Medical Industrial Test Broadcast Comms Renewable

450W - 900W
Modular power supply.

Features	Benefits
• Industry leading flexibility	Suits your application
• Screw, Fast-on or IEC connection	Simplifies design into system
• Worldwide safety approvals	Supports global use
• Up to 11 outputs	Eliminates need for additional supplies
• 3 year warranty	Low cost of ownership



Input

	Vega 450, 650 and 900	Vega dc (450W)
Input Voltage / Frequency	90-264Vac / 47 - 63 Hz (440Hz with reduced PFC) 900W version is 150-264Vac only, 650W below 150Vac	34 - 75Vdc derate linearly below 44V to 340W at 34V
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:

V4	F	S	S	F

Converter	V0	450W (dc in)
	V4	450W
	V6	650W
	V9	900W
Cooling	F	Forward air - standard
	Q_d	Forward air - Quiet
	R_a	Reverse air
	P_{ad}	Reverse air - Quiet fan
	C_b	Customer air - no fan
Input Connection	S	Screw
	F_d	Fast-on terminal
	I_d	IEC320 with switch

Primary Option	F	ac fail, psu+fan inhibit, 5V/100mA standby
	FV	ac fail, psu+fan inhibit, 5V/300mA standby
	xFW_{cd}	ac fail, psu+fan inhibit, 5-15V/1A standby
	E	ac fail, psu+fan enable, 5V/100mA standby
	EV	ac fail, psu+fan enable, 5V/300mA standby
	xEW_{cd}	ac fail, psu+fan enable, 5-15V/1A standby

Leakage Current (max leakage current at 264Vac, 63Hz)	S	Standard 1.5mA
	M	650µA
	L	290µA
	R	175µA
	T	60µA

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 5.2B1H**S**)
   c) add suffix 'N' for output inhibit if required (eg 5.2B1HS**N**)
   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 12/12H3/3S 24C5S 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.

a) Not available for Vega 900
b) Thermocoupled sample recommended to ensure adequate cooling - consult sales
c) xFX and xEW options increase leakage current by 90µA. Replace 'x' with required output voltage (5FW = 5V standby supply)
d) Not available for Vega dc

OUTPUT VOLTAGES (single output modules)

Module	Adjustment Range (Volts)	Current (Amps)	Slots
B1L	1.8 - 3.8[e]	20	1
C1	1.8 - 4.1[e]	35	1
C1Y	1.8 - 4.1[e]	40	1
D1L	1.8 - 3.8	50	1.5
E1	1.8 - 3.8[e]	60	2
F1[a]	1.8 - 3.8	80	2
Z2	1.8 - 3.8[e]	95	3
Z3	1.8 - 3.8[e]	114	4
B1H	3.9 - 5.5[d]	20	1
L1	4.2 - 5.5[d]	35	1
D2	3.8 - 9[k]	45	1.5
D1H	3.9 - 5.5[d]	50	1.5
E2	3.8 - 8[k]	60	2
Z18	4.2 - 5.5	66	2
F2[a]	3.8 - 8	75	2
Z4	3.9 - 5.5[d]	95	3
Z6	3.9 - 5.5[d]	104	3.5
B2	5 - 9[f]	25	1
B3	9.1 - 16.2[g]	12	1
C3	9.1 - 16.2[g]	18	1
D3	8 - 16.5[g]	24	1.5
E3L	8 - 13.9[l]	40	2
Z7	8 - 16.5[g]	45	3
EE2	7.6 - 16[g]	45	4
D4	14 - 21.5[i]	18	1.5
E4	14 - 19.9[m]	30	2
E3H	14 - 15	36	2
C4	16.3 - 21.5[i]	14	1
CC3	18.2 - 32.4[j]	18	2
E5L[v]	20 - 24	27	2
B5	21.6 - 31[h]	6	1
C5	21.6 - 31[j]	10	1
D5	21 - 28	15	1.5
E5H[v]	24 - 28	25	2
Z19[co]	24 - 28	36	3.5
HH5/3	25.3 - 44.2[b]	5	1
DD4	28 - 43[s]	18	3
EE4[c]	28 - 38	22.5	4
HH5/4	32.5 - 53[t]	4.5	1
BB4	32.6 - 43[q]	10	2
EE5L[co]	40 - 48	18	4
C5B4	43 - 48	10	2
EE5H[o]	48 - 56	18	4
CC5	48.1 - 62[r]	10	2
DD5	42 - 56	15	3

