Model: BPA-PFS3000

AC/DC Power Series for Industrial/Medical Application

Special Features

- Low cost
- 3000W max continuous output
- 4.28”x10.95”x1.61” compact size
- -20℃-70℃ operation temperature range
- -40℃ power up capability
- Build-in active PFC
- Intelligent fan speed control
- DC_OK analog indication signal
- Remote sense, Remote ON/OFF control
- Active current sharing support
- 5000m operation altitude
- Medical grade 2xMOPP isolation
- Meet Semi F47-0706
- 5V/2A standby
- Support semi-custom design
- 40W/in^3 high power density
- Optional Or-ing FET
- Optional CANBus or PMBUS

RoHS

Typical Application

- Medical IVD, Image equipment
- Industrial automation production line
- Robot and Motor control
- Semiconductor manufacture

Product Overview

The **BPA-FS3000** is a highly reliable, compact, 3000W, AC to DC, single output power supply module. With a full range input of 90-264VAC, this power supply module achieves the highest performance and efficiency by incorporating digital control technology. The BPA-FS3000 family also includes CANBus interface to monitor and control all essential functions of the power supply module.

Custom controls available.

Key Specification

Model	BPA-PFS3000T24	BPA-PFS3000T30	BPA-PFS3000T36	BPA-PFS3000T42	BPA-PFS3000T48	*Support Optional Oring FET*
Output voltage	24V	30V	36V	42V	48V	
Rated Current	0-125A	0-100A	0-83.4A	0-71.5A	0-62.5A	
Model	BPA-PFS3000T60	BPA-PFS3000T72	BPA-PFS3000T100	BPA-PFS3000T120	BPA-PFS3000T150	*No Oring FET*
Output voltage	60V	72V	100V	120V	150V	
Rated Current	0-50A	0-41.7A	0-30A	0-25A	0-20A	
Rated Power	3000W					
Dimension	4.28"x10.95"x1.61" or 108.8mmx278.1mmx41mm					
EMC	CLASS B Conducted and CLASS A Radiated Emissions. Compliance with IEC60601-1-2 4th edition					

Ordering Model Name

BPA-P	F	S	3000	T	24	
Series Name	**Package Type**	**Outputs**	**Rated Power**	**Connector Type**	**Output Voltage**	**Control Code**
	F: Force air cooling enclosed	S: Single output	3000W	T: Screw terminal		Note below

Note:
AA: 5V standby, CAN bus, no Oring FET
BA: 5V standby, CAN bus, with Oring FET (Available for models with output 48V or below)
BB: 5V standby, CAN bus, with Oring FET and Conformal Coating (Available for models with output 48V or below)
For any custom design please contact BluTek Power, Inc.

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Input Specification

Function	Minimum	Typical	Maximum	Condition
Rated Input Voltage	100Vac		240Vac	
Input Voltage Range	90Vac		264Vac	Output Power derating to 50% rated load when input voltage < 180VAC. See Fig.1 for detail
Input Frequency	47Hz	50 / 60Hz	63Hz	
Input Current			18A	@Rated input voltage range
Power Factor	0.99			With max rated output power
Efficiency			95%	230Vac, exclude fan power
Inrush Current			40A	240Vac
Input surge voltage			300Vac	last for 1second

Output Specification

Function	Minimum	Typical	Maximum	Condition
Output Voltage Trim Range	24V	24V	28V	24V Model
	28V	30V	32V	30V Model
	33V	36V	40V	36V Model
	38V	42V	46V	42V Model
	42V	48V	53.5V	48V Model
	54V	60V	66V	60V Model
	65V	72V	79V	72V Model
	90V	100V	110V	100V Model
	110V	120V	132V	120V Model
	132V	150V	150V	150V Model
Output Power	0W		3000W	
Initial Tolerance			±0.5%	Trim in factory
Total Regulation			3%	Include line and load regulation
Output Ripple			1%	Peak-Peak value, measure at 5cm from PSU with 0.1uF Ceramic and 100uF electrolytic capacitor, 20MHz BW
Dynamic Response			5%	with 50% load step, min from 5% load
Capacitive Load				No special requirement
Power up time			2s	
Rise time			50ms	without cap load
Hold up time	12ms			230Vac/50Hz input @ 80% load

Protection Specification

Function	Minimum	Typical	Maximum	Condition
Input under voltage		80Vac		Auto-restart after fault is removed
Over current protection (OCP)				Auto-restart, Clamp by constant current
Short circuit protection (SCP)				Auto-restart after fault is removed
Over voltage protection (OVP)			130%	Latch off
Over temperature protection (OTP)				Latch off

