

FlatPAC™

50 to 600W
Autoranging
AC-DC Switchers



Product Highlights

If you're looking for the convenience of a complete, low profile, agency-approved switching power supply, look no further. The FlatPAC combines Vicor's workhorse VI-200 family of DC-DC converters with a modular package and front end subassembly to provide from 50 to 600W of output power from one to three outputs.

A flat plate heatsink for use in conduction cooled applications may be specified as an alternate to the standard finned version by adding "CC" to the end of the model number.

Vicor's FlatPAC is also available with a current controlled output using BatMod converter modules of 12, 24, or 48Vdc outputs. This option is specified by appending "BM" or "BC" (for conduction cooled versions) to the end of the FlatPAC model number.

The FlatPAC's contemporary design allows us to configure your order quickly and provide rapid turnaround on standard models. It is truly a complete power solution, enabling you to spend more time designing your system and less time worrying about how to power it.

Features

- Microcontroller architecture
- Inputs: 115/230Vac autoranging
- Meets FCC Part 15, EN55022, Class B conducted emissions
- 80-90% efficiency
- Any output: 1 to 95Vdc
- Module enable/disable (except LU series)
- UL, CSA, TÜV, VDE, BABT, CE marked
- Remote sense and current limit
- BUS OK and AC OK (except LU series)
- 40mS ride-through time
- OVP and thermal shutdown
- 1 output; up to 200W
- 1 or 2 outputs; up to 400W
- 1, 2, or 3 outputs; up to 600W

FlatPAC Configuration Chart

Typical Model: VI-RU 0 1 1 - E U U U - [dots]

Input: 115/230Vac; Output 1: 5Vdc at 200W
Output 2: 12Vdc at 200W
Output 3: 12Vdc at 200W

	Total Power	Part No.	# of Converters	Dimensions
Single Outputs:				
50-200W	VI-LU	[dot] - [dot] [dot]	1	9.25" x 2.5" x 1.37" (234,8 x 63,5 x 34,8mm)
200-400W	VI-MU	[dot] - [dot] [dot]	2	9.25" x 4.9" x 1.37" (234,8 x 124,5 x 34,8mm)
300-600W	VI-NU	[dot] - [dot] [dot]	3	9.25" x 7.3" x 1.37" (234,8 x 185,4 x 34,8mm)
Dual Outputs:				
100-400W	VI-PU	[dot] [dot] - [dot] [dot] [dot]	2	9.25" x 4.9" x 1.37" (234,8 x 124,5 x 34,8mm)
150-600W	VI-QU	[dot] [dot] - [dot] [dot] [dot]	3	9.25" x 7.3" x 1.37" (234,8 x 185,4 x 34,8mm)
Triple Outputs:				
150-600W	VI-RU	[dot] [dot] [dot] - [dot] [dot] [dot]	3	9.25" x 7.3" x 1.37" (234,8 x 185,4 x 34,8mm)

Input Characteristics

90-132/180-264Vac
U = Autoranging

Output Voltage

Z 2V M 10V K 40V
Y 3.3V 1 12V 4 48V
O 5V P 13.8V H 52V
X 5.2V 2 15V F 72V
W 5.5V N 18.5V D 85V
V 5.8V 3 24V B 95V
T 6.5V L 28V
R 7.5V J 36V

Product Grade

E = 0°C to +85°C Case
C = 0°C to +85°C Case
I = -30°C to +85°C Case

Output Power/Current

V_{out} ≥ 5V **V_{out} < 5V**
Y = 50W Y = 10A
X = 75W X = 15A
W = 100W W = 20A
V = 150W V = 30A
U = 200W U = 40A

Output Power

V_{out} ≥ 5V **V_{out} < 5V**
W = 100W W = 20A
V = 150W V = 30A
U = 200W U = 40A
S = 300W S = 60A
Q = 400W Q = 80A

Output Power/Current

V_{out} ≥ 5V **V_{out} < 5V**
S = 300W S = 60A
P = 450W P = 90A
M = 600W M = 120A

Options

BC= BatMod/Conduction Cooled
BM= BatMod
CC= Conduction Cooled

FlatPAC Specifications

(Typical at 25°C, nominal line and 75% load, unless otherwise specified.)

