

3-Phase 115VAC Input, 5kW PFC Module

Summary and Application :

3-PHASE 115VAC Input, 5kW PFC Module is a non-isolated PFC module with input 70-127Vrms, maximum output power 5kW and efficiency as high as 97%. The protection include: output over voltage/over current and over temperature. The series meet military standard and applied on military and other harsh environment.

Application: Military, avionics, ships, submarines, radar, weapon and other harsh environment.

Features :

- ◆ Input Voltage:115Vrms L-N
- ◆ Input connection: 3-Phase 3-Wire System
- ◆ Input Voltage range : 70-127Vrms L-N
- ◆ Input Frequency Range : 360-800Hz
- ◆ Output voltage : 320Vdc
- ◆ Efficiency: 97.0% @ 50% load
96.5% @ 100% load
- ◆ Operation Temperature:-55°C-100°C
- ◆ Output over voltage, output over current and over temperature protection
- ◆ Can be paralleled with current sharing (droop version only)



Part Numbering

Part Number	Input Voltage	Output Voltage	Output Current	Parallel Mode
FPT5K0MB320R02G	115Vrms L-N	320Vdc	16A	Droop

Electrical Specifications

Parameter	Min	Typ	Max	Unit	Notes and condition
Absolute Maximum Rating					
Input Voltage					
Operating			127	Vrms	Continues input, V _{L-N}
Surge operating voltage			180	Vrms	<2s
Isolation					
Input to Output			0	V _{DC}	Non-isolation
Input to Baseplate			4000	V _{DC}	
Output to Baseplate			4000	V _{DC}	
Control signal to Output			0	V _{DC}	Control signal GND is V _{out} -
Operating Ambient Temperature	-55		100	°C	Temperature of Baseplate
Storage Temperature	-55		125	°C	
Efficiency					
50% load Input : 115Vrms		97		%	
100% load Input : 115Vrms		96.5		%	
Input Specifications					
Input Voltage Range	70	115	127	Vrms	L-N phase voltage. If output voltage exceeds 127Vdc, output voltage would be unregulated DC output, the value: Vo ~ 2.5*Vin
Input Under Voltage Lock Up					
Input Turn-on Voltage Threshold	65	70	75	Vrms	
Input Turn-off Voltage Threshold	60	65	70	Vrms	
Input Over Voltage Lock Up					
Input Voltage Frequency Range	360	400	800		
Max. Input Current			17	Arms	V _{in} =115Vac, full load
Input Surge Current			20	A	V _{in} =130Vac, each phase
Power Factor					
		0.99			I _o =100%,115VAC
		0.98			I _o =50%,115VAC
THD		3		%	I _o =100%,115VAC
Output Specifications					
Output Voltage Set Point	327	330	333	V	I _o =5%
	317	320	323	%	I _o =95%
Output droop		-10			I _o : 5% =>95%

Electrical Specifications

Parameter	Min	Typ	Max	Unit	Notes or Conditions
Output Specifications					
Max. Output Current			18	A	
Max Output Power		5000		W	Vin>110Vac, if output power exceeds power limit, output voltage would be decreased for power limit.
		4000		W	Vin>90Vac
		3000		W	Vin>70Vac
Output Over-voltage Trip Point	350	360	370	V	When trip protection, output voltage would decrease to unregulated DC voltage (Vo ~ 2.5*Vin), module would restart in 0.5s
Output Current-limit trip point	17	18	19	A	When trip protection, module would restart in 0.5s with load off. With load on, the module would not start and it would restart after cut off the load.
Output Regulation:					
Line Regulation		0.5	1	%	
Temperature Regulation	-1	0.2	1	%	Ta = -55°C~100°C
Output Ripple & Noise Voltage					
Peak-to-peak		3	5	Vp-p	With 100µF capacitor outside
RMS		1	3	Vrms	With 100µF capacitor outside
External Load Capacitance	0		1000	µF	With 22µF high frequency capacitor inside the module, recommend to add 100µF capacitor outside
Dynamic					
Dynamic Response					
Peak Deviation		5	10	V	Load 50%~75%~50% ; 50%~25%~50% ;
Recovery Time		2	5	mS	
Output Rise Time		2000		mS	With 1000µF capacitor/Output
Startup Delay		500		mS	Without capacitor/Output
Thermal Shutdown					
Semiconductor junction Temp			125	°C	
Over Temperature Protection		120		°C	Internal test point
OTP Recovery		100		°C	Internal test point
General specification					
PWM Frequency	180		800	kHz	
Parallel units	1		5		
Weight		700		g	

