

# TDK-Lambda Power Supplies



The choice and application of the power supply is an important one. Working with TDK-Lambda can help you save time and money, from design concept to years after your system or product is first installed.

## Why TDK-Lambda?

- ◆ Over the last 60 years, TDK-Lambda has developed a worldwide reputation and heritage for high quality, robust power products.
- ◆ We at TDK-Lambda stand behind our products with industry leading warranties of up to a lifetime (limited).
- ◆ Our research and development budget is one of the largest in the industry, helping you design-in reliable, cutting edge technology, ahead of your competition.

- ◆ A broad range of product enables our customers to choose the right model for the application, and assists with their vendor reduction programs.
- ◆ Multiple manufacturing and design facilities across the globe. We can provide crucial local support when programs move between Asia, North America, and Europe. With those multiple factories we also have proven risk mitigation against natural disasters. Plus, our products are RoHS compliant and our sites are ISO9001 and ISO14001 certified.
- ◆ Our technical support can get your product to market faster. Please see overleaf for more details.

Thank you for your interest in TDK-Lambda products.

## Table of Contents

ALD.....	121	LS.....	71
Alpha1000.....	9	LS200.....	73
Alpha1500.....	11	LZSA.....	75
CC-E.....	123	MWS65.....	77
CFE400M.....	13	NN.....	79
CNA24.....	125	NV175.....	81
CPFE500.....	15	NV350/700.....	83
CPFE1000.....	17	PAF500F.....	143
CPFE1000FI.....	19	PAF600F.....	145
CSS65.....	21	PAF700F.....	147
CSS150.....	23	PAH300/450.....	149
CSS500.....	25	PFE300/1000.....	85
CUS250LD.....	27	PH-A.....	151
DPP.....	29	PH-FF.....	153
DPP120-240.....	31	PH-SF.....	155
DPP120-960.....	33	PXA.....	157
DPP480.....	35	PXB.....	159
DPX.....	127	PXD.....	161
DRB.....	37	PXD30W.....	163
DRF.....	39	PXE.....	165
DSP.....	41	PXF.....	167
DT62-80C.....	43	RFE1600.....	87
DT100-150-C.....	45	RSAL.....	171
EFE300/400.....	47	RSHN.....	173
EFE300M/400M.....	49	RTAN.....	175
FPS1000.....	51	RTHN.....	177
GWS.....	53	SC40/60.....	89
HFE1600.....	55	SCS120PW.....	91
HFE2500.....	57	SWS.....	93
HWS-A.....	59	SWS300A/600.....	95
HWS300/1500.....	61	SWS600L/1000L.....	97
HWS/HD.....	63	Vega.....	99
HWS1800T.....	65	Vega-Lite.....	101
iAF.....	129	ZPSA20.....	103
iBF.....	131	ZPSA40/60.....	105
iCF.....	133	ZWQ.....	107
iCG.....	135	ZWS10-30B.....	109
iQE.....	137	ZWSBAF.....	111
iQG.....	139	ZWS300BAF.....	113
iQL.....	141	ZWSBP.....	115
KM.....	67	Z+.....	117
KPSA.....	69		

# TDK-Lambda Website, Blog and Social Media

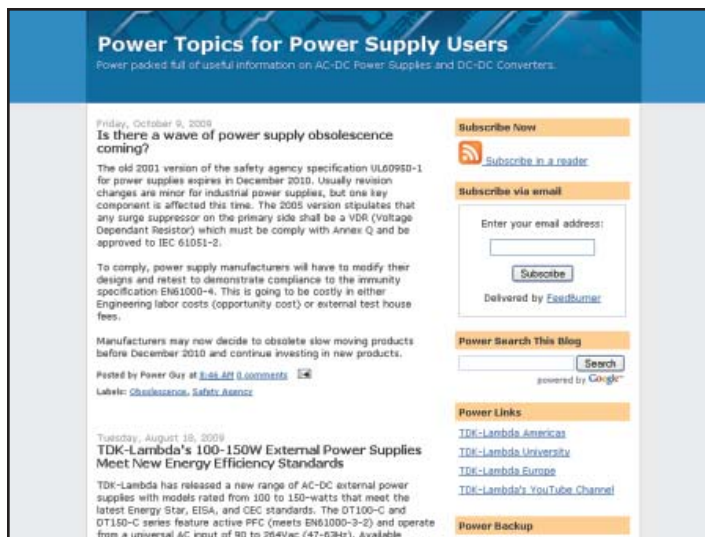
At TDK-Lambda Americas, we value your time and privacy as much as we value ours. No one likes receiving unsolicited emails. That's why we let you choose how, when and in what format we contact you with valuable updates. We also don't force you to pick which social networking site to stay connected to us. You choose.

**Web** <http://www.us.tdk-lambda.com/lp>

Get the latest product, program and company information including datasheets, technical information and white papers, from TDK-Lambda America's main Internet site. See 360° rotating view of key products, find models using our parametric search engine and research specifications for legacy products.

**Blog** <http://power-topics.blogspot.com>

Learn about "Power Supply Considerations for Industrial Applications" or determine what size fan you need by reading articles, definitions and design tips on our main blog. Search through educational articles on various elements of power supply design engineering for the beginner to the seasoned expert. This is an interactive site so feel free to post comments including clarifications, additional questions and other helpful links.



**Video** <http://www.youtube.com/user/TDKLambda>

TDK-Lambda Americas' main video channel is hosted on YouTube. Our videos focus on education, innovative design strategies and product showcases. We also make these videos available in standard video formats at TDK-Lambda University on our website.



**Twitter** <http://www.Twitter.com/tdklambda>

Follow us on Twitter and find out the latest information on TDK-Lambda in 140 characters or less. Ideal for mobile phone users and online engineers, who need information immediately, this micro-blogging site keeps loyal fans and partners updated on changes to our Web site, blog, or video channel.



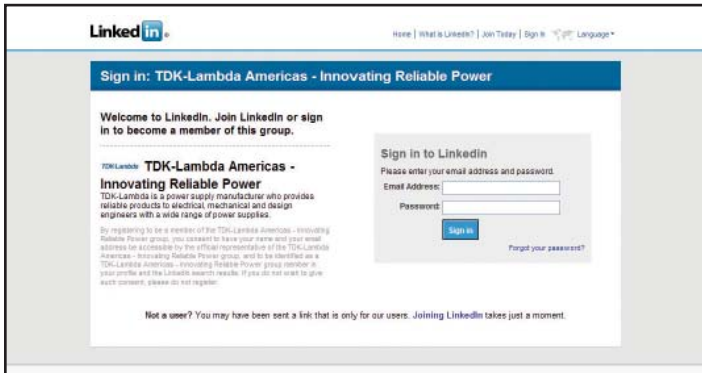
**Facebook** <http://www.facebook.com/pages/TDK-Lambda-Americas-Inc/109780051681?ref=mf>

Become a fan of TDK-Lambda Americas on Facebook. Periodically, we post product highlights, press releases, web site changes and other information on the wall. Many of the videos can also be found here.

# TDK-Lambda Website, Blog and Social Media

**LinkedIn.com** <http://www.linkedin.com/e/vgh/2298571/>

A professional networking site for building relationships, we have a group for keeping apprised of TDK-Lambda Americas' news, discussions and tips. Join us there and get linked in.



## Mobile Web App

TDK-Lambda has a mobile web app for iPhone and Android smart phone owners. This app is user friendly and provides easy access to the company's full line of power supplies via smart phones. The app can be downloaded to iPhones and Android (2.0 or higher) cell phones at this mobile web link: <http://us.tdk-lambda.com/lp/about/phone-apps.htm>

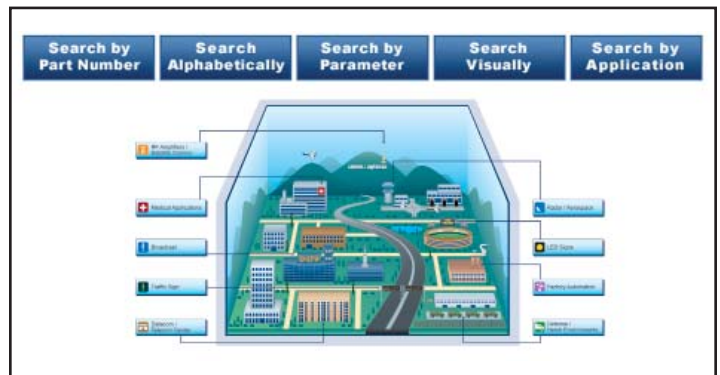
This innovative mobile web app allows the user to select power supplies based on their specific application, for example, Industrial, Medical, Communications, LED, Military, etc. In addition, the user can select the output power level they require and will be given a selection of models that meet their criterion. Thereafter the selection process proceeds intuitively via new screen views that show product descriptions and detailed specifications for the recommended power supplies.



In addition, links to the company's YouTube instructional videos and other related sites are available through this app. TDK-Lambda Americas is very pleased to provide our customers with the most comprehensive mobile phone app available today for selecting power supplies. This represents another step in our commitment to provide the latest high tech tools to our clients. This mobile app complements our company's website, which together now provides the easiest to use power supply selection tools, application notes and educational content, bar none.

## Products by Application: Power City

Our online power-products search engine includes an easy to use Search-by-Application called "Power City". When selected, you see a pictorial of a typical town with hot links to places where power supplies and DC-DC converters are used. For example, within Power City there is a hospital (medical applications), a factory (industrial/automation), a radio tower (RF amplifiers/satellite communications) and a military base (Mil/COTS applications), to name a few. When you click on a hot spot, all of the power products that are designed for that application appear as photos with a brief description. To get more detailed information (i.e., data-sheet, instruction manual); just click on the product photo that comes closest to your needs.



If we are not where you like to hang out on the Internet, let us know and we'll investigate getting involved. Our goal is to be where it's most convenient for you, our valued customer, and not the other way around. When you are designing for power, think TDK-Lambda Americas.

The TDK-Lambda website (<http://us.tdk-lambda.com/lp>) has a huge library of data:

- ◆ Installation manuals
- ◆ Detailed specifications
- ◆ Evaluation data
- ◆ Outline drawings
- ◆ MTBF predictions
- ◆ Reliability data
- ◆ Application Notes

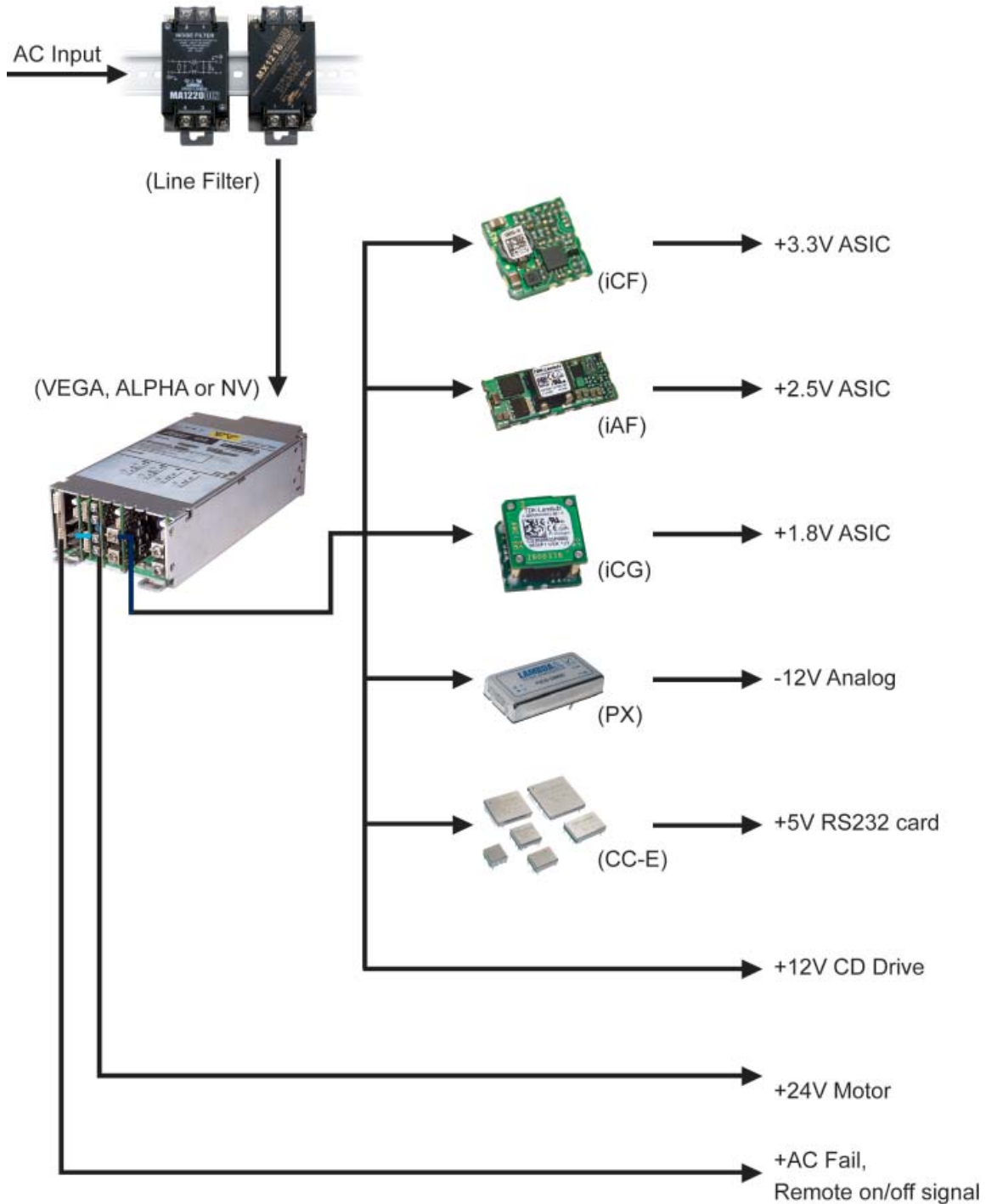


## Want Engineering Support?

- ◆ Please call 1-800-LAMBDA-4 to speak to our inside technical support team, or email [lambda.techsupport@us.tdk-lambda.com](mailto:lambda.techsupport@us.tdk-lambda.com)
- ◆ TDK-Lambda's Field Application Engineers are available for in-depth advice at your facility. Please contact your local TDK-Lambda Salesperson to schedule a visit.

# **TDK-Lambda** The Complete Power Solution

Configurable AC-DC Supply + DC-DC converters (isolated & non isolated)

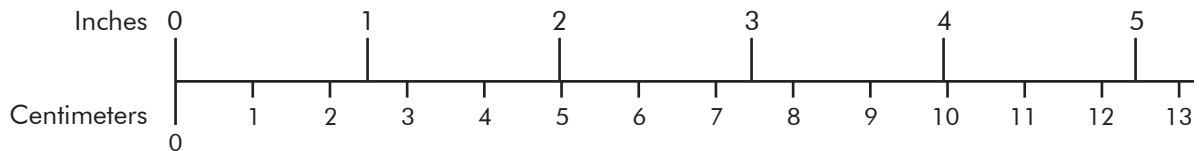


- ✓ Flexible
- ✓ Off the shelf
- ✓ No minimum loads
- ✓ No cross regulation

# TDK-Lambda Conversion Factors & Equations

English & Metric Conversions	
English to Metric	Multiply English Unit by:
inch to millimeter (mm)	25.4
inch to centimeter (cm)	2.54
foot to meter (m)	0.3048
ounce (oz) to gram (gm)	28
pound (lb) to kilogram (kg)	0.45
Metric to English	Multiply Metric Unit by:
millimeter (mm) to inch	0.03937
centimeter (cm) to inch	0.3937
Meter (m) to foot (ft)	3.2808
gram (gm) to ounce (oz)	0.036
kilogram (kg) to pound (lb)	2.2

## Inches to Centimeters (cm) to Millimeters (mm) Conversions



## Air Flow Conversions

1m/s (meters per second)= 3.28 feet per second = 196.85 LFM (linear feet per minute)

## Weight Conversions

453.6 grams = 12 ounces = 1 pound

## Rack Height Units

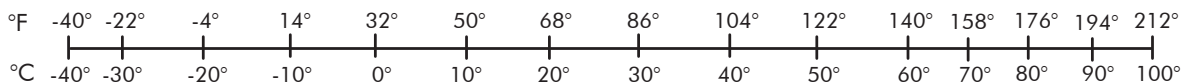
1U = 1.75 inch = 44.45mm

2U = 3.50 inch = 88.90mm

## Fahrenheit - Celsius Temperature Conversions

$$^{\circ}\text{C} = \frac{^{\circ}\text{F} - 32^{\circ}}{1.8} \quad ^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32^{\circ}$$

## Conversion Formulas



## DC Circuit Equations

$$E = IR \quad I = \frac{E}{R} \quad R = \frac{E}{I} \quad P = IE \quad P = \frac{E^2}{R} \quad P = I^2R$$

E = Voltage (in volts)      R = Resistance (in ohms)

I = Current (in amperes)      P = Power (in watts)



**AC-DC Products**

**DC-DC Products**

**Filters**



Line	Enclosed or Rack	Mount	Desktop
Open Frame	Rack Mount Hot Swap		

Applications	Outputs	Output Power																		
		5	10	15	30	50	100	300	500	1000	1500	2500								
High Reliability Industrial Active Load Limited Lifetime Mount	Single				Line															
									Enclosed											
						Open Frame														
											Enclosed									
													Enclosed SA							
Industrial Active Load Mount	Single / Multiple				Open Frame															
Datacom Commercial One-to-two Load Mount	Single																			
Mountable	Single																			
Rail Mount	Single																			

See website

## 1000W Multiple Output Modular Power Supply

### Features

- ◆ Universal AC Input
- ◆ Power factor Corrected
- ◆ Capable of up to 14 fully regulated and independent outputs
- ◆ Output Voltages from 1.8V - 48V
- ◆ Low Leakage Options
- ◆ International Safety Agency Certification
- ◆ Fast-on Tab Connections
- ◆ No Minimum Load
- ◆ Wide Range Output Modules



### Key Market Segments & Applications



Specifications		
Model		
AC Input Volt. range & Freq.	-	85-264VAC, 47-63Hz
DC Input Voltage Range	-	120 - 360VDC (800W maximum output to 45°C)
Input Current	A	16A maximum
Inrush Current	A	Less than 50A
Leakage Current	-	1.1mA @ 264VAC, 63Hz (see input filter options in detailed product datasheet)
Efficiency	%	75% typical (configuration and input dependent)
Power Factor Correction	-	Compliant to EN61000-3-2 (> 0.99 typical, reduced PFC > 255VAC)
Conducted EMI	-	EN55022 level A
Output Power	W	800W@85VAC (50°C max); 1000W@100VAC (50°C max); 1000W@90VAC (45°C max); 1000W for 30 seconds maximum @ 85VAC followed by 800W for 60 seconds minimum.
Output Load Regulation	-	0.2% maximum.
Output Line Regulation	-	0.5% maximum.
Ripple & Noise	-	2% pk-pk or 100mV (Whichever is greater)
No Load Operation	-	No preload is required on any output module.
Hold Up Time	ms	>15ms
Remote Sense	-	Available on single output modules only, refer to the module table.
Options (see option codes)	-	AC Fail, Global Inhibit, Module Inhibit, 5V@50mA aux., Parallel, Low Leakage.
Operating Temperature	°C	-20°C to +50°C full load, derate each output at 2.5% /°C from 50°C to 65°C.
Thermal Protection	-	Converter protected against over-temperature conditions. Recycle I/P power to restore output.
Storage Temperature	°C	-40°C to +85°C
Temperature Coefficient	-	0.02% per °C
Humidity	% RH	5% - 95% Non-condensing
Altitude	-	3,000m operating
Cooling	-	Internal fan provides forced-air cooling. Airflow intake on I/P end, exhaust on O/P end of unit.
Isolation	-	Input - Output 4.3kVDC, Input - Ground 2.3kVDC, Output - Ground 500VDC
Switching Frequency	-	100kHz on PFC, 200kHz on forward converter.
Vibration	-	1.5G, 10 - 200Hz
Shock	-	3,000 bumps, 10G, 16ms half-sine pulses.
Safety Agency Certification	-	UL/CSA/IEC/EN60950-1, UL/CSA/IEC/EN60601-1 <sup>(1)</sup> , IEC/EN61010-1 <sup>(2)</sup> , CE Mark
Size (WxHxD)	in	7" x 2.5" x 11"
Warranty	yrs	Three Years

Notes: Consult detailed product datasheet for additional specifications

- (1) With low leakage filter options only.
- (2) Designed to meet IEC/EN61010-1.

## 1 Case Codes

Choose the converter which best fits your total power needs:

Code	Wattage	Max Slots	Size (H x W x L)	Input Voltage
CA1000	1000*	7	2.5" x 7" x 11"	85 - 265VAC

\* Note: CA1000 derates to 800W for 85-100VAC input with a peak of 1000W for 30 seconds max.

## 2 Output Module Codes

Code	V1 Adjust	V1 Amps	V2 Adjust	V2 Amps	Slot(s) <sup>(1)</sup>
L	1.8 - 3.2	25	-	-	1
T	1.8 - 3.2	60	-	-	2
Q	2.7 - 3.9	25	-	-	1
R	2.7 - 3.9	60	-	-	2
B	4.5 - 5.5	25	-	-	1
A	4.5 - 5.5	60	-	-	2
BB	4.5 - 6.5	25	-	-	1
AA	4.5 - 6.5	60	-	-	2
S	2.5 - 5.7	85	-	-	2
M	5.0 - 16.0	8	-	-	1
C	5.0 - 16.0	16(3)	-	-	1
F	9.0 - 16.0	33	-	-	2
U	10.0 - 21.0	16	-	-	1
N	18.0 - 29.0	5	-	-	1
D	18.0 - 29.0	8	-	-	1
K	18.0 - 29.0	15	-	-	2
G	17.5 - 29.0	25(3)	-	-	2
J	30.0 - 48.0	10(3)	-	-	2
E	5.0 - 16.0	8(3)	5.0 - 16.0	8(3)	1
P	18.0 - 29.0	5	5.0 - 16.0	8(3)	1
H	18.0 - 32.0	5(3)	18.0 - 32.0	5(3)	1

Notes: 1) The total # of slots must not exceed 7 for CA1000.  
 2) Slot position may change upon order placement.  
 3) Module Deratings: C derates linearly to 12A from 12.1V-15V  
 E & P 8A rating derates to 6A in slots 4 & 5  
 H derates from 5A to 4A in slots 4 & 5  
 G derates to 21A above 24.5V  
 J derates 0.25A/V above 40V

## Sample Configurations

	Output 1		Output 2		Output 3		Output 4		Output 5	
	V	A	V	A	V	A	V	A	V	A
CA1000-24G	24	16.5	-	-	-	-	-	-	-	-
CA1000-5APP-5APP *	5	120	-	-	-	-	-	-	-	-
CA1000-5A-12.7C	5	60	12.7	16	-	-	-	-	-	-
CA1000-24G-5/12E	24	25	5	8	12	8	-	-	-	-
CA1000-5A-24G-12C-12C	5	60	24	25	12	16	12	16	-	-
CA1000-5BMF-24D-6/12E	5	25	24	8	6	8	12	8	-	-
CA1000-5B-5CIN-12C-12/12E	5	25	5	16	12	16	12	8	12	8
CA1000-5S-12F-12C-5/24P	5	85	12	33	12	16	5	8	24	5

Notes: Total output power must not exceed 1000W converter limits.  
 \* Modules in parallel.

## Other Modular Products

NV	350W to 700W up to 8 outputs
Vega	450W to 900W up to 10 outputs
Alpha1500	1500W up to 16 outputs

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/alpha-series.htm](http://us.tdk-lambda.com/lp/products/alpha-series.htm)



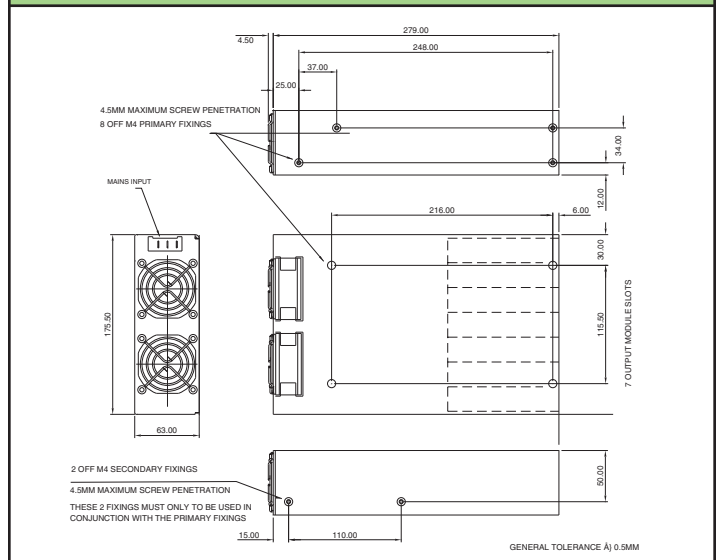
## 3 Option Codes

If required the following options may be added to the configuration by placing the code after the module.  
 (i.e. Inhibiting a 5V @ 25A = 5B + Inhibit code = "5BIN")

Code	Description	Available On
MF <sup>2</sup>	Mains Fail This option provides an AC fail signal, power supply inhibit, and 5V@50mA auxiliary supply. This is only placed in the first module slot. (TTL compatible reference to 0 volts of Aux. Supply)	All modules except Dual output (E, H, P)
PP	Parallel for Power This option allows 2 adjacent modules to be paralleled together for increased output power. Bus bars provided.	Modules: A, B, C, D, F, G, M, N, Q, R
PA	Parallel for Redundancy This option allows modules to be connected for N+1 redundancy. A DC good signal is also offered (electrically similar to AC fail.) No bus bars provided.	Modules: A, B, C, D, F, G, M, N, Q, R, S
IN3	Inhibit Module inhibit and DC good signal. (TTL compatible referenced to (-V) of the module)	Modules A, B, C, D, F, G, J, M, N, Q, R
Low Leakage Options (Max values stated)		
	120VAC, 60Hz	240VAC, 60Hz
LL	88 µA	197 µA
RL	50 µA	112 µA
TL	24 µA	53 µA
	264VAC, 63Hz <sup>(4)</sup>	Conducted EMI
		Curve A
		>Curve A
		>Curve A

Notes: 1) Only one option per module may be used.  
 2) Mains Fail: AC Fail "AC On" = ≤ 0.8V, 50mA max.  
 "AC Off" = open circuit, 50V abs max.  
 PS Inhibit "PS On" = ≥ 2.0V or open circuit.  
 "PS Off" = ≤ 0.8V @ 5mA.  
 (TTL compatible, Referenced to 0 volts of Aux. Supply.)  
 3) Inhibit: DC Good Electrically similar to AC fail module.  
 Inhibit Electrically similar to PS inhibit.  
 4) Type testing result

## Outline Drawing



## 1500W Multiple Output Modular Power Supply

### Features

- ◆ Power factor Corrected
- ◆ Capable of up to 16 fully regulated and independent outputs
- ◆ Output Voltages from 1.8V - 48V
- ◆ Low Leakage Options
- ◆ Low Profile Package
- ◆ International Safety Agency Certification
- ◆ Fast-on Tab Connections
- ◆ No Minimum Load
- ◆ Wide Range Output Modules



### Key Market Segments & Applications



Specifications		
Model		
AC Input Volt. Range & Freq.	-	150 - 264VAC, 47 - 63Hz (1500W). See power limitations for lower input ranges.
Input Current	A	16A maximum
Inrush Current	A	Less than 50A
Leakage Current	-	1.1mA @ 264VAC, 63Hz (low leakage current options available)
Efficiency	%	75% typical (configuration and input dependent)
Power Factor Correction	-	Compliant to EN61000-3-2 (> 0.99 typical, reduced PFC > 255VAC)
Conducted EMI	-	EN55022 level A
Output Power	W	800W@85VAC (50°C max); 1000W@100VAC (50°C max); 1000W@90VAC (45°C max); 1500W @ 150VAC (50°C max)
Output Load Regulation	-	2% max. without remote sensing. 0.5% max. remote sense connected
Output Line Regulation	-	0.5% maximum
Ripple & Noise	-	2% pk-pk or 100mV (Whichever is greater)
No Load Operation	-	No preload is required on any output module
Hold Up Time	ms	>15ms
Remote Sense	-	Available on single output modules only
Options (see option codes)	-	AC Fail, Global Inhibit, Module Inhibit, 5V@50mA aux., Parallel, Low Leakage
Operating Temperature	°C	0°C to +50°C full load, derate each output at 2.5% /°C from 50°C to 65°C
Thermal Protection	-	Converter protected against over-temperature conditions. Recycle I/P power to restore output
Storage Temperature	°C	-40°C to +85°C
Temperature Coefficient	-	0.02% per °C
Humidity	% RH	5% - 95% Non-condensing
Altitude	-	3000m Operating
Cooling	-	Internal fan provides forced-air cooling. Airflow intake on I/P end, exhaust on O/P end of unit.
Isolation	-	Input - Output 4.3kVDC, Input - Ground 2.3kVDC, Output - Ground 500VDC
Switching Frequency	-	100kHz on PFC, 200kHz on forward converter.
Vibration	-	1.5G, 10 - 200Hz
Shock	-	3,000 bumps, 10G, 16ms half-sine pulses.
Safety Agency Certification	-	UL/CSA/IEC/EN60950-1, IEC/EN61010-1 <sup>(1)</sup> , CE Mark
Size (WxHxD)	in	8" x 2.5" x 11"
Weight	lbs.	8 (3.6kg) typical dependent on configuration
Warranty	yrs	Three Years

(1) Designed to meet IEC/EN 61010-1.

1 Case Codes				
Code	Wattage	Max Slots	Size (H x W x L)	Input Voltage
CA1500	1500	8	2.5" x 8" x 11"	150 - 264VAC

* Input Voltage/Power Limitations			
Input Voltage Power Rating	Intermittent Output Power Rating	Continuous Output Temperature	Max. Ambient
85 - 99.9VAC	-	800W	50°C
100 - 149.9VAC	-	1000W	50°C
150 - 164.9VAC	-	1500W	50°C
165 - 179.9VAC	-	1595W	50°C
180 - 264VAC	-	1690W	50°C
90 - 264VAC	-	1000W	45°C
85 - 264VAC	1000W*	-	50°C

\* - 1000W for 30 seconds maximum followed by 800W for 60 seconds min.  
Note: Ratings are not affected by the use of input or output connector housings

2 Output Module Codes					
Code	V1 Adjust	V1 Amps	V2 Adjust	V2 Amps	Slot(s) <sup>(1)</sup>
L	1.8 - 3.2	25	-	-	1
T	1.8 - 3.2	60	-	-	2
Q	2.7 - 3.9	25	-	-	1
R	2.7 - 3.9	60	-	-	2
B	4.5 - 5.5	25	-	-	1
A	4.5 - 5.5	60	-	-	2
BB	4.5 - 6.5	25	-	-	1
AA	4.5 - 6.5	60	-	-	2
S	2.5 - 5.7	85	-	-	2
M	5.0 - 16.0	8	-	-	1
C	5.0 - 16.0	16	-	-	1
F	9.0 - 16.0	33	-	-	2
U	10.0 - 21.0	16	-	-	1
N	18.0 - 29.0	5	-	-	1
D	18.0 - 29.0	8	-	-	1
K	18.0 - 29.0	15	-	-	2
G	17.5 - 29.0	25	-	-	2
J	30.0 - 48.0	10	-	-	2
E	5.0 - 16.0	8	5.0 - 16.0	8	1
P	18.0 - 29.0	5	5.0 - 16.0	8	1
H	18.0 - 32.0	5	18.0 - 32.0	5	1

Notes: 1) The total # of slots must not exceed 8 for CA1500.  
2) Slot position may change upon order placement.

