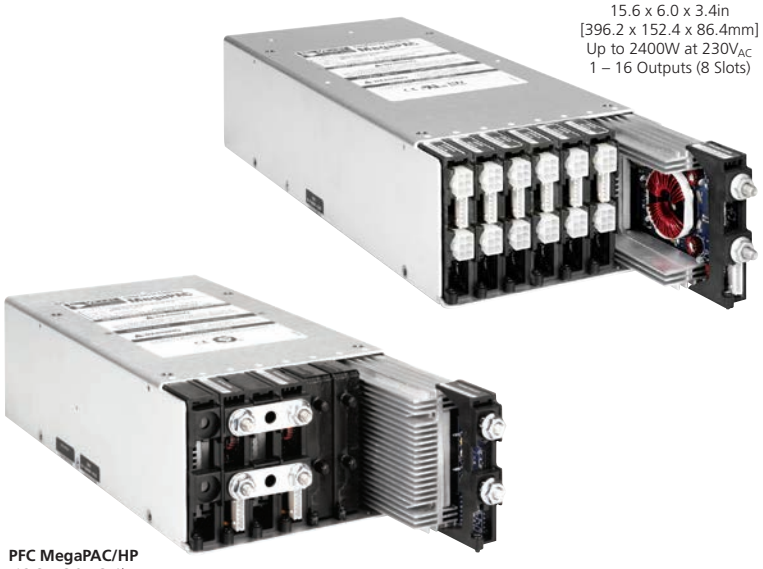
MegaPAC™ Family
AC-DC and DC-DC Switchers

User- and Field-Configurable Power Supplies

Features & Benefits

- AC inputs available: 85 – 264V_{AC}, 208 / 240V_{AC} 3-Phase
- Power factor corrected (some models)
- Up to 4kW
- DC inputs available: 100 – 380V_{DC}
- User and field configurable
- Compact sizes as small as 3.4 x 6.0 x 9.5in [86.4 x 152.4 x 241.3mm]
- Fan cooled
- Efficiency >80%
- Up to 20 regulated outputs (up to 10 slots) from 1 to 95V_{DC} and above
- Full power to 45°C on most products
- OVP, OTL, OCP on most outputs
- Autosense
- Power fail warning
- Sequencing and general shut down
- Agency approved cTÜVus, CE Marked
- Current Sharing
- Low leakage option available (some models)



PFC MegaPAC-EL/HPEL
15.6 x 6.0 x 3.4in
[396.2 x 152.4 x 86.4mm]
Up to 2400W at 230V_{AC}
1 – 16 Outputs (8 Slots)

PFC MegaPAC/HP
12.3 x 6.0 x 3.4in
[312.4 x 152.4 x 86.4mm]
Up to 2400W at 230V_{AC}
1 – 16 Outputs (8 Slots)

Product Description

The MegaPAC family of products offers four different versions of user configurability to meet almost any set of input and output requirements. Leveraging Vicor modular DC-DC converters, MegaPAC family products combine feature-laden front ends with slide-in output assemblies called ConverterPACs.

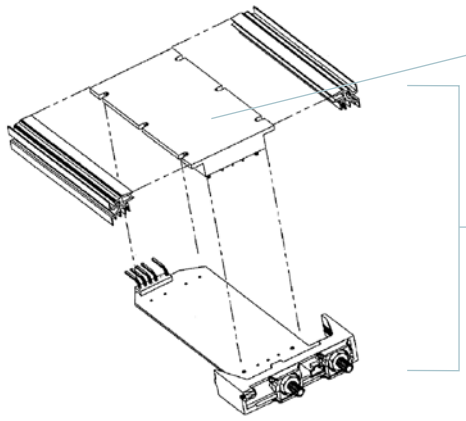
User configurability is at the heart of every MegaPAC. A wide variety of the same length ConverterPACs™ can be installed, exchanged or removed with the turn of just one screw. This means the MegaPAC can be reconfigured to meet evolving power requirements. Given its range of configurability, the MegaPAC is appropriate for virtually any application from prototype through production.

MegaPAC Family

Model	Dimension	Input Voltage	Output Power	Number of Outputs	ConvertPACs™ Per Slot
Mini MegaPAC™	9.5 x 6.0 x 3.4in [241.3 x 152.4 x 86.4mm]	90 – 132 / 180 – 264V_{AC} Strappable 260 – 380V_{DC}	1,000W @ 115V_{AC} or 230 Vac	1 – 10 (5 slots)	ModuPAC™, JrPAC™, DualPAC™, RamPAC™, BatPAC™
PFC MegaPAC-EL/HPEL™ [a]	15.6 x 6.0" x 3.4in [396.2 x 152.4 x 86.4mm]	85 – 264V_{AC} 100 – 380V_{DC}	1,200W @ 115V_{AC} 2,400W @ 230V_{AC}	1 – 16 (8 slots)	QPAC™, DualQPAC™, JrQPAC™, FinQPAC™ [b] (FinQPAC requires 2 slots)
PFC MegaPAC/HP™	12.3 x 6.0 x 3.4in [312.4 x 152.4 x 86.4mm]	85 – 264V_{AC} 100 – 380 Vdc	2,400W @ 230V_{AC} 1,200W @ 115V_{AC}	1 – 16 (8 slots)	ModuPAC, JrPAC, DualPAC, RamPAC, BatPAC, FinPAC™ [a] (FinPACs require 2 slots)
4kW MegaPAC™	14.0 x 7.5 x 4.9in [355.6 x 190.5 x 124.5mm]	208 or 240V_{AC} Three Phase 260 – 352V_{DC}	4,000W – 3 phase	1 – 20 (10 slots)	ModuPAC, JrPAC, DualPAC, RamPAC, BatPAC, UniPAC™ [b]

