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Find the *Vicor FlatPAC VI-MUL-CQ* at our website: *Click HERE*

FlatPAC Family
50 to 600 Watt AC-DC Switchers

Application Notes
Functional and Mechanical Layout
Installation and Operation Guidelines

U-Series



Product Description

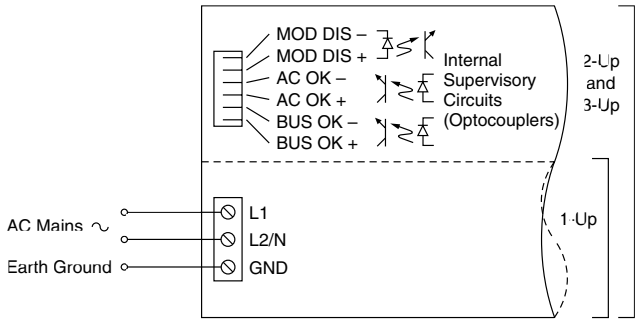
The FlatPAC family of user-definable offline power supplies provides a complete power solution that incorporates one, two, or three standard Vicor DC-DC converters and a front-end subassembly in a modular package. FlatPAC is available with one, two, or three outputs and total output ratings of 50–600 W. These power supplies feature an autoranging input, which automatically senses the input line voltage and sets the power supply's input range accordingly. FlatPAC's unique modular design accommodates over 10,000 different configurations.

FlatPAC power supplies that contain BatMod current source modules instead of VI-200 converters are indicated by the suffix -BM following the FlatPAC part number. BatMod converters provide a programmable output current, rather than a regulated output voltage. Consequently, the output supervisory terminal functions differ on FlatPACs with BatMod modules.

VICOR

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AC Mains and Supervisory Connections

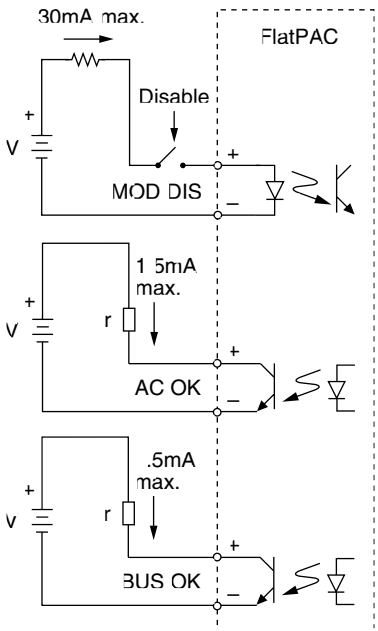


Product is internally fused

External Supervisory Functions *(2-up and 3-up models only)*

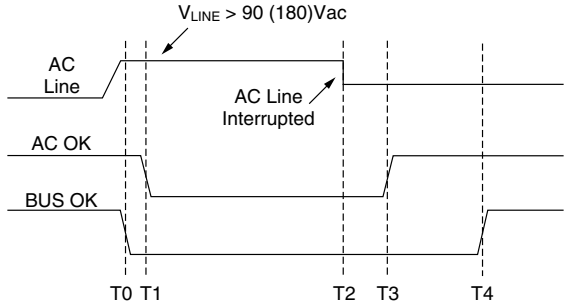
MOD DIS Input. Apply a current of 1–30 mA to disable output. Forward voltage drop of internal opto diode is 1.65 V max. at 30 mA max.

AC OK and BUS OK Status Outputs. Outputs low when OK.
Vce sat. = < 0.4 V @ 1.5m A. Maximum external pullup is 70 Vdc. AC OK and BUS OK signals are isolated and can have different reference levels.



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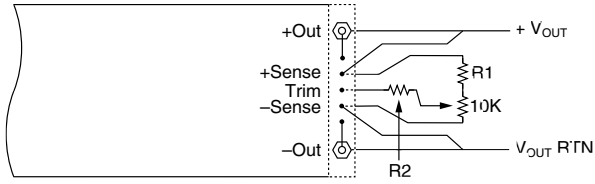
Timing Diagram—Status Signals *(2-up and 3-up models only)*



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	Ride-through time
T4-T2	5	–	–	ms	Hold-up time
T4-T3	5	–	–	ms	AC fail warning time

Output Sense and Trim *(All models with VI-200s)*



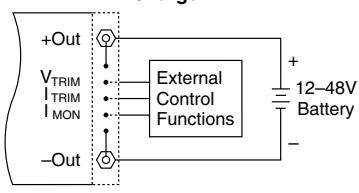
+Sense and –Sense must be connected locally or remotely (shown).