Port Function Description	
ON/OFF	On input port, ON/OFF>2V or float, module power on; ON/OFF<0.7V or connect GND, module power off. The voltage to drive ON/OFF<5V
PG	On output port, PG>4V indicate normal output; PG<1V indicate abnormal output. Max. output voltage/current of PG is 5V/10mA
GND	Signal reference GND, equipotential to Vo-

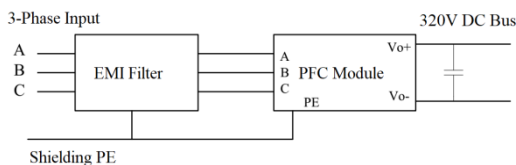
Feature Description & Application

EMI Filter

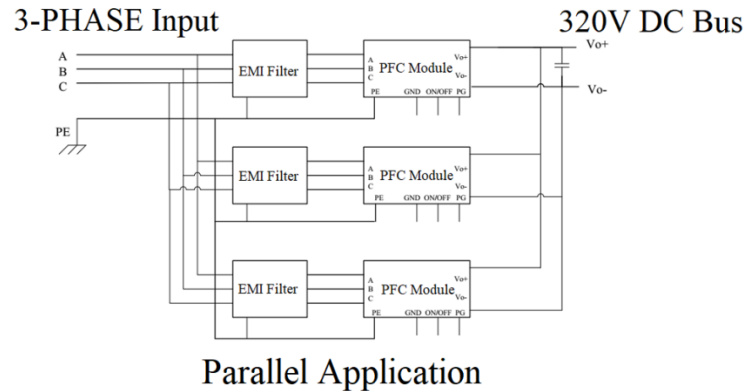
An additional external EMI filter is needed to achieve good EMC performance. Generally EMI filter is composed of a differential mode (DM) inductor and a common mode (CM) inductor. The DM inductor should be close to PFC module. If the CM inductor is close PFC module, the CM inductor should have 5μH differential mode component value. And the output of the EMI filter should not be placed with a capacitor, that is, the EMI filter should be directly connected to the input of the PFC module with a differential mode inductor above 5μH.

The AC input of PFC is a three-phase three-wire system, so the neutral wire should not be connected. PE is the module shell, which can be connected to the shell of the EMI filter and the shielding ground of the system.

For parallel application, it would be better to connect an independent filter to each module. Typical applications are shown as follows:



One Unit Application



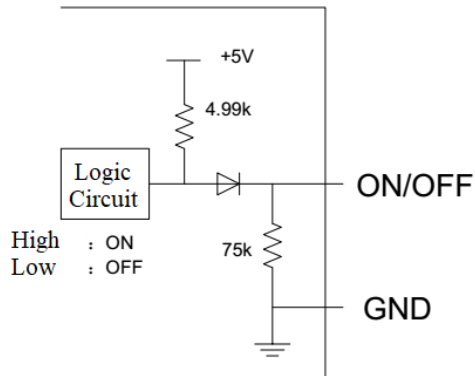
Parallel Application

In parallel application, each PFC module has separate voltage feedback and PWM frequency. The output voltage droop mode secures the current sharing.

ON/OFF Circuit

The PFC module can be turned on and off by changing the voltage between the ON/OFF pin and GND. ON/OFF PIN is internally connected to GND through a 75KΩ resistor. The input of the logic circuit is pulled up to +5V through a 4.99KΩ resistor. When ON/OFF is float or at high logic level, the logic circuit is pull up to high level, PFC module is ON. When ON/OFF switch to low logic level or shorted to GND, the logic circuit is pull down to low level, PFC module is OFF. The internal ON/OFF circuit please refer below

figure,

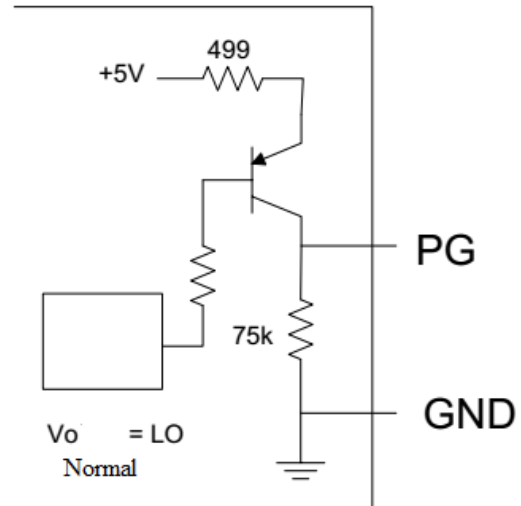


The reference ground of ON/OFF is GND which connects to Vo- internally and is equipotential to Vo-.