[a] Low noise ripple for EL power supplies is 10mV_{P-P} or 0.15% whichever is greater.
[b] ConverterPACs with Maxi module

MegaPAC Configuration

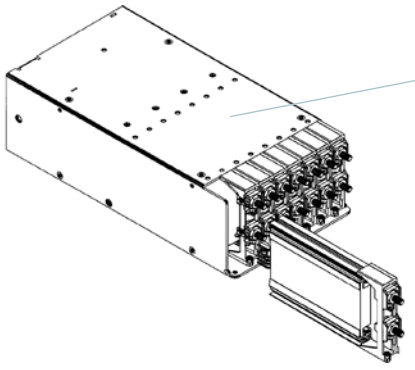


DC-DC Converter

At the heart of every MegaPAC are Vicor zero-current switching, DC-DC converters. The modularity of the design combined with the breadth of the product line means virtually any output voltage can be provided.

ConverterPAC

ConverterPACs are the slide-in output assemblies that allow each MegaPAC to be easily configured to user-specified output requirements. Using the Vicor DC-DC converter, up to 600W of output power can be provided per ConverterPAC. Larger power needs are easily handled by paralleling ConverterPACs.



MegaPAC

Each MegaPAC houses an array of user-selected ConverterPACs to provide a customized power supply. Using a different front end for each product line, almost any input power can be accommodated. The result is a customized power supply with off-the-shelf delivery.

Performance Specifications

Typical at 25ºC, nominal line and 75% load, unless otherwise specified

Parameter	PFC MegaPAC™, PFC MegaPAC-HP™, PFC MegaPAC-HPEL™, PFC MegaPAC-EL™	Mini MegaPAC™	4kW MegaPAC™
Input Characersitics			
Input	85 – 264V_{AC}	115 – 230V_{AC}, Strappable	208 / 240V_{AC}, 3-phase, 4 wire 180 – 264V_{AC} 1-phase
Standard Line	47 – 500Hz		
Vantage Line	47 – 63Hz		
	100 – 380V_{DC}	260 – 380V_{DC}	260 – 352V_{DC}
Line Regulation	0.2% max from 10% to full load		
Inrush Current	25A_{PK} at 115V_{AC}	80A_{PK} at 115 and 230V_{AC}	30A_{PK} at 230V_{AC}
	25A_{PK} at 230V_{AC}		
Ride-Through Time	>20ms at nominal line, full load		
Power Fail	>3ms warning		
Conducted EMI (47 – 63Hz)	EN 55022 Level B (certain configurations)	EN 55022 Level A	EN 55022 Level A
	FCC B		
Power Factor	0.99 (115V_{AC})	0.65	0.92 (3-phase operation)
	0.98 (230V_{AC})		
Surge Immunity (Common Mode & Normal Mode)	EN 61000-4-5 Class 3, Performance Critera B		
Output Characersitics			
Load Regulation	0.2% max from 10% to full load		
	0.5% from no load to 10% load		
Set-Point Accuracy	Standard Line:1.0% for standard voltages, 2.0% for special or adjustable voltages		
	Vantage Line: 2.0% for standard voltages, 5.0% for special or adjustable voltages		
	See Vicor module specifications. A preload may be necessary for modules trimmed down below 90% of normal output voltage.		
Ripple and Noise (20MHz BWL)	Standard outputs: 2% or 100mV_{P-P} max whichever is greater, 10% minimum load		
	VXI options: 50mV_{P-P} max for outputs, ≤15V_{DC}; 150mV_{P-P} max. 15V < V_{OUT} ≤ 24V; 1% V_{OUT} > 24V		
	2nd Generation QPAC, FinPAC, FinQPAC and UniPAC performance dependent on the converter module used. (Output of module is unfiltered.)		
	QPAC, DualQPAC, JuniorQPAC, RamPAC: 10mV_{P-P} max or 0.15%, whichever is greater.		
Overcurrent Protection	105 –130% > 5V outputs		
	30 – 125% ≤ 5V outputs		
Overvoltage Protection	ModuPACs and QPACs: 115 – 135%		
Efficiency	80% typical	82% typical	82% typical
Output Power	1,600W at 40°C (230V_{AC}) PFC MegaPAC; PFC MegaPAC-EL (Low Noise)	1,000W at 45°C (115 / 230V_{AC})	4,000W at 45°C (3-phase)
	2,400W at 40°C (230V_{AC}) PFC MegaPAC HP, PFC MegaPAC HPEL		1,500W at 45°C (1-phase)
	1,200W at 40°C (115V_{AC}) PFC MegaPACs		

Performance Specifications (Cont.)