**Protection mode latch or auto-restart can be customized, contact BluTek Power, Inc. for more details.*

Standby Output Specification

Function	Minimum	Typical	Maximum	Condition
Output voltage	4.75V	5V	5.25V	0 – 2A Load
Over current protection (OCP)	2.5A			Auto-restart after fault is removed
Short circuit protection (SCP)				Auto-restart after fault is removed

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Reliability

Function	Minimum	Typical	Maximum	Condition
MTBF	500Khrs			According to Telecordia SR-332. 115Vac 25℃ ambient with rated load
Life	5 years			Rated nominal conditions

EMC

Conducted Emissions	EN 55011 / EN 55032,Class B
Radiated Emissions	EN 55011 / EN 55032,Class A
Note: PFS3000T is a enclosed type PSU as a component intended to be assembled and built inside the system cabinet, PSU normally is to mounted connecting to an earthed metal plate, all the EMC tests are performed with the PSU and resistive loads plated on a metal plate to simulate the system application. The final system must re-evaluate to confirm it can still meet the EMC directives.	
Harmonic Current Emissions	IEC 61000-3-2 Meet Class A limit
Voltage Flicker	IEC 61000-3-3
Electrostatic Discharge	IEC 61000-4-2 Level 4 (Air Discharge: 15 kV,Contact Discharge: 8 kV) Criteria A
Radiated Field	IEC 61000-4-3 Criteria A
Electrical Fast Transient / Burst	IEC 61000-4-4 Level 3 (2 kV),Criteria A
Surge	IEC 61000-4-5 Level 3 (Common Mode 2kV, Differential Mode 1kV), Criteria A
CS	IEC 61000-4-6 Level 2 (150 kHz-80 MHz, 3 Vrms, 6 Vrms at ISM bands and Amateur radio bands), Criteria A
Power Frequency Magnetic Fields	IEC 61000-4-8 Criteria A,Magnetic field strength 30 A/m
Voltage Dips	IEC 61000-4-11 30% 10 ms Criteria A 60% 100 ms Criteria B 100% 5000 ms Criteria B
Voltage Dips	IEC 60601-1-2 Criteria A @ 2000 W or lower 0% UT, 0.5 cycle(10 ms) (0°,45°,90°,135°,180°,225°,270°,315°,360°) Criteria B ,can meet Criteria A with 1250 W or lower load 0% UT,1 cycle (20 ms), 0° Criteria B 70% UT,25 cycle (500 ms) , 0° Criteria B 0% UT,250 cycle (5000 ms) , 0°

Criteria A: Normal operation within spec limit
Criteria B: Out of regulation or restart to normal operation after test

Safety / Directives

Medical Safety *		IEC 60601-1 2nd and 3rd+A1 edition UL 60601-1+CAN/CSA 60601-1
ITE Safety *		IEC 62368-1 UL 62368-1+CAN/CSA 62368-1 GB 4943.1-2011, GB 9254-2008, GB 17625.1-2012
CE *		EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU EN 60601-1: 2006 + A11: 2011 + A1: 2013 + A12: 2014 & EN 60601-1-2: 2015
UKCA *		In conformance with Electrical Equipment (Safety) Regulations 2016, and Electromagnetic Compatibility Regulations 2016, Medical Devices Regulations 2002 (UK MDR 2002)
Dielectric Voltage	Input to/Output	4000Vac (2XMOPP)
	Input to/Ground	1500Vac (1XMOPP)
	Output to/Ground	1500Vac (1XMOPP)

**Compliance only, contact BluTek Power, Inc. for detailed safety certifications*

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Environmental

Function	Min	Typical	Max	Condition
Operation Temperature	-20℃		70℃	See power derating curve Fig.2
Operation Humidity	10%		90%	Non-condensing
Storage Temperature	-40℃		70℃	
Storage Humidity	10%RH		90%RH	Non-condensing
Operation Altitude			5000m or 16,405 feet	
Fan Acoustic Noise			45dB	80% Load, 1m distance
Shock			196m/s2	With Package
Vibration			19.6m/s2	10-55Hz (1 min sweep). 1 Hour for each axis. With package

Leakage Current

Function	Min	Typical	Max	Condition
Input-PE Leakage			500uA	264Vac/50Hz Normal Condition
			1mA	264Vac/50Hz Single Fault Condition
Output-PE Leakage (Meet Type BF application for IEC60601-1)			100uA	264Vac/50Hz Normal Condition
			500uA	264Vac/50Hz Single Fault Condition

