PST21C

ACDC 300W Standard product

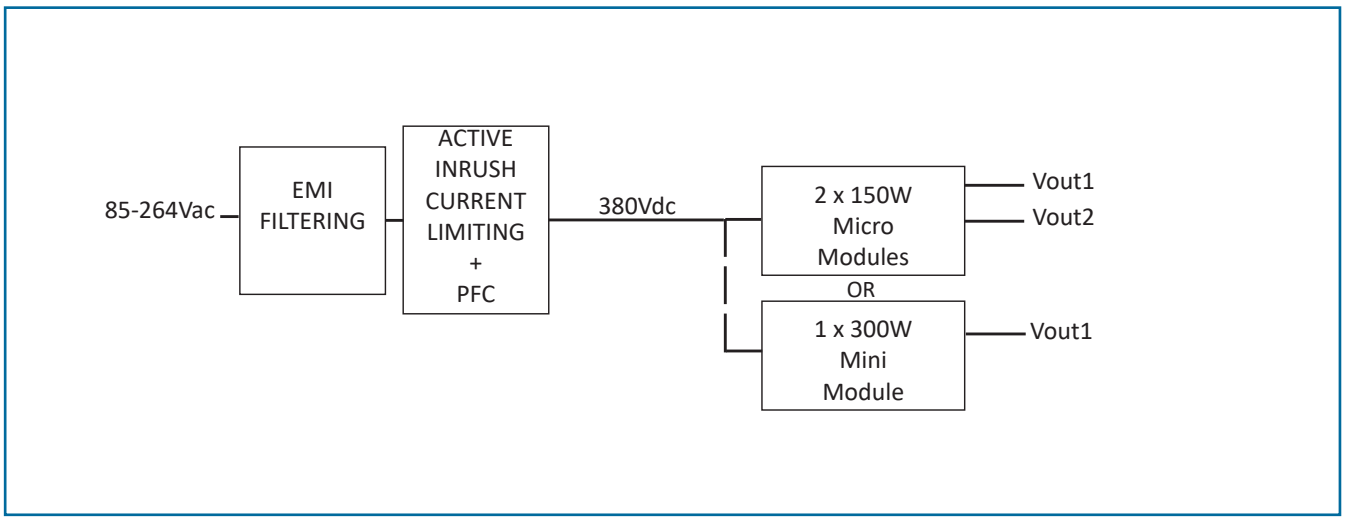
85-264Vac, 47-440Hz Input voltage ranges , PFC
100-350 Vdc input voltage operation
1 to 2 isolated outputs
Active very low inrush current limiting circuit
200*80*40mm very low profile
Industrial or ruggedizzed for hard environment
Many output configurations available
Conduction cooled 100°C baseplate

Safety IEC/EN 60950-1, RoHS lead-free-solder compliant

Description

The PST21C, very compact and low profile 300W AC-DC power supply in chassis format, incorporates input filtering, input and output protections, very robust mechanical mounting and connection, conformal coating and MIL-STD options required in most of the severe environment for industrial, defense applications. The PSU provides high reliability thanks to the integration of Vicor Corp. modules, high efficiency, input-to-output isolation, soft start and ***active very low inrush circuit***, overtemperature protection, input over/undervoltage lockout. The PSU is configurable with 1 to 2 outputs in many output voltages from 3.3V to 48Vdc, other outputs are even possible as semi-standard versions, they are countinuously short-circuit proof. The 100°C baseplate allows operation in high temperature environment.

Bloc diagram



Options Description

MIL-STD ruggedized (-M)

Meet MIL-STD 461E CE102, MIL-STD 1399-300A, MIL-STD810E shock & vibrations. No Laboratory certification.

-40°C operation (-T)

The thermal grade of the Vicor the DC/DC converters used and other components are changed to comply with low ambiant temperature.

Conformal coating (-V)

During manufacturing process , when V option is specified, components and pcb are covered with an acrylic coating to address high level of ambiant humidity application.

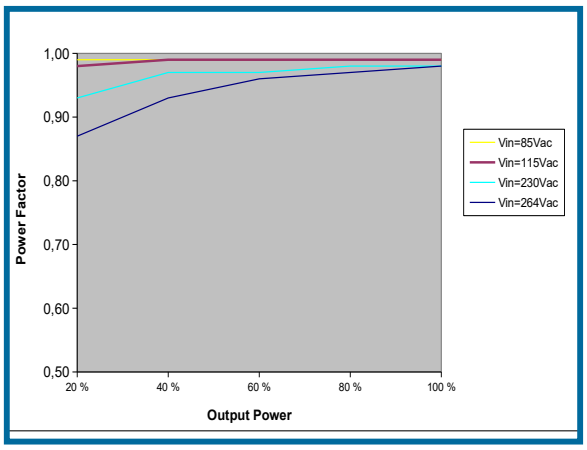
Heatsink (-H, -H1)

-H: a 15 mm heatsink is mounted on the baseplate with longitudinal fins.
-H1: a 15 mm heatsink is mounted on the baseplate with transversal fins.

IP option (-IP)

Full IP65 enclosed mecanical available.

Power factor curve - PST21C-28150-28150



Input

Electrical Input Data

Input					Unit
Characteristics	Conditions	min	typ	max	
Operating input voltage		85		264	Vac
Operating input voltage		100		350	Vdc
Frequency		47	50	440	Hz
Power Factor	230Vac, 50Hz, Pnom.		0,96	0,98	
Input current	At Vin min			5	A
No-load input power	At Vin typ		8		W
Peak inrush current	Vin max			5	A
Start-up time				2	s

Input Fuse

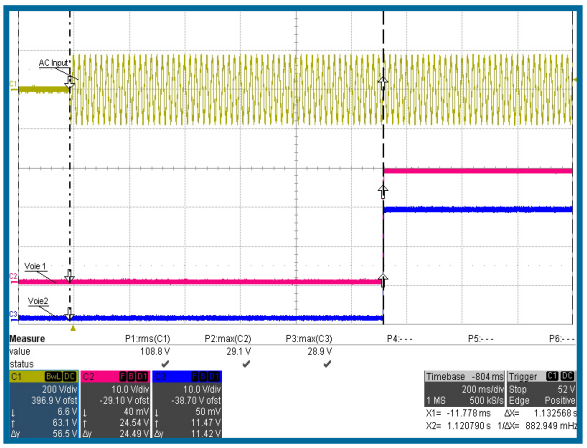
A fuse mounted inside the psu protects against damages in case of a failure. The fuse is not user-accessible without opening the unit. In DC mode, reverse polarity at the input is protected and will not cause the fuse to blow .