Max. Output Current Limitations	
All modules can be used at their full rated current in all slot positions unless otherwise stated below	
A module:	Limited to 51A in slot 7/8
B module:	Limited to 20A in slot 8
C module:	Limited to 12A if output exceeds 12V
L module:	Limited to 20A in slot 8
Q module:	Limited to 20A in slot 8
R module:	Limited to 51A in slot 7/8
S module:	Limited to 65A in slot 7/8, 66A in slot 6/7, 80A in slot 5/6, 85A in slot 4/5, 66A in slot 3/4, 68A in slot 2/3, 73A in slot 1/2
T module:	Limited to 51A in slot 7/8

Other Modular Products	
NV	350W to 700W up to 8 outputs
Vega	450W to 900W up to 10 outputs
Alpha1000	1000W up to 14 outputs

Sample Configurations					
Description	O/P 1	O/P 2	O/P 3	O/P 4	O/P 5
CA1500 24G_PP* 24G_PP*	24V 50A	-	-	-	-
CA1500 5S_MF 12F_PP* 12F_PP*	5V 80A	12V 60A	-	-	-
CA1500 LL 5A 28G 36J_IN	5V 60A	28V 25A	36V 10A	-	-
CA1500 5A_PP* 5A_PP* 3.3R 12C 12C	5V 120A	3.3V 60A	12V 16A	12V 16A	-
CA1500 24G_PP* 24D_PP* 3.3S 5S 12/12E	24V 33A	3.3V 85A	5V 66A	12V 8A	12V 8A

Actual part number (format CA1500Hxxxxx) assigned on quotation.  
\* Outputs paralleled via bus bars. (O/P = Output)

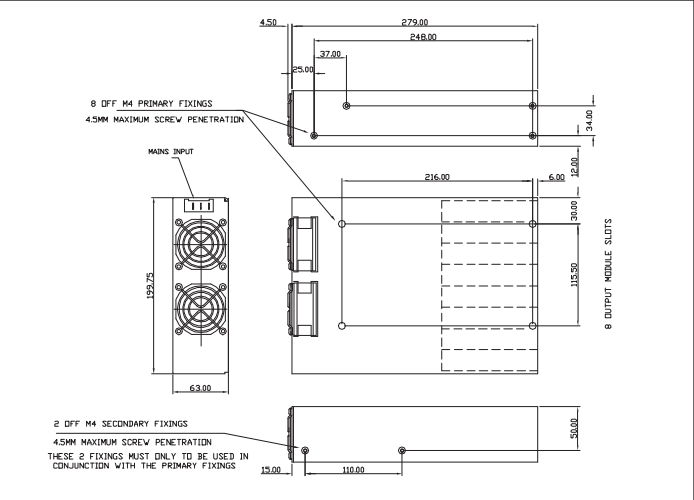
## 3 Option Codes

If required the following options may be added to the configuration by placing the code after the module.  
(i.e. Inhibiting a 5V @ 25A = 5B + Inhibit code = "5BIN")

Code	Description	Available On		
MF <sup>2</sup>	Mains Fail This option provides an AC fail signal, power supply inhibit, and 5V@50mA auxiliary supply. This is only placed in the first module slot. (TTL compatible reference to 0 volts of Aux. Supply)	All modules except Dual output (E, H, P)		
PP	Parallel for Power This option allows 2 adjacent modules to be paralleled together for increased output power. Bus bars provided.	Modules: A, B, C, D, F, G, M, N, Q, R		
PA	Parallel for Redundancy This option allows modules to be connected for N+1 redundancy. A DC good signal is also offered (electrically similar to AC fail.) No bus bars provided.	Modules: A, B, C, D, F, G, M, N, Q, R, S		
IN3	Inhibit Module inhibit and DC good signal. (TTL compatible referenced to (-V) of the module)	Modules A, B, C, D, F, G, J, M, N, Q, R		
Low Leakage Options (Max values stated)				
	120VAC, 60Hz	240VAC, 60Hz		
LL	88 µA	197 µA	233 µA	Curve A
RL	50 µA	112 µA	132 µA	>Curve A
TL	24 µA	53 µA	63 µA	>Curve A

Notes: 1) Only one option per module may be used.  
2) Mains Fail: AC Fail "AC On" = ≤ 0.8V, 50mA max.  
"AC Off" = open circuit, 50V abs max.  
PS Inhibit "PS On" = ≥ 2.0V or open circuit.  
"PS Off" = ≤ 0.8V @ 5mA.  
(TTL compatible, Referenced to 0 volts of Aux. Supply.)  
3) Inhibit: DC Good Electrically similar to AC fail module.  
Inhibit Electrically similar to PS inhibit.  
4) Type testing result

## Outline Drawing



For Additional Information, please visit [us.tdk-lambda.com/lp/products/alpha-series.htm](http://us.tdk-lambda.com/lp/products/alpha-series.htm)



## 300W Convection / 400W Fan Cooled Medical Power Supplies

### Features

- ◆ Medical & ITE Safety Certifications (BF Rated)
- ◆ 94% Efficient
- ◆ 0.5W Standby Power
- ◆ Meets ERP/Eco-Design (2009/125/EC)
- ◆ Meets Climate Savers Gold Level
- ◆ 450W Peak Loading (10s)
- ◆ High Power Density (7" x 4" x 1.6")
- ◆ Suitable for 1U applications
- ◆ Five Year Warranty



### Key Market Segments & Applications



Specifications		
Model	CFE400M	
Input Voltage range	VAC	85 - 264VAC
Input Frequency	Hz	47 - 63Hz, 440Hz with reduced PFC
Inrush Current	A	<20A at 25°C and 230VAC input, Cold Start
Power Factor Harmonics	-	EN61000-3-2 Compliant. Class A (Class C >100W output power)
Voltage Setting Accuracy	%	±1% at 50% Load
Regulation	%	Line: 0.25%; Load: 1%; Thermal Coefficient: 0.02%/°C
Ripple & Noise	mV	1% peak-peak
Efficiency (230VAC, 80% load)	%	94% typical (48V & 24V), 91% (12V), 0.5W power draw in standby mode
Overcurrent Protection	-	Automatic recovery upon overload removal
Overvoltage Protection	V	Cycle AC line to reset
Overtemperature Protection	-	Yes
Hold Up Time (Typ)	ms	15ms at full load
Leakage Current (max)	µA	140µA 120VAC 60Hz, 280µA 240VAC 60Hz, <300µA 240VAC 63Hz (Type Test results)
Fan Supply	-	12V 0.25A (Not available if the top fan option is selected)
Standby Voltage	-	5V 80mA or 5V 2A (chosen at time of ordering)
Remote Sense	-	None
Signals & Features	-	Remote on/off - Inhibit or Enable operation (chosen at time of ordering) Power Good - High indicates DC output & AC input is good. ORing FET - (Option)
Operating Temperature <sup>(1)</sup>	°C	Convection cooled: 0 to +60°C. Derate linearly to 50% load from 40°C to 60°C Forced air cooled: 0 to +70°C. Derate linearly to 50% load from 50°C to 70°C
Storage Temperature	°C	-40 to +70°C
Humidity (non condensing)	%RH	5 - 95%RH
Cooling	-	Convection, internal fan or external 1.5m/s forced air , approx. 12 CFM (see oper. temp.)
Isolation	-	Input to Output 4kVAC (Reinforced) <sup>(3)</sup> (2 x MOPPs (3rd edition 60601)), Input to Ground 1500VAC, Output to Ground 1500VAC
Vibration (non operating)	-	2G, 10-500Hz in all 3 planes. MIL-STD-810E, Method 514.4, Pro I, Cat 1, 9
Shock	-	30G per IEC68-2-27, MIL-STD-810E/F, Method 516.5, Pro I, IV, VI
Safety Agency Certifications <sup>(2)</sup>	-	IEC/UL/EN/CSA22.2 60601-1, IEC/UL/EN 61010-1, IEC/UL/EN/CSA22.2 No 60950-1, CE for LVD
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11, -12, -14
Conducted Emissions and Flicker	-	EN55011, EN55022 Class B (per CISPR.11/22), EN61000-3-3
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.11/22)
Weight (open frame)	kg	U Channel: 0.71kg, Top fan: 0.86kg
Size	in	U channel: 7 x 3.94 x 1.6, With cover: 7 x 3.94 x 2, Top Fan: 7 x 3.94 x 2.8
Warranty	yrs	Five Years

(1) -20°C cold start

(2) Designed to meet IEC/EN/UL/CSA 61010-1 Edition 2

(3) Type tested to 4kVAC (equivalent to 5.7kVDC). Production tested to 4.3 kVDC.

## Model Selector (Standard Models\*)

Product Code	Part Description	Style	Output Voltage	Current (Convection)	Current (Forced Air or Fan)	Peak Output Current <sup>(2)</sup>
U7Y0010	CFE400M-12-5H-N1-UML-NT	U Chassis	12V	25A	33.3A	37.5A
U7Y0043	CFE400M-12-5H-TF-CML-NT	Cover & Top Fan	12V	-	33.3A	37.5A
U7Y0269	CFE400M-24-5H-N1-UML-NT	U Chassis	24V	12.5A	16.67A	18.75A
U7Y028C	CFE400M-24-5H-TF-CML-NT	Cover & Top Fan	24V	-	16.67A	18.75A
U7Y027B	CFE400M-48-5H-N1-UML-NT	U Chassis	48V	6.25A	8.33A	9.375A
U7Y029D	CFE400M-48-5H-TF-CML-NT	Cover & Top Fan	48V	-	8.33A	9.375A

### Notes:

(\*) Additional variants available, see Option Selection below.

(2) For up to 10s without exceeding Average Output Power rating (300W convection, 400W with forced air or fan)

## Option Selection

### Output Adjustment Range

12	10.8 - 14.4V
24	21.6 - 28.8V
48	43.2 - 50V

\*Adjustable by potentiometer

NN = None  
5C = 5V 80mA  
5H = 5V 2A

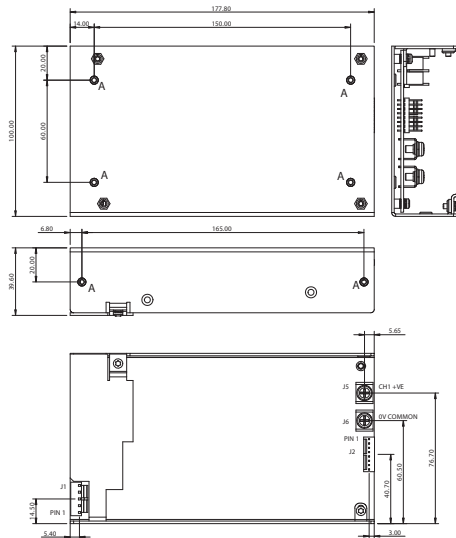
N = None  
E = Enable  
T = Inhibit

CFE400M Output V - Standby Voltage - Fan & Cover Option ORing FET Remote On/Off

NN-U = No fan, no fan supply, no cover  
NN-C = No fan, no fan supply, cover  
N1-U = 12V fan supply, no cover  
N1-C = 12V fan supply, cover  
TF-C = Top fan & cover

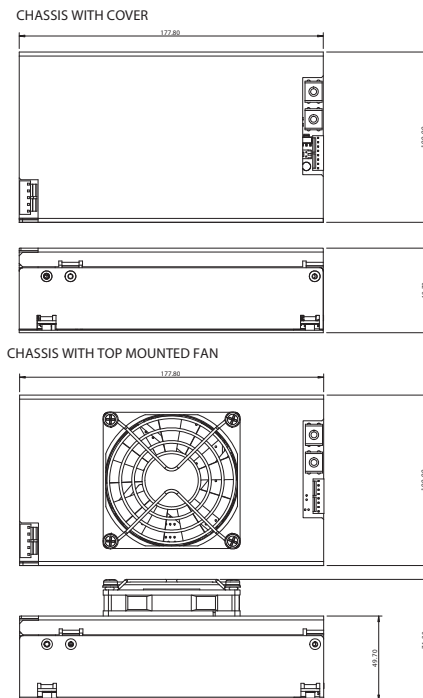
ML-Y = FET fitted  
ML-N = No FET fitted

## Outline Drawing



PIN	CONNECTION	PIN	CONNECTION	CONNECTOR	HOUSING	COMP. PIN	MANUFACTURER
1	EARTH	1	FAN SUPPLY	J1	09-50-8851	08-52-0113	MOLEX
2	NOT CONNECTED	2	STANDBY ON/OFF	J2	22-01-2885	0850-0032	MOLEX
3	LINE	3	SENSE	J3 & J6	N/A	TAG-19073-0165	MOLEX
4	NOT CONNECTED	4	NC				
5	NEUTRAL	5	STANDBY RTN				
		6	STANDBY				
		7	SENSE				
		8	I-SENSE				

NOTE:  
A: 6 OFF FIXING HOLES FOR M3, MAXIMUM PENETRATION 4.0mm,  
MAXIMUM TORQUE 0.9Nm.  
ALL TOLERANCES +/- 0.5mm.



## Other TDK-Lambda Products

EFE Series	300 to 400W 1U single output power supply
CSS Series	65 to 500W 1U single output power supply
NV Series	175 to 900W 1U power supply 1-8 outputs

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/cfe-series.htm](http://us.tdk-lambda.com/lp/products/cfe-series.htm)



## 500W Conduction Cooled Power Supplies

### Features

- ◆ Base plate cooled, no fan required
- ◆ High efficiency
- ◆ Protective coating option
- ◆ MIL STD 461/462D CE102 Conducted EMC



### Key Market Segments & Applications



Specifications		
Model		
AC Input	VAC/Hz	90 to 265VAC, 47-63Hz (up to 440Hz) (3)
Input Current Model dependant (1)	A	6.8 / 3.4
Inrush Current (115 / 230VAC)	A	20 / 40 peak
Power Factor	-	Meets EN61000-3-2
Efficiency (typical)	%	85% at 75% loading (Non ORing diode versions)
Output Voltage Setpoint Accuracy	-	±2% at 50% load
Total Regulation	%	< 4%. (ORing diode option, adds 1V to load regulation)
Ripple and Noise (20MHz BW)	-	1% (1.5% below -10°C)
Over Current Protection	%	105 - 140% (Automatic Recovery)
Over Voltage Protection	-	125 - 145% (Cycle AC to reset)
Series Operation	-	Yes
Parallel Operation	-	Yes (Single wire, up to 6 units)
ORing Diodes/FETs	-	Yes (option)
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present
Auxiliary Supply	-	10 - 14V, 20mA
Remote On/Off (Opto isolated)	-	High = On
Temperature Coefficient	-	<0.01%/°C
Overtemperature	°C	Shuts down between 90 - 130°C (Cycle AC to reset)
Hold Up Time (230VAC)	ms	10ms
Leakage Curr. (at 230VAC, 50Hz)	mA	< 1.5mA
Remote Sense	-	Yes, compensates up to 500mV cable drop
Operating Temp. (Base plate)	°C	-40 to +85°C (2)
Storage Temperature	°C	-40 to +100°C
Humidity	-	Operating: 20 - 95%RH, Non operating 10 - 95%RH (Pcb assembly protective coated)
Cooling	-	Conduction cooled through 6mm base plate
Withstand Voltage	-	Input to Output 4242VDC, Input to Ground 2121VDC, Output to ground 500VDC
Vibration (non operating)	-	MIL-STD-810E, Method 514.4, Proc 1, Category 1, 9
Shock	-	MIL-STD-810E, Method 516.5, Proc. I, IV, VI
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No 60950-1, EN60950-1 (Ed 2), CE Mark
Line Dip	-	Complies with SEMI F47 (200VAC line only)
Conducted EMI	-	EN55011, EN55022 (as per CISPR, 11/22) Class B, FCC47 part 15 subpart B) MIL STD 461E/461E/462D CE102, 115V and 220V
Radiated EMI	-	EN55011, EN55022 (as per CISPR, 11/22) Class B, FCC47 part 15 subpart B) see app. note for details
Immunity	-	IEC61000-4-2 (Contact Level 2, Air discharge Lvl 3), -3 (Lvl 3), -4(Lvl 3), -5 (Lvl 4), -6 (Lvl 3), -8 (Lvl 4), -11 (Class 3), -12 (Lvl 3), -14 (Class 3)
Weight (Typ)	g	with cover 1400g, without cover 1200g
Size (L x W x D)	mm	270 x 126 x 55mm
Warranty	yrs	2 years

(1) 100/200VAC

(2) CPFE500F-12: -40 to 80°C. See instruction manuals for derating curves

(3) Reduced PFC above 63Hz. Contact technical support for 440Hz operation.



## Model Selector

Model	Output Volt (V)	Adjust Range (V)	Max Curr (A)	Max Watt (W)
CPFE500F-12-NLC	12	9.6 - 14.4	42	504
CPFE500F-24-NLC	24	22.4 - 33.6	18	504
CPFE500F-28-NLC	28	22.4 - 33.6	18	504
CPFE500F-48-NLC	48	38.4 - 57.6	10.5	504

## Options

Part Number	Desc.	Suffix	ORing Diode (3)	Cover	Protective Coating
-DLC			Y	Y	Y
-NLC			N	Y	Y

3) Reduces maximum output adjustment range by 1V  
Preferred stocking part highlighted in green.

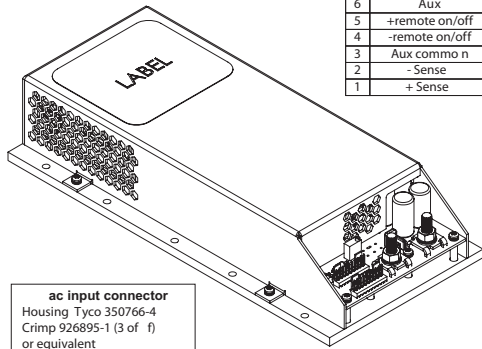
## Outline Drawing

### CPFE500F

#### Signals Connections

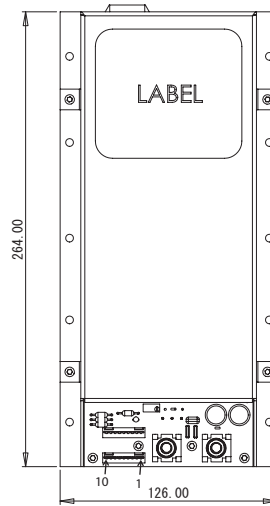
Housing - Molex 22-01-1 102  
Crimp - Molex 50802 series  
(or equivalents)

Pin	Function
10	Do not connect
9	Output good - ENA
8	Trim
7	Current share
6	Aux
5	+remote on/off
4	-remote on/off
3	Aux common
2	- Sense
1	+ Sense

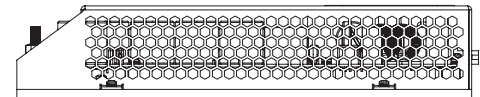
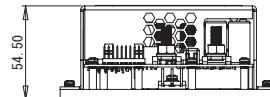
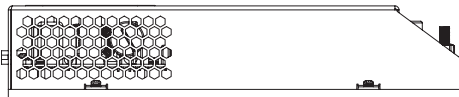
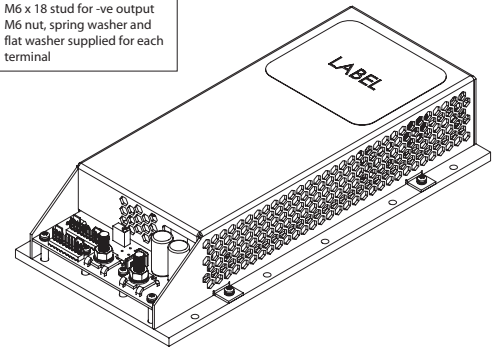


**ac input connector**  
Housing Tyco 350766-4  
Crimp 926895-1 (3 of f)  
or equivalent

Live Earth Neutral



**dc output**  
M6 x 18 stud for +ve output  
M6 x 18 stud for -ve output  
M6 nut, spring washer and  
flat washer supplied for each  
terminal



Notes 1. All customer fixings 10 x M4 clearance holes 2. All tolerances +/-0.5mm

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/cpfe-series.htm](http://us.tdk-lambda.com/lp/products/cpfe-series.htm)



## 720 to 1000W Conduction Cooled Power Supplies

### Features

- ◆ Base plate cooled, no fan required
- ◆ High efficiency
- ◆ Protective coating
- ◆ MIL STD 461/462D CE102 EMC
- ◆ I<sup>2</sup>C Interface
- ◆ Wide range AC Input



### Key Market Segments & Applications



Specifications		
Model		
AC Input	-	90 to 265VAC, 47-63Hz (up to 440Hz) (3)
Input Current (1)	A	13.6 / 6.6 (Model dependant)
Inrush Current (115 / 230VAC)	A	20 / 40 peak
Power Factor	-	Meets EN61000-3-2
Efficiency (typical)	%	79 to 86% (Model dependant)
Output Voltage Setpoint Accuracy	-	±2% at 50% load
Line Regulation	mV	12V: 48mV, 28V: 56mV, 48V: 96mV
Load Regulation	mV	12V: 48mV, 28V: 56mV, 48V: 96mV
Ripple and Noise (20MHz BW)	-	1% (2% below 0°C)
Over Current Protection	%	105 - 140% (Automatic recovery)
Over Voltage Protection	-	125 - 145% (Automatic recovery)
Parallel Operation	-	Yes (Single wire)
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present
Auxiliary Supply	-	10 - 14V, 20mA
Remote On/Off (Opto isolated)	-	High = On
Temperature Coefficient	-	<0.02%/°C
Overtemperature	°C	Shuts down between 90 - 115°C (Auto recovery)
Hold Up Time (230VAC)	ms	25ms
Leakage Current (@230VAC,50Hz)	mA	< 1.5mA
Remote Sense	-	Yes, compensates up to 500mV cable drop
I <sup>2</sup> C Interface	-	Provides manufacturing location, date, serial number, part number, unit revision, output voltage & current read back, base plate temperature, remote on/off, IOG, DC good and over temperature warning
Operating Temperature (Base plate)	-	12V: -40 to +85°C, 28V & 48V: -40 to +70 / 85°C (See reverse side for derating)(2)
Storage Temperature	°C	-40 to +100°C
Humidity	-	Operating: 20 - 90%RH, Non operating 10 - 95%RH (Pcb assembly protective coated)
Cooling	-	Conduction cooled through 6mm base plate
Withstand Voltage	-	Input to Output 4242VDC, Input to Ground 2121VDC, Output to ground 500VDC
Vibration (non operating)	-	MIL-STD-810F, Method 514.5, Figure 514.5C US (Category IV) and Figure 514.5C-15 (Category X)
Shock	-	MIL-STD-810E, Method 516.5, Proc. I, IV, VI
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No 60950-1, EN60950-1 (Ed 2), CE Mark
Line Dip	-	Complies with SEMI F47 (200VAC line only)
Conducted & Radiated EMI	-	EN55022/EN55011 Class B, MIL STD 461/462D CE102
Immunity	-	IEC61000-4-2 (Contact Level 2, Air discharge Lvl 3), -3 (Lvl 3), -4(Lvl 3), -5 (Lvl 4), -6 (Lvl 3), -8 (Lvl 4), -11 (Class 3), -12 (Lvl 3), -14 (Class 3)
Weight (Typ)	g	2,400
Size (L x W x H)	mm	270 x 190 x 61mm
Warranty	yrs	2 years

(1) 100/200VAC

(2) CPFE1000F-28, -48: -40 to +70°C below 170VAC input voltage

(3) Reduced PFC above 63Hz. Contact technical support for 440Hz operation.

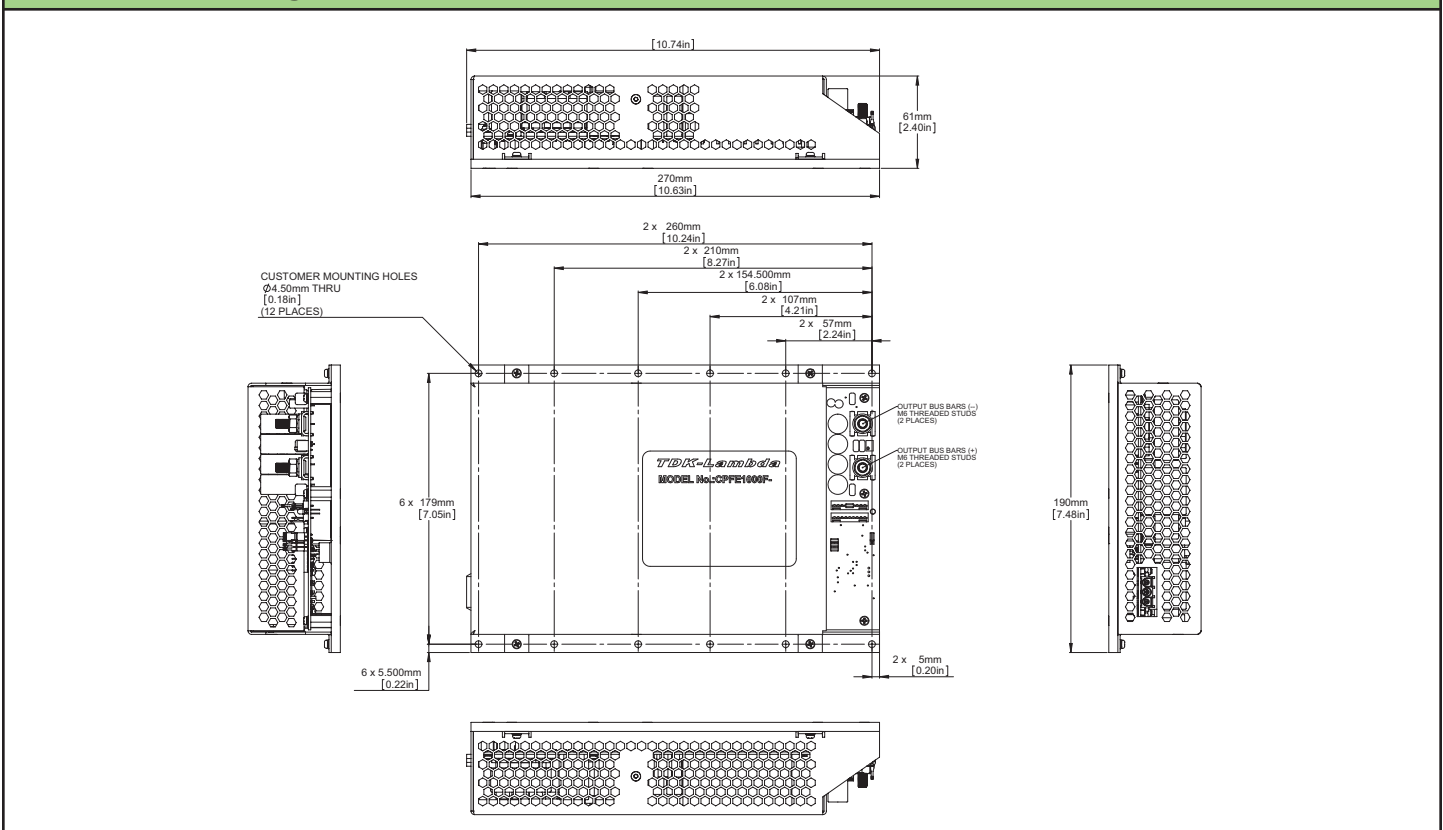
## Model Selector

Model	Output Voltage (V)	Adjust Range (V)	Maximum Current	Efficiency (%) (110/220VAC)
CPFE1000F-12	12	9.6 - 14.4	60	79 / 81
CPFE1000F-28	28	22.4 - 33.6	36	83 / 86
CPFE1000F-48	48	38.4 - 57.6	21	83 / 86

## Derating (Ambient Temperature)

Model	Input Voltage	Output Power (W)			
		50°C	60°C	70°C	85°C
CPFE1000F-12	85VAC to 170VAC	720	720	576	360
	170VAC to 265VAC	720	720	670	595
CPFE1000F-28	85VAC to 170VAC	1008	864	720	-
	170VAC to 265VAC	1008	1008	958	883
CPFE1000F-48	85VAC to 170VAC	1008	864	720	-
	170VAC to 265VAC	1008	1008	958	883

## Outline Drawings



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/cpfe-series.htm](http://us.tdk-lambda.com/lp/products/cpfe-series.htm)



## 720 to 1000W Conduction Cooled Power Supplies

### Features

- ◆ Smaller size than CPFE1000F
- ◆ Base plate cooled, no fan required
- ◆ Protective coating option
- ◆ I<sup>2</sup>C Interface



### Key Market Segments & Applications



### Specifications

Model		
AC Input	VAC	90 to 265VAC, 47-63Hz
Input Current (1)	A	13.6 / 6.6 (Model dependant)
Inrush Current (115 / 230VAC)	A	20 / 40 peak
Power Factor	-	Meets EN61000-3-2
Efficiency (typical)	%	79 to 86% (Model dependant)
Output Voltage Setpoint Accuracy	-	±2% at 50% load
Line Regulation	mV	12V: 48mV, 28V: 56mV, 48V: 96mV
Load Regulation	mV	12V: 48mV, 28V: 56mV, 48V: 96mV
Ripple and Noise (20MHz BW)	-	1% (2% below 0°C)
Over Current Protection	%	105 - 140% (Automatic recovery)
Over Voltage Protection	-	125 - 145% (Automatic recovery)
Parallel Operation	-	Yes (Single wire)
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present
Auxiliary Supply	-	10 - 14V, 20mA
Remote On/Off (Opto isolated)	-	High = On
Temperature Coefficient	°C	<0.02%/°C
Overtemperature	°C	Shuts down between 90 - 115°C (Auto recovery)
Hold Up Time (230VAC)	ms	25ms
Leakage Current (at 230VAC, 50Hz)	uA	< 1.5mA
Remote Sense	-	Yes, compensates up to 500mV cable drop
I <sup>2</sup> C Interface	-	Provides manufacturing location, date, serial number, part number, unit revision, output voltage & current read back, base plate temperature, remote on/off, IOG, DC good and over temperature warning
Operating Temperature (Base plate)	°C	12V: -40 to +85°C, 28V & 48V: -40 to +70 / 85°C (See reverse side for derating)(2)
Storage Temperature	°C	-40 to +100°C
Humidity	-	Operating: 20 - 90%RH, Non operating 10 - 95%RH (Pcb assembly protective coated)
Cooling	-	Conduction cooled through 6mm base plate
Withstand Voltage	-	Input to Output 4242VDC, Input to Ground 2121VDC, Output to ground 500VDC
Vibration (non operating)	-	MIL-STD-810F, Method 514.4, Proc 1, Category 1, 9
Shock	-	MIL-STD-810F, Method 516.5, Proc. I, IV, VI
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No 60950-1, EN60950-1 (Ed 2), CE Mark
Line Dip	-	Complies with SEMI F47 (200VAC line only)
Conducted & Radiated EMI	-	Conducted: EN55022/EN55011 Class B, Radiated: Class A
Immunity	-	IEC61000-4-2 (Contact Level 2, Air discharge Lvl 3), -3 (Lvl 3), -4(Lvl 3), -5 (Lvl 4), -6 (Lvl 3), -8 (Lvl 4), -11 (Class 3), -12 (Lvl 3), -14 (Class 3)
Weight (Typ)	g	1220g (without cover)
Size (L x W x H)	mm	254 x 112 x 44mm
Warranty	yrs	2 years

(1) 100/200VAC

(2) CPFE1000FI-28, -48: -40 to +70°C below 170VAC input voltage

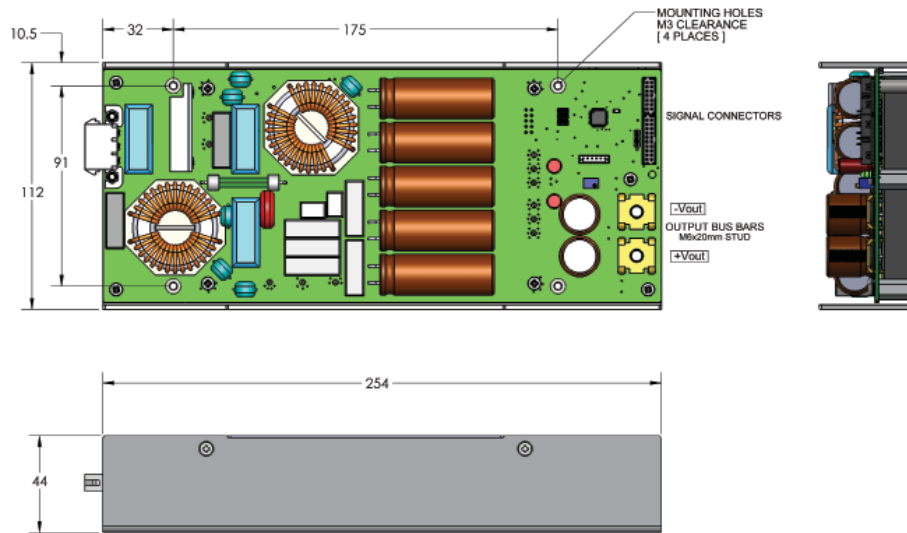
## Model Selector

Model	Output Voltage (V)	Adjust Range (V)	Maximum Current	Efficiency (%) (110/220VAC)
CPFE1000FI-12	12	9.6 - 14.4	60	79 / 81
CPFE1000FI-28	28	22.4 - 33.6	36	83 / 86
CPFE1000FI-48	48	38.4 - 57.6	21	83 / 86

## Derating (Ambient Temperature)

Model	Input Voltage	Output Power (W)				Derating
		50°C	60°C	70°C	85°C	
CPFE1000FI-12	85VAC to 170VAC	720	720	576	360	14.4W/°C
	170VAC to 265VAC	720	720	670	595	5W/°C
CPFE1000FI-28	85VAC to 170VAC	1008	864	720	-	14.4W/°C
	170VAC to 265VAC	1008	1008	958	883	5W/°C
CPFE1000FI-48	85VAC to 170VAC	1008	864	720	-	14.4W/°C
	170VAC to 265VAC	1008	1008	958	883	5W/°C

## Outline Drawings



## Options

Suffix	Description
/C	Cover
/P	No U channel

For Additional Information, please visit [us.tdk-lambda.com/lp/products/cpfe-series.htm](http://us.tdk-lambda.com/lp/products/cpfe-series.htm)



## 2 x 4" 40 to 65W AC-DC Medical Power Supplies

### Features

- ◆ Wide Range AC Input
- ◆ Low profile, Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ Remote Sense
- ◆ Dual input fuses



### Key Market Segments & Applications



Medical

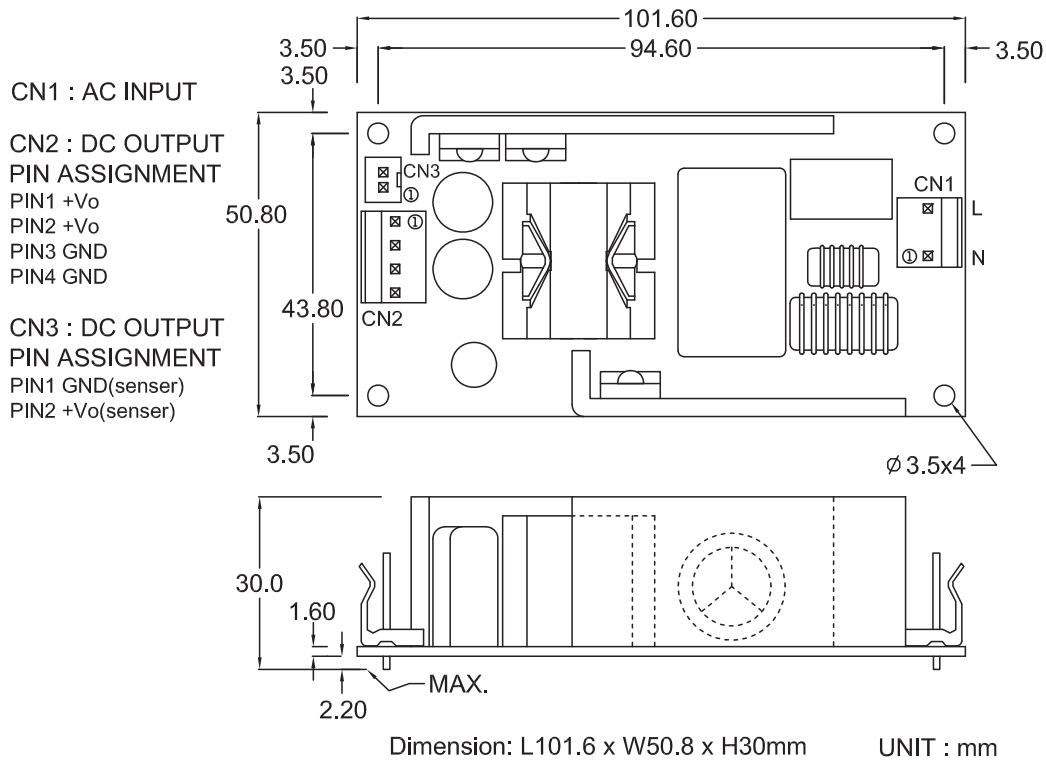


RoHS

### Specifications

Model		CSS65
Input Voltage range	V	90 - 264VAC (47 - 63Hz) or 120 - 370VDC
Inrush Current	A	<40A maximum at 115VAC input, 25°C ambient cold start
Input Current (115/230VAC)	A	2 / 1
Leakage Current	uA	<250uA 264VAC 63Hz
Hold Up Time (Typ)	ms	10ms at 115VAC input
Temperature Coefficient	°C	±0.05%/°C
Adjustment Range	-	None
Remote Sense	-	Yes
Minimum Load	A	None
Regulation	%	5V: ±5%, 12-24V: ±3%, 36-48V: ±2% (10 - 100% load change, 100-240VAC line change)
Ripple & Noise	%	1%
Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	110 - 150% of nominal (Automatic Reset)
Efficiency	%	86% typical (115VAC Input)
Operating Temperature	°C	0 to +70°C derate linearly to 50% load from 50 to 70°C
Storage Temperature	°C	-10 to +70°C
Humidity (non condensing)	-	20 - 95% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 4kVAC (Reinforced) (2 x MOPPS 3rd Edition), Output to Ground 500VDC for 1 min.
Isolation Resistance	-	>20M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Approvals	-	UL60601-1, EN60601-1, IEC60601-1
Conducted & Radiated EMI	-	EN55011-B, FCC Class B
Immunity	-	EN60601-1-2
Weight (Typ)	g	200g
Size (WxLxH)	in	2 x 4 x 1.18" (including underside components)
Warranty	yrs	Two Years

## Outline Drawing



## Model Selector

Model	Output (V)	Maximum Output (A)	Maximum Power (W)
CSS65-5	5	8.0	40
CSS65-12	12	5.0	60
CSS65-15	15	4.0	60
CSS65-19	19	3.43	65
CSS65-24	24	2.71	65
CSS65-36	36	1.81	65
CSS65-48	48	1.36	65

## Other Medical Products

CSS150, 500	150 - 500W 1 output
KM	15 - 40W pcb mount medical
NV175	175 - 200W 1-4 outputs
NV300	300W 1-4 outputs
EFE300M	300W 3x6" 1 output

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/css-series.htm](http://us.tdk-lambda.com/lp/products/css-series.htm)



- ◆ Input Connector mates with Molex Housing 09-50-3031 or equivalent
- ◆ Output Connector mates with Molex Housing 09-50-3041 or equivalent
- ◆ Sense connector (CN3) mates with J.S.T. XHP-2

## 3 x 5" 150W AC-DC Medical Power Supplies

### Features

- ◆ Wide Range AC Input
- ◆ Low profile, Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ Dual input fuses



### Key Market Segments & Applications

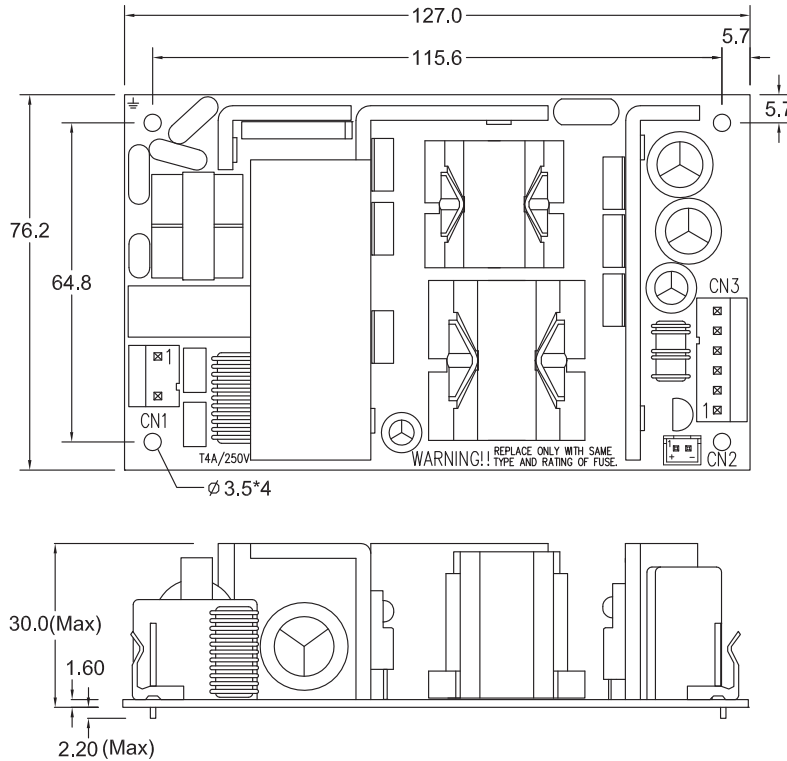


Specifications		CSS150
Model		CSS150
Input Voltage range	V	90 - 264VAC (47 - 400Hz)(1) or 120 - 180VDC
Inrush Current	A	<60A maximum at 264VAC input, 25°C ambient cold start
Input Current (115/230VAC)	A	1.7 / 0.85
Power Factor Correction	-	Meets EN61000-3-2, >0.9
Leakage Current	µA	<250µA 264VAC 63Hz
Hold Up Time (Typ)	ms	16ms at 115VAC input
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	%	±1%
Minimum Load	A	None
Total Regulation	%	±3%
Ripple & Noise	%	2% peak to peak
Overcurrent Protection	-	110 - 150%
Overvoltage Protection	V	110 - 150% of nominal (Cycle input power to reset)
Remote On/Off	-	Unit on: Floating or low <1.2V, Unit off: Apply 5V with respect to 0V
Efficiency	%	89% typical
Off load power draw	W	<0.5W
Operating Temperature	°C	0 to +70°C derate linearly to 50% load from 50 to 70°C
Storage Temperature	°C	-20 to +85°C
Humidity (non condensing)	-	20 - 95% RH
Cooling	-	Convection or forced air (2.5m/s)
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 4kVAC, Output to Ground 500VDC for 1 min.
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	19.6m/s <sup>2</sup> (10~55Hz:2G Constant, X,Y,Z 60min each.)
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Approvals	-	UL60601-1, EN60601-1, IEC60601-1, CE Mark, UL60950-1, EN60950-1
Conducted & Radiated EMI	-	EN55011-B, FCC Class B
Immunity	-	EN60601-1-2
MTBF	-	180,000 (MIL-217F-HDBK)
Weight (Typ)	g	340g
Size (WxLxH)	mm	3 x 5 x 1.3" (including underside components)
Warranty	yrs	Two Years

(1) Derate linearly to 90W convection rating from 90 to 100VAC input.