OUTPUT VOLTAGES (twin output modules)

Module	V1 Adjustment Range (Volts)	Current	V2 Adjustment Range (Volts)	Current (Amps)	Slots
H1L/1L	1.8 - 3.8[n]	12	1.8 - 3.8[n]	8	1
H1L/1H			3.9 - 5.5[d]	8	1
H1L/2			5.6 - 9[f]	6	1
H1L/3			9.1 - 16.2[u]	6	1
H1L/4			16.3 - 25[p]	4.5	1
H1H/1L	3.9 - 5.5[d]	12	1.8 - 3.8[n]	8	1
H1H/1H			3.9 - 5.5[d]	8	1
H1H/2			5.6 - 9[f]	6	1
H1H/3			9.1 - 16.2[u]	6	1
H1H/4			16.3 - 25[p]	4.5	1
H2/1L	5.6 - 9[f]	10	1.8 - 3.8[n]	8	1
H2/1H			3.9 - 5.5[d]	8	1
H2/2			5.6 - 9[f]	6	1
H2/3			9.1 - 16.2[u]	6	1
H2/4			16.3 - 25[p]	4.5	1
H3/1L	9.1 - 16.2[u]	10	1.8 - 3.8[n]	8	1
H3/1H			3.9 - 5.5[d]	8	1
H3/2			5.6 - 9[f]	6	1
H3/3			9.1 - 16.2[u]	6	1
H3/4			16.3 - 25[p]	4.5	1
H5/1L	16.2 - 28	5	1.8 - 3.8[n]	8	1
H5/1H			3.9 - 5.5[d]	8	1
H5/2			5.6 - 9[f]	6	1
H5/3			9.1 - 16.2[u]	6	1
H5/4			16.3 - 25[p]	4.5	1

Wide Range Programmable Modules

Module	Voltage Range	Current	Slots	
W2[a]	0.25[w] - 7.5	30	1	Select features from table below
W5	0.25[x] - 32	8.5	1	

Follow by	F or T	Fixed or Tracking Overvoltage protection
	F or S	Fast-on or Screw output terminals
	R or V	Resistance (0-32kΩ) or Voltage (0-5V) programming
	1, 2, 3 or 4	1 Inhibit, Fixed Current Limit
		2 Inhibit, Programmable Current Limit (0-5V)
		3 Enable, Fixed Current Limit
		4 Enable, Programmable Current Limit (0-5V)

Follow non wide range modules by F (Fast-on) or S (Screw) output terminals

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

Isolation		
Input to Output	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.
Input to Earth	Basic	2.3kVdc
Output to Output / Output to Earth		200Vdc