Model	Fuse type	Rating	Reference
PST21C	Schurter	5A	3403.0173

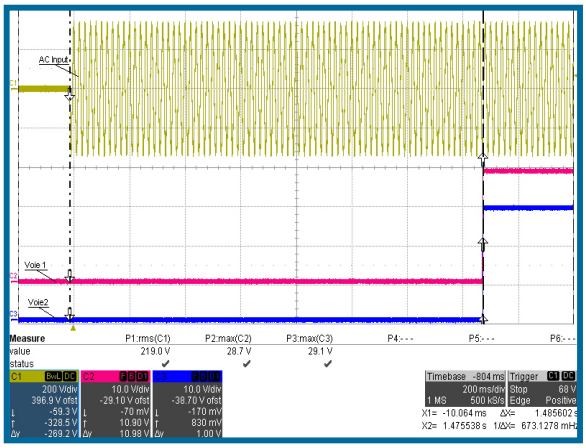
Input Transient Protection

A VDR (Voltage Dependent Resistor) and a common mode input filter form an effective protection against input transients in severe environments.

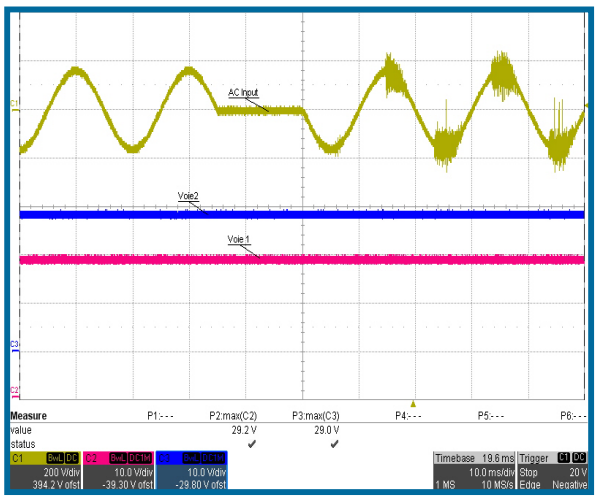
Establishment time curve 115Vac 50Hz - PST21C-28150-28150



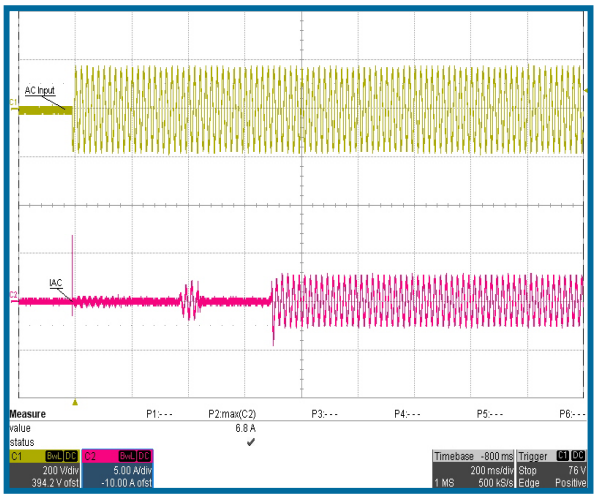
Establishment time curve 230Vac 50Hz - PST21C-28150-28150



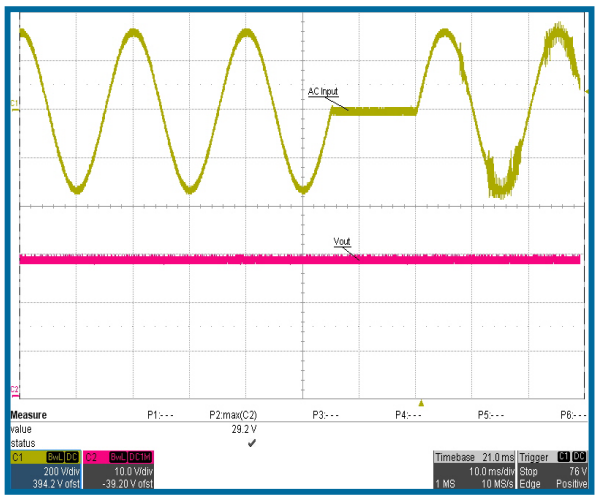
Input power brake at 115Vac 100% Load - PST21C-28150-28150



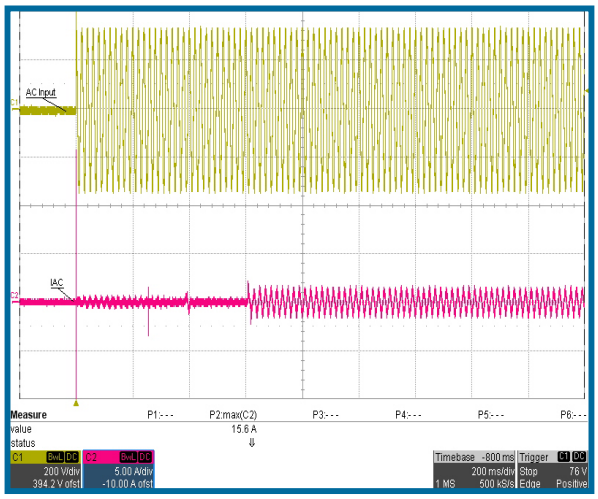
Inrush current at 115Vac - PST21C-28150-28150



Input power brake at 230Vac 100% Load - PST21C-28150-28150



Inrush current at 230Vac - PST21C-28150-28150



Output

Electrical Output Data

General conditions : 25°C ambiant. For each output voltage, max power configuration.

PST21C can be equipped with one of the two boards of the models below.																							
Output		**3V3**			**5V**			**12V**			**15V**			**24V**			**28V**			**48V**			**Unit**
Characteristics	**Conditions**	**min**	**typ**	**max**	**min**	**typ**	**max**	**min**	**typ**	**max**	**min**	**typ**	**max**	**min**	**typ**	**max**	**min**	**typ**	**max**	**min**	**typ**	**max**	
Output voltage			3,3			5			12			15			24			28			48		V
Trim range	Factory set	3		3,6	4,5		5,5	10,8		13,2	13,5		16,5	21,6		26,4	25,2		30,8	43,2		52,8	V
Overvoltage protection				4,5			6,5			14,9			18,5			29,1			34			58	V
Output noise	20MHz		100			100			150			150			150			150			200		mVpp
Efficiency			75			83			85			84			84			83			84		%
Load Regulation	Vin nom.			1			1			0,5			0,5			0,4			0,4			0,4	%
Mini Board (m)		**Each board includes 1 Mini module below**																					
Output current		0		45	0		40	0		25	0		20	0		12,5	0		10,7	0		6,25	A
Max. power				150			200			300			300			300			300			300	W
Output current limit			54	64		46	52		29	35		23	26		14,5	17		12,5	14,5		7,2	8,2	A
Micro Board (µ)		**Each board includes 1 or 2 Micro modules below**																					
Output current		0		22,7	0		20	0		12,5	0		10	0		6,25	0		5, 3	0		3,1	A
Max. power				75			100			150			150			150			150			150	W
Output current limit			25	31		23	26		14,5	17		11	14		7,2	8,2		6,2	7		3,6	4,4	A

See "options and configurations" section for all the power possibilities.

