



FlatPAC™

50 to 600 Watt
Autoranging AC-DC
Switchers

Features

- Microcontroller Architecture
- Inputs: 115/230 Vac Autoranging
- VDE/FCC Class A, Class B
- 80-90% Efficiency
- Any Output: 1 to 95 Vdc
- Module Enable/Disable (2 & 3 up)
- UL, CSA, TÜV, VDE, BABT
- Remote Sense and Current Limit
- BUS OK and AC OK (2 & 3 up)
- 40 ms Ride-Through Time (typical)
- OVP and Thermal Shutdown
- One-Up Models: 1 Output;
Up to 200W
- Two-Up Models: 1 or 2 Outputs;
Up to 400W
- Three-Up Models: 1, 2, or 3 Outputs;
Up to 600W
- CE Marked

Conduction Cooled Models Available
Consult Factory

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 convection and optional conduction cooled enclosures. The result is a flexible, economical power solution for systems requiring from 50 to 600W 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, 50-200W of power, and output voltage of 1 to 95 Vdc. All models 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	90-132/180-264 Vac
Line Frequency	47 to 63 Hz (C-grade and E-grade; 400 Hz optional) 47 to 440 Hz (I-grade)

Inrush Current (Peak Line)

115 Vac Operation	1 up: 16A; 2 up: 23A; 3 up: 39A
230 Vac Operation	1 up: 32A; 2 up: 47A; 3 up: 78A

Ride-through Time (Full Load)

90/180 Vac Low Line	5 ms minimum
115/230 Vac Nominal Line	40 ms minimum

AC Fail Warning Time

	5 ms minimum (full load)
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AC and BUS OK (2-up and 3-up models only)

Off State	Vce = 70V maximum
On State	Vcesat = 0.4V maximum @ 1 mA (1.5 mA max.)

Module Disable (optically isolated LED input; 2-up and 3-up models only)

Continuous Forward Current	1 mA to 30 mA
Forward Voltage	1.65V max. at 30 mA

Conducted and Radiated EMI/RFI

	EN 55022-B All Models; 2 up/3 up: VDE 0871 Level B
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Dielectric Withstand

Input to case =	2,121 Vdc
Input to output =	4,242 Vdc
Output to case =	707 Vdc

Transient Surge

	IEC 61000-4-5 Level 3
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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 ¹	110% of Vnom.
Low Trim/Program ¹	50% of Vnom.
Peak-to-Peak Ripple	3% max., 20 MHz 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	0°C to +85°C (C-grade and E-grade)
Case	-30°C to +85°C (I-grade)

Warranty	2 years
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¹112V and 15V outputs, standard trim range ±10%. Consult factory for wider trim range.

FlatPAC Configuration Chart

Single Outputs	VI-LU		50-200W	9.245" x 2.5" x 1.37"
	VI-MU		100-400W	9.245" x 4.9" x 1.37"
	VI-NU		450-600W	9.245" x 7.4" x 1.37"
Dual Outputs	VI-PU		100-400W	9.245" x 4.9" x 1.37"
	VI-QU		250-600W	9.245" x 7.4" x 1.37"
Triple Outputs	VI-RU		150-600W	9.245" x 7.4" x 1.37"

Input Characteristics
90-132/180-264 Vac
U = Autoranging

Output Voltage
Z = 2V 1 = 12V
Y = 3.3V 2 = 15V
O = 5V 3 = 24V
M = 10V L = 28V
4 = 48V
1 to 95V, consult factory.

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} ≥ 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