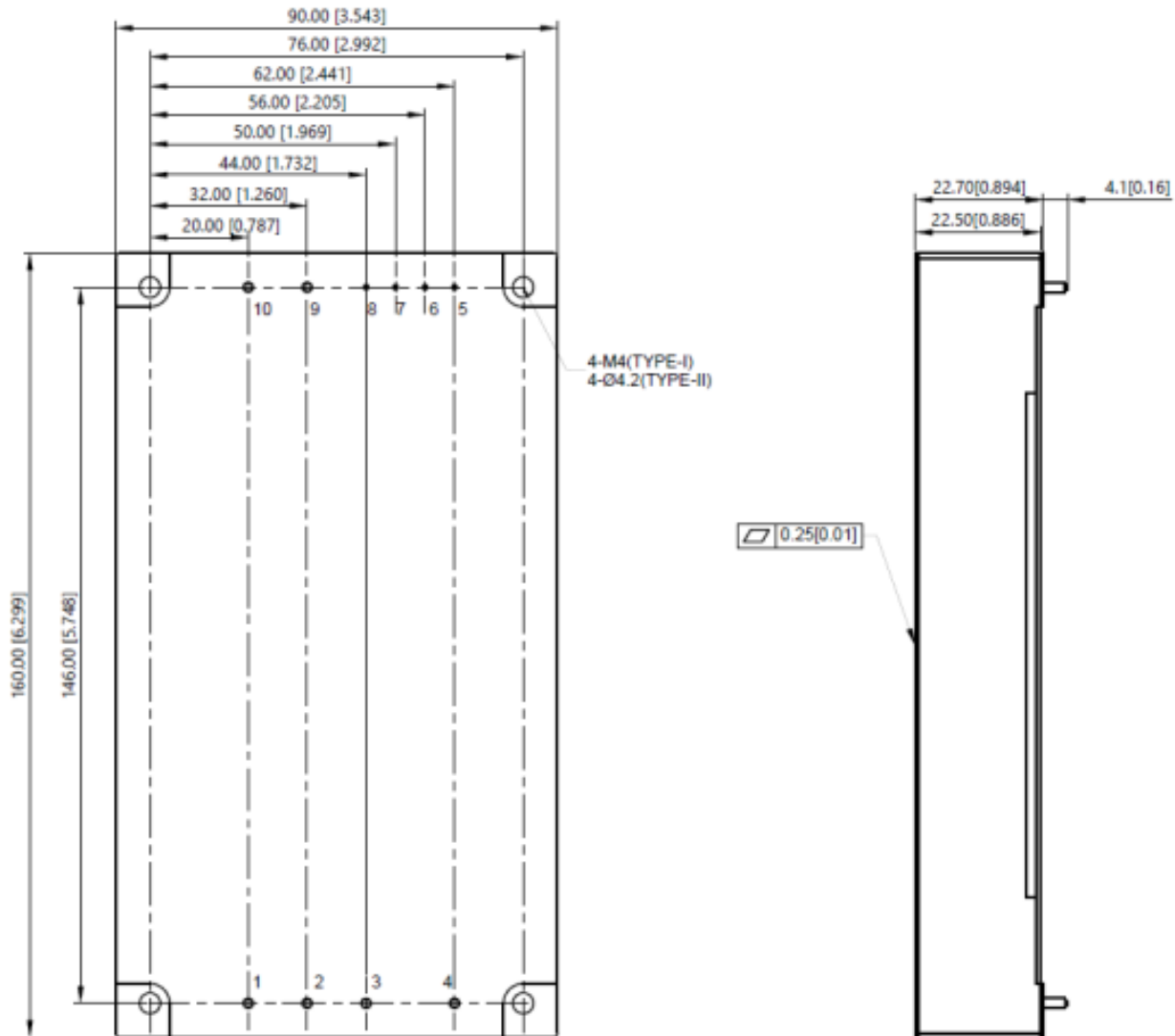
PG (Power Good)

The PFC module monitors Vo. When the output voltage is within 90%-110% of normal output, monitoring circuit will turn to low level and PG will pull up to +5V through a

499Ω resistor which limit the max current to 10mA. The reference ground of PG is GND, which connected to Vo- internally and is equipotential to Vo-.



Mechanical Dimension



Pins 5-8: Ø1.00mm[40mil]; Pins 1-4, 9-10: Ø2.00mm[80mil]
 单位(Unit): mm[inch];
 误差(Tol.): X.X±0.5mm [X.XX±0.02inch], X.XX±0.25mm [x.xxx±0.010inch].