## **AC-DC Power Supplies**



## 650 Watts

- Medical (BF) Safety Approvals
- 4″ x 8″ Package
- 5V Standby Supply
- AC OK, Inhibit & Remote Sense
- Class B Conducted & Radiated Emissions
- 3 Year Warranty



The PBR650 series of AC-DC switching power supplies, in a package of just  $4 \times 8 \times 2.58$  inches, deliver 600-650 watts of continuous power. They are designed for medical applications including those needing BF rated insulation with an operation altitude of up to 5000m.

### Dimensions:

PBR650:

8.00 x 4.00 x 2.58" (203.2 x 101.6 x 65.5 mm)

### Models & Ratings

Output Voltage V1	Output Cu	Output Current V1 <sup>(2)</sup>		Ripple & Noise <sup>(1)</sup>	Model Number <sup>(4)</sup>
	Nominal	Peak <sup>(3)</sup>			
12 V	50.00 A	55.00 A		120 mV	PBR650PS12C
15 V	40.00 A	44.00 A		150 mV	PBR650PS15C
18 V	36.12 A	40.00 A	5.0 V / 0.2 A	180 mV	PBR650PS18C
24 V	27.09 A	30.00 A		240 mV	PBR650PS24C
28 V	23.22 A	25.50 A		280 mV	PBR650PS28C
36 V	18.06 A	20.00 A		360 mV	PBR650PS36C
48 V	13.55 A	15.00 A		480 mV	PBR650PS48C
57 V	11.41 A	12.50 A	1	570 mV	PBR650PS57C

#### Notes

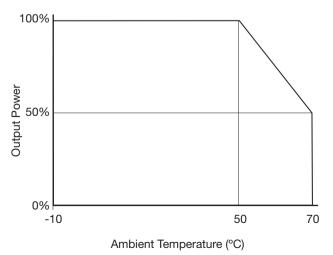
1. Ripple and noise is the maximum peak-to-peak voltage value measured at the output with 20 MHz bandwidth, at rated line voltage and output load, and with a 10 μF tantalum capacitor in parallel with a 0.1 μF ceramic capacitor.

2. All models may be operated at no-load without damage. At no load, output voltage fluctuates beyond 5% due to burst-mode operation of the control IC for energy saving.

3. Peak current available for 15s max, 10% duty cycle, average power not to exceed nominal power rating.

4. For single fuse option add suffix -SP, e.g. PBR650PS12C-SP

#### **Temperature Derating Curve**



## **AC-DC Power Supplies**



Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	80		264	VAC	Derate to 90% at 85 VAC & 80% at 80 VAC
Input Frequency	47		63	Hz	
Input Current - Full Load		8.4/4.2		A (rms)	115/230 VAC, 60/50 Hz
Earth Leakage Current		225	275	μA	264 VAC, 63 Hz

Output					
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	12		57	VDC	See Models and Ratings table
Tolerance			±2	%	Line and Load Regulation, 0.1% minimum load required to meet specification
Transient Response			4	%	Recovery within 1% in less than 500 µs for a 25% step load change
Ripple & Noise			1	% pk-pk	20 MHz bandwidth, see model table notes
Overvoltage Protection	115		140	%	Latching
Overcurrent Protection	115		140	%	Trip & restart characteristic
Thermal Shutdown					Protected for overtemperature conditions, latching
Temperature Coefficient			±0.04	%/°C	
5 V Standby Supply			5	V	At 200 mA
Patient Leakage Current		50	80	μA	264 VAC, 63 Hz

Environmental					
Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-10		+70	°C	Derate Linearly from 100% load at +50 °C to 50% load at +70 °C
Storage Temperature	-40		+85	°C	
Humidity	5		95	%RH	Non-condensing
Cooling					Integral temperature controlled fan. Fan speed based on temperature of transformer T1, internally monitored. Fan will not rotate until T1 temperature reaches approx. 60 °C and reaches full speed when T1 temperature reaches approx. 80 °C.

