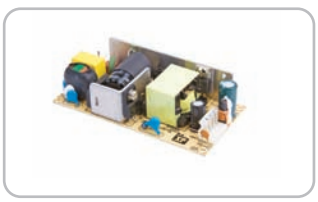
XP Power

AC-DC Open Frame

PCB Mount

External



AC-DC Open Frame

PCB Mount

External

BRAND

Power Supply Guide 2011/12

Global Power Solutions

People
- Global support
- Industry specific sales team
- Technically trained
- Solution orientated

Engineering
- Local engineering support
- Standard products
- Modified standards
- Engineered solutions group

Manufacturing
- Best in class
- Low cost – China
- Competitive lead-times
- Expansion in Vietnam

XP Power reduces the production and running costs of your equipment enabling you to gain a competitive advantage

Product
- Broadest product offering
- Leading edge
- Flexible platforms
- Industry specific solutions

Green
- High efficiency power
- Low standby power
- EICC applicant member
- ISO14001

Quality
- Stringent design/de-rating
- Risk analysis
- Out of box audit
- ISO13485/ISO9001

We are committed to providing the best technical and commercial solution for your power needs.

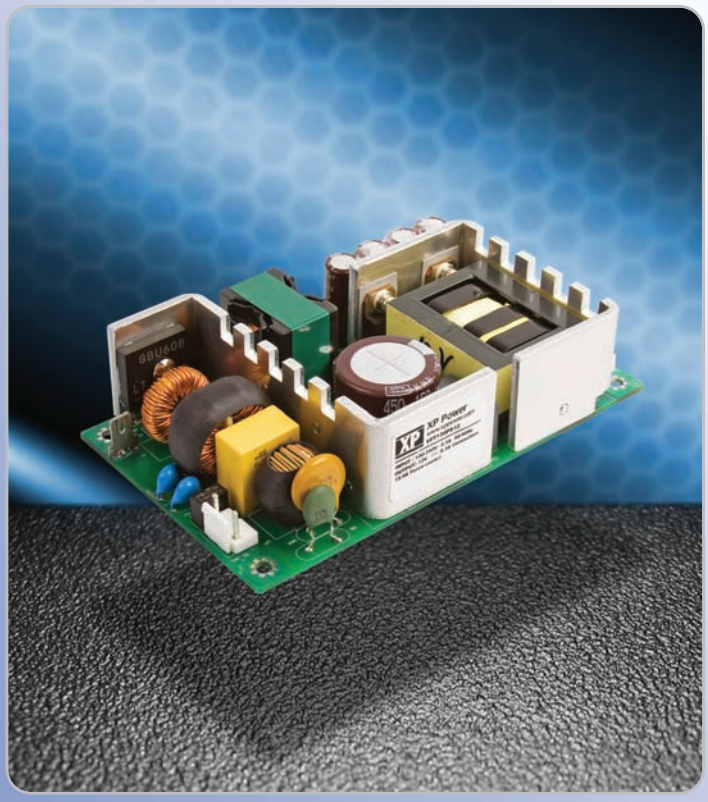
- Exclusive focus on power conversion
- Worldwide sales of $150 million
- Local engineering and sales support
- London Stock Exchange listed
- ISO9001 certified quality management system

Our mission

To inspire our people to be The Experts in Power delivering genuine value to our customers.

THE XPERTS IN POWER

Power Supply Guide



New Products

Industry Expertise

Engineered Solutions

Welcome to the first edition of the XP Power V-Brand Power Supply Guide, designed to complement the full XP Power Supply Guide. This guide highlights our V-Brand range of products developed specifically for high volume low cost applications.

Contents

Introducing V-Brand . . . . . .page 2

An introduction to our V-Brand range of low cost products and an overview of each series.

Green Power . . . . . .page 3

We aim to develop products that are smaller, produce less waste and have as little environmental impact as possible.

Industry Expertise . . . . . .page 4

Our industry specialists are versed in all the technical requirements and power supply legislation applicable to the industrial, healthcare and technology industries

Engineered Solutions . . . . . .page 6

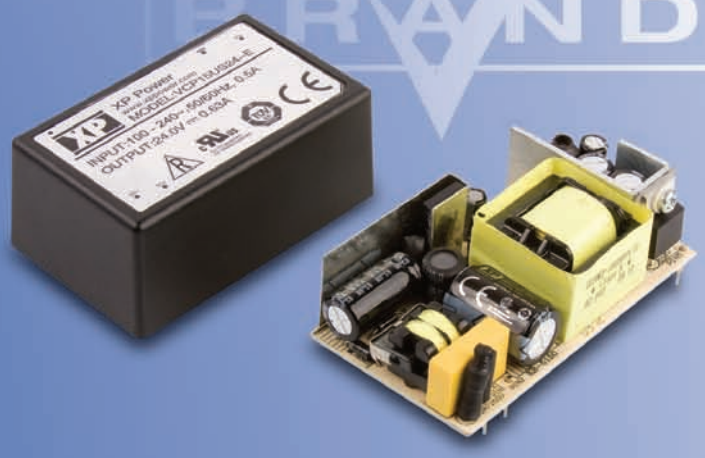
Standard power supplies do not always meet the specific requirements of the target application. XP Power's Engineering Services can provide the solution.

V-Brand Products . . . . . .page 8

XP product datasheets for our latest V-Brand products can be found here. These detail full specifications, part number tables and mechanical drawings.

Farnell & Newark Reference . . . . . .page 28

Looking to purchase from Farnell, element14 or Newark? Use this reference guide to help quickly identify the right part number.



Premier Farnell

XP Power's global agreement with Premier Farnell ensures a high level of service to our customers. Items stocked in the Farnell, Newark & element14 catalogs and websites are highlighted in the series datasheet. In addition, there is a cross reference section on page 28 showing XP Power model numbers against the equivalent Farnell, Newark & element14 stock number.

Introducing V-Brand

... the new benchmark for low cost power supplies

XP Power presents a new range of products designed to bring high performance, low cost power to higher volume cost sensitive equipment and systems.

Typical applications are alarm systems, door entry systems, point of sale equipment, vending machines, networking equipment and consumer applications.

- 1000 piece MOQ/MSQ
- 1 year warranty
- Scheduled orders only

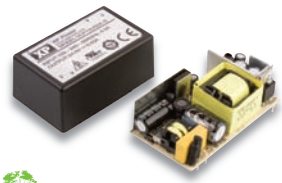
Choose V–Brand if you really want true value from your power supply.

2011/2012
Power Supply Guide

Complementary to this V-Brand guide, our 296 page power supply guide contains specifications of our full product portfolio including over 60 new product ranges added since the last edition.

The guide provides detailed information on AC-DC products ranging from 5 Watts to 3,000 Watts, including open-frame, U-channel, desktop, pcb-mount, DIN rail and LED power supplies. DC-DC converters rated from 0.25 Watt to 600 Watts are highlighted with component based power modules and filters also featured.

The new 2011/2012 Power Supply Guide is available now and can be requested on-line at **www.xppower.com**, or by contacting a local office directly.



VCP
- **5, 15 & 24 Watts Open-Frame PCB Mount**
- Encapsulated Version Available (15/24 W)
- Single Outputs 3.3 V to 24 V
- Universal Input
- Medical (15/24 W) & ITE Approvals
- Class II Construction
- No Load Input Power <0.3 W

VCT
- **60 Watts Open-Frame**
- Single Outputs 5 V to 30 V
- 4" x 2" x 0.95"
- Universal Input
- Convection Cooled
- No Load Input Power <0.5 W
- Fits 1U Applications

VFT
- **80 & 150 Watts Open-Frame**
- Single Outputs 5 V to 48 V
- 2" x 4" & 3" x 5" Packages
- No Load Input Power <0.5 W
- Built-in Fan Supply (150 W)
- Up to 92% Efficiency
- Fits 1U Applications

VEB
- **10 Watts Plugtop**
- Single Outputs 5 V to 48 V
- Energy Efficiency Level V
- CEC 2008 & EISA 2007 Compliant
- Class II Construction
- Universal Input
- US, EU & UK Versions

VEH
- **20, 40, 60 & 90 Watts Desktop**
- Single Outputs 12 V to 48 V
- Energy Efficiency Level V
- CEC 2008 Compliant
- EISA 2007 Compliant
- China Compulsory Certification
- No Load Input Power <0.5 W

Protecting the Environment

With the recent withdrawal of the external power supplies category by Energy Star, we are no longer permitted to use the Energy Star logo. We have accelerated the rate of 'green' product introductions in the last two years and have created our own 'green power' logo to highlight these particular products to our customers. This logo will be used for the appropriate products on datasheets and other marketing material.

Below is what we mean by 'green power'. This definition includes the no load power limits and average efficiency limits of our 'green power' products for both our external power supply range and component power supplies.

More and more customers are asking us about efficiency and energy consumption. In summary we are focused on developing products that are smaller, produce less waste, consume less physical material and avoid hazardous substances.

Our goal is to become the leader in our industry on environmental issues.

- Board level Environmental Committee focused on minimizing our environmental impact
- Environmental concerns and legislation drive demand for energy efficient products
- Applicant member of the Electronic Industry Citizenship Coalition (EICC), full membership expected by April 2011
- ISO14001 certified environmental management system

GREEN•POWER

Green Power: A definition

External power supplies meet Energy Efficiency Level V requirements as defined below:

No load power limits	
Rated power	No load consumption
0 W to < 50 W (≤ 51 W)	0.3 W
≥ 50 W to 250 W (> 51 W)	0.5 W

Active mode power limits, O/P < 6 V	
Rated power	*Average efficiency
0 W to 1 W	≥ 0.497 x rated power+0.067
> 1 W to ≤ 49 W (≤ 51 W)	≥ [0.0750 x Ln(Rated power)]+0.561
> 49 W (> 51 W)	≥ 0.86

Active mode power limits, O/P ≥ 6 V	
Rated power	*Average efficiency
0 W to 1 W	≥ 0.48 x rated power+0.14
> 1 W to ≤ 49 W (≤ 51 W)	≥ [0.0626 x Ln(Rated power)]+0.622
> 49 W (> 51 W)	≥ 0.87

Figures in ( ) are ErP limits

In addition, power supplies with an input power of 100 W and above must have minimum power factor of 0.9 at 115 VAC 60 Hz.

Component power supplies meet the following criteria:

No load power limits	
Rated power	No load consumption
0 W to < 250 W	0.5 W
≥ 250 W	No limit

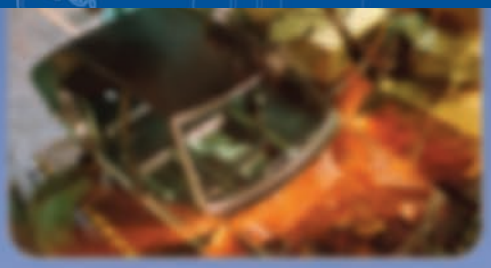
Active mode power limits	
Rated power	*Average efficiency
0 W to 1 W (< 1 W)	0.5 x Rated power
> 1 W to 49 W (≤ 51 W)	≥ [0.09 x Ln(Rated power)] + 0.5
> 49 W (> 51 W)	≥ 0.85

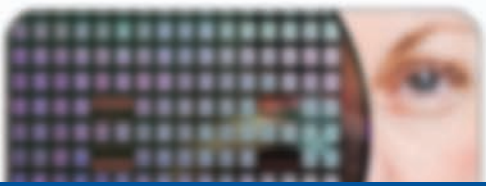
*Average efficiency is measured at 25, 50, 75 & 100% load.

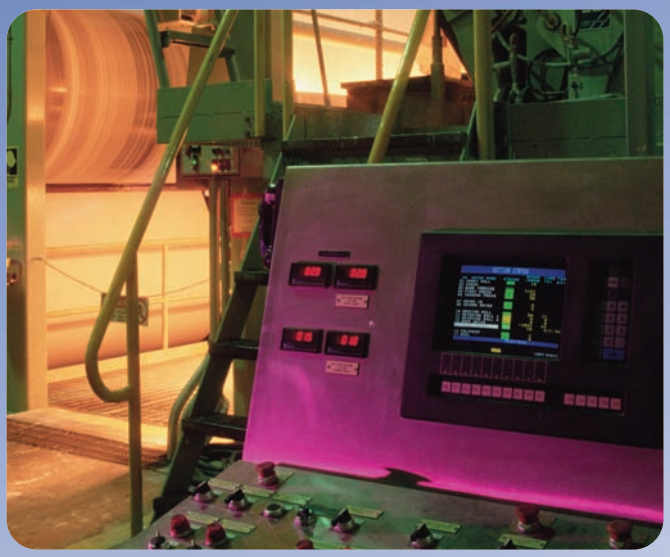
FSC www.fsc.org FSC® C004802

Our printers of this guide are certified by the Forest Stewardship Council ®, this means they are ethically minded and the paper is from responsible sources.

Industry Expertise







Industrial

Our industrial products are designed to satisfy the legislative and safety requirements that are unique to the industrial sector. XP's product range covers applications in factory automation, automated test equipment, industrial control, test and measurement, instrumentation, hazardous environments and defense. Our team of technical sales specialists is well versed in the individual needs of your specific sector.

Whether your system demands high peak loads for motors, extended temperature range for outdoor applications, field replaceable fans or the need to operate in hazardous environments, you will find a solution from our broad range of industrial power supplies.

In systems requiring more than one output, start up, shutdown and sequencing of outputs is often desirable. Our modular power supplies are fitted with isolated control signals which allow for remote and independent manipulation of the outputs.

