

Desktop PC Power Supply mPCSL-210-X2S

Medical Standard IEC60601-1 Approved, Slim Size Power Supply



mPCSL-210-X2S

**RoHS
Directive**

Other	
Continuous Max.	Peak Power
210W	—

Model	Description	Stock
mPCSL-210-X2S	—	Standard stock
Model Name Coding mPCSL - 210 - X 2 S ① ② ③ ④ ⑤		
	1. Series name 2. Output power	3. ATX output 4. +3.3V output equipped 5. Standard

Features

- Medical standard IEC60601-1 2nd and 3rd approved
- CQC certification approved
- IEC60065-1 approved
- Slim size of 48mm in height and 90mm in width
- Complying with medical standard at the low leakage current of 0.2mA max. (at 100VAC input)
- By building in the thermal-sensing variable speed fan, noise reduction can be realised. Heat related issue for CPU can be settled with fan speed changeover switch.
- Seven years expected lifetime is achieved at max. output power and 40°C ambient temperature. (electrolytic capacitor: approx. 13 years, Fan: approx. 7 years)
- Conducted emission class B compliant

Refer to "Product Page Guideline" on p.13

Safety standard / Approval	UL	CSA	EN	CE	CCC
Reliability Grade	HFA	FA	HOA	OA	

Function



Input

AC input	85 - 264V (worldwide range)
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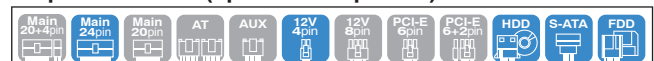
Output

Output voltage	+3.3V	+5V	+12V	-12V	+5VSB
Max. current / max. power (continuous)	10A	10A	12A	0.3A	1.5A
	Total 83W		Total 199.7W		
	Total 210.5W max.				
Min. current	0A	0A	0.8A	0A	0A

Dimensions

W×H×D (mm)	90×48×240
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Output connector (optional component)

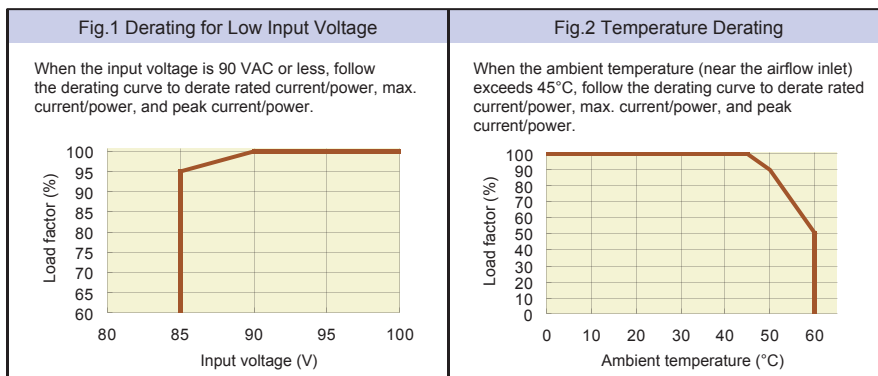


General Specification Condition: at normal temperature and humidity unless otherwise specified