General						
Characteristic		Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency			90		%	230 VAC, 100% load
	Input to Output	4000			VAC	2 x MOPP
Isolation	Input to Ground	1500			VAC	1 X MOPP
	Output to Ground	1500			VAC	1 X MOPP
	PFC	55	65	75		Fixed
Switching Frequency	Main Converter	90		300	kHz	Variable
	Standby Converter	124	132	140		Variable
Hold Up Time		12	20		ms	At 110 VAC & 650 W
Inrush Current			30/60		VAC	115 VAC/230 VAC at 25 °C, cold start
Mean Time Between Failure			190,000		Hrs	MIL-HDBK-217F, Full load at 25 °C GB
Weight			4.4 (2000)		lb (g)	

## **AC-DC Power Supplies**



### Signals & Controls

Characteristic	Notes & Conditions
Remote Sense	Compensates for 0.5 V total voltage drop.
Inhibit	To inhibit apply TTL high signal .
AC OK	TTL high for normal operation, low upon loss of input power, turn-on delay time 100-1000 ms, turn-off delay time 1 ms minimum

## EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55011/EN55032	Class B	
Radiated	EN55011/EN55032	Class B	
Harmonic Current	EN61000-3-2	Class A	
Voltage Fluctuations	EN61000-3-3		

## EMC: Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	4	A	±8 kV contact, ±15 kV air
Radiated	EN61000-4-3	10 V/m	А	
EFT	EN61000-4-4	±2 kV	A	
Surges	EN61000-4-5	Installation class 3	А	±1 kV differential/ ±2 kV common mode
Conducted	EN61000-4-6	10 Vrms	А	
Magnetic Field	EN61000-4-8	30 A/m	А	
	100 VAC/60 Hz	Dip 30% (70 VAC), 500ms	А	
		Dip 60% (40 VAC), 100ms	В	
		Int >95% (0 VAC), 10ms	A	
		Int 100% (0 VAC), 20ms	А	
		Int 100% (0 VAC), 5000ms	В	
Dips and Interruptions		Dip 30% (161 VAC), 500ms	А	
		Dip 60% (92 VAC), 100ms	А	
	230 VAC/50 Hz	Int >95% (0 VAC), 10ms	A	
		Int 100% (0 VAC), 20ms	А	
		Int 100% (0 VAC), 5000ms	В	

### Safety Approvals

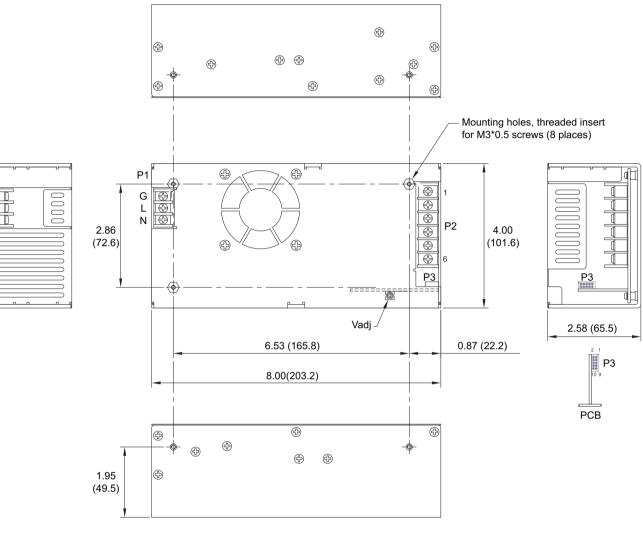
Safety Agency	Safety Standard	Notes & Conditions
CB Report	IEC60601-1	Medical
UL	ES60601-1, CSA C22.2 No.60601-1	Medical
TUV	EN60601-1	Medical

### **AC-DC Power Supplies**



#### **Mechanical Details**

D



Input Connector - P1				
G				
L				
Ν				

Ou	Output Connector - P2					
Pin 1	+V1					
Pin 2	+V1					
Pin 3	+V1					
Pin 4	Com					
Pin 5	Com					
Pin 6	Com					

	P3
Pin 1	+V1 Sense
Pin 2	+V1 Sense
Pin 3	AC OK
Pin 4	Common Return
Pin 5	N/C
Pin 6	N/C
Pin 7	Inhibit
Pin 8	N/C
Pin 9	+5V Standby
Pin 10	+5V Standby Return

#### Notes

- 1. Dimensions shown in inches [mm]
- 2. Tolerance 0.02 [0.5] maximum
- 3. Input connector P1 is Dinkle terminal P/N DT-35C-B01W-03, with nickel plated M3 screws.
- 4. Output connector P2 is Dinkle Terminal P/N DT-4N-B01W-06 with nickel plated M3.5 screw.
- 5. Connector P3 is JST Header S10B-PHDSS, or equivalent, mating with JST housing PHDR-10VS or equivalent.
- 6. Weight: 1.4 kg (3.1 lbs.) approx.
- 7. Maximum penetration of fixing screws is 4 mm from the outer surface of chassis.