Output Power De-rating Curve

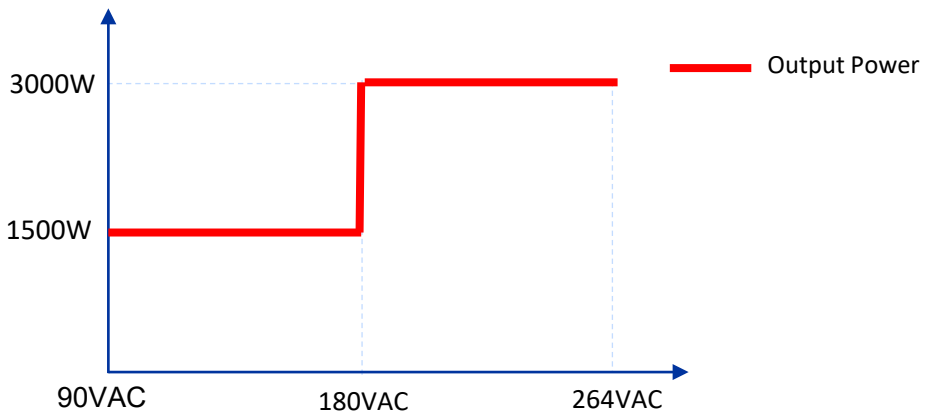

Fig.1 Power Derating Curve vs. Input Voltage

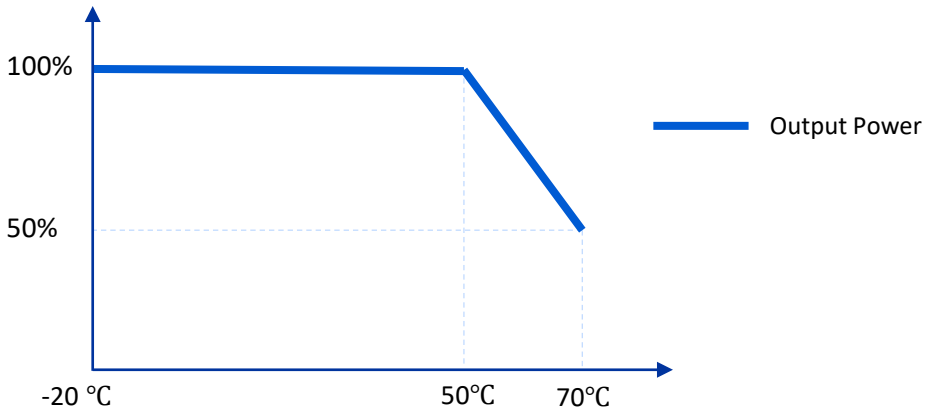

Fig.2 Power Derating Curve vs. Ambient Temperature

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Connector and Pin Assignment

Position	Connector / Connection	
Input Connector CN1	M4 screw type terminal connector	
	Enclosure Mark	**Designation**
	L	Line
	N	Neutral
	⏚	Earth Ground

Position	Connector / Connection	
Main Output Connector CN201/CN202	Output terminal blocks, with M4x8 screw and plastic spacer	
	Enclosure Mark	**Designation**
	Vo+	Output positive
	Vo-	Output return

Position	Connector / Connection	
Control Connector CN401	Mating with CJT connector A2008H-2X5P or equivalent	
	Pin#	**Description**
	1	Current share
	2	Output return
	3	Remote sense+
	4	Remote sense-
	5	Reserve No Connection
	6	Reserve No Connection
	7	Standby_5V
	8	Standby_5V
	9	Standby_5V return
	10	Standby_5V return

Position	Connector / Connection	
Control Connector CN402	Mating with CJT connector A2008H-2X5P or equivalent	
	Pin#	**Description**
	1	DC_OK-
	2	DC_OK+
	3	Remote ON/OFF-
	4	Remote ON/OFF+
	5	Reserve No Connection
	6	Reserve No Connection
	7	CANL or SDA
	8	CANH or SCL
	9	CAN 5V+
	10	CAN 5V Return

**Cable signal cables defines to be 3m in length the longest, contact BluTek Power, Inc. if longer than 3m cables are needed, .*

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Control Features Description

	Pin#	Description	Feature Description
Control Connector CN401	1	Current share	For parallel operation, each control pin of parallelled units shall be shorted together to achieve parallel and current share feature.
	2	Output return	Main output GND return
	3	Remote sense+	Connect these two pins to the output sensing positive/negative point to compensate the voltage drop on output wires, refer to detailed feature description.
	4	Remote sense-	
	5	Reserve No Connection	No connection, leave open.
	6	Reserve No Connection	No connection, leave open.
	7	Standby_5V	Standby 5V output positive, 2A output capability.
	8	Standby_5V	Standby 5V output positive, 2A output capability.
	9	Standby_5V return	Standby 5V output GND (not isolated to main output GND)
	10	Standby_5V return	Standby 5V output GND (not isolated to main output GND)