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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	72% typ. (100 VAC), 75% typ. (240 VAC) *Characteristic data: Fig.4					At rated input/output	
	Power Factor	97% min. (100 VAC), 92% min. (240 VAC) *Characteristic data: Fig.5						
	Inrush Current*	31A peak (100 VAC), 75A peak (240 VAC) *Characteristic data: Fig.6					At rated input/output at cold start (25°C)	
	Input VA	320VA max. *Characteristic data: Fig.5					At rated input and max. output	
Output	Rated Voltage	+3.3V	+5V	+12V	-12V	+5VSB		
	Rated Current	9A	10A	10A	0.3A	1.5A		
	Max. Current / Power	10A	10A	12A	0.3A	1.5A	Max. output power: 210.8W	
		83W max.						
		199.7W max.						
		Total 210.8W max.						
	Min. Current	0A	0A	0.8A	0A	0A	Min. load current for the voltage accuracy	
Total Voltage Accuracy (%)	±5 max.	±5 max.	±5 max.	±10 max.	±5 max.	Total accuracy of input and load fluctuations, and the drift caused by temperature and time.		
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 150mm max. long. 10µF electrolytic capacitor and 0.1µF ceramic capacitor are placed on it and it is measured by the 100MHz oscilloscope. *Characteristic data: Fig.16		
Max. Spike Voltage (mVp-p)	100 max.	100 max.	170 max.	170 max.	100 max.			
Protection	Overcurrent Protection	OCP Point (A)	12 min.	12 min.	14 min.	Short protection		
		Method	All outputs except for +5VSB shutdown			Fold back current limiting	Hold down current limiting	All other outputs are at rated input/output
		Recovery	Reclosing AC input (10 sec min. interval)			Automatic recovery		
	Overvoltage Protection	OVP Point (V)	3.74 - 4.3	5.74 - 7.0	13.4 - 15.6	-	-	
	Method	All outputs except for +5VSB shutdown			-	Zener clamp		
	Recovery	Reclosing AC input (10 sec min. interval)			-			
Environment	Operating Temp. / Humidity	0 to 60°C* / 10 to 90%					No condensation *Refer to Fig.2	
	Storage Temp. / Humidity	-25 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: 2500 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) / 0.5mA max. (264 VAC) *Characteristic data: Fig.6					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 / EN55022 Class B compliant *Characteristic data: Fig.7 and 8					Measured by single unit	
	Harmonic Current Regulation	IEC 6100-3-2 Class D compliant					At rated input/output	
Others	Safety Standard	UL60601-1, CSA C22.2 No.601.1 (c-UL), UL60950-1, CSA C22.2 No.60950-1 (c-UL), IEC60065-1, CQC(GB8898), CE Marking (LVD,EMC)						
	Cooling System	Forced air cooling: thermal-sensing variable speed fan embedded						
	Output Grounding	Connected chassis (FG)						
	Output Hold-up Time	PWR_OK holds up 16ms min. after AC failure *Characteristic data: Fig.13					At rated output	
	Reliability Grade	FA (industrial equipment grade, double-sided through hole PCB)					Follow our standard	
	MTBF	70,000 H min.					Based on EIAJ RCR-9102	
	Weight	1.4 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 not listed		

*The inrush current into X-capacitor of input noise filter is not specified unless its period is more than 100µs.

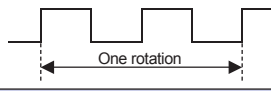
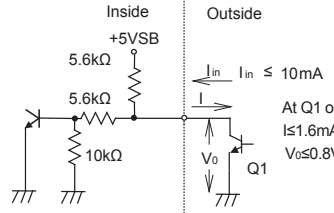
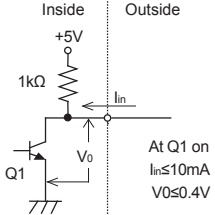
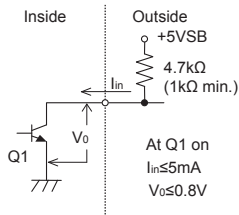


Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

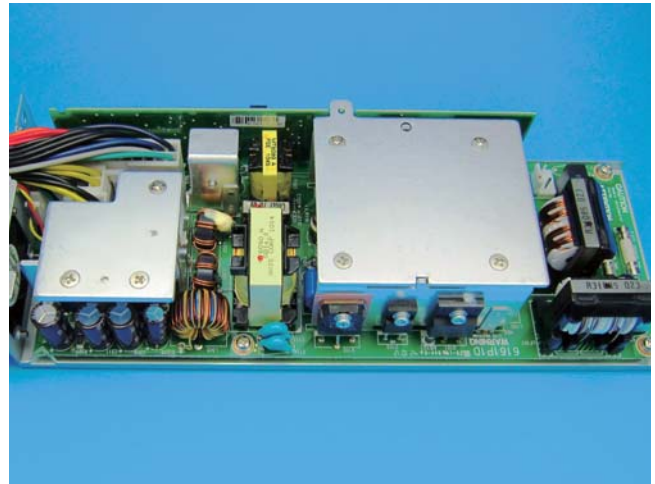
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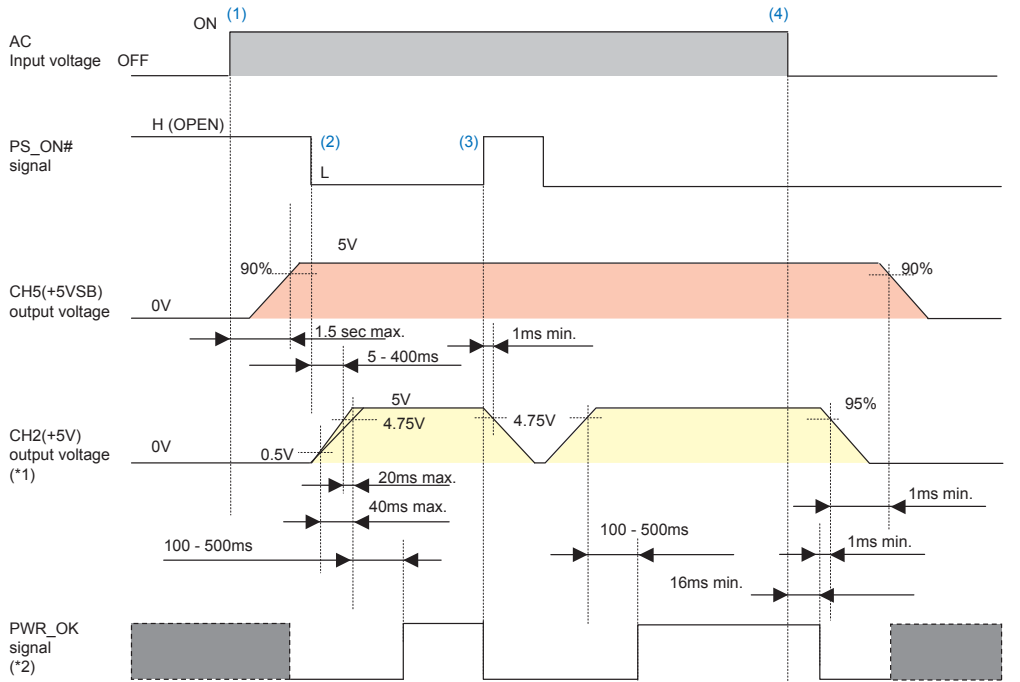
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Items	Specification	Note	
Input Signal	Output ON / OFF Control Signal (PS_ON#)	+3.3V, +5V, +12V, and -12V outputs are delivered with 'L' input. +3.3V, +5V, +12V, and -12V outputs shutdown with 'H' or 'OPEN' input.	Signal input between the pin 14 of P1 connector and COM pin
	+3.3V SENSE	The input terminal to detect the voltage of +3.3V output; by connecting to the load terminal, only the line drop of the + side of the output cable is compensated.	The pin 11 of P1 connector
Output Signal	Normal Output Signal (PWR_OK)	'H' signal is delivered when the +5V output is normal.	The pin 8 of P1 connector
	Fan Monitor Signal (FAN M)	Two cycle pulses per one rotation of the fan motor are delivered. Duty ratio of the pulse shall be 0.5 typ. The signal remains 'L' or 'OPEN' when the fan stops caused by any failure or malfunction.	The pin 1 of P7 connector 
Signal Circuit			
Input Signal Circuit	(PS_ON#)		
			
Output Signal Circuit	(PWR_OK)	(FAN M)	
			