## Outline Drawing



Dimension :  
 L127(5") x W76.2(3") x H30.0(1.18")mm

Pin Assignments :

CN1 P3.96 (3PN2) Molex P/N:09652038 OR Equivalent	PIN1	N
	PIN2	L
CN2 P2.5-2P Molex P/N:481520210 OR Equivalent	PIN1	PS-ON +
	PIN2	PS-ON -
CN3 P3.96-6P Molex P/N:09652068 OR Equivalent	PIN1	+V
	PIN2	+V
	PIN3	+V
	PIN4	GND
	PIN5	GND
	PIN6	GND

## Model Selector

Model	Output Voltage (V)	Maximum Current Convection (A)	Maximum Power Convection (W)	Maximum Current Forced Air	Maximum Power Forced Air
CSS150-12	12V	8.3A	100W	12.5A	150W
CSS150-15	15V	6.7A	100W	10A	150W
CSS150-24	24V	4.2A	100W	6.3A	150W
CSS150-36	36V	2.8A	100W	4.2A	150W
CSS150-48	48V	2.1A	100W	3.1A	150W

## Connectors (not supplied)

- ◆ Input Connector mates with Molex Housing 09-50-3031 or equivalent
- ◆ Output Connector mates with Molex Housing 09-50-3061 or equivalent
- ◆ Remote On/Off (CN2) mates with J.S.T. XHP-2

## Other Medical Products

KM	15 - 40W pcb mount medical
CSS	40 - 500W medical
NV175	175 - 200W 1-4 outputs
NV300	300W 1-4 outputs

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/css-series.htm](http://us.tdk-lambda.com/lp/products/css-series.htm)



## 500W AC-DC Medical or Industrial Power Supplies

### Features

- ◆ 360W Convection rating
- ◆ High Efficiency
- ◆ IEC60601-1 or IEC60950-1 certifications
- ◆ ORing FET & Current Share
- ◆ Dual input fuses



### Key Market Segments & Applications



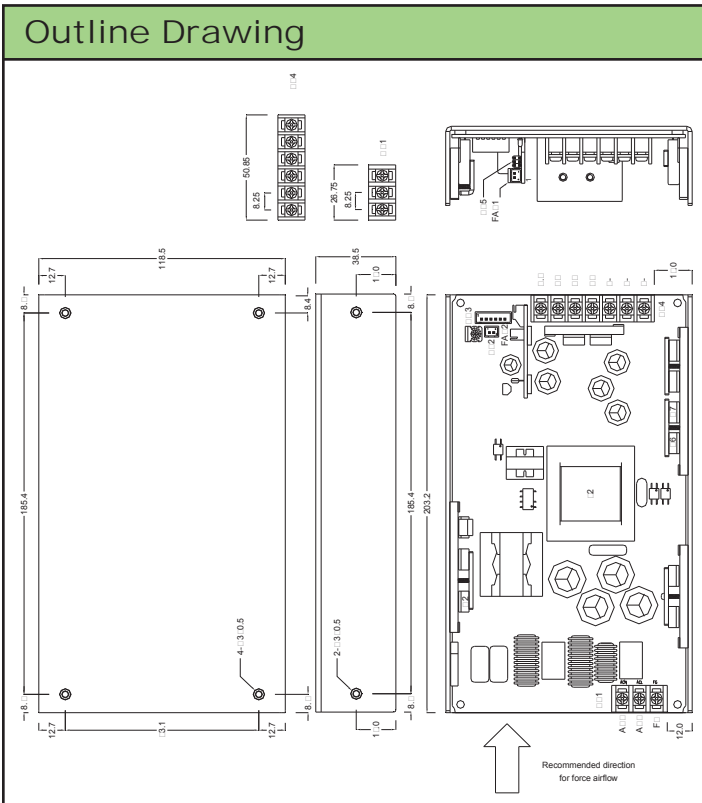
Specifications		
Model	CSS500	
Input Voltage range	-	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<50A maximum at 230VAC input, 25°C ambient cold start
Input Current (115/230VAC)	A	6 / 3A
Power Factor Correction	-	Meets EN61000-3-2, >0.9
Leakage Current	µA	<300µA 264VAC 63Hz
Hold Up Time (Typ)	ms	20ms at 115VAC input, 360W loading
Temperature Coefficient	-	±0.04%/°C
Voltage Accuracy	%	±1% at 60% load
Adjustment Range	%	None
Regulation	-	Load Regulation ±1%, Line Regulation ±0.5%
Ripple & Noise	%	1% peak to peak (5Vsb also)
Overcurrent Protection	-	110 - 150%
Overvoltage Protection	V	110 - 130% of nominal (Cycle input power or use remote on/off to reset)
Overtemperature Protection	-	Yes (Cycle input power or use remote on/off to reset)
Remote On/Off	-	Unit on: Floating or high 3.5 - 5.25V, Unit off: Low or <0 - 0.5V
Efficiency	%	87% to 92%, model & input dependant
Standby Voltage	-	5V 1A (5V 0.25A when convection cooled or when inhibit is activated)
Fan Output	-	12V 1A
Current Share	-	Single wire, up to 4 units can be shared within 10% accuracy at full load
DC Good & Fan Fail Signals	-	Both Low on Fail
ORing FET	-	Yes, for redundant operation
Operating Temperature	°C	Convection (U channel): 0 to +70°C, derate linearly to 35% load from 40 to 70°C Forced air (or internal fan): 0 to +70°C, derate linearly to 50% load from 50 to 70°C
Storage Temperature	°C	-10 to +85°C
Humidity (non condensing)	%	10 - 95% RH
Cooling	-	Convection or forced air (30CFM or 3.1m/s). Internal fan is temperature controlled
Withstand Voltage (1)	-	Input to Ground 1.5kVAC, Input to Output 4kVAC(1), Output to Ground 500VAC for 1 min.
Isolation Resistance	-	>20M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	19.6m/s <sup>2</sup> (10~55Hz:2G Constant, X,Y,Z 60min each.)
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Approvals	-	Medical Version: UL60601-1, IEC60601-1, Industrial Version: UL60950-1, EN60601-1, CE Mark
Conducted & Radiated EMI	-	Medical Version: EN55011-B, FCC Class B, Industrial: EN55022, FCC Class B
Immunity	-	Medical Version: EN60601-1-2, Industrial: EN55024
MTBF	-	>68,695 (MIL-217F-HDBK)
Weight (Typ)	g	860g (U channel), 980g (End Fan)
Size (WxLxH)	in	U Channel: 8 x 4.7 x 1.51", End Fan (S) 9 x 4.7 x 1.63", Top Fan (T) 8 x 4.7 x 2.85"
Warranty	yrs	Two Years

(1) Industrial version (I suffix): 3kVAC

Medical version 4kVAC (Reinforced) (2 x MOPPS 3rd Edition)

Model Selector					
Model	Output Voltage (V)	Maximum Curr. Conv. (A)	Maximum Power Conv. (W)	Maximum Curr. Forced Air	Maximum Pwr Forced Air
CSS500-12	12V	30A	360W	41.67A	500W
CSS500-24	24V	15A	360W	20.84A	500W
CSS500-30	30V	12A	360W	16.67A	500W
CSS500-36	36V	10A	360W	13.89A	500W
CSS500-48	48V	7.5A	360W	10.42A	500W
CSS500-54	54V	6.67A	360W	9.26A	500W
CSS500-57	57V	6.32A	360W	8.78A	500W

Options					
Suffix	Mechanical			Safety Certifications	
	U channel	End Fan	Top Fan	Medical	Industrial
Blank	Yes	-	-	Yes	-
/S	-	Yes	-	Yes	-
/T	-	-	Yes	Yes	-
I	Yes	-	-	-	Yes
/SI	-	Yes	-	-	Yes
/TI	-	-	Yes	-	Yes



Other Medical Products	
KM	15 - 40W pcb mount medical
CSS65, 150	40 - 150W open frame
NV175	175 - 200W 1-4 outputs
NV300	300W 1-4 outputs

For Additional Information, please visit [us.tdk-lambda.com/lp/products/css-series.htm](http://us.tdk-lambda.com/lp/products/css-series.htm)



## Single Output 250W Low Profile Power Supplies

### Features

- ◆ High Efficiency, up to 90%
- ◆ 1.18" high
- ◆ Wide Range AC Input
- ◆ Convection Cooled
- ◆ Three year warranty



### Key Market Segments & Applications



### Specifications

Model		CUS250LD
AC Input Voltage (300VAC for 5s)	VAC	85 - 265VAC
Input Frequency	Hz	47 - 63Hz
DC Input Voltage	VDC	120 - 370VDC (No safety certification)
Inrush Current (cold start)	A	20A at 115VAC, 40A at 230VAC
Power Factor	-	Meets EN61000-3-2 (Typical PF 0.98/0.95)(1)
Input Current (115/230VAC)	A	2.8 / 1.4
Temperature Coefficient	-	<0.02%/°C (0 - 50°C)
Overcurrent Protection	-	> 105%
Overvoltage Protection (2)	V	3.3V: 4 - 5.25V, 4V: 5 - 6.5V, 5V: 5.75 - 7.5V, 12V: 13.8 - 16.2V, 24V: 27.6 - 32.4V
Hold Up Time	ms	20ms
Leakage Current (240VAC 60Hz)	mA	<0.75mA
Remote Sense	-	No
LED Indicator	-	Green LED = On
Operating Temperature (3)	°C	-25 to +70°C. Derate 50% load from +40 to +70°C (-40°C start up above 88VAC input)
Storage Temperature	°C	-30 to +75°C
Operating Humidity (non condensing)	%	30 - 90% RH
Storage Humidity (non condensing)	%	10 - 90% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Immunity	-	IEC61000-4-2 (lv 2, 3), -3 (lv3), -4 (lv 3), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11
Safety Agency Certifications	-	UL60950-1, CSA60950-1-07 (cTUVus), EN60950-1, CE Mark
Conducted & Radiated EMI	-	EN55022-B, FCC--B
Weight (Typ)	g	700
Size (LxWxH)	in	7.8 x 4 x 1.18"
Warranty	yrs	Three Years

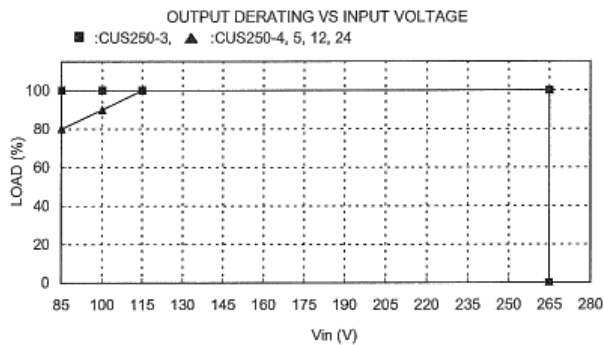
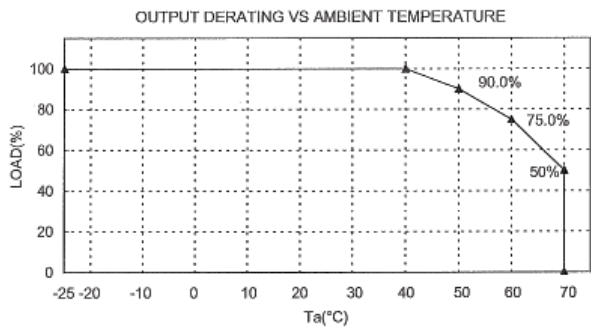
#### Notes:

- (1) 115 / 230VAC input
- (2) Cycle AC to reset
- (3) See derating curves on page 2. CSS250LD-3 derates linearly to 80% load from 115VAC to 85VAC input

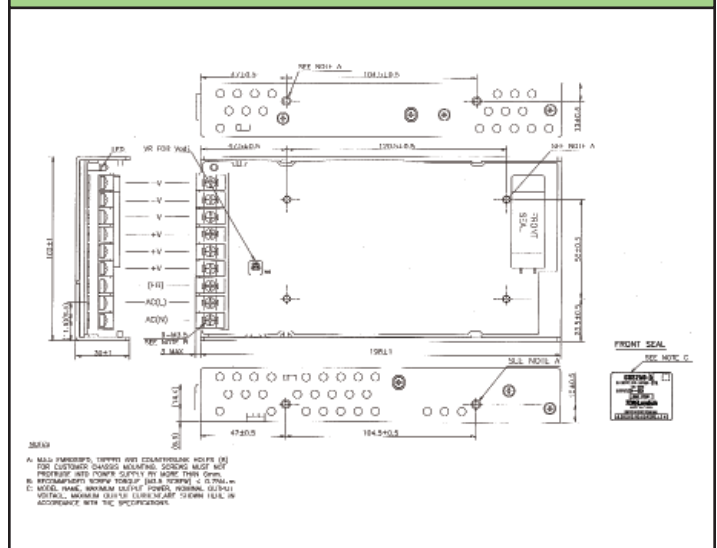
## Model Selector

Model	Voltage	Adjust Range (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % <sup>(1)</sup>
CUS250LD-3	3.3V	2.97 - 3.63	50	165	40	20	120	86 / 88
CUS250LD-4	4.2V	3.78 - 4.62	50	210	40	20	120	87 / 89
CUS250LD-5	5V	4.5 - 5.5	50	250	40	20	120	88 / 90
CUS250LD-12	12V	10.8 - 13.2	21	252	96	48	120	88 / 90
CUS250LD-24	24V	21.6 - 26.4	10.5	252	192	96	150	88 / 90

## Derating Curve



## Outline Drawing



## Similar Products

LS25 - 200	25W to 200W low cost
HWS15 - 1800	15W to 1800W limited lifetime warranty
SWS300 - 1000	300W to 1000W single output
GWS250-500	250W to 500W
CSS500	360W to 500W medical

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/cus-series.htm](http://us.tdk-lambda.com/lp/products/cus-series.htm)



## 15-100W, 5-48V Output DIN Rail Mount Power Supplies

### Features

- ◆ Low Cost
- ◆ Universal Input
- ◆ NEC NFPA70 Class 2<sup>(2)</sup>
- ◆ UL508 Listed
- ◆ Class 1, Division 2 (ISA 12.12)<sup>(3)</sup>
- ◆ -10 to +71°C Operation



### Key Market Segments & Applications



Industrial



RoHS

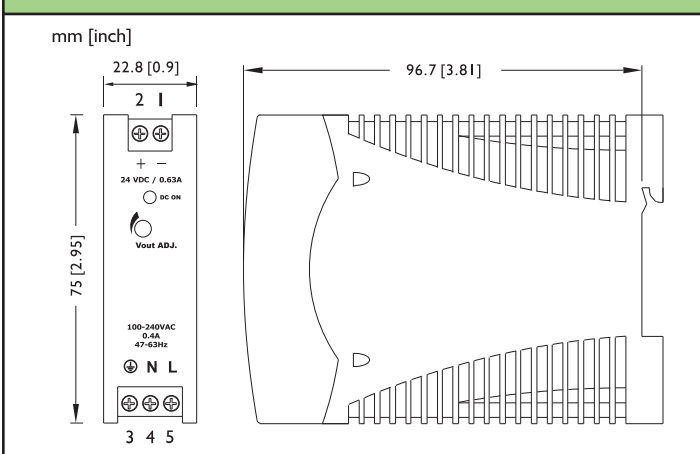
Specifications		DPP15	DPP25/30	DPP50	DPP100
AC Input Voltage range	VAC	85 - 264VAC			85 - 132VAC 176 - 264VAC
Input Frequency	Hz	47 - 63Hz			
DC Input Voltage range	-	90 - 375VDC			210 - 375VDC
Inrush Current (115 / 230VAC)	A	<35A	35 / 45A	35 / 50A	35 / 55A
Power Factor	-	Meets EN61000-3-2 Class A			
Input Current (230VAC)	A	0.4	0.72	1.35	1.2
Leakage Current	mA	<0.75mA, 265VAC, 63Hz			
Output Voltage Accuracy	%	±1% (24V outputs preset at 24.5V)			
Line Regulation	%	< 0.5%			
Load Regulation	%	< 0.5%			
Ripple and Noise	mV	50mV			
Overcurrent Protection (Typ)	-	>110% (fold forward type)			
Overvoltage Protection	V	120 - 137.5%, Cycle AC line to reset			
Hold Up Time (115VAC input)	ms	> 20ms			
Parallel switch	-	No			Yes
LED Indicator	-	Green LED = On			
Operating Temperature	°C	-10* to +71°C (Derate linearly 5%/°C from 61 to 71°C) * -25°C start up, DPP25-50 only			
Storage Temperature	°C	-25 to +85°C			
Operating Humidity	-	20 - 90% RH (non condensing)			
Cooling (1)	-	Convection			
Withstand Voltage	-	Input to Output 3kVAC for 1 min.			
Shock	-	Half sine wave, 4G, 22ms, 3 times per face, X, Y, Z			
Vibration	-	10-500Hz (20 min sweep) 0.002G <sup>2</sup> /Hz, 1 Grms acceleration X, Y, Z, 1 hour			
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Safety Agency Approvals	-	UL60950-1, UL508, NEC Class 2 <sup>(2)</sup> , EN60950-1, CE Mark, ISA 12.12 <sup>(3)</sup>			
Emissions	-	EN55011, EN55022 class B Radiated & Conducted, EN61000-6-3			
Immunity	-	EN61000-6-2, EN61000-4-2 Level 4, EN61000-4-3, EN61000-4-6 Level 3, EN61000-4-4 Level 4 (I/P) Level 3 (O/P), EN61000-4-5 Level 4, EN61000-4-8, EN61000-4-11			
Weight (Typ)	g	130	260	390	
Size (WxHxD)	in	0.9x2.95x3.81"	1.77x2.95x3.58"		2.86x2.95x3.81"
Case material	-	Plastic			
MTBF (MIL-HDBK-217F, GF25)	Hours	287,000	>288,000	269,000	239,000
Warranty	yrs	Two years			

- (1) Recommend 1" clearance on all sides.  
 (2) See model selector. Evaluated to NEC NFPA70 Class 2 output per UL1310.  
 (3) See model selector.

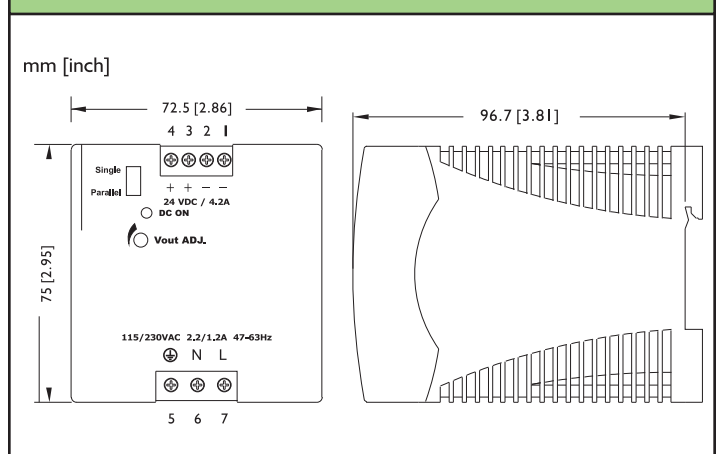
## Model Selector

Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Effic. (typ) %	UL1310 Class 2	ISA12.12 Class 1 Div 2
DPP25-5	5	5-6	5.0	25	78	-	Yes
DPP30-12	12	9.9-12.1	2.5	30	83	Yes	Yes
DPP50-15	15	11.9-15.1	3.4	50	85	Yes	Yes
DPP15-24	24	22.5-28.5	0.63	15	81	Yes	-
DPP30-24	24	22.5-28.5	1.3	30	84	Yes	Yes
DPP50-24	24	22.5-28.5	2.1	50	86	Yes	Yes
DPP100-24	24	22.5-28.5	4.2	100	87	-	-
DPP50-48	48	48-56	1.05	50	87	Yes	Yes

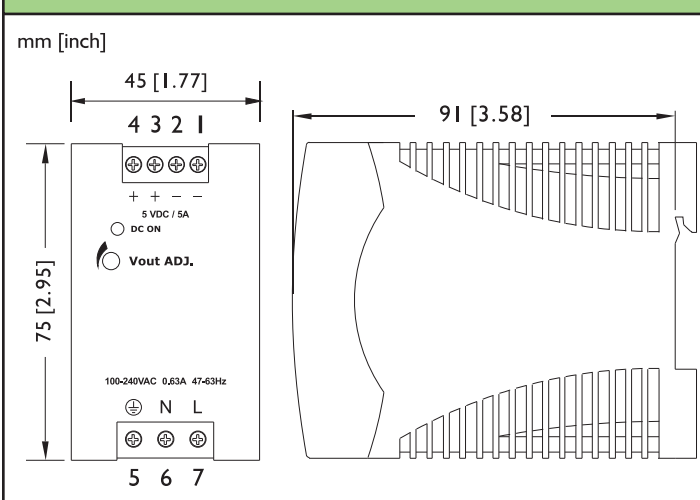
## DPP15 Outline



## DPP100 Outline



## DPP25-DPP50 Outline



### Installation:

**Snap-on Mounting** - snap onto DIN Rail TS35/7.5 or TS35/15. (No tools required)

**Cooling** - Normal Convection

**Clearance** - 25mm all sides

**Connection** - Use copper wire 0.5-2.5mm<sup>2</sup> (AWG24-12)

### Other DIN Rail Products

DSP/DPP	10W to 480W power supplies
DLP	75W to 240W power supplies
DLP-PU	Redundancy Module (20A)
R Series	3A to 30A single & three phase EMI Filters

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/dpp-series.htm](http://us.tdk-lambda.com/lp/products/dpp-series.htm)



## 120W & 240W DIN Rail Mount Power Supplies

### Features

- ◆ Low Cost
- ◆ 12V, 24V or 48V Outputs
- ◆ Auto-ranging input (no manual switching)
- ◆ Parallel Function Switch
- ◆ -40<sup>(2)</sup> to +71°C Operation

### Key Market Segments & Applications



Industrial



RoHS

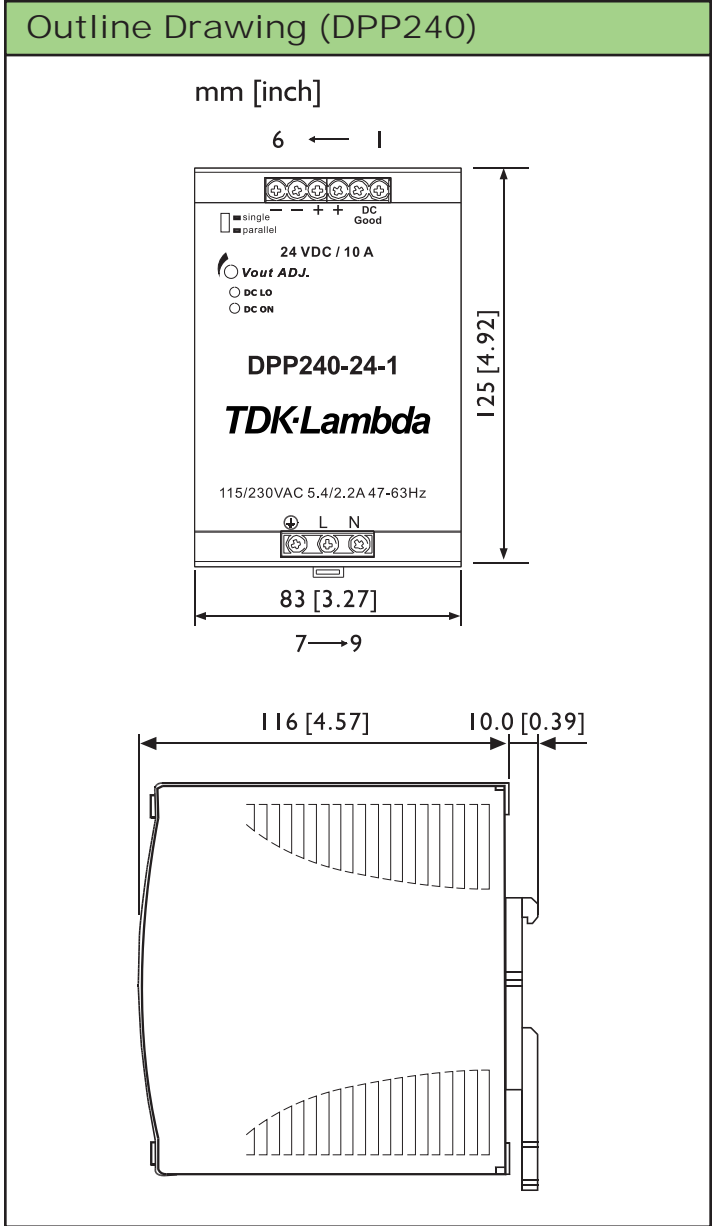
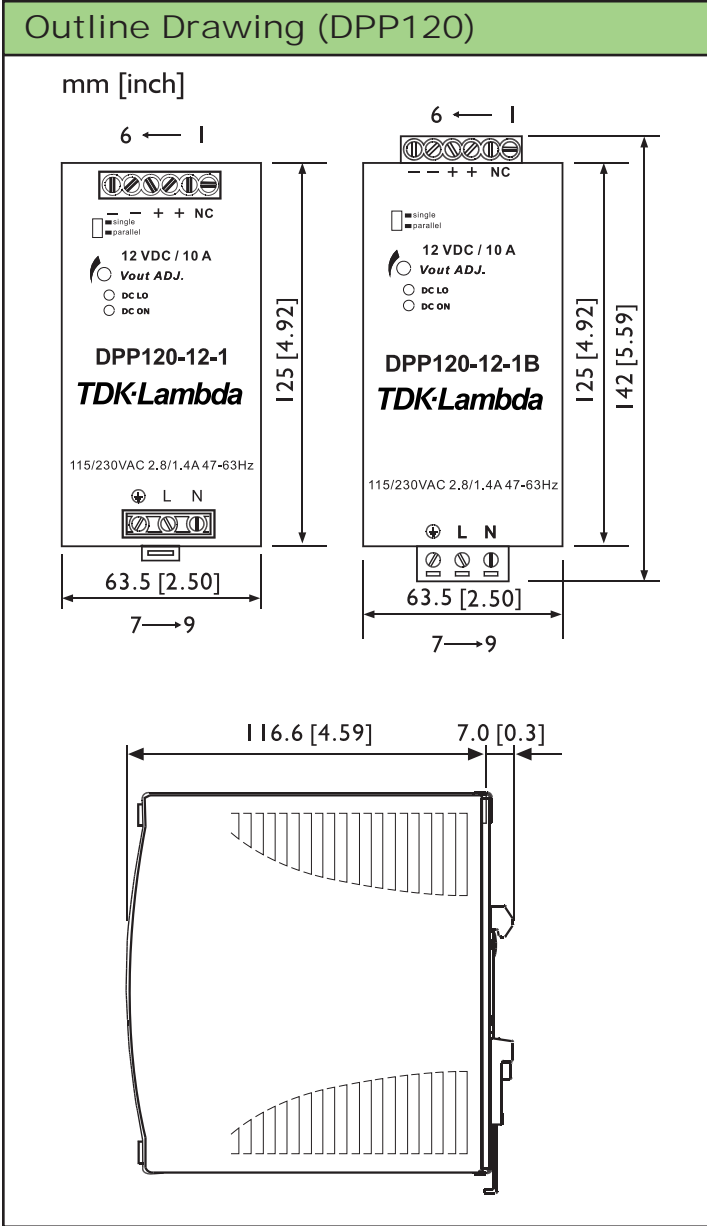
### Specifications

Model		DPP120-xx-1	DPP240-xx-1
AC Input Voltage range	VAC	93 - 132 / 186 - 264VAC, single phase. Auto select	
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage range	VDC	210 - 370VDC	
Inrush Current (115 / 230VAC)	A	24 / 48A	30 / 60A
Power Factor	-	Meets EN61000-3-2	
Input Current (115 / 230VAC)	A	2.8 / 1.4A	5.4 / 2.2A
Output Voltage Accuracy	%	-0, +1% of Nominal	
Line Regulation	%	±0.5%	
Load Regulation	%	±1% (±5% when set in parallel mode)	
Ripple and Noise (20MHz BW)	mV	50mV	100mV
Overcurrent Protection (Typ)	-	110 - 145%	
Overvoltage Protection	V	See model selector	
Overtemperature Protection	-	-	
Hold Up Time (230VAC input)	ms	> 30ms	
Parallel operation	-	Set in parallel (droop) mode - maximum of 3 units	
LED Indicators	-	Green LED = On, Red LED = DC Output Low	
DC Good Relay (24V model only)	-	0.3A rated normally open relay contacts, closes when output is above 17.6 - 19.4V	
Operating Temperature	°C	-40 <sup>(2)</sup> to +71°C (Derate linearly 2.5%/°C from 61 to 71°C)	
Storage Temperature	°C	-40 to +85°C	
Operating Humidity	-	20 - 95% RH (non condensing)	
Cooling (1)	-	Convection	
Withstand Voltage	-	Input to Output 3kVAC for 1 min.	
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC	
Vibration (Operating)	-	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)	
Shock (Operating)	-	IEC 60068-2-27 (Half sine wave, 4G, 22ms, 3 axes, 6 Faces, 3 times for each face)	
Safety Agency Approvals	-	UL508 Listed, UL60950-1, EN60950-1, CE	
Conducted & Radiated EMI	-	EN55022 class B	EN55022 class A
Weight (Typ)	g	920	1000
Size (WxHxD) (1)	in	2.5 x 4.92 x 4.59"	3.27 x 4.92 x 4.57"
Case material	-	Metal	
Warranty	yrs	Two years	

(1) Recommend 1" clearance on all sides

(2) DPP120 -35°C





### Model Selector

Model	Voltage	Adjust. Range	Output Curr.	Over-voltage	Eff.
DPP120-12-1	12V	11.4 - 14.5V	10A	15 - 17.4V	84%
DPP120-24-1	24V	22.5 - 28.5V	5A	30 - 34.8V	86%
DPP120-48-1	48V	45 - 55V	2.5A	60 - 69.6V	87%
DPP240-24-1	24V	22.5 - 28.5V	10A	30 - 34.8V	89%
DPP240-48-1	48V	47 - 56V	5A	60 - 69.6V	90%

### Terminal Assignments

#	Function
1	DC Good relay
2	DC Good relay
3	+V
4	+V
5	-V
6	-V
7	Chassis ground
8	L
9	N

### Other DIN Rail Products

DPP	15W to 100W
DPP480	480W single and three phase
DSP	10W to 100W low profile
DLP	75W to 240W single phase

**Snap-on Mounting:** snap onto DIN Rail TS35/7.5 or TS35/15. (no tools required)

### Options

Suffix	Description
Blank	Non detachable connectors
B	Detachable input and output connectors

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dpp-series.htm](http://us.tdk-lambda.com/lp/products/dpp-series.htm)



## 120W, 240W, 480W & 960W 3 Phase DIN Rail Mount Power Supplies

### Features

- ◆ Low Cost
- ◆ 12V, 24V or 48V Outputs
- ◆ Wide Range 340 to 575VAC Input
- ◆ Parallel Function Switch (240 & 480W)
- ◆ Current Share (960W)
- ◆ -40<sup>(3)</sup> to +71°C Operation