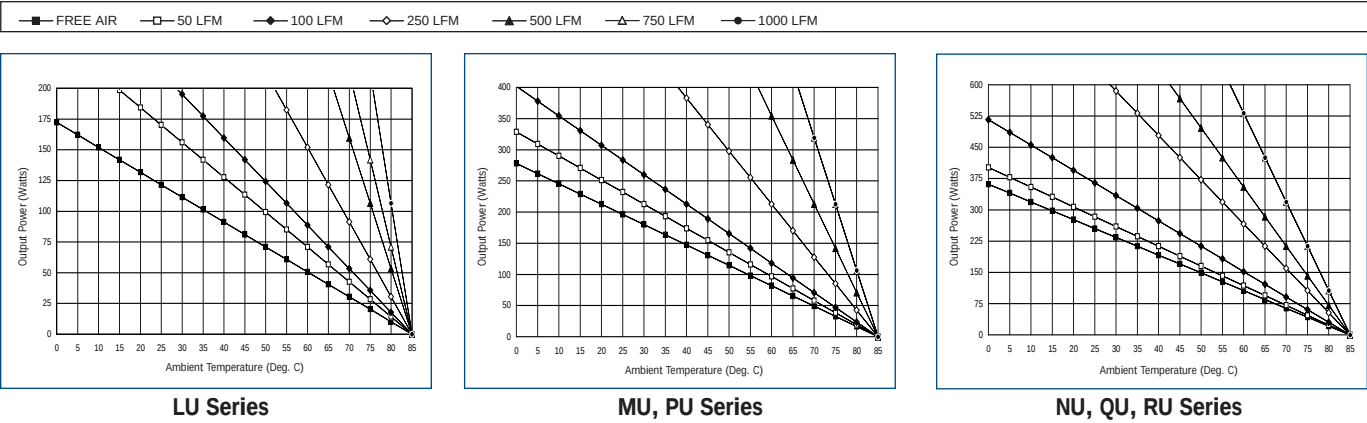
Input Characteristics									
AC line input									
Autoranging			90-132/180-264Vac						
Line frequency			47 to 63Hz (C-grade and E-grade)						
			47 to 440Hz (I-grade)						
Inrush current									
115Vac operation			1 converter: 16A @ peak line; 2 converters: 23A @ peak line; 3 converters: 39A @ peak line						
230Vac operation			1 converter: 32A @ peak line; 2 converters: 47A @ peak line; 3 converters: 78A @ peak line						
Ride-through time (full load)									
90/180Vac low line			5ms minimum						
115/230Vac nominal line			40ms minimum						
AC fail warning time			5ms minimum (low line, full load)						
AC and BUS OK (2 converter and 3 converter models only)									
Off state			Vce = 70V maximum						
On state			Vcesat = 0.4V maximum @ 1mA (1.5mA max.)						
Module disable (2 converter and 3 converter models only, optically isolated LED input)									
Continuous forward current			1 mA to 30mA						
Forward voltage			1.65V max. at 30mA						
Dielectric withstand									
Primary to chassis GND			2,121Vdc						
Primary to secondary			4,242Vdc						
Secondary to chassis GND			707Vdc						
Output Characteristics (applies to each output individually)									
		E-Grade			C-, I-Grade				
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX	UNITS	NOTES	
Setpoint accuracy		1%	2%		0.5%	1%	V _{NOM}		
Load/line regulation			0.5%		0.05%	0.2%	V _{NOM}	LL to HL, 10% to Full Load	
Load/line regulation			1%		0.2%	0.5%	V _{NOM}	LL to HL, No Load to full load	
Output temperature drift		0.02			0.01	0.02	%/°C	Over rated temperature	
Long term drift		0.02			0.02		%/1k hours		
Output ripple									
2V			150mV		60mV	100mV	p-p	20MHz bandwidth	
5V			5%		2%	3%	p-p	20MHz bandwidth	
10-48V			3%		0.75%	1.5%	p-p	20MHz bandwidth	
Output voltage trimming ¹	50%		110%	50%		110%			
Total remote sense compensation									
	0.5			0.5			Volts	0.25V max. neg. leg	
OVP setpoint		125%		115%	125%	135%	V _{NOM}	Recycle power	
Current limit	105%		135%	105%		125%	I _{NOM}	Automatic restart	
Short circuit current ²	20%		140%	20%		130%	I _{NOM}		
Thermal Characteristics									
Efficiency		78-88%			80-90%				
Shutdown temp. — case	90	95	105	90	95	105	°C	Cool and recycle power to restart	
Operating temp. — case			85			85	°C	See Thermal Curves	
Mechanical Specifications									
Weight ³		22.4 (652)			22.4 (652)		Ounces (Grams)		
Safety Agency Approvals									
UL, CSA, TÜV, VDE, IEC 950, CE Marked for low voltage directive, 73/23/EEC									
Environmental Characteristics/Product Grade Designators									
Storage temperature			-20°C to +100°C (C-grade and E-grade)						
			-55°C to +100°C (I-grade)						
Operating temperature (case)			0°C to +85°C (C-grade and E-grade)						
			-30°C to +85°C (I-grade)						
EMI / EMC Characteristics (Performed on selected samples representative of the U Series FlatPac product family.)									
Conducted emissions, LISN			EN 55022 and FCC R&R, Part 15, Subpart B, Class B						
Electrostatic discharge			IEC 801-2, 1991, Level 4; ±8kV Contact, ± 15kV Air Discharge						
RF radiated immunity, E-field			IEC 801-3, 1984; 27MHz to 500MHz, 3 V/M, CW						
Electrical fast transients/burst			EN 61000-4-4, Level 2; ±1kV,						
Surge immunity			EN 61000-4-5, Class 3; ±2kV Line to Ground, ±1kV Line to Line						

