

CERTIFICATE OF COMPLIANCE

Certificate Number 20140327-E181848
Report Reference E181848-19960718
Issue Date 2014-MARCH-27



Issued to: VICOR CORP
25 FRONTAGE RD
ANDOVER MA 01810

This is to certify that representative samples of COMPONENT - POWER SUPPLIES FOR USE IN HAZARDOUS LOCATIONS
See Addendum Page

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

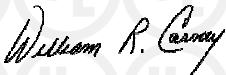
Standard(s) for Safety: See Addendum Page
Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Recognized Component Marks for the U.S. and Canada should be considered as being covered by UL's Recognition and Follow-Up Service and meeting the appropriate U.S. and Canadian requirements.

The UL Recognized Component Mark for the U.S. generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark: , may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions. The UL Recognized Component Mark for Canada consists of the UL Recognized Mark for Canada:  and the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory.

The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Recognized Component Mark on the product.



William R. Carney, Director, North American Certification Programs

UL LLC

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This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Component Power Supply, Flat Pack Series, Model Nos. VI-abccc-deee-ff-xx. The power supplies are intended for use with data processing equipment, office appliances and business equipment.

Class I, Division 2, Groups A, B, C and D Hazardous Locations only.

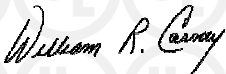
Standard(s) for Safety:

ANSI/ISA 12.12.01-2012 - Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 (Classified) Locations;

C22.2 No. 213-M1987 - Non Incendive Electrical Equipment For Use In Class I, Div. 2 Hazardous Locations;

Standard No. UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements)

CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment - Safety - Part 1: General Requirements)



William R. Carney, Director, North American Certification Programs

UL LLC

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File E181848
Project 95NK30863

July 18, 1996

REPORT

on

COMPONENT - POWER SUPPLIES FOR USE IN
HAZARDOUS LOCATIONS

Vicor Corporation
Andover, MA

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named company to reproduce this Report provided it is
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DESCRIPTION

PRODUCT COVERED:

USR, CNR

Component Power Supply, Flat Pack Series, Model Nos. VI-abccc-deee-ff-xx. The power supplies are intended for use with data processing equipment, office appliances and business equipment. Refer to ILL.14 for nomenclature breakdown.

Class I, Division 2, Groups A, B, C and D Hazardous Locations only.

GENERAL CHARACTER AND USE:

The Flat Pac Series is built using up to three R/C (QQBK2) Vicor dc-dc output voltage modules which provide primary to secondary isolation. It can be configured by selecting the desired output voltages of the modules and paralleling of similar outputs to provide the output configuration described in the Nomenclature section of this Report (up to three outputs). Units with the same number of modules share the same front end primary circuitry. They are intended to be factory wired within electronic data processing equipment. ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

USR - The power supplies were investigated for compliance with ANSI/ISA-12.12.01-2012, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 (Classified) Locations. Information Processing and Business Equipment, UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements)

CNR - The power supplies were investigated for compliance with Standard C22.2 No. 213-M1987, Non-Incendive Electrical Equipment For Use In Class I, Div. 2 Hazardous Locations. CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment - Safety - Part 1: General Requirements)

NOMENCLATURE BREAKDOWN:

Refer to ILL. 14.

ELECTRICAL RATINGS:

Refer to ILL. 14.

*** CONDITIONS OF ACCEPTABILITY:**

1. The supplies should be installed within an enclosure so that the exposed current-carrying parts (wiring terminals) are suitably enclosed.
2. The baseplate temperature should be measured in the end-use, and should not exceed 85°C.
3. The component power supply may be used in still air at 25°C if the output is derated; and the baseplate is maintained at or less than 85°C.
4. Secondary circuits have not been investigated for secondary interconnection or user accessibility.
5. The input and output terminals are not acceptable for field connections and are only intended for connection to mating connectors of internal wiring inside the end-use machine. The acceptability of these and the mating connectors relative to secureness, insulating materials, and temperature should be considered.
6. The "Gate In" and "Gate Out" terminals are in low voltage primary connected circuits.
7. Based on Paragraph 35A.1 of the Standard for Telephone Equipment, UL 1459; these products are acceptable for use with telephone equipment.
8. These units have an earth leakage current which exceeds 3.5 mA at high frequency inputs.

For units which operate at input frequencies higher than 63 Hz the end-product must be provided with industrial type sockets or plugs and the cross-sectional area of the internal protective earthing conductor may not be less than 1.0 mm², or the end-product must be additionally evaluated to determine acceptability with respect to leakage current requirements of UL 1950.

9. If the end-product input frequency exceeds 63 Hz, the following marking must be provided:

"WARNING - HIGH LEAKAGE CURRENT - EARTH CONNECTON ESSENTIAL BEFORE CONNECTING SUPPLY."