### Key Market Segments & Applications



Specifications			DPP120-xx-3	DPP240-xx-3	DPP480-xx-3	DPP960-xx-3
AC Input Voltage range (1)	VAC	340 - 575VAC, three phase				
Input Frequency	Hz	47 - 63Hz				
DC Input Voltage range	VDC	480 - 820VDC				
Inrush Current (380-480VAC)	A	10A	20A	20A	30A	
Power Factor (2)	-	0.55	0.55	0.65	0.8	
Input Current (400VAC) (typ)	A	0.36A	0.65A	1.1A	1.72A	
Output Voltage Accuracy	%	-0, +1% of Nominal				
Line Regulation	%	±1%				
Load Regulation	%	±1% (±5% when set in parallel mode)				
Ripple and Noise (20MHz BW)	mV	100mV	100mV	100mV	80mV	
Overcurrent Protection (Typ)	-	115 - 135%	120 - 140%	110 - 135%	110 - 130%	
Overvoltage Protection	V	See model selector				
Overtemperature Protection	-	Yes, auto recovery				
Hold Up Time (380-480VAC)	ms	> 20ms	> 20ms	> 20ms	> 15ms	
Parallel operation (up to 90% load)	-	Set in parallel (droop) mode - up to 2 units				
LED Indicators	-	Green LED = On, Red LED = DC Output Low				
DC Good Relay (24V models only)	-	0.3A rated normally open relay contacts, closes when output is above 17.6 - 19.4V				
Operating Temperature	-	-40 <sup>(3)</sup> to +71°C (Derate linearly 2.5%/°C from 61 to 71°C, 3.5%/°C for DPP960) <sup>(3)</sup>				
Storage Temperature	-	-40 to +85°C				
Operating Humidity (non condensing)	-	20 - 95% RH				
Cooling	-	Convection. Recommend 1" clearance on all sides				
Withstand Voltage	-	Input to Output 3kVAC, Input to Ground 1.5kVAC for 1 min.				
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC				
Vibration	-	IEC 60068-2-6. 10- 500Hz, 2G on X, Y & Z axes				
Shock	-	IEC 60068-2-27. Half sinewave, 4G, 22ms, 3 times each face				
Vibration (Operating)	-	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)				
Shock (Operating)	-	IEC 60068-2-27 (Half sine wave, 4G, 22ms, 3 axes, 6 Faces, 3 times for each face)				
Safety Agency Approvals	-	UL508 Listed, UL60950-1, EN60950-1, CE				
Conducted & Radiated EMI	-	EN55022 class B				
Immunity	-	IEC 61000-4-2, -3, 4, -5, -6. -8, -11				
Weight (Typ)	g	800g	1100g	1720g	3400g	
Size (WxHxD)	in	2.92 x 4.88 x 4.68"	3.5 x 4.88 x 4.68"	5.91 x 4.88 x 4.68"	10.86 x 4.97 x 4.68"	
Switching Frequency	kHz	70kHz	25kHz	80kHz	52kHz	
MTBF (Bellcore Issue 6 @40°C, GB)	Hours	527,000	488,000	411,000	352,000	
Case material	-	Metal				
Warranty	yrs	Two years				

(1) Bi-phase input is permissible, but output load must be derated to 75% load

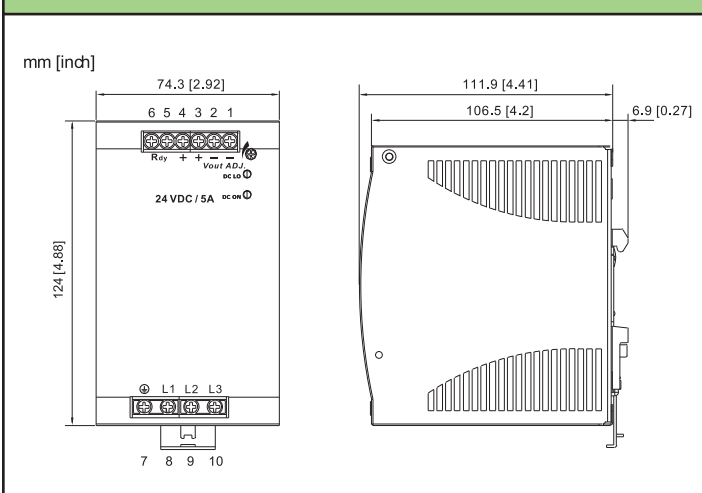
(2) Passive, meets EN61000-3-2

(3) DPP480 -30°C

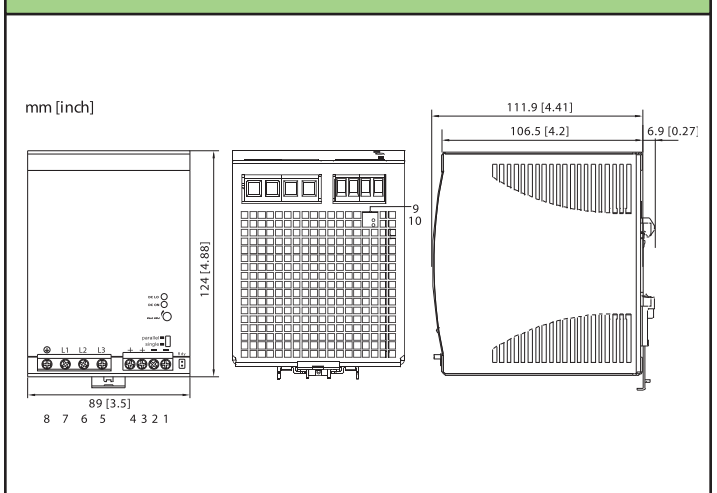
## Model Selector

Model	Voltage (V)	Adjust Range (V)	Output Current (A)	Overvoltage (V)	Efficiency (%)
DPP120-12-3	12V	11.4 - 14.5V	10A	14.5 - 17.4V	87%
DPP120-24-3	24V	22.5 - 28.5V	5A	30 - 33V	89%
DPP240-24-3	24V	22.5 - 28.5V	10A	30 - 33V	90%
DPP480-24-3	24V	22.5 - 28.5V	20A	30 - 33V	90%
DPP960-24-3	24V	22.5 - 28.5V	40A	30 - 33V	92%
DPP240-48-3	48V	47 - 56V	5A	60 - 68V	91%
DPP480-48-3	48V	47 - 56V	10A	60 - 68V	91%
DPP960-48-3	48V	47 - 56V	20A	60 - 68V	93%

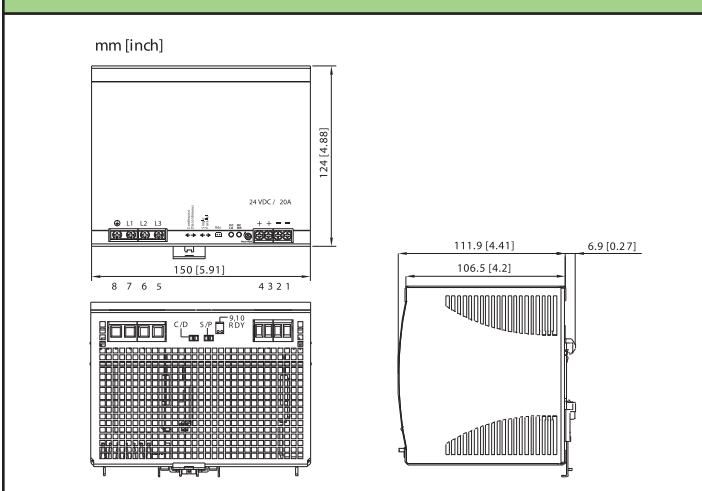
## DPP120 Outline



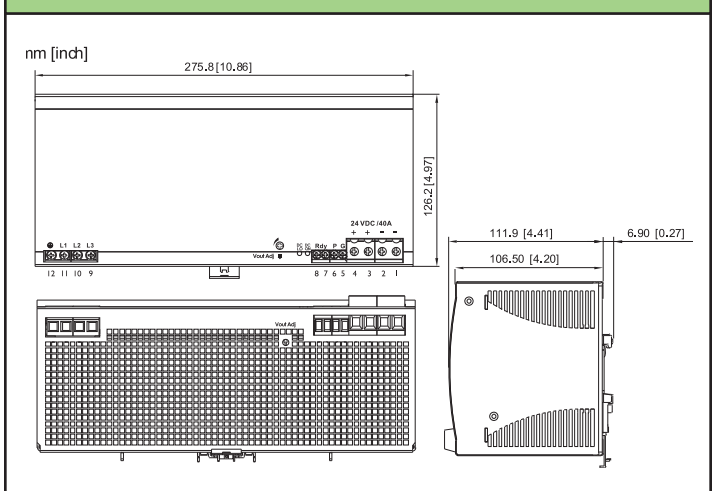
## DPP240 Outline



## DPP480 Outline



## DPP960 Outline



## Other DIN Rail Products

DPP	15W to 480W
DSP	10W to 100W low profile
DLP	75W to 240W single phase

Snap-on Mounting: snap onto DIN Rail TS35/7.5 or TS35/15. (no tools required)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dpp-series.htm](http://us.tdk-lambda.com/lp/products/dpp-series.htm)



## 480W Single Output DIN Rail Mount Power Supplies

### Features

- ◆ Low Cost
- ◆ 24V or 48V Outputs
- ◆ Wide Range AC Input
- ◆ Active PFC
- ◆ Parallel Function Switch
- ◆ -40 to +71°C Operation
- ◆ Convection Cooled



### Key Market Segments & Applications



Industrial



RoHS

Specifications		
Model	DPP480-xx-1	
AC Input Voltage range	VAC	90 - 264VAC, single phase
Input Frequency	Hz	47 - 63Hz
DC Input Voltage range	VDC	120 - 370VDC
Inrush Current	A	25 / 50A (115 / 230VAC)
Power Factor	-	Meets EN61000-3-2 Class A
Input Current	A	6.9 / 3.3A (115 / 230VAC)
Output Voltage Accuracy	%	-0, +1% of Nominal
Line Regulation	%	±0.5%
Load Regulation	%	±1% (±5% when set in parallel mode)
Ripple and Noise (20MHz BW)	mV	100mV
Overcurrent Protection (Typ)	-	110 - 140%
Overvoltage Protection	V	See model selector
Overtemperature Protection	-	-
Hold Up Time (115VAC input)	ms	> 35ms
Parallel operation	-	Set in parallel (droop) mode - maximum of 3
LED Indicators	-	Green LED = On, Red LED = DC Output Low
DC Good Relay (24V model only)	-	0.3A rated normally open relay contacts, closes when output is above 17.6 - 19.4V
Operating Temperature	°C	-40 to +71°C (Derate linearly 2.5%/°C from 56 to 71°C)
Storage Temperature	°C	-40 to +85°C
Operating Humidity	-	20 - 95% RH (non condensing)
Cooling (1)	-	Convection
Withstand Voltage	-	Input to Output 3kVAC for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Operating)	-	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)
Shock (Operating)	-	IEC 60068-2-27 (Half sine wave, 4G, 22ms, 3 axes, 6 Faces, 3 times for each face)
Safety Agency Approvals	-	UL508 Listed, UL60950-1, EN60950-1, CE
Conducted & Radiated EMI	-	EN55022 class B
Immunity	-	IEC 61000-4-2, -3, 4, -5, -6, -8, -11
Weight (Typ)	g	1800g
Size (WxHxD)	in	6.89 x 4.92 x 4.57
Case material	-	Metal
Warranty	yrs	Two years

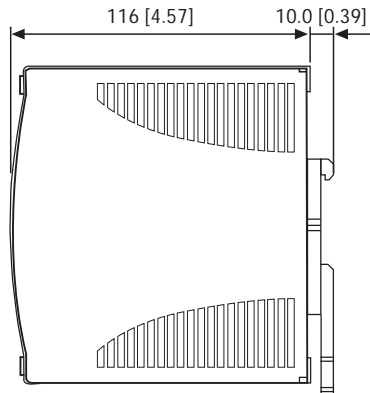
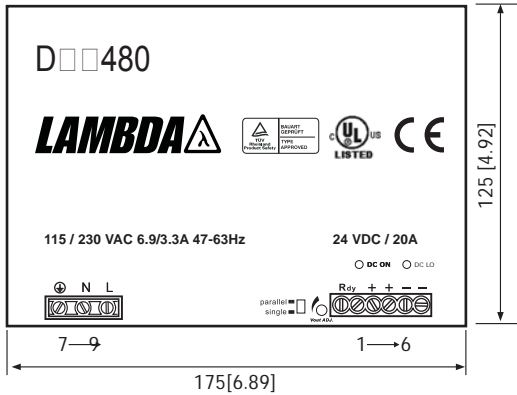
(1) Recommend 1" clearance on all sides

## Model Selector

Model	Voltage	Adjust. Range	Output Curr.	Over-voltage	Eff.
DPP480-24-1	24V	22.5 - 28.5V	20A	30 - 33V	89%
DPP480-48-1	48V	47 - 56V	10A	57 - 63V	90%

## Outline Drawing (DPP480-24-1)

mm [inch]



Accepts TS35/7.5 or TS35/15 DIN Rails

## Terminal Assignments

#	DPP480-xx-1
1	DC Good relay
2	DC Good relay
3	+V
4	+V
5	-V
6	-V
7	Chassis ground
8	N
9	L
10	No connection

**Snap-on Mounting:** snap onto DIN Rail TS35/7.5 or TS35/15. (no tools required)

## Options

Suffix	Description
Blank	Non detachable connectors
B	Detachable input and output connectors

## Other Industrial Products

DPP/DSP	10W to 960W, 5V to 48V power supplies
DLP	75W to 240W power supplies
DLP-PU	Redundancy Module (20A)
R Series	6A to 1000A single & three phase EMI Filters

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/dpp-series.htm](http://us.tdk-lambda.com/lp/products/dpp-series.htm)



## 15-100W, 5-48V Output DIN Rail Mount Power Supplies

### Features

- ◆ Compact Size
- ◆ High Efficiency (Up to 91%)
- ◆ ErP Compliant Design
- ◆ Low No Load Power Draw



### Key Market Segments & Applications



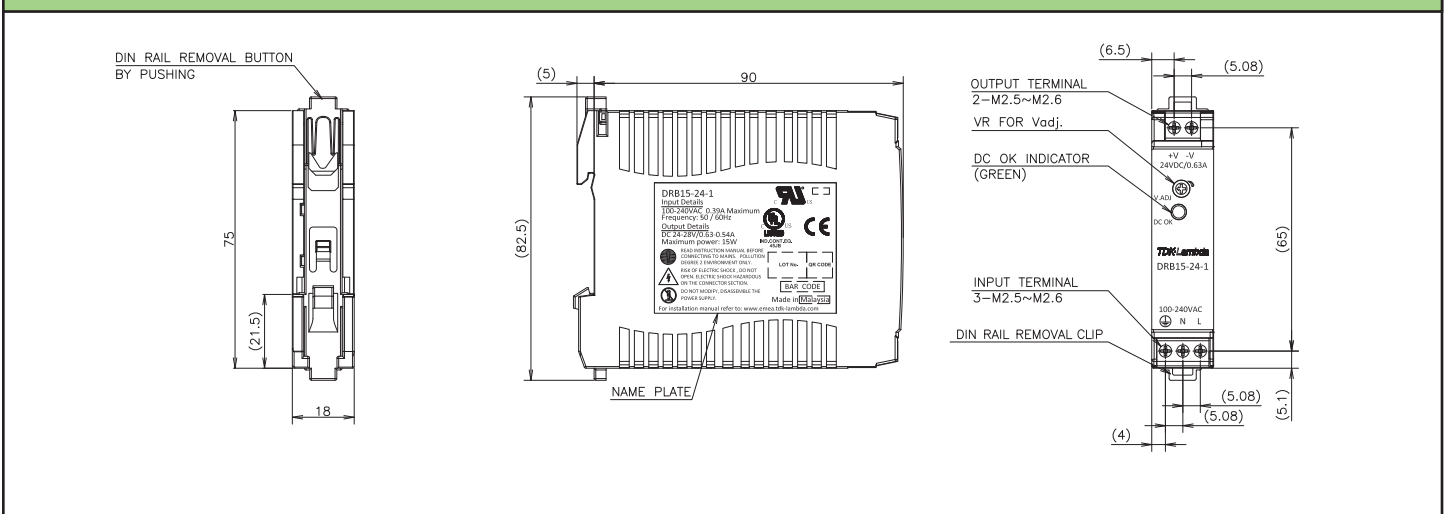
Specifications		DRB15	DRB30	DRB50	DRB100
AC Input Voltage range	VAC	85 - 264VAC (Withstands 300VAC for 5 seconds)			
Input Frequency	Hz	47 - 63Hz			
Inrush Current (typ) (Cold Start)	A	35A	40A	50A	40A
Power Factor (110/230VAC) Meets EN61000-3-2	-	0.55 / 0.42	0.56 / 0.46	0.6 / 0.5	0.98 / 0.93
Input Current (110/230VAC)	A	0.27 / 0.17	0.55 / 0.33	0.9 / 0.55	1.2 / 0.6
Line & Load Regulation	-	See model selector			
Ripple & Noise	-	See model selector			
Overcurrent Protection	-	Hiccup with auto recovery			
Overvoltage Protection	-	See model selector. Cycle AC input voltage to reset			
Hold Up Time (230VAC input)	ms	> 20ms			
Efficiency	-	See model selector			
No Load Power Draw	W	<0.3W	<0.3W	<0.3W	<0.5W
LED Indicator	-	Green LED indicates DC is OK			
Operating Temperature (1)	°C	-20 to +70°C. (DRB30-100, derate linearly to 50% load above 55°C)			
Storage Temperature	-	-40 to +85°C			
Operating Humidity (non condensing)	%RH	5 - 95%RH			
Parallel Operation	-	Not available			
Series Operation	-	Possible			
Cooling	-	Convection			
Withstand Voltage (For 1 minute)	VAC	Input to Output 3kVAC, Input to GND 1.5kVAC, Output to GND 500VAC			
Isolation Resistance	MΩ	>100MΩ at 25°C, 70%RH & 500VDC			
Vibration (Non operating)	-	10-55Hz (sweep for 1 min); 19.6m/s <sup>2</sup> (2G) Constant; X,Y,Z each 1 hour			
Shock	-	294m/s (30G) 11ms half sine			
Safety Agency Certifications	-	UL508 Listed, UL60950-1, CSA22.2 No60950-1, EN60950-1, CE Mark			
Conducted & Radiated EMI	-	EN55022-B Radiated & Conducted			
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11			
Weight (Typ)	g	85	95	175	300
Size (WxHxD)	in	0.71 x 2.95 x 3.54	0.83 x 2.95 x 3.54	1.18 x 2.95 x 3.54	1.77 x 2.95 x 3.94
	mm	18 x 75 x 90	21 x 75 x 90	30 x 75 x 90	45 x 75 x 100
Case material	-	Flame Retardant Polycarbonate (UL94 V-0)			
Warranty	yrs	Three years			

(1) For operation below -10°C, start up load is derated linearly to 50% load down to -20°C

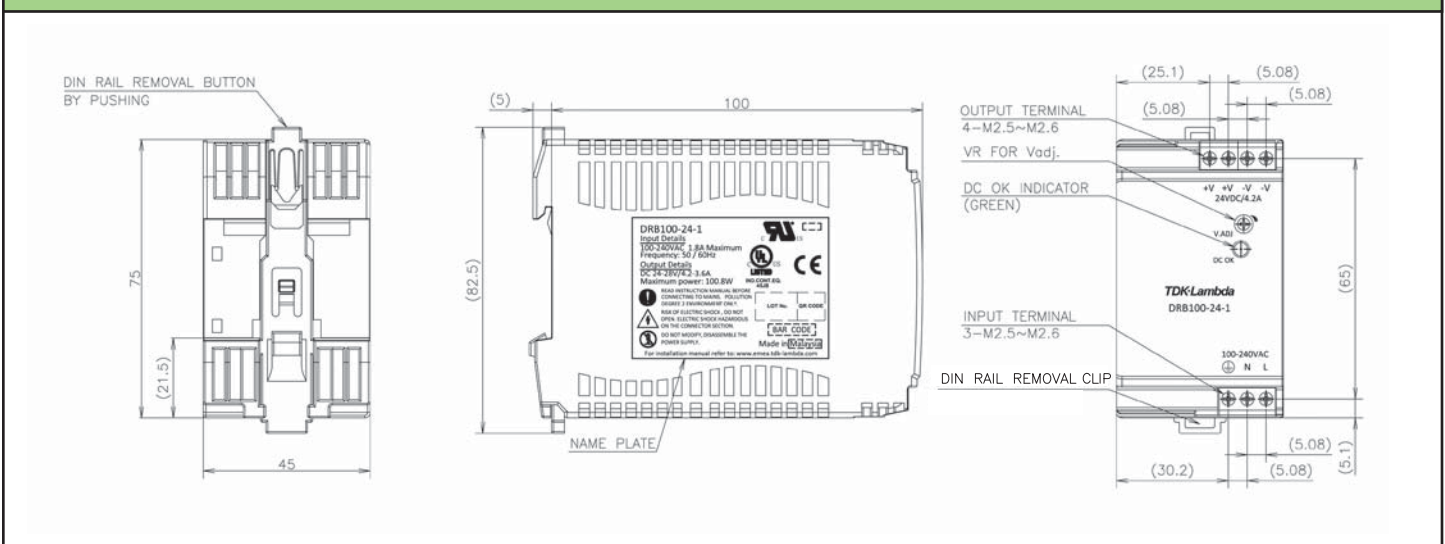
## Model Selector

Model	Output Voltage	Adjust Range	Max Current	Max Power	Load Reg	Line Reg	Ripple & Noise	Overvoltage Protection	Efficiency (%) (115/230VAC)
DRB50-5-1	5V	5 - 5.5V	6.0A	30W	50mV	50mV	30mV	5.75 - 6.75V	79 / 80
DRB30-12-1	12V	12 - 15V	2.5A	30W	150mV	150mV	40mV	15.96 - 18.72V	86 / 88
DRB50-12-1	12V	12 - 15V	4.2A	50.4W	150mV	150mV	20mV	15.96 - 18.72V	88 / 90
DRB15-24-1	24V	24 - 28V	0.63A	15.1W	240mV	240mV	20mV	30 - 33.6V	87 / 90
DRB30-24-1	24V	24 - 28V	1.25A	30W	240mV	240mV	30mV	30 - 33.6V	88 / 90
DRB50-24-1	24V	24 - 28V	2.1A	50.4W	240mV	240mV	30mV	30 - 33.6V	88 / 90
DRB100-24-1	24V	24 - 28V	4.2A	100.8W	240mV	240mV	30mV	30 - 33.6V	90 / 91
DRB50-48-1	48V	48 - 52.8V	1.05A	50.4W	480mV	480mV	40mV	53.76 - 68.16V	90 / 91

## Outline DRB15



## Outline DRB100



For Additional Information, please visit [us.tdk-lambda.com/lp/products/drbs-series.htm](http://us.tdk-lambda.com/lp/products/drbs-series.htm)



## 120-480W, 24V Output DIN Rail Mount Power Supplies

### Features

- ◆ Very Compact Size
- ◆ High Efficiency (Up to 94%)
- ◆ 150% Peak Power Capability
- ◆ ErP Compliant Design
- ◆ Low Standby Power Draw
- ◆ Remote On/Off
- ◆ Remote Voltage Adjustment



### Key Market Segments & Applications



Specifications		DRF120	DRF240	DRF480
AC Input Voltage range	VAC	85 - 264VAC		
Input Frequency	Hz	47 - 63Hz		
Inrush Current (typ) (Cold Start)	A	20	20	40
Power Factor (115/230VAC) (Meets EN61000-3-2)	-	0.98 / 0.95	0.98 / 0.95	0.98 / 0.92
Input Current (115/230VAC)	A	1.2 / 0.6	2.4 / 1.2	4.7 / 2.5
Line Regulation	mV	<96mV		
Load Regulation	mV	<240mV		
Ripple & Noise (1)	mV	<240mV		
Overcurrent Protection	-	>101% of peak current rating. Shutdown after 4 seconds		
Overvoltage Protection	-	30 - 35.5V. Cycle input voltage or remote on/off to reset		
Hold Up Time (230VAC input)	ms	> 20ms		
Efficiency (115 / 230VAC)	%	89 / 91	92.5 / 94	92.5 / 94
Standby Power Draw	W	<0.5W	<0.5W	<0.75W
LED Indicators	-	Green LED = DC is OK (>80% Nom). Red LED = Peak Load Operation		
DC OK relay	-	Relay contact 30V/1A		
Remote On / Off	-	When signal is low, the output is On		
Remote Voltage Adjust	-	See Installation Manual		
Operating Temperature	°C	-25 to +70°C. (Derate linearly to 75% load above 60°C)		
Storage Temperature	°C	-40 to +85°C		
Operating Humidity (non condensing)	%RH	5 - 95%RH		
Parallel Operation	-	Droop Mode - Refer to Installation Manual		
Series Operation	-	Possible		
Cooling	-	Convection		
Withstand Voltage (For 1 minute)	VAC	Input to Output 3kVAC, Input to GND 1.5kVAC, Output to GND 500VAC		
Isolation Resistance	MΩ	>100MΩ at 25°C, 70%RH & 500VDC		
Vibration (Non operating)	-	10-55Hz (sweep for 1 min); 19.6m/s <sup>2</sup> (2G) Constant; X,Y,Z each 1 hour		
Shock	-	<196m/s <sup>2</sup>		
Safety Agency Certifications (2)	-	UL508 Listed, IEC/UL/EN60950-1, ATEX, IEC Ex, GL, CE Mark		
Conducted & Radiated EMI	-	EN55022-B Radiated & Conducted		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11		
Weight (Typ)	g	600	900	1300
Size (WxHxD)	in	1.44 x 4.86 x 4.53	1.93 x 4.86 x 4.53	3.23 x 4.86 x 4.53
	mm	36.5 x 123.4 x 115	49 x 123.4 x 115	82 x 123.4 x 115
Case material	-	Metal		
Warranty	yrs	Five years		

(1) See installation manual

(2) See options table

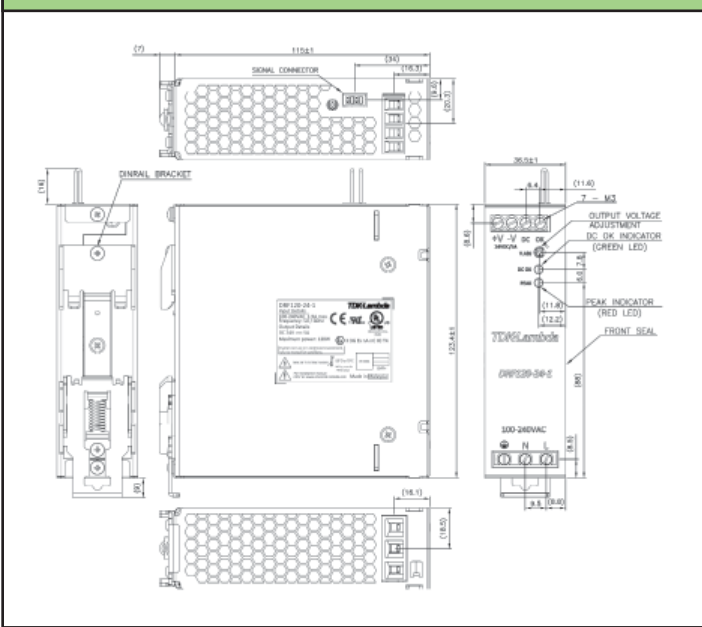
(3) Operating period at peak output current is 4 sec, max duty cycle <35% & < rated output power



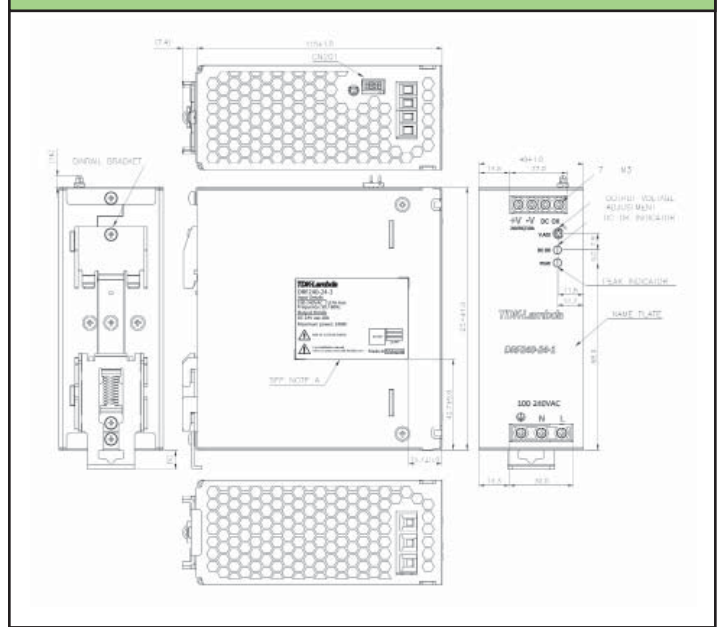
## Model Selector

Model	Output Voltage	Adjust Range	Max Current	Max Power	Peak Output Current (3)	Peak Output Power (3)
DRF120-24-1	24V	24 - 28V	5A	120W	7.5A	180W
DRF240-24-1	24V	24 - 28V	10A	240W	15A	360W
DRF480-24-1	24V	24 - 28V	20A	480W	30A	720W

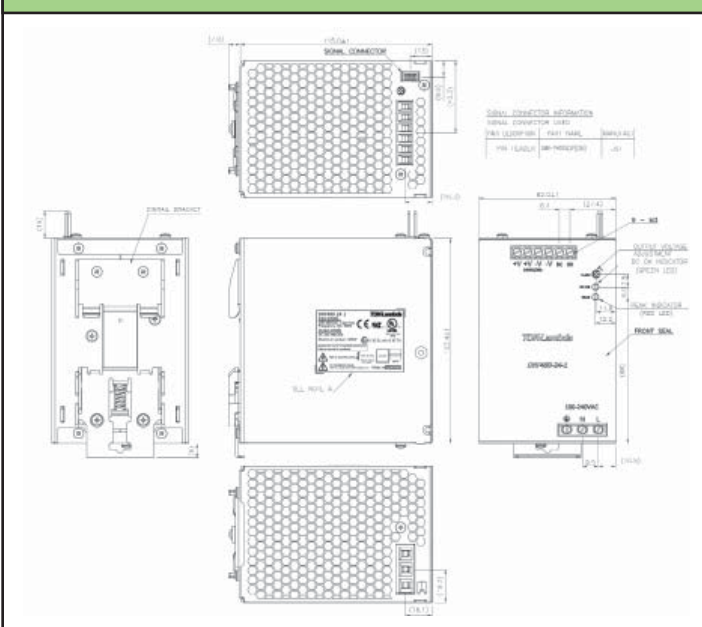
## Outline DRF120-24-1



## Outline DRF240-24-1



## Outline DRF480-24-1



## Options

Suffix	Description
/HL	ATEX, IEC EX, GL Certification (Incl pcb coating)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dr-f-series.htm](http://us.tdk-lambda.com/lp/products/dr-f-series.htm)



## 7.5W to 100W Low Profile DIN Rail Mount Power Supplies

### Features

- ◆ Low Profile for Building Automation
- ◆ 5V to 24V Outputs
- ◆ Wide Range AC Input
- ◆ UL1310 Class 2<sup>(1)</sup>
- ◆ Class II Double Insulation
- ◆ -25 to +71°C Operation



### Key Market Segments & Applications



Industrial



RoHS

### Specifications

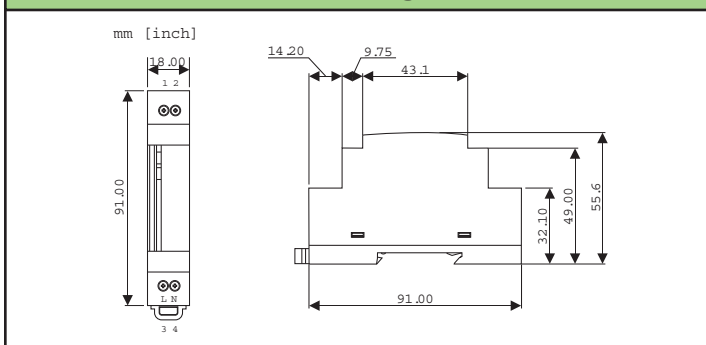
Model		DSP10	DSP30	DSP60	DSP100
AC Input Voltage range	VAC	90 - 264VAC, Class II double insulated (No ground connection required)			
Input Frequency	Hz	47 - 63Hz			
DC Input Voltage range	VDC	120 - 370VDC			
Inrush Current (115 / 230VAC)	A	15 / 30A	25 / 50A	30 / 60A	30 / 60A
Power Factor & Flicker	-	Meets EN61000-3-2, EN61000-3-3			
Output Voltage Accuracy	%	±1% of Nominal			
Line Regulation	%	1%			
Load Regulation	%	1%			
Ripple and Noise (20MHz BW)	mV	50mV			
Overcurrent Protection (Typ)	-	110 - 160%, fold forward under short circuit (DSP100-24/C2 102-108%)			
Overvoltage Protection	V	120 - 145%			
Hold Up Time (115VAC input)	ms	See Model Selector			
LED Indicators	-	Green LED = On, Red LED = DC Output Low			
Operating Temperature	°C	-25 to +71°C (Derate linearly 2.5%/°C from 55 to 71°C)			
Temperature Coefficient	%/°C	±0.02%/°C			
Storage Temperature	°C	-25 to +85°C			
Operating Humidity	-	20 - 95% RH (non condensing)			
Cooling	-	Convection			
Withstand Voltage	-	Input to Output 3kVAC for 1 min.			
Isolation Resistance	-	>100M at 25°C & 70%RH, Input to Output 500VDC			
Vibration (Operating)	-	IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X, Y, Z axes 10 min/cycle, 60 min)			
Shock (Operating)	-	IEC 60068-2-27 (Half sine wave, 4G, 22ms, 3 axes, 6 Faces, 3 times for each face)			
Safety Agency Approvals	-	UL1310 Class 2 <sup>(1)</sup> , UL508 Listed, UL60950-1, EN60950-1, CE			
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8 & -11			
Conducted & Radiated EMI	-	DSP10: EN55022 Class B; DSP30-100: EN55022 Class A			
Weight (Typ)	g	60	200	250	320
Size (WxHxD)	in	0.71 x 3.58 x 2.19"	2.09 x 3.58 x 2.19"	2.8 x 3.58 x 2.19"	3.54 x 3.58 x 2.24"
Case material	-	Plastic			
Warranty	yrs	Three years			

(1) See model selector on page 2.

