FlatPAC™

50 to 600 Watt Autoranging AC-DC Switchers

Features

- Inputs: 115/230 VAC Autoranging
- VDE/FCC Class B*
- 80-90% Efficiency
- Any Output: 1 to 95 VDC
- Now with Module Disable
- UL, CSA, TÜV, VDE (in process to IEC 950)
- Remote Sense and Current Limit
- BUS OK and AC OK
- 50ms Ride-Through Time (typical)
- OVP and Thermal Shutdown
- One-Up Models: 1 Output; Up to 200 Watts
- Two-Up Models: 1 or 2 Outputs; Up to 400 Watts
- Three-Up Models: 1, 2, or 3 Outputs; Up to 600 Watts

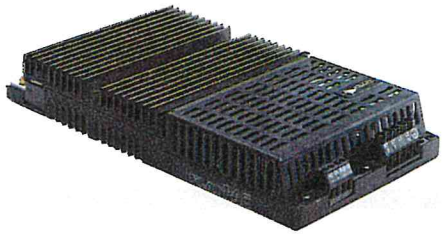
**All models except VI-LFX-XX*

Product Highlights

Vicor's FlatPAC family of user-definable off-line power supplies combines Vicor high frequency DC-DC converters and front-end subassemblies in a set of modular, chassis-mount enclosures. The result is a flexible, economical power solution for systems requiring from 50 to 600 watts of total output power.

FlatPAC switchers incorporate one, two, or three Vicor VI-200 DC-DC Converters in packages of common height and length and three different widths. Each internal converter offers one output, 50-200 watts of power, and output voltage of 1 to 95 VDC. The two-up and three-up models (maximum output 400 watts and 600 watts) feature autoranging input, which automatically senses the input line voltage and sets the power supply's input range accordingly.

FlatPAC's unique modular design allows any of over 10,000 configurations to be assembled from stock components for next-day delivery.



Specifications

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

Input Characteristics	
AC line input	
Autoranging	90-135/180-270 VAC (2-up and 3-up models only. Strappable input available as standard option, consult factory.)
Strappable	1-up models
Line Frequency	47 to 63Hz (C-grade and E-grade) 47 to 440Hz (I-grade)
Inrush Current	
115 VAC Operation	27 Amp at peak line
230 VAC Operation	54 Amp at peak line
Ride-through Time (Full Load)	
90/180 VAC Low Line	5ms minimum
115/230 VAC Nominal Line	40ms minimum
AC Fail Warning Time	5ms minimum (low line, full load)
AC and BUS OK (2-up and 3-up models only)	
Off State	Vce = 70V maximum
On State	Vcesat = 0.4V maximum @ 1mA (1.5mA max.)
Module Disable (Optically isolated LED input)	
Continuous Forward Current	1mA to 30mA
Forward Voltage	1.65V max. at 30mA
Agencies	UL, CSA, TÜV, VDE (in process to IEC 950)
Conducted and Radiated EMI/RFI	
1-up Models	VDE 0871 / FCC Part 15, Class A
2-up and 3-up Models	VDE 0871 / FCC Part 15, Class B
Dielectric Withstand	Primary to chassis GND = 3535 VDC Primary to secondary = 4300 VDC Secondary to chassis GND = 750 VDC
Transient Surge	IEC 801-5 Level 3

Output Characteristics (applies to each output individually)	
Setpoint Accuracy	±1% maximum (E-grade = 2%)
Line/Load Regulation	±0.2% maximum (E-grade = 0.5%)
Temperature Drift	±0.02%/°C maximum (E-grade = 0.02%/°C typ.)
Efficiency	80–90% (typ.), depending on output voltage
High Trim/Program	110% of Vnom.
Low Trim/Program	5% of Vnom. (E-grade = 70%)
Peak-to-Peak Ripple	3% max., 20MHz BW, full load (E-grade = 5%)
Current Limit	115% (typ.) (E-grade = 105-135%)
Short Circuit Limit	20–130% as function of output voltage
OVP Set Point	115–135%, recycle power to restart

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 (Heatsink)	0°C to +85°C (C-grade and E-grade) -30°C to +85°C (I-grade)

Warranty	2 years

FlatPAC Configuration Chart

Single Outputs	VI-L	F □ – □ □	50–200W	8.6"L x 2.5"W x 1.37"H
	VI-M	A □ – □ □	100–400W	8.6"L x 4.9"W x 1.37"H
	VI-N	A □ – □ □	450–600W	8.6"L x 7.4"W x 1.37"H
Dual Outputs	VI-P	A □ □ – □ □ □	100–400W	8.6"L x 4.9"W x 1.37"H
	VI-Q	A □ □ – □ □ □	250–600W	8.6"L x 7.4"W x 1.37"H
Triple Outputs	VI-R	A □ □ □ – □ □ □ □	150–600W	8.6"L x 7.4"W x 1.37"H

Input Characteristics

90–135/180–270 VAC

F = Strappable (1-up models)
A = Autoranging (2-up and 3-up models; consult factory for strappable option.)