Internal Structure



Sequence Diagram

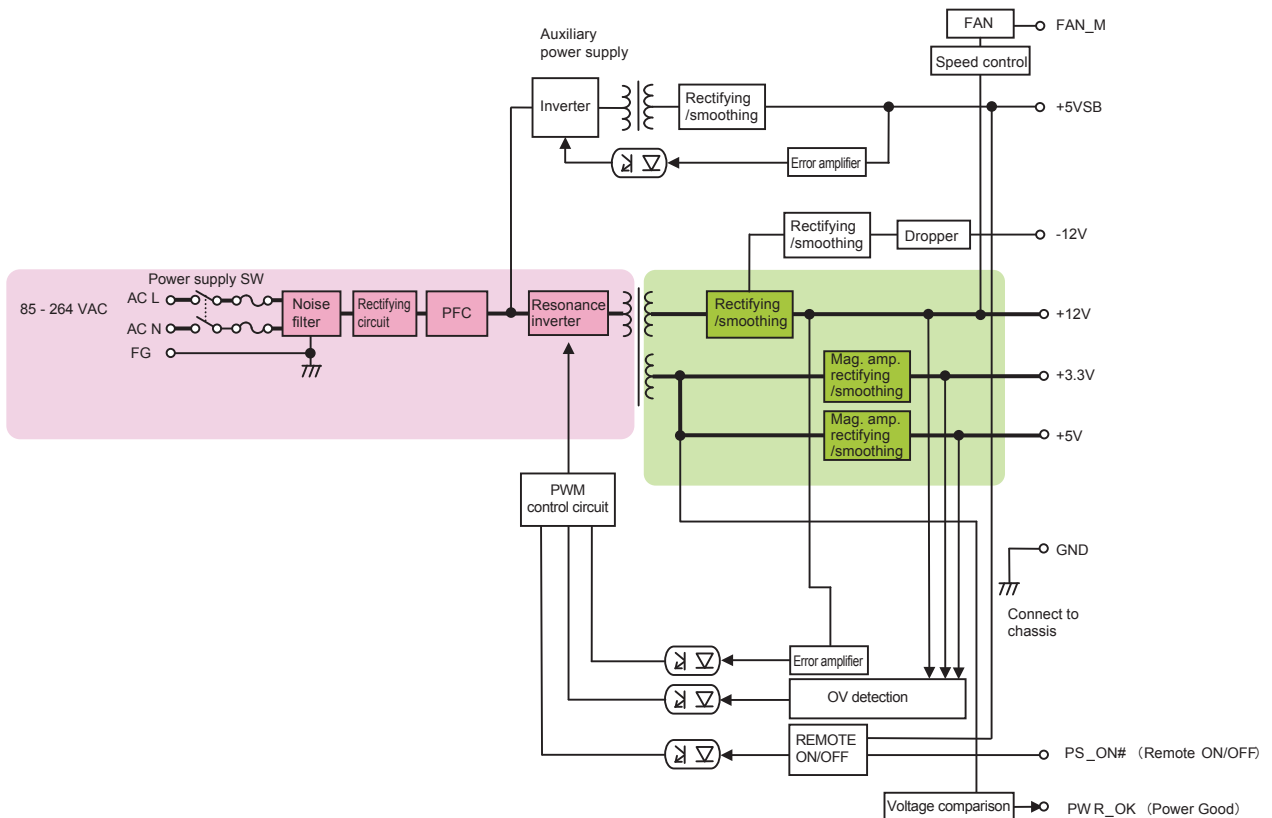


(*1) All other outputs except for CH2 (+5V) shall follow this timing and the rising time difference from CH2 (+5V) shall be 20ms or less. In addition, output voltage level of CH2 (+5V) and CH3 (+12V) at rising shall be more than the voltage level of CH1 (+3.3V). The difference of output voltage level of CH2 (+5V) and CH1 (+3.3V) should be less than 2.25V. Each output voltage at the time of trailing rank or level differences are 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 (OPEN)', 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 (OPEN)' 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.