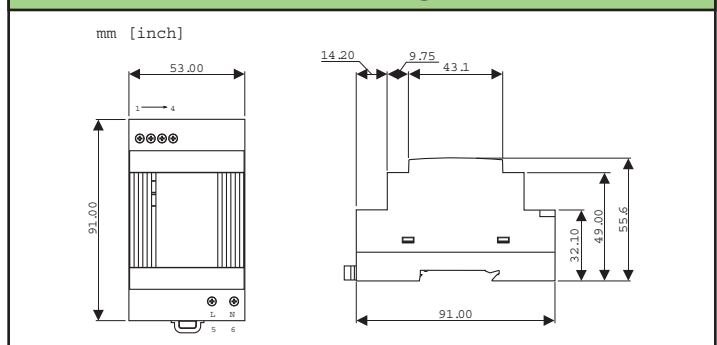
## Model Selector

Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Efficiency (Typ %)	Hold Up Time 115VAC in (ms)	UL1310 Class 2
DSP10-5	5	None	1.50	7.5	74	10	Yes
DSP30-5	5	5 - 5.5	3.00	15.0	74	25	Yes
DSP60-5	5	5 - 5.5	7.00	35.0	80	16	-
DSP10-12	12	None	0.83	10.0	78	10	Yes
DSP30-12	12	12 - 14	2.10	25.2	82	25	Yes
DSP60-12	12	12 - 14	4.50	54.0	84	16	Yes
DSP100-12	12	12 - 14	6.00	72.0	82	16	-
DSP10-15	15	None	0.67	10.1	78	60	Yes
DSP30-15	15	13.5 - 16.5	2.00	30.0	83	25	Yes
DSP60-15	15	13.5 - 16.5	4.00	60.0	85	12	Yes
DSP100-15	15	13.5 - 16.5	5.00	75.0	85	16	-
DSP10-24	24	None	0.42	10.1	80	60	Yes
DSP30-24	24	24 - 28	1.30	31.2	83	25	Yes
DSP60-24	24	24 - 28	2.50	60.0	86	12	Yes
DSP100-24/C2	24	20 - 24.2	3.80	91.2	89	10	Yes
DSP100-24	24	24 - 28	4.20	100.8	85	10	-

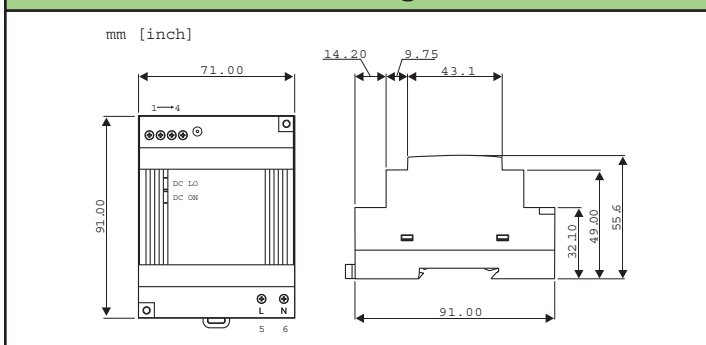
### DSP10 Outline Drawing



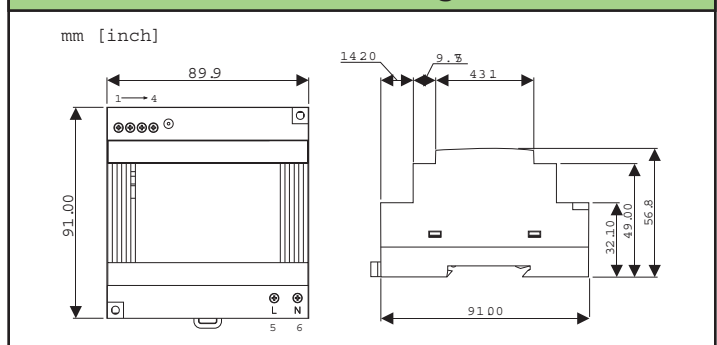
### DSP30 Outline Drawing



### DSP60 Outline Drawing



### DSP100 Outline Drawing



### Other DIN Rail Products

DSP/DPP	10W to 480W, 5V to 48V power supplies
DLP	75W to 240W power supplies
DLP-PU	Redundancy Module (20A)
R Series	3A to 30A single & three phase EMI Filters

**Snap-on Mounting:** snap onto DIN Rail TS35/7.5 or TS35/15.  
(no tools required)

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/dsp-series.htm](http://us.tdk-lambda.com/lp/products/dsp-series.htm)



## 62W to 80W AC-DC External Power Supplies

### Features

- ◆ CEC, EISA<sup>(1)</sup> & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Power Factor Correction (DT80)
- ◆ Low Profile & Lightweight
- ◆ 85% Efficient



### Key Market Segments & Applications



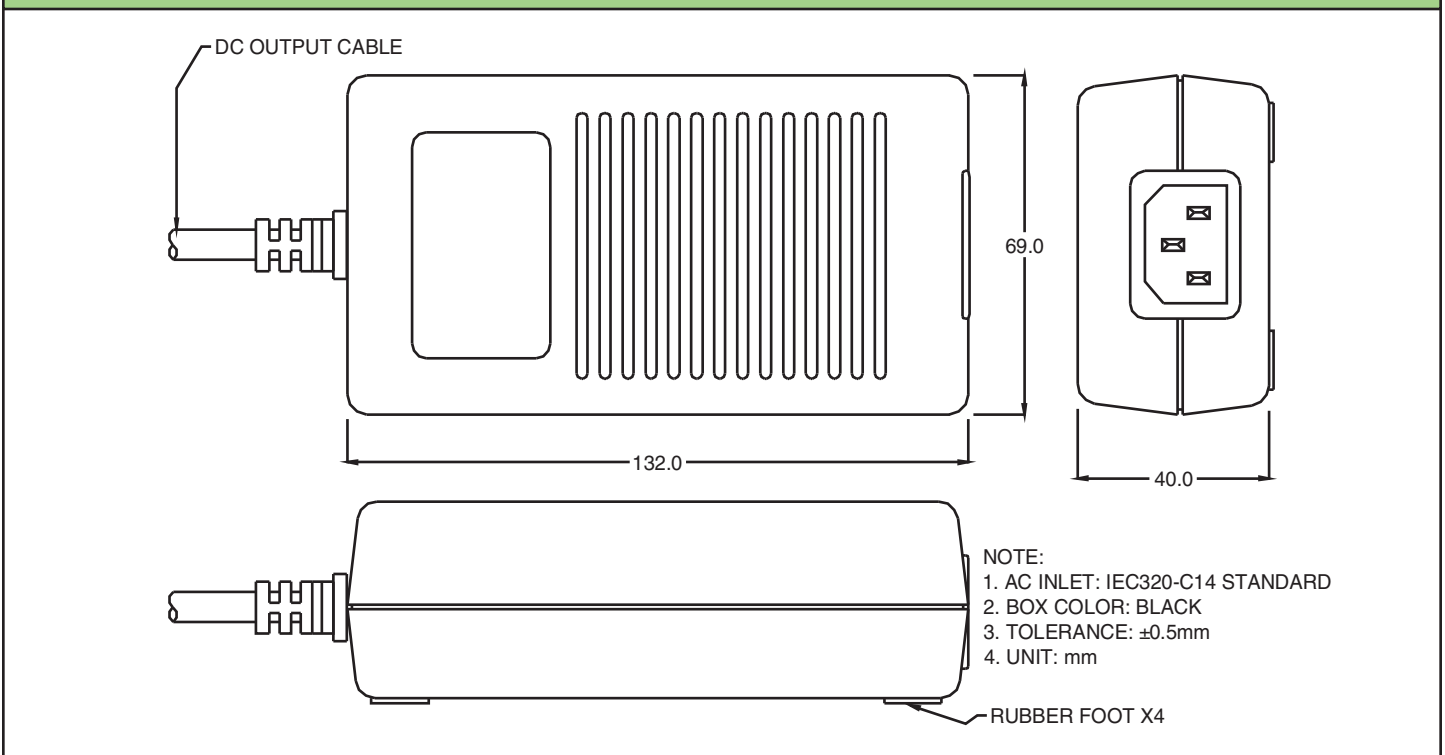
Specifications			
Model		DT62PWxxx-C	DT80PWxxx-C
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)	
Inrush Current	A	<50A at 230VAC input, 25°C ambient cold start	
Input Current (Maximum)	A	2.5A	
Power Factor	-	None	Typically 0.9 at full load(Meets EN61000-3-2)
Leakage Current (typ, 264VAC 63Hz)	mA	0.7mA	
Hold Up Time (Typ)	ms	16ms at 115VAC input	
Temperature Coefficient	°C	±0.05%/°C	
Voltage Accuracy	%	±1%	
Adjustment Range	-	None	
Minimum Load	-	None	
Total Regulation	-	±5%	
Ripple & Noise	%	1%	
Short Circuit Protection	-	Continuous - hiccup mode (110-160%)	
Overvoltage Protection	V	110 - 130% of nominal (Cycle input power to reset)	
Efficiency	%	>85% typical	
Operating Temperature	°C	0 to +40°C Full load, derate linearly to 50% load at 60°C	
Storage Temperature	°C	-10 to +70°C	
Humidity (non condensing)	-	10 - 90% RH	
Cooling	-	Convection	
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC (Output is connected to Ground)	
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)	
Shock	-	< 196.1 m/s <sup>2</sup> (20G)	
Safety Agency Approvals	-	UL60950-1, EN609501-1, IEC60950-1	
California Energy Commission (CEC)	-	See model selector	
EISA (1)	-	See model selector	
Offload Power Consumption	W	< 0.5W	
Conducted & Radiated EMI	-	EN55022-B, FCC Class B	
Immunity	-	EN55024	
Weight (Typ)	g	410g	
Size (WxLxH)	in	2.71 x 5.2 x 1.57	
Cable Length and Thickness	mm	1050mm	
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)	
Output Connector	-	Kycon KPPx-4P or equivalent. Pins 1 & 2: -Vout, Pins 3 & 4: +Vout	
MTBF (MIL-HNBK), 100% load, 25C	hours	223,933 Hours	203,109 Hours
Warranty	yrs	One Year	

(1) EISA - Energy Independence and Security Act of 2007.

## Output Ratings

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	CEC		EISA Level IV	EISA Level V
				IV	V		
DT62PW090C	9	5.56	50	-	-	-	-
DT62PW120C	12	5.17	62	Y	-	Y	-
DT62PW150C	15	4.14	62	-	Y	-	Y
DT62PW180C	18	3.54	64	-	Y	-	Y
DT62PW240C	24	2.59	62	-	Y	-	Y
DT80PW090C	9	8.00	72	-	-	-	-
DT80PW120C	12	6.67	80	Y	-	Y	-
DT80PW150C	15	5.33	80	Y	-	Y	-
DT80PW180C	18	4.45	80	-	Y	-	Y
DT80PW240C	24	3.34	80	-	Y	-	Y

## Outline Drawing



## Other AC-DC Products

DTM65-C	65W CEC Compliant Medical Adapters
DT100/150-C	100W to 150W CEC Compliant Adapters
DTM110-C	110W CEC Compliant Medical Adapters

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/dt-c-series.htm](http://us.tdk-lambda.com/lp/products/dt-c-series.htm)



## 100W to 150W AC-DC External Power Supplies

### Features

- ◆ CEC, EISA<sup>1</sup> & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Power Factor Correction
- ◆ Low Profile & Lightweight
- ◆ 87% Avg. Active Efficiency



### Key Market Segments & Applications



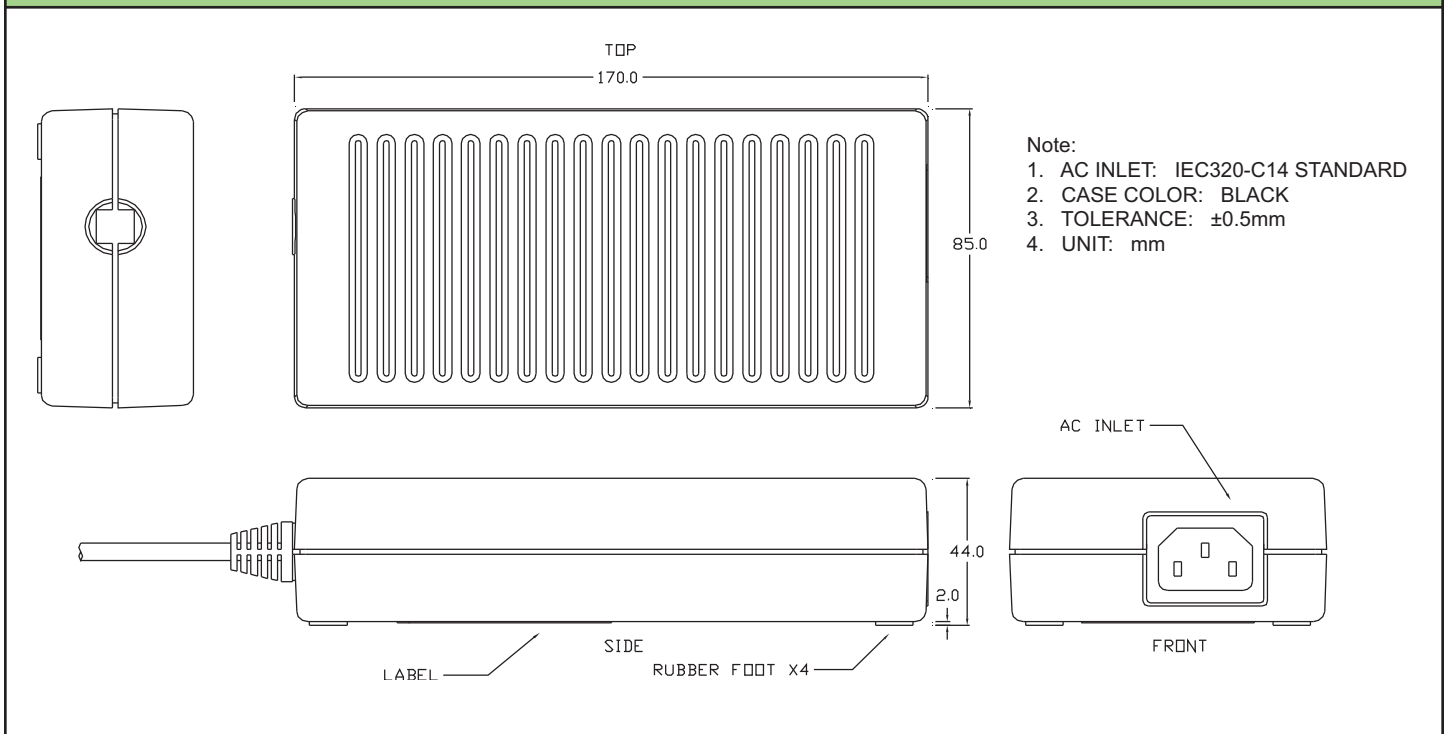
Specifications				
Model	DT100PWxxx-C		DT150PWxxx-C	
Input Voltage range	-	90 - 264VAC (47 - 63Hz)		
Inrush Current	A	<60A at 230VAC input, 25°C ambient cold start		
Input Current (Maximum)	A	2.5A		
Power Factor	-	Typically 0.9 at full load (Meets EN61000-3-2)		
Leakage Current	µA	<600µA at 264VAC 60Hz		
Hold Up Time (Typ)	ms	16ms at 115VAC input		
Temperature Coefficient	-	±0.05%/°C		
Voltage Accuracy	%	±1%		
Adjustment Range	-	None		
Minimum Load	A	None		
Total Regulation	-	+5% / -2%		
Ripple & Noise	%	See model selector		
Short Circuit Protection	-	Continuous - hiccup mode		
Overvoltage Protection	V	110 - 130% of nominal (Cycle input power to reset)		
Efficiency	%	≥87% Avg. Active Efficiency		
Operating Temperature	°C	0 to +40°C		
Storage Temperature	°C	-10 to +70°C		
Humidity (non condensing)	-	20 - 90% RH		
Cooling	-	Convection		
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC for 1 min. (Output is connected to Ground internally)		
Isolation Resistance	-	>20M at 25°C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)		
Shock	-	< 196.1 m/s <sup>2</sup> (20G)		
Safety Agency Approvals	-	UL60950-1, EN609501-1, IEC60950-1		
California Energy Commission (CEC)	-	Efficiency Mark V		
EISA	-	Efficiency Mark V		
Offload Power Consumption	-	< 0.5W		
Conducted & Radiated EMI	-	EN55022-B, FCC Class B		
Immunity	-	EN55024		
Weight (Typ)	g	730g		780g
Size (WxLxH)	in	3.35 x 6.7 x 1.73"		
Cable Length & Thickness	mm	1050mm; 12 to 24V Models: #14 AWG, 36 to 48V Models: #16 AWG		
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)		
Output Connector	-	Kycon KPPx-4P or equivalent Pins 1 & 2: -Vout, Pins 3 & 4: +Vout		
MTBF	-	140,000 hours, 100% load, 25°C ambient, MIL-HNBK		
Warranty	yr	One Year		

(1) EISA - Energy Independence and Security Act of 2007

## Output Ratings

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	Ripple & Noise (mV)	CEC V	EISA Efficiency Level V
DT100PW120C	12	8.34	100	240	Y	Y
DT100PW160C	16	6.25	100	320	Y	Y
DT100PW190C	19	5.27	100	380	Y	Y
DT100PW240C	24	4.17	100	480	Y	Y
DT100PW360C	36	2.78	100	480	Y	Y
DT100PW480C	48	2.09	100	480	Y	Y
DT150PW120C	12	11.67	140	240	Y	Y
DT150PW160C	16	9.38	150	320	Y	Y
DT150PW190C	19	7.90	150	380	Y	Y
DT150PW240C	24	6.25	150	480	Y	Y
DT150PW360C	36	4.17	150	480	Y	Y
DT150PW480C	48	3.13	150	480	Y	Y

## Outline Drawing



## Other AC-DC Products

DT62-C	62W CEC Compliant Adapters
DTM65-C	65W CEC Compliant Medical Adapters
DT80-C	80W CEC Compliant Adapters
DTM110-C	110W CEC Compliant Medical Adapters

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dt-series.htm](http://us.tdk-lambda.com/lp/products/dt-series.htm)



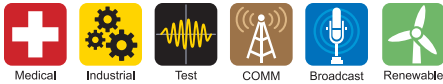
## 300W / 400W, 3 x 5" / 3 x 6" Power Supplies

### Features

- ◆ High Efficiency
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ High peak loading capability
- ◆ Suitable for 1U applications
- ◆ Full Digital Control
- ◆ Low Profile



### Key Market Segments & Applications



Specifications				
Model	EFE300		EFE400	
Input Voltage range	-	90 - 264VAC, 120 - 350VDC		
Input Frequency	-	47 - 63Hz, 440Hz with reduced PFC		
Inrush Current (3)	A	<20A	<30A	
Power Factor Harmonics	-	EN61000-3-2 Compliant (0.97 typical)		
Voltage Setting Range	-	-5% to +10% (Chosen at time of ordering)		
Voltage Setting Accuracy	-	±1% at 50% load		
Total Regulation	-	< 4% with 90 - 264VAC input change and 0-100% load change		
Ripple & Noise	mV	<1.5% pk-pk		
Efficiency	-	90% typical		
Minimum Load	A	None		
Overcurrent Protection	-	Automatic recovery upon overload removal		
Overvoltage Protection	V	Cycle AC line to reset		
Overtemperature Protection	-	Yes		
Hold Up Time (Typ)	ms	>16ms at 90VAC input, 75% load		
Leakage Current (max)	mA	1.5mA at 264VAC, 63Hz		
Fan Supply	-	12V 0.25A (Available if no fan option selected)		
Remote Sense	-	None		
Operating Temperature (2)	°C	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C		
Storage Temperature	°C	-40 to +85°C		
Humidity (non condensing)	-	5 - 95% RH		
Cooling	-	Forced air, 2m/s from input to output (approximately 10CFM)		
Isolation	-	Input to Ground 2.3kVDC, Input to Output 4.3kVDC, Output to Ground 200VDC		
Vibration (non operating)	-	2G, 10-500Hz (sweep & endurance at resonance) in all 3 planes. MIL-STD-810E, Method 516.5, Pro I, IV, V		
Shock	-	30G per IEC68-2-27, MIL-STD-810E, Method 514.4, Pro 1, Cat 1, 9.		
Safety Agency Approvals*	-	UL60950-1, CSA22.2 No 60950-1, EN60950-1, EN61010-1, IEC61010-1, CE for LVD		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11, -12, -14		
Conducted Emissions & Flicker	-	EN55011, EN55022 Class B (per CISPR.11/22), EN61000-3-3		
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.11/22)		
Weight (open frame or enclosed)	g	310g or 550g	430g or 650g	
Size (Open frame style) (1)	in	3 x 5 x 1.34"	3 x 6 x 1.34"	
Warranty	yrs	Five Years (4)		

(1) Including underside component leads

(2) -20°C cold start

(3) At 25°C, 230VAC and cold start

(4) Three years for products built before Aug 1, 2011



## Model Selector

Product Code	Part Description	Style	Output Voltage (V)	Output Current (A)	Average Output Power (W)	Peak Output Current (A) <sup>(5)</sup>	Peak Output Power (W) <sup>(5)</sup>
U2Y002G	EFE300-12-CNMDs	Open Frame	12	25.0	300	33.30	400
U2Y003H	EFE300-12-ECMDS	With Fan	12	25.0	300	33.30	400
U4Y002H	EFE400-12-CNMDs	Open Frame	12	33.3	400	44.17	530
U4Y003J	EFE400-12-ECMDS	With Fan	12	33.3	400	44.17	530
U2Y005K	EFE300-24-CNMDs	Open Frame	24	12.5	300	16.70	400
U2Y006L	EFE300-24-ECMDS	With Fan	24	12.5	300	16.70	400
U4Y005L	EFE400-24-CNMDs	Open Frame	24	16.7	400	22.08	530
U4Y006M	EFE400-24-ECMDS	With Fan	24	16.7	400	22.08	530

(5) For up to 10s without exceeding Average Output Power rating

Note: The EFE300M is also available with 28V, 48V and 50V

## Outline Drawing

**J1**

PIN	Symbol
1	AR
2	N
3	IV
4	N
5	U

**J2**  
TOP ROW: 0V  
BOTTOM ROW: +V

**J3**

PIN	Symbol
1	0V
2	V
3	N

**MATING PARTS (MOLEX OR EQUIVALENT)**

Symbol	Part Number	Part Number
AR	09-50-8051	08-52-0113
N	02F300 39-01-2105	02F400 39-01-2145
IV	02201-3037	08-50-0032

**OPEN FRAME**

## Options

Part Description Suffix	U Chassis	Internal Fan
-CNMDS	N	N
-CUMDS	Y	N
-CCMDS	Y	Y
-ECMDS	Y	Y

## Other Industrial Products

NV Series	175 to 900W 1U power supply 1-8 outputs
ZPSA	40 to 60W 2 x 4" single output power supplies
ZWS/ZWSPAF	5 to 240W single output power supplies

For Additional Information, please visit [us.tdk-lambda.com/lp/products/efe-series.htm](http://us.tdk-lambda.com/lp/products/efe-series.htm)



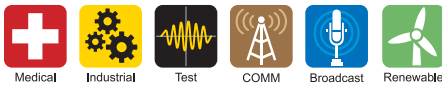
## 300W to 400W Medical Power Supplies

### Features

- ◆ Medical Safety Certifications (BF Rated)
- ◆ Fully Featured - including ORing FET
- ◆ Universal Input (90 - 264VAC)
- ◆ Peak Loading (10s)
- ◆ Suitable for 1U applications
- ◆ Full Digital Control
- ◆ High Efficiency
- ◆ Low Profile
- ◆ Reinforced Isolation (4kVAC input to output)



### Key Market Segments & Applications



Specifications			
Model	EFE300M		EFE400M
Input Voltage range	-	90 - 264VAC, 120 - 350VDC	
Input Frequency	-	45 - 63Hz, 440Hz with reduced PFC	
Inrush Current	A	<40A at 25C and 230VAC input, Cold Start	
Power Factor Harmonics	-	EN61000-3-2 Compliant (0.97 typical)	
Voltage Setting	-	Setting: -5% to +10% (Chosen at time of ordering), Accuracy: +/-1% at 50% Load	
Total Regulation	-	< 4% with 90 - 264VAC input change and 0-100% load change	
Ripple & Noise	mV	< 1.5% peak-peak	
Efficiency	-	90% typical. EFE400M: 1W power draw in standby mode	
Overcurrent Protection	-	Automatic recovery upon overload removal	
Overvoltage Protection	V	Cycle AC line to reset	
Overtemperature Protection	-	Yes	
Hold Up Time (Typ)	ms	>16ms at 90VAC input, 75% load	
Leakage Current (max)	µA	123µA 120VAC 60Hz, 257µA 240VAC 60Hz, <300µA 264VAC 63Hz (Type Test results)	
Fan Supply	-	12V 1A (Available if no fan option selected)	
Standby Voltage	-	5V 2A or 12V 1A (chosen at time of ordering)	
Remote Sense	-	None	
Signals & Features	-	Remote on/off - Inhibit or Enable operation (chosen at time of ordering) Power Good - High indicates supply is good. ORing FET - Allows redundant connection of supplies	
Operating Temperature (2)	°C	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C	
Storage Temperature	°C	-40 to +85°C	
Humidity (non condensing)	%RH	5 - 95% RH	
Cooling	-	Forced air, 2m/s from input to output (approximately 10CFM)	
Isolation	-	Input to Output 4kVAC <sup>(3)</sup> , (2 x MOPPs (3rd edition 60601)); Input to Ground 1.5 kVAC, 2.3kVDC (Basic), Output to Ground 1500VAC	
Vibration (non operating)	-	2G, 10-500Hz (sweep & endurance at resonance) in all 3 planes. MIL-STD-810E, Method 51.4, Pro I, Cat 1, 9	
Shock	-	30G per IEC68-2-27, MIL-STD-810E/F, Method 516.5, Pro I, IV, VI	
Safety Agency Approvals	-	IEC/UL/EN/CSA22.2 60601-1, IEC/EN 61010-1 <sup>(4)</sup> , IEC/UL/EN/CSA22.2 No 60950-1, CE for LVD	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11, -12, -14	
Conducted Emissions and Flicker	-	EN55011, EN55022 Class B (per CISPR.11/22), EN61000-3-3	
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.11/22)	
Weight (open frame or enclosed)	g	350g or 600g	450g or 700g
Size (Open frame style) (1)	in	3 x 6 x 1.34"	3.5 x 6.5 x 1.34"
Warranty	yrs	Five Years	

(1) Including underside component leads

(2) -20°C cold start.

(3) Type tested to 4kVAC (equivalent to 5.7 kVDC), production tested to 4.3 kVDC.

(4) EFE400M, designed to meet 61010-1

## Model Selector

Product Code	Part Description	Style	Output Voltage (V)	Output Current (A)	Average Output Power (W)	Peak Output Current (A) <sup>(5)</sup>	Peak Output Power (W) <sup>(5)</sup>
U5Y0031	EFE300M12-5-ECMDL-YT	With Fan	12	25.0	300	33.30	400
U5Y0020	EFE300M12-5-HNMDL-YT	Open Frame	12	25.0	300	33.30	400
U6Y007P	EFE400M-12-5-ECMDL-YT	With Fan	12	33.3	400	44.17	475
U6Y001H	EFE400M-12-5-HNMDL-YT	Open Frame	12	33.3	400	44.17	475
U5Y0064	EFE300M24-5-ECMDL-YT	With Fan	24	12.5	300	16.70	400
U5Y0053	EFE300M24-5-HNMDL-YT	Open Frame	24	12.5	300	16.70	400
U6Y008Q	EFE400M-24-5-ECMDL-YT	With Fan	24	16.67	400	20.80	475
U6Y002J	EFE400M-24-5-HNMDL-YT	Open Frame	24	16.67	400	20.80	475
U5Y0166	EFE300M-48-5-ECMDL-YT	With Fan	48	6.25	300	8.33	350
U5Y0201	EFE300M-48-5-HNMDL-YT	Open Frame	48	6.25	300	8.33	350
U6Y009R	EFE400M-48-5-ECMDL-YT	With Fan	48	8.33	400	10.40	475
U6Y003K	EFE400M-48-5-HNMDL-YT	Open Frame	48	8.33	400	10.40	475

(5) For up to 10s without exceeding Average Output Power rating

## Options

Additional options available. Reference detailed product data sheet on downloadable files section of web page.

Part Description Suffix	Standby "5" or "12"	U Chassis	Cover	Internal Fan	Enable or Inhibit "E" or "T"
-5-ECMDL-YT	5V 2A	Y	Y	Y	Inhibit
-5-HNMDL-YT	5V 2A	N	N	N	Inhibit

## Outline Drawing

### EFE300M (not -V version)

**NOTE:**

- All customer fixings M3
- Maximum Penetration 4.5mm
- Maximum torque 0.9Nm
- All tolerances +/-0.5mm

Note, connection details and outline drawings for -v (vertical) connector are different See handbook for details

### EFE400M (not -V version)

Connectors are not included with the product. They are available from TDK-Lambda

1 off input connector and 3 crimps are available as part number 94910  
 1 off output connector and 18 crimps are available as part number 94752 (EFE300M)  
 1 off output connector and 20 crimps are available as part number 94912 (EFE400M)

## Other Medical Products

Vega Series	450 to 900W up to 10 outputs
CSS	40 to 500W Single Output
NV Series	175 to 900W 1U Power Supply 1-8 Outputs

For Additional Information, please visit [us.tdk-lambda.com/lp/products/efe-series.htm](http://us.tdk-lambda.com/lp/products/efe-series.htm)



## 1000W Front End Power Supplies

### Features

- ◆ 1U high
- ◆ Up to 3000W (3 units) in 19" rack
- ◆ Hotswap capable (ORing diodes built in)
- ◆ Low Cost
- ◆ PoE Option
- ◆ High efficiency
- ◆ Full array of signals



### Key Market Segments & Applications



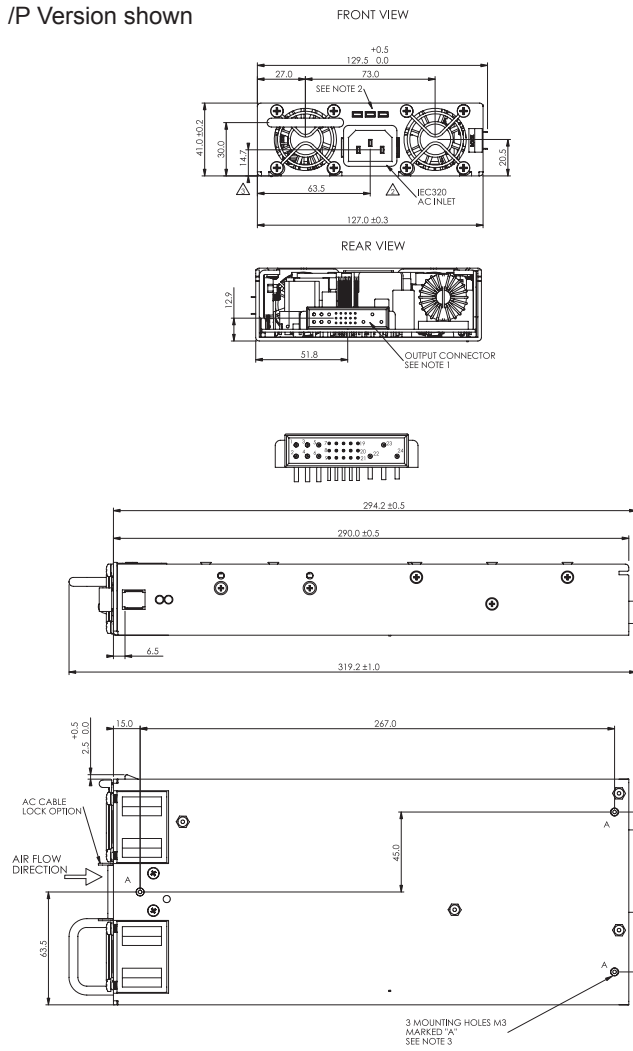
Specifications						
Model			12V Nominal	24V Nominal	32V Nominal	48V Nominal
Output Voltage Range	(1) V		10.5 - 13.2V	21.5 - 29V	28.8 - 38.4V	43 - 58V
Output Current	A		72A	40A	31A	21A
Line Regulation	%		<0.4%			
Load Regulation	%		<0.8%			
Output Noise	mV		150mV	200mV	250mV	300mV
Overvoltage Protection	V		14.3 to 15.7V	31 to 34V	41.5V to 45.5V	62 to 66V
Overcurrent Protection	-		105 - 125%, Constant Current type			
Load Sharing	-		Single wire current sharing, up to 8 units			
Remote Sense	-		Compenstates for 1V on each output lead			
I2C Monitoring	-		Optional (Specify /S)			
Signals (opto isolated)	-		DC OK, AC Fail, and Overtemperature warning, high on fail			
Remote On/Off	-		On: 0 - 0.6V or short, Off: 2- 15V or open			
Auxiliary Output	A		11.2-12.5VDC 0.25A			
AC Input	-		85 - 265VAC, 47 - 63Hz <sup>2</sup> , 120-360VDC. (Derate 10% < 100VAC)			
Leakage Current	mA		<1.1mA at 230VAC input			
Inrush Current	A		<40A			
Hold up time (100VAC input)	-		20ms typical (800W loading)			
Efficiency (typ) 100/200VAC	-		80 / 83%	83 / 86%	84 / 87%	85 / 88%
Power Factor Correction	-		EN61000-3-2 class A (20-100% load), >0.98 at full load			
Immunity	-		EN61000-4-2, -3, -4, -5, -6, -11			
EMC (conducted and radiated)	-		EN55022, level B, FCC Class B			
Operating Temperature	°C		0 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C			
Storage Temperature	°C		-30 to +85°C			
Withstand Voltage	-		Input to Output 3kVAC, Input to Ground 2kVAC, Output to Ground 500VAC for 1 min.			
Cooling	-		Two internal fans, airflow from front to back (variable speed)			
Humidity	-		Operating: 10 - 90% RH, Storage: 10 - 95% RH (non condensing)			
Shock & Vibration	-		Meets ETS 300 019			
Safety Agency	-		UL60950-1, EN60950-1 (Ed 2), CE Mark			
Input / Output Connector	-		Positronic PCB24W9M400A1 (Mating #PCIB24W9F400A1)			
Front panel indicators	-		AC OK, DC OK, DC Fail			
Size (LxWxH)	in		Stand alone: 1.61 x 5 x 11.4"; Rack: 1.72 x 19 x 13.8"			
Weight	g		2,000			
Warranty	yrs		Two Years			

(1) Via Trim pin on output connector

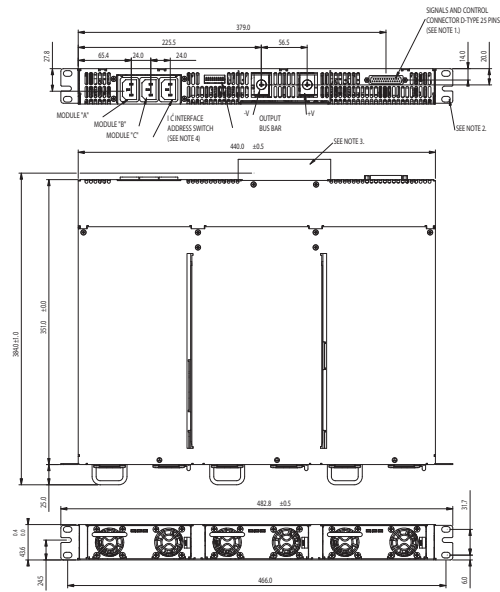
(2) 47-440Hz with reduced PFC (100-265VAC input)

## FPS1000 Outline Drawing

/P Version shown



## FPSS1U Outline Drawing



## Model Selector

Front AC Input Configuration	Output Voltage	Output Current	Maximum Power	I <sup>2</sup> C Interface
FPS100012/P	12V	72A	864W	No
FPS100012/PS	12V	72A	864W	Yes
FPS100024/P	24V	40A	960W	No
FPS100024/PS	24V	40A	960W	Yes
FPS100032/P	32V	31A	992W	No
FPS100032/PS	32V	31A	992W	Yes
FPS100048/P	48V	21A	1008W	No
FPS100048/PS	48V	21A	1008W	Yes
FPSS1U/P	Rack (3 slot), contains two blanking panels			
FPST1U/P	Rack with 3 individual outputs (floating)			

Rear AC Input Configuration	Output Voltage	Output Current	Maximum Power	I <sup>2</sup> C Interface
FPS100012	12V	72A	864W	No
FPS100012/S	12V	72A	864W	Yes
FPS100024	24V	40A	960W	No
FPS100024/S	24V	40A	960W	Yes
FPS100032	32V	31A	992W	No
FPS100032/S	32V	31A	992W	Yes
FPS100048	48V	21A	1008W	No
FPS100048/S	48V	21A	1008W	Yes
FPSS1U	Rack (3 slot), contains two blanking panels			
FPST1U	Rack with 3 individual outputs (floating)			

## Accessories

Part No.	Description
FPS/Z00016299	Module Mating Connector (Positronic PCIB24W9F400A1/AA-S1031)

## Options

Suffix	Description
/POE*	1500VAC Output to Ground Isolation (Output noise 400mV)

\* FPS100048 only.

## Other Industrial Products

PX, CC-E, PAQ, PAH, PAF	DC-DC Converters
HFE	1U 1600-2500W Front End AC-DC

## Full Systems (3 units + rack)

Front AC Input Configuration	Output Voltage	Output Current	Maximum Power	I <sup>2</sup> C Interface
FPS300024/P	24V	120A	2880W	No
FPS300024/PS	24V	120A	2880W	Yes
FPS300048/P	48V	63A	3000W	No
FPS300048/PS	48V	63A	3000W	Yes

Front AC Input configuration. Remove /P suffix for Rear AC configuration.