Output Voltage

Z	= 2V	2	= 15V
Y	= 3.3V	3	= 24V
0	= 5V	L	= 28V
1	= 12V	4	= 48V

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

$V_{OUT} \geq 5V$		$V_{OUT} < 5V$	
Y	= 50W	Y	= 10A
X	= 75W	X	= 15A
W	= 100W	W	= 20A
V	= 150W	V	= 30A
U	= 200W	U	= 40A

Output Power

$V_{OUT} \geq 5V$		$V_{OUT} < 5V$	
W	= 100W	W	= 20A
V	= 150W	V	= 30A
U	= 200W	U	= 40A
S	= 300W	S	= 60A
Q	= 400W	Q	= 80A

Output Power

$V_{OUT} \geq 5V$		$V_{OUT} < 5V$	
S	= 300W	S	= 60A
P	= 450W	P	= 90A
M	= 600W	M	= 120A

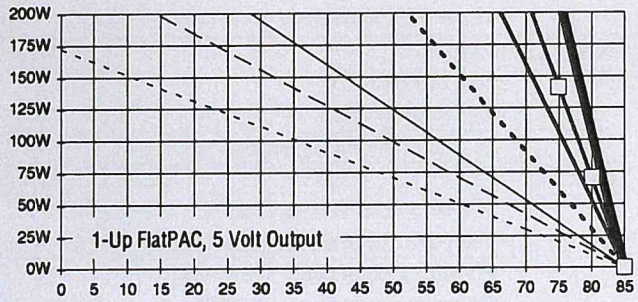
Thermal Considerations

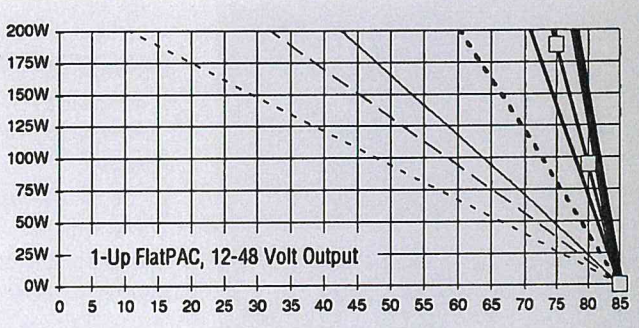
For each FlatPAC frame (one-up, two-up, and three-up) an "Output Power vs. Ambient Temperature" curve is shown for estimating the maximum output power deliverable in a free convection or forced convection environment. Two curves are given for each frame: one for power delivered from 5V outputs, the other for power delivered from 12-48V outputs. These account for the difference in efficiency as a function of output voltage. For designs where the FlatPAC contains a mix of 5V and higher voltages, the thermal performance may be estimated by interpolation.

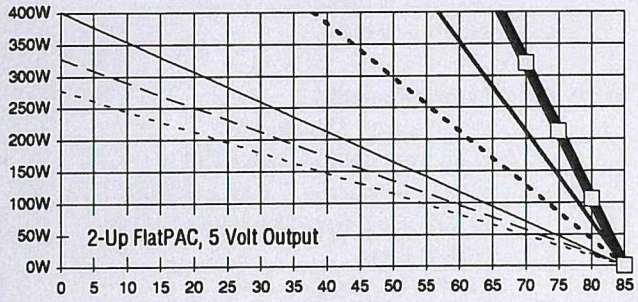
Thermal Charts Guide

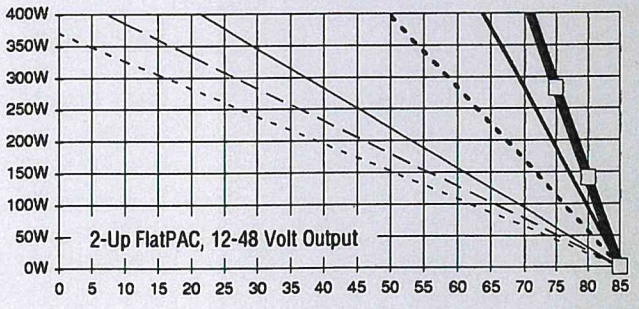
- Free air
- 50 LFM
- 100 LFM
- 250 LFM
- 500 LFM
- 750 LFM
- 1000 LFM

