Vega Series

Medical  Industrial  Test  Broadcast  Comms  Renewable

450W - 900W
Modular power supply.

Features
• Industry leading flexibility
• Screw, Fast-on or IEC connection
• Worldwide safety approvals
• Up to 11 outputs
• 3 year warranty

Benefits
Suits your application
Simplifies design into system
Supports global use
Eliminates need for additional supplies
Low cost of ownership

Input Voltage / Frequency
90-264Vac / 47 - 63 Hz (440Hz with reduced PFC)
900W version is 150-264Vac only, 650W below 150Vac

Input Fuse
16A / 250Vac HBC Fast acting (not user accessible)
20A Fast acting (not user accessible)

Inrush Current
<40A at 25°C and 264Vac (cold start)
<40A at 25°C, ETSI EN300 132-2

Leakage Current
See ‘How To Create A Product Description’ for details
n/a

How To Create A Product Description
The extensive range of output modules and options make it possible to achieve almost any combination of Volts and Amps. You can create your own Vega configuration online at https://config.emea.tdk-lambda.com/. This method checks your configuration and offers the optimum solution. Alternatively, you can do this manually by using the guide below.

1. Calculate total output power to select the appropriate converter, then select required Cooling, Connection, Leakage Current and Controls/Signals from the following table:

<table>
<thead>
<tr>
<th>Converter</th>
<th>V0</th>
<th>V4</th>
<th>V6</th>
<th>V9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>450W (dc in)</td>
<td>450W</td>
<td>650W</td>
<td>900W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cooling</th>
<th>F</th>
<th>Q</th>
<th>R</th>
<th>P_st</th>
<th>C_c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward air - standard</td>
<td>Forward air - Quiet</td>
<td>Reverse air - Quiet Fan</td>
<td>Customer air - no fan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input Connection</th>
<th>F</th>
<th>S</th>
<th>S</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw</td>
<td>Fast-on terminal</td>
<td>IEC320 with switch</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Select Output Modules and options from the output voltages tables.
Example - If you require 5.2V / 18A with output inhibit:

a) Select B1H as closest match for voltage & current and prefix with voltage (eg 5.2B1H)
b) Add suffix ‘S’ or ‘F’ for Screw or Fast-on output connection (eg 5.2B1HS)
c) Add suffix ‘N’ for output inhibit if required (eg 5.2B1HSN)
d) Repeat for other outputs.

Ensure you do not select more than a total of 5 slots width of modules. This will create a complete product description eg V6FSSF 5L1SN 4/12H3/3S 24CSS which represents a four output 650W Vega with Forward air, Screw terminal input, 1.5mA leakage, ac Fail, Global inhibit & 5V/100mA standby supply with the following outputs:
Output 1 = 5V/35A (with output inhibit, module good and current share option). Output 2 = 12V / 10A, Output 3 = 12V / 6A, Output 4 = 24V / 10A, all with screw terminal outputs.