¹10, 12V and 15V outputs, trim range ±10%. Consult factory for wider trim range.

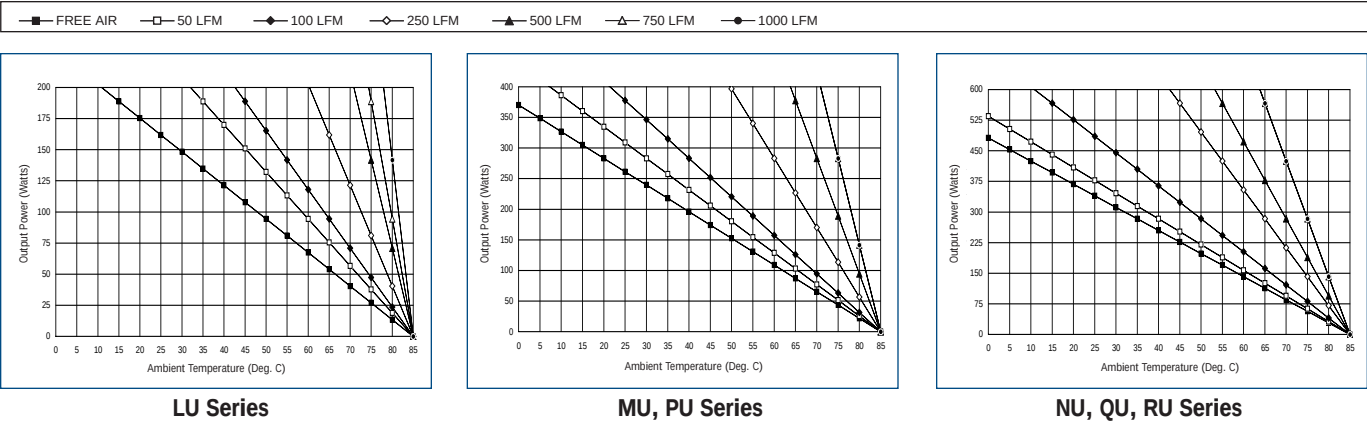
²Output voltages of 5V or less incorporate foldback current limiting, greater than 5V incorporate straight line current limiting.

³For MU, PU series, multiply value by 2; for NU, QU, RU series, multiply value by 3.

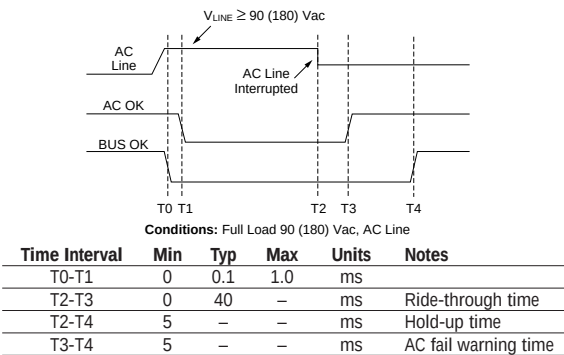
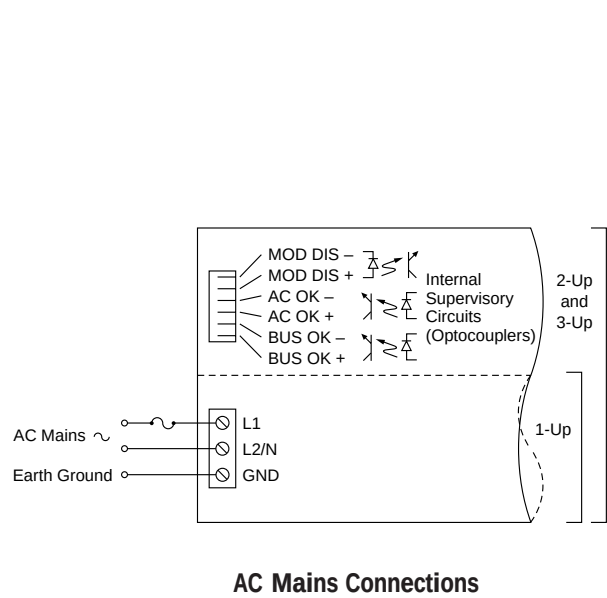
Thermal Curves, 5V Output



