

## QuiQPLUS™ Series: MODULAR/CONFIGURABLE 1U High, Up to 1000 Watts with up to 8 outputs

### FEATURES

- 1U High
- 600, 800 & 1000 Watt Configurations
- 1 to 8 Outputs
- Any voltage from 3V to 56V
- Wide Range Output Adjust
- Any Combination of Single or Dual Modules
- Isolated and Floating Outputs
- Parallel Operation of Single Output Modules
- Universal 85 to 264VAC Input to 800W
- I<sup>2</sup>C Serial Data Bus
- TTL Level Control and Status Signals
- Power Factor Correction
- Class B Input EMI Filter
- 5VDC/100mA Standby Output
- Up to 10.9 Watts/Cubic Inch
- Optimized Thermal Management
- No Minimum Load
- Thermally Controlled Fan Speed
- SEMI F47 Compliant to 800W



**TWO-YEAR WARRANTY**



C U8V 11 05  
61384 017



LVD2006/95/EC



### CHASSIS CAPABILITIES

Chassis Code	Maximum Power	AC Voltage Range
QH	600W	85-264VAC
QM	800W	85-264VAC
QN	1000W	180-264VAC

### OUTPUT MODULE CAPABILITIES

SINGLE OUTPUT MODULES							
HIGH CURRENT MODULES				HIGH CURRENT MODULES			
Module Code <sup>2</sup>	Voltage Range	Max. Current <sup>1</sup>	Max. Power <sup>1</sup>	Module Code <sup>2,3</sup>	Voltage Range	Max. Current <sup>1</sup>	Max. Power <sup>1</sup>
BL	3.0V-7.2V	35.0A	220W	BH	3.0V-7.2V	70.0A	350W
CL	7.0V-16.8V	16.6A	240W	CH	7.0V-16.8V	33.3A	400W
DL	15.0V-36.0V	8.3A	250W	DH	15.0V-36.0V	16.6A	400W
EL	30.0V-56.0V	4.2A	215W	EH	30.0V-56.0V	6.8A	325W

DUAL OUTPUT MODULES					
Module Code	Output 1		Output 2		Max. Power <sup>1</sup>
	Voltage Range	Max. Current <sup>1</sup>	Voltage Range	Max. Current <sup>1</sup>	
BB	3.0V-7.2V	10.0A	3.0V-7.2V	10.0A	50W/50W
BC	3.0V-7.2V	10.0A	3.0V-7.2V	10.0A	50W/60W
CC	7.0V-16.8V	5.0A	7.0V-16.8V	5.0A	60W/60W
DD	15.0V-36.0V	2.5A	15.0V-36.0V	2.5A	60W/60W

**Notes:**

1. The maximum output from each module is defined by the maximum current or power, whichever is first.  
For example, a type BH module will provide 3.0-5.0V at up to 70A and from 5.0-7.2V at up to 350W. Above 5.0V current is limited automatically to maintain power within the 350W limit.  
When two or more single output modules are configured for parallel operation the maximum power for each module is reduced by 15%.
2. The maximum allowable series module voltage is 200V.
3. QH chassis accepts only one high current module.

### QuiQPLUS™ CONFIGURATION GUIDE

To specify a unit to meet your needs:

1. List the actual output voltages and currents required.
2. Add the total combined power and select the most appropriate chassis code.
2. Select the module or combination of modules that most closely meets the needs for each output.
  - a) To specify a single output module or combination of modules: Prefixing the module code shown in the tables to the left with the exact output voltage required, to the nearest 100mV. e.g. 3.4BH represents a type BH module set to 3.4V. To parallel two like modules please indicate this by adding 2P to the end of the module code. e.g. 3.4BH2P represents two type BH modules set to 3.4V and connected in parallel. The same applies for 3 or 4 modules in parallel. Adding 3P or 4P.
  - b) To specify a dual output module: Prefix each half of the module code shown with the exact output voltage required, to the nearest 100mV. e.g. 13.4C15.1C represents a dual output module type CC with the first output set to 13.4V and the second to 15.1V.
3. Enter the chassis code and then the module codes into the template below from left to right in ascending order of actual required voltage, starting with single output modules or module combinations followed by dual output modules. Note that 2P, 3P or 4P combinations will occupy only one template position and that the combination of modules selected may also result in less than 4 positions being filled.

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For further explanation on how to configure your exact model number see the Detailed Configuration Guide on the last page of this datasheet.

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## SPECIFICATIONS

Typical at Nominal 115/230VAC Line, Full Load and 25°C Unless Otherwise Noted.