Free Brochures Available

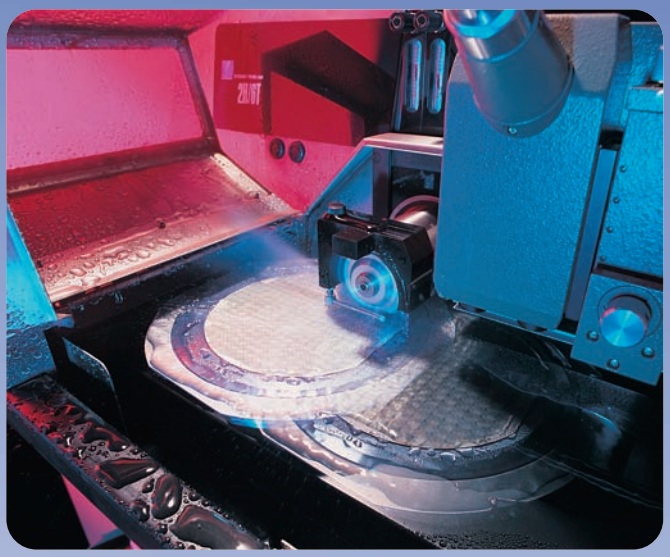
XP Power has published a series of in-depth industry focused literature which look at how XP products can provide power solutions for specific requirements unique to each sector. All literature is available upon request by calling your local sales office or by download. To download a free copy in pdf format, go to:

www.xppower.com

Healthcare

XP Power understands the challenges faced by medical device manufacturers due to legislation and market demands. Our products are designed to meet these challenges and provide cost-effective solutions for use in both the hospital and non-hospital environments. Understanding the requirements of our target customers has led to product features that are incorporated for a reason, such as class II approvals for homecare devices, highly efficient convection-cooled designs for low noise patient area devices and defibrillator-proof DC-DC converters for applied part applications.

The mission critical nature of medical devices demands high quality, reliable and safe products. Our goal is to consistently deliver products that meet this criterion. To ensure that we meet this goal XP Power operates under ISO9001 certification and all of our products are designed to rigorous standards as well as undergoing extensive testing. During the design and manufacturing phases we use processes such as DFMEA (Design Failure Mode Effects Analysis) and PFMEA (Process Failure Mode Effects Analysis) to ensure our products are as reliable and safe as possible. In addition, our Kunshan facility has ISO13485 certification for the manufacturing of medical devices.



Technology

An extensive range of product and engineering capabilities allows us to satisfy the often rigorous and fast moving application requirements seen in communications, audio/visual broadcast equipment and semiconductor production equipment. The demand for smaller, more efficient, fully featured power converters with both AC and DC input requirements has driven the development of market leading products. XP Power continue to support emerging standards with our product offering, such as power supplies with digital control suitable for PMBus, and "green" power products employing very low no load power consumption and high efficiency levels compliant with the latest legislation from CEC, EISA and ErP.

For outdoor applications we offer conduction-cooled solutions which operate over a wide temperature range making them suitable for use in sealed enclosures and harsh environments.

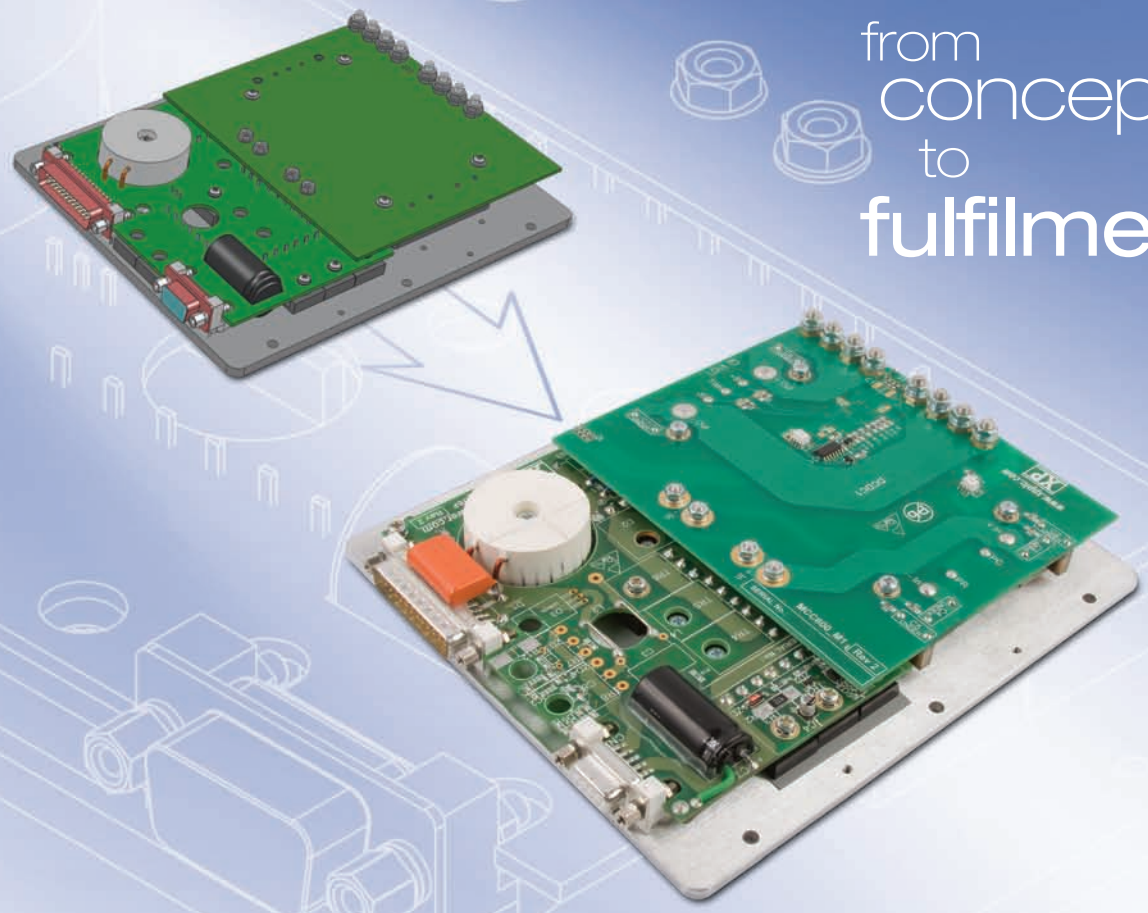
In critical applications where the AC supply is not always reliable, XP offers SEMI F47 ratings on our supplies, this means customers are assured a regulated output will be maintained to their system in the event of AC voltage sags.

Power Supply Technical Guide

Having trouble keeping up with the latest standards for external power supplies such as the California Energy Commission's (CEC) requirements for efficiency and no-load power consumption; or the implications of the 3rd Edition 60601 on medical safety? Ever wondered why seemingly similar power supplies have significantly different performance and reliability characteristics? The answers to these and many more questions can be found in this, the third edition of XP's Power Supply Technical Guide, the culmination of many, many years experience gained by the XP Power applications team spread over three continents. Whether you're new to designing-in a power supply or DC-DC converter or an 'old hand', this book offers an invaluable resource and all the information you'll need in one easy reference guide.

Visit **xppower.com** or call your nearest sales office for your free copy.

Engineered Solutions



from concept to **fulfilment**

XP Engineering Services provides solutions where applications cannot be fulfilled from our standard product range or where integrated products are required. We offer the world's strongest standard product range, which provides us with a vast selection of power platforms from which to deliver complex modified standards.

We design and manufacture cost effective application specific solutions that meet your electrical, mechanical, safety, EMC and thermal management requirements, while ensuring a fast time to market.

- Low development cost
- Low risk, proven technology
- World class design
- Short development times
- Worldwide local engineering support
- Low cost manufacturing in Asia
- ISO 9001 certified quality management system

Mechanical Design

- 3D-model, photo-rendering, animation
- Thermal, stress and mass simulation
- Environmentally sealed units

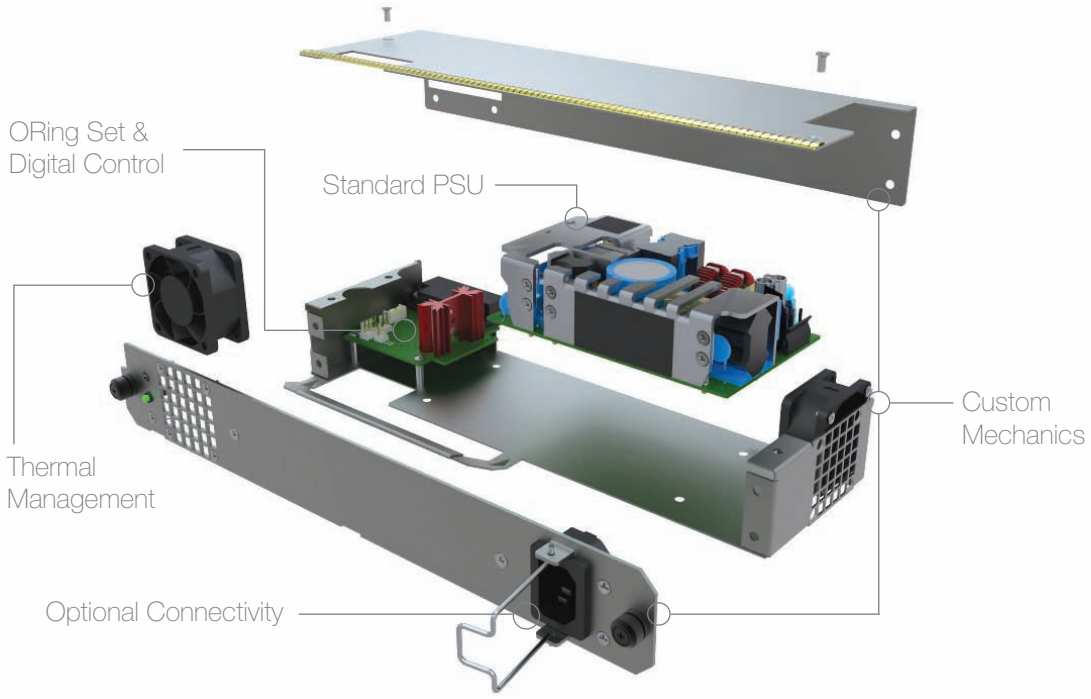
Electrical Design

- Filter design for specific noise and ripple standards
- I^2C interface requirements for power supply health and control
- Blind-mate, hot-swap experts
- Embedded micro-processor based design
- Schematic capture / simulation
- Compliance with defense specifications

Quality and Test

- Serial numbered reports attached to each unit shipped
- 100% parametric DVT testing
- In-system troubleshooting
- System specific testing can also be provided
  - Turnkey EMC certification
  - HALT / HASS integrity testing
  - Burn-in

Redundant Hot Swap Power Solution



Printed Circuit Board Design

- Timely electrical assemblies improving customer time-to-market
- Safety specific creepage and clearance
- Design for manufacturability
- PCB modeling & layout

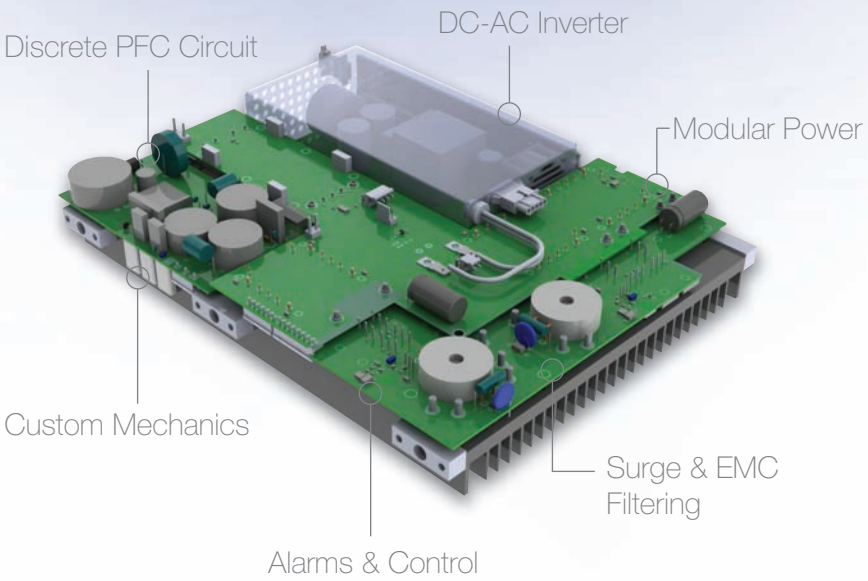
Software Programming

- In-house software / firmware development
- Serial bus interfaces - I²C & RS232 / 422
- Software / firmware functionality
  - Smart battery interface (SMBus)
  - Battery charging
  - Power supply sequencing
  - Power supply alarm and control

Safety & Compliance

- Compliance engineering
- Expert knowledge of UL, TUV, CSA, CE & CB schemes
- NEBS & ETSI compliance
- MIL STD compliance
- IT, Industrial & medical safety standards
- IT, Industrial & medical EMC compliance
- MIL STD & DEF STAN EMC compliance

Secure Satellite Communication Power Supply



5 Watts
VCP Series

- Low Cost
- Universal AC Input
- Output Voltage from 5 to 15 V
- PCB Mount
- Class II Construction
- EN55022 Class B Emissions
- No Load Input Power <0.3 W

Specification

Input

Input Voltage	• 90-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 0.2 A max at 90 VAC
Inrush Current	• 40 A max at 240 VAC, cold start at 25 °C
Power Factor	• EN61000-3-2, class A
No Load Input Power	• <0.3 W
Input Protection	• Internal T1.6A/250 V fuse in line