Parallel operation & current share

Parallel operation is possible between different units for Miniboards only with active current sharing through the PR signal. The outputs put in parallel **MUST** be exactly the same, all OUT+ connected together and all OUT- connected together when PR are linked (risk of damage otherwise).

Redundant Systems Operation

When systems require a very high level of reliability and should work normally in the event of a failure, N+1 redundancy is implemented where N is the number of converter to support power requirement. If one converter fails, the remaining ones still delivers the power to the loads.
Redundant operation requires external oring diodes.

Hold-up time

The psu provides internal hold-up time (see curve).

Output Current Limitation

All outputs are continously protected against short-circuit by a constant current limitation (no foldback) with automatic recovery. See Page 3 for values.

Thermal Considerations

When a converter is mounted in conduction cooled, the temperature measured on the baseplate should not exeed 100°C.
When heatsink option is used in convection cooling and is operating at its nominal output power at the max. ambiant temperature, the temperature measured on the heatsink should not exceed 100°C.

Thermal protection

A temperature protection (OTP) is integrated in each output module, disabling output when baseplate temperature exceeds 105°C (+/-5°C). The converter automatically restarts, when the temperature drops below 70°C . Nevertheless, exceeding the max operating temperature may cause failures of the converter.

Overvoltage protection

An OVP is incorporated on each output configuration. Outputs is cut if an OVP is detected. This protection is latch style (Recovery after AC reset or inhibit).

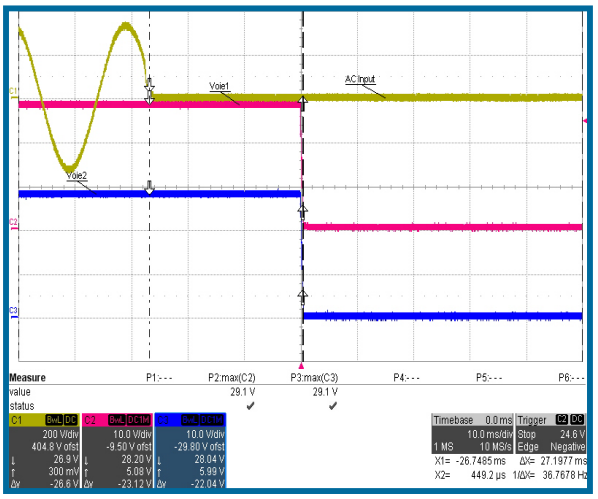
Auxiliary Functions

Remote On/Off (INHIB)

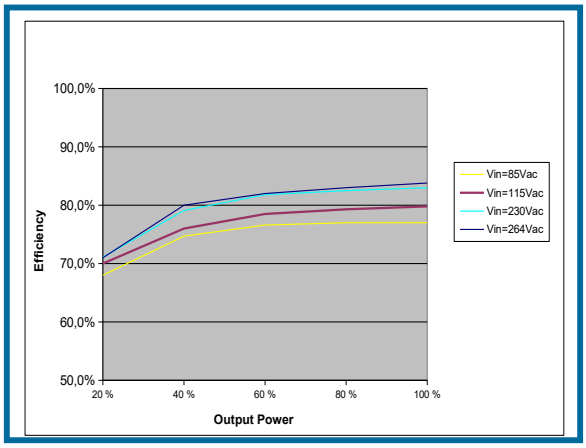
An isolated INHIB signal disables all output voltage when connected to RTN (TTL signal or closed contact). Outputs inhibited : INHIB level LOW.
Additionnaly, in case of microboard with two outputs, it is possible to control each output separately with INHIB1 and INHIB2 (for revision IND02 and above).

As semi standard version, an inversion of the inhibition level is possible, please consult factory.

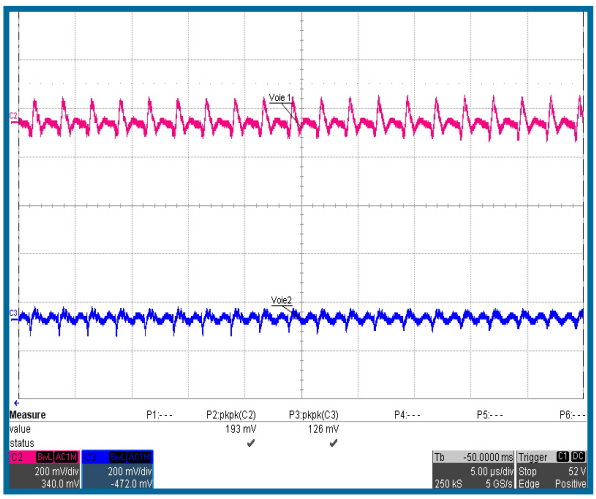
Hold up time at 230VAC, 100% load - PST21C-28150-28150



Efficiency curve - PST21C-28150-28150



Output Noise - PST21C-28150-28150



Output Voltage Adjustment (ADJ)

A potentiometer at the output side allows output voltage variation from -10% to +10% of Vnom. The TRIM signal allows output voltage to be adjusted by an external voltage 1,15 to 1,25Vmax voltage referenced to -OUT.

Remote Senses (+S -S)

This feature enables compensation of voltage drop across the connector contacts and the load lines. Remote Sense, max 0,5V per line compensation (If local sense, connect locally S+ to OUT+ and S- to OUT- of the corresponding output).

Output type	Total drop	Positive line drop
V1, V2	< 0.5V	< 0.25V

PowerGood & LED (Pgood)

Collector isolated optocoupled signal referenced to RTN, closed when all outputs voltages are OK (30Vdc max).
Led is also available for each output.

AC FAIL

Collector isolated optocoupled signal referenced to RTN (30Vdcmax), closed when AC input voltage is present and input power factor correction circuit in normal operation .