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

Parameter	PFC MegaPAC™, PFC MegaPAC-HP™, PFC MegaPAC-HPEL™, PFC MegaPAC-EL™	Mini MegaPAC™	4kW MegaPAC™
Environmental			
Storage Temperature	–40 to +85°C		
Operating Temperature [c]			
Vantage Line Full Power	0 to +40°C	0 to +45°C	0 to +45°C
Vantage Line Half Power	0 to +60°C	0 to +65°C	0 to +65°C
Standard Line Full Power	–20 to +40°C	–20 to +45°C	–20 to +45°C
Standard Line Half Power	–20 to +60°C	–20 to +65°C	–20 to +65°C
Safety Agency Approvals	cTÜVus		
	CE Marked for Low Voltage Directive and RoHS Recast Directive, as applicable		
Product Weight (Fully Configured)	9.75lbs [4.43kg] (PFC MegaPAC & HP)	6.25lbs [2.84kg]	22.0lbs [10kg]
	12.8lbs [5.8kg] (PFC MegaPAC EL)		
	13.0lbs [6.0kg] (PFC MegaPAC HPEL)		
Limited Warranty	2 Years		

[c] PFC MegaPACs: The maximum operating temperature is 40°C. If using a VI-200™ with output voltage <12V and >150W, the operating temperature decreases to 35°C. This also applies when using a FinPAC™ with output voltage <24V and >500W. Mini MegaPAC & 4kW MegaPACs: The operating temperature is 45°C using any combination of modules and output voltages as long as the front-end rating is not exceeded. Normal derating applies to half power if the ambient temperature is 20°C hotter.

ConverterPAC™ Overview

- Output voltages from 2 – 95V_{DC}
- Output power up to 600W
- DC OK
- Adjustment ranges from 50% to 110% of nominal
- Autosense / Remote Sense
- Low noise option:10mV_{P-P} or 0.15%, whichever is greater
- 80 – 90% efficiency
- Current source outputs available

MegaPAC Configuration for MegaPAC Family Product

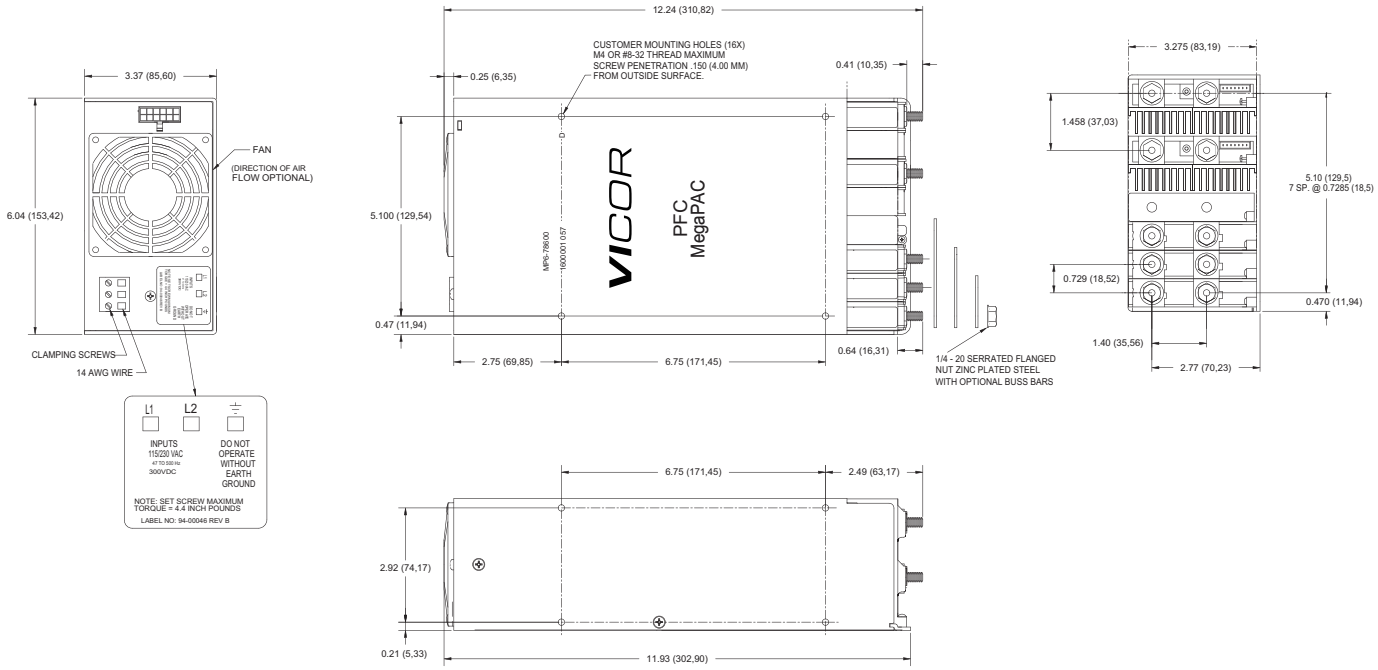
Converters	Module(s) Used	Maximum Output Power
VE-200 and VE-J00 ConverterPACs		
 ModuPAC™ (M) (RoHS – GM)	1 VE-200 DC-DC Converter	Up to 200W per ConverterPAC
 RamPAC™ (R) (RoHS – GR)	1 VE-J00 DC-DC Converter 1 Ripple Attenuator Module (VI-RAM)	Up to 100W for applications requiring low ripple / noise
 DualPAC™ (D) (RoHS – GD)	2 VI-J00™ DC-DC Converters	Dual Output; Up to 100W each output
 JuniorPAC™ (J) (RoHS – GJ)	1 VI-J00 DC-DC Converter	Up to 100W
 BatPAC™ (B) (RoHS – GB)	1 VI-200™ BatMod	A 200W programmable current source that can be configured as a battery charger
 QPAC™ [d] Low Noise (L) (RoHS – GL)	1 VI-200 DC-DC Converter with differential- and common-mode filters	Up to 200W for applications requiring as low as 10mV_{P-P} output noise
 JrQPAC™ [d] Low Noise (LJ) (RoHS – GLJ)	1 VE-J00 DC-DC Converter with differential- and common-mode filters	Up to 100W
 DualQPAC™ [d] Low Noise (LD) (RoHS – GLD)	2 VI-J00 DC-DC Converters with differential- and common-mode filters	Dual Output; Up to 100W each output
Maxi ConverterPACs		
 UniPAC™ (XU) (RoHS – GXU)	1 Maxi DC-DC Converter	Up to 500W; Applicable for 3-phase / 4kW product
 FinPAC™ [e] (PZ) (RoHS – GPZ)	1 Maxi DC-DC Converter	Up to 600W; Applicable for PFC MegaPAC High Power
 FinQPAC™ [e] (PZL) (RoHS – GPL)	1 Maxi DC-DC Converter with discrete output filter	Up to 600W; Applicable for PFC MegaPAC-HPEL