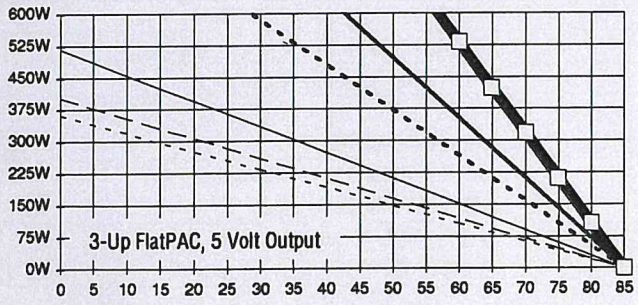
Output Power vs. Ambient Temperature

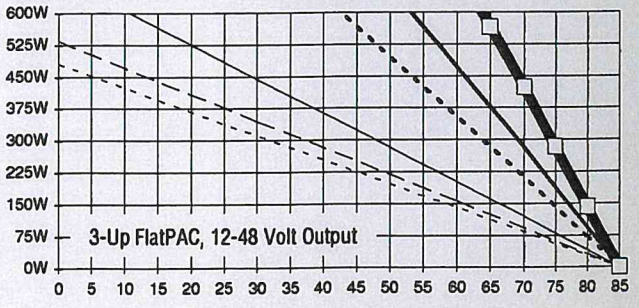










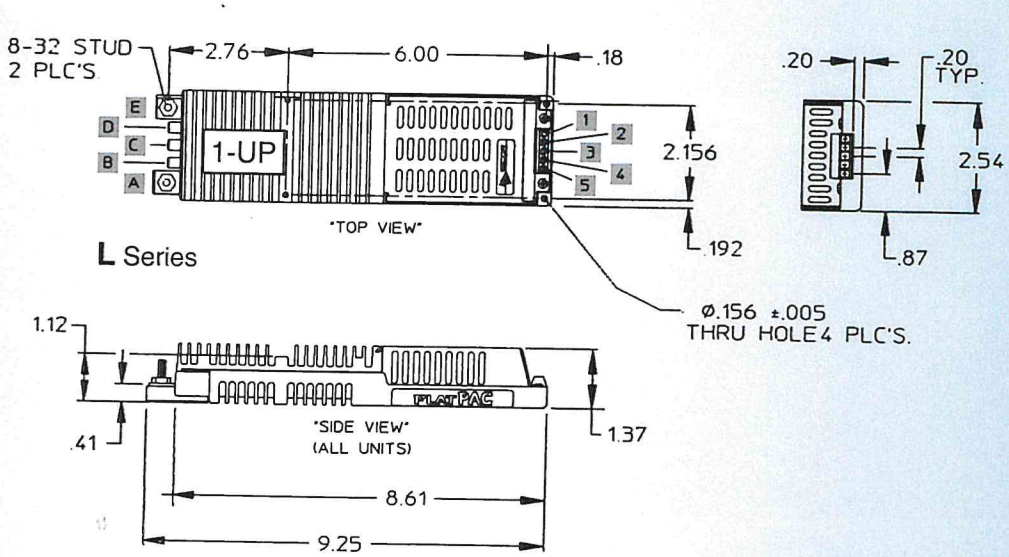


FlatPAC Mechanical Diagram

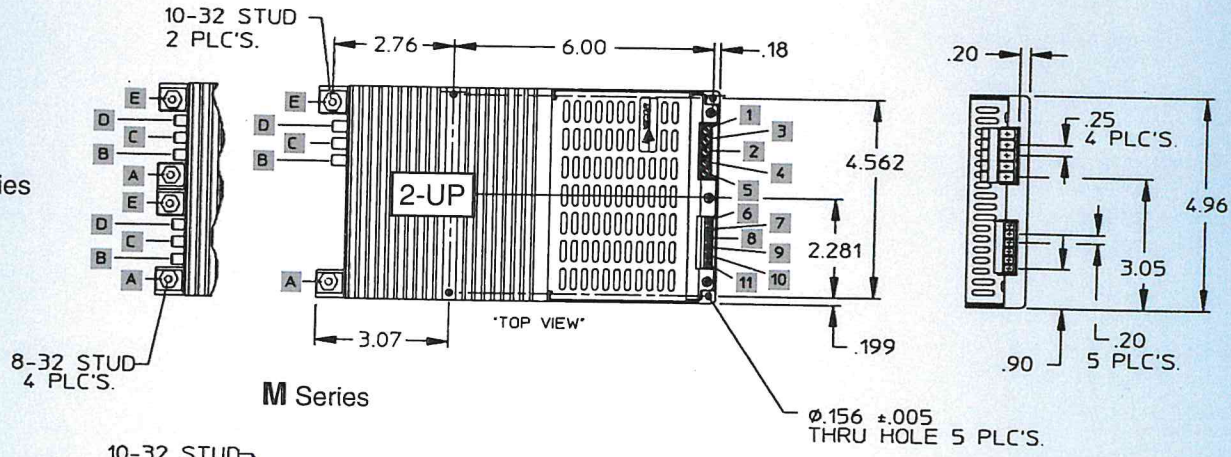
FlatPAC Input-Output Connections

Inputs		Outputs	
1	Earthground	A	+Out
2	L1	B	+Sense
3	L2/N	C	Trim
4	*ST1	D	–Sense
5	*ST2	E	–Out
6	BUS OK+		
7	BUS OK–		
8	AC OK+		
9	AC OK–		
10	MOD DIS+		
11	MOD DIS–		