Output

Output Voltage	• See table
Initial Set Accuracy	• ±5% at 50% load
Minimum Load	• No minimum load required
Start Up Delay	• 2 s max
Start Up Rise Time	• 100 ms typical
Hold Up Time	• 5 ms typical at full load and 115 VAC
Line Regulation	• ±0.5% max
Load Regulation	• 2% max, 0-100% load
Transient Response	• 10% max. deviation, recovery to <1% within 500 µs for a 50% step load change at 0.2 A/µs
Ripple & Noise	• See table
Overvoltage Protection	• See table
Overload Protection	• 120-180%, auto recovery
Short Circuit Protection	• Trip and restart (hiccup mode)
Temperature Coefficient	• 0.2 %/°C

General

Efficiency	• See table
Isolation	• 3000 VAC Input to Output
Switching Frequency	• 60 kHz typical
MTBF	• 250 kHrs to MIL-HDBK-217F at 25 °C, GB

Environmental

Operating Temperature	• 0 °C to +50 °C, derate from 100% load at 50 °C to 50% load at 70 °C
Cooling	• Natural convection
Operating Humidity	• 10-90% RH, non-condensing
Storage Temperature	• -20 °C to +60 °C
Shock	• Able to survive 1 m drop onto concrete on each of 6 axes
Vibration	• 10-300 Hz, 2 g 15 mins/sweep. 30 mins for each of 3 axes

EMC & Safety

Emissions	• EN55022, level B conducted & radiated
Harmonic Currents	• EN61000-3-2, class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, ±4kV contact, ±8kV air, Perf Criteria A
Radiated Immunity	• EN61000-4-3, 3 V/m, Perf Criteria A
EFT/Burst	• EN61000-4-4, level 2, Perf Criteria A
Surge	• EN61000-4-5 installation class 3, Perf Criteria A
Conducted Immunity	• EN61000-4-6, 3 V, Perf Criteria A
Magnetic Field	• EN61000-4-8, 1 A/m, Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B
Safety Approvals	• EN60950-1, cUL60950-1, IEC60950-1

Models and Ratings

Output Power	Output Voltage[2]	Output Current	Ripple & Noise[1]	OVP Setting[3]	Efficiency[4]	Model Number
5.0 W	5.0 V	1.0 A	150 mV	10.0 V	69%	VCP05US05†^
4.8 W	12.0 V	0.4 A	150 mV	20.0 V	69%	VCP05US12†^
4.5 W	15.0 V	0.3 A	150 mV	25.0 V	69%	VCP05US15

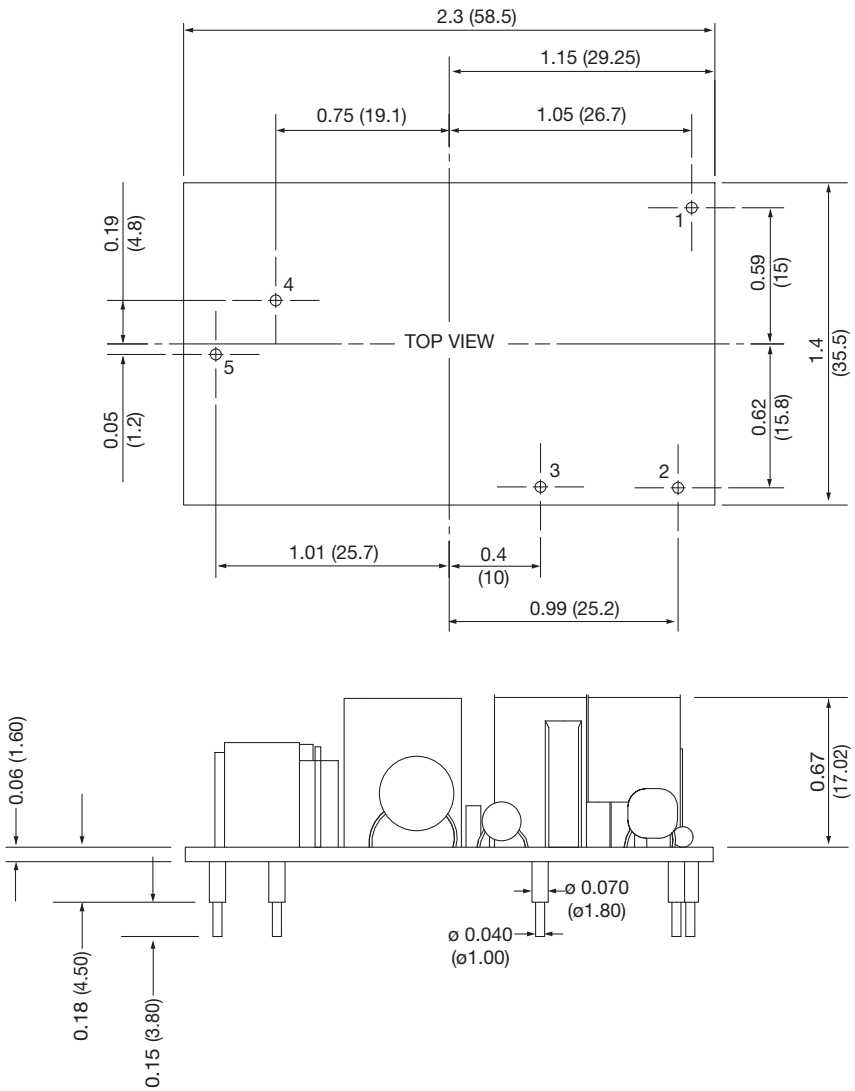
Notes

1. Measured at DC output connector using 20 MHz bandwidth and 0.1 µF ceramic capacitor in parallel with 10 µF electrolytic capacitor placed at connector terminals
2. Other voltages between 3.0 V and 15.0 V are available, consult sales for details.
3. Typical trip point.
4. Minimum average of efficiencies measured at 25%, 50%, 75% & 100% load and 230 VAC input.

† Available from Farnell & element14. See page 28.

^ Available from Newark. See page 28.

Mechanical Details



Pin	Designation
1	No connection
2	Neutral
3	Live
4	Output -VE
5	Output +VE

Notes

1. All dimensions are in inches (mm).
2. Weight: 0.04 lbs (20 g) approx.
3. Tolerance: x.x = ±0.04 (x.x = ±1.0), x.xx = ±0.02 (x.xx = ±0.5)

15 Watts
VCP Series

- Low Cost
- Output Voltages from 5 to 24 V
- PCB Mounting
- Open Frame & Encapsulated Versions
- IT & Medical Approvals
- Class II Construction
- No Load Input Power <0.3 W

Specification

Input

Input Voltage	• 90-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 0.5 A max at 90 VAC
Inrush Current	• 40 A max at 240 VAC, cold start at 25 °C
Power Factor	• EN61000-3-2, class A
No Load Input Power	• <0.3 W
Input Protection	• Internal T2.0A/250 V fuse in line

Output

Output Voltage	• See table
Initial Set Accuracy	• ±2% at 50% load
Minimum Load	• No minimum load required
Start Up Delay	• 2 s max
Start Up Rise Time	• 100 ms typical
Hold Up Time	• 5 ms typical at full load and 115 VAC
Line Regulation	• ±0.5% max
Load Regulation	• 2% max, 0-100% load
Transient Response	• 10% max. deviation, recovery to <1% within 500 µs for a 50% step load change at 0.2 A/µs
Ripple & Noise	• See table
Overvoltage Protection	• See table
Overload Protection	• 120-280 %, auto recovery
Short Circuit Protection	• Trip and restart (hiccup mode)
Temperature Coefficient	• 0.2 %/°C

General

Efficiency	• See table
Isolation	• 4000 VAC Input to Output
Switching Frequency	• 132 kHz typical
MTBF	• 250 kHrs to MIL-HDBK-217F at 25 °C, GB

Environmental

Operating Temperature	• 0 °C to +70 °C, derate from 100% load at 50 °C to 50% load at 70 °C
Cooling	• Natural convection
Operating Humidity	• 5-90% RH, non-condensing
Storage Temperature	• -20 °C to +60 °C
Vibration	• 10-300 Hz, 2 g 15 mins/sweep. 30 mins for each of 3 axes

EMC & Safety

Emissions	• EN55011/22, level B conducted & radiated
Harmonic Currents	• EN61000-3-2, class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, ±4 kV indirect contact, ±8 kV air, Perf Criteria A
Radiated Immunity	• EN61000-4-3, 3 V/m, Perf Criteria A
EFT/Burst	• EN61000-4-4, level 2, Perf Criteria A
Surge	• EN61000-4-5 installation class 3, Perf Criteria A
Conducted Immunity	• EN61000-4-6, 3 V, Perf Criteria A
Magnetic Field	• EN61000-4-8, 1 A/m, Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B
Safety Approvals	• EN60950-1, cUL60950-1, IEC60950-1, EN60601-1, cUL60601-1, IEC60601-1

Models and Ratings

Output Power	Output Voltage[2]	Output Current	Ripple & Noise[1]	OVP Setting[3]	Efficiency[5]	Model Number[4]
10 W	5.0 V	2.00 A	100 mV	10.0 V	74%	VCP15US05†^
15 W	12.0 V	1.25 A	100 mV	20.0 V	82%	VCP15US12†^
15 W	15.0 V	0.90 A	150 mV	25.0 V	83%	VCP15US15
15 W	24.0 V	0.63 A	200 mV	35.0 V	84%	VCP15US24†^

Notes

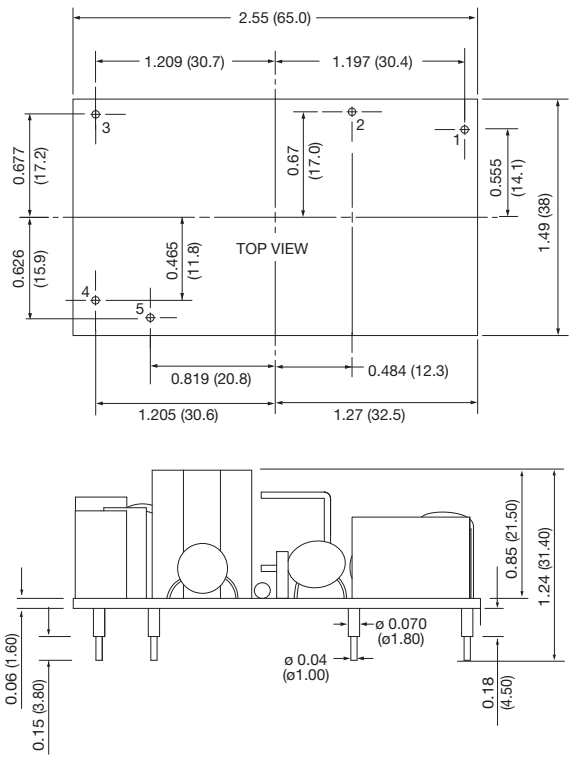
1. Measured at DC output connector using 20 MHz bandwidth and 0.1 µF ceramic capacitor in parallel with 10 µF electrolytic capacitor placed at connector terminals.
2. Other voltages between 5.0 V and 24 V are available, consult sales for details.
3. Typical trip point.
4. For encapsulated versions, add suffix '-E' to the model number e.g VCP15US24-E.
5. Average of efficiencies measured at 25%, 50%, 75% & 100% load and 230 VAC input.

† Available from Farnell & element14. See page 28.

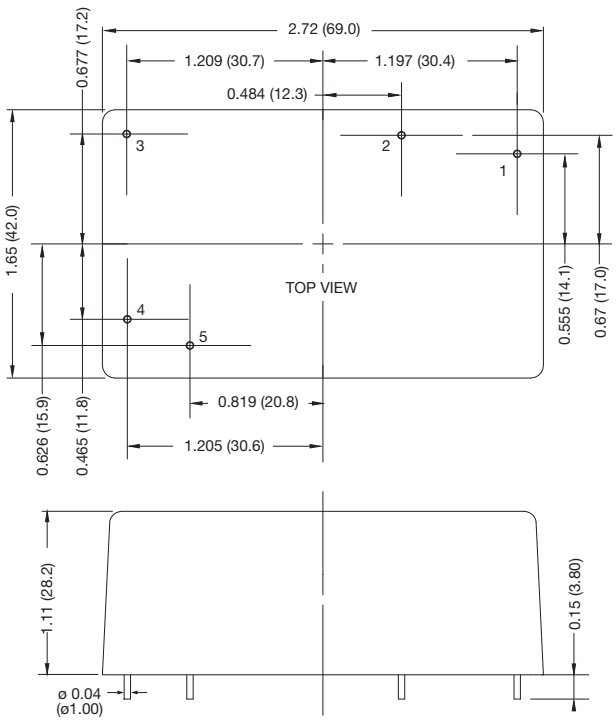
^ Available from Newark. See page 28.