[d] Only for the extended-length MegaPACs
[e] FinPACs and FinQPACs require two (2) slots.

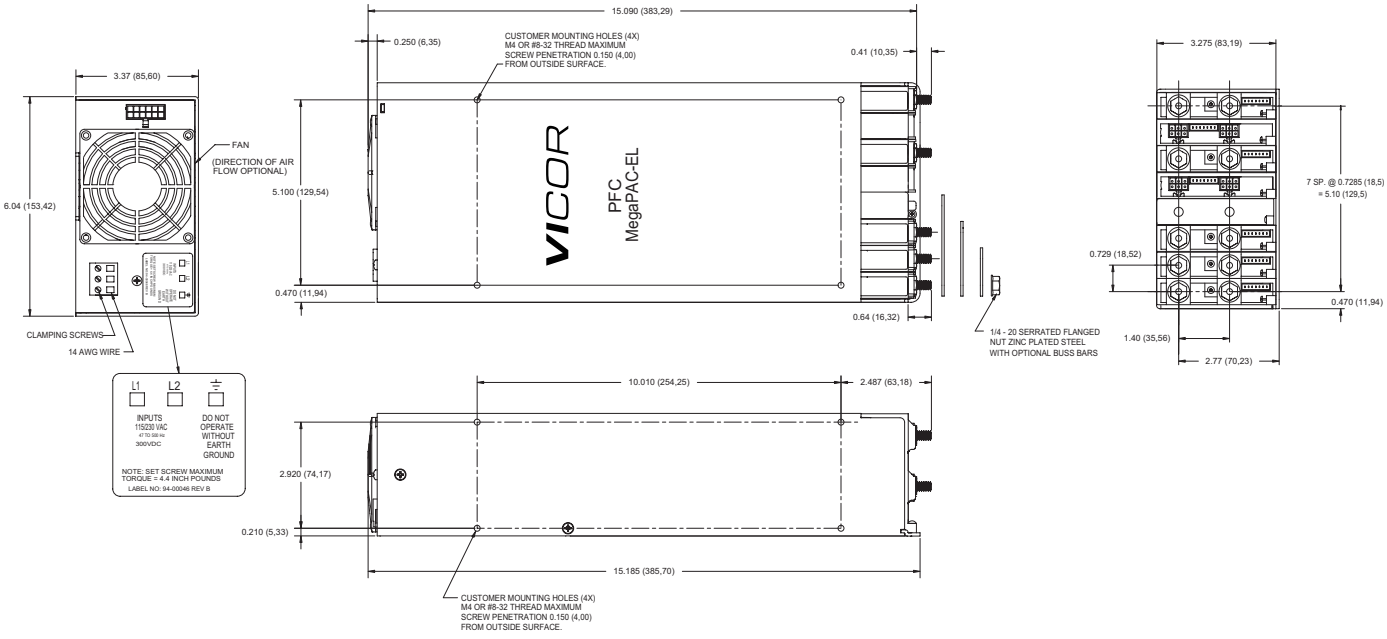
MegaPAC Mechanical Drawings

Note: Newer power supplies have redesigned output studs which are 1/8th inch longer. Design guides available online at vicorpower.com for more details.