RESISTOR VALUES FOR TRIMMING STANDARD OUTPUT VOLTAGES

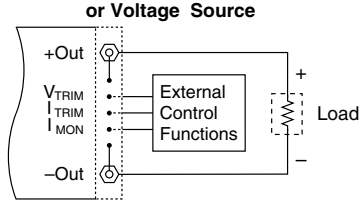
Nominal Output Voltage	5 V	12 V	15 V	24 V	28 V	48 V	Trim Range
R1(KΩ)	.953	15.8	22.1	41.2	48.7	90.9	+10%, -10%
R2(KΩ)	90	90	90	90	90	90	+10%, -10%

Typical Applications *(Models with BatMods only)*

Battery Charger



Programmable Current or Voltage Source



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Functional and Mechanical Layout

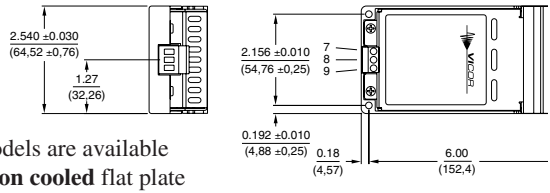
LU-Series
Single output
50-200 W
MU-Series
Single output
200-400 W
NU-Series
Single output
300-600 W
PU-Series
Dual output
100-400 W
QU-Series
Dual output
150-600 W
RU-Series
Triple output
150-600 W

FlatPAC units are shipped with pins 11-12 and 14-15 connected via jumper plugs (Vicor P/N 02589) for **local sense**. For **remote sense**, remove these connections and connect pins 10-12 and 14-16, as shown in the Output Sense and Trim drawing on page 3.

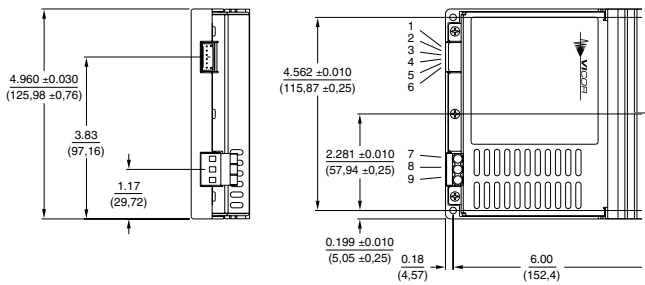
All FlatPAC models are available with a **conduction cooled** flat plate instead of the top heat sink. Contact factory for outline drawings.

Inputs

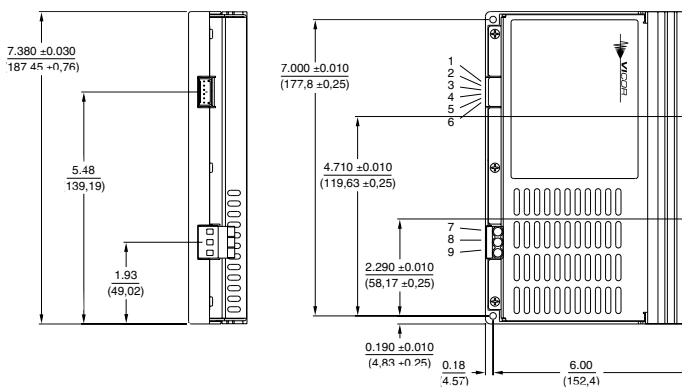
LU-Series



MU-, PU-Series



NU-, QU-, and RU-Series



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 Ground

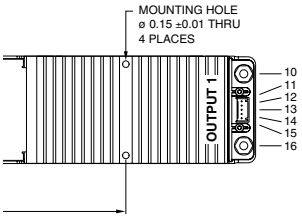
Outputs
10 +Power Out
11 +Out**
12 +Sense*
13 Trim*
14 –Sense*
15 –Out**
16 –Power Out

**On FlatPACs containing BatMods:*
12 V_{TRIM}
13 I_{TRIM}
14 I_{MON}
***For local sense connection only—not for load connection*