Undefined

Block Diagram

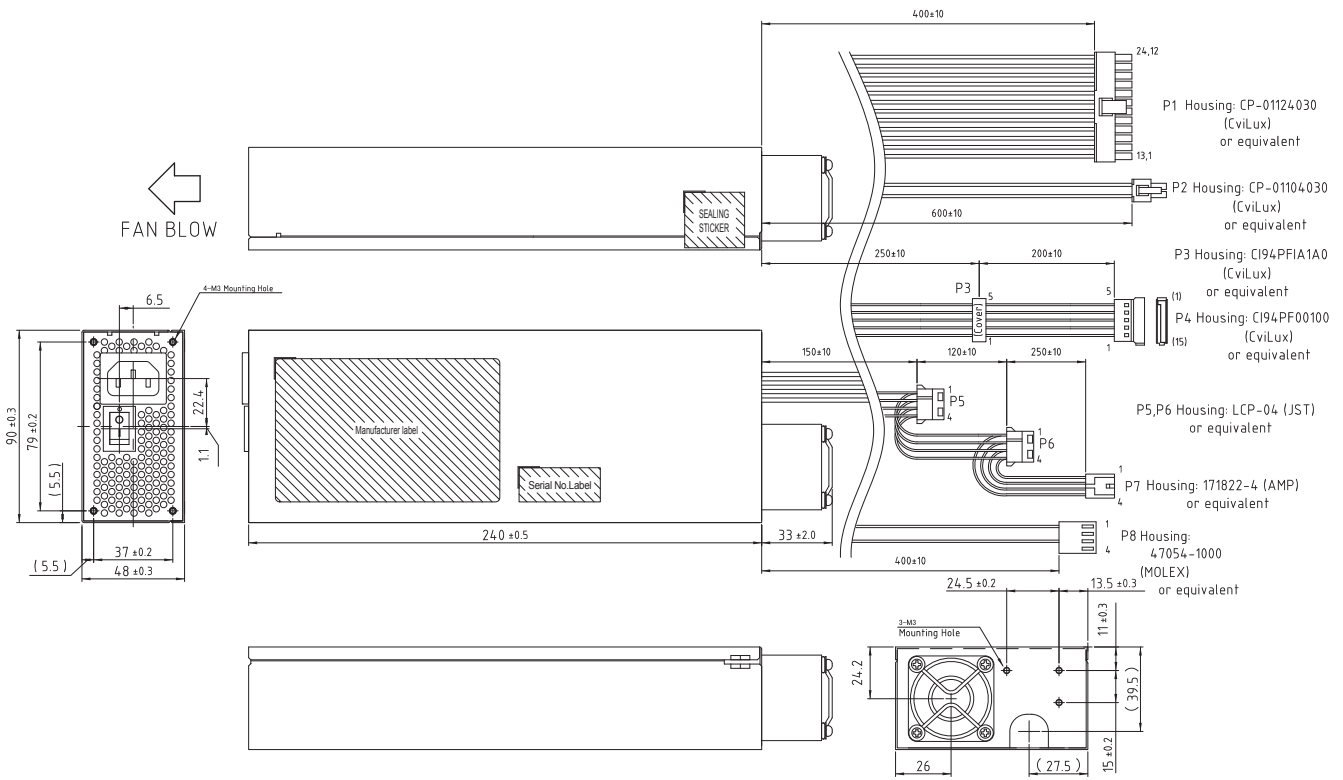


Outline Drawing

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



* Dimensional tolerance shall be ± 1mm.
Convex parts such as inlet and connectors are not included.
Driving depth of screws inside power supply shall be 6mm max.

Based on the bottom chassis as its origin, the bulge of the side of top and bottom chassis is not included.

CONN	PIN NO.	FUNCTION	MAX CURRENT	WIRE COLOR	CONNECTOR TYPE
MAIN P1	1	+3.3 V	6.0A	Orange	Housing:CP-01124030 (CviLux) or equivalent
	2	+3.3 V	6.0A	Orange	
	3	GND	6.0A	Black	
	4	+5 V	6.0A	Red	
	5	GND	6.0A	Black	
	6	+5 V	6.0A	Red	
	7	GND	6.0A	Black	
	8	PWR_OK	10mA	Gray	
	9	+5 V_SB	2.5A	Purple	
	10	+12 V	6.0A	Yellow	
	11	+12 V	6.0A	Yellow	
	12	+3.3 V	6.0A	Orange	
	13	+3.3 V	6.0A	Orange	
	14	+3.3V SENSING	10mA	Brown	
	15	GND	6.0A	Black	
	16	PS_ON	10mA	Green	
	17	GND	6.0A	Black	
	18	GND	6.0A	Black	
	19	GND	6.0A	Black	
	20	N.C	-	-	
	21	+5 V	6.0A	Red	
	22	+5 V	6.0A	Red	
	23	+5 V	6.0A	Red	
	24	GND	6.0A	Black	
12V P2	1	GND	6.0A	Black	Housing:CP-01104030 (CviLux) or equivalent
	2	GND	6.0A	Black	
	3	+12V	6.0A	Yellow	
	4	+12V	6.0A	Yellow	
S-ATA P3~4	1~3	+12V	7.0A	Yellow	Housing:C194PFI1A10 (CviLux) or equivalent
	4~5	GND	7.0A	Black	
	6~8	+5V	7.0A	Red	
	9~12	GND	7.0A	Black	
HD P5~6	13~15	+3, 3V	7.0A	Orange	Housing:LCP-04 (JST) or equivalent
	1	+12V	7.0A	Yellow	
	2	GND	7.0A	Black	
	3	GND	7.0A	Black	
FD P7	4	+5V	7.0A	Red	Housing:171822-4 (AMP) or equivalent
	1	+5V	2.0A	Black	
	2	GND	2.0A	Black	
	3	GND	2.0A	Black	
SIG P8※	4	+12V	2.0A	Yellow	Housing:47054-1000 (MOLEX) or equivalent
	1	GND	5mA	Black	
	2	FAN_M	5mA	Brown	
	3	-	-	-	

※ In case of using the pin 1 GND of SIG(P8), please check carefully that the output current except FAN_M should not flow into this pin.