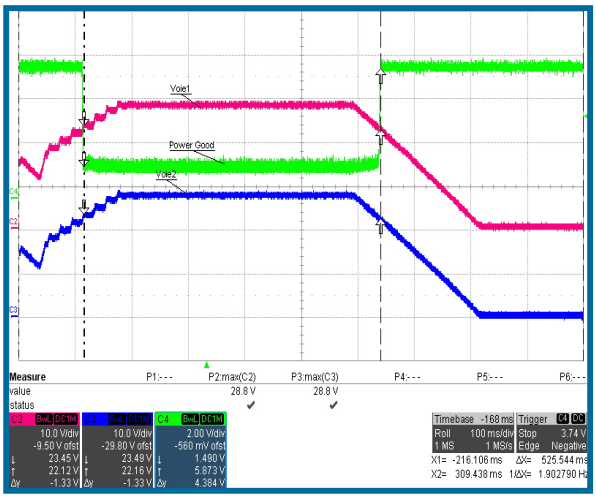
Auxiliary bias voltage (+5VAUX)

Auxiliary supply limited to 200mA, signal referenced to RTN

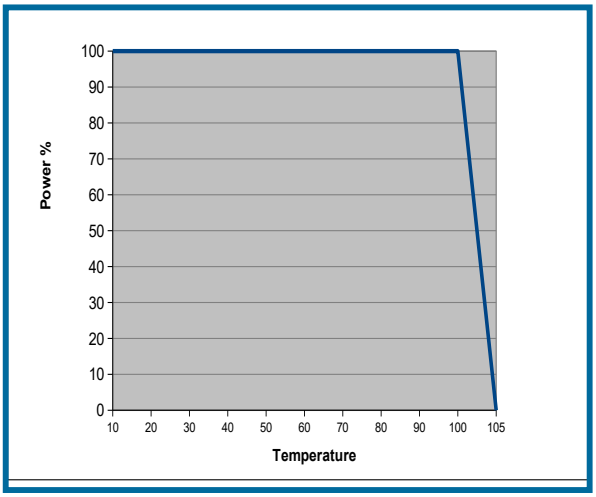
Paralleling signal (PR1)

Parallel only identical outputs (voltage and power). Outputs in parallel will current share when their corresponding PR are connected together. When outputs are coming from different boards, RTN have to be connected together.

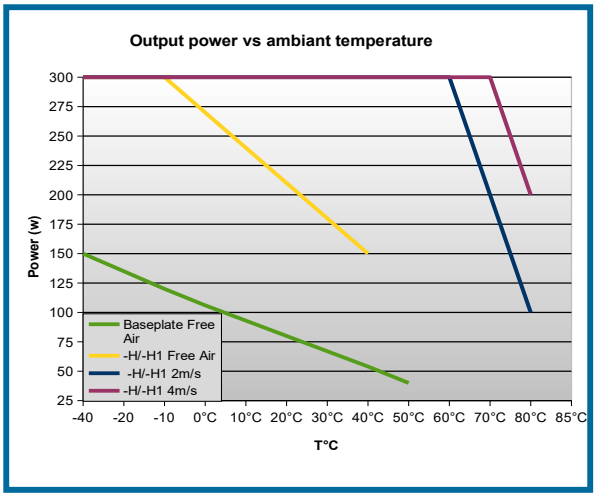
Powergood Signal - PST21C-28150-28150



Temperature Derating - PST21C-28150-28150 conduction cooled



Temperature Derating - PST21C-28150-28150 convection and air forced



Electromagnetic

Electromagnetic Immunity

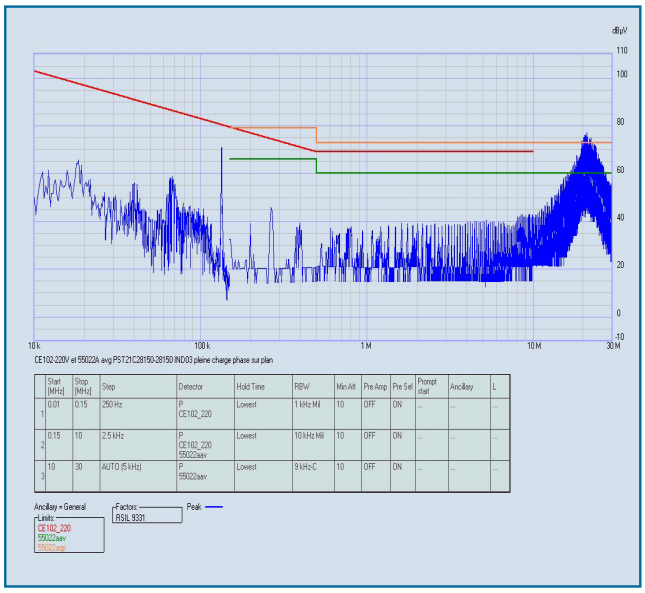
		Standard		Level	Value	Waveform	Source imped.	Test procedure	Mode	Criteria
Surges	Built to meet	EN 61000-4-5	DM	3	1KV	1,2 / 50 µs	12 ohms		OP	A
			CM		2KV	1,2 / 50 µs	12 ohms		OP	A
Electrostatic discharge (to case)	Built to meet	EN 6100-4-2		4	8000V	1 / 50µs	330 Ohms	10 pos., 10neg.	OP	B
Electrical fast transients/burst	Built to meet	EN 61000-4-4		4	4000V	5 / 50µs	50 ohms		OP	B

Note : Built to meet EN 61000-4 -3, -6, -11, Harmonics EN 61000-3-2, Flickers EN 61000-3-3

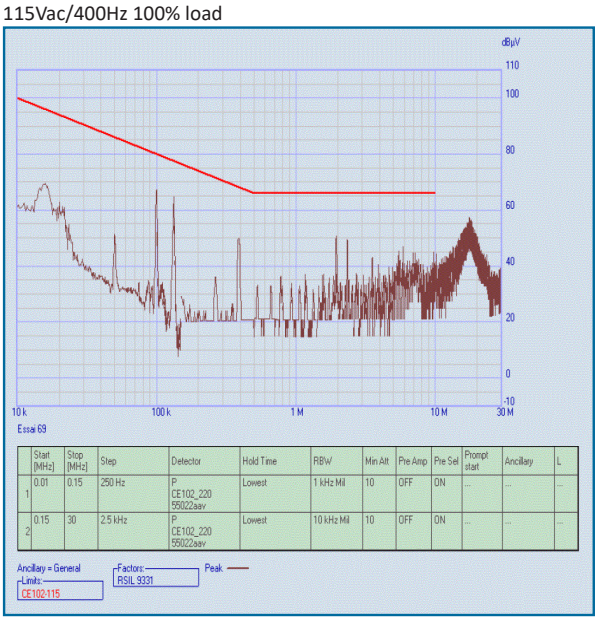
Electromagnetic Emissions

According to the voltages configuration, EMI results could change. External filter may be required to meet EN55022A or B and MIL-STD461E CE102. The figure below have been made with revision IND03, results may change with previous revision.