### OUTPUT SPECIFICATIONS

Total Output Power, Continuous, Max	1000 Watts
Voltage Adjustment Range, local or remote trim	See table
Total Regulation <sup>1</sup>	2.0%
Total Regulation, Standby Supply	5.0%
Ripple & Noise, Pk-Pk <sup>2</sup>	1% or 50mV
Hold-up Time <sup>3</sup>	20ms
Dynamic Response <sup>4</sup>	300µs
Temperature Coefficient	±0.02%/°C
Minimum Load	0A
Overload Protection	Auto Recovery
Overvoltage Protection	Latched Shutdown
Remote Sense	Up to 0.25V Per Wire
Current Share, singles only	±15% Full Load Rating
Standby Output	+5V, 100mA
DC Power Good Signal	Logic Low
AC Power Good Signal	Logic Low
Module Inhibit	Logic Low
Global Inhibit	Logic Low

### INPUT SPECIFICATIONS

Input Voltage Range	
600 & 800W	85-264VAC
1000W	180-264VAC
Power Factor	0.99
Input Frequency	47-63Hz
Inrush Current Limiting	30A Peak
Input EMI Filter	EN55022 Curve B FCC20780 pt. 15J Curve B
Harmonic Distortion	EN61000-3-2
Input Current	
600W	6.5A@115VAC, 3.2A@230VAC
800W	8.7A@115VAC, 4.3A@230VAC
1000W	5.4A@230VAC
Input Immunity, Conducted	
Fast Transients, Line-Line	±2kV (EN61000-4-4 Level 3)
Surges, Line-Line	±2kV (EN61000-4-5 Level 3)
Surges, Line-Ground	±4kV (EN61000-4-5 Level 4)
Input Protection	Internal Fuse, 15A

### GENERAL SPECIFICATIONS

Efficiency <sup>5</sup>	80% at Full Load
Isolation, Class I, min. <sup>6</sup>	
Input-Output	3000VAC
Input-Ground	1500VAC
Output-Ground	500VDC
MTBF (Bellcore)	200,000 Hours
Safety Certifications	EN60950-1, UL1950-1, CSA22.2 No.60950-1

### ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-20°C to 70°C Ambient
Derating	2.5%/°C, 50°C to 70°C
Storage Temperature	-40°C to +85°C
Cooling	Integral Ball Bearing Fans

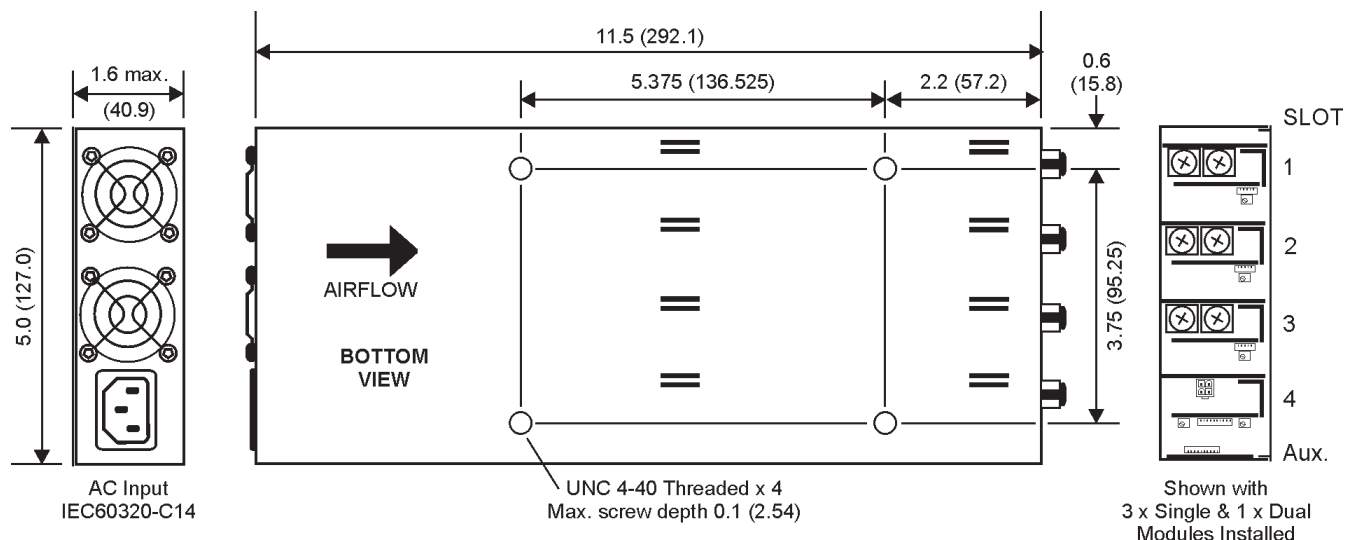
### PHYSICAL SPECIFICATIONS

Case Material	Steel
Dimensions, Inches(mm)	1.6 H x 5.0 W x 11.5 D (40.9 x 127 x 292)
Weight	5.35 lbs. (2.4 kg.)