Optional Components Sold Separately

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)
WH2812	PCI-E 6-pin connector conversion harness	WH5105-02	12V 4-pin connector conversion harness (320mm)

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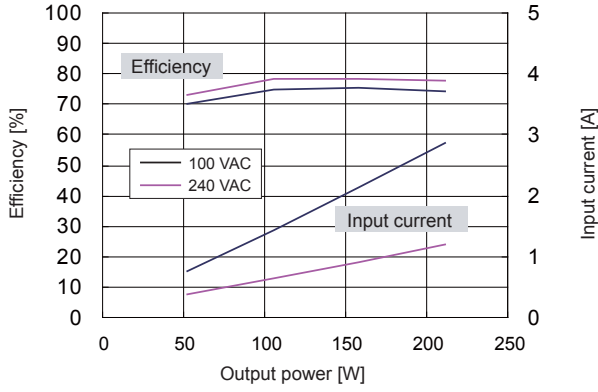
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Characteristics Data (Examples of actual measurement)

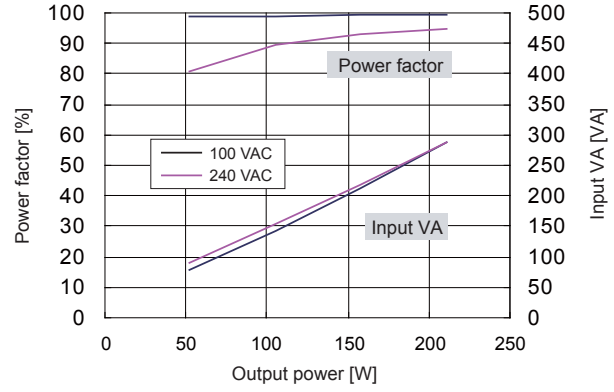
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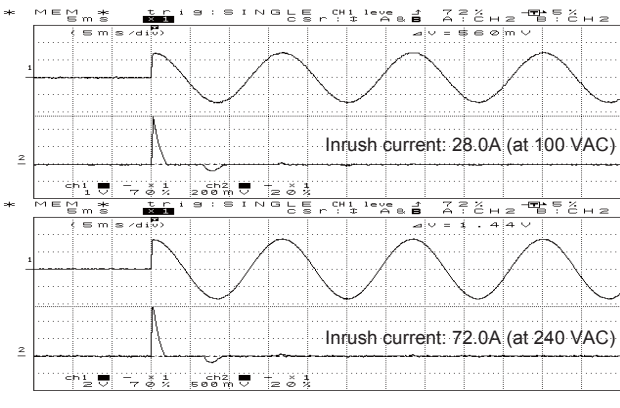
• Fig.3 Efficiency / Input Current vs. Output Power



• Fig.4 Power Factor / Input VA vs. Output Power



• Fig.5 Inrush Current

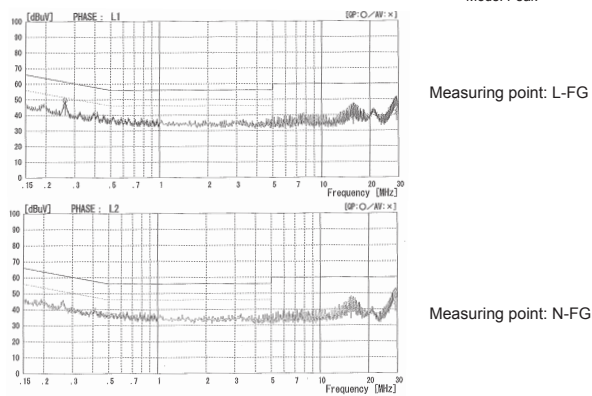


• Fig.6 Leakage Current

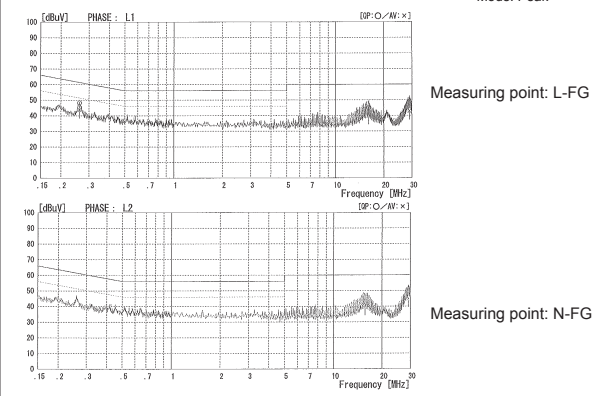
Input: 100 / 264 VAC
Load: Rated and min. load

