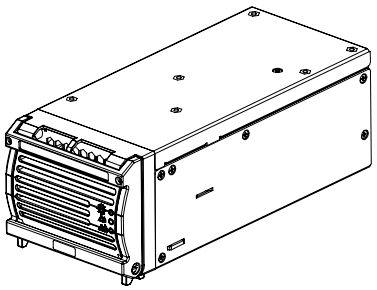
EPW50-48A-E 电源模块用户手册



1　主要特点

EPW50-48A-E 电源模块（以下简称电源模块）输入输出采用软启动；输出电压可通过监控调节；采用软开关技术；可并联使用，均分负载。

尺寸（高×宽×深）：88.1mm×102.7m（壳宽 105.5mm）×242.5mm（不包含插座宽度）

重量：＜2.8kg

机械应力条件：ETS300019-2

安全性能：UL 60950-1,C22.2 NO. 60950-1, EN 60950-1

2　使用环境

工作温度：－33℃～65℃；存储温度：－40℃～70℃；

相对湿度：5%～95%（无冷凝）；大气压力：86 kPa～106 kPa；

海拔高度：小于 4000m；散热方式：强迫风冷；

振动：2～500Hz，X、Y、Z 三个方向任意振动 30 分钟

3　电气参数

输入

额定输入电压：200～240Vac 或 115～130Vac

输入电流：单模块最大电流 18.5A

额定频率：50/60Hz

功率因数：不小于 99%（额定工作条件下）

输出

额定输出电压：53.5V（输出电压范围：43.2Vdc～57.6Vdc）

输出功率：2900W（176Vdc～300Vdc）

1200W（90Vdc～175Vdc）

稳压精度：≤±1%

负载调整率：≤±1%

电网调整率：≤±0.1%

宽频杂音电压：≤100mV（3.4kHz～150kHz）

≤30mV（150kHz～30MHz）

峰-峰值杂音电压：≤200mV（20MHz 范围内，负载不小于 1A 时）

衡重杂音：≤2mV

离散杂音：≤5mV（3.4kHz～150kHz）

≤3mV（150kHz～200kHz）

≤2mV（200kHz～500kHz）

≤1mV（500kHz～30MHz）

效率：≥92%，220Vac 输入，53.5V/2900W 输出

≥86%，110Vac 输入，53.5V/1200W 输出

4　保护功能

模块的保护功能见表 1。

表 1　保护功能

输入过压保护	交流输入过压至 305Vac 以上，模块告警并关机保护；当电压降至 300Vac 以下，模块可自动恢复工作
输入欠压保护	交流输入欠压至 85Vac 以下，模块告警并关机保护；当电压升至 90Vac 以上，模块可自动恢复工作
输出过压保护	直流输出过压点 58.5～60.5Vdc，过压后模块关机保护、锁死；故障排除后需手动重新启动电源模块
限流保护	模块设有限流保护，保护值分别为：2900W（176～220Vac 输入）；1200W（90～175Vac 输入）
短路保护	模块有短路保护，当模块的输出端发生短路时，最大输出电流为 61A，排除故障后可自动恢复工作
过热保护	当检测点温度大于 116℃时，模块告警并保护，当温度降低且小于 110℃时，可自动恢复工作

输入过、欠压、输出过压等模块故障都有相应的告警指示灯指示。

5　接口说明

电源模块与背板的电气连接是通过模块后方的交流输入插座（FCI 公司，型号 51939-021）和直流输出插座（FCI 公司，型号 51939-022）实现，直流输出插座同时完成信号接口功能。背板接插件管脚示意参见图 1，管脚定义参见表 2。