**Not used on autoranging versions*

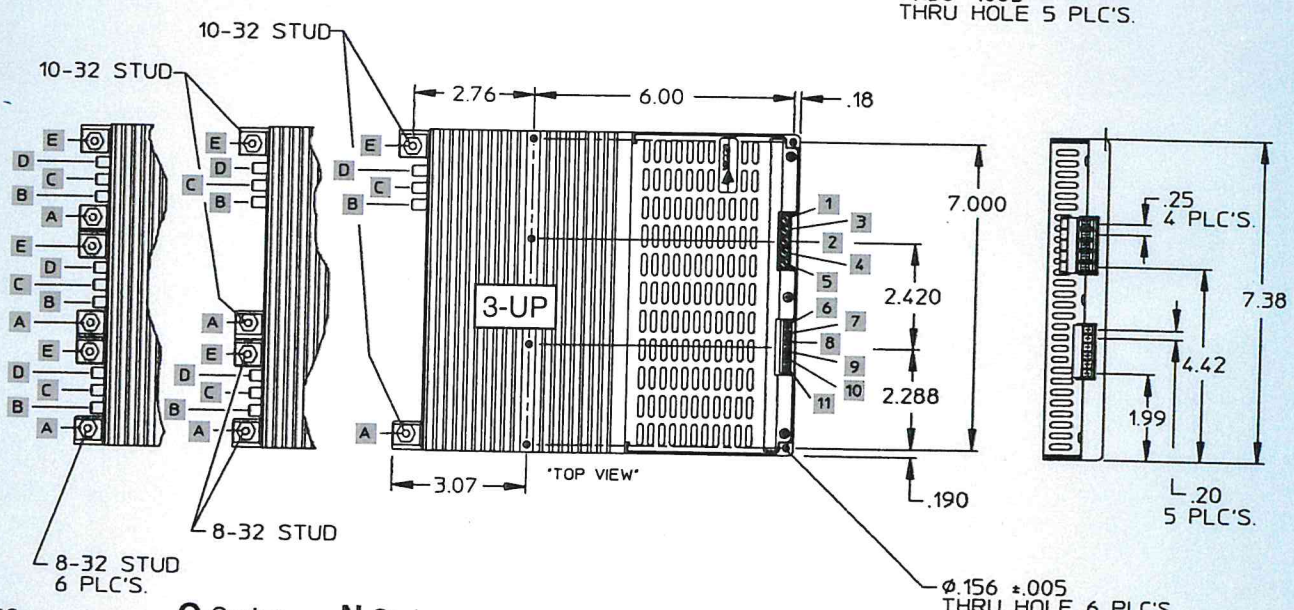


L Series



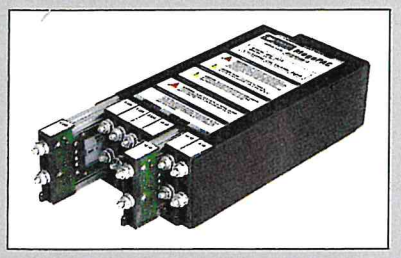
P Series

M Series



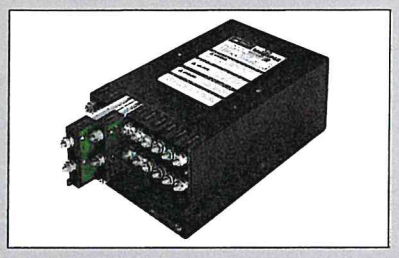
R Series **Q** Series **N** Series

MegaPAC™
AC-DC Switcher, 400 to 1600 Watts



- Inputs: 115/230 VAC Autoranging or 300 VDC
- 1-16 Outputs, 1-95 VDC
- User Configurable, Reconfigurable
- UL, CSA, TÜV/IEC, (in process)
- VDE/FCC Class A
- Fan-Cooled: 1600W at 45°C
- Size: 11.8"L x 6.0"W x 3.4"H

Three-Phase MegaPAC™
AC-DC Switcher, 2000 Watts



- Three-Phase Input, 208 or 220 VAC (Single-Phase Operation, 1.5 kW)
- Field Configurable, 1-20 Outputs
- Power Factor Correction (PF = .92 typ.)
- Parallelable with Current Sharing
- UL, CSA, TÜV, VDE, (in process)
- Fan-Cooled: 2000W at 45°C
- Size: 12.0"L x 7.5"W x 4.9"H

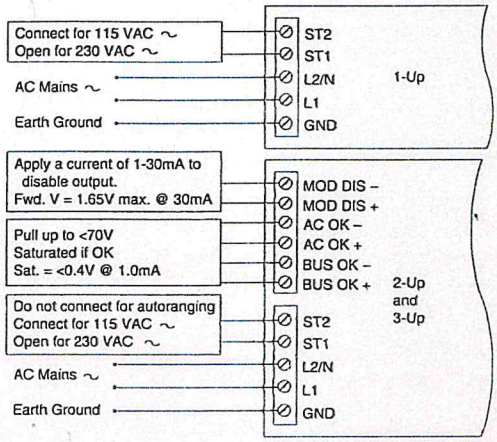
Mini StakPAC™
AC-DC Switcher, 250 to 600 Watts

- Inputs: 115/230 VAC, Single-Phase, Field Selectable
- 1-5 Outputs, 1-95 VDC
- Full Power to 40°C; 65°C Operation with Derating