	Rated load	Min. load
100 VAC	0.12mA	0.10mA
264 VAC	0.26mA	0.26mA

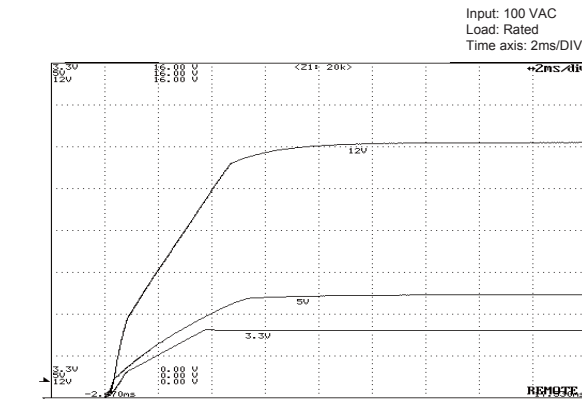
• Fig.7 Conducted Emission at 100 VAC



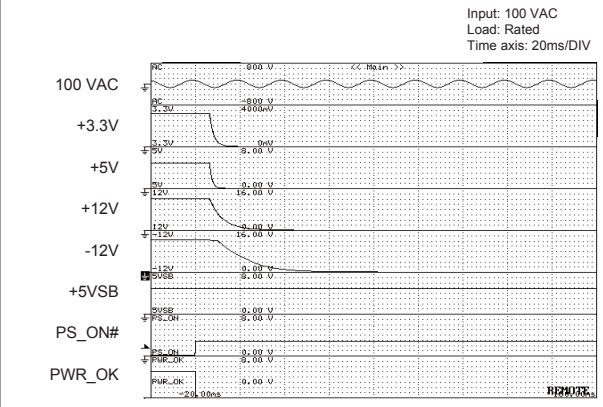
• Fig.8 Conducted Emission at 230 VAC



• Fig.9 Rising Characteristics at 100 VAC

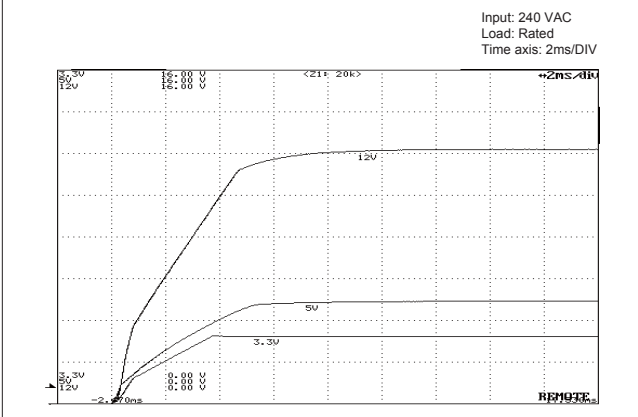


• Fig.10 Falling Characteristics at 100 VAC when REMOTE goes Off

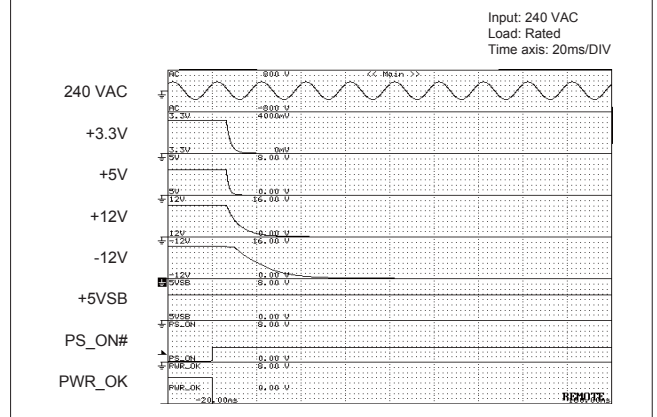


Characteristics Data (Examples of actual measurement)