#### NOTES:

- No load to full load, including line regulation and load regulation.
- Whichever is greater, 20MHz bandwidth. Measured with 0.1µF ceramic and 10µF tantalum capacitors in parallel across the output.
- When output is set at approximately the midpoint of it's range.
- <5% deviation recovering to within 1% for 25% load change.
- Typical efficiency for 4 output unit with one high current output of 5V or lower. Efficiency can vary 5% or more depending on combination of outputs.
- Input-output isolation figure is for isolation components only. 100% production Hipot tested.

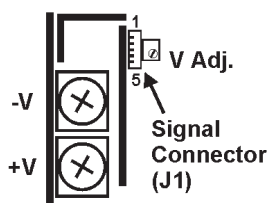
## OUTLINE & DIMENSIONS



ALL DIMENSIONS NOMINAL IN INCHES (mm).

## OUTPUT AND GLOBAL MODULE INTERFACE DETAIL

Single Output Module    Dual Output Module    Global Module

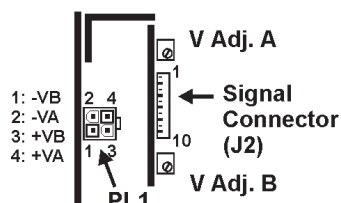


J1

Pin	Function
1	+ve Sense
2	-ve Sense
3	Trim
4	Share
5	Inhibit

### Mating Connector

Supplied as standard, pre-wired with cable length ~24"/610mm, one per installed module.  
Pt. No. 319-1728-0000



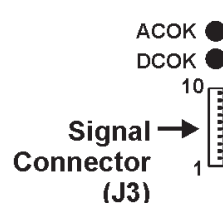
J2

Pin	Function - VA	Pin	Function - VB
1	+ve Sense	6	-
2	-ve Sense	7	+ve Sense
3	Trim	8	-ve Sense
4	Inhibit	9	Trim
5	-	10	Inhibit

### Mating Connectors

Signal: Supplied as standard, pre-wired with cable length ~24"/610mm, one per installed module. Pt. No. 319-1728-0010

Power: Supplied as standard.  
Housing: Molex 39-01-2045 x 1  
Crimps: Molex 44476-3112 x 4  
Wire Size: 16AWG



J3

Pin	Function	Pin	Function
1	Global Inhibit <sup>2</sup>	6	GA1
2	AC Good <sup>2</sup>	7	SDA
3	DC Good <sup>2</sup>	8	5V Standby <sup>1</sup>
4	-	9	5V Return
5	GA0	10	SCL

### Mating Connector

Supplied as standard pre-wired with cable length ~24"/610mm.  
Pt. No. 319-1728-0010

### Notes:

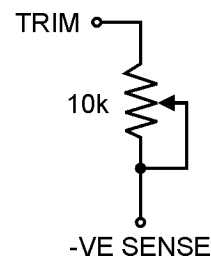
- 5V Standby Output is rated at 100mA.
- Referenced to 5V Return with internal pullup to 5V Standby.

## DESCRIPTION OF CONTROL AND SUPERVISORY SIGNALS

### OUTPUT MODULES

SIGNAL	DESCRIPTION
+ve Sense -ve Sense	Remote sense will compensate for a voltage drop of up to 0.25V per load wire, 0.5V total when connected to the +ve and -ve outputs at the load respectively. If remote sense is not required, the sense leads may be left open for local sensing at the output terminals.
Trim	The output voltage can be adjusted down from the the initial set point using the external circuit shown to the right.
Inhibit	A short circuit to -ve sense will inhibit the specific output.

### External Trim Down Circuit



For alternative trim methods please consult the factory.