	Pin#	Description	Feature Description
Control Connector CN402	1	DC_OK-	DC_OK indication signal pins, these two pins provide DC_OK output signal to system side, refer to detailed feature description.
	2	DC_OK+	
	3	Remote ON/OFF-	These two pins are used as input signal to turn on or turn off the PSU main output, refer to detailed feature description, leave the pins open will turn on the PSU as default.
	4	Remote ON/OFF+	
	5	Reserve No Connection	No connection, leave open.
	6	Reserve No Connection	No connection, leave open.
	7	CANL or SDA	CAN Bus or PMbus/I²C communication ports.
	8	CANH or SCL	
	9	CAN 5V+	5V control supply for communication port, it is isolated from the main output, and can only be used as control purpose, this output has no power output capability.
	10	CAN 5V Return	

LED Indication

BPA-PFS3000T series provide four green/red bi-color LED indicators on the front cover to indicate the main operation status, customer can use these LED indications to easily retrieve the PSU status or to perform malfunction diagnosis, functions as below.

Description	DC_OK	OVP	OCP	OTP
DC output OK Normal Operation	Green	Green	Green	Green
Main output out of regulation warning	Red	Green	Green	Green
Over voltage protection	Red	Red	Green	Green
Over current protection	Red	Green	Red	Green
Over temperature protection	Red	Green	Green	Red
Fan fault	Red	Red	Red	Red
Short load or output under voltage protection	Horse-running red lights flashing			

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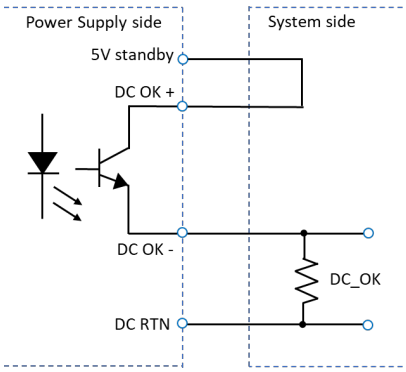
Voltage Trimming

The power supply provides a potentiometer for user to adjust the output voltage. Switch the potentiometer clockwise to increase the output voltage, switch the potentiometer counterclockwise to decrease the output voltage.
Please reference to Output Specification for the output voltage range which user shall trim the voltage within.
When the output is adjusted below nominal value, the maximum output current is the same as the nominal output, when the output is adjusted above nominal value, the output power cannot exceed the nominal maximum power (the maximum output current used should be reduced accordingly).

DC_OK Signal

DC_OK Signal is designed to indicate the main DC output status. When DC output is present, DC_OK Signal (Shown in below figure) generated will be high. When DC output is off, the internal transistor will be turned off. When AC input is off, there will be a minimum of 5 milliseconds between the time the DC_OK internal transistor turns off, and the time when the output reaches 90% of its rated value.

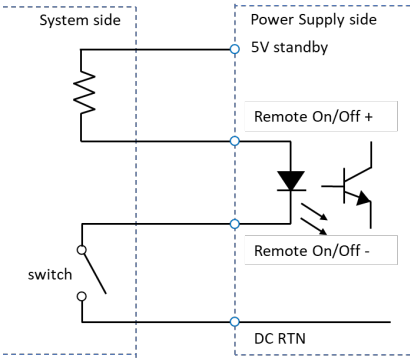


Remote Sense

Remote sense feature can be used to compensate for the extra voltage drop on output wires that are connected from the main output terminals, to the load. With wires connected from the remote sense pins, at the same locations as the wires from the main output, the remote sense function can compensate up to 500mV voltage drop.

Remote ON/OFF

Remote ON/OFF input can be used to turn off or turn on the power supply main output
The output ON/OFF can be controlled by conducting an isolated diode located within the power supply. When the main output is disabled, the +5 V Standby output will continue to operate. System can use a switch to conduct through this diode (suggested pull up resistor to 5 V standby with 1 Kohm resistor) to disable the main out. The signal can be floated (no connection to the signal), in order to enable the main output.



CAN / I²C Communication

CAN bus or Isolated I2C communication comply with PMBus protocol. Please contact BluTek Power, Inc. for detail communication specification.

Current Sharing

BPA-PFS3000T series supports current sharing function. Please contact BluTek Power, Inc. for detail.