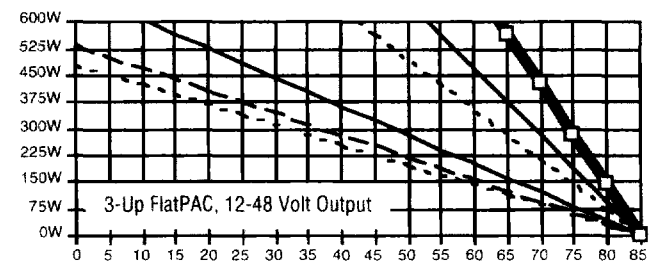
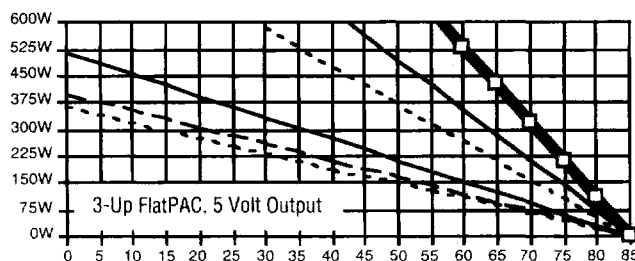
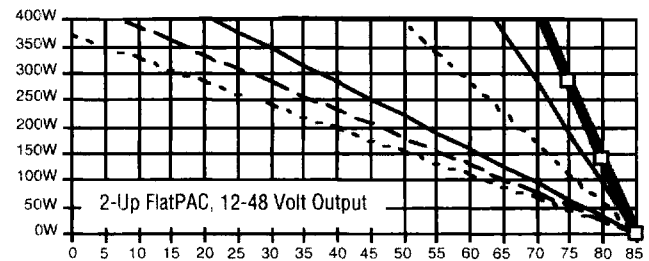
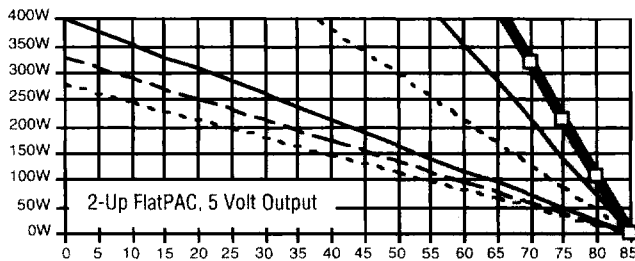
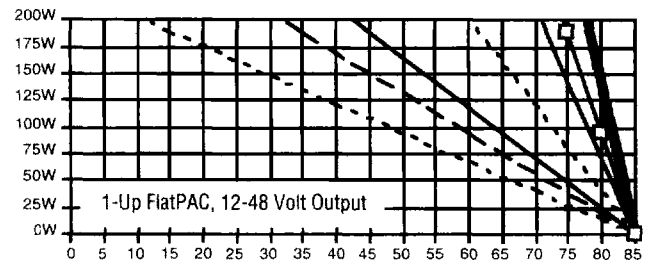
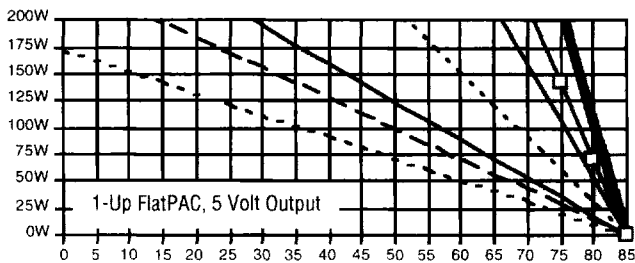
Output Power	
V_{OUT} ≥ 5V	V_{OUT} < 5V
S = 300W	S = 60A
P = 450W	P = 90A
M = 600W	M = 120A

Thermal Considerations

For each FlatPAC model, 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
(see chart below)	

Output Power vs. Ambient Temperature



Ambient Temperature °C

Ambient Temperature °C

FlatPAC Mechanical Diagram

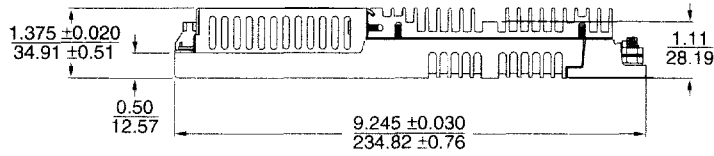
Side View (All Models)

Inputs

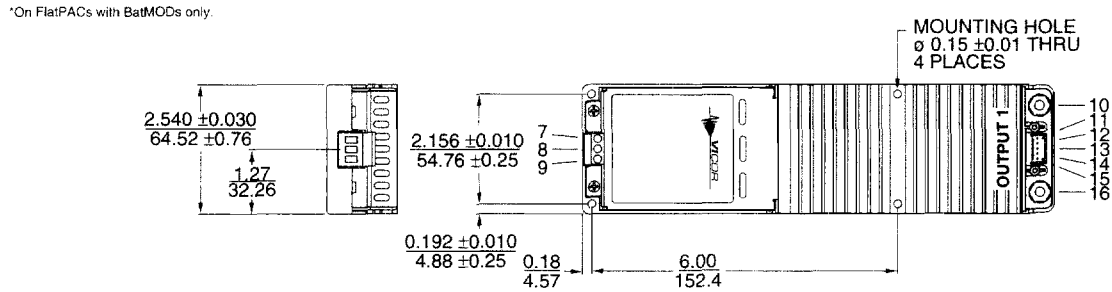
- 1 MOD DIS-
 - 2 MOD DIS+
 - 3 AC OK-
 - 4 AC OK+
 - 5 BUS OK-
 - 6 BUS OK+
 - 7 AC IN L1
 - 8 AC IN L2/N
 - 9 CHASSIS GND
- Input connector, Amp P/N 644488-6, mating connector, MTA-100 IDC Series
- Terminals for #16-12 AWG wire