### GLOBAL MODULES

SIGNAL	DESCRIPTION
Global Inhibit	A short circuit to 5V Return, pin 9, will inhibit all outputs.
AC Good	Active LO indicates that the AC supply is present and the PFC Front-End is running.
DC Good	Active LO indicates that all DC outputs are enabled and within tolerance.
GA0 / GA1	I <sup>2</sup> C address. Connect to either 5V Return or 5V Standby via 100 Ohm resistor. (GA2 is internally hard-wired to 5V Return.)
SDA	I <sup>2</sup> C Serial Data. A pull-up resistor to 5V Standby in the range 3k to 10k is required for correct operation.
SCL *	I <sup>2</sup> C Serial Clock. A pull-up resistor to 5V Standby in the range 3k to 10k is required for correct operation.

### \* I<sup>2</sup>C BUS SPEED

The I<sup>2</sup>C serial bus employed in the QuiQPLUS is designed to operate with a serial clock speed of 100kHz.

## I<sup>2</sup>C SERIAL BUS INTERFACE

The integral I<sup>2</sup>C serial bus includes a digital register which allows the user to monitor the status of several parameters within the unit and transmit these to a host computer on demand. An on-board EEPROM containing specific data about each unit allows for remote inventory control. A Global Output Inhibit function is also provided via this I<sup>2</sup>C interface.

### DIGITAL FUNCTION

Digital status and control functions are provided by a PCF8574 8-bit I/O port devices manufactured by Philips. When this device is read by the I<sup>2</sup>C controller a single 8-bit word provides the following information:

BIT	FUNCTION	GOOD STATE	MEANING
0	Not Used	0	-
1	DC Good	1	All outputs are within specified limits.
2	Temp. Warning	0	A "1" indicates excessive internal Temperature.
3	Not Used	X	Note: State is indeterminate.
4	Not Used	X	Note: State is indeterminate.
5	Not Used	1	-
6	Global Inhibit	1	Writing "0" inhibits all outputs.
7	Inhibit Sense	1	A "0" indicates the unit is inhibited due to: Over Temperature, OVP or an active Inhibit.

### EEPROM FUNCTION

The EEPROM is a 256 byte device type 24C02 produced by ST which is preprogrammed at the final configuration centre with the following data:

ADDRESS RANGE	DATA
0-63	Model Number
64-79	Serial Number
80-95	Revision Level
96-255	Free for customer use

#### PCF8527 slave address

BIT	7	6	5	4	3	2	1	0
VALUE	0	1	0	0	A2(0)	A1	A0	R/W

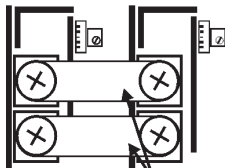
#### EEPROM slave address

BIT	7	6	5	4	3	2	1	0
VALUE	1	0	1	0	A2(0)	A1	A0	R/W

For detailed information about the operation of the I<sup>2</sup>C devices please consult the original manufacturers' data.

### Paralled Modules (code 2P, 3P or 4P)

#### Parallel (code 2P)



Link Bars

#### Notes on parallel module configurations

When 2 or more single output modules are configured in parallel the link bars shown above are factory fitted between the output terminals of the modules concerned.

When two modules are configured in parallel this is identified in the model number by a 2P code suffixed to the module code. Similarly, for three modules the code is 3P and for four modules the code is 4P.

## DETAILED CONFIGURATION GUIDE

When configuring a **QuiQPLUS™** power module to a specific requirement we recommend use of the automated configurator which is available as an Excel spreadsheet application. The following guide will assist with configuring a unit manually.

- For each desired output select the module or combination of modules that most closely meets the requirement.  
Then code the module or module combination to include the desired set-point voltage to the nearest 100mV and prefix the module code with this voltage.

Example A: 3.2V @ 65A requires one **BH** module and is coded **3.2BH**.

Example B: 5.2V @ 95A requires two **BH** modules in parallel and is coded **5.2BH2P**.  
(N.B.) This code includes the module linking bars shown in the illustration to the left.

- Once all desired output modules have been selected the complete model number is configured in ascending output voltage order from left to right when viewed from the end facing the output terminals starting with single output modules and then dual output modules.

Example A - 3.2V @ 65A, 5.2V @ 95A, 12.4V @ 3A & 12.4V @ 3A totalling 776W is coded:  
**QM-3.2BH-5.2BH2P-12.4C12.4C**

In this example a dual output module is used for the two 12.4V outputs. Note that each half of the module code **CC** is prefixed with the required set-point voltage.

Example B - 3.3V @110A, 5.1V @ 45A, 18.0V @ 2A & 24.0V @ 1A totalling 653W is coded:  
**QM-3.3BH2P-5.1BH-18.0D24.0D**

Note that single output modules must be selected in preference to dual output modules.