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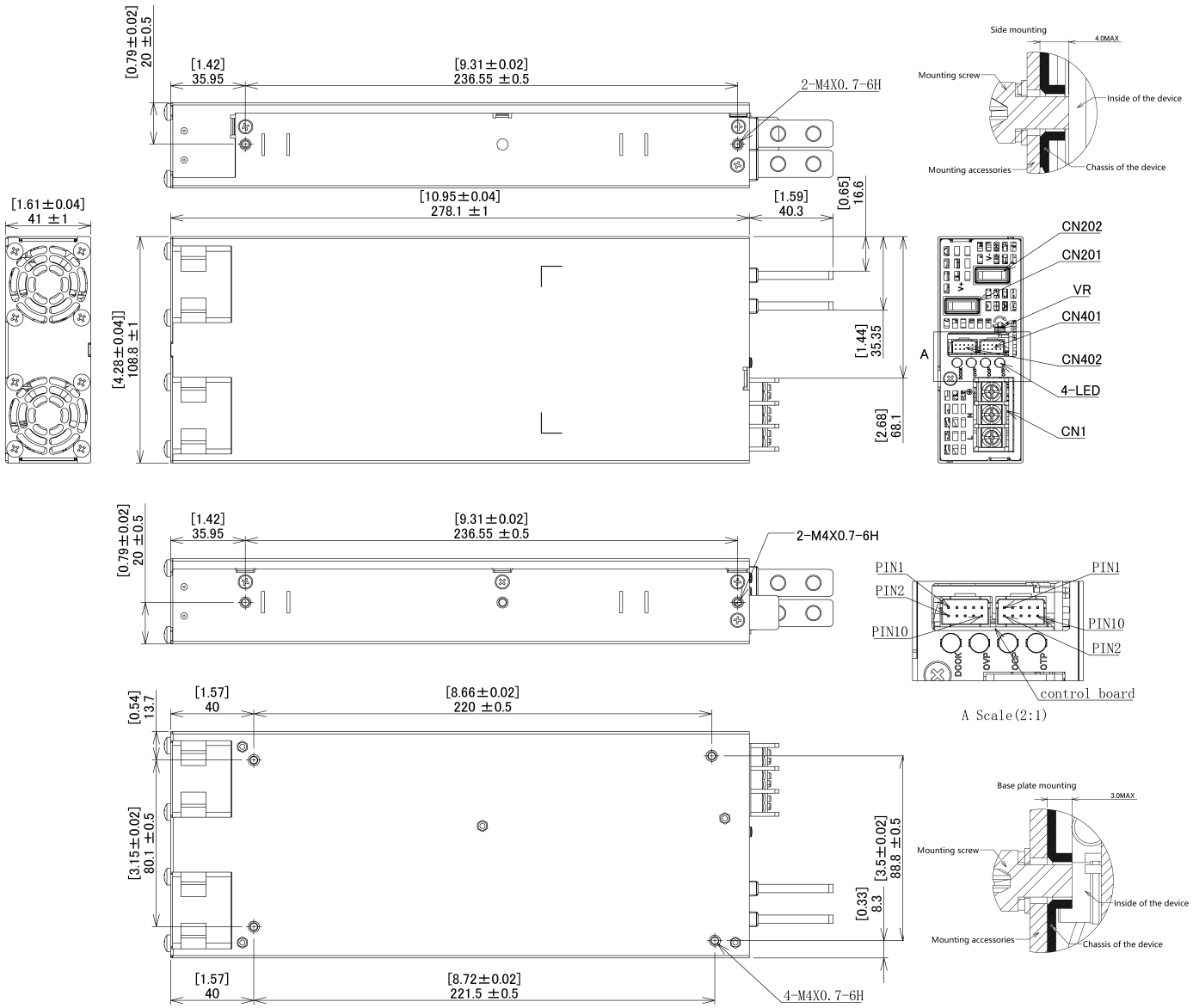
Mechanical Drawing



Notes:

1. Base plate mounting, M4 thread holes, maximum penetration 3.0 mm (0.12 inch) from outside face of chassis, 10 kgf.cm (8.8 inch.lbs)Max torque.
2. Side mounting, M4 thread holes, maximum penetration 4.0 mm (0.16 inch) from outside face of chassis, 10kgf.cm (8.8 inch.lbs) Max torque.
3. CN1 is AC input terminal block and with M4 screw in three positions,wire gauge is 10~18 AWG,10 kgf.cm (8.8 inch.lbs) Max torque.
4. CN201/CN202 is DC output termianl block and with M6 screw in two positions, 35kgf.cm(30.8inch.lbs) Max torque.
5. CN401/CN402 is control or signal connection.
6. VR: clockwise is to increase the output voltage, anti-clockwise is to reduce the output voltage.

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