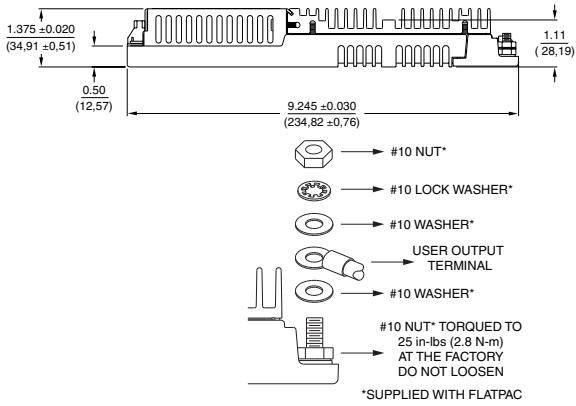
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Outputs

LU-Series

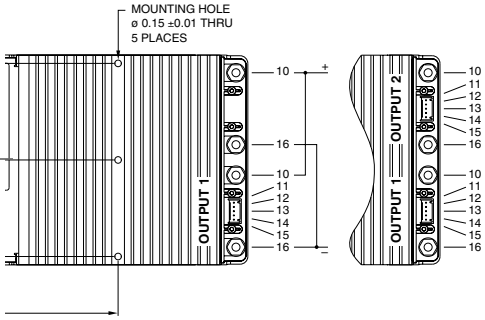


All Models



OUTPUT STUD CONNECTIONS

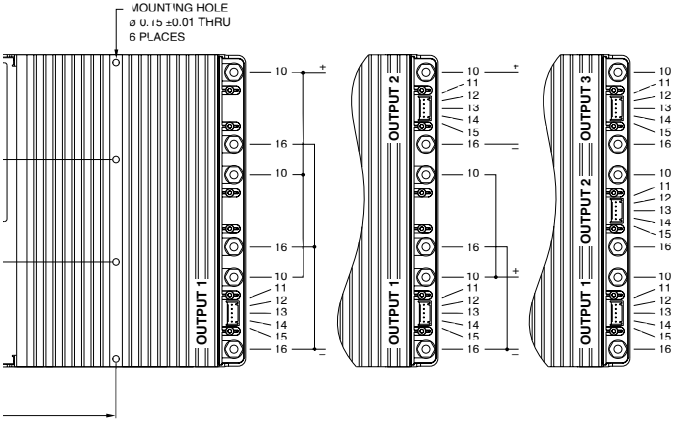
MU-Series PU-Series



Notes:

- Connect paralleled outputs as shown (MU-, NU-, and QU-Series) for >40 A out.
- All output studs 10-32 UNF. Torque to 20 in-lbs (2.3 N-m).
- Input supervisory terminals (1–6): use mating connector Vicor P/N 16384, AMP P/N 644083-6
- Output supervisory terminals (11–15): use mating connector Vicor P/N 16385, AMP P/N 644083-5
- AMP Termination Tool Pistol Grip Handle P/N 58074-1; with interchangeable head P/N 58246-1
- Do not loosen bottom nut.

NU-Series QU-Series RU-Series



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Fusing. The FlatPAC's internal fuses are not user-replaceable. Please return the unit to vendor if servicing is necessary.

Grounding. To satisfy IEC 950 Class I grounding requirements, connect a ground lead to the terminal marked ⏚ (GND). For one-up FlatPAC models (max. output 200 W), use 1.5 mm^2 / #16 AWG wire; for two-up and three-up models (max. output 400 W and 600 W), use 2.5 mm^2 / #14 AWG wire.

Input Voltage Connections. Connect the line voltage to L1 (hot) and L2N (neutral). For one-up FlatPAC models (max. output 200 W), use #16 AWG input wire; for two-up and three-up models (max. output 400 W and 600 W), use #14 AWG input wire. Recommended connector screw torque is 5 to 7 in-lbs (0.5 to 0.8 N-m). Recommended strip length is 8 mm. Use your FlatPAC model only with the corresponding input voltages and frequencies shown in the table below.

	Model	*90–132 Vac*	*180–264 Vac*
C–Grade	VI–☐U–C ☐	47–63 Hz	47–63 Hz
I–Grade	VI–☐U–I ☐	47–440 Hz	47–440 Hz

Output Wire Gauge. Use the output wire gauge that corresponds to the output current of your FlatPAC unit, below: Do not loosen bottom nut.