3. Contact TDK-Lambda to validate configuration and issue a part number.
<table>
<thead>
<tr>
<th>Module</th>
<th>Adjustment Range (Volts)</th>
<th>Current (Amps)</th>
<th>Slots</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1L</td>
<td>1.8 - 3.8</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>C1</td>
<td>1.8 - 4.1</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td>C1Y</td>
<td>1.8 - 4.1</td>
<td>40</td>
<td>1</td>
</tr>
<tr>
<td>D1L</td>
<td>1.8 - 3.8</td>
<td>60</td>
<td>2</td>
</tr>
<tr>
<td>E1</td>
<td>1.8 - 3.8</td>
<td>62</td>
<td>2</td>
</tr>
<tr>
<td>F1</td>
<td>1.8 - 3.8</td>
<td>80</td>
<td>2</td>
</tr>
<tr>
<td>Z2</td>
<td>1.8 - 3.8</td>
<td>95</td>
<td>3</td>
</tr>
<tr>
<td>Z3</td>
<td>1.8 - 3.8</td>
<td>114</td>
<td>4</td>
</tr>
<tr>
<td>B1H</td>
<td>3.9 - 5.5</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>L1</td>
<td>4.2 - 5.5</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td>D2</td>
<td>3.8 - 5.5</td>
<td>45</td>
<td>1.5</td>
</tr>
<tr>
<td>D1H</td>
<td>3.9 - 5.5</td>
<td>50</td>
<td>1.5</td>
</tr>
<tr>
<td>E2</td>
<td>3.8 - 8</td>
<td>60</td>
<td>2</td>
</tr>
<tr>
<td>Z18</td>
<td>4.2 - 5.5</td>
<td>66</td>
<td>2</td>
</tr>
<tr>
<td>F2</td>
<td>3.8 - 8</td>
<td>75</td>
<td>2</td>
</tr>
<tr>
<td>Z4</td>
<td>3.9 - 5.5</td>
<td>95</td>
<td>3</td>
</tr>
<tr>
<td>Z6</td>
<td>3.9 - 5.5</td>
<td>104</td>
<td>3.5</td>
</tr>
<tr>
<td>B2</td>
<td>5 - 9</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>B3</td>
<td>9.1 - 16.2</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>C3</td>
<td>9.1 - 16.2</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>D3</td>
<td>8 - 16.5</td>
<td>24</td>
<td>1.5</td>
</tr>
<tr>
<td>E3L</td>
<td>8 - 13.9</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>Z7</td>
<td>8 - 16.5</td>
<td>45</td>
<td>3</td>
</tr>
<tr>
<td>EE2</td>
<td>7.6 - 16</td>
<td>45</td>
<td>4</td>
</tr>
<tr>
<td>D4</td>
<td>14 - 21.5</td>
<td>18</td>
<td>1.5</td>
</tr>
<tr>
<td>E4</td>
<td>14 - 19.9</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>E3H</td>
<td>14 - 15</td>
<td>36</td>
<td>2</td>
</tr>
<tr>
<td>C4</td>
<td>16.3 - 21.5</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>CC3</td>
<td>18.2 - 32.4</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>E5Lw</td>
<td>20 - 24</td>
<td>27</td>
<td>2</td>
</tr>
<tr>
<td>B5</td>
<td>21.6 - 31</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>C5</td>
<td>21.6 - 31</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>D5</td>
<td>21 - 28</td>
<td>15</td>
<td>1.5</td>
</tr>
<tr>
<td>E5Hv</td>
<td>24 - 28</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>Z19w</td>
<td>24 - 28</td>
<td>36</td>
<td>3.5</td>
</tr>
<tr>
<td>HH5/3</td>
<td>25.3 - 44.2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>DD4</td>
<td>28 - 43</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>EE4</td>
<td>28 - 38</td>
<td>22.5</td>
<td>4</td>
</tr>
<tr>
<td>HH5/4</td>
<td>32.5 - 53</td>
<td>4.5</td>
<td>1</td>
</tr>
<tr>
<td>BB4</td>
<td>32.6 - 43</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>EE5Lco</td>
<td>40 - 48</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>C5B4</td>
<td>43 - 48</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>EE5Hx</td>
<td>48 - 56</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>CC5</td>
<td>48.1 - 62</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>D5D</td>
<td>42 - 56</td>
<td>15</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module</th>
<th>Voltage Range</th>
<th>Current</th>
<th>Slots</th>
</tr>
</thead>
<tbody>
<tr>
<td>W2</td>
<td>0.25 - 7.5</td>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td>W5</td>
<td>0.25 - 32</td>
<td>8.5</td>
<td>1</td>
</tr>
</tbody>
</table>