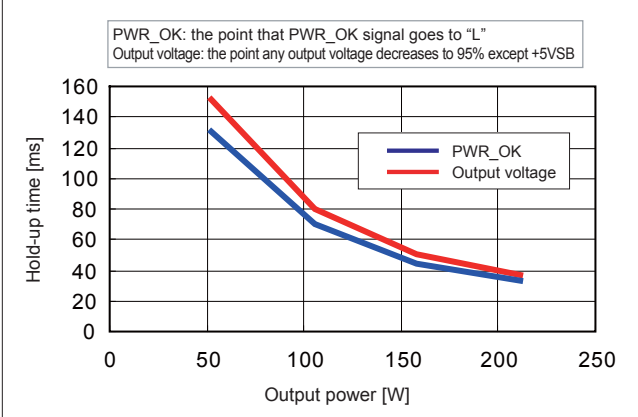
• Fig.11 Rising Characteristics at 240 VAC



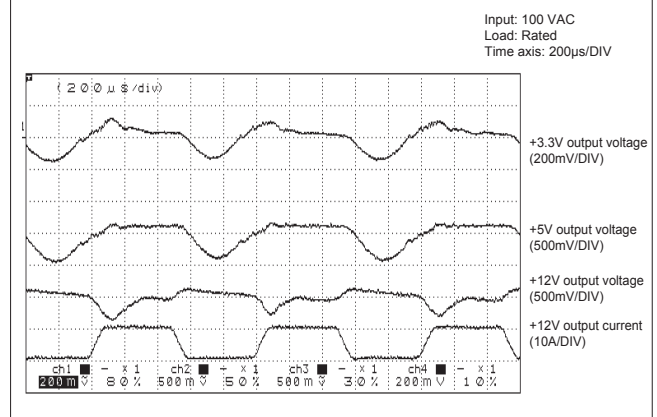
• Fig.12 Falling Characteristics at 240 VAC when REMOTE goes Off



• Fig.13 Output Hold-up Time vs. Output Power



• Fig.14 Dynamic Load Fluctuation Characteristics at 1kHz

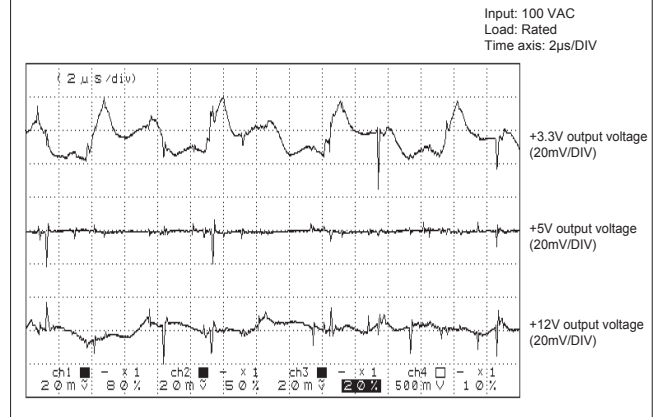


• Fig.15 Output Voltage Regulation

Output	Min. load	Rated load
+12V output	0.8A	10A
+5V output	0A	10A
+3.3V output	0A	9A

AC input voltage	85 VAC	100 VAC	132 VAC	176 VAC	240 VAC	264 VAC
+3.3V output (min. load)	3.393 V	3.393 V	3.393 V	3.393 V	3.393 V	3.393 V
+3.3V output (rated load)	3.269 V	3.269 V	3.269 V	3.269 V	3.269 V	3.269 V
+5V output (min. load)	5.092 V	5.092 V	5.092 V	5.092 V	5.092 V	5.092 V
+5V output (rated load)	4.955 V	4.954 V	4.954 V	4.954 V	4.954 V	4.954 V
+12V output (min. load)	12.324 V	12.323 V	12.323 V	12.322 V	12.322 V	12.322 V
+12V output (rated load)	12.214 V	12.213 V	12.214 V	12.214 V	12.214 V	12.214 V

• Fig.16 Ripple and Spike Voltage



• Fig.17 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	45°C
Expected service life (yr)	approx. 54	approx. 27	approx. 13	approx. 9.7

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

■ Fan

Ambient temp.	20°C	30°C	40°C	45°C
Expected service life (yr)	approx. 7.2	approx. 7.2	approx. 7.2	approx. 5.8

• Fig.18 Over Current Protection (V-I Characteristic)