PFC MegaPAC™ / PFC MegaPAC-High Power™



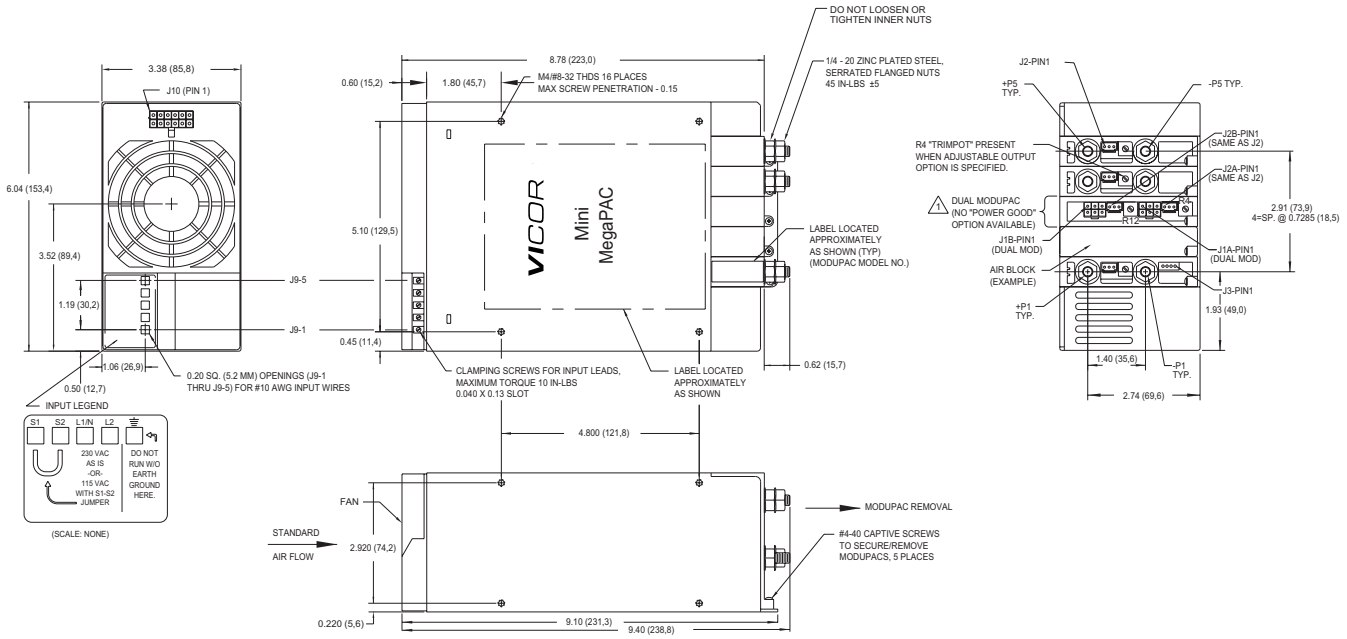
PFC MegaPAC-EL™ (Low Noise)