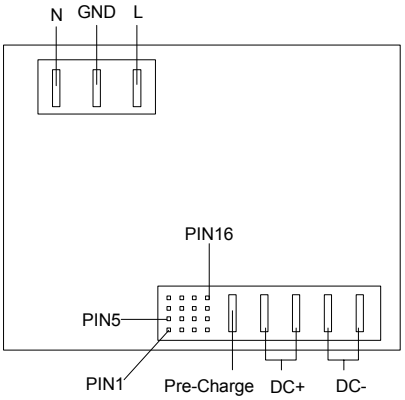


图 1　背板接插件管脚示意图

表 2　电源模块背板接插件管脚定义

管脚	定义	功能	接触顺序
交流输入 FCI 51939-021			
见图 1	L	模块交流输入	2
见图 1	GND	模块保护地	1
见图 1	N	模块交流输入	2
直流输出及信号 FCI 51939-022			
Pin1	Address bit 0	模块地址线	3
Pin 2	Address bit 1	模块地址线	3
Pin 3	Load share +	模块均流线	3
Pin 4	NC	NC	4（保留）
Pin 5	Current limit	限流信号	3
Pin 6	Current limit	限流信号	3
Pin 7	Address bit 2	模块地址线	3
Pin 8	Address bit 3	模块地址线	3
Pin 9	Load share -	模块均流线	3
Pin 10	+5V	RS485 电源+	3
Pin 11	+5VGND	RS485 电源-	3
Pin 12	RS485-	模块通讯线	3
Pin 13	Address bit 4	模块地址线	3

管脚	定义	功能	接触顺序
Pin 14	NC	NC	3（保留）
Pin 15	RS485+	模块通讯线	3
Pin 16	Address GND	地址线 GND	3
见图 1	Pre-charge	预充电	1
见图 1	DC+	模块输出 48V+	2
见图 1	DC+	模块输出 48V+	2
见图 1	DC-	模块输出 48V-	2
见图 1	DC-	模块输出 48V-	1

说明：

1．Load share+和 Load share-是多模块并联时负载均分的信号线。为减小外界干扰其长度应尽量短，推荐小于 0.5m。

2．Pre-charge 是用于电源模块在热插拔状态下确保插针安全的信号线。

3．GND 是电源模块接保护地的端子。为确保模块工作正常及人身安全，此端子必须使用线径大于 4mm2 的黄绿双色线可靠连接到大地。

4．L 和 N 分别是电源模块交流输入的相线和中线。

5．电源模块地址定义说明：电源模块的地址范围为 0～31。Address bit 0～Address bit 4 在电源模块外部可以悬空或与接地线 GND 短接。短接代表“1”，悬空代表“0”。比如 Address bit 0 在外部与地址线 GND 短接，其他地址线悬空，则该电源模块地址为 1。

6. pin5 和 pin6 用于模块输出电流限制功能和模块型号上报功能。当 pin5 和 pin6 在插框背板上短路时，电源模块按照 EPW50-48A 外特性输出，模块上报 0x02（即 EPW50-48A(48V/50A)）；开路时，电源模块按照 EPW30-48A 外特性输出，模块上报 0x01（即 EPW30-48A(48V/30A)）。

6 安装与使用

安装尺寸参见图 2，按照以下步骤安装电源模块：

1．确定电源模块的手柄处于打开状态。

2．把电源模块放在插框相应的插槽中。

3．滑动电源模块直到模块和插框背板的接口接触。

4．推动电源模块手柄，直到模块全插入框中。此时模块手柄翘起，锁住模块。

5．使用一字螺丝刀紧固把手上的螺钉，模块安装完毕。

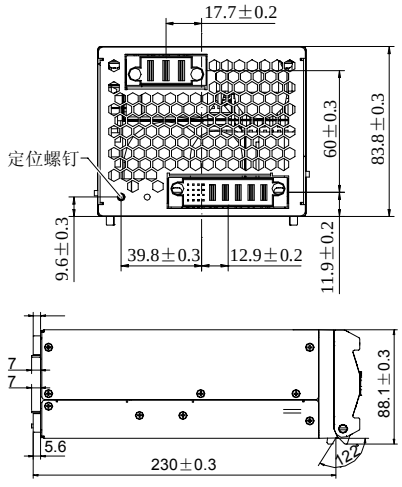


图 2 电源模块安装尺寸

在单个电源模块不能满足负载需要时，可以多个并联使用。并联时只需要把不同电源模块相应的输出端及均流线分别并联在一起。

7 维护

电源模块支持热插拔功能，可以在不断电的情况下更换模块。更换模块时应注意使模块插头与背板的插座对准，在感觉无法插到位的情况下应先检查模块的插针是否有碰弯和歪斜的情况。