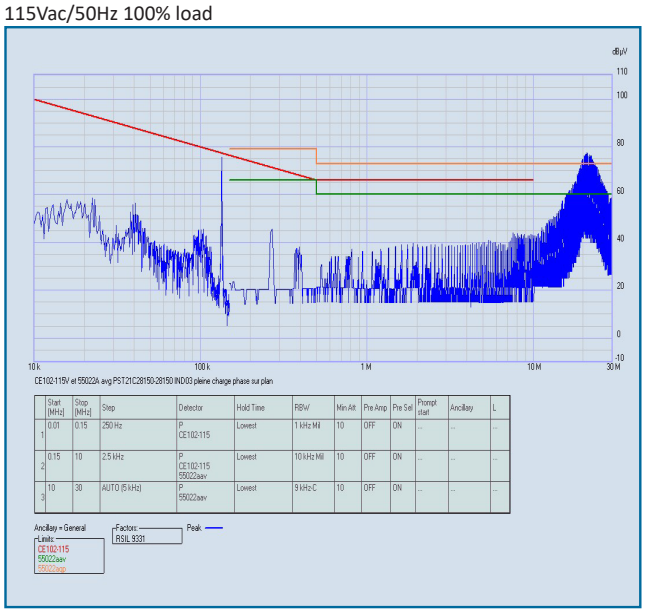
PST21C-28150-28150 IND03 EN55022 MILSTD461 CE102
230Vac/50Hz 100% load



PST21C-28150-28150 IND02 MILSTD461 CE102
115Vac/400Hz 100% load



PST21C-28150-28150 IND03 EN55022 MILSTD461 CE102
115Vac/50Hz 100% load



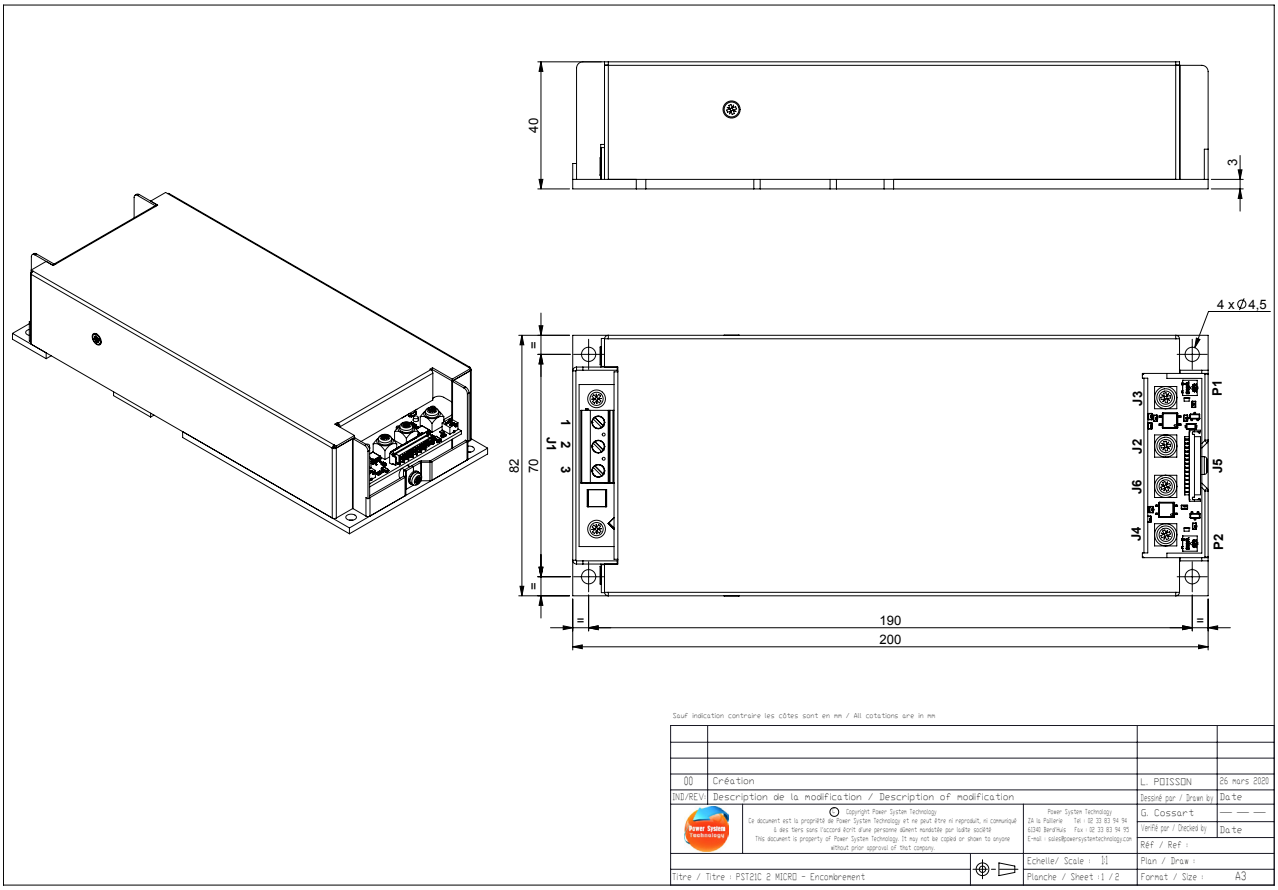
Note: For the test at 115Vac/400Hz above, the harmonics at 50kHz and 100kHz are due to the input source and should not be considered.

