
Input: 100 / 240 VAC
Load: Rated and min. load

	Rated load	Min. load
100 VAC	0.24mA	0.22mA
240 VAC	0.50mA	0.52mA

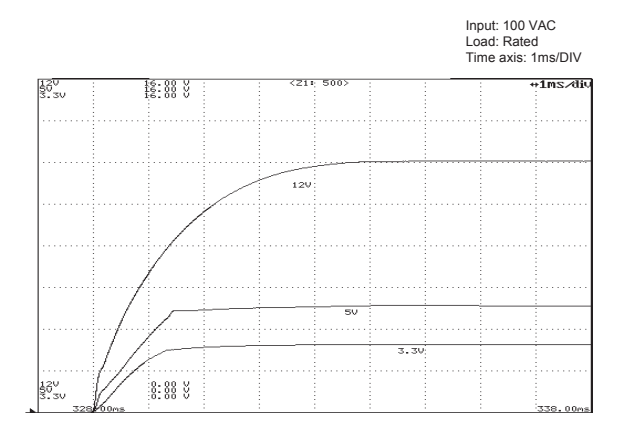
• Fig.8 Conducted Emission at 100 VAC



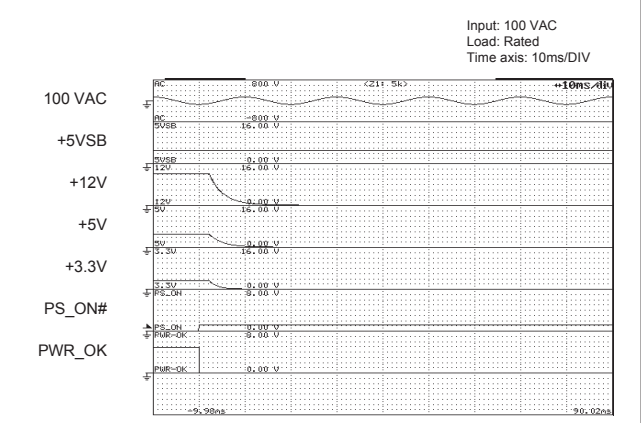
• Fig.9 Conducted Emission at 240 VAC



• Fig.10 Rising Characteristics at 100 VAC

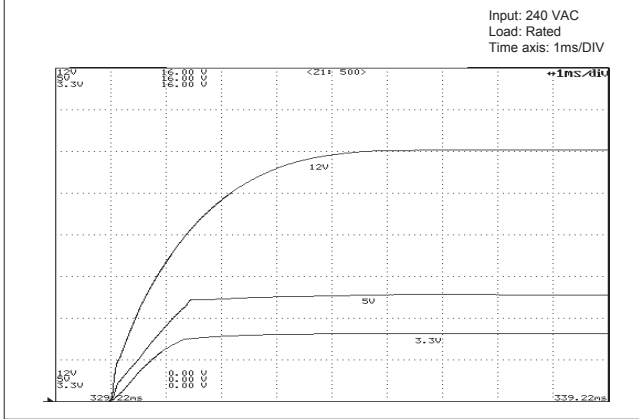


• Fig.11 Falling Characteristics at 100 VAC when REMOTE goes Off

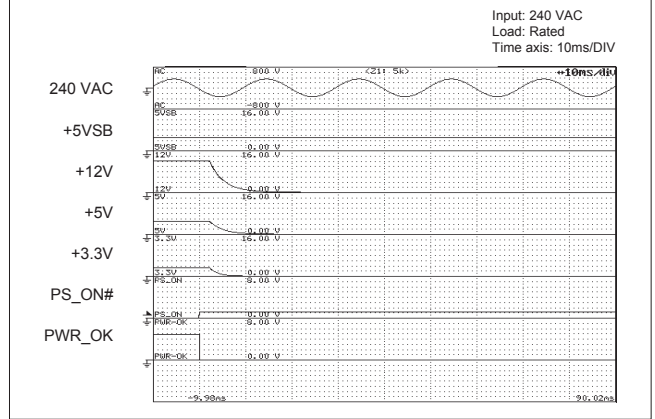


Characteristics Data (Examples of actual measurement)

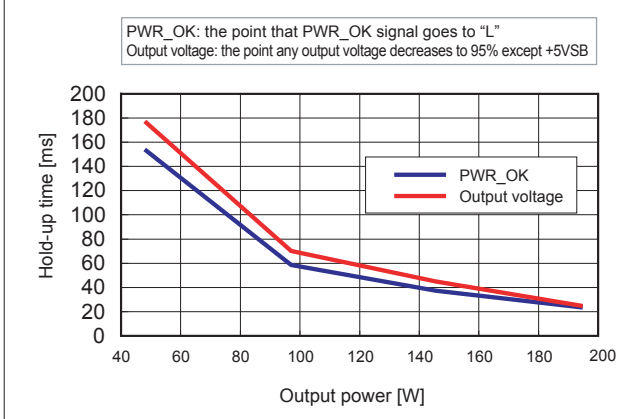
● Fig.12 Rising Characteristics at 240 VAC