- Power Good/Power Fail Signals
- Logic Enable/Disable
- Size: 12"L x 5.5"W x 1.9"H

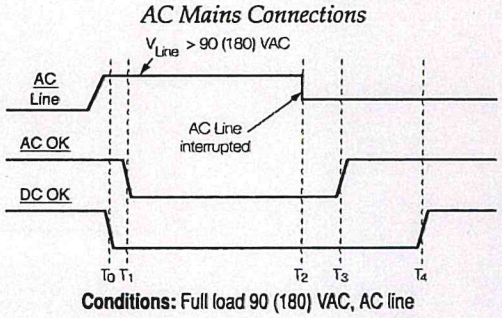
VICOR

Application Circuits

AC Mains Connections



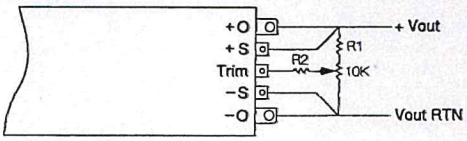
Power Up and Power Down Sequencing



Conditions: Full load 90 (180) VAC, AC line

Time Interval	Min	Typ	Max	Units	Notes
T1-T0	0	0.1	1.0	ms	
T3-T2	0	–	–	ms	
T4-T2	5	–	–	ms	Ride-through time
T4-T3	5	–	–	ms	AC fail warning time

Output Trimming



RESISTOR VALUES FOR TRIMMING STANDARD OUTPUT VOLTAGES							
Nominal Output Voltage	5V	12V	15V	24V	28V	48V	Trim Range
R1(KΩ)	9.2	35	46	79	91	167	+10%, -95%
R2(KΩ)	0	0	0	0	0	0	
R1(KΩ)	4.4	24	32	57	68	123	+10%, -20%
R2(KΩ)	40	40	40	40	40	40	

How to Order

Contact VICOR EXPRESS by phone at 800-735-6200, or by fax at 508-475-6715...

- For immediate delivery of Vicor power components or configurable power supplies or...
- For a catalog containing complete information on Vicor products, applications, and accessories.

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