Mechanical Details

Open Frame Version



Encapsulated Version (–E)

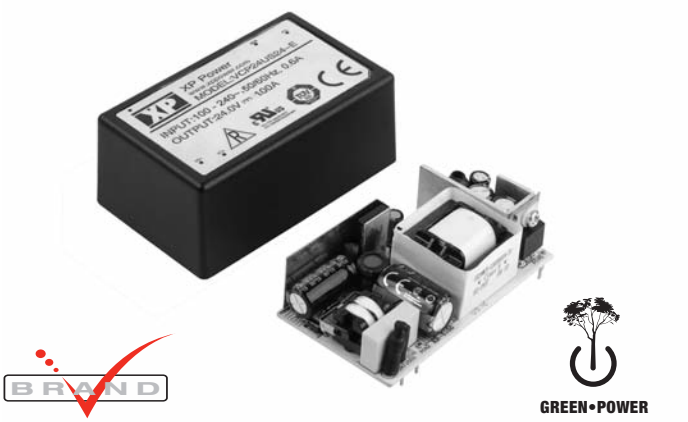


Pin	Designation
1	Live
2	Neutral
3	No connection
4	Output -VE
5	Output +VE

Notes

1. All dimensions are in inches (mm).
2. Weight: Open frame versions: 0.09 lbs (40 g) approx.
   Encapsulated versions: 0.22 lbs (100 g) approx.
3. Tolerance: x.xx = ±0.04 (x.x = ±0.1); x.xxx = ±0.2 (x.xx = ±0.5)

24 Watts
VCP Series



- Low Cost
- Output Voltages from 5 to 24 V
- PCB Mount
- Open Frame & Encapsulated Versions
- IT & Medical Approvals
- Class II Construction
- No Load Input Power <0.3 W

Specification

Input

Input Voltage	• 90-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 0.6 A max at 90 VAC
Inrush Current	• 40 A max at 240 VAC, cold start at 25 °C
Power Factor	• EN61000-3-2, class A
No Load Input Power	• <0.3 W
Input Protection	• Internal T2.0A/250 V fuse in line

Output

Output Voltage	• See table
Initial Set Accuracy	• ±2% at 50% load
Minimum Load	• No minimum load required
Start Up Delay	• 2 s max
Start Up Rise Time	• 50 ms typical
Hold Up Time	• 5 ms typical at full load and 115 VAC
Line Regulation	• ±0.5% max
Load Regulation	• 2% max, 0-100% load
Transient Response	• 10% max. deviation, recovery to <1% within 500 µs for a 50% step load change at 0.2 A/µs
Ripple & Noise	• See table
Overvoltage Protection	• See table
Overload Protection	• 120-280 %, auto recovery
Short Circuit Protection	• Trip and restart (hiccup mode)
Temperature Coefficient	• 0.2 %/°C

General

Efficiency	• See table
Isolation	• 4000 VAC Input to Output
Switching Frequency	• 65 kHz typical
MTBF	• 250 kHrs to MIL-HDBK-217F at 25 °C, GB

Environmental

Operating Temperature	• 0 °C to +70 °C, derate from 100% load at 50 °C to 50% load at 70 °C
Cooling	• Natural convection
Operating Humidity	• 5-90% RH, non-condensing
Storage Temperature	• -20 °C to +60 °C
Vibration	• 10-300 Hz, 2 g 15 mins/sweep. 30 mins for each of 3 axes

EMC & Safety

Emissions	• EN55011/22, level B conducted & radiated
Harmonic Currents	• EN61000-3-2, class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, ±4kV indirect contact, ±8kV air, Perf Criteria A
Radiated Immunity	• EN61000-4-3, 3 V/m, Perf Criteria A
EFT/Burst	• EN61000-4-4, level 2, Perf Criteria A
Surge	• EN61000-4-5, installation class 3, Perf Criteria A
Conducted Immunity	• EN61000-4-6, 3 V, Perf Criteria A
Magnetic Field	• EN61000-4-8, 1 A/m, Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B
Safety Approvals	• EN60950-1, cUL60950-1, IEC60950-1, EN60601-1, cUL60601-1, IEC60601-1

Models and Ratings

Output Power	Output Voltage[2]	Output Current	Ripple & Noise[1]	OVP Setting[3]	Efficiency[5]	Model Number[4]
12.5 W	5.0 V	2.5 A	100 mV	10.0 V	73%	VCP24US05†^
24.0 W	12.0 V	2.0 A	100 mV	20.0 V	80%	VCP24US12†^
24.0 W	15.0 V	1.6 A	150 mV	25.0 V	81%	VCP24US15
24.0 W	24.0 V	1.0 A	200 mV	35.0 V	82%	VCP24US24†^

Notes

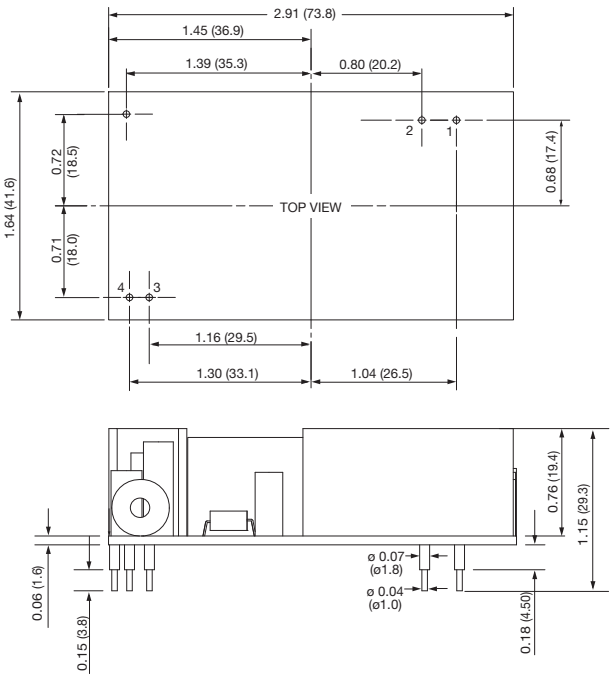
1. Measured at DC output connectors using 20 MHz bandwidth and 0.1 µF ceramic capacitor in parallel with 10 µF electrolytic capacitor placed at connector terminals.
2. Other voltages between 5.0 V and 24.0 V are available, consult sales for details.
3. Typical trip point.
4. For encapsulated versions, add suffix '-E' to the model number, e.g. VCP24US12-E
5. Average of efficiencies measured at 25%, 50%, 75% & 100% load and 230 VAC input.

† Available from Farnell & element14. See page 28.

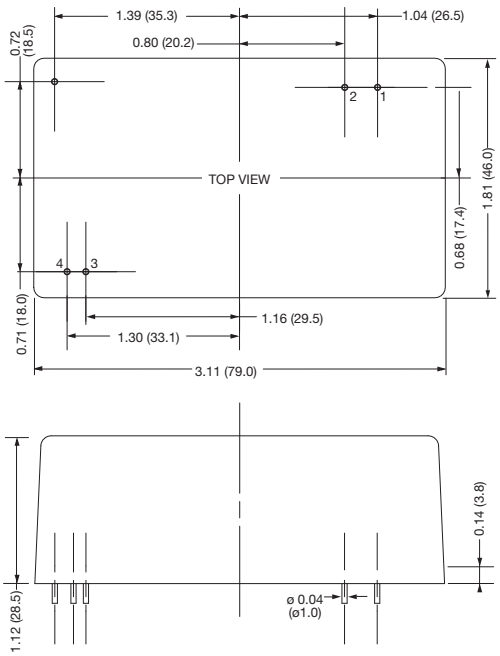
^ Available from Newark. See page 28.

Mechanical Details

Open Frame Version



Encapsulated Version (–E)

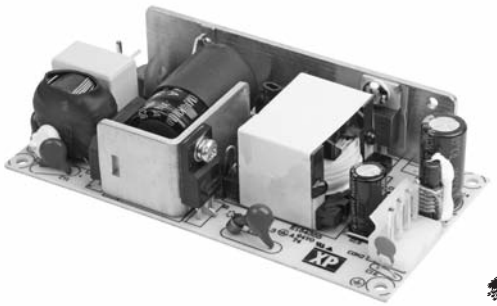


Pin	Designation
1	Live
2	Neutral
3	Output +VE
4	Output -VE

Notes

1. All dimensions are in inches (mm).
2. Weight: open frame versions: 0.165 lbs (75 g) approx, encapsulated versions 0.32 lbs (150 g) approx.
3. Tolerance: x.xx = ±0.04 (x.x = ±0.1); x.xxx = ±0.2 (x.xx = ±0.5)

60 Watts
VCT Series



- Low Cost
- Single Outputs from 5 V to 30 V
- Peak Load Capability
- Convection–cooled
- <0.5 W No Load Input Power
- 2” x 4” Package
- Fits 1U Applications

Specification

Input

Input Voltage	• 85-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 1.7 A max at 115 VAC, 0.85 A max at 230 VAC
Inrush Current	• 60 A max at 230 VAC, cold start at 25 °C
Earth Leakage Current	• 500 µA at 264 VAC / 60 Hz
Power Factor	• EN61000-3-2, class A
No Load Input Power	• <0.5 W
Input Protection	• Internal T3.15A/250 V fuse in line

Output

Output Voltage	• See table
Output Voltage Trim	• None
Initial Set Accuracy	• ±2% at 50 % load
Minimum Load	• No minimum load requirement
Start Up Delay	• 500 ms max
Start Up Rise Time	• 8 ms typical
Hold Up Time	• 8 ms typical at full load and 115 VAC
Line Regulation	• ±0.5% max
Load Regulation	• ±1.0% max (see note 1)
Transient Response	• 4% maximum deviation, recovering to less than 1% within 500 µs for 50% step load
Ripple & Noise	• 1% max pk-pk (see note 2)
Overvoltage Protection	• See table
Overload Protection	• 133-166%
Short Circuit Protection	• Trip and restart (hiccup mode)
Temperature Coefficient	• 0.02% /°C

General

Efficiency	• See table
Isolation	• 3000 VAC Input to Output 1500 VAC Input to Ground 500 VDC Output to Ground
Switching Frequency	• 60 kHz ±10 kHz
MTBF	• >700 kHrs to Bell Core iss. 6

Environmental

Operating Temperature	• -10 °C to +70 °C derate from 100% load at 50 °C to 50% load at 70 °C
Cooling	• Natural convection
Operating Humidity	• 5% to 90% RH, non condensing
Operating Altitude	• 3000 m
Storage Temperature	• -20 °C to +85 °C
Shock	• IEC68-2-6, 30 g, 11 mins half sine, 3 times in each of 6 axes
Vibration	• IEC68-2-27, 10-500Hz, 2 g 10 mins / sweep. 60 mins for each of 3 axes

EMC & Safety

Emissions	• EN55022, level B conducted & radiated
Harmonic Currents	• EN61000-3-2 class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, level 3, Perf Criteria A
Radiated Immunity	• EN61000-4-3, 10 V/m, Perf Criteria A
EFT/Burst	• EN61000-4-4, level 3, Perf Criteria A
Surge	• EN61000-4-5, installation class 3, Perf Criteria A
Conducted Immunity	• EN61000-4-6, 10 V, Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60%, 100 ms, 100%, 5000 ms Perf Criteria A, B, B
Safety Approvals	• UL60950-1, IEC60950-1, EN60950-1

Models and Ratings

Output Voltage[6]	Output Current		OVP Setting[5]	Efficiency[4]	Model Number
	Nominal	Peak[3]			
5.0 V	8.00 A	10.0 A	7.0 V	82%	VCT40US05†^
12.0 V	5.00 A	6.3 A	13.0 V	87%	VCT60US12†^
15.0 V	4.00 A	5.0 A	17.0 V	87%	VCT60US15†^
24.0 V	2.50 A	3.1 A	29.0 V	88%	VCT60US24†^

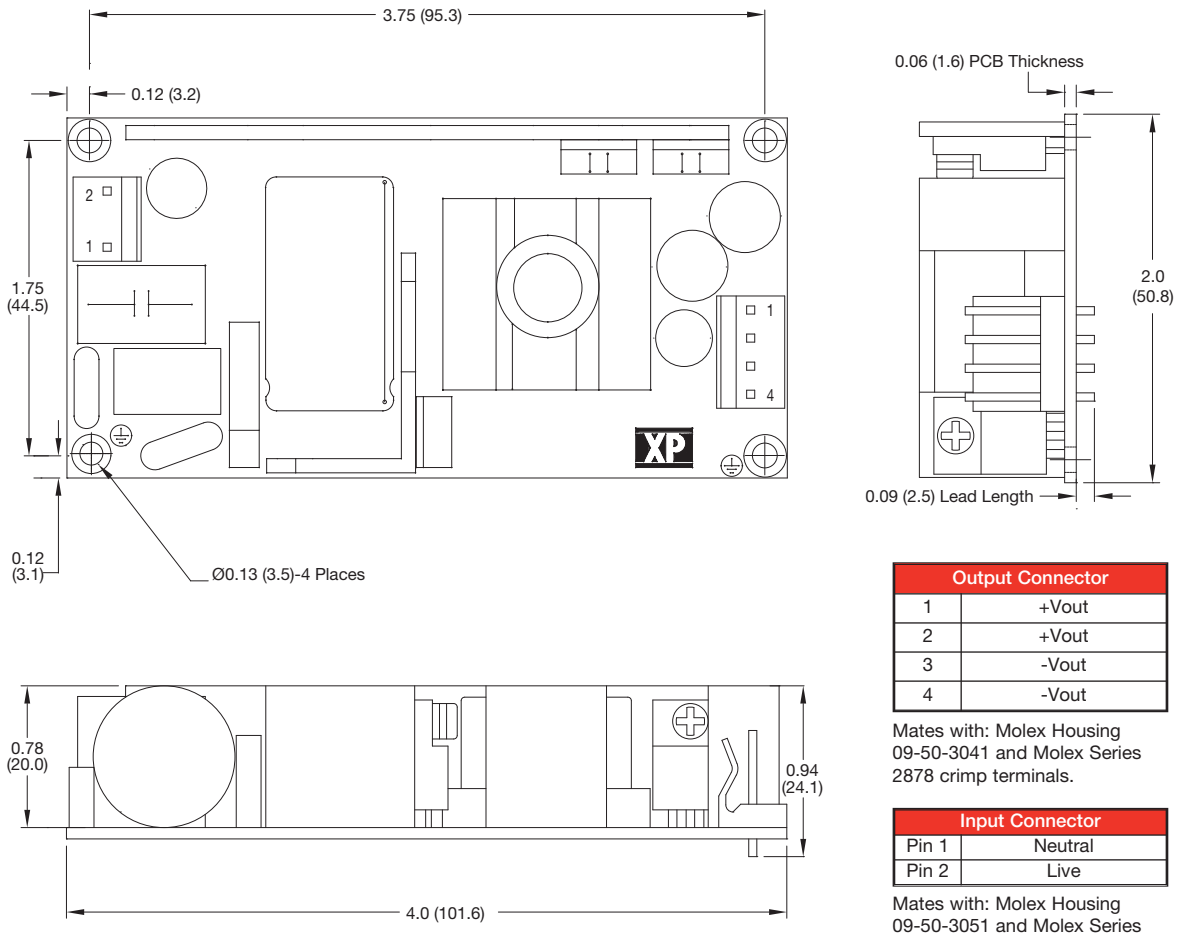
Notes

1. Load regulation is measured from 60% to full load and from 60% to 20% load (60% ±40% full load).
2. Measured at the output connector with a 0.1 µF ceramic capacitor and a 10 µF electrolytic capacitor.
3. Peak load lasting <30 s with a maximum duty cycle of 10%, average output power not to exceed nominal.
4. Average of efficiencies measured at 25%, 50%, 75% & 100% load and 230 VAC input.
5. Typical trip point.
6. Other voltages between 5 V and 30 V available on request, contact sales for details.