更换电源模块：电源模块具有锁定机构，可以与外部的机箱配合以便能够将模块固定在位置上。拔出模块时需要先拉起模块面板下部的拉手，然后向外抽出即可。推入时不必拉起拉手，直接将模块平稳推入，直到完全推入和机构锁住。

电源模块采用整机替换的方式进行维护。

8 故障处理

损坏的电源模块退回艾默生公司进行修理。简单故障可参见表 3 进行处理。

表 3 面板指示灯与故障处理

LED	正常	异常	异常原因	处理方法
绿灯	亮	灭	无交流输入或输入保险管损坏以及模块故障和各种保护状态	检查模块负载、输入电压、输入保险、环境温度、模块的风扇，排除模块保护原因
红灯	灭	亮	模块关机故障	
黄灯	灭	亮	模块温度预告警，休眠关机	

注意

1. 为避免着火危险，请使用相同型号和规格的保险管进行替换。
2. 模块中使用了双极/零线保险管设计。
3. 模块前级需安装空气开关，推荐使用 220V/32A 及以上的空气开关。
4. 技术指标等如有更改恕不另行通知。
5. 质量保修 1 年。

有毒有害物质或元素标识表

部件名称	有毒有害物质或元素					
	铅	汞	镉	六价铬	多溴联苯	多溴联苯醚
	Pb	Hg	Cd	C^{6+}	PBB	PBDE
制成板	×	○	○	○	○	○
线缆	×	○	○	○	○	○
○：表示该有毒有害物质在该部件所有均质材料中的含量在 SJ/T-11363-2006 规定的限量要求以下 ×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T-11363-2006 规定的限量要求						
艾默生网络能源有限公司一直致力于设计和制造环保的产品，我们会通过持续的研究来减少和消除产品中的有毒有害物质。以下部件或应用中含有有毒有害物质是限于目前的技术水平无法实现可靠的替代或者没有成熟的解决方案： 1．制成板中的所有焊料含有铅，制成板上元器件的铜合金中含有小于 4%的铅 2．线缆的铜合金中含有小于 4%的铅						
适用范围：EPW50-48A-E 电源模块						

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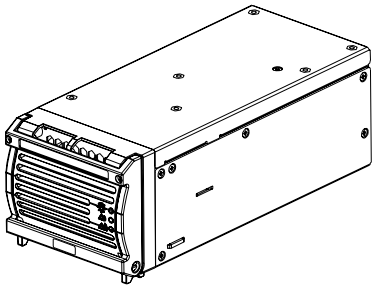
EPW30-48A-E Power Module

User Manual



1 Features

EPW50-48A-E power module (module for short) uses soft-switching and input / output soft start-up technology. Its output can be regulated through monitoring. Multiple modules can be paralleled to share the load.

Dimensions (H × W × D): 88.2mm × 102.8mm (105.5mm with enclosure) × 242.3mm (excluding socket dimension)

Weight: < 2.8kg

Mechanical stress: ETS300019-2

Safety: meet UL 60950-1,C22.2 NO. 60950-1, EN 60950-1

2 Environment

Operation temperature: -33 to 65°C;

Storage temperature: -40 to 70°C

Humidity: 5 ~ 95% (non-condensing)

Air pressure: 86 ~ 106 kPa

Altitude: < 4000m; Cooling: fan cooling

Vibration: random vibration in 2 ~ 500Hz in three orthogonal axes, 30 minutes in each direction

3 Electrical Specification

Input

Rated input: 200 ~ 240Vac / 115 ~ 130Vac

Input current: Max. 18.5A for single module

Rated frequency: 50 / 60Hz

Power factor: no less than 99% (rated operation condition)