Outputs

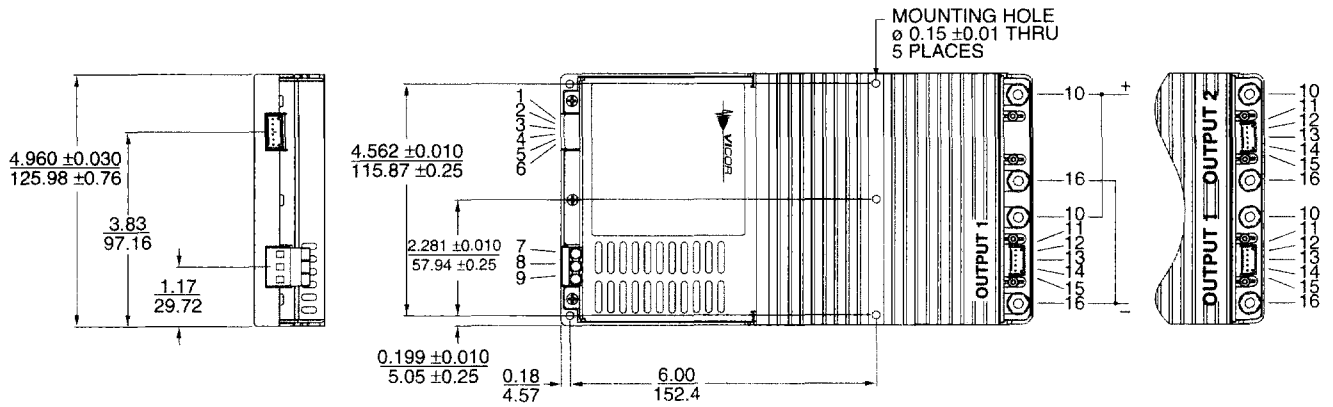
- 10 +OUT (#10-32 Stud)
 - 11 +OUT SENSE
 - 12 +SENSE (VTRIM*)
 - 13 TRIM (U'TRIM*)
 - 14 -SENSE (IMON*)
 - 15 -OUT SENSE
 - 16 -OUT (#10-32 Stud)
- Output connector, Amp P/N 644486-5, mating connector, MTA-100 IDC Series