† Available from Farnell & element14. See page 28.

^ Available from Newark. See page 28.

Mechanical Details



Output Connector	
1	+Vout
2	+Vout
3	-Vout
4	-Vout

Mates with: Molex Housing 09-50-3041 and Molex Series 2878 crimp terminals.

Input Connector	
Pin 1	Neutral
Pin 2	Live

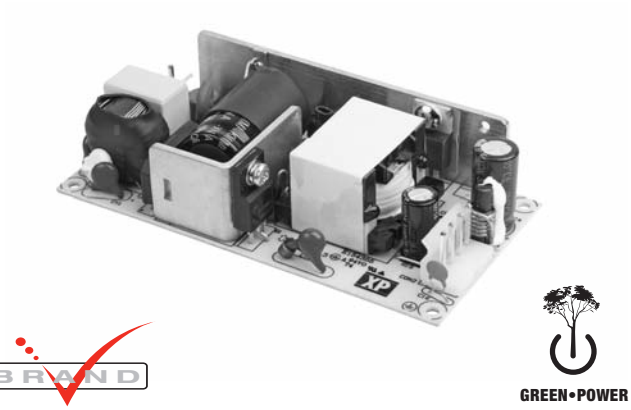
Mates with: Molex Housing 09-50-3051 and Molex Series 2878 crimp terminals.

Mounting holes marked with ⏚ must be connected to safety earth

Notes

1. All dimensions shown in inches (mm).
2. Weight 0.29 lbs (130 g) approx
3. Tolerance: x.xx = ±0.04 (x.x = ±0.1); x.xxx = ±0.2 (x.xx = ±0.5)

80 Watts
VFT Series



- Low Cost
- Single Outputs from 5 V to 24 V
- Peak Load Capability
- High Efficiency
- <0.5 W No Load Input Power
- 2” x 4” Package
- Fits 1U Applications

Specification

Input

Input Voltage	• 85-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 2 A max at 115 VAC, 1 A max at 230 VAC
Inrush Current	• 60 A max at 230 VAC, cold start 25 °C
Earth Leakage Current	• 500 µA max at 264 VAC / 60 Hz
Power Factor	• EN61000-3-2, class A
No Load Input Power	• <0.5 W max
Input Protection	• Internal T3.15A/250 V fuse in line

Output

Output Voltage	• See table
Output Voltage Trim	• None
Initial Set Accuracy	• ±2% at 50% load
Minimum Load	• No minimum load requirement
Start Up Delay	• 2 s max
Start Up Rise Time	• 8 ms typical
Hold Up Time	• 8 ms typical at full load and 115 VAC
Line Regulation	• ±0.5% max
Load Regulation	• ±1.0% max (see note 1)
Transient Response	• 4% maximum deviation, recovering to less than 1% within 500 µs for 50% step load
Ripple & Noise	• 1% max pk-pk (see note 2)
Overvoltage Protection	• See table
Overload Protection	• 110-180%
Short Circuit Protection	• Trip and restart (hiccup mode)
Temperature Coefficient	• 0.02%/°C
Remote Sense	• Fitted to 5 V version compensates for 0.5 V total voltage drop

General

Efficiency	• See table
Isolation	• 3000 VAC Input to Output 1500 VAC Input to Ground 500 VDC Output to Ground
Switching Frequency	• 60 kHz ± 10 kHz
MTBF	• >320 kHrs to Bell Core iss. 6

Environmental

Operating Temperature	• -10 °C to +70 °C derate from 100% load at 50 °C to 50% load at 70 °C
Cooling	• VFT80US05: convection-cooled 40 W, forced-cooled 60 W with 10 CFM VFT80US12-24: convection-cooled 60 W, forced-cooled 80 W with 10 CFM
Operating Humidity	• 5% to 90% RH, non condensing
Operating Altitude	• 2000 m
Storage Temperature	• -40 °C to +85 °C
Shock	• IEC68-2-6, 30 g, 11 mins half sine, 3 times in each of 6 axes
Vibration	• IEC68-2-27, 10-500Hz, 2 g 10 mins / sweep. 60 mins for each of 3 axes

EMC & Safety

Emissions	• EN55022, level B conducted & radiated
Harmonic Currents	• EN61000-3-2 class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, ±8 kV air, ±4 kV contact, Perf Criteria A
Radiated Immunity	• EN61000-4-3, 3 V/m, Perf Criteria A
EFT/Burst	• EN61000-4-4, level 2, Perf Criteria A
Surge	• EN61000-4-5, installation class 3, Perf Criteria A
Conducted Immunity	• EN61000-4-6, 3 V, Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60%, 100 ms, 100%, 5000 ms Perf Criteria A, B, B
Safety Approvals	• UL60950-1, IEC60950-1, EN60950-1

Models and Ratings

Output Voltage[6]	Output Current		OVP Setting[5]	Efficiency[4]	Model Number
	Nominal	Peak[3]			
5.0 V	12.00 A	15.00 A	7.0 V	80%	VFT80US05†^
12.0 V	6.67 A	8.34 A	16.0 V	87%	VFT80US12†^
15.0 V	5.53 A	6.91 A	18.0 V	87%	VFT80US15†^
24.0 V	3.33 A	4.16 A	30.0 V	88%	VFT80US24†^

Notes

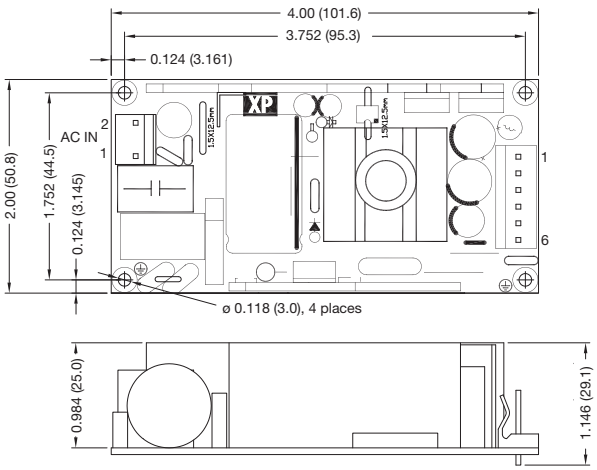
1. *Load regulation is measured from 60% to full load and from 60% to 20% load (60% ±40% full load).*
2. *Measured at the output connector with a 0.1 µF ceramic capacitor and a 10 µF electrolytic capacitor.*
3. *Peak load lasting <30 s with a maximum duty cycle of 10%, average output power not to exceed nominal.*
4. *Average of efficiencies measured at 25%, 50%, 75% & 100% load and 230 VAC input*
5. *Typical trip point.*
6. *Other voltages between 5 V & 30 V are available on request, contact sales for details.*

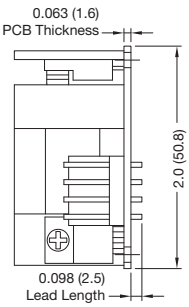
† Available from Farnell & element14. See page 28.

^ Available from Newark. See page 28.

Mechanical Details

VFT80US05





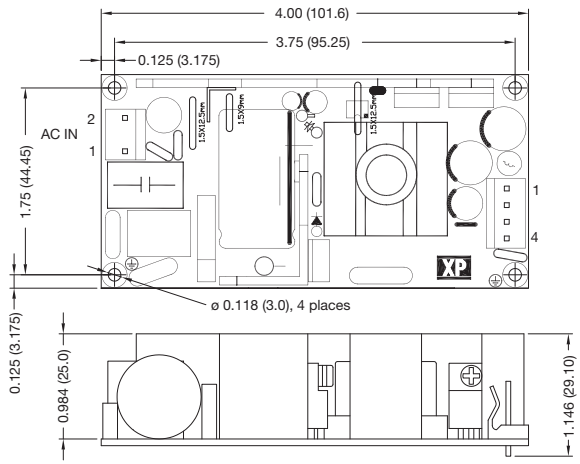
Output Connector			
Pin 1	+Vout	Pin 4	-Vout
Pin 2	+Vout	Pin 5	-S
Pin 3	-Vout	Pin 6	+S

Only 5 V Version has pins 5 & 6 fitted.

5 V Mates with: Molex Housing 09-50-3061 and Molex Series 2878 crimp terminals

Others mates with: Molex Housing 09-50-3041 and Molex Series 2878 crimp terminals.

VFT80US12 – US24



Input Connector	
Pin 1	Neutral
Pin 2	Live

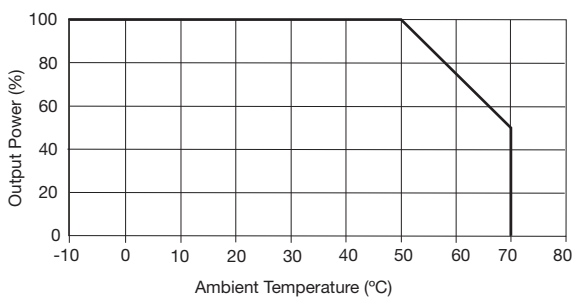
Mates with: Molex Housing 09-50-3051 and Molex Series 2878 crimp terminals.

Mounting holes marked with ⏚ must be connected to safety earth

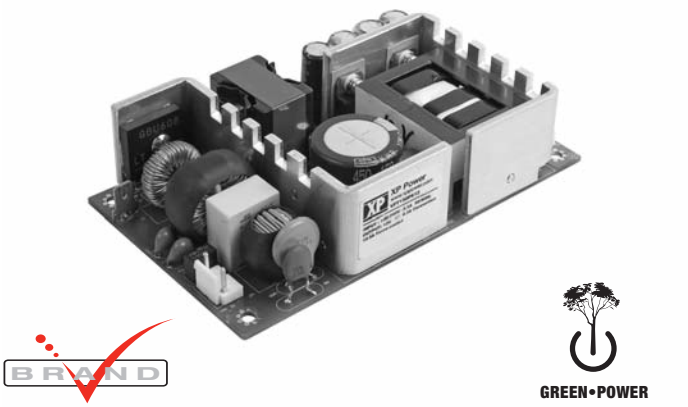
Notes

1. All dimensions shown in inches (mm).
2. Weight: 0.29 lbs (130 g) approx
3. Tolerance: x.xx = ±0.04 (x.x = ±0.1); x.xxx = ±0.2 (x.xx = ±0.5)

Derating Curve



150 Watts
VFT Series



- 100 W Convection Rating
- 150 W Forced–cooled Rating
- 3” x 5” Package
- Single Outputs from 5 V to 48 V
- Built–in Fan Supply
- <0.5 W No Load Input Power
- Low Cost

Specification

Input

Input Voltage	• 90-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 2.5 A max at 115 VAC, 1.5 A max at 230 VAC
Inrush Current	• 65 A max at 230 VAC, cold start 25 °C
Earth Leakage Current	• 180 µA max at 230 VAC/50 Hz
Power Factor	• >0.9 at 230 VAC and full load
No Load Input Power	• <0.5 W
Input Protection	• Internal T3.15 A/250 V fuse in line

Output

Output Voltage	• See table
Output Voltage Trim	• None
Initial Set Accuracy	• ±2% at 50 % load
Minimum Load	• No minimum load requirement
Start Up Delay	• 2 s max
Start Up Rise Time	• 35 ms typical
Hold Up Time	• 8 ms minimum at full load and 115 VAC
Line Regulation	• ±0.5% max
Load Regulation	• ±0.5% max
Transient Response	• 5% maximum deviation, recovering to less than 1% within 500 µs for 50% step load
Ripple & Noise	• 5 V version: 85 mV pk-pk max, 1% pk-pk max for others (see note 1)
Overvoltage Protection	• 110-135%, recycle input to reset
Overload Protection	• 130-160%
Short Circuit Protection	• Trip and restart (hiccup mode)
Temperature Coefficient	• 0.02 %/°C
Remote Sense	• Compensates for 0.5 V total voltage drop
Fan Supply	• 5 V version: 5 V at 200 mA Other versions: 12 V at 300 mA