For Additional Information, please visit [us.tdk-lambda.com/lp/products/fps-series.htm](http://us.tdk-lambda.com/lp/products/fps-series.htm)



## Single Output 250 & 500W Power Supplies

### Features

- ◆ High Efficiency, up to 93%
- ◆ 1.6" high (For 1U racking)
- ◆ Wide Range AC Input
- ◆ 250W Convection Cooled
- ◆ Five year warranty



### Key Market Segments & Applications



GWS500 Shown



Specifications		GWS250	GWS500
AC Input Voltage (300VAC for 5s)	VAC	85 - 264VAC	
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage	VDC	120 - 373VDC	
Inrush Current (cold start)	A	20A at 115VAC, 40A at 230VAC	
Power Factor (1)	-	Meets EN61000-3-2 (Typical PF 0.98/0.95)	
Input Current (115/230VAC)	A	3.0 / 1.4	5.5 / 2.7 (4.5 / 2.3 for 5V model)
Temperature Coefficient	°C	<0.02%/°C (0 - 50°C)	
Overcurrent Protection	-	>105% of nominal or >101% of peak. 5V-12V hiccup style, 24V-48V Constant current style	
Overvoltage Protection (2)	V	5V: 5.75 - 6.75V, 7.5V: 8.6 - 10.1V, 12V: 13.8 - 16.2V/24V: 30.3 - 35.5V, 36V: 41.4 - 48.6V, 48V: 60 - 69.6V	
Overtemperature Protection (2)	-	Yes	
Hold Up Time (115 / 230V input)	ms	16ms (12ms for GWS500-5, -7.5)	
Leakage Current (230VAC 60Hz)	mA	<0.75mA	
Remote Sense	-	No	Yes
Remote On/Off	-	Active Low	
Standby Input Power Draw	W	<0.5W	
5V Standby (always on)	-	5V 0.3A	
DC Good	-	DC Good, open collector signal, High on Fail	
LED Indicator	-	Green LED = On	
Output Remote Programming	-	See installation manual for details	
Operating Temperature	°C	-25 to +70°C. Derate linearly to 50% load from +50 to +70°C	-25 <sup>(3)</sup> to +70°C. Derate linearly to 50% load from +50 to +70°C
Storage Temperature	°C	-30 to +85°C	
Operating Humidity	-	30 - 90% RH (non condensing)	
Storage Humidity	-	10 - 95% RH (non condensing)	
Cooling	-	Convection	Internal fan
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC <sup>(4)</sup> for 1 min.	
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s <sup>2</sup> (20G)	
Immunity	-	IEC61000-4-2 (lv 2, 3), -3 (lv3), -4 (lv 3), -5 (lv 3), -6 (lv 3), -8 (lv 4), -11	
Safety Agency Approvals	-	UL60950-1, CSA C22.2 No 60950-1-07 (cUL), EN60950-1 2nd Edition, IEC60950-1, CE Mark	
Conducted & Radiated EMI	-	EN55022-B, FCC-B	
Weight (Typ)	g	850	1020
Size (LxWxH)	in	7.8 x 4.1 x 1.61"	8.6 x 4.1 x 1.61"
Warranty	yrs	Five Years	

(1) 115 / 230VAC input

(2) Recycle AC, or use remote on/off to reset

(3) Guaranteed start up at -40°C

(4) 500VDC for GWS500

## Model Selector

Model	Voltage (V)	Adjust Range (V)	Max Current (A)	Peak Curr. <10s, <35% DC (A)	Load Reg. (mV)	Line Reg. (mV)	Ripple Noise (mV)	Efficiency (typ) % (230VAC)
GWS500-5	5V	4.5 - 5.5	80	-	50	25	150	84
GWS500-7.5	7.5V	6.75 - 8.25	67.2	-	70	35	150	87
GWS250-12	12V	10.8 - 13.2	21	-	96	48	150	92
GWS500-12	12V	10.8 - 13.2	42	-	96	48	150	89
GWS250-24	24V	22 - 28.8	10.5	12.5	192	96	240	92
GWS500-24	24V	22 - 28.8	21	25.0	192	96	150	90
GWS250-36	36V	32 - 40	7	8.4	288	144	360	93
GWS500-36	36V	32 - 40	14	16.7	288	144	200	90
GWS250-48	48V	42 - 57.6	5.3	-	384	192	480	93
GWS500-48	48V	42 - 57.6	10.5	-	384	192	300	90

## GWS500 Outline Drawing

**SIGNAL CONNECTOR INFORMATION**

**CN201 PIN ASSIGN**

S10B-PHDSS (LIST)

1.	+V
2.	+S
3.	-V
4.	-S
5.	DOCK
6.	COM
7.	5VSB
8.	COM
9.	CNT+
10.	CNT-

**SIGNAL CONNECTOR USED**

PART DESCRIPTION	PART NAME	MANUFACT
PIN HEADER	S10B-PHDSS(LF)(SN) (CN201)	JST

**MATCHING HOUSINGS, PIN & TOOL**

PART DESCRIPTION	PART NAME	MANUFACT
SOCKET HOUSING	PHDR-10VS (CN201)	JST
TERMINAL PINS	SPHD-002T-P05(AWG28-24) SPHD-001T-P05(AWG26-22)	JST
HAND CRIMPING TOOL	YRS-620(SPHD-002T-P0.5) YC-610R(SPHD-001T-P0.5)	JST

==ACCESSORIES==

\* SHORT PIECE -----1  
SHORTING +V --- +S, -V --- -S, CNT+ --- CNT-  
(ATTACHED ON CN201 AT SHIPMENT)

**NAME PLATE:**  
SEE NOTE A

**NOTES**

A. MODEL NAME, INPUT VOLTAGE RANGE, NOMINAL OUTPUT VOLTAGE, MAXIMUM OUTPUT CURRENT & COUNTRY OF MANUFACTURE ARE SHOWN IN ACCORDANCE WITH THE SPECIFICATION.

B. M4 TAPPED, EMBOSSED & COUNTERSUNK HOLES (8) FOR CUSTOMER CHASSIS MOUNTING. SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 5mm.

Dimensions: 152.4±0.5, 32.8, 63.5±0.5, 105.0±1.0, 20.75, 11.0, (14.1), (12.2), (15.1), 7 x M4, 18(MAX), 21.0, (7.6), 12.5, 18.0, 41.0±1.0, 152.4±0.5, 32.8, 218.0.

Labels: OUTPUT VOLTAGE ADJUSTMENT, DC ON INDICATOR, CN201, SEE NOTE B (TAPPED AT THE BOTTOM CHASSIS), +V, -V, (FG), AC(N), AC(L), NAME PLATE.

## Other Industrial Products

LS25 - 200	25W to 200W low cost
HWS15 - 1800	15W to 1800W limited lifetime warranty
SWS300 - 1000	300W to 1000W single output
CSS500	360W to 500W medical

For Additional Information, please visit [us.tdk-lambda.com/lp/products/gws-series.htm](http://us.tdk-lambda.com/lp/products/gws-series.htm)



## 1600W 1U Front End Power Supplies

### Features

- ◆ 1U rackmount containing up to 5 units
- ◆ Internal ORing MOSFET & Current Share
- ◆ High Efficiency
- ◆ Up to 7600W in 1U rack
- ◆ Full array of signals available



### Key Market Segments & Applications



Specifications		
Model		
Input Voltage Range (2)	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating
Input Current (Max) 100/230VAC	A	14.2 / 8.1A
Inrush Current	A	<35A
Power Factor Correction	-	Meets EN61000-3-2, PF > 0.98 at full load
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	%	105 - 120%
Overvoltage Protection (1)	%	110% (Tracking). Cycle AC to reset or utilize Remote On/Off
Overtemperature Protection (1)	-	Shutdown with automatic reset. Warning signal provided
Hold up time	ms	>10ms, 100/230VAC Input, 80% loading
Leakage Current	mA	< 0.75 / 1.5mA 100/230VAC, 60Hz
Remote Sense Compensation	-	HFE1600-12: 0.25V/wire, HFE1600-24: 0.5V/wire, HFE1600-32: 0.75V/wire, HFE1600-48: 1.0V/wire
Indicators	-	AC OK: Green LED, DC OK / Fail: Green / Red LED
Remote On/Off	-	Unit ON: 0 - 0.6V or short, OFF: 2 - 15V or open circuit
Parallel Operation (1)	-	Yes, single wire current share, 90% accuracy, up to 10 units
AC Fail Signal	-	Open Collector, ON when AC is within 85 - 270VAC
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)
Remote Adjust (1)	-	By either external 0 - 5V signal or 1k potentiometer
I <sup>2</sup> C Interface (1)	-	Isolated from output, Add suffix /S, PMBus compatible
Auxiliary Output	-	11.2 - 12.5V, 0.5A, 240mV ripple and noise
Operating Temp. (-TB Rack)	°C	-10 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C
Operating Temp. (-IEC320 Rack)	°C	-10 to +60°C, derate 2%/°C from 50 to 60°C
Storage Temperature	°C	-30 to +85°C
Humidity (Non condensing)	%RH	Operating: 10 - 90%RH, Storage: 10 - 95%RH
Cooling	-	Two variable speed internal fans, airflow exits across input/output connector (3)
Withstand Voltage	-	I/P to O/P 3kVAC, I/P to GND 2kVAC, O/P to GND: HFE1600-12,-24V 500VAC, HFE1600-48 1.5kVAC
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	Meets IEC60068-2-64
Shock (Basic transportation)	-	Meets IEC60068-2-27
Safety Agency Certifications	-	UL60950-1 (Listed), EN60950-1, CE Mark
Line Dip	-	Complies with SEMI F47 (200VAC line only)
Conducted and Radiated EMI	-	EN55022 & FCC part 15; Conducted class B, Radiated class A
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv 2), -4 (lv2), -5 (lv3,4), -6 (lv2), -8 (lv 4), -11
Size (W x H x D)	in	Power Supply: 3.35 x 1.61 x 11.8", Rack: 17.5 x 1.72 x 14.4"
Weight	g	Power Supply: 1550g, Rack: 4800g
Warranty	yrs	Three Years

(1) See installation manual for detailed specifications & test methods

(2) Derate output power linearly 1%/V from 100VAC to 85VAC input

(3) Reverse air - contact factory



## Model Selector

Model	Output Voltage	Adjust Range <sup>(1)</sup>	Max Current (Vin>170VAC)	Max Power (Vin>170VAC)	Max Current (100<Vin<170VAC) <sup>(2)</sup>	Max Power (100<Vin<170VAC) <sup>(2)</sup>
HFE1600-12	12V	9.6 - 13.2V	133A	1596W	100A	1200W
HFE1600-12/S	12V	9.6 - 13.2V	133A	1596W	100A	1200W
HFE1600-24	24V	19.2 - 29V	67A	1608W	50A	1200W
HFE1600-24/S	24V	19.2 - 29V	67A	1608W	50A	1200W
HFE1600-32	32V	25.6 - 38.4V	47A	1500W	37.5A	1200W
HFE1600-32/S	32V	25.6 - 38.4V	47A	1500W	37.5A	1200W
HFE1600-48	48V	38.4 - 58V	33A	1584W	25A	1200W
HFE1600-48/S	48V	38.4 - 58V	33A	1584W	25A	1200W

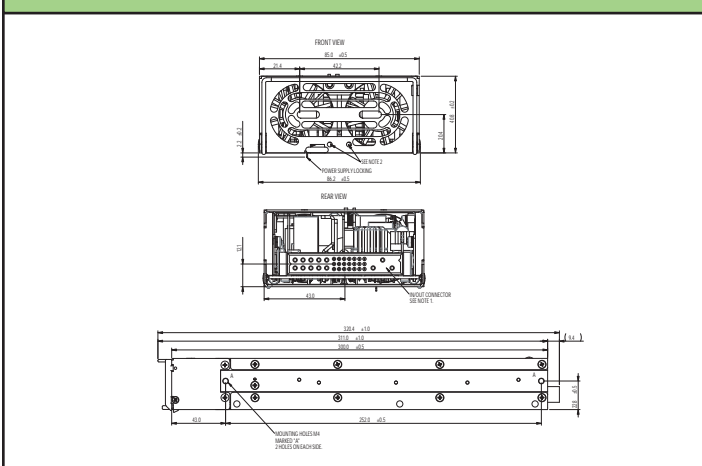
Model	Load Reg	Line Reg	Ripple & Noise <sup>(1)</sup>	Efficiency (%) <sup>(4)</sup>	I <sup>2</sup> C
HFE1600-12	60mV	30mV	240mV	87 / 90%	-
HFE1600-12/S	60mV	30mV	240mV	87 / 90%	Yes
HFE1600-24	120mV	60mV	240mV	88 / 90%	-
HFE1600-24/S	120mV	60mV	240mV	88 / 90%	Yes
HFE1600-32	160mV	80mV	320mV	88 / 90%	-
HFE1600-32/S	160mV	80mV	320mV	88 / 90%	Yes
HFE1600-48	240mV	120mV	480mV	89 / 92%	-
HFE1600-48/S	240mV	120mV	480mV	89 / 92%	Yes

(4) At 75% load, 100 / 230VAC input

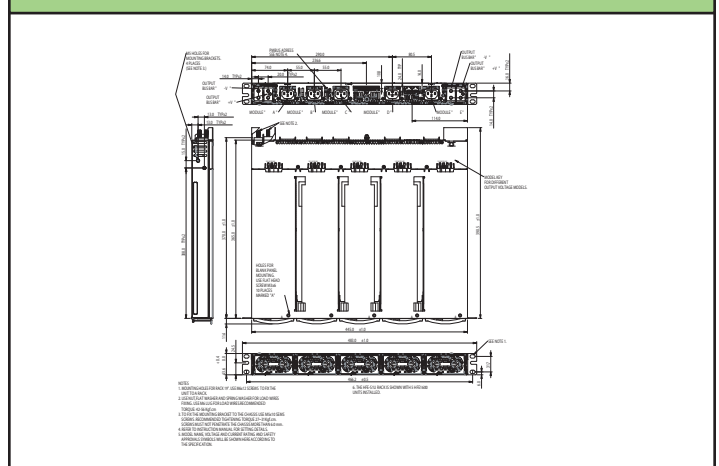
## Accessories

Model	Description	Maximum Rack Current
HFE1600-S1U	Five slot 19" rack, IEC320-C16 input connectors (5)	266A each side (532A total)
HFE1600-S1U-TB	Five slot 19" rack, Terminal Block input connectors (5)	266A each side (532A total)
HFE1600/BP	One slot blanking panel, four provided with each rack	-
HFE/C15U	AC Power cord, 2.0m long, one per power supply required	-
HFE1600/D1U	Four slot (two isolated pairs), dual output 19" rack, IEC320 input	266A each side (532A total)
HFE1600-D1U-TB	Four slot (two isolated pairs), dual output 19" rack, terminal block input	266A each side (532A total)

## Outline HFE1600



## Outline HFE1600S1U



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/hfe-series.htm](http://us.tdk-lambda.com/lp/products/hfe-series.htm)



## 2500W 1U Front End Power Supplies

### Features

- ◆ 1U rackmount containing up to 4 units
- ◆ Internal ORing MOSFET & Current Share
- ◆ High Efficiency
- ◆ Up to 9,500W in 1U rack



### Key Market Segments & Applications



(HFE2500-48 model)

Specifications		
Model		
Input Voltage Range (2)	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating
Input Current (Max) 100/230VAC	A	15 / 12A
Inrush Current	A	<50A
Power Factor Correction	-	Meets EN61000-3-2, PF > 0.98 at full load
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	%	105 - 115%
Overvoltage Protection (1)	%	110% (Tracking). Cycle AC to reset or utilize Remote On/Off
Overtemperature Protection (1)	-	Shutdown with automatic reset. Warning signal provided
Hold-up time	ms	>10ms, 115/230VAC Input, 80% loading
Leakage Current	mA	< 0.75 / 1.5mA, 100 / 230VAC, 60Hz
Remote Sense Compensation	-	HFE2500-12: 0.25V / Wire, HFE2500-24: 0.5V / Wire, HFE2500-48: 1V / Wire
Indicators	-	AC OK: Green LED, DC OK / Fail: Green / Red LED
Remote On/Off	-	Unit ON: 0 - 0.6V or short, OFF: 2 - 15V or open circuit
Parallel Operation (1)	-	Yes, single wire current share, 95% accuracy, up to 8 units
AC Fail Signal	-	Open Collector, ON when AC is within 85 - 270VAC
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)
Remote Adjust (1)	-	By either external 0 - 5V signal or 1k potentiometer
I <sup>2</sup> C Interface (1)	-	Isolated from output, Add suffix /S, PMBus compatible
Auxiliary Output	-	11.2 - 12.5V, 0.5A, 240mV ripple and noise
Operating Temperature	°C	-10 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C
Storage Temperature	°C	-30 to +85°C
Humidity (Non condensing)	%RH	Operating: 10 - 90%RH, Storage: 10 - 95%RH
Cooling	-	Two variable speed internal fans, airflow exits across input/output connector (3)
Withstand Voltage	-	I/P to O/P 3kVAC, I/P to GND 2kVAC, O/P to GND: HFE2500-12, -24V 500VAC, HFE2500-48 1.5kVAC
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	Meets IEC60068-2-64
Shock (Basic transportation)	-	Meets IEC60068-2-27
Safety Agency Certifications	-	UL60950-1 (Listed), EN60950-1, CE Mark
Line Dip	-	Complies with SEMI F47 (200VAC line only)
Conducted and Radiated EMI	-	EN55022 & FCC part 15; Conducted class B, Radiated class A
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv 2), -4 (lv 2), -5 (lv 3,4), -6 (lv 2), -8 (lv 4), -11
Size (W x H x D)	in	Power Supply: 4.21 x 1.61 x 12.8", Rack: 17.5 x 1.72 x 15.8"
Weight	g	Power Supply: 2100g, Rack: 5000g
Warranty	yrs	Three Years

(1) See installation manual for detailed specifications & test methods

(2) Derate linearly 1.3%/V from 100VAC to 85VAC input

(3) Reverse air - contact factory

## Model Selector

Model	Output Voltage	Adjust Range <sup>(1)</sup>	Max Current (Vin>170VAC)	Max Power (Vin>170VAC)	Max Current (100<Vin<170VAC) <sup>(2)</sup>	Max Power (100<Vin<170VAC) <sup>(2)</sup>
HFE2500-12	12V	9.6 - 13.2V	200A	2400W	125A	1500W
HFE2500-12/S	12V	9.6 - 13.2V	200A	2400W	125A	1500W
HFE2500-24	24V	19.2 - 29V	104A	2496W	62A	1488W
HFE2500-24/S	24V	19.2 - 29V	104A	2496W	62A	1488W
HFE2500-48	48V	38.4 - 58V	52A	2496W	31A	1488W
HFE2500-48/S	48V	38.4 - 58V	52A	2496W	31A	1488W

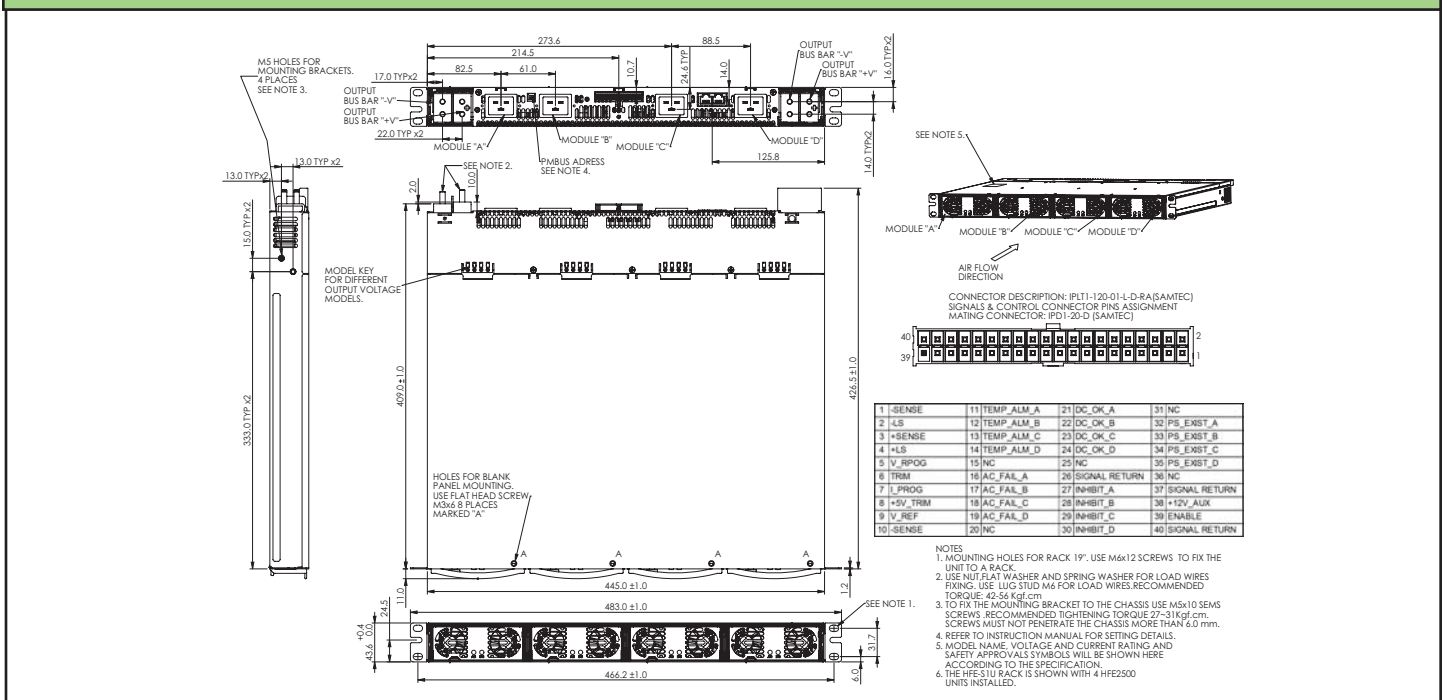
Model	Load Reg	Line Reg	Ripple & Noise <sup>(1)</sup>	Efficiency (%) <sup>(4)</sup>	I <sup>2</sup> C
HFE2500-12	60mV	30mV	240mV	90 / 92%	-
HFE2500-12/S	60mV	30mV	240mV	90 / 92%	Yes
HFE2500-24	120mV	60mV	240mV	90 / 92%	-
HFE2500-24/S	120mV	60mV	240mV	90 / 92%	Yes
HFE2500-48	240mV	120mV	480mV	91 / 93%	-
HFE2500-48/S	240mV	120mV	480mV	91 / 93%	Yes

(4) At 75% load, 100 / 230VAC input

## Accessories

Model	Description	Maximum Rack Current
HFE2500-S1U	Four slot 19" rack, IEC320-C20 input connector	320A each side (640A total)
HFE2500-S1U-TB	Four slot 19" rack, Terminal Block input connector	320A each side (640A total)
HFE2500/BP	One slot blanking panel, two provided with each rack	-

## Outline HFE2500S1U



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/hfe-series.htm](http://us.tdk-lambda.com/lp/products/hfe-series.htm)



## Single Output Industrial Power Supplies

### Features

- ◆ Limited Lifetime Warranty
- ◆ UL508 approved
- ◆ SEMI F47 Compliant (high line AC)
- ◆ Universal Input (85 - 265VAC)
- ◆ Higher Efficiency Than HWS series



### Key Market Segments & Applications



Specifications						
Model		HWS15A/A	HWS30A/A	HWS50A/A	HWS100A/A	HWS150A/A
Input Voltage Range	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC* (Withstands 300VAC for 5s)				
Input Current (Typ) (1)	A	0.35 / 0.2	0.65 / 0.4	0.65 / 0.35	1.3 / 0.65	1.9 / 0.95
Inrush Current (1)	A	14 / 28				
Power Factor (1)	-	Meets EN61000-3-2				
	-	-	-	0.97/0.91	0.98/0.93	0.98/0.93
Temperature Coefficient	%/°C	<0.02%/°C				
Overcurrent Protection	%	>105%				
Overvoltage Protection	V	Yes				
Hold Up Time (Typ)	ms	20				
Leakage Current (max)	mA	>0.5mA (Typ 0.2mA at 100VAC, 0.4mA at 230VAC)				
Remote Sense	-	No			Yes	
Indicator	-	Green LED = ON				
Operating Temperature (with cover)	°C	-10°C to +70°C, derate linearly to 20% load from 50°C to 70°C (2)				
Storage Temperature	°C	-30 to +85°C				
Humidity (non condensing)	%RH	Operating: 30 - 90%RH, Non operating 10 - 95%RH				
Cooling	-	Convection				
Withstand Voltage	VAC	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.				
Isolation Resistance	MOhms	>100M at 25°C & 70%RH, Output to Ground 500VDC				
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour				
Shock	m/s <sup>2</sup>	< 196.1 m/s <sup>2</sup>				
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508, CE Mark				
Line Dip	-	Complies with SEMI F47 (200VAC line only)				
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B, VCCI-B				
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11; IEC61000-6-2				
Weight (Typ)	g	190	240	300	470	520
Size (WxHxD) (with cover)	Inches	1.24x3.23x3.15	1.24x3.23x3.74	1.24x3.23x4.72	1.3x3.23x6.3	1.65x3.23x6.3
	mm	31.5x82x80	31.5x82x95	31.5x82x120	33x82x160	42x82x160
Warranty	-	Limited lifetime warranty (See website for terms & conditions)				

\* Safety certified for AC input only

(1) 100/200VAC

(2) HWS15A/A derates linearly to 50% load from 50 to 70°C

Output Ratings								
Model	Voltage V	Adjust Range V	Max Current A	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Overvoltage V	Efficiency (typ) % (1)
HWS15A-3/A	3.3V	2.97 - 3.96	3	40	20	120	4.13-4.95	70/71
HWS30A-3/A	3.3V	2.97 - 3.96	6	40	20	120	4.13-4.95	75/77
HWS50A-3/A	3.3V	2.97 - 3.96	10	40	20	120	4.13-4.95	76/78
HWS100A-3/A	3.3V	2.97 - 3.96	20	40	20	120	4.13-4.95	82/84
HWS150A-3/A	3.3V	2.97 - 3.96	30	40	20	120	4.13-4.95	82/84
HWS15A-5/A	5V	4.0 - 6.0	3	40	20	120	6.25-7.25	77/79
HWS30A-5/A	5V	4.0 - 6.0	6	40	20	120	6.25-7.25	80/82
HWS50A-5/A	5V	4.0 - 6.0	10	40	20	120	6.25-7.25	82/84
HWS100A-5/A	5V	4.0 - 6.0	20	40	20	120	6.25-7.25	84/86
HWS150A-5/A	5V	4.0 - 6.0	30	40	20	120	6.25-7.25	85/87
HWS15A-12/A	12V	9.6 - 14.4	1.3	96	48	150	15-17.4	80/83
HWS30A-12/A	12V	9.6 - 14.4	2.5	96	48	150	15-17.4	84/86
HWS50A-12/A	12V	9.6 - 14.4	4.3	96	48	150	15-17.4	83/85
HWS100A-12/A	12V	9.6 - 14.4	8.5	96	48	150	15-17.4	86/88
HWS150A-12/A	12V	9.6 - 14.4	13	96	48	150	15-17.4	85/88
HWS15A-15/A	15V	12.0 - 18.0	1	120	60	150	18.8-21.8	81/84
HWS30A-15/A	15V	12.0 - 18.0	2	120	60	150	18.8-21.8	85/87
HWS50A-15/A	15V	12.0 - 18.0	3.5	120	60	150	18.8-21.8	83/86
HWS100A-15/A	15V	12.0 - 18.0	7	120	60	150	18.8-21.8	86/88
HWS150A-15/A	15V	12.0 - 18.0	10	120	60	150	18.8-21.8	86/89
HWS15A-24/A	24V	19.2 - 28.8	0.65	150	96	150	30-34.8	82/85
HWS30A-24/A	24V	19.2 - 28.8	1.3	150	96	150	30-34.8	86/88
HWS50A-24/A	24V	19.2 - 28.8	2.2	150	96	150	30-34.8	84/87
HWS100A-24/A	24V	19.2 - 28.8	4.5	150	96	150	30-34.8	87/89
HWS150A-24/A	24V	19.2 - 28.8	6.5	150	96	150	30-34.8	88/90
HWS15A-48/A	48V	38.4 - 52.8	0.33	240	192	200	55.2-64.8	80/80
HWS30A-48/A	48V	38.4 - 52.8	0.65	240	192	200	55.2-64.8	82/83
HWS50A-48/A	48V	38.4 - 52.8	1.1	240	192	200	55.2-64.8	84/86
HWS100A-48/A	48V	38.4 - 52.8	2.1	240	192	200	55.2-64.8	88/90
HWS150A-48/A	48V	38.4 - 52.8	3.3	240	192	200	55.2-64.8	89/91

Other Industrial Products	
HWS300-1800	300W to 1800W
LZSA	500W to 1500W (MIL STD)
DRB, DRF, DSP & DPP	10W to 960W DIN Rail Mount

Options	
Suffix	Description
Blank	No cover
/A	Cover

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/hwsa-series.htm](http://us.tdk-lambda.com/lp/products/hwsa-series.htm)



## Single Output Industrial Power Supplies

### Features

- ◆ Limited Lifetime Warranty
- ◆ UL508 approved
- ◆ SEMI F47 Compliant (high line AC)
- ◆ Universal Input (85 - 265VAC)
- ◆ High Efficiency
- ◆ Class 1 Div 2 option (/RY suffix)
- ◆ Wide Range AC Input



### Key Market Segments & Applications



Specifications		HWS300	HWS600	HWS1000	HWS1500
Input Voltage range (47-63Hz)	-	85 - 265VAC or 120 - 330VDC (6)			
Input Current (Typ) (1)	A	5V: 3.8/1.9; 12-48V: 4.2/2.1	5V: 7.5/3.6; 12-48V: 8.1/3.9	3.3V: 9.6/5.0; 5-60V: 13.5/7.0	3.3V: 15.0/8.0; 5-60V: 19.5/10.0
Inrush Current (1)	A	20 / 40			
Power Factor	-	Meets EN61000-3-2			
Temperature Coefficient	-	<0.02%/°C			
Overcurrent Protection	-	>105% (>101% of peak current for peak current capable models)			
Overvoltage Protection	V	See table on page 2 (Recycle AC or remote on/off to reset)			
Hold Up Time (Typ)	ms	20			
Leakage Curr. (at 240VAC, 60Hz)	mA	<0.75mA		<1.2mA	<1.5mA
Remote Sense	-	Yes			
Indicator	-	Green LED = ON			
Remote on/off	-	Yes (Isolated from output)			
Parallel operation	-	Single wire connection (up to 5 units)			
DC Good	-	Yes			
Remote Adjust (PV)	-	External voltage adjusts output, see options table			
Operating Temperature	-	-10°C to +70°C, derate linearly to 50% load from 50C to 70C (2, 3)			
Storage Temperature	°C	-30 to +85°C			
Humidity (non condensing)	-	Operating: 10 - 90%RH, Non operating 10 - 95%RH			
Cooling	-	Internal fan			
Withstand Voltage (4)	-	Input to Ground 2.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour			
Shock	-	< 196.1 m/s <sup>2</sup>			
Safety Agency Certifications (5)	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508, CE Mark			
Line Dip	-	Complies with SEMI F47 (200VAC line only)			
Conducted & Radiated EMI	-	EN55011 / EN55022, FCC VCCI (HWS300, 600 & 1000: Class B, HWS1500: Class A)			
Immunity	-	IEC61000-4-2, -3, -4, -6 (Level 3), -5, -8 (Level 4), -11			
Weight (Typ)	g	1,000	1,600	3,200	3.3-7.5V: 4000; 12V+: 3800
Size (WxHxD)	in	2.4 x 3.23 x 6.5"	3.94 x 3.23 x 6.5"	5 x 3.25 x 9.45"	5 x 3.25 x 11"
Warranty	yrs	Limited lifetime warranty (See TDK-Lambda's terms and conditions)			

(1) 100/200VAC

(2) HWS start up -20°C. (-40°C see options table)

(3) HWS1000/1500 with 85VAC input: See installation manual

(4) 2kVAC HWS1000/1500 Input to ground

HWS1000: -10 to +71°C. HWS1000-5, HWS1500-3, -5 derate linearly above 40°C

(5) UL60601-1, EN60601-1, see options.

UL508; HWS300/600 5V, 12V, 24V & 48V models

(6) Not on HWS1500/ME, /HD or /RY versions

(\*) Class 1 Div 2 option (/RY suffix)

## Output Ratings

Model	Voltage V	Adjust Range V(3)	Max Curr. A	Peak Curr. A(2)	Max. Pwr. W	Load Reg mV	Line Reg mV	Ripple Noise mV	Over- voltage V	Eff. typ % (1)
HWS300-3	3.3V	2.64 - 3.96	60	-	198	30	20	120	4.13 - 4.95	74/77
HWS600-3	3.3V	2.64 - 3.96	120	-	396	30	20	120	4.13 - 4.95	75/78
HWS1000-3	3.3V	2.64 - 3.96	200	-	660	40	20	120	4.13 - 4.62	71/73
HWS1500-3	3.3V	2.64 - 3.96	300	-	990	60	36	150	4.12 - 4.62	72/75
HWS300-5	5V	4 - 6	60	-	300	30	20	120	6.25 - 7.25	79/82
HWS600-5	5V	4 - 6	120	-	600	30	20	120	6.25 - 7.25	80/83
HWS1000-5	5V	4 - 6	200	-	1000	40	20	120	6.25 - 7.0	76/78
HWS1500-5	5V	4 - 6	300	-	1500	60	36	150	6.25 - 7.0	77/81
HWS1000-6	6V	4.8 - 7.2	167	-	1002	60	36	150	7.5 - 8.4	79/81
HWS1500-6	6V	4.8 - 7.2	250	300	1500	60	36	150	7.5 - 8.4	79/82
HWS1000-7	7.5V	6 - 9V	134	160	1005	60	36	150	9.38 - 10.5	80/82
HWS1500-7	7.5V	6 - 9V	200	240	1500	60	40	150	9.37 - 10.5	81/83
HWS300-12	12V	9.6 - 14.4	27	-	324	96	48	120	15 - 17.4	80/83
HWS600-12	12V	9.6 - 14.4	53	-	648	96	48	120	15 - 17.4	80/83
HWS1000-12	12V	9.6 - 14.4	88	100	1056	100	48	150	15 - 17.4	83/85
HWS1500-12	12V	9.6 - 14.4	125	-	1500	72	48	150	15 - 17.4	82/85
HWS300-15	15V	12 - 18	22	-	330	120	60	150	18.8 - 21.8	82/85
HWS600-15	15V	12 - 18	43	-	645	120	60	150	18.8 - 21.8	82/85
HWS1000-15	15V	12 - 18	70	80	1050	120	60	150	18.8 - 21.8	83/85
HWS1500-15	15V	12 - 18	100	-	1500	90	60	150	18.7 - 21.8	83/87
HWS300-24	24V	19.2 - 28.8	14	16.5	336	192	96	150	30 - 34.8	82/85
HWS600-24	24V	19.2 - 28.8	27	31	648	192	96	150	30 - 34.8	82/85
HWS1000-24	24V	19.2 - 28.8	44	50	1056	150	96	150	30 - 34.8	85/87
HWS1500-24	24V	19.2 - 28.8	65/70 (1)	105	1560	144	96	200	30 - 34.8	84/88
HWS1000-36	36V	28.8 - 43.2	29.3	33.3	1055	150	144	200	45 - 49.7	85/88
HWS1500-36	36V	28.8 - 43.2	42/46.5 (1)	70	1512	150	144	200	45 - 49.7	84/88
HWS300-48	48V	38.4 - 52.8	7	-	336	384	192	200	55.2 - 64.8	82/85
HWS600-48	48V	38.4 - 52.8	13	-	624	384	192	200	55.2 - 64.8	82/85
HWS1000-48	48V	38.4 - 52.8	22	25	1056	300	192	200	55.2 - 64.8	86/88
HWS1500-48	48V	38.4 - 52.8	32	-	1536	288	192	200	55.2 - 64.8	86/90
HWS1000-60	60V	48 - 66	17.6	20	1056	360	240	400	69 - 75	85/88
HWS1500-60	60V	48 - 66	25.6/28 (1)	42	1536	360	240	400	69 - 75	86/90

### Notes

(1) 100/200VAC

(2) 200-265VAC Input, 10s maximum on time with 35% duty cycle

(3) Use program input (PV) to adjust from 20-120% of nominal (20-110% for 48V models)

## Options

Suffix	Description
Blank	HWS300-1500 the cover is fitted as standard
/A	Not Applicable
	HWS300-1500 the cover is fitted as standard
/PV	HWS300, 600 (Standard on HWS1000 & 1500): 1-6V program voltage input to adjust output 20-120% of nominal (20-110% for 48V) (12V-48V models only)
/HD	See HWS50-1500/HD Datasheet for details. -40 to +71(74)°C operation, conformally coated PCBs
/ME	See HWS30-1500/ME Datasheet for details. UL60601-1, EN60950-1 medical certification
/RY	ISA 12.12.01 (UL1604) - Class 1 Div 2 with dry contact relay DC Good signal (300W, 600W and 1500W 24V output models only, no UL508 certification, no remote on/off function.)