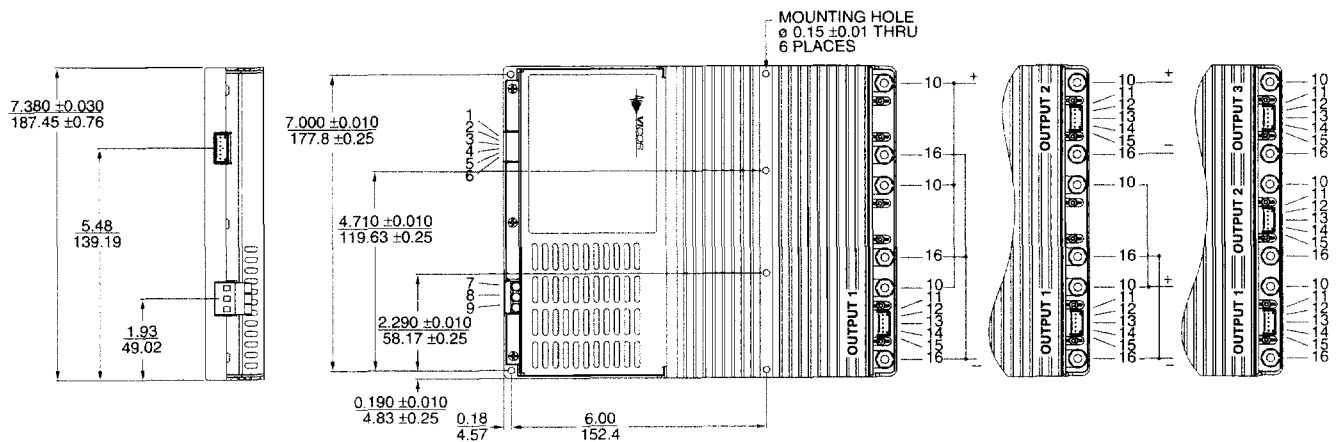
1 Up



2 Up



3 Up



Other Configurable Products

ComPAC™

DC-DC Switchers, 50-600W

- Inputs: 24, 48, and 300 Vdc
- Any Output: 1-95 Vdc
- User Configurable, Reconfigurable
- UL, CSA, TÜV, VDE, BABT
- FCC/VDE Class A
- 80-90% Efficiency
- Size: 8.6" x 2.5" x 0.99"
(218,4 x 63,5 x 25,1)
(1 Up, Single Output)
- CE Marked

MegaPAC Family™

AC-DC, DC-DC Switchers
300-2000W

- MegaPAC: 1-16 Outputs, Up to 1600W
- Autoranging, PFC, 3Ø, Mini, DC Input Versions
- 1-20 Outputs, 1-95 Vdc
- User Configurable, Reconfigurable
- UL, CSA, TÜV
- VDE/FCC Class A or Class B
- Fan-Cooled

PFC Mini

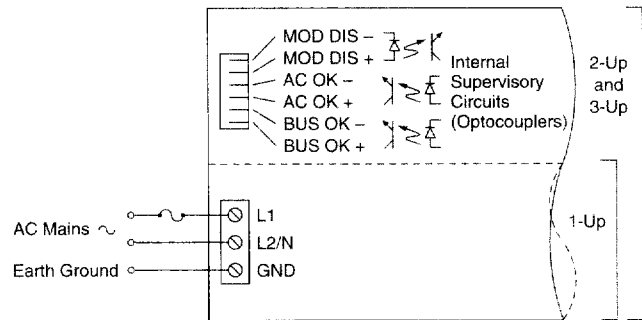
AC-DC Switcher,
Up to 1500 Watts

NEW

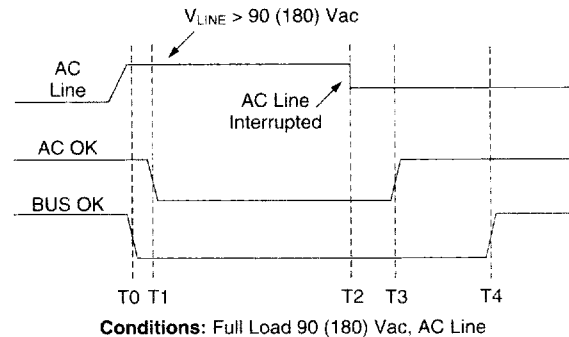
- 1-6 Outputs
- Size: 12" x 6.0" x 1.75"
(304,8 x 152,4 x 44,5)
- Efficiency: >80%
- UL 1950 (pending)
CSA C222.2 No. 234 (pending)
IEC 60950 (pending)
EN 60 90 (pending)
CE (pending)
- 600W, 115/230 Vac

Application Circuits

AC Mains Connections

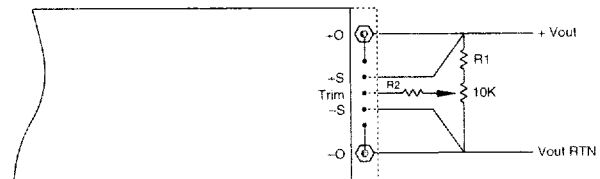


Power Up and Power Down Sequencing



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



Nom. Output Voltage	Resistor Values for Trimming Standard Output Voltages						Trim Range
	5V	12V	15V	24V	28V	48V	
R1(kΩ)	.953	15.8	22.1	41.2	48.7	90.9	+10%, -10%
R2(kΩ)	90	90	90	90	90	90	

For price, delivery, product, accessory or applications assistance, or to simply find out how your system can benefit from Vicor's complete line of Component Power Solutions, contact Vicor Express at (800) 735-6200 or fax us at (978) 475-6715.