Options - Single output Modules*  | Options - Twin output Modules*
---|---
N | Output Inhibit, Module Good & Current Sharing  | N | Output Inhibit, Module Good & Remote Sense
R | Remote Sense only  |  

| See configuring guide |

- a) F1, F2 and W2 modules not for Vega 900
- b) 38V max for 900W
- c) Only available for Vega 900
- d) 5.1V max for 900W
- e) 3.4V max for 900W
- f) 8V max for 900W
- g) 15V max for 900W
- h) 28V max for 900W
- i) 18V max for 900W
- j) 30V max for 900W
- k) 7.5V max for 900W
- l) 12.5V max for 900W
- m) 19V max for 900W
- n) 3.4V max for 900W
- o) 'N' option not available
- p) 24V max for 900W
- q) 40V max for 900W
- r) 60V max for 900W
- s) 36V max for 900W
- t) 52V max for 900W
- u) 15.5V max for 900W
- v) 'N' option not available if more than 1 module fitted
- w) 500mA min load below 1V
- x) 100mA minimum load below 2V

Note: Follow non wide range modules by F (Fast-on) or S (Screw) output terminals.
### Isolation

<table>
<thead>
<tr>
<th>Input to Output</th>
<th>Reinforced 2 x MOPPs (3rd edition 60601) - units without xFW or xEW primary option fitted 4kVac, 5.7kVdc type tested to 4kVac (equivalent to 5.7kVdc), production tested to 4.3kVdc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input to Earth</td>
<td>Basic 1 x MOOP (3rd edition 60601) 2.3kVdc</td>
</tr>
<tr>
<td>Output to Output / Output to Earth</td>
<td>200Vdc</td>
</tr>
</tbody>
</table>

### Output Specification

<table>
<thead>
<tr>
<th>Voltage / Current</th>
<th>See output voltages table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn on time</td>
<td>1.5s max at 90Vac (150Vac for 900W, 48Vdc for Vega dc) and 100% rated output power</td>
</tr>
<tr>
<td>Rise time</td>
<td>&lt;50ms to 90% of voltage, monotonic rise above 10%</td>
</tr>
<tr>
<td>Turn on overshoot</td>
<td>&lt;5% or 250mV Load type dependent, no overshoot with resistive load</td>
</tr>
<tr>
<td>Efficiency</td>
<td>up to 75% at 230Vac (48Vdc for Vega dc) &amp; 100% rated power, configuration dependent</td>
</tr>
<tr>
<td>Hold up</td>
<td>16ms min at 90Vac (150Vac for 900W) and 100% rated power (10ms min for Vega dc)</td>
</tr>
<tr>
<td>Ripple and Noise</td>
<td>&lt;1% or 50mV pk-pk, using EIAJ test method &amp; 20MHz bandwidth</td>
</tr>
<tr>
<td>Voltage Accuracy</td>
<td>&lt;1% of set voltage</td>
</tr>
<tr>
<td>Remote Sense</td>
<td>Yes standard on single output modules, max 0.75V total line drop. Option for twin output modules</td>
</tr>
<tr>
<td>Minimum Load</td>
<td>No on any output (except W2 and W5 modules which need 0.5A load to achieve full specification)</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>&lt;0.02% of rated voltage per °C</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>&lt;0.5% or 50mV for 0-100% load change</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>&lt;0.1% for 90-264Vac input change (34 - 75Vdc for Vega dc)</td>
</tr>
<tr>
<td>Cross Regulation</td>
<td>&lt;0.2% for 100% load change on any output</td>
</tr>
<tr>
<td>Transient Response</td>
<td>&lt;6% or 300mV of set voltage for 50% load change (above 25% load)</td>
</tr>
<tr>
<td>Recovery</td>
<td>500μs for recovery to 1% or 100mV of set voltage</td>
</tr>
<tr>
<td>Over Voltage Protection</td>
<td>Yes Refer to application notes for details</td>
</tr>
<tr>
<td>Over Current Protection (singles)</td>
<td>105-125% of rated current, constant current characteristic For EE2, EE4, EE5L, EE5H, Z2, Z18 and Z19 modules</td>
</tr>
<tr>
<td>Short Circuit Protection</td>
<td>&lt;150% of rated current, when output voltage &lt;1%</td>
</tr>
<tr>
<td>Over Temperature Protection</td>
<td>Yes shuts down all outputs and fan. Cycle ac off/on to reset Shutdown temperature varies according to ambient, output power and input voltage. ac fail signal (if fitted) provides 5ms warning of thermal shutdown</td>
</tr>
</tbody>
</table>