General

Efficiency	• Up to 92%, see table
Isolation	• 3000 VAC Input to Output 1500 VAC Input to Ground 500 VDC Output to Ground
Switching Frequency	• PFC: 45-80 kHz, PWM: 100-115 kHz
MTBF	• >300 kHrs to MIL HDBK 217F at 25 °C, GB

Environmental

Operating Temperature	• -10 °C to +70 °C derate from 100% load at 50 °C to 50% load at 70 °C
Cooling	• Convection-cooled: 100 W Forced-cooled: 150 W (120 W for 5 V models) with 15 CFM
Operating Humidity	• 5% to 90% RH, non condensing
Operating Altitude	• 3000 m
Storage Temperature	• -20 °C to +85 °C
Shock	• IEC68-2-6, 30 g, 11 mins half sine, 3 times in each of 6 axes
Vibration	• IEC68-2-27, 10-55 Hz, 2 g 10 mins / sweep. 60 mins for each of 3 axes

EMC & Safety

Emissions	• EN55022, level B conducted & radiated
Harmonic Currents	• EN61000-3-2 class A EN61000-3-2 class C for loads ≥60 W
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, ±8 kV air, ±4 kV contact, Perf Criteria A
Radiated Immunity	• EN61000-4-3, 3 V/m, Perf Criteria A
EFT/Burst	• EN61000-4-4, level 3, Perf Criteria A
Surge	• EN61000-4-5, installation class 3, Perf Criteria A
Conducted Immunity	• EN61000-4-6, 3 V, Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60%, 100 ms, 100%, 5000 ms Perf Criteria A, B, B
Safety Approvals	• UL60950-1, IEC60950-1, EN60950-1

Models and Ratings

Output Voltage	Output Current		Efficiency[2]	Model Number
	Convection-cooled	Forced-cooled		
5.0 V	20.0 A	24.00 A	83%	VFT150PS05†^
12.0 V	8.30 A	12.50 A	87%	VFT150PS12[3]†^
15.0 V	6.66 A	10.00 A	87%	VFT150PS15
24.0 V	4.20 A	6.25 A	92%	VFT150PS24†^
48.0 V	2.10 A	3.13 A	92%	VFT150PS48†^

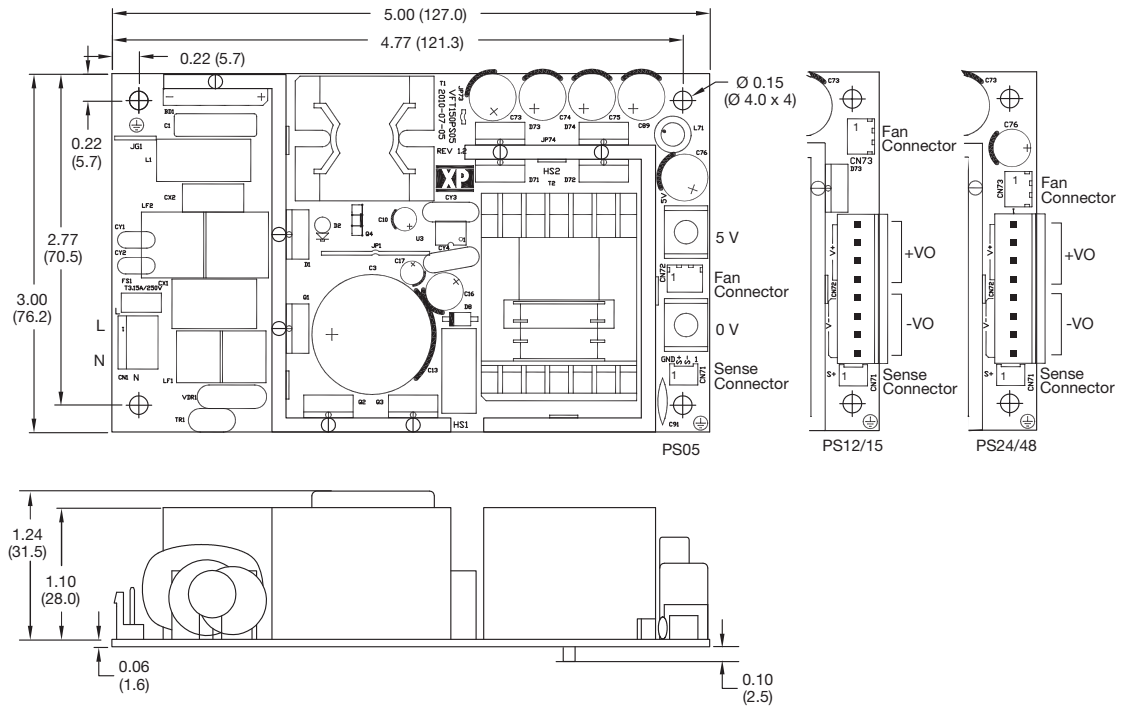
Notes

1. *Measured at the output connector with a 0.1 µF ceramic capacitor and a 10 µF electrolytic capacitor and 20 MHz bandwidth.*
2. *Average of efficiencies measured at 25%, 50%, 75% & 100% load and 230 VAC input.*
3. *VFT150PS12 model is available with optional blocking diode, add suffix '-D', e.g. VFT150PS12-D.*

† Available from Farnell & element14. See page 28.

^ Available from Newark. See page 28.

Mechanical Details



Input Connector	
Pin 1	Live
Pin 2	Neutral

Mates with: Molex Housing 09-50-3051 and Molex Series 2878 crimp terminals.

Mounting holes marked with ⏚ must be connected to safety earth

Output Connector (PS12-48)	
1	-Vout
2	-Vout
3	-Vout
4	-Vout
5	+Vout
6	+Vout
7	+Vout
8	+Vout

Mates with: Molex Housing 09-50-3081 and Molex Series 2878 crimp terminals

Sense Connector	
Pin 1	Sense+
Pin 2	Sense-

Mates with: JST PHR-2 Housing and SPH-002T-PO.5S crimps.

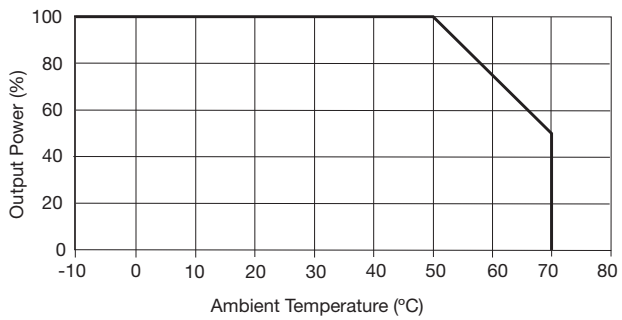
Fan Connector	
Pin 1	Fan+
Pin 2	Fan-

Mates with: JST XHP-3 Housing and SXH-002T-PO.6 crimps

Notes

1. All dimensions shown in inches (mm).
2. Weight: 0.75 lbs (340 g) approx
3. Tolerance: x.xx = ±0.04 (x.x = ±0.1); x.xxx = ±0.2 (x.xx = ±0.5)

Derating Curve



10 Watts
VEB10 Series

- Energy Efficiency Level V
- CEC2008 & EISA2007 Compliant
- +70 °C Operating Temperature
- Universal Input
- Output Voltages from 5.0 V to 48.0 V Available
- Class II Construction
- Low Cost

Specification

Input

Input Voltage	• 90-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 0.3 A max at 90 VAC
Inrush Current	• 80 A max at 240 VAC, cold start at 25 °C
Power Factor	• EN61000-3-2, class A
No Load Input Power	• <0.3 W
Input Protection	• Internal T1.0A/250 V fuse in line

Output

Output Voltage	• See table
Minimum Load	• No minimum load required
Start Up Delay	• 3 s max
Start Up Rise Time	• 100 ms typical
Hold Up Time	• 5 ms typical at full load and 100 VAC
Total Regulation	• See table
Transient Response	• 4% max. deviation, recovery to <1% within 500 µs for a 50% step load change at 0.2 A/µs
Ripple & Noise	• 1.0% pk-pk max, 20 MHz bandwidth
Overvoltage Protection	• Not fitted
Overload Protection	• 120-280%, auto recovery
Short Circuit Protection	• Trip and restart (hiccup mode)
Temperature Coefficient	• 0.04 %/°C

General

Efficiency	• See table
Energy Efficiency	• Level V
Isolation	• 3000 VAC Input to Output
Switching Frequency	• 80 kHz typical
MTBF	• >330 kHrs per MIL-HDBK-217F at 25 °C, GB

Environmental

Operating Temperature	• 0 °C to +70 °C, derate linearly from 100% load at 40 °C to 50% load at 70 °C
Cooling	• Natural convection
Operating Humidity	• 5-95% RH, non-condensing
Storage Temperature	• -40 °C to +85 °C
Shock	• Able to survive 1 m drop onto concrete on each of 6 axes
Vibration	• 10-300 Hz, 2 g 15 mins/sweep, 30 mins for each of 3 axes

EMC & Safety

Emissions	• EN55022, level B conducted & radiated
Harmonic Currents	• EN61000-3-2, class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, ±4 kV contact, ±8 kV air, Perf Criteria A
Radiated Immunity	• EN61000-4-3, 3 V/m, Perf Criteria A
EFT/Burst	• EN61000-4-4, level 2, Perf Criteria A
Surge	• EN61000-4-5, installation class 3, Perf Criteria A
Conducted Immunity	• EN61000-4-6, 3 V, Perf Criteria A
Magnetic Field	• EN61000-4-8, 1 A/m, Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B
Safety Approvals	• EN60950-1 for EU and UK models UL60950-1 for US models

Models and Ratings

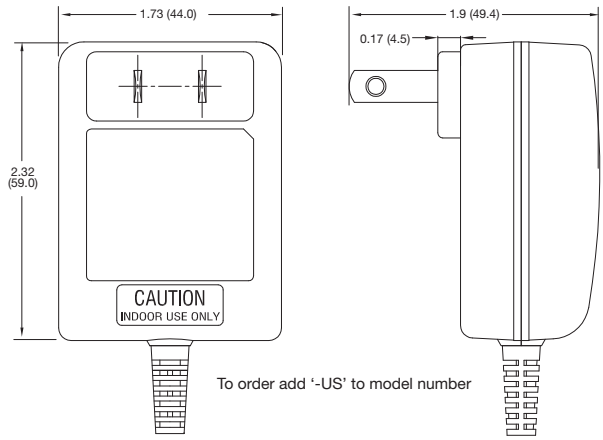
Output Power	Output Voltage[1]	Output Current	Total Regulation[2]	Efficiency[4]	Model Number[3]
8 W	5.0 V	1.60 A	5%	73%	VEB10US05
10 W	9.0 V	1.11 A	5%	77%	VEB10US09
10 W	12.0 V	0.83 A	5%	78%	VEB10US12
10 W	15.0 V	0.66 A	5%	77%	VEB10US15
10 W	24.0 V	0.42 A	5%	77%	VEB10US24
10 W	48.0 V	0.21 A	5%	80%	VEB10US48

Notes

1. Other output voltages available, contact sales for details.
2. Total regulation includes initial set accuracy, line and load regulation.
3. Add suffix to model number to define input plug type, add '-US' for US plug, '-UK' for UK plug or '-EU for European plug.
4. Average of efficiencies measured at 25%, 50%, 75% & 100% load and 230 VAC input.

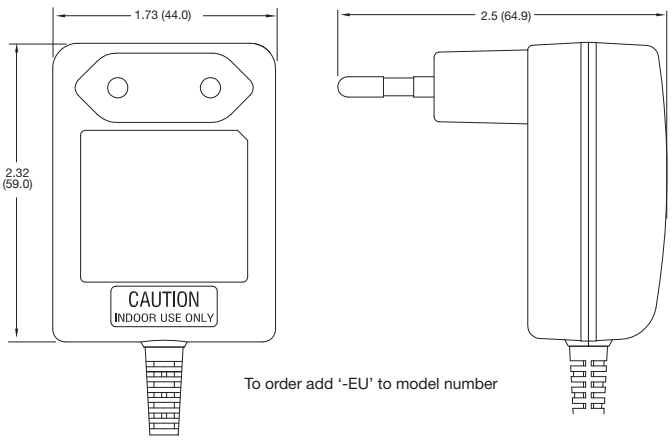
Mechanical Details

-US Version



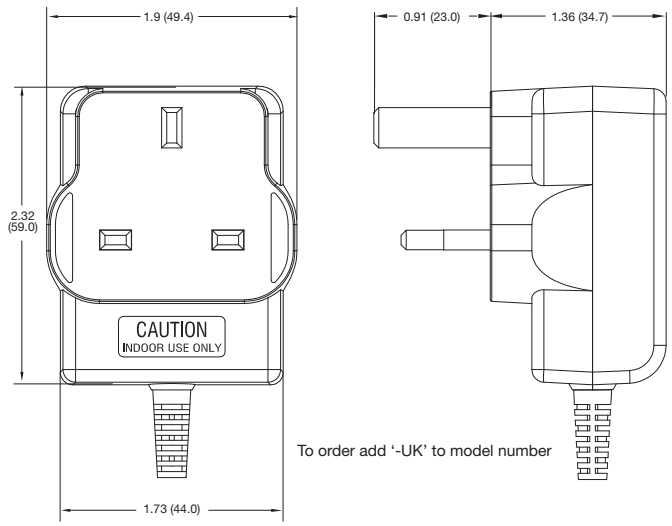
To order add '-US' to model number

-EU Version

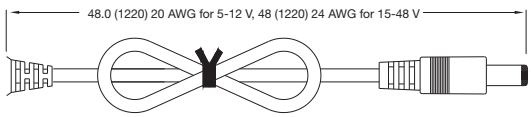


To order add '-EU' to model number

-UK Version



To order add '-UK' to model number



Output plug 0.22 (5.5) x 0.1 (2.5) x 0.433 (11.0) Centre Positive

Notes

1. All dimensions are in inches (mm). Tolerance is ±0.04 (±1.0), except output cable length is +4, -0 (+100, -0)
2. Weight: US Version 70 g, EU Version 70 g, UK Version 90 g