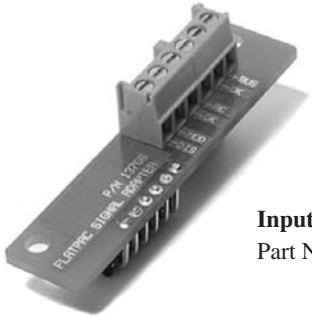
100 A–160 A : #2 AWG	30 A–50 A : #8 AWG	10 A–15 A : #14 AWG
75 A–100 A : #4 AWG	20 A–30 A : #10 AWG	6 A–10 A : #16 AWG
50 A–75 A : #6 AWG	15 A–20 A : #12 AWG	0 A–6 A : #18 AWG

Output Voltage Trimming. Do not trim the outputs higher than 110% of their nominal output voltage. When an output is trimmed up, do not exceed its maximum rated output power.

Operating Temperature. Do not allow the FlatPAC to exceed its maximum operating temperature, which is reached when the heat sink is 85°C. (Full power can be delivered up to this temperature.) Heat sink temperature is a function of the output power and voltage of the supply, ambient temperature, and airflow across the heat sink. Refer to the Vicor Applications Manual to determine the maximum ambient temperature for your application. Always use worst-case conditions when calculating operating temperature. **Note 1:** To ensure proper heat transfer from the internal module(s) to the heat sink, the mounting holes through the heat sink (2, 3, and 4 holes on one-, two-, and three-up models, respectively) must contain torqued screws at all times during operation, whether or not the unit is mounted. If the unit is operated unmounted, insert a #6 or metric panhead screw through each hole from below and secure with a nut on top, torqued to 6 in-lbs (0.7 N-m). **Note 2:** All FlatPAC models are available with a conduction cooled flat plate instead of the top heat sink. Contact factory for outline drawings.

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Input/Output Retrofit Connections. A hardware kit available from Vicor allows the input and output supervisory terminals to be connected in the same manner as for the earlier style FlatPAC (two-up model only). The retrofit output terminals are sized to accept AMP Faston® insulated receptacle #2-520184-2.



Input Retrofit Kit
Part Number: 14136



Output Retrofit Kit
Part Number: 14137

For More Information

The Vicor Applications Manual and product data sheet contain complete information about FlatPAC AC-DC power supplies. To receive literature or to consult an applications engineer about installation or operation of this product, contact your nearest Vicor office or visit the Vicor Website. (See back panel.)

(Bitte lesen Sie die Sicherheits-Vorschriften auf Seite 8.)

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Sicherungen. Die internen Sicherungen im FlatPAC können nicht vom Anwender ausgetauscht werden. Für Servicearbeiten schicken Sie das Teil bitte an den Händler zurück.

Erdung. Um den IEC 950 Klasse I Erdungsforderungen zu entsprechen, muß ein Erdungskabel an den Anschluß ⏚ (GND) angeschlossen werden. Für FlatPAC Modelle mit einem Modul (max. Leistung 200 W) benutzen Sie bitte 1.5 mm^2 AWG 16- und für Modelle mit 2 und 3 Modulen (max. Leistung 400 W und 600 W) bitte 2.5 mm^2 AWG 14-Kabel.

Betriebstemperatur. Die maximale Betriebstemperatur des FlatPAC-Gerätes darf nicht überschritten werden. Dies ist gegeben, wenn der Kühlkörper eine Temperatur von 85 Grad Celsius erreicht hat. Die Kühlkörpertemperatur ist eine Größe, die sich aus der Ausgangsleistung und Spannung der Stromversorgung, der Umgebungstemperatur und der Luftzirkulation über dem Kühlkörper ergibt. Bitte bestimmen Sie mit Hilfe des Vicor Applikationshandbuches die maximale Umgebungstemperatur Ihrer Applikation.

Weitere Informationen. Das Vicor Applications Manual und Produkt-Datenblätter enthalten ausführliche Informationen über FlatPAC AC-DC Wandler. Fordern Sie bitte Unterlagen bei Vicor oder Ihrer nächsten Vicor Vertretung an.

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vicorpower.com

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