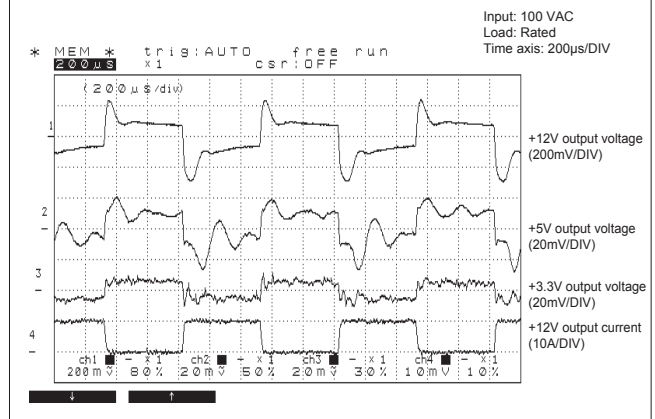
● Fig.13 Falling Characteristics at 240 VAC when REMOTE goes Off



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



● Fig.15 Dynamic Load Fluctuation Characteristics at 1kHz

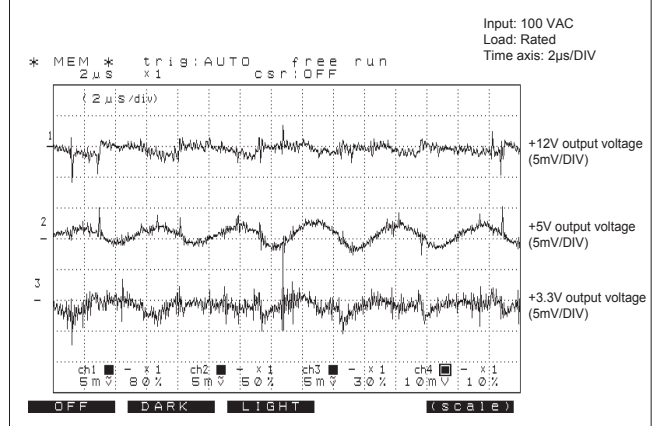


● Fig.16 Output Voltage Regulation

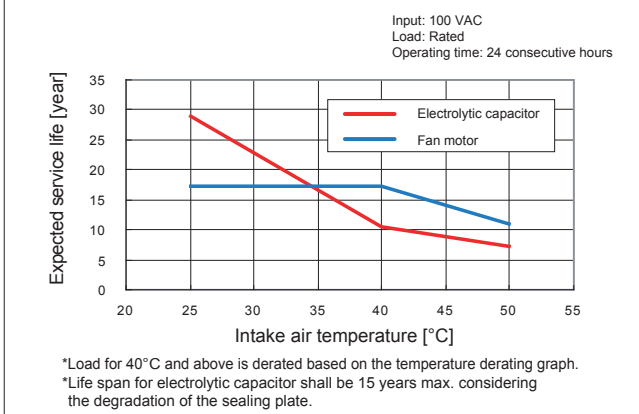
Output	Min. load	Rated load	Peak load
+12V output	0A	10A	12A
+5V output	1A	6A	15A
+3.3V output	0A	10A	16.7A

AC input voltage	85 VAC	100 VAC	132 VAC	176 VAC	240 VAC	264 VAC
+12V output (min. load)	12.172 V	12.174 V	12.173 V	12.171 V	12.171 V	12.171 V
+12V output (rated load)	12.075 V	12.075 V	12.073 V	12.072 V	12.071 V	12.072 V
+12V output (peak load)	12.061 V	12.060 V	12.059 V	12.059 V	12.060 V	12.059 V
+5V output (min. load)	5.138 V	5.137 V	5.137 V	5.137 V	5.137 V	5.137 V
+5V output (rated load)	5.096 V	5.095 V	5.095 V	5.095 V	5.095 V	5.095 V
+5V output (peak load)	5.082 V	5.081 V	5.081 V	5.081 V	5.081 V	5.081 V
+3.3V output (min. load)	3.318 V	3.318 V	3.318 V	3.318 V	3.318 V	3.318 V
+3.3V output (rated load)	3.266 V	3.266 V	3.266 V	3.266 V	3.266 V	3.266 V
+3.3V output (peak load)	3.246 V	3.246 V	3.246 V	3.246 V	3.246 V	3.246 V

● Fig.17 Ripple and Spike Voltage



● Fig.18 Ambient Temperature vs. Expected Service Life



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