Output

Rated output: 53.5Vdc (output range: 43.2 ~ 57.6Vdc)

Output power: 2900W（176Vdc ~ 300Vdc）

1200W（90Vdc ~ 175Vdc）

Efficiency: ≥ 92% (220Vac input and 53.5V/2900W output)

≥ 86% (110Vac input and 53.5V/1200W output)

Line regulation: ≤ ± 1%; Load regulation: ≤ ± 1%

Mains regulation: ≤ ± 0.1%

Psophemetic noise: ≤ 2mV

Broadband noise: ≤ 100mV (3.4kHz ~ 150kHz)

≤ 30mV (150kHz ~ 30MHz)

Output ripple (p-p): ≤ 200mV (0 ~ 20MHz bandwidth with load no less than 1A)

Discrete noise: ≤ 5mV (3.4kHz ~ 150kHz)

≤ 3mV (150kHz ~ 200kHz)

≤ 2mV (200kHz ~ 500kHz)

≤ 1mV (500kHz ~ 30MHz)

4 Protection

Refer to Table 1 for the protection functions.

Table 1 Protection functions

Input overvoltage protection	The module will send alarm and shutdown when the input is above 305Vac; and recover when the input drops down 300Vac
Input undervoltage protection	The module will send alarm and shutdown when the input is below 85Vac; and recover when the input increases above 90Vac
Output overvoltage protection	The protection point is 58.5 ~ 60.5Vdc. The module will shutdown to lock upon the overvoltage status. Restart the module after the protection is removed
Current limit protection	The module has current limit protection:2900W (176 ~ 220Vac input); 1200W (90 ~ 175Vac input)
Short circuit protection	The module has short circuit protection. The module output 61A upon shortcircuit. The module will recover when the fault is removed
Overtemperature protection	The module will send alarm and shutdown when the testing temperature is above 116°C; and recovery when the temperature is under 110°C

The module will send alarm through alarm indicators upon input over- and under- voltage, output over-voltage, and module fault.

5 Input And Output Connectors

EPW50-27A-E power module connects to user system through its interfaces: AC input socket (FCI, 51939-021); DC output socket (FCI, 51939-022), which also serves as the signal interface. Their pin locations are shown in Figure 1 and pin definitions are listed in Table 2.

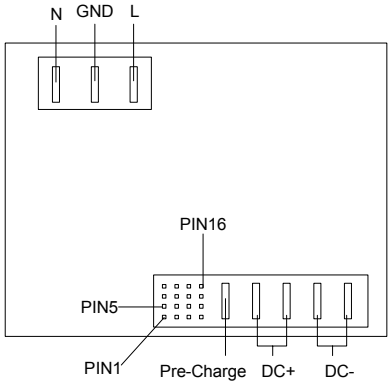


Figure 1 Pin location

Table 2 Pin definition

Pin	Definition	Function	Contact sequence
AC input (FCI 51939-021)			
See Fig.1	L	Live line	2
See Fig.1	GND	Protect earth	1
See Fig.1	N	Neutral line	2
DC output (FCI 51939-022)			
Pin1	Address bit 0	Address	3
Pin 2	Address bit 1	Address	3
Pin 3	Load share +	Share bus	3
Pin 4	NC	Not connected	4(reserved)
Pin 5	Current limit	Current limit	3
Pin 6	Current limit	Current limit	3
Pin 7	Address bit 2	Address	3
Pin 8	Address bit 3	Address	3
Pin 9	Load share -	Share bus	3
Pin 10	+5V	RS485 power+	3
Pin 11	+5VGND	RS485 power-	3

Pin	Definition	Function	Contact sequence
Pin 12	RS485-	RS485-	3
Pin 13	Address bit 4	Address	3
Pin 14	NC	Not connected	3 (reserved)
Pin 15	RS485+	RS485+	3
Pin 16	Address GND	Address GND	3
See Fig.1	Pre-charge	Precharge	1
See Fig.1	DC+	Output 48V+	2
See Fig.1	DC+	Output 48V +	2
See Fig.1	DC-	Output 48V -	2
See Fig.1	DC-	Output 48V -	1

Explanations:

1. Load share+ and Load share- are load-sharing signal cables when multiple modules work in parallel. They should be well grounded and shorter than 0.5m.

