

## 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	• 110 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% maximum 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 &amp; 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 <sup>(2)</sup>	Efficiency <sup>(3)</sup>	Model Number <sup>(4)</sup>
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†^

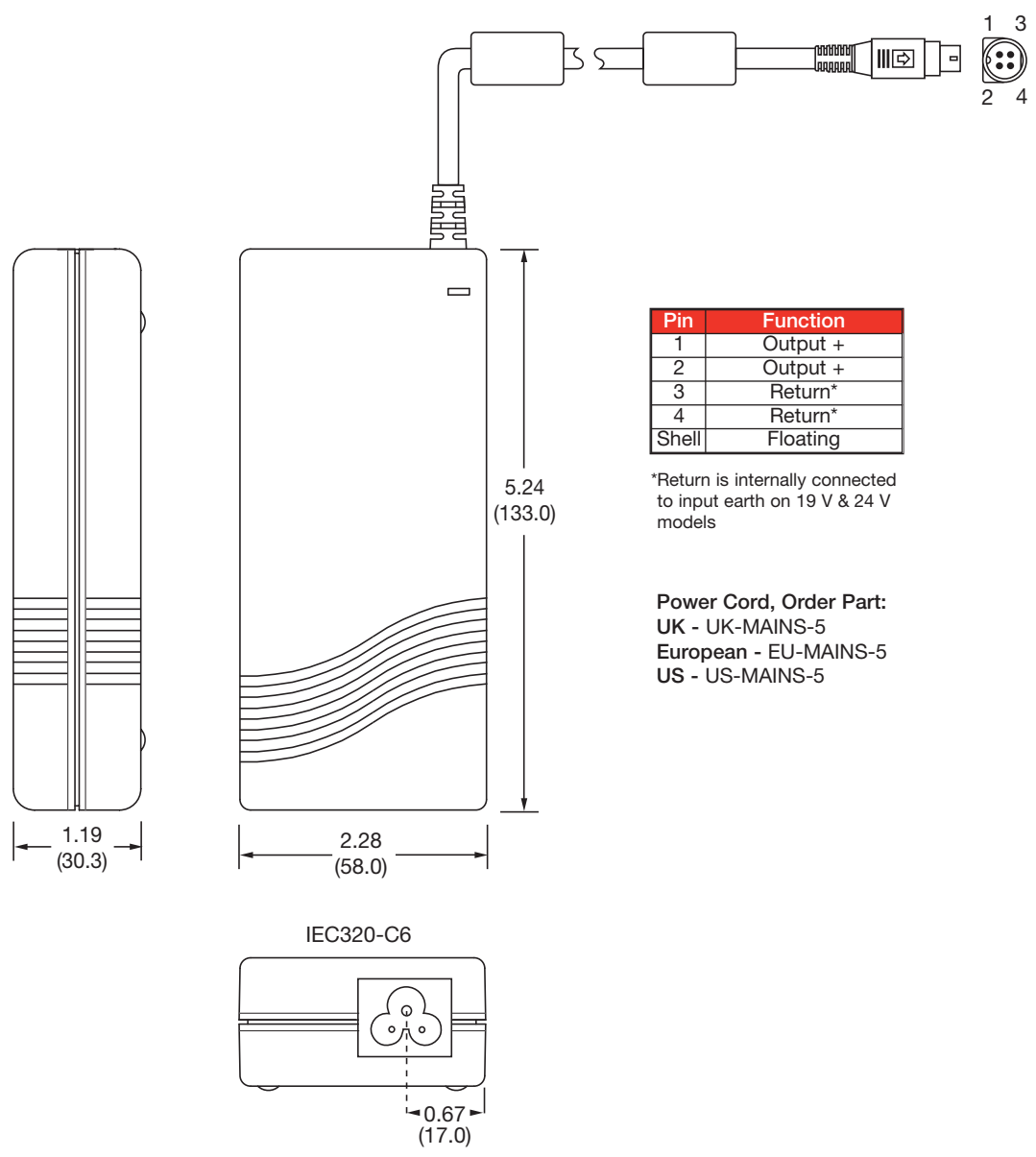
**Notes**

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**



**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.