Immunity to Environmental Conditions

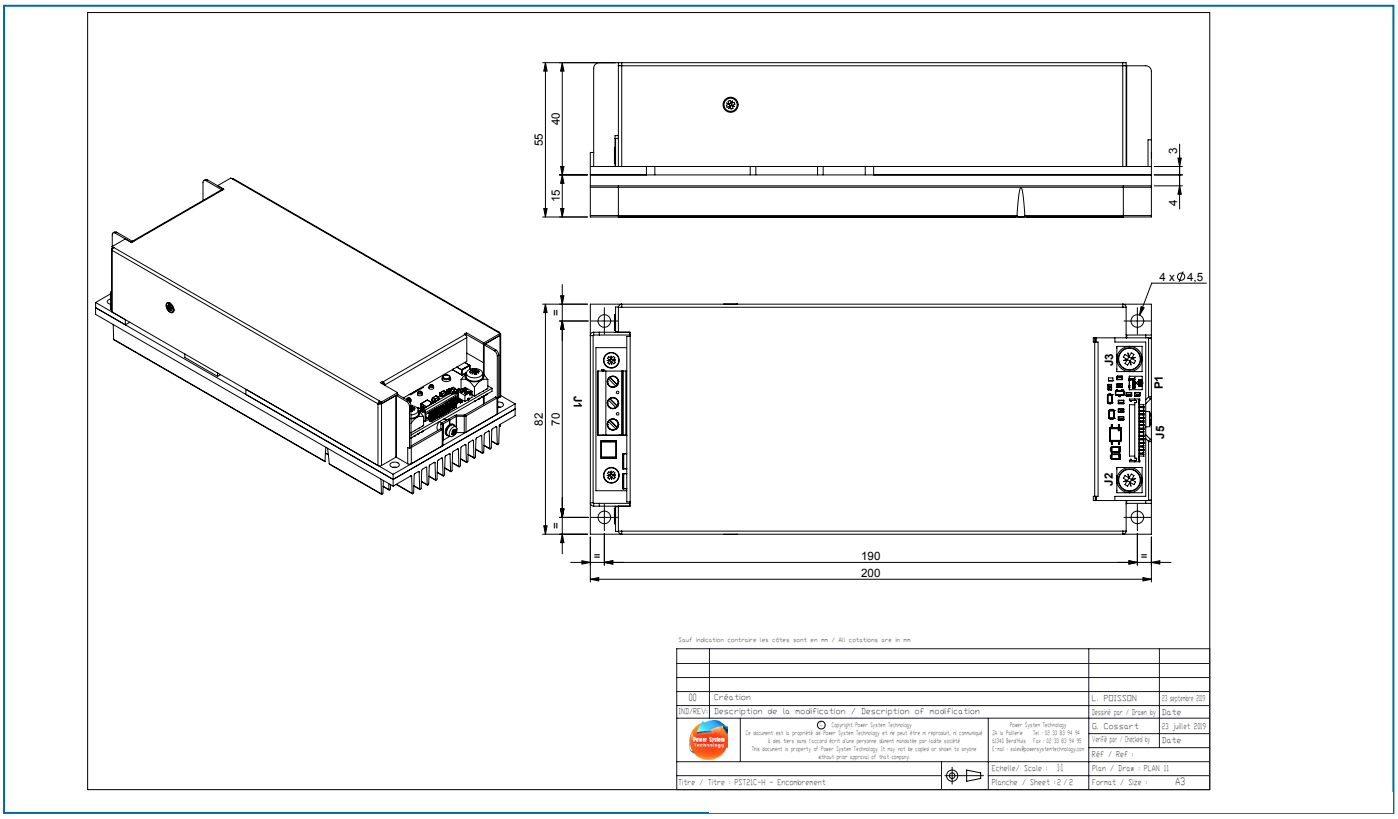
Test method	Standard	Test conditions	Status
Damp Heat	MIL STD 810F Proc. 507-2	Humidity 93 %, 40°C, 56 days	Option (-V), built to meet
Shock	MIL STD 810F Proc.516.3	20g / 18ms half size 5g / 30ms	Option (-M), built to meet
Vibrations	MIL STD 810F Proc. 514-5	4-80Hz (2,8m/s²)²/Hz, non operating 160-500Hz (0,175m/s²)²/Hz, non operating	Option (-M), built to meet

Mechanical data

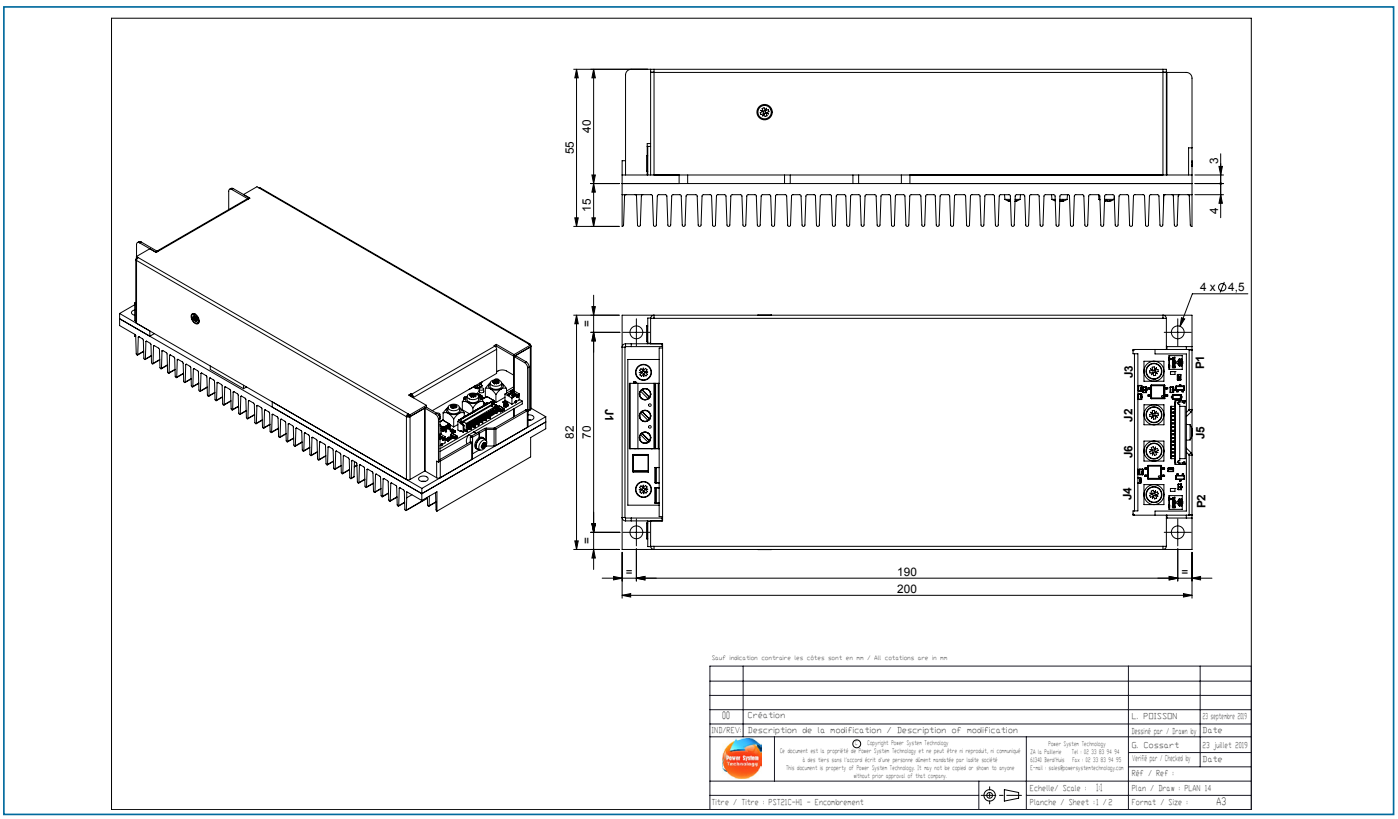
Size : 200 x 80 x 40 mm
Aluminum Natural
Weight : 660g without heatsink