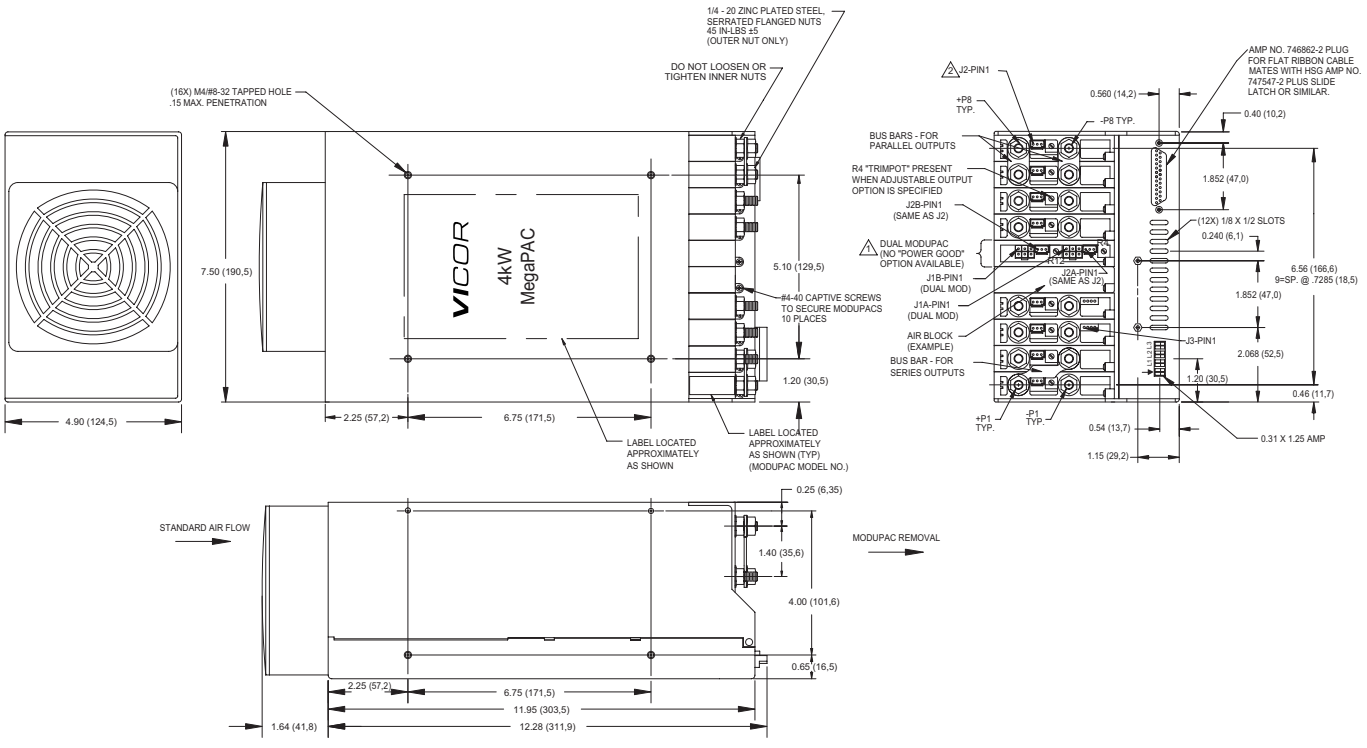
MegaPAC Mechanical Drawings

Note: Newer power supplies have redesigned output studs which are 1/8th inch longer. Design guides available online at vicorpower.com for more details.

Mini MegaPAC™



4kW MegaPAC™



Connection Diagrams – Input

PFC MegaPAC™
PFC MegaPAC-High Power™
PFC MegaPAC-EL™
PFC MegaPAC-HPEL™

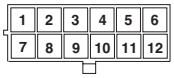
INPUT CONNECTIONS
J9

J9-3 L1/N
J9-2 L2
J9-1 Earth Ground

J10 Interface

J10-1	E/D-1
J10-2	E/D-2
J10-3	E/D-3
J10-4	E/D-4
J10-5	E/D-5
J10-6	E/D-6
J10-7	E/D-7
J10-8	E/D-8
J10-9	Vcc +5V, 0.3A
J10-10	Signal Ground
J10-11	AC Power OK
J10-12	General Shutdown

J10



Housing-Molex P/N: 39-01-2120
Terminal-Molex P/N: 39-00-0039
Crimp Tool-Molex P/N: 11-01-0197

Mini MegaPAC™

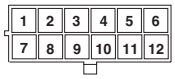
INPUT CONNECTIONS
J9

J9-5 120V_{AC} } Jumper for 115V operation
J9-4 120V_{AC}
J9-3 AC Neutral
J9-2 AC Hot
J9-1 Earth Ground

J10 Interface

J10-1	E/D-1
J10-2	E/D-2
J10-3	E/D-3
J10-4	E/D-4
J10-5	E/D-5
J10-6	N/C
J10-7	N/C
J10-8	N/C
J10-9	VCC +5V, 0.3A
J10-10	Signal Ground
J10-11	AC Power OK
J10-12	General Shutdown

J10



Molex header Mini-fit Jr. 12 POS #39-30-1120
Customer I/O interface mating receptacle
Molex #39-01-2120with terminal #39-00-0039
and 18-24 AWG str anded wire.
Use Molex tool #11-01-0197

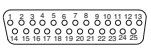
4kW MegaPAC™

INPUT CONNECTIONS
J1

J1-1 Line 3
J1-2 Line 2
J1-3 Line 1
J1-4 Earth Ground

J10 Interface

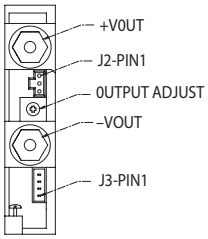
1 Signal Ground	14 Phase Fail Warning
2 Signal Ground	15 Signal Ground
3 Overtemp. Warning	16 Vcc +5 volt, 300 mA
4 Analog Temperature	17 Vcc +5 volt, 300 mA
5 General Shutdown	18 AC Power OK
6 No Connection	19 AC Power Fail
7 Enable/Disable #10	20 Enable/Disable #9
8 Enable/Disable #8	21 Enable/Disable #7
9 Enable/Disable #6	22 Enable/Disable #5
10 Enable/Disable #4	23 Enable/Disable #3
11 Enable/Disable #2	24 Enable/Disable #1
12 Signal Ground	25 Gate Out Slot #10 (isolated)
13 Gate In Slot #1 (isolated)	



Amp 25 pin connector #841-17-DBFR-DA25P plug for flat ribbon cable. Mates with housing ADAM TECH #DB25-SR-SL and contacts #DCS-01B plus slide latch #HDW-043-25.