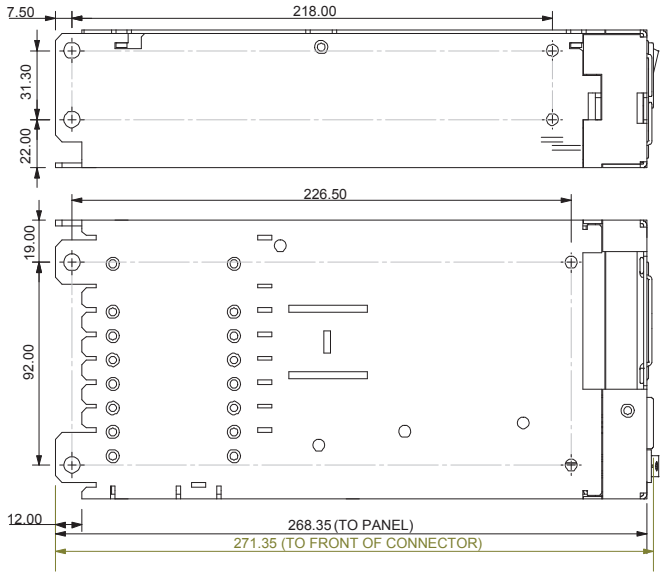
Output Specification		
Voltage / Current	See output voltages table	
Turn on time	1.5s max	at 90Vac (150Vac for 900W, 48Vdc for Vega dc) and 100% rated output power
Rise time	<50ms	to 90% of voltage, monotonic rise above 10%
Turn on overshoot	<5% or 250mV	Load type dependent, no overshoot with resistive load
Efficiency	up to 75%	at 230Vac (48Vdc for Vega dc) & 100% rated power, configuration dependent
Hold up	16ms min	at 90Vac (150Vac for 900W) and 100% rated power (10ms min for Vega dc)
Ripple and Noise	<1% or 50mV	pk-pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	<1%	of set voltage
Remote Sense	Yes	standard on single output modules, max 0.75V total line drop. Option for twin output modules
Minimum Load	No	on any output (except W2 and W5 modules which need 0.5A load to achieve full specification)
Temperature Coefficient	<0.02%	of rated voltage per °C
Load Regulation	<0.5% or 50mV	for 0-100% load change
Line Regulation	<0.1%	for 90-264Vac input change (34 - 75Vdc for Vega dc)
Cross Regulation	<0.2%	for 100% load change on any output
Transient Response	<6% or 300mV	of set voltage for 50% load change (above 25% load)
Recovery	500µs	for recovery to 1% or 100mV of set voltage
Over Voltage Protection	Yes	Refer to application notes for details
Over Current Protection (singles)	105-125% 110-170%	of rated current, constant current characteristic For EE2, EE4, EE5L, EE5H, Z2, Z18 and Z19 modules
Short Circuit Protection	<150%	of rated current, when output voltage <1%
Over Temperature Protection	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

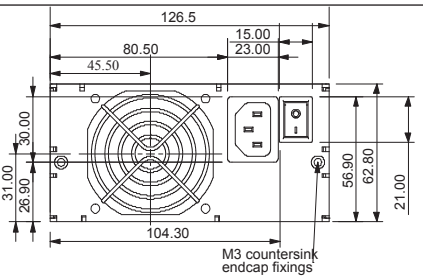
Environment	
Temperature	0°C to 65°C operational, -40°C to 70°C storage (max 12 months).
Derating	50°C to 65°C derate total output power and each output current by 2.5% per °C
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30g shocks in each plane, total 18 shocks 30g shock = 11ms (+/-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 IIIb
IP Rating	IP 10

Emissions EN61000-6-3:2007, EN60601-1-2:2001		
Radiated Electric Field	EN55011, EN55032	(as per CISPR.11/22) Class B (Class A for Vega dc), FCC47 part 15 subpart B see application note for details. Additional filtering required for IEC inlet version. Only for 'S' type leakage variants.
Conducted Emissions	EN55011, EN55032	(as per CISPR.11/22) Class B (Class A for Vega dc), FCC47 part 15 subpart B Only for 'S' type leakage variants. 'M' and 'L' types meet Class A
Conducted Harmonics	EN61000-3-2	Class A - not applicable to Vega dc
Flicker	EN61000-3-3	Compliant - d_{max} only - not applicable to Vega dc

Immunity EN61000-6-2:2005, EN60601-1-2:2001				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV, Contact discharge 8kV	A
Electromagnetic Field	EN61000-4-3	Level 3	12V/m	A
Fast / Burst Transient	EN61000-4-4	Level 4 Level 3 for Vega dc	ac input tested to 4.4kV (2kV for Vega dc) dc output tested to 2.2kV (1kV for Vega dc) Tested at 5kHz and 100kHz	A
Surge Immunity	EN61000-4-5	Level 3 Level 2 for Vega dc	Common mode - 2.2kV (1.1kV for Vega dc) Differential - 1.1kV (0.55kV for Vega dc)	A
Conducted RF Immunity	EN61000-4-6	Level 3	12V	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	30A/m	A
Voltage Dips, Variations, Interruptions	EN61000-4-11	Class 3 na - Vega dc		A B for 5s interruptions