## Other Industrial Products

HWS	15W to 150W single output
LZSA	500W to 1500W Single output
SWS	50W to 1000W, low cost
DPP, DLP & DSP	10W to 480W DIN Rail Mount

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/hws-series.htm](http://us.tdk-lambda.com/lp/products/hws-series.htm)



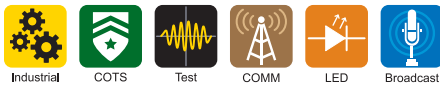
## Single Output Industrial Power Supplies

### Features

- ◆ Limited Lifetime Warranty
- ◆ -10 to +71°C Operation (-40°C start up)
- ◆ Universal Input (85 - 265VAC)
- ◆ Conformally coated pcbs
- ◆ Class 1 Div 2 option (/RYHD suffix)
- ◆ Wide range AC Input



### Key Market Segments & Applications



Specifications			HWS50	HWS100	HWS150	HWS300	HWS600	HWS1000	HWS1500	
Model										
Input Voltage range (47-63Hz)	-		85-265VAC or 120-370VDC			85-265VAC or 120-330VDC (No DC input for HWS1500)				
Input Current (Typ) (1)	A		0.7 / 0.35	1.3 / 0.65	1.9 / 0.95	4.1 / 2.1	8.1 / 3.9	13.5 / 7	19 / 10	
Inrush Current (1)	A		14 / 2			20 / 4				
Power Factor	-		Meets EN61000-3-2							
Temperature Coefficient	-		<0.02%/°C							
Overcurrent Protection	-		>104%							
Overvoltage Protection	V		Yes (See table on page 2)							
Hold Up Time (Typ)	ms		20							
Leakage Current (60Hz)	mA		<0.5mA			<0.75mA		<1.2mA	≤1.5mA	
Remote Sense	-		No	Yes						
Indicator	-		Green LED = ON							
Remote On/Off	-		No	Yes (Isolated from output)						
Parallel operation	-		No	Single wire connection (5 units max)						
DC Good	-		No	Yes						
Remote Adjust (PV)	-		No					Yes (3)		
Operating Temperature and Derating (operation to +74°C - contact factory)	°C		HWS50-150: -10°C to +71°C, (-10 ~+50°C: 100%, +60°C: 60%, +71°C: 20%) HWS300-1500: -10°C to +71°C, (-10 ~+50°C: 100%, derate linearly to 50% load from +50 to +71°C) Guaranteed start up at -40°C (see specification sheets on website for details and derating)							
Storage Temperature	°C		-40 to +85°C							
Humidity (non condensing)	-		Operating: 30 - 90%RH (10 -90% on HWS300-1500), Non operating 10 - 95%RH							
Cooling	-		Convection			Internal fan				
Withstand Voltage (2)	-		Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.							
Isolation Resistance	-		>100MΩ at 25°C & 70%RH, Output to Ground 500VDC, >10M Output to remote on/off 100VDC							
Vibration (non operating)	-		MIL-STD-810F 514.5 Category 4, 10 (HWS1500 Cat 4, figure 514.5C-1)							
Shock (in packaging)	-		MIL-STD-810F 516.5 Category I, VI (HWS1500 <196.1m/s <sup>2</sup> )							
Safety Agency Approvals	-		UL60950-1, CSA60950-1, EN60950-1, EN50178, CE Mark							
Line Dip	-		Complies with SEMI F47 (200VAC line only)							
Conducted & Radiated EMI	-		EN55011 / EN55022-B, FCC-B, VCCI-B (HWS1500 Class A)							
Immunity	-		IEC61000-4-2 (Level 2,3), -3, -4, -6, (Level 3), -5, -8 (Level 4), -11							
Weight (Typ)	g		280	450	500	1000	1600	3200	3800	
Size (WxHxD)	in		1.04x3.23x4.72	1.1x3.23x6.3	1.46x3.23x6.3	2.4x3.23x6.5	3.94x3.23x6.5	5x3.2x9.5	5x3.25x11	
Warranty	yrs		Limited lifetime warranty (See TDK-Lambda's terms & conditions)							

(1) 100/200VAC input

(2) HWS300-600 2.5kVAC Input to ground

(3) 1-6V program voltage input to adjust output 20-120% (typical) of nominal. See instruction manual for details & models with this feature.

(\*) Class 1 Div 2 option (/RYHD suffix)



## Output Ratings

Model	Voltage	Adjust Range	Max Curr(A)	Peak Curr(A) <sup>4</sup>	Max Power(W)	Load Reg(mV)	Line Reg(mV)	Ripple Noise(mV)	Overshoot (V)	Efficiency (typ)% <sup>1</sup>
HWS50-3/HD	3.3V	2.97 - 3.96	10	-	33	40	20	120	4.13-4.95	76/78
HWS100-3/HD	3.3V	2.97 - 3.96	20	-	66	40	20	120	4.13-4.95	78/81
HWS150-3/HD	3.3V	2.97 - 3.96	30	-	99	40	20	120	4.13-4.95	78/81
HWS300-3/HD	3.3V	2.64 - 3.96	60	-	198	30	20	120	4.13-4.95	74/77
HWS600-3/HD	3.3V	2.64 - 3.96	120	-	396	30	20	120	4.13-4.95	75/78
HWS1000-3/HD	3.3V	2.64 - 3.96	200	-	660	40	20	120	4.12-4.62	71/73
HWS1500-3/HD	3.3V	2.64 - 3.96	300	-	990	60	36	150	4.12-4.62	72/75
HWS50-5/HD	5V	4.0 - 6.0	10	-	50	40	20	120	6.25-7.25	82/84
HWS100-5/HD	5V	4.0 - 6.0	20	-	100	40	20	120	6.25-7.25	83/86
HWS150-5/HD	5V	4.0 - 6.0	30	-	150	40	20	120	6.25-7.25	83/86
HWS300-5/HD	5V	4.0 - 6.0	60	-	300	30	20	120	6.25-7.25	79/82
HWS600-5/HD	5V	4.0 - 6.0	120	-	600	30	20	120	6.25-7.25	80/83
HWS1000-5/HD	5V	4.0 - 6.0	200	-	1000	40	20	120	6.25-7	76/78
HWS1500-5/HD	5V	4.0 - 6.0	300	-	1500	60	36	150	6.25-7	77/81
HWS1000-6/HD	6V	4.8 - 7.2	167	-	1002	60	36	150	7.5-8.4	79/81
HWS1000-7/HD	7.5V	6.0 - 9.0	134	160	1005	60	36	150	9.37-10.5	80/82
HWS50-12/HD	12V	9.6 - 14.4	4.3	-	51.6	96	48	150	15-17.4	81/83
HWS100-12/HD	12V	9.6 - 14.4	8.5	-	102	96	48	150	15-17.4	83/86
HWS150-12/HD	12V	9.6 - 14.4	13	-	156	96	48	150	15-17.4	83/86
HWS300-12/HD	12V	9.6 - 14.4	27	-	324	72	48	150	15-17.4	80/83
HWS600-12/HD	12V	9.6 - 14.4	53	-	636	72	48	150	15-17.4	80/83
HWS1000-12/HD	12V	9.6 - 14.4	88	100	1056	100	48	150	15-17.4	82/85
HWS1500-12/HD	12V	9.6 - 14.4	125	-	1500	72	48	150	15-17.4	82/85
HWS50-15/HD	15V	12.0 - 18.0	3.5	-	52.5	120	60	150	18.8-21.8	81/83
HWS100-15/HD	15V	12.0 - 18.0	7	-	105	120	60	150	18.8-21.8	83/86
HWS150-15/HD	15V	12.0 - 18.0	10	-	150	120	60	150	18.8-21.8	83/86
HWS300-15/HD	15V	12.0 - 18.0	22	-	330	90	60	150	18.8-21.8	80/83
HWS600-15/HD	15V	12.0 - 18.0	43	-	645	90	60	150	18.8-21.8	81/84
HWS1000-15/HD	15V	12.0 - 18.0	70	80	1500	120	60	150	18.7-21.8	83/85
HWS1500-15/HD	15V	12.0 - 18.0	100	-	1500	90	60	150	18.7-21.8	83/87
HWS50-24/HD	24V	19.2 - 28.8	2.2	-	52.8	192	96	150	30-34.8	82/84
HWS100-24/HD	24V	19.2 - 28.8	4.5	-	108	192	96	150	30-34.8	84/87
HWS150-24/HD	24V	19.2 - 28.8	6.5	-	156	192	96	150	30-34.8	85/88
HWS300-24/HD	24V	19.2 - 28.8	14	16.5	336	144	96	150	30-34.8	82/85
HWS600-24/HD	24V	19.2 - 28.8	27	31	648	144	96	150	30-34.8	82/85
HWS1000-24/HD	24V	19.2 - 28.8	46	58.5	1104	150	96	150	30-34.8	85/87
HWS1500-24/HD	24V	19.2 - 28.8	65/70 (1)	105	1560	144	96	200	30-34.8	84/88
HWS1000-36/HD	36V	28.8 - 43.2	30.7	39	1104	150	144	200	45-49.7	85/88
HWS1500-36/HD	36V	28.8 - 43.2	42/46.5(2)	70	1512	150	144	200	45-49.7	84/88
HWS50-48/HD	48V	38.4 - 52.8	1.1	-	52.8	384	192	200	55.2-64.8	83/85
HWS100-48/HD	48V	38.4 - 52.8	2.1	-	100.8	384	192	200	55.2-64.8	84/87
HWS150-48/HD	48V	38.4 - 52.8	3.3	-	158.4	384	192	200	55.2-64.8	85/88
HWS300-48/HD	48V	38.4 - 52.8	7	-	336	288	192	350	55.2-64.8	82/85
HWS600-48/HD	48V	38.4 - 52.8	13	-	624	288	192	350	55.2-64.8	83/86
HWS1000-48/HD	48V	38.4 - 52.8	28	29.2	1104	300	192	200	55.2-60	86/88
HWS1500-48/HD	48V	38.4 - 52.8	32	-	1536	288	192	200	55.2-64.8	86/90
HWS1000-60/HD	60V	48.0 - 66.0	18.4	23.4	1104	360	240	400	69-75	85/88

(4) 200-265VAC Input, 10s maximum on time, 35% duty cycle

## Options

Suffix	Description
Blank	No Cover (HWS50-150 Only) HWS300-1500 the cover is fitted as standard
/HDA	The cover option for HWS50-150 is special order only HWS300-1500 the cover is fitted as standard
/RYHD	ISA 12.12.01 (UL1604) - Class 1 Div 2 with dry contact relay DC Good signal (300W, 600W and 1500W 24V output models only, no remote on/off function.)

## Other Industrial Products

LZSA	500W to 1500W Single output
DPP, DLP, DSP	10W to 960W DIN Rail Mount
PFE	300 to 1000W AC-DC Power Models

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/hws-series.htm](http://us.tdk-lambda.com/lp/products/hws-series.htm)



## 1800W 3ph Industrial Power Supplies

### Features

- ◆ Limited Lifetime Warranty
- ◆ 208VAC Three Phase Input
- ◆ High Efficiency
- ◆ SEMI F47 Compliant
- ◆ Compact Size



### Key Market Segments & Applications

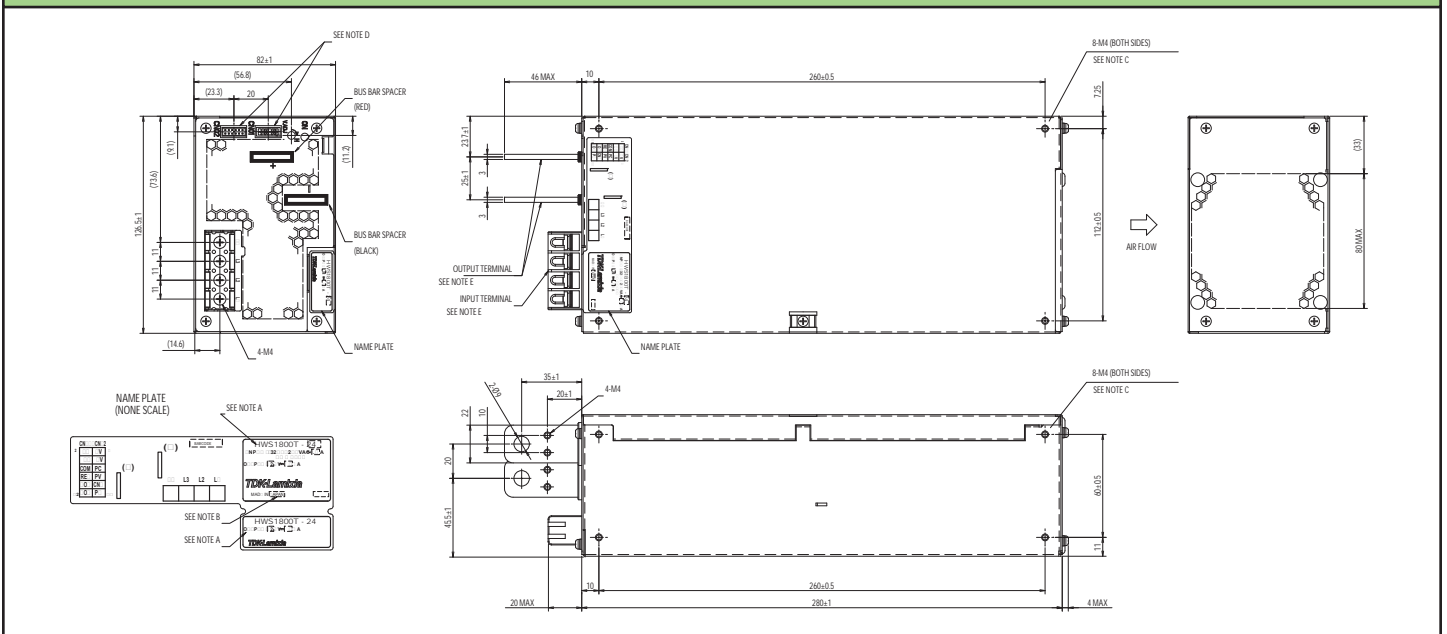


Specifications		
Model	HWS1800	
Input Voltage Range	-	208VAC, Three phase 170 - 265VAC (47 - 63Hz)
Input Current (Typical)	A	3.3V: 4.5A, 5V to 15V: 6A, 24 to 60V: 7A
Inrush Current (200VAC)	A	40A
Power Factor	-	Typically 0.94
Temperature Coefficient	-	<0.02%/°C
Overcurrent Protection	-	>105% of maximum / peak current rating
Overvoltage Protection	V	See table on page 2. Cycle input to reset or use remote on/off function
Hold Up Time (Typ)	ms	3.3V to 15V: 20ms, 24 to 60V: 18ms at 200VAC
Leakage Current (max)	mA	<2.6mA at 240VAC 60Hz
Remote Sense	-	Yes
Indicator	-	Green LED = ON
Remote on/off	-	Yes
Parallel operation	-	Single wire connection
DC Good	-	Yes
Remote Adjust (PV)	-	External voltage adjusts output voltage. See Instruction Manual
Operating Temperature	°C	-10°C to +71°C, see output derating curves, -20°C start up
Storage Temperature	°C	-30 to +85°C
Humidity (non condensing)	-	Operating: 10 - 90%RH, Non operating 10 - 95%RH
Cooling	-	Internal fan
Withstand Voltage	-	I/P to Grnd 2kVAC, I/P to O/P 3kVAC, O/P to Grnd 500VAC (1), O/P to CNT 100VAC for 1 min
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour
Shock (In package)	-	< 196.1 m/s <sup>2</sup>
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178
Line Dip	-	Complies with SEMI F47
Conducted & Radiated EMI	-	EN55011 / EN55022-A, FCC-A, VCCI-A
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8
Weight (Typ)	g	3800
Size (WxHxD)	in	4.98 x 3.23 x 11"
Warranty	yrs	Limited lifetime warranty (See Lambda's terms & conditions)

#### Notes:

(1) HWS1800T-60V: 651VAC

## Outline Drawing



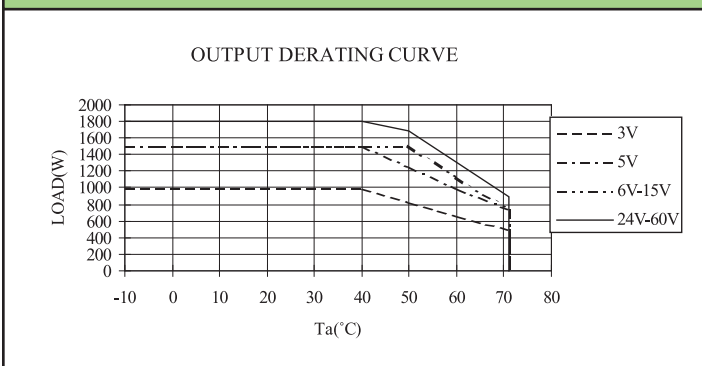
## Output Ratings

Model	Voltage V	Adjust Range V	Max Curr. A	Peak Curr. A(2)	Max Power W	Peak Power W2	Load Reg mV	Line Reg mV(3)	Ripple Noise mV	Overshoot V	Efficiency (typ) %
HWS1800T-3	3.3	2.64 - 3.96	300	-	990	-	60	36	120	4.12 - 4.62	75
HWS1800T-5	5	4 - 6	300	-	1500	-	60	36	120	6.25 - 7.0	81
HWS1800T-6	6	4.8 - 7.2	250	300	1500	1800	60	40	150	7.5 - 8.4	82
HWS1800T-7	7.5	6 - 9	200	240	1500	1800	60	40	150	9.37 - 10.5	84
HWS1800T-12	12	9.6 - 14.4	125	150	1500	1800	72	48	200	15 - 17.4	84
HWS1800T-15	15	12 - 18	100	120	1500	1800	90	60	200	18.7 - 21.8	84
HWS1800T-24	24	19.2 - 28.8	75	105	1800	2520	144	96	250	30 - 34.8	88
HWS1800T-36	36	28.8 - 43.2	50	70	1800	2520	216	144	250	45 - 49.7	88
HWS1800T-48	48	38.4 - 52.8	37.5	52.5	1800	2520	288	192	300	55.2 - 60	90
HWS1800T-60	60	48 - 66	30	42	1800	2520	360	240	400	69 - 75	90

### Notes

- (2) 10s maximum on time with 35% duty cycle
- (3) 180 - 265VAC

## Output Derating Curves



## Other Industrial Products

HWS	15W to 1500W single output, single phase
LZSA	500W to 1500W single output
SWS	50W to 1000W, low cost
DPP, DLP & DSP	10W to 960W DIN Rail mount

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/hws-series.htm](http://us.tdk-lambda.com/lp/products/hws-series.htm)



## 15-40W Medical AC-DC PCB-Mount Power Supplies

### Features

- ◆ Small size and lightweight
- ◆ PC Board Mountable
- ◆ Wide Range Input
- ◆ Medical Safety Certifications (4kVAC Input - Output)
- ◆ Class II (No ground needed)
- ◆ High efficiency



### Key Market Segments & Applications



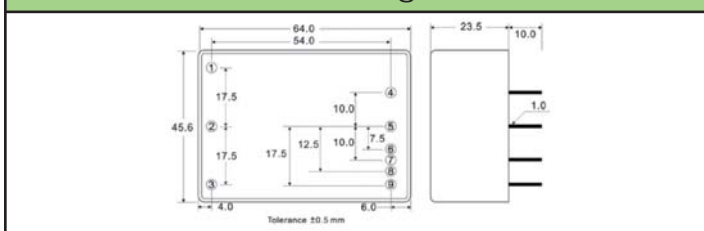
Specifications		KMS15	KMD15	KMT15	KMS40	KMD40	KMT40
Input Voltage Range	-	90-264VAC 47-440Hz or 100-375VDC					
Inrush Current Limiting	A	10 / 20A, cold start, 25°C ambient (115 / 230VAC)					
Input Current (115 / 230VAC)	mA	220 / 118mA			860 / 460mA		
Recommended External Fuse	-	2A slow blow type			3.15A slow blow type		
Temperature Coefficient	-	±0.01%/°C					
Ripple and Noise (pk-pk)	mV	50mV or 1%, whichever is greater					
Overcurrent Protection	-	> 105%, hiccup mode, automatic recovery					
Overvoltage Protection	%	Yes, Zener diode clamp					
Hold-up Time (typical)	ms	20ms			18ms		
Enclosure Leakage (240VAC 63Hz) (264VAC 63Hz)	mA	0.055 max 0.06 max			0.08 max 0.085 max		
Operating Temperature	°C	-25°C to 70°C, derate linearly to 50%(1) load from 50°C to 70°C. Max case temperature 95°C					
Storage Temperature	°C	-40°C to 100°C					
Humidity	%RH	20% to 95% RH (non-condensing)					
Cooling	-	Convection, over temperature protected ~100°C case temperature					
Withstand Voltage	VAC	Input to output: 4kVAC (Reinforced) (2 x MOPPS 3rd Edition)					
Immunity	-	EN60601-1-2					
Safety Agency Certification	-	UL60601-1, IEC60601-1, CE Mark, EN60950-1					
Conducted EMI	-	EN55011, EN55022 Class B			EN55011, EN55022 Class A		
Switching Frequency	kHz	132kHz					
Weight	g	120			280		
Size (LxWxH)	in	2.52 x 1.79 x 0.92"			3.5 x 2.5 x 1.06"		
Mounting & Case	-	PC board mountable. Plastic resin fiberglass case (UL 94V-0)					
MTBF	hrs	200,000 to 400,000 hours, model dependent					
Warranty	yrs	2 years					

(1) KM15 derates linearly to 40% load

## Output Ratings

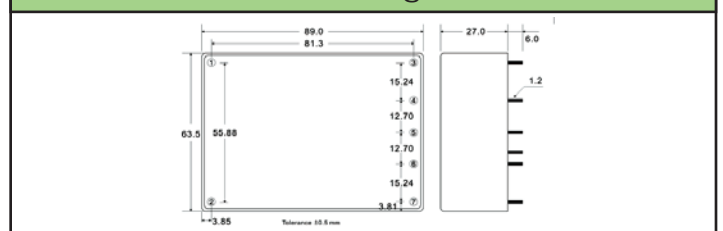
Model	Output Voltage (V)	Minimum Current (A)	Maximum Current (A)	Power (W)	Output Set Accuracy (%)	Line Regulation (%)	Load Regulation (1) (%)	Cross Regulation	Efficiency (%)
<b>Single Output</b>									
KMS15-3P3	V1 3.3V	0A	3.00A	9.9W	±2%	0.5%	1%	-	74%
KMS40-3P3	V1 3.3V	80mA	8.00A	26.4W	±2%	0.5%	1%	-	75%
KMS15-5	V1 5V	0A	3.00A	15W	±2%	0.5%	1%	-	78%
KMS40-5	V1 5V	80mA	8.00A	40W	±2%	0.5%	1%	-	79%
KMS15-9	V1 9V	0A	1.67A	15W	±2%	0.5%	1%	-	79%
KMS40-9	V1 9V	44mA	4.44A	40W	±2%	0.5%	1%	-	82%
KMS15-12	V1 12V	0A	1.25A	15W	±2%	0.5%	1%	-	81%
KMS40-12	V1 12V	33mA	3.33A	40W	±2%	0.5%	1%	-	83%
KMS15-15	V1 15V	0A	1.00A	15W	±2%	0.5%	1%	-	81%
KMS40-15	V1 15V	26.7mA	2.67A	40W	±2%	0.5%	1%	-	83%
KMS15-24	V1 24V	0A	0.62A	15W	±2%	0.5%	1%	-	83%
KMS40-24	V1 24V	16.7mA	1.67A	40W	±2%	0.5%	1%	-	83%
<b>Dual Output</b>									
KMD15-55	V1 +5V	150mA	1.5A	15W	±2%	0.5%	1%	5%	78%
	V2 -5V	150mA	1.5A		±2%	0.5%	1%	5%	
KMD40-55	V1 +5V	400mA	4A	40W	±2%	0.5%	1%	5%	79%
	V2 -5V	400mA	4A		±2%	0.5%	1%	5%	
KMD40-512	V1 5V(2)	1250mA	5A	40W	±3%	0.5%	2%	1%	80%
	V2 12V(2)	312mA	1.25A		±5%	5.0%	6%	7%	
KMD40-524	V1 5V(2)	1250mA	5A	40W	±3%	0.5%	2%	1%	80%
	V2 24V(2)	156mA	0.625A		±5%	5.0%	6%	7%	
KMD15-1212	V1 +12V	62.5mA	0.625A	15W	±2%	0.5%	1%	3%	80%
	V2 -12V	62.5mA	0.625A		±2%	0.5%	1%	3%	
KMD40-1212	V1 +12V	166mA	1.66A	40W	±2%	0.5%	1%	5%	83%
	V2 -12V	166mA	1.66A		±2%	0.5%	1%	5%	
KMD15-1515	V1 +15V	50mA	0.5A	15W	±2%	0.5%	1%	3%	81%
	V2 -15V	50mA	0.5A		±2%	0.5%	1%	3%	
KMD40-1515	V1 +15V	133mA	1.33A	40W	±2%	0.5%	1%	5%	81%
	V2 -15V	133mA	1.33A		±2%	0.5%	1%	5%	
<b>Triple Output</b>									
KMT15-51212	V1 5V(3)	500mA	2A	15W	±2%	0.5%	1%	1%	78%
	V2 +12V	50mA	0.2A		±3%	2.0%	5%	5%	
	V3 -12V	50mA	0.2A		±3%	2.0%	5%	5%	
KMT40-51212	V1 5V(3)	1250mA	5A	40W	±3%	0.5%	3%	3%	80%
	V2 +12V	150mA	0.6A		±5%	5.0%	7%	7%	
	V3 -12V	150mA	0.6A		±5%	5.0%	7%	7%	
KMT15-51515	V1 5V(3)	500mA	2A	15W	±2%	0.5%	1%	1%	78%
	V2 +15V	37.5mA	0.15A		±3%	2.0%	5%	5%	
	V3 -15V	37.5mA	0.15A		±3%	2.0%	5%	5%	
KMT40-51515	V1 5V(3)	1250mA	5A	40W	±3%	0.5%	3%	3%	80%
	V2 +15V	125mA	0.5A		±5%	5.0%	7%	7%	
	V3 -15V	125mA	0.5A		±5%	5.0%	7%	7%	

## KM15 Outline Drawings



- (1) Symmetrical loading, from minimum to maximum load
- (2) Output V1 is isolated from output V2
- (3) Output V1 is isolated from outputs V2 & V3

## KM40 Outline Drawings



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/km-series.htm](http://us.tdk-lambda.com/lp/products/km-series.htm)



## 4 to 15W AC-DC Board Mount Power Supplies

### Features

- ◆ Low profile
- ◆ Smaller footprint
- ◆ PC board Mountable
- ◆ Low Cost
- ◆ UL Class II Approved
- ◆ Wide input range
- ◆ No external components needed



### Key Market Segments & Applications



Specifications		KPS-5	KPS-10	KPS-15
Input Voltage range	-	85 - 264VAC (47 - 440Hz) or 110 - 370VDC		
Inrush Current	A	30A at 240VAC, cold start at 25°C		
Input Current (115/230VAC)	A	0.13 / 0.07	0.27 / 0.13	0.4 / 0.2
Leakage Current	mA	0.25mA maximum		
Temperature Coefficient	-	±0.05%/°C		
Voltage Accuracy	-	±1%		
Minimum Load	A	None		
Load Regulation	-	±1% (10% to 100% load)		
Line Regulation	-	±0.5% (100-240VAC line change)		
Ripple & Noise (1)	mV	1% or 50mV whichever is greater		
Short Circuit Protection	-	Continuous - hiccup mode		
Overvoltage Protection	V	130-150%, Zener clamp		
Efficiency (typical)	%	72%	75%	75%
Hold Up Time (Typ@115VAC input)	ms	8ms at full load		
LED Indicator	-	Green LED = OK		
Operating Temperature (2)	°C	Convection cooling: 0 to +70°C, derating linearly to 25% load from 40 to 70°C		
Storage Temperature	°C	-20 to +85°C		
Humidity (non condensing)	-	10 - 95% RH		
Cooling	-	Convection or forced air		
Withstand Voltage	-	Input to Output 3kVAC		
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)		
Shock	-	< 196.1 m/s <sup>2</sup> (20G)		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, Class II, CE Mark		
Conducted & Radiated EMI	-	EN55022-B, FCC Class B		
Immunity	-	EN61000-4 -2, -3, -4, -5, -6		
Weight (Typ)	g(oz)	29g (1oz)	60g (2oz)	80g (2.8oz)
Size (WxLxH; H above pcb)	in.	1.28 x 2.17 x 0.83	1.55 x 2.40 x 0.9	1.77 x 2.75 x 0.79
Warranty	yr	One Year		

#### Notes:

- (1) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW
- (2) 20CFM forced air ratings:
  - KPSA5: 0 - 70°C full load
  - KPSA10: 0 - 70°C full load (3.3V & 5V models derate linearly to 80% load from 50 to 70°C)
  - KPSA15: 0 - 70°C derate linearly to 80% load from 50 to 70°C

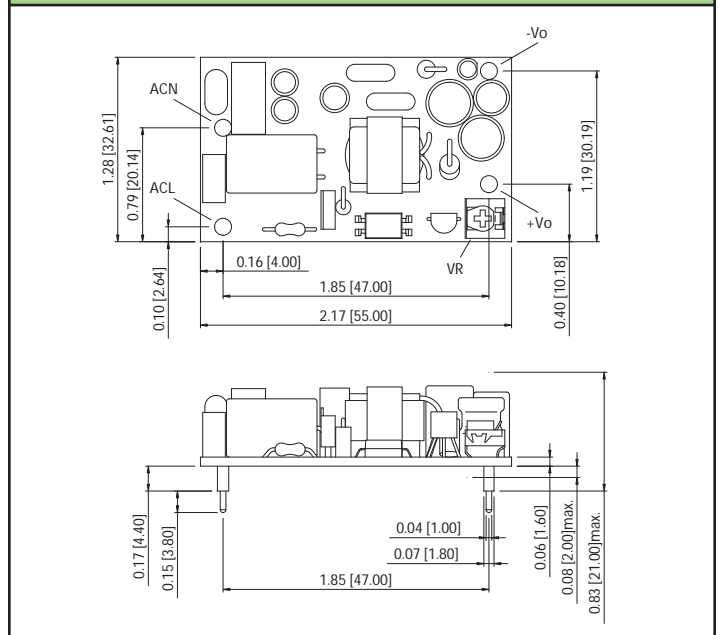
## Model Selector (other voltages available)

Model	Output Voltage (V)	Maximum Output (A)	Peak Load (A)(3)	Output Pwr (W)
KPSA5-3R3	3.3	1.25	-	4.1
KPSA5-5	5	1.0	-	5.0
KPSA5-12	12	0.42	-	5.0
KPSA5-15	15	0.33	-	5.0
KPSA5-24	24	0.23	-	5.5
KPSA10-3R3	3.3	2.5	3.8	8.3
KPSA10-5	5	2.0	2.8	10.0
KPSA10-12	12	0.84	1.2	10.1
KPSA10-15	15	0.67	1.0	10.1
KPSA10-24	24	0.42	0.65	10.1
KPSA15-3R3	3.3	3.0	4.5	9.9
KPSA15-5	5	3.0	4.5	15.0
KPSA15-12	12	1.25	1.8	15.0
KPSA15-15	15	1.0	1.5	15.0
KPSA15-24	24	0.63	0.95	15.1

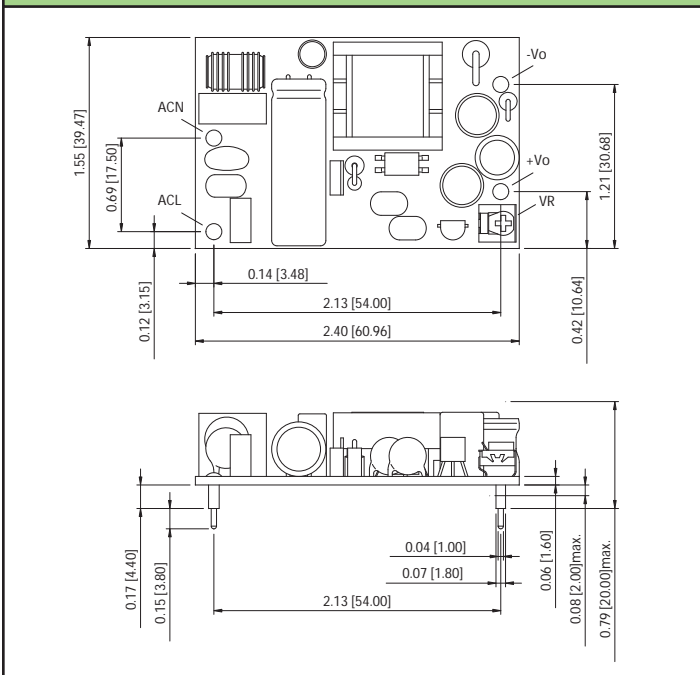
### Notes

(3) Average not to exceed max power, <30s, 10% duty cycle

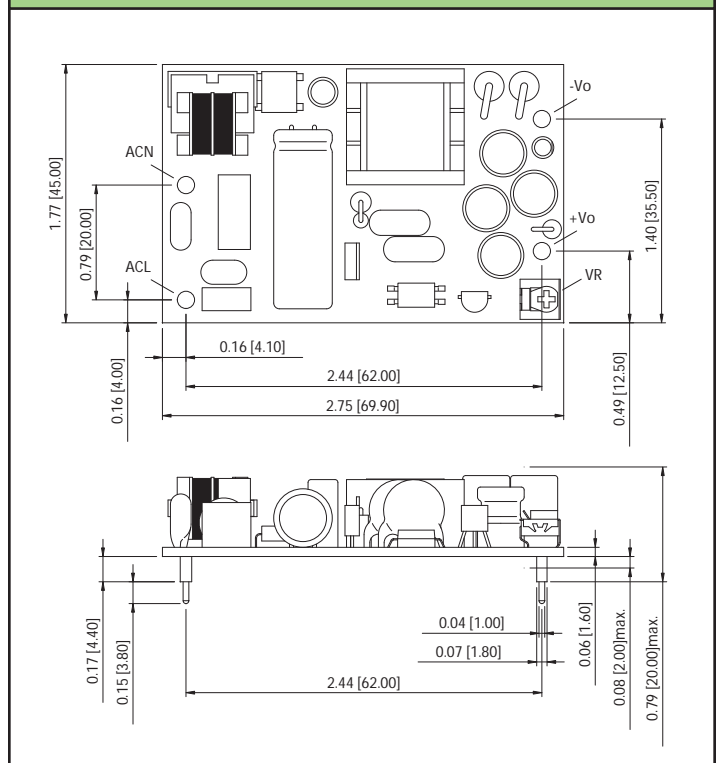
## KPSA5 Outline Drawing



## KPSA10 Outline Drawing



## KPSA15 Outline Drawing



## Other Industrial Products

ZPSA	20W to 60W
KM	15 to 40W pcb mount medical
ZWS	5 to 240W, single output

For Additional Information, please visit [us.tdk-lambda.com/lp/products/kps-series.htm](http://us.tdk-lambda.com/lp/products/kps-series.htm)



## Single Output General Purpose Power Supplies

### Features

- ◆ Very low cost
- ◆ 25W to 150W
- ◆ Small size
- ◆ 115VAC or 230VAC input
- ◆ Withstands 300VAC surges (5s)
- ◆ Three year warranty



### Key Market Segments & Applications



Specifications		LS25	LS35	LS50	LS75	LS100	LS150	
AC Input Voltage (300VAC for 5s)	VAC	88 - 264VAC (See note (2) for LS100)						88-132/176-264VAC(1)
Input Frequency	Hz	47 - 63Hz						
DC Input Voltage	VDC	125 - 373VDC						248 - 273VDC
Inrush Current (230VAC, cold start)	A	30	40	40	40	60	40	
Power Factor	-	Meets EN61000-3-2, -3						
Input Current (115/230VAC)	A	0.7 / 0.4	0.8 / 0.55	1.3 / 0.8	1.6 / 1.0	2.2 / 1.2	3.5 / 2	
Temperature Coefficient	-	<0.02%/°C						
Overcurrent Protection	-	> 110%						
Overvoltage Protection	V	3.3V: 3.8-4.45V, 5V: 5.75-6.75V, 12V: 13.8-16.2V, 15V: 17.25-20.25V, 24V: 27.6-32.4V, 36V: 41.4-48.6V, 48V: 55.2-64.8V						
Hold Up Time (115 / 230V input)	ms	14 / 80	12 / 80	14 / 60	14 / 60	25 / 150	20 / 28	
Leakage Current (230VAC 60Hz)	mA	<1mA						
Remote Sense	-	No						
LED Indicator	-	Green LED = On						
Operating Temperature	°C	-25 to +70°C. Derate linearly to 50% load from +50 to +70°C (2)						
Storage Temperature	°C	-40 to +85°C						
Operating Humidity	-	20 - 90% RH (non condensing)						
Storage Humidity	-	10 - 95% RH (non condensing)						
Cooling	-	Convection						
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.						
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC						
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour						
Shock	-	< 196.1 m/s <sup>2</sup> (20G)						
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11						
Safety Agency Approvals	-	UL60950-1, EN60950-1, IEC60950-1, CE Mark						
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC-B						
MTBF (MIL-HDBK-217F)	hrs	906,997	706,464	712,890	648,786	545,375	505,393	
Weight (Typ)	g	170	270	350	410	600	700	
Size (LxWxH)	in	3.1 x 2.0 x 1.1	3.9 x 3.2 x 1.4	3.9 x 3.8 x 1.4	5.1 x 3.8 x 1.5	6.3 x 3.8 x 1.5	7.8 x 3.9 x 1.5	
Warranty	yrs	Three Years						

#### Notes:

- (1) Switch selectable for 115 or 230VAC
- (2)
 

LS25-3	Derate linearly to 60% load from +40 to +70°C.
LS50, LS75-3 & -5	Derate linearly to 70% load from +50 to +70°C.
LS25-5 to 48, LS75-12 to 48	Derate linearly to 60% load from +50 to +70°C.
LS100-3 & -5	Derate linearly to 60% load from +45 to +70°C. Derate linearly to 80% load from 115V to 88VAC input.
LS100-12, -15, -24, -36, -48	Derate linearly to 60% load from +50 to +70°C. Derate linearly to 80% load from 115V to 88VAC input.
LS150-3 & -5,	Derate linearly to 50% load from +40 to +70°C.
LS150-12, -15, -24, -36, -48	Derate linearly to 70% load from +50 to +70°C.