Connection Diagrams – Output

ModuPAC™
JuniorPAC™
RamPAC™



J2 (REMOTE SENSE)

1	TRIM PIN ACCESS
2	+SENSE
3	–SENSE

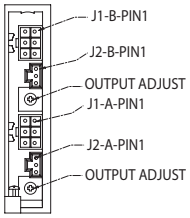
J3 DC OK (POWER GOOD)

4	VCC IN
3	POWER GOOD
2	POWER GOOD INVERTED
1	SIGNAL GROUND

MATING HARDWARE
HOUSING- MOLEX P/N: 50-57-9403
TERMINALS- MOLEX P/N: 16-02-0103
CRIMP TOOL MOLEX P/N: 63811-8700

MATING HARDWARE
HOUSING- MOLEX P/N: 50-37-5043
TERMINALS- MOLEX P/N: 08-70-1040
CRIMP TOOL MOLEX P/N: 63811-5200

DualPAC™



J1 (OUTPUT CONNECTORS)

4 1	1 AND 4 +VOUT
5 2	2 AND 5 –VOUT
6 3	3 +R/SENSE 6 –R/SENSE

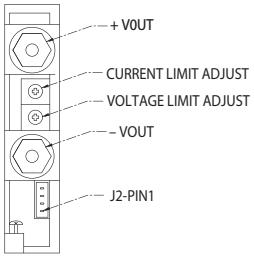
J2 (REMOTE SENSE)

1	TRIM PIN ACCESS
2	+ SENSE
3	–SENSE

MATING HARDWARE
HOUSING- MOLEX P/N: 39-01-2060
TERMINALS- MOLEX P/N: 39-00-0039
CRIMP TOOL MOLEX P/N: 11-01-0197

MATING HARDWARE
HOUSING- MOLEX P/N: 50-57-9403
TERMINALS- MOLEX P/N: 16-02-0103
CRIMP TOOL MOLEX P/N: 11-01-0208

BatPAC™

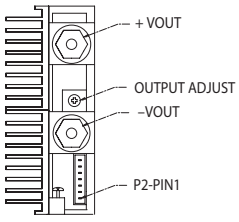


J2 (BATPAC REMOTE INTERFACE)

4	CURRENT LIMIT ADJUST
3	VOLTAGE LIMIT ADJUST
2	CURRENT MONITOR
1	– VOUT

MATING HARDWARE
HOUSING- MOLEX P/N: 50-37-5043
TERMINALS- MOLEX P/N: 08-70-1040
CRIMP TOOL MOLEX P/N: 63811-5200

FinPAC™



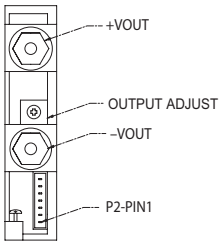
P2 REMOTE SENSE T RIM/SC & POWER GOOD

7	+SENSE
6	–SENSE
5	TRIM
4	VCC IN
3	POWER GOOD
2	POWER GOOD INVERTED
1	SIGNAL GROUND

MATING HARDWARE
HOUSING- MOLEX P/N: 50-37-5073
TERMINALS- MOLEX P/N: 08-70-1040
CRIMP TOOL MOLEX P/N: 63811-5200

Connection Diagrams – Output (Cont.)

QPAC™
JuniorQPAC™

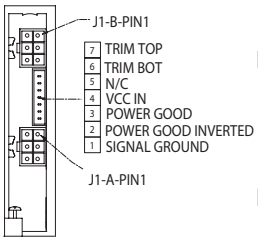


P2 REMOTE SENSE TRIM/SC & POWER GOOD

7	+SENSE
6	–SENSE
5	TRIM
4	VCC IN
3	POWER GOOD
2	POWER GOOD INVERTED
1	SIGNAL GROUND

MATING HARDWARE
HOUSING- MOLEX P/N: 50-37-5073
TERMINALS- MOLEX P/N: 08-70-1040
CRIMP TOOL MOLEX P/N: 63811-5200

DualQPAC™



7	TRIM TOP
6	TRIM BOT
5	N/C
4	VCC IN
3	POWER GOOD
2	POWER GOOD INVERTED
1	SIGNAL GROUND

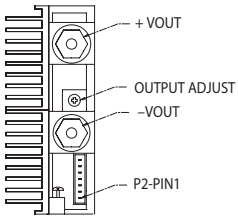
J1-B (OUTPUT CONNECTORS) **MATING HARDWARE**