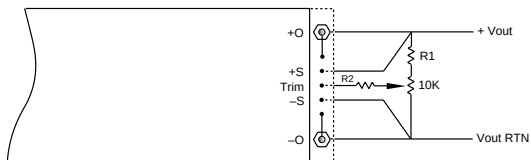
Thermal Curves, 10 to 48V Output



Application Circuits



Power Up and Power Down Sequencing



Resistor Values for Trimming Standard Output Voltages							
Nom. Output Voltage	5V	12V	15V	24V	28V	48V	Trim Range
R1(kΩ)	0.953	15.8	22.1	41.2	48.7	90.9	+10%, -10%
R2(kΩ)	90	90	90	90	90	90	

Mechanical Drawings

Inputs

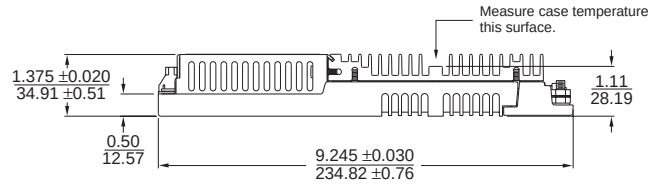
- 1 MOD DIS-
 - 2 MOD DIS+
 - 3 AC OK-
 - 4 AC OK+
 - 5 BUS OK-
 - 6 BUS OK+
 - 7 AC IN L1
 - 8 AC IN L2/N
 - 9 CHASSIS GND
- Input connector,
Amp P/N 644488-6;
mating connector,
MTA-100 IDC Series
- Terminals for
#16-12 AWG wire

Outputs

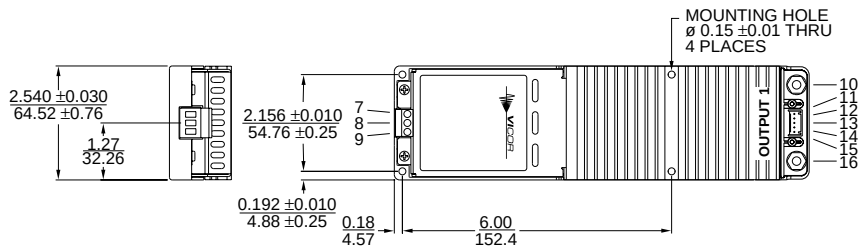
- 10 +OUT (#10-32 Stud)
 - 11 +OUT
 - 12 +SENSE (V_{TRIM}^*)
 - 13 TRIM (I_{TRIM}^*)
 - 14 -SENSE (I_{MON}^*)
 - 15 -OUT
 - 16 -OUT (#10-32 Stud)
- Output connector,
Amp P/N 644486-5;
mating connector,
MTA-100 IDC Series

*On FlatPACs with BatMODs only.

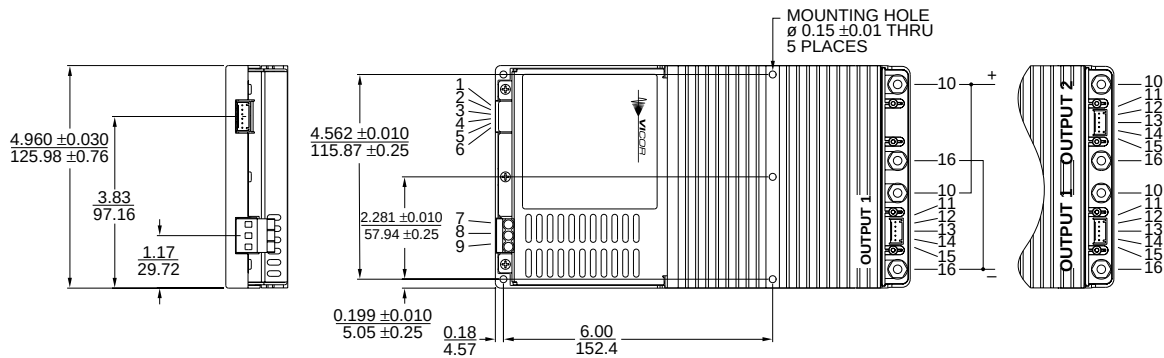
All Models



LU Series



MU, PU Series



NU, QU, RU Series