### Environment

| Temperature       | 0°C to 65°C operational, -40°C to 70°C storage (max 12 months). |
| Derating          | 50°C to 65°C derate total output power and each output current by 2.5% per °C |
| Low Temp Startup  | -20°C |
| Humidity          | 5 - 95% RH non condensing |
| Shock             | ±3 x 30g shocks in each plane, total 18 shocks 30g shock = 11ms +/-0.5msec, half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 516.5, Pro I, IV, VI |
| Vibration         | Single axis 10 - 500 Hz at 2g (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 514.4, Pro I, Cat 1, 9 |
| Altitude          | 5000 metres operational/non operational (IEC inlet 3000m operational, 5000m non operational) |
| Pollution         | Degree 2, Material group Illb |
| IP Rating         | IP 10 |
**Emissions EN61000-6-3:2007, EN60601-1-2:2001**

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Code</th>
<th>Level</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radiated Electric Field</strong></td>
<td>EN55011, EN55032</td>
<td></td>
<td>(as per CISPR.11/22) Class B (Class A for Vega dc), FCC47 part 15 subpart B</td>
</tr>
<tr>
<td><strong>Conducted Emissions</strong></td>
<td>EN55011, EN55032</td>
<td>Level 3</td>
<td>Only for ‘S’ type leakage variants.</td>
</tr>
<tr>
<td><strong>Conducted Harmonics</strong></td>
<td>EN61000-3-3</td>
<td></td>
<td>Compliant - $d_{\text{min}}$ only - not applicable to Vega dc</td>
</tr>
</tbody>
</table>

**Immunity EN61000-6-2:2005, EN60601-1-2:2001**

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Code</th>
<th>Level</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic Discharge</td>
<td>EN61000-4-2</td>
<td>Level 4</td>
<td>Air discharge 15kV, Contact discharge 8kV</td>
</tr>
<tr>
<td>Electromagnetic Field</td>
<td>EN61000-4-3</td>
<td>Level 3</td>
<td>12V/m</td>
</tr>
<tr>
<td>Fast / Burst Transient</td>
<td>EN61000-4-4</td>
<td>Level 4</td>
<td>ac input tested to 4.4kV (2kV for Vega dc)</td>
</tr>
<tr>
<td>Surge Immunity</td>
<td>EN61000-4-5</td>
<td>Level 3</td>
<td>Common mode - 2.2kV (1.1kV for Vega dc)</td>
</tr>
<tr>
<td>Conducted RF Immunity</td>
<td>EN61000-4-6</td>
<td>Level 3</td>
<td>12V</td>
</tr>
<tr>
<td>Power Frequency Magnetic Field</td>
<td>EN61000-4-8</td>
<td>Level 4</td>
<td>30A/m</td>
</tr>
<tr>
<td>Voltage Dips, Variations, Interruptions</td>
<td>EN61000-4-11</td>
<td>Class 3</td>
<td>na - Vega dc</td>
</tr>
</tbody>
</table>

**Approvals / Accreditations**

- IEC/EN 62368-1, UL62368-1 / CSA 22.2 No 62368-1 File E135494
- IEC/EN 60950-1, UL60950-1 / CSA 22.2 No 60950-1 File E135494
- IEC/EN 60601-1, UL/CSA 60601-1, ANSI/AAMI ES60601-1 CAN/CSA-C22.2 No 60601-1-08 File E349607 (not Vega dc, only for L, R and T leakage variants)
- IEC/EN 61010-1 File E331788
- CE Mark (EN62368-1) Low Voltage Directive (LVD), electromagnetic compatibility (EMC) and Restriction of Hazardous Substances (RoHS)

Designed and manufactured under the control of ISO9001 and ISO13485 (including risk management).
**IEC-320 Connector Case**

All versions have:
- 8 x M4 Customer fixings
- Max thread penetration: 4.5mm

**Customer Air Case (no fan)**

**Screw & Fast-on Terminal Case**