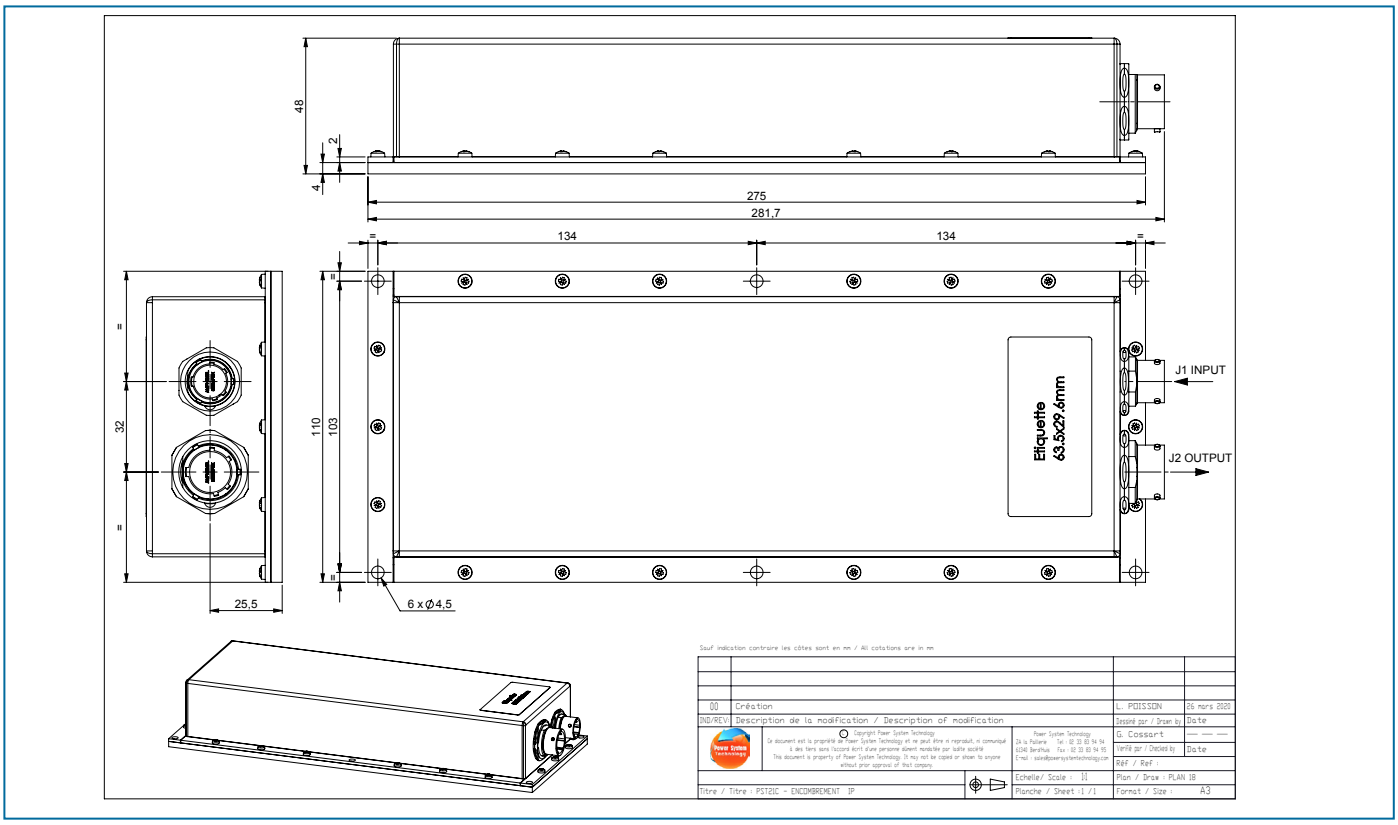
PST21C - H option



PST21C - H1 option



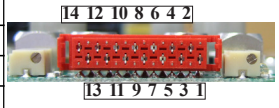
PST21C - IP option



Connector Pin Allocation

Note: PINOUT apply for revision IND02 and above. For earlier revision, for Microboard, INHIB1 and INHIB2 do not exist

	PST21C	
Description	**PIN**	**Connector**
Input Screw type connector GMKDS 3/3-7.62		
1	J1-1	Earth
2	J1-2	Neutral AC/N
3	J1-3	Line AC/L
Output Miniboard Power connectors		
OUT1+	J2	Wurth Pres Fit M4 Ref : 7461095
OUT1-	J3	Wurth Pres Fit M4 Ref : 7461095
Output Microboard Power connectors		
OUT1+	J2	Wurth Pres Fit M3 Ref : 7461093
OUT1-	J3	Wurth Pres Fit M3 Ref : 7461093
OUT2+	J4	Wurth Pres Fit M3 Ref : 7461093
OUT2-	J6	Wurth Pres Fit M3 Ref : 7461093
Signals Wurth 690368191472 Female 2*7 pins		
Microboard	**Miniboard**	
J5-1 : ACFAIL	J5-1 : ACFAIL	
J5-2 : PGOOD	J5-2 : PGOOD	
J5-3 : RTN	J5-3 : RTN	
J5-4 : INHIB	J5-4 : NC	
J5-5 : +5VAUX	J5-5 : +5VAUX	
J5-6 : S1+	J5-6 : NC	
J5-7 : S1-	J5-7 : NC	
J5-8 : ADJ1	J5-8 : NC	
J5-9 : INHIB1	J5-9 : PR1	
J5-10 : NC	J5-10 : NC	
J5-11 : INHIB2	J5-11 : INHIB1	
J5-12 : S2+	J5-12 : S1+	
J5-13 : S2-	J5-13 : S1-	
J5-14 : ADJ2	J5-14 : ADJ1	