10. The Temperature Test should be conducted in the end application to determine a T Code.

11. The need for the following instructions shall be determined in the end application.
- A. SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D.
 - B. WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.
 - C. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.
 - D. WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES.
12. **These components have been judged on the basis of the required spacings in UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment - Safety - Part 1: General Requirements) which covers the end-use product for which the component was designed.**

CONSTRUCTION DETAILS:

General - See ILLS. 1 through 3 for schematic.

Spacings - Minimum spacings between live parts of opposite polarity and between live- and dead-metal parts shall be as indicated below.

Spacing Other Than at Field Wiring Terminals

Potential Involved Volts V rms (Peak)	Minimum Spacings, in. (mm)	
	Over Surface	Through Air
0-50 (0-70.7)	3/64 (1.2) ^b	3/64 (1.2) ^b
51-125 (72.1-176.8)	1/16 (1.6) ^b	1/16 (1.6) ^b
126-250 (178.2-353.5)	3/32 (2.4) ^b	3/32 (2.4) ^b

^bOn printed wiring boards, their connectors, and board mounted electrical components, wired on the load side of line filters or similar voltage-peak reduction networks and components, a minimum spacing of 0.023 in. (0.58 mm) plus 0.0002 in. (0.005 mm) per volt peak shall be maintained over the surface and through air between uninsulated live parts and any other uninsulated live parts and any other uninsulated conductive part (live or dead) not of the same polarity.

* Marking - All markings are located on outer chassis and are ink-stamped or applied with self-adhesive label. Marking includes Vicor and model number. **Marking may include Class I, Div. 2, Groups A, B, C, and D.**

Industrial units (i.e., F is "I", frequency 47-440 Hz units) are provided with a "Warning High Leakage Current" label. Refer to ILL. 13.

Sealants - Provided on internal components for limiting vibration, Type ECCOSIL SC71 by Emerson and Cuming or Type NUVA-SIL 88 Loctite **or type (R/C) QMFZ2, Momentive Performance Material Japan TSE3944-W rated V-1 min or SHIN-ETSU Chemical KE-3494 rated V-1 min.** Not relied upon for securement of components.

*

Company: Vicor Corporation, 25 Frontage Road Andover, MA 01810 USA

VI - a b c c c - d e e e - f f - x x FlatPAC Family Tree

VI Product Type

VI = VI (Vicor), VI = VE (Vicor RoHs), VI = IP (VJCL), VI = IE (VJCL RoHs)

a	Module Configurations	Input Current (Max)	b	Input Type
	L = 1 module, 1 output	5.0 / 2.5 A		F = Strappable
	M = Up to 2 modules, 1 output	9.5 / 6.0 A		A = AutoRanging
	N = Up to 3 modules, 1 output	13.5 / 8.0 A		U = Universal
	P = Up to 2 modules, 2 outputs	9.5 / 6.0 A		
	Q = Up to 3 modules, 2 outputs	13.5 / 8.0 A		
	R = Up to 3 modules, 3 outputs	13.5 / 8.0 A		

d	Product Grade	Input Voltage
	C = Commercial -20C to 85C	100-120 / 200-240 V, 47-63 Hz
	I = Industrial -40C to 85C	100-120 / 200-240 V, 47-440 Hz
	M = Military -55C to 85C	100-120 / 200-240 V, 47-440 Hz
	E = Economy 0C to 85C	100-120 / 200-240 V, 47-63 Hz

eee	Output Power	ccc	Output voltage (Vdc) Nominal
	Vout ≥ 5V		Z = 2.0
	Vout ≤ 5V		2 = 15.0
	M = 600W		Y = 3.3
	120A		N = 18.5
	P = 450W		O = 5.0
	90A		3 = 24.0
	Q = 400W		X = 5.2
	80A		L = 28.0
	S = 300W		W = 5.5
	60A		J = 36.0
	U = 200W		V = 5.8
	40A		K = 40.0
	V = 150W		4 = 48.0
	30A		R = 7.5
	W = 100W		H = 52.0
	20A		M = 10.0
	X = 75W		F = 72.0
	15A		I = 12.0
	Y = 50W		D = 85.0
	10A		P = 13.8
	Z = 25W		B = 95.0
	5A		

ff	Customer Options (optional)
	BC = BatMOD/Conduction Cooled
	BM = BatMOD
	CC = Conduction Cooled
	LL = Low Leakage version

xx	Customer Specials (optional)
	00-99 = unique customer labels, testing, or non-safety related component changes (d and eee are optional when xx is used)

Example

VI-PU01-CUX-23

P = Up to 2 modules, 2 outputs, U = Universal, 0 = 5Vdc, 1 = 12Vdc, C = Commercial product Grade

U = Output 1 @ 200W, X = Output 2 @ 75W, 23 = Customer Label