20/40 Watts
VEH Series

- Energy Efficiency Level V
- CEC 2008 and EISA 2007 Compliant
- Optional Inlet Connectors
- Class II Versions
- +70 °C Operating Temperature
- Compact Dimensions
- Low Cost

Specification

Input

Input Voltage	• 90-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 0.4 A max VEH20 1.0 A max VEH40
Inrush Current	• VEH20: 15 A/30 A for 115 VAC/230 VAC, cold start at 25 °C VEH40: 45 A/90 A for 115 VAC/230 VAC, cold start at 25 °C
Earth Leakage Current	• 0.75 mA at 240 VAC/50 Hz
Power Factor	• EN61000-3-2, Class A
Input Protection	• Internal fuse fitted in line VEH20: T1 A, 250 V VEH40: T3.15 A, 250 V
No Load Input Power	• <0.3 W

Output

Output Voltage	• See table
Minimum Load	• No minimum load required
Hold Up Time	• VEH20: 5 ms min, VEH40: 12 ms min, at full load & 110 VAC
Start Up Delay	• 2 s max at full load 100 VAC
Transient Response	• 2% deviation, recovery to within 1% of nominal in 500 µs for 50% load change
Regulation	• See table
Ripple & Noise	• 1% pk-pk max, 20 MHz bandwidth
Overvoltage Protection	• Not fitted
Overload Protection	• 110-150%
Short Circuit Protection	• Trip & restart (hiccup mode), auto recovery
Temperature Coefficient	• ±0.04%/°C

General

Efficiency	• 87% typical (average of measured values with output loads of 25%, 50%, 75% and 100%)
Energy Efficiency	• Level V
Isolation	• 3000 VAC Input to Output 1500 VAC Input to Ground* 500 VDC Output to Ground* *Not C2 version
Switching Frequency	• VEH20: 63 kHz typical VEH40: 20 kHz - 60 kHz variable
MTBF	• >250 kHrs to MIL-HDBK-217F at 25 °C,GB

Environmental

Operating Temperature	• 0 °C to +70 °C, derate from 100% power at +40 °C to 50% power at +70 °C
Storage Temperature	• -40 °C to +85 °C
Cooling	• Convection-cooled
Operating Humidity	• 5-95% RH, non-condensing
Operating Altitude	• 2000 m
Shock	• 10 g, 10 ms on 3 axes

EMC & Safety

Emissions	• EN55022 level B conducted & radiated
Harmonic Current	• EN61000-3-2 class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2 level 3 Perf criteria A
Radiated Immunity	• EN61000-4-3 3 V/m Perf criteria A
EFT/Burst	• EN61000-4-4 level 2 Perf criteria A
Surge	• EN61000-4-5 installation class 3 Perf criteria A
Conducted Immunity	• EN61000-4-6 level 2 Perf criteria A
Magnetic Field	• EN61000-4-8 1 A/m Perf criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms Perf Criteria A, B, B
Safety Approvals	• EN60950-1, UL/cUL60950-1, Approved as Limited Power Source

Models and Ratings

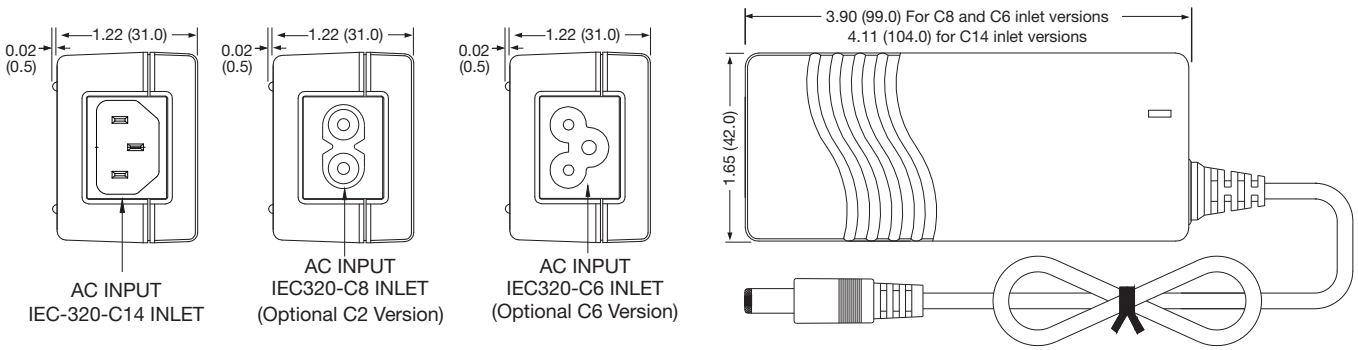
Max Output Power	Output Voltage[1]	Output Current	Total Regulation[2]	Model Number
20 W	12.0 VDC	1.67 A	5%	VEH20US12[3,4]
20 W	15.0 VDC	1.33 A	5%	VEH20US15[3,4]
20 W	18.0 VDC	1.11 A	5%	VEH20US18[3,4]
20 W	24.0 VDC	0.83 A	5%	VEH20US24[3,4]
20 W	48.0 VDC	0.42 A	5%	VEH20US48[3,4]
40 W	12.0 VDC	3.33 A	5%	VEH40US12
40 W	15.0 VDC	2.67 A	5%	VEH40US15
40 W	18.0 VDC	2.22 A	5%	VEH40US18
40 W	24.0 VDC	1.67 A	5%	VEH40US24
40 W	48.0 VDC	0.83 A	5%	VEH40US48

Notes

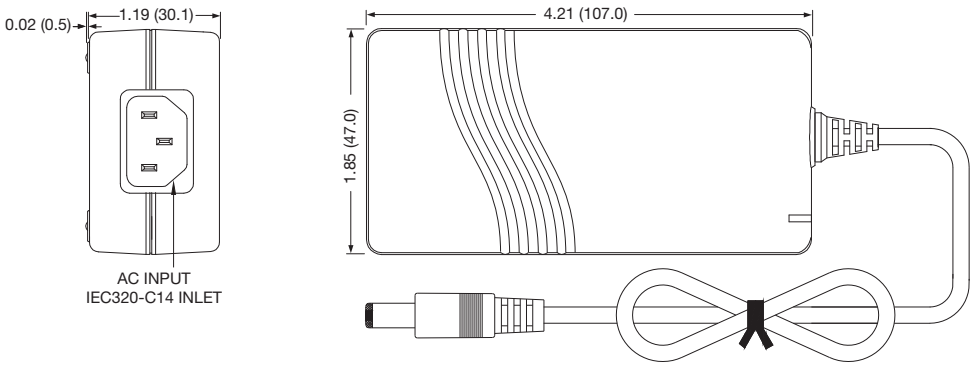
1. Other output voltages available, contact sales for details
2. Total regulation includes line regulation and load regulation.
3. Standard input connector is IEC320-C14 inlet. For optional IEC320-C6 inlet add suffix 'C6' to model number, e.g. VEH20US12C6.
4. For optional class II version with IEC320-C8 inlet add suffix 'C2' to model number e.g. VEH20US12C2

Mechanical Details

VEH20



VEH40



Notes

1. All dimensions are shown in inches (mm). Tolerance ±0.04 (±1.0) max.
2. Weight: 0.37 lbs (170 g) for VEH20, 0.62 lbs (280 g) for VEH40
3. Output connector: is 0.22 (5.5) outer diameter barrel, 0.10 (2.5) inner diameter barrel with center positive (+) and outer shell negative (-). Length is 0.433 (11.0).
4. Output cable length is 48" (1220mm) approx.
5. For European mains lead order part: EU-MAINS-IEC, for IEC320-C14 inlet, EU-MAINS-C5 for IEC320-C6 inlet, EU-MAINS-8 for Class II
6. For UK mains lead order part: UK-MAINS-IEC, for IEC320-C14 inlet, UK-MAINS-C5 for IEC320-C6 inlet, UK-MAINS-8 for Class II
7. For US mains lead order part: US-MAINS-IEC, for IEC320-C14 inlet, US-MAINS-C5 for IEC320-C6 inlet, US-MAINS-8 for Class II

60 Watts
VEH Series

- Energy Efficiency Level V, ≥15 V
- CEC 2008 & EISA 2007 Compliant
- China Compulsory Certfication (CCC) Qualified
- Single Outputs from 12 V to 30 V
- Optional Inlet Connectors
- No Load Input Power <0.5 W
- High Power Density

Specification

Input

Input Voltage	• 90-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 1.7 A max
Inrush Current	• 50 A max at 230 VAC, cold start at 25 °C
Earth Leakage Current	• <1 mA at 240 VAC/50 Hz
Power Factor	• EN61000-3-2, class A
No Load Input Power	• <0.5 W
Input Protection	• Internal T3.15A/250 V fuse in line

Output

Output Voltage	• See table
Initial Set Accuracy	• ±5% at 50% load
Minimum Load	• No minimum load requirement
Hold Up Time	• 8 ms min at 115 VAC, full load
Start Up Delay	• 3 s max
Start Up Rise Time	• 8 ms typical
Transient Response	• 4% maxiumum deviation, recovering to less than 1% within 500 µs for a 50% step load change
Line Regulation	• ±0.5% max
Load Regulation	• ±5% max
Ripple & Noise	• 200 mv pk-pk max, 20 MHz bandwidth (see note 1)
Overvoltage Protection	• See table
Overload Protection	• 110 -180%
Short Circuit Protection	• Continuous (hiccup/trip & restart mode with auto recovery)
Temperature Coefficient	• ±0.04%/°C

General

Efficiency	• See table
Energy Efficiency	• Level V ≥15 V
Isolation	• 3000 VAC Input to Output, 1500 VAC Input to Ground.
Switching Frequency	• 60 kHz ±10 kHz
MTBF	• >700 kHrs to Bell Core iss. 6

Environmental

Operating Temperature	• 0 °C to +60 °C derate linearly from 100% load at +40 °C to 50% load at +60 °C
Storage Temperature	• -20 °C to +85 °C
Operating Humidity	• 5% to 90% RH non-condensing
Storage Humidity	• 5% to 95% RH non-condensing
Shock	• 6 random drops from 0.7 m with no damage, 50 g for 20 ms in each of 3 axes
Vibration	• 2 g variable frequency from 20 Hz to 30 Hz

EMC & Safety

Emissions	• EN55022, level B conducted & radiated
Harmonic Currents	• EN61000-3-2 class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, level 3 Perf Criteria A
Radiated Immunity	• EN61000-4-3, 3 V/m Perf Criteria A
EFT/Burst	• EN61000-4-4, level 3 Perf Criteria A
Surge	• EN61000-4-5, installation class 3, Perf Criteria B
Conducted Immunity	• EN61000-4-6, level 2 Perf Criteria A
Magnetic Field	• EN61000-4-8, 3 A/m Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms Perf Criteria A, B, B
Safety Approvals	• IEC60950-1, EN60950-1, UL/cUL60950-1, China Compulsory Certification (CCC) qualified

Models and Ratings

VEH60

Output Power	Output Voltage[5]	Output Current	OVP Setting[2]	Efficiency[3]	Model Number[4]
60 W	12.0 V	5.00 A	16.0 V	85%	VEH60US12†^
60 W	15.0 V	4.00 A	18.0 V	87%	VEH60US15[6]†^
60 W	19.0 V	3.16 A	25.0 V	87%	VEH60US19[6]
60 W	24.0 V	2.50 A	30.0 V	87%	VEH60US24[6]†^
60 W	30.0 V	2.00 A	36.0 V	87%	VEH60US30[6]

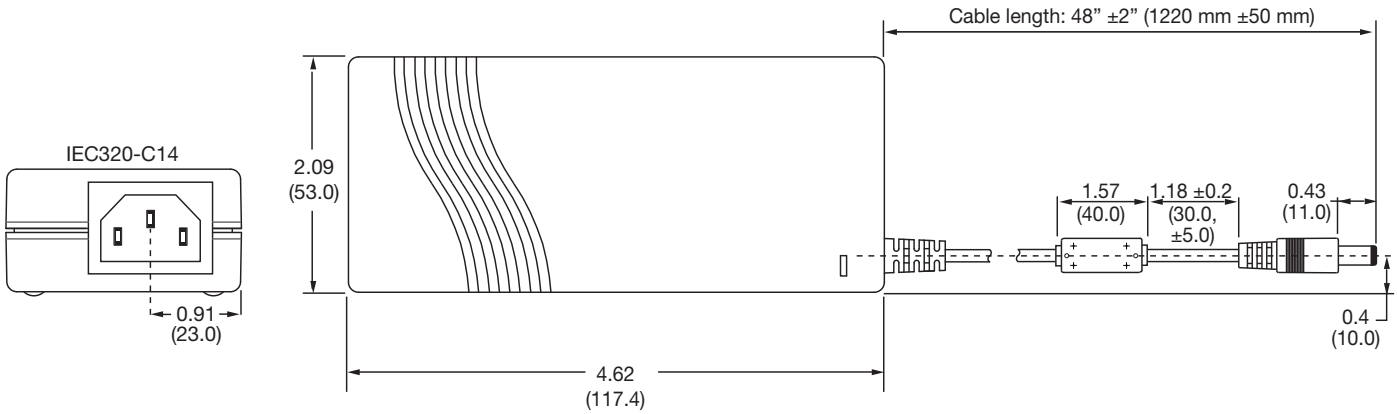
Notes

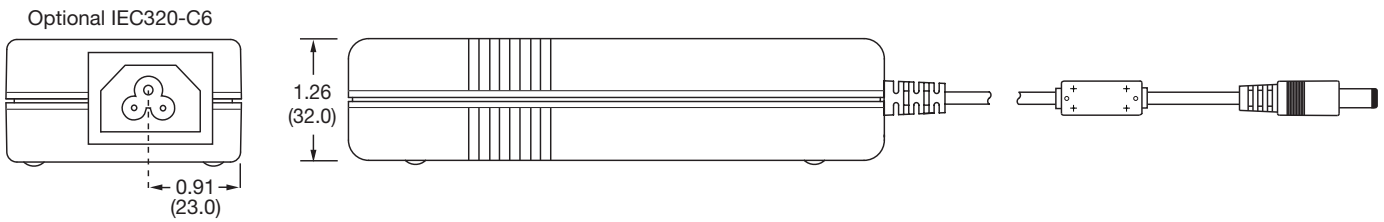
1. Measured at the output connector with a 0.1 µF ceramic capacitor and a 10 µF electrolytic capacitor.
2. Typical values.
3. Average of efficiencies measured at 25%, 50%, 75% and 100% load and 230 VAC input.
4. For optional IEC320-C6 input connector, add suffix 'C6' to end of the part number, e.g. VEH60US24C6. Contact sales for details.
5. Other voltages between 12 V and 30 V available on request, contact sales for details.
6. Energy Efficiency Level V.