Pin Allocation -IP option

INPUT			
Connecteurs	Type	PIN	Description
J1 INPUT	Amphenol Male 45107A106P50	A	NC
		B	AC / L
		C	NC
		D	Earth
		E	NC
		F	AC / N
OUTPUT PST21C 1 MINI (1 output 45A max.)			
J2 OUTPUT	Amphenol Femelle 451-07A1214S50	B	OUTPUT +
		C	OUTPUT +
		F	OUTPUT +
		H	OUTPUT +
		L	OUTPUT +
		M	OUTPUT +
		R	OUTPUT -
		P	OUTPUT -
		K	OUTPUT -
		E	OUTPUT -
		J	OUTPUT -
		N	OUTPUT -
		A	INHIB
		D	RTN
PST21C 2 MICRO (2 outputs 22A max.)			
J2 OUTPUT	Amphenol Female 451-07A1214S50	B	OUTPUT1 +
		C	OUTPUT1 +
		F	OUTPUT1 +
		H	OUTPUT2 +
		L	OUTPUT2 +
		M	OUTPUT2 +
		R	OUTPUT1 -
		P	OUTPUT1 -
		K	OUTPUT1 -
		E	OUTPUT2 -
		J	OUTPUT2 -
		N	OUTPUT2 -
		A	INHIB
		D	RTN

Safety & Installation

These converters are components, intended exclusively for integration into other equipment by an industrial assembly process or by a professionally competent person. Installation must strictly follow the safety regulations in respect of the enclosure, mounting, creepage and clearance distances, markings of the end-use application.
Connection to the system shall be made via the male connector Wurth.
The AC/L is internally fused. This fuse is designed to protect the converter against overcurrent caused by a failure, but may not be able to satisfy all requirements. External fuses in the wiring circuit to one or both input pins may be necessary to ensure compliance with local requirements.
Do not open the PSU, or the warranty will be invalidated. Make sure that there is sufficient thermal baseplate dissipation (max. temperature : 100°C). This should be verified by measuring the case of temperature at the specified measuring point, when the converter is operated in the end-use application.

Standards and Approvals

The converters are built to meet the safety standards IEC 60950-1, EN 60950-1.
'Built to meet' mentionned in the different paragraphs of the datasheet means that Power System Technology has designed the product to meet the standard but not certified it in a laboratory.
'Qualified' means that the test has been made in a certified laboratory.

Cleaning Agents and Process

The converters are not hermetically sealed. In order to avoid possible damage, any penetration of liquids shall be avoided.

Isolation

The electric strength test is performed in the factory in accordance with IEC/EN 60950.

Electric Strength

Characteristic		Input to Earth	Input to Output	Output to Earth	Output to Output	Unit
Electric strength	Design strength	1500	3000	500		Vrms
	Factory test for production units (>10s)	2120	2120	500		Vdc
Insulation resistance				> 100	>100	Mohms

Temperatures

		Standard			T option			Unit
Conditions		Min.	Typ.	Max.	Min.	Typ.	Max.	
Ambiant	Operating (see derating)	-20		+71	-40		+71	°C
Heatsink		-20		+100	-40		+100	
Storage	Not operating	-40		+125	-40		+125	

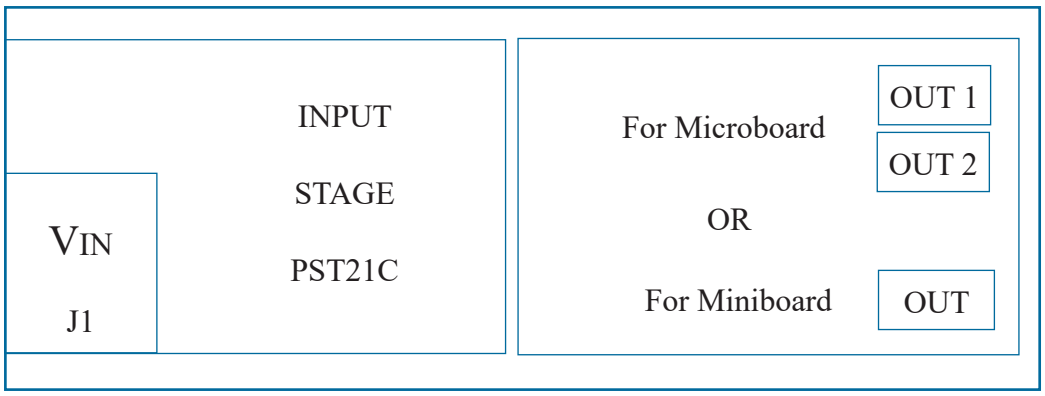
In operation, there is no power derating as long as the baseplate temperature is in the indicated range.

Reliability

MIL-HDBK-217F, notice 2	Model	Baseplate Temp.	GB	GF
MTBF (Hours)	PST21C 1 output 300W	40°C	287612	163937
		70°C	138054	80330
		100°C	85211	49807

MTBF calculation for a specific part number has to be ordered.

Options and configurations



PST21C — OUT1 [µ] OUT2 [µ] — Option

Option	
H	H : Heatsink longitunal fins
H1	H1 : Heatsink transversal fins
IP	IP : IP65 enclosure
M	M : Ruggedized
T	T : -40°C
V	V : Conformal coating

µ-µ : Microboard out1, out2 : Up to 2 outputs with micromodules from 2V to 48Vdc 150W (see table page 3)

µ V	µ W	µ V	µ W
N	N	N	N
2	50	2	50
3V3	50, 75	3V3	50, 75
5	50, 100	5	50, 100
8	100	8	100
12	75, 150	12	75, 150
15	75, 150	15	75, 150
24	75, 150	24	75, 150
28	75, 150	28	75, 150
36	75, 150	36	75, 150
48	75, 150	48	75, 150

PST21C — OUT [m] — Option

Option	
H	H : Heatsink longitunal fins
H1	H1 : Heatsink transversal fins
IP	IP : IP65 enclosure
M	M : Ruggedized
T	T : -40°C
V	V : Conformal coating

m : Miniboard out1 : Up to 1 output with minimodules from 2V to 48Vdc 300W (see table page 3)

m V	m W
N	N
2	100
3V3	100, 150
5	150, 200
8	200
12	200, 300
15	200, 300
24	200, 300
28	200, 300
36	200, 300
48	200, 300

Note: empty slots are filled with "NN". Configure your option in alphabetic order
Example :
PST21C-48150-48150-MTV
(1 microboard with 2 outputs of 48V 150W with MIL-STD, -40°C and Conformal coating option)
PST21C-3V375-5100
(1 microboard with 2 different outputs 3.3V 75W and 5V 100W)
PST21C-36300
(1 miniboard with 1 output 36V 300W)