2. Pre-charge is the signal cable protecting pins upon online removal/insertion.

3. GND is the module terminal connecting ground. Use yellow-green bicolor cable with sectional area of 4mm2 or more. Connect it to the ground reliably.

4. L and N are the live line and neutral line of AC input.

5. Address explanation: The address range of the module is within 0 ~ 31. Address bit 0 ~ address bit 4 can be suspended or connect to GND outside module. Suspending presents “0”, and short to GND presents “1”. For example, if Address bit 0 is shorted with GND outside the module and other addresses are suspending, the module address is 1.

6. Pin5 and Pin6 are used to limit the output current and report module model. The module will output according to the external characteristic of EPW50-48A module and send “0x02” (EPW50-48A) to the monitoring module when the pin5 and pin6 are shorted from the back board on the subrack. Otherwise, the module will output according to the external characteristic of EPW30-48A module and send “0x01” (EPW30-48A) to the monitoring module.

6 Installation And Operation

The installation dimensions refer to Figure 2. Install the module using the following procedures:

1. Make sure the handle of the module is open.

2. Put the module into the corresponding slot.

3. Push the module until the module interfaces contact the interfaces on the backboard.

4. Push the handle until the module is completely inserted into the subrack. At this point, the handle tilts up slightly locking the module into the subrack.

5. Fix the screws on the handle using a screwdriver to finish the module installation.

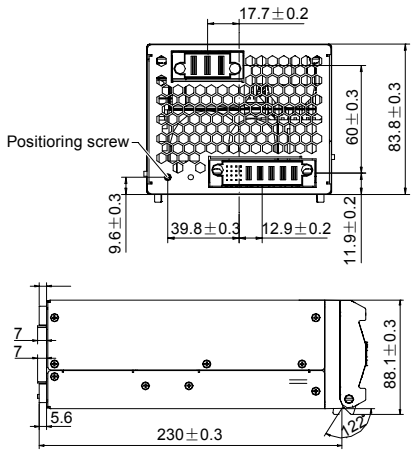


Figure 2 Installation dimensions (mm)

Where a single module cannot meet the load demand, multiple modules can be connected in parallel to share the load. In this case, just connect all the output connectors and load sharing cables of the modules respectively in parallel.

7 Maintenance

The module is hot-swappable. The damaged module can be replaced during the system operation. Locate the module pins in the backboard socket when replacing the module. Check whether the pins are bent or skew when the module can not be inserted into the socket properly.

Replacing the module: the module has a lock structure matching the external chassis to lock the module in place. When taking out the module, just pull up the handle on the bottom of the module front panel and pull it out. When installing the module, insert the module along the slot smoothly until the lock structure locks the module.

The whole unit should be replaced if maintenance is needed.

8 Troubleshooting

You may contact the nearest Emerson local sales office or service center if the unit is faulty. Do not manage by yourself. Please return the faulty unit to Emerson directly for repair. Table 3 is troubleshooting of simple problems.

Table 3 Troubleshooting

Indicator	Normal	Abnormal	Reason for abnormal	Actions
Green LED	On	Off	No AC input, or input fuse damaged, or module failure, or all protections	Check loads, input voltage, input fuse, and the fan of the module; Remove the conditions raising protections
Red LED	Off	On	Module shutdown fault	
Yellow LED	Off	On	Module temperature pre-alarm or the monitoring module controls the module to switch off	

Caution

1. For continued protection against risk of fire, replace only with same type and rating of fuse.

2. Double pole / neutral fusing.

3.An air breaker, advisably of 220V/32A or higher rating, should be installed upstream the module.

4. Specifications are subject to change without notice.

5. Warranty period: 1 year.

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