† Available from Farnell & element14. See page 28.

^ Available from Newark. See page 28.

Mechanical Details





Power Cord for C14 inlet, Order Part:
UK - UK-MAINS-IEC
European - EU-MAINS-IEC
US - US-MAINS-IEC

Power Cord for C6 inlet, Order Part:
UK - UK-MAINS-5
European - EU-MAINS-5
US - US-MAINS-5

Notes

1. All dimensions are shown in inches (mm), Tolerance is 0.04" (±1.0) max except output lead.
2. Weight: 0.76 lbs (345 g) approx.
3. Output connector is barrel type with 11 mm length, 5.5 mm dia. outer, 2.5 mm dia. inner with center + and outer shell - polarity.
4. Optional output connectors available.

90 Watts
VEH Series

- Energy Efficiency Level V
- CEC 2008 & EISA 2007 Compliant
- High Power Density
- Single Outputs from 12 V to 24 V
- No Load Input Power <0.5 W
- Optional Output Connector
- Low Cost

Specification

Input

Input Voltage	• 90-264 VAC
Input Frequency	• 47-63 Hz
Input Current	• 1.5 A max at 90 VAC
Inrush Current	• 100 A max at 230 VAC, cold start at 25 °C
Earth Leakage Current	• <1 mA at 230 VAC/50 Hz
Power Factor	• >0.95 at 230 VAC and full load
No Load Input Power	• <0.5 W
Input Protection	• Internal T2.0A/250 V fuse in line

Output

Output Voltage	• See table
Initial Set Accuracy	• ±5% at 50% load
Minimum Load	• No minimum load requirement
Hold Up Time	• 10 ms min at 115 VAC, full load
Start Up Delay	• 3 s max
Start Up Rise Time	• 8 ms typical
Transient Response	• 4% maxiumum deviation, recovering to less than 1% within 500 µs for a 50% step load change
Line Regulation	• ±0.5% max
Load Regulation	• ±5% max
Ripple & Noise	• 1% pk-pk max, 20 MHz bandwidth (see note 1)
Overvoltage Protection	• See table
Overload Protection	• 120 -180%
Short Circuit Protection	• Continuous (hiccup/trip & restart mode with auto recovery)
Temperature Coefficient	• ±0.04%/°C

General

Efficiency	• See table
Energy Efficiency	• Level V
Isolation	• 3000 VAC Input to Output, 1500 VAC Input to Ground PS12: 500 VDC Output to Ground, PS19/24: Negative output is connected to Ground
Switching Frequency	• PFC: 25-125 kHz, PWM: 60 kHz typical
MTBF	• >160 kHrs to Bell Core iss. 6

Environmental

Operating Temperature	• 0 °C to +60 °C derate linearly from 100% load at +40 °C to 50% load at +60 °C,
Storage Temperature	• -10 °C to +85 °C
Operating Humidity	• 5% to 90% RH non-condensing
Storage Humidity	• 5% to 95% RH non-condensing
Shock	• 6 Random drops from 0.7 m with no damage, 50 g for 20 ms in each of 3 axes
Vibration	• 2 g variable frequency from 20 Hz to 30 Hz

EMC & Safety

Emissions	• EN55022, level B conducted & radiated
Harmonic Currents	• EN61000-3-2 class A, EN61000-3-2 class C >60% load
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, level 3 Perf Criteria A
Radiated Immunity	• EN61000-4-3, 3 V/m Perf Criteria A
EFT/Burst	• EN61000-4-4, level 3 Perf Criteria A
Surge	• EN61000-4-5, installation class 3, Perf Criteria A
Conducted Immunity	• EN61000-4-6, level 2 Perf Criteria A
Magnetic Field	• EN61000-4-8, 3 A/m Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B
Safety Approvals	• EN60950-1:2001, UL/cUL60950-1

Models and Ratings

Output Power	Output Voltage	Output Current	OVP Setting[2]	Effeciency[3]	Model Number[4]
90 W	12.0 V	7.50 A	16.0 V	88%	VEH90PS12†^
90 W	19.0 V	4.74 A	25.0 V	88%	VEH90PS19†^
90 W	24.0 V	3.75 A	32.0 V	89%	VEH90PS24†^

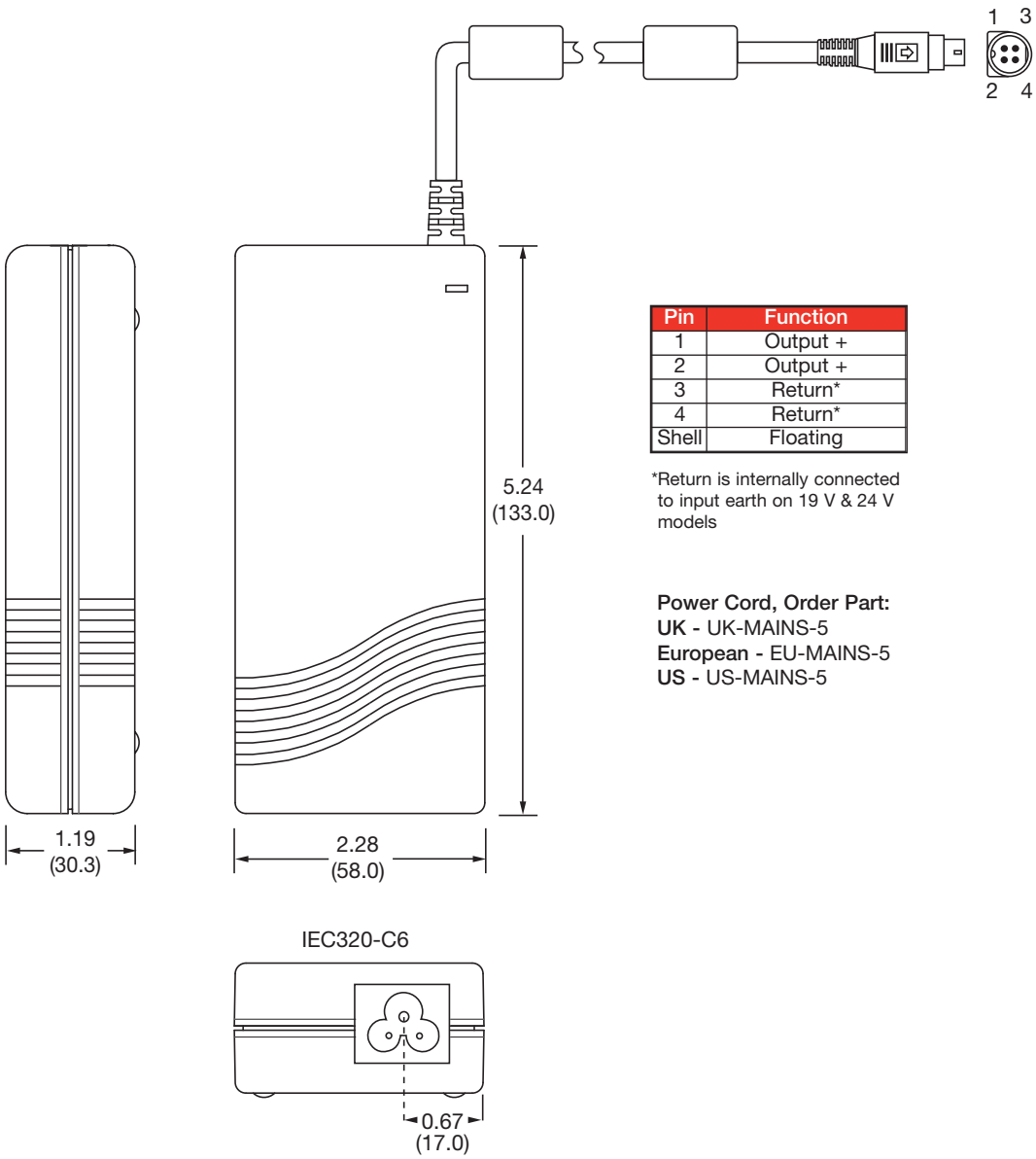
Notes

1. *Measured at the output connector with a 0.1 µF ceramic capacitor and a 10 µF electrolytic capacitor.*
2. *Typical values.*
3. *Average of efficiencies measured at 25%, 50%, 75% and 100% load and 230 VAC input.*
4. *For optional barrel jack connector, 2.5 mm inner positive, 5.5 mm outer negative, 11 mm length add suffix '-B' e.g. VEH90PS24-B*

† Available from Farnell & element14. See page 28.

^ Available from Newark. See page 28.

Mechanical Details



Pin	Function
1	Output +
2	Output +
3	Return*
4	Return*
Shell	Floating

*Return is internally connected to input earth on 19 V & 24 V models

Power Cord, Order Part:
UK - UK-MAINS-5
European - EU-MAINS-5
US - US-MAINS-5

Notes

1. All dimensions shown in inches (mm). Tolerance is 0.02 (0.5) maximum, except output cable length.
2. Weight 0.82 lbs (370 g) approx.
3. Cable length is 48"±2"(1220 ±50 mm) approx.
4. Output connector (Power Mini Din) mates with Kycon KPJ-4S or equivalent.

XP Power - Farnell & element14 Cross Reference

www.farnell.com
www.element14.com

XP Power Model	Farnell & element14 Code
VCP05US05	1716962
VCP05US12	1716963
VCP15US05	1716964
VCP15US12	1716965
VCP15US24	1716966
VCP24US05	1716968
VCP24US12	1716969
VCP24US24	1716970
VCT40US05	1716958
VCT60US12	1716959
VCT60US15	1716960
VCT60US24	1716961
VEH60US12	1673382
VEH60US15	1673383
VEH60US24	1673384
VEH90PS12	1821454
VEH90PS19	1821455
VEH90PS24	1821456
VFT150PS05	1821497
VFT150PS12	1821498
VFT150PS24	1821499
VFT150PS48	1821500
VFT80US05	1821493
VFT80US12	1821494
VFT80US15	1821495
VFT80US24	1821496

XP Power - Newark Cross Reference

www.newark.com

XP Power Model	Newark Code
VCP05US05	04R9669
VCP05US12	04R9670
VCP15US05	04R9671
VCP15US12	04R9672
VCP15US24	04R9673
VCP24US05	04R9674
VCP24US12	04R9675
VCP24US24	04R9676
VCT40US05	04R9677
VCT60US12	04R9678
VCT60US15	04R9679
VCT60US24	04R9680
VEH60US12	04R9681
VEH60US15	04R9682
VEH60US24	04R9683
VEH90PS12	67R9652
VEH90PS19	67R9653
VEH90PS24	67R9654
VFT150PS05	67R9655
VFT150PS12	67R9656
VFT150PS24	67R9657
VFT150PS48	67R9658
VFT80US05	67R9659
VFT80US12	67R9661
VFT80US15	67R9662
VFT80US24	67R9663

We are continually adding products to the
Farnell, Newark and element14 catalogs and websites, please visit:

www.farnell.com

www.newark.com

www.element14.com

for the latest product availability.

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VFT80	16
VFT150	18

xppower.com

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- XP Blogs

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- Product Selector where specific requirements can be entered to get an instant selection of suitable products.
- Product Drop Down Menus for rapid product selection by type and power output.
- Part Search is available for quick access to known products.

Each product has a full specification available to view on screen. Everything from models and ratings, to stock check through Farnell, Newark and element 14 are viewable. All documentation can also be downloaded.

XP Power
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AC-DC Open Frame

PCB Mount

External

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Greece	+30 210 240 1961	ADEM Electronics
Hungary	+36 1 705 2345	JAMSoft
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Israel	+972 9 7498777	Appletec
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Korea	+82 31 422 8882	Hanpower
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Lithuania	+370 5 2652683	Elgerta
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