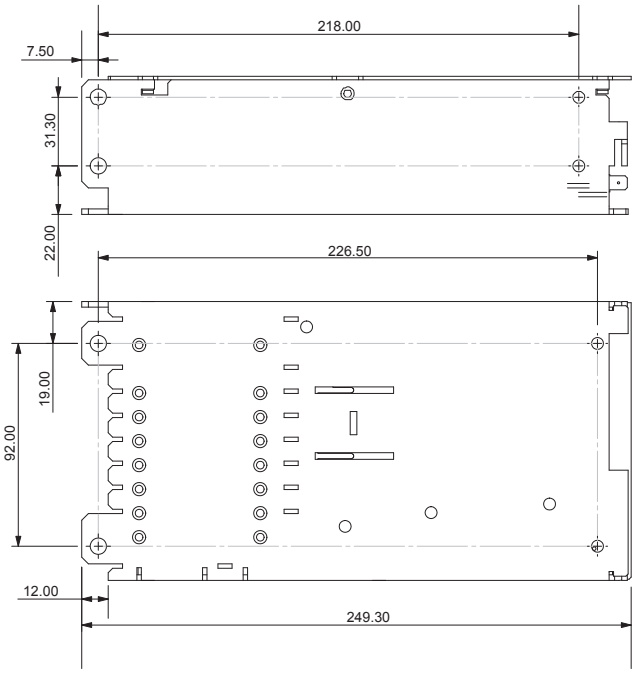
Approvals / Accreditations	
IEC/EN 60950-1, UL60950-1 / CSA 22.2 No 60950-1	File E135494
IEC/EN 60601-1, UL/CSA 60601-1, ANSI/AAMI ES60601-1 CAN/CSA-C22.2 No 60601-1-08	File E349607 (not Vega dc, only for L, R and T leakage variants)
IEC/EN 61010-1	File E331788
CE Mark (EN60950-1)	LV Directive 2006/95/EC
CB certificate and Report available on request	*Please check with technical sales for status of approvals*
Designed and manufactured under the control of ISO9001 and ISO13485 (including risk management).	

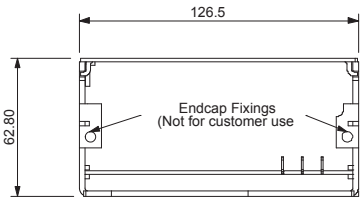




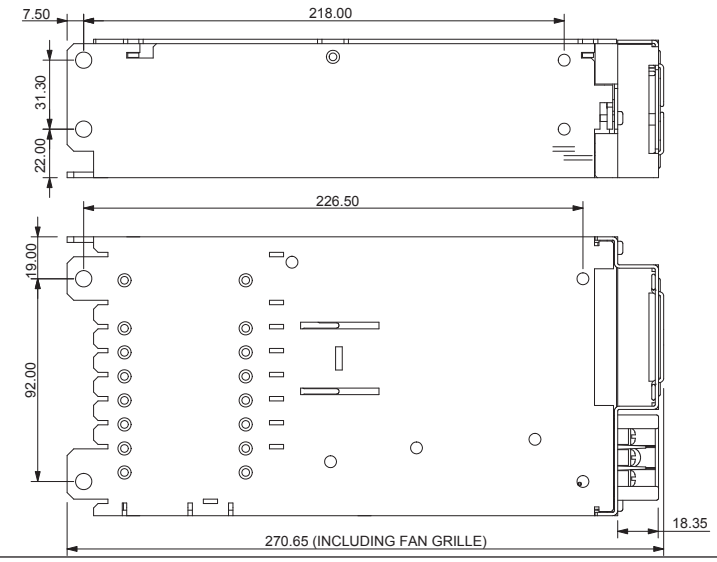
IEC-320 Connector Case

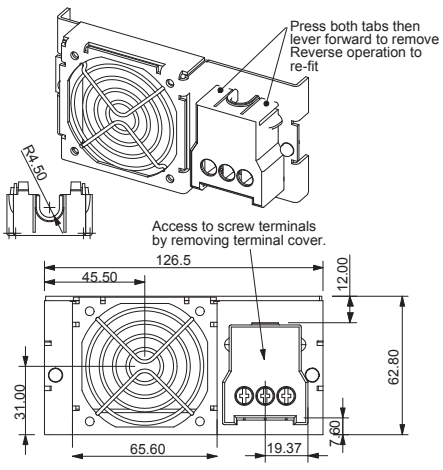
All versions have:-
8 x M4 Customer fixings
Max thread penetration:- 4.5mm





Customer Air Case (no fan)





Screw & Fast-on Terminal Case