4 1	1 AND 4 +VOUT	HOUSING- MOLEX P/N: 39-01-2060
5 2	2 AND 5 –VOUT	TERMINALS- MOLEX P/N: 39-00-0039
6 3	3 +R/SENSE 6 –R/SENSE	CRIMP TOOL MOLEX P/N: 11-01-0197

J1-A (OUTPUT CONNECTORS) **MATING HARDWARE**

4 1	1 AND 4 +VOUT	HOUSING- MOLEX P/N: 39-01-2060
5 2	2 AND 5 –VOUT	TERMINALS- MOLEX P/N: 39-00-0039
6 3	3 +R/SENSE 6 –R/SENSE	CRIMP TOOL MOLEX P/N: 11-01-0197

FinQPAC™



P2 REMOTE SENSE T RIM/SC & POWER GOOD

7	+SENSE
6	–SENSE
5	TRIM
4	VCC IN
3	POWER GOOD
2	POWER GOOD INVERTED
1	SIGNAL GROUND

MATING HARDWARE
HOUSING- MOLEX P/N: 50-37-5073
TERMINALS- MOLEX P/N: 08-70-1040
CRIMP TOOL MOLEX P/N: 63811-5200

ConverterPAC™ Options

Option	ModuPAC™ (M)	BatPAC™ (B)	DualPAC™ (D)	JuniorPAC™ (J)	RamPAC™ (R)	DualQPAC™ (LD)	QPAC™ (L)	JuniorQPAC™ (LJ)	UniPAC™ (XU)	FinPAC™ (PZ)[f]	FinQPAC™ (PLZ)[f]
D Power Good	OPT	NA	NA	OPT	OPT[i]	OPT[i]	OPT	OPT	OPT	OPT	OPT
T Trim: +10%/–10%	OPT[g]	NA	OPT	OPT[g]	OPT[g]	NA	OPT[g]	OPT	OPT	OPT	OPT
F Trim: +10%/–50%	OPT[g]	NA	OPT	OPT[g]	OPT[g]	NA	OPT[g]	OPT	OPT	OPT	OPT
V1 VXI Low Noise ($150mV_{P-P}$ $15V < V_{OUT} \leq 24V$)	OPT	NA	OPT	OPT	NA[h]	NA[h]	NA[h]	NA[h]	NA	NA	NA[h]
V2 VXI Low Noise ($50mV_{P-P} \leq 15V$)	OPT	NA	OPT	OPT	NA	NA	NA	NA	NA	NA	NA
V3 VXI Low Noise (1% $V_{OUT} > 24V$)	OPT	NA	OPT	OPT	NA	NA	NA	NA	NA	NA	NA
Parallelable	STD	STD	NA	NA	NA	NA	STD	NA	STD	STD	STD
Autosense	STD	NA	STD	STD	NA	STD	STD	STD	STD	STD	STD

[f] FinPACs and FinQPACs require two slots.
[g] Module dependent, 3.3V, 10 – 15V "T" option only.
[h] All QPACs and RamPACs have output ripple of $10mV_{P-P}$ or 0.15% whichever is greater.
[i] Per slot-based indicator.

Vicor's comprehensive line of power solutions includes high density AC-DC and DC-DC modules and accessory components, fully configurable AC-DC and DC-DC power supplies, and complete custom power systems.

Information furnished by Vicor is believed to be accurate and reliable. However, no responsibility is assumed by Vicor for its use. Vicor makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication. Vicor reserves the right to make changes to any products, specifications, and product descriptions at any time without notice. Information published by Vicor has been checked and is believed to be accurate at the time it was printed; however, Vicor assumes no responsibility for inaccuracies. Testing and other quality controls are used to the extent Vicor deems necessary to support Vicor's product warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Specifications are subject to change without notice.

Visit http://www.vicorpower.com/megapac for the latest product information.

Vicor's Standard Terms and Conditions and Product Warranty

All sales are subject to Vicor's Standard Terms and Conditions of Sale, and Product Warranty which are available on Vicor's webpage (http://www.vicorpower.com/termsconditionswarranty) or upon request.

Life Support Policy

VICOR'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE CHIEF EXECUTIVE OFFICER AND GENERAL COUNSEL OF VICOR CORPORATION. As used herein, life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in a significant injury to the user. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness. Per Vicor Terms and Conditions of Sale, the user of Vicor products and components in life support applications assumes all risks of such use and indemnifies Vicor against all liability and damages.

Intellectual Property Notice

Vicor and its subsidiaries own Intellectual Property (including issued U.S. and Foreign Patents and pending patent applications) relating to the products described in this data sheet. No license, whether express, implied, or arising by estoppel or otherwise, to any intellectual property rights is granted by this document. Interested parties should contact Vicor's Intellectual Property Department.

Contact Us: http://www.vicorpower.com/contact-us

Vicor Corporation
25 Frontage Road
Andover, MA, USA 01810
Tel: 800-735-6200
Fax: 978-475-6715
www.vicorpower.com

email
Customer Service: custserv@vicorpower.com
Technical Support: apps@vicorpower.com