Output Ratings							
Model	Voltage	Adjust Range (V)	Max Current (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) %
LS25-3.3	3.3V	2.85 - 3.6	6.0	40	20	80	75
LS25-5	5V	4.5 - 5.5	5.0	40	20	80	79
LS25-12	12V	10.8 - 13.2	2.1	96	48	120	83
LS25-15	15V	13.5 - 16.5	1.7	120	60	120	83
LS25-24	24V	22 - 27.6	1.1	192	96	120	84
LS25-36	36V	32 - 40	0.75	288	144	150	84
LS25-48	48V	42 - 54	0.57	384	192	200	85
LS35-3.3	3.3V	2.85 - 3.6	7.0	40	20	80	75
LS35-5	5V	4.5 - 5.5	7.0	40	20	80	78
LS35-12	12V	10.8 - 13.2	3.0	96	48	120	82
LS35-15	15V	13.5 - 16.5	2.4	120	60	120	83
LS35-24	24V	22 - 27.6	1.5	192	96	120	84
LS35-36	36V	32 - 40	1.0	288	144	150	84
LS35-48	48V	42 - 54	0.8	384	192	200	84
LS50-3.3	3.3V	3.0 - 3.6	10.0	40	20	80	75
LS50-5	5V	4.75 - 5.5	10.0	40	20	80	80
LS50-12	12V	10.8 - 13.2	4.2	96	48	120	84
LS50-15	15V	13.5 - 16.5	3.4	120	60	120	85
LS50-24	24V	22 - 27.2	2.2	192	96	120	86
LS50-36	36V	32 - 40	1.4	288	144	150	86
LS50-48	48V	42 - 54	1.1	384	192	200	86
LS75-3.3	3.3V	3.0 - 3.6	15.0	40	20	80	75
LS75-5	5V	4.75 - 5.5	12.0	40	20	80	79
LS75-12	12V	10.8 - 13.2	6.0	96	48	120	84
LS75-15	15V	13.5 - 16.5	5.0	120	60	120	85
LS75-24	24V	22 - 27.2	3.2	192	96	120	86
LS75-36	36V	32 - 40	2.1	288	144	150	86
LS75-48	48V	42 - 54	1.6	384	192	200	87
LS100-3.3	3.3V	3.0 - 3.6	20.0	40	20	80	75
LS100-5	5V	4.75 - 5.5	16.0	40	25	80	79
LS100-12	12V	10.8 - 13.2	8.5	96	48	120	82
LS100-15	15V	13.5 - 16.5	7.0	120	60	120	84
LS100-24	24V	22 - 27.2	4.5	192	96	120	86
LS100-36	36V	32 - 40	3.0	288	144	150	86
LS100-48	48V	42 - 54	2.3	384	192	200	86
LS150-3.3	3.3V	3.0 - 3.6	30.0	40	20	80	75
LS150-5	5V	4.75 - 5.5	26.0	40	20	80	79
LS150-12	12V	10.8 - 13.2	12.5	96	48	120	83
LS150-15	15V	13.5 - 16.5	10.0	120	60	120	85
LS150-24	24V	22 - 27.2	6.5	192	96	120	86
LS150-36	36V	32 - 40	4.3	288	144	150	87
LS150-48	48V	42 - 54	3.3	384	192	200	87

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/ls-series.htm](http://us.tdk-lambda.com/lp/products/ls-series.htm)



## Single Output 150 - 200W General Purpose Power Supplies

### Features

- ◆ Very low cost
- ◆ Small Size
- ◆ Wide Range AC Input
- ◆ Convection or Fan Cooled
- ◆ Three year warranty
- ◆ 1.6" high (For 1U racking)



### Key Market Segments & Applications



Specifications		LS200 (Enclosed style with internal fan)	LS200/L (U channel style - no internal fan)
Model		LS200 (Enclosed style with internal fan)	LS200/L (U channel style - no internal fan)
AC Input Voltage (300VAC for 5s)	VAC	85 - 264VAC	85 - 264VAC (3)
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage	VDC	120 - 373VDC	
Inrush Current (230VAC, cold start)	A	60	
Power Factor	-	Meets EN61000-3-2, -3 (Typical PF 0.98/0.95)(1)	
Input Current (115/230VAC)	A	3.5 / 1.7 (typical)	
Temperature Coefficient	-	<0.02%/°C (0 - 50°C)	
Overcurrent Protection	-	>105% of nominal or peak. Constant current style	
Overvoltage Protection (2)	V	3.3V: 3.8 - 4.45V, 5V: 5.75 - 6.75V, 7.5V: 8.6 - 10.1V, 12V: 15.1 - 17.75V 15V: 17.25 - 20.25V, 24V: 30.25 - 35.5V, 36V: 41.4 - 48.6V, 48V: 60 - 69.6V	
Overtemperature Protection (2)	-	Yes	
Hold Up Time (115/230V input)	ms	20ms	
Leakage Current (230VAC 60Hz)	mA	<1mA	
Remote Sense	-	Yes	
Remote On/Off	-	On: 0 - 0.8V; Off: 3 - 12V	
LED Indicator	-	Green LED = On	
Operating Temperature	°C	Fan or forced air rating: -25 to +70°C. Derate linearly to 60% load from +50 to +70°C	
Storage Temperature	°C	-40 to +85°C	
Operating Humidity	-	20 - 90% RH (non condensing)	
Storage Humidity	-	10 - 95% RH (non condensing)	
Cooling	-	Internal Fan (air exhausts from fan end)	Convection or customer supplied airflow
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.	
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s <sup>2</sup> (20G)	
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Approvals	-	UL60950-1, CSA60950-1 (cUL), IEC60950-1 2nd Edition, CE Mark	
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC--B	
Weight (Typ)	g	700	600
Size (LxWxH)	in	7.8 x 3.9 x 1.61"	
Warranty	yrs	Three Years	

### Notes:

- (1) 115 / 230VAC input
- (2) Recycle AC to reset
- (3) (Derate linearly to 65% load from 115VAC to 85VAC)

## Output Ratings

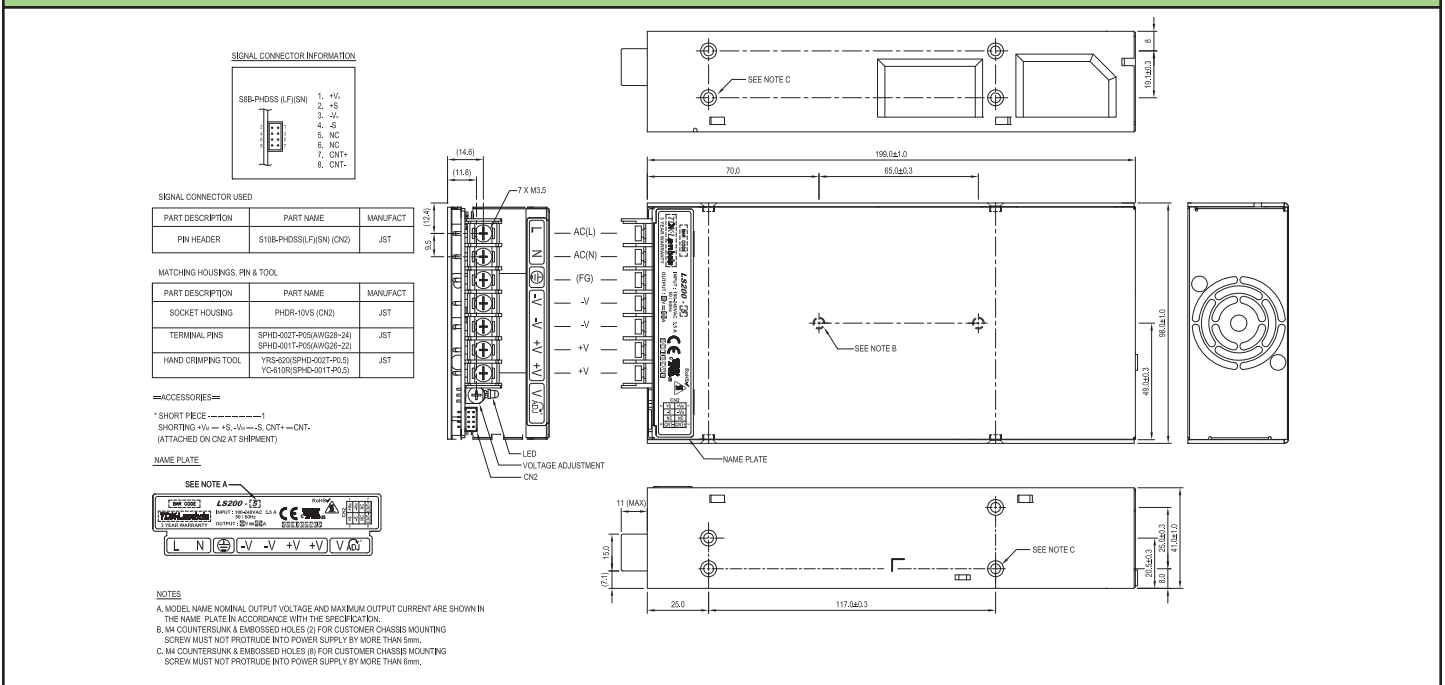
Model	Adjust Range Voltage (V)	Max Current Forced Air(A) <sup>(4)</sup>	Max Current Convect.(A) <sup>(5)</sup>	Peak Current (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % <sup>(1)</sup>
LS200-3.3	3.3V	3.0 - 3.6	40.0	N/A	-	40	16	80 / 68
LS200-5	5V	4.75 - 5.5	40.0	N/A	-	40	20	80 / 75
LS200-7.5	7.5V	6.8 - 8.2	26.7	N/A	-	40	20	80 / 77
LS200-12	12V	10.8 - 14.4	16.7	N/A	-	96	48	76 / 79
LS200-15	15V	13.5 - 16.5	13.4	N/A	-	120	60	80 / 83
LS200-24	24V	22 - 28.8	8.4	N/A	10.4	192	96	82 / 84
LS200-36	36V	32 - 40	5.6	N/A	6.9	288	144	82 / 85
LS200-48	48V	42 - 57.6	4.2	N/A	-	384	192	82 / 85
LS200-3.3/L	3.3V	3.0 - 3.6	40.0	26	-	40	16	67 / 68
LS200-5/L	5V	4.75 - 5.5	40.0	26	-	40	20	72 / 75
LS200-7.5/L	7.5V	6.8 - 8.2	26.7	17.3	-	40	20	74 / 77
LS200-12/L	12V	10.8 - 14.4	16.7	11.6	-	96	48	76 / 79
LS200-15/L	15V	13.5 - 16.5	13.4	9.3	-	120	60	80 / 83
LS200-24/L	24V	22 - 28.8	8.4	5.8	10.4	192	96	82 / 84
LS200-36/L	36V	32 - 40	5.6	3.9	6.9	288	144	82 / 85
LS200-48/L	48V	42 - 57.6	4.2	2.9	-	384	192	82 / 85

**Notes**

(4) With internal fan version LS200-xx or LS200-xx/L version with external airflow.

(5) See Installation manual for derating curve.

## Outline Drawing



## Other Related Products

LS25 - 150	25W to 150W low cost
HWS15 - 1800	15W to 1800W limited lifetime warranty
SWS300 - 1000	300 to 1000W single output

## Options

Suffix	Description
/L	No cover or fan (U channel)
Blank	Cover and fan

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/lis-series.htm](http://us.tdk-lambda.com/lp/products/lis-series.htm)



## Single Output Industrial Power Supplies

### Features

- ◆ 5 Year Warranty
- ◆ -40°C to +71°C Operation
- ◆ MIL-STD-810E Vibration / Shock
- ◆ Input transient protected
- ◆ UL508, SEMIF47, Factory Mutual (Class 1, Division 2)
- ◆ Rugged mechanical design with coating on pcbs
- ◆ Superior thermal design
- ◆ Wide range adjustment of output



### Key Market Segments & Applications



Specifications		LZSA500	LZSA1000	LZSA1500
Input Voltage (47-440Hz) (*)	-	85 - 265VAC (LZSA1500 - see output derating graphs on page 2), 100-380VDC (1)		
Inrush Current (110 / 220VAC)	A	25 / 45A	30 / 40A	
Power Factor	-	EN61000-3-2 Class A		
Efficiency (typical)	%	84%		
Ripple & Noise (Pk-Pk)(max)	-	75mV	75mV	24V: 75mV; 48V: 150mV
Line Regulation	%	0.1%		
Load Regulation	%	0.1%		
Transient Response	-	±1% deviation, recovering to ±0.2% in <1.25ms (25% load change)		
Overcurrent Protection	-	110 - 130%		
Overvoltage Protection	V	User adjustable from front panel		
Thermal Protection	-	Internal thermostat. Recycle AC to reset		
Hold Up Time at 110VAC	ms	20ms Hold Up, 20ms Ride Through		
Remote Sense	-	Compensates for a total of 1V cable drop		
Remote Adjust	-	Using front panel potentiometer, Resistance (1k/V), or Voltage (1V/V)		
Remote On / Off	-	TTL compatible, active high		
Signals	-	Optocoupled transistor for AC Fail, DC Good, Inverter OK. 200kHz sync signal (Ref-sense)		
Indicators	-	Green LED indicates output good, red LED indicates overvoltage or over temperature		
Parallel Connection	-	Single wire current share		
Operating Temperature	°C	-40° to +71°C, derate linearly to 60% load from 60°C~71°C (20 min warm up period needed for <-30°C)		
Storage Temperature	°C	-40° to +85°C		
Temperature Coefficient	-	0.01%/°C		
Humidity (non condensing)	%RH	10 - 90%RH		
Cooling	-	Internal fan		
Withstand Voltage	-	Input - Ground 2,121VDC, Input - Output 4,242VDC, Output - Ground 500VDC		
Vibration	-	MIL-STD-810E, Method 514.4, Category 1, 9		
Shock	-	MIL-STD-810E, Method 516.4 Proc. I, II, IV, VI		
Safety Agency Certifications	-	UL/CSA60950-1, UL508, EN60950-1, FM 3600, 3611, 3810, & CE Mark. SEMIF47(>100VAC)		
Leakage current	uA	<500uA at 265VAC, 60Hz		
Emissions	-	EN55022/EN55011 Class B, EN61000-3-3, MIL STD 461/462D CE102		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11. IEEE C62.41 (6kV/30 Ohm, Criteria A)		
Altitude	m	3,000m operating, 12,000m non operating		
Weight	lbs	6.5	8.1	
Size (WxHxD)(w/o bus bars)	ins	4.25 x 4.75 x 10.25	5.62 x 4.75 x 10.5	
Warranty	yrs	Five Years		

(1) Startup > 110VDC

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes) (\*) Reduced power factor above 63Hz



## 2 x 4" 55W to 67W AC-DC Power Supplies

### Features

- ◆ Medical & ITE Certifications
- ◆ BF Rated
- ◆ Very Low 1" profile
- ◆ Industry Standard Footprint
- ◆ Up to 89% Efficient
- ◆ <0.3W Off-load Power Draw



### Key Market Segments & Applications



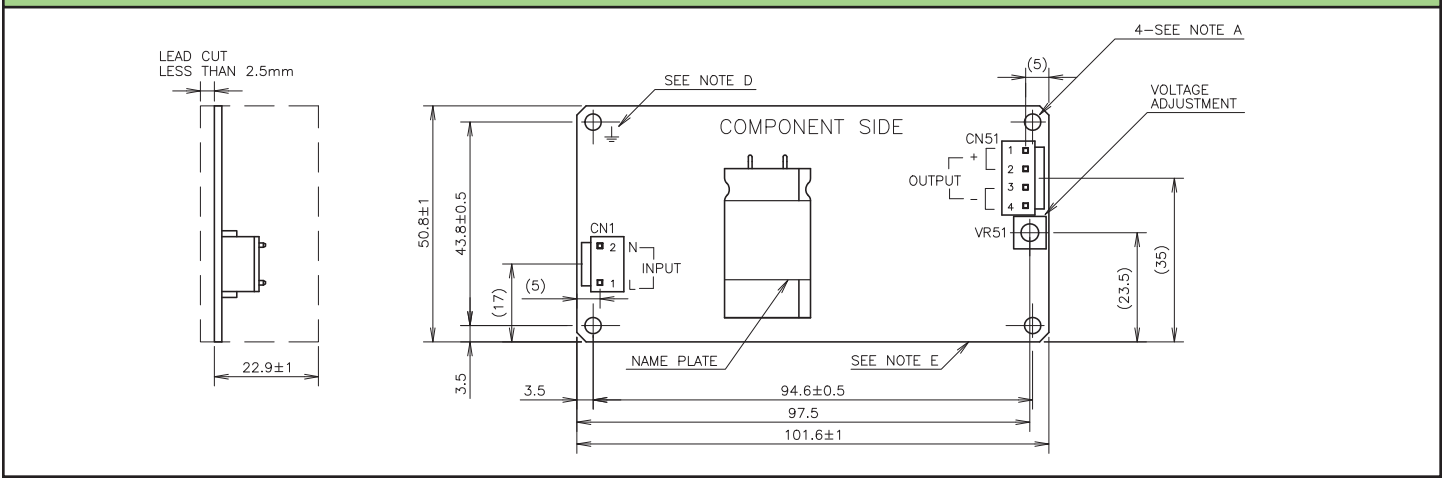
### Specifications

Model	MWS65	
AC Input Voltage Range	-	85 - 265VAC (47 - 440Hz)
DC Input Voltage Range	-	120 - 370VDC
Input Current (115 / 230VAC)	A	1.25 / 0.62A (Cold Start)
Inrush Current (115 / 230VAC)	A	30 / 60A
Temperature Coefficient	-	±0.02%/°C
Minimum Load	-	None
Off-load Power Draw	W	<0.3W at 230VAC
Overcurrent Protection	%	> 105%
Overvoltage Protection	%	115 - 135%
Load Regulation	%	0.8%
Line Regulation	%	0.4%
Hold Up Time (Typ)	ms	10ms / 20ms (115VAC / 230VAC input)
Leakage Current	mA	<0.25mA at 265VAC, 63Hz
Operating Temperature	°C	-20 to +70°C, derate linearly to 50% load from 50 to 70°C, Guaranteed start up at -25°C
Cooling	-	Convection
Operating Humidity (non condensing)	%RH	10 - 90% RH
Storage Temperature	°C	-40 to +85°C
Storage Humidity (non condensing)	%RH	10 - 95% RH
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 4kVAC, Output to Ground 1.5kVAC for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	19.6m/s <sup>2</sup> (10 - 500Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s <sup>2</sup> (20G), MIL-STD810-F
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 (OV II), CE Mark UL60601-1, EN60601-1 (2nd & 3rd edition)
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC Class B, VCCI-B
Immunity	-	EN61000-4-2 (lv 2,3), -3 (lv 3), -4 (lv 3), -5 (lv 2,3), -6 (lv3), -8 (lv4), -11
Weight (Typ)	g	150
Size (WxLxH)	in	2 x 4 x 1" (including underside components)
Warranty	yrs	Three Years

## Model Selector

Model	Output Voltage (V)	Adjustment Range (V)	Maximum Output (A)	Output Power (W)	Ripple/Noise (mV)	Efficiency (115/230VAC) (%)
MWS65-5	5V	4.5 - 5.5V	11A	55	120mV	80 / 82
MWS65-12	12V	10.8 - 13.2V	5A	60	150mV	84 / 86
MWS65-15	15V	13.5 - 16.5V	4.4A	66	150mV	85 / 87
MWS65-24	24V	21.6 - 26.4V	2.8A	67.2	150mV	86 / 88
MWS65-48	48V	43.2 - 52.8V	1.4A	67.2	200mV	87 / 89

## Outline Drawings



## Other Medical AC-DC Products

KM	15 - 40W, 1 - 3 Outputs, Encapsulated
NV175, NV300	175 - 300W, 1 - 5 Outputs
EFE-M	300 - 400W, 1 Output
NV350, NV700	350 - 900W, 1 - 8 Outputs, Modular
Vega	450 - 900W, 1 - 11 Outputs, Modular
Alpha	1000W, 1 - 14 Outputs, Modular
SWS1000L	1000W, 1 Output

For Additional Information, please visit [us.tdk-lambda.com/lp/products/mws-series.htm](http://us.tdk-lambda.com/lp/products/mws-series.htm)



## High Reliability 15 to 90W Linear Power Supplies

### Features

- ◆ Single and Dual Outputs
- ◆ Excellent Line & Load Regulation
- ◆ Remote Programming and Current Share (NNS)
- ◆ Front Panel Voltage Taps
- ◆ Thermal Protection
- ◆ Five Year Warranty
- ◆ Low Output Ripple
- ◆ Fully Featured
- ◆ Operation from -20 to +71°C Ambient



### Key Market Segments & Applications



Specifications		NNS15	NNS30	NNS50	NND15	NND30
AC Input	VAC	85~115, 98~132, 170~230, 195~265VAC (Front panel selectable)				
Input Frequency	Hz	47~440Hz				
EMI	-	FCC Class B, VDE0871 Level B				
Output Adjustment	-	±10%				
Remote Sense	-	Yes	Yes	Yes	None	
Remote Programming	-	1000 Ohm/Volt			None	
Parallel Operation	-	Via PC Terminal			None	
Output Indicator	-	LED = On				
Line Regulation	%	0.01%				
Load Regulation	%	0.03%				
Cross Regulation	%	Not applicable			0.03%	
Ripple and Noise	mV	1mV rms, 3mV peak to peak				
Overcurrent Protection	%	105 to 130%				
Overvoltage Protection	VDC	5V: 6 ~ 7.2V, 12V: 14.5 ~ 17.2V, 15V: 18.1 ~ 21.5V, 24V: 29 ~ 34.3V				
Cooling	-	Convection				
Operating Temp. Range	°C	-20°C: 60%, 0 to 50°C: 100%, 60°C: 60%, 71°C: 40%				
Storage Temperature	°C	-40 to +85°C				
Temperature coefficient	%	±0.02% per °C				
Humidity (non condensing)	%RH	Operating: 20 - 95% RH, Non operating: 10 - 95% RH				
Vibration	-	10-55Hz Amplitude (sweep for 1 min), <2G X, Y, Z 1 hour each				
Shock (in package)	-	<20G				
Safety Agency Approval	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark				
Withstand Voltage	-	Input to Output: 3.75kVAC, Input to Chassis: 2.5kVAC for 1 minute				
Isolation Resistance	-	>100M at 500VDC @ 25C & 70%RH for 1 minute				
Weight	g	1750	2930	4200	1750	2750
Size WxHxD	mm	60x124x124	80x124x178	97x113x200	60x113.5x150	80x113.5x164
Warranty	yrs	Five years				

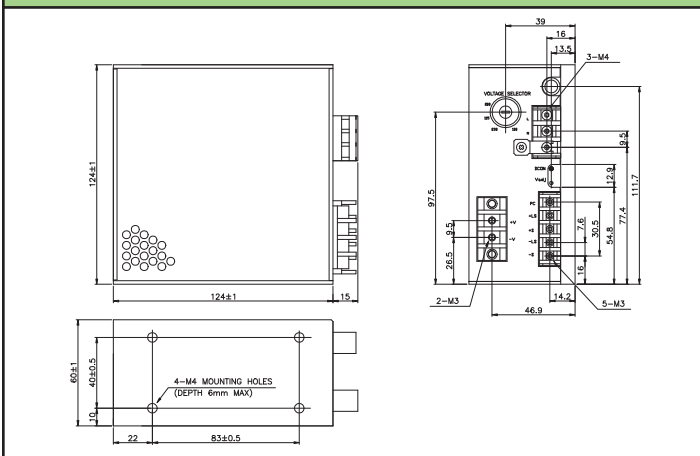
Note: See Installation Manual for full details, test methods of parameters and application notes



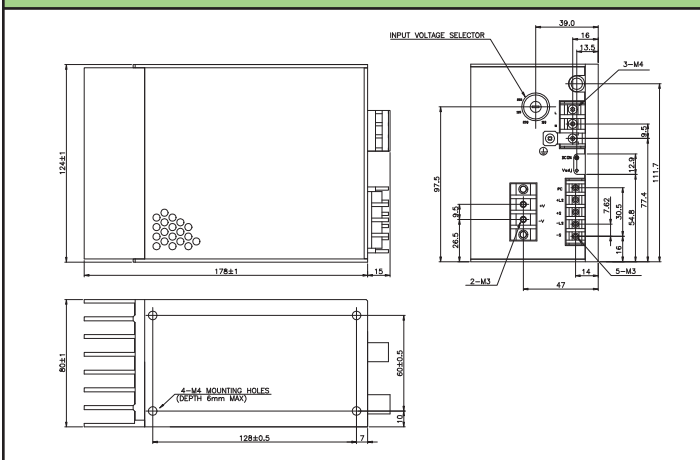
## Model Selector

	Model	O/P	O/P(V)	Max Cur.(A)	Max Pwr(W)	Eff. (%)
Single Output	NNS155	V1	5	3.0	15.0	35
	NNS305	V1	5	6.0	30.0	35
	NNS505	V1	5	10.0	50.0	42
	NNS1512	V1	12	1.7	20.4	45
	NNS3012	V1	12	4.0	48.0	45
	NNS5012	V1	12	6.5	78.0	51
	NNS1515	V1	15	1.4	21.0	46
	NNS3015	V1	15	3.4	51.0	46
	NNS5015	V1	15	5.5	82.5	53
	NNS1524	V1	24	0.9	21.6	50
Dual Output	NND15-1212	V1	+12	0.75	18.0	45
		V2	-12	0.75		
	NND30-1212	V1	+12	1.6	38.4	45
		V2	-12	1.6		
	NND15-1515	V1	+15	0.6	18.0	45
		V2	-15	0.6		
	NND30-1515	V1	+15	1.3	39.0	45
		V2	-15	1.3		

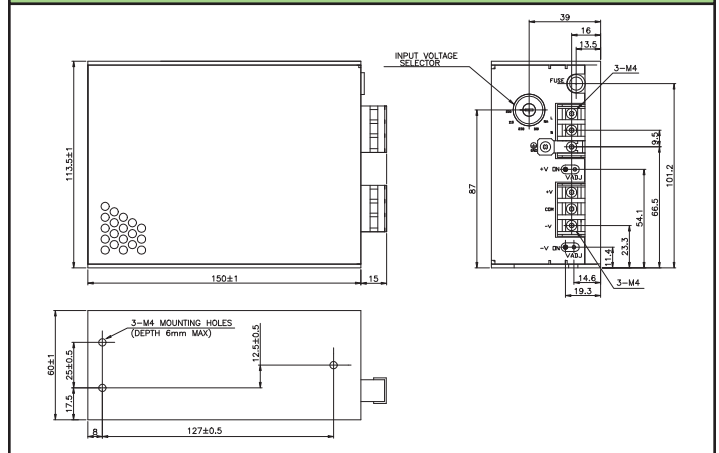
## NNS15 Outline Drawing



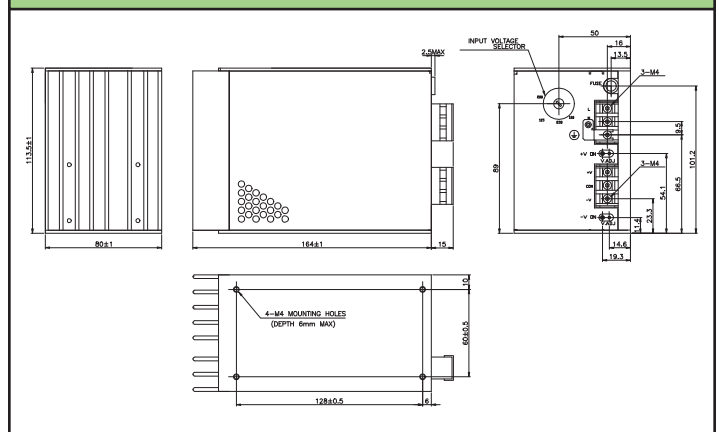
## NNS30 Outline Drawing



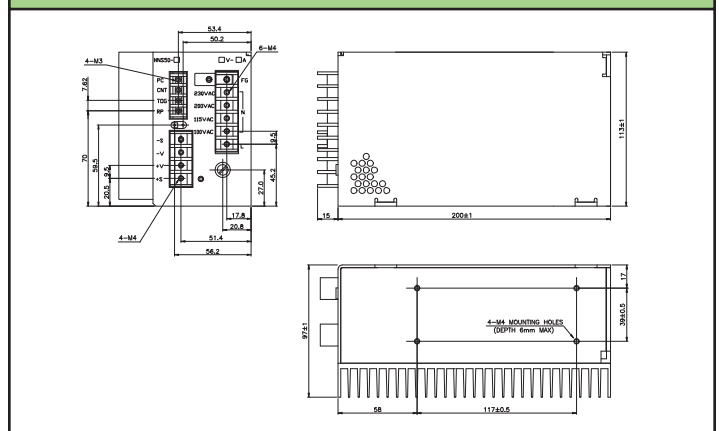
## NND15 Outline Drawing



## NND30 Outline Drawing



## NNS50 Outline Drawing



## Other Industrial Products

- HWS 15 to 1500W Single output, universal input switching
- ZWS 5 to 150W single output, universal input (switching)
- VSB & VSC 10 to 150W single output, 115VAC input (switching)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/nn-series.htm](http://us.tdk-lambda.com/lp/products/nn-series.htm)



## 3" x 5" 175-200W Power Supplies

### Features

- ◆ 1-5 Outputs
- ◆ Up to 90% Efficient
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ No Minimum Loads
- ◆ Medical Approvals (Basic Insulation Input-Output)



### Key Market Segments & Applications



Specifications		
Model	NV175	
Input Voltage range	-	90 - 264VAC (47 - 63Hz, 440Hz with reduced PFC)
Inrush Current	A	<40A at 25°C and 264VAC input, Cold Start
Power Factor Harmonics	-	EN61000-3-2 Compliant (0.97 typical)
Regulation Total	-	1%; Including Line (for 90-264VAC input change), Load (for 0-100% load change) and Cross (for 0-100% load change on any other output) regulation
Ripple & Noise	mV	1% or 50mV (Which ever is greater)
Efficiency	-	Up to 90%, configuration dependant
Minimum Load	A	None
Overcurrent Protection	-	>105%
Overvoltage Protection	V	CH1 & CH2, 120-130%, Cycle AC line to reset
Overtemperature Protection	-	Yes
Hold Up Time (Typ)	ms	>16ms at 90VAC Input
Leakage Current (max)	µA	123µA 120VAC 60Hz, 257µA 240VAC 60Hz, <300µA 264VAC 63Hz (Type Test results)
Remote Sense	-	On Outputs CH1 & CH2, 0.5V compensation maximum
DC Good	-	CH1 Only, High on Fail (90% of nominal ±5%)
Remote On/Off (Specify N option)	-	-N1 or -N2 option: TTL level high = Off, -N3 or -N4 option: open circuit = Off (except standby)
Operating Temperature (1)(7)	-	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C
Storage Temperature	-	-40 to +85°C
Humidity (non condensing)	-	5 - 95% RH
Cooling	-	Forced air, 2m/s from input to output (Approx 10 CFM)
Isolation (4)	-	Input to Ground 2.3kVDC, Input to Output 4.3kVDC, Output to Ground 200VDC
Vibration (non operating)	-	Conforms to MIL-STD-810E, Method 516.5, Pro I, IV, VI; EN60068-2-6, IEC68-2-6
Shock	-	Conforms to MIL-STD-810E/F, Method 514.4, Pro I, Cat 1,9; EN60068-2-27, EN60068-2-47, IEC68-2-47, IEC68-2-47, JIS C0041-1987
Safety Agency Approvals	-	UL60950-1, CSA22.2 No 60950-1, EN60950-1, IEC60950-1, CE for LVD, UL, EN, IEC60601-1, EN & IEC61010-1 (5)
Immunity	-	EN61000-6-2:2001, EN61000-4-2, -3, -4, -5, -6, -8, -11
Conducted Emissions and Flicker	-	EN55022 Class B (per CISPR.22), EN61000-3-3
Radiated Emissions (2)	-	EN55022 Class A (per CISPR.22)
Weight (Typ)	g	250g
Size (without cover) (3)	in	3" x 5" x 1.25"; N option version 3.7" x 5" x 1.25"
Warranty	yrs	Three Years

(1) -20°C cold start

(2) See application note for Class B

(3) Including underside component leads

(4) Input-Output: Reinforced IEC60950-1, Basic IEC 60601-1.

(5) Designed to meet 61010

See NV175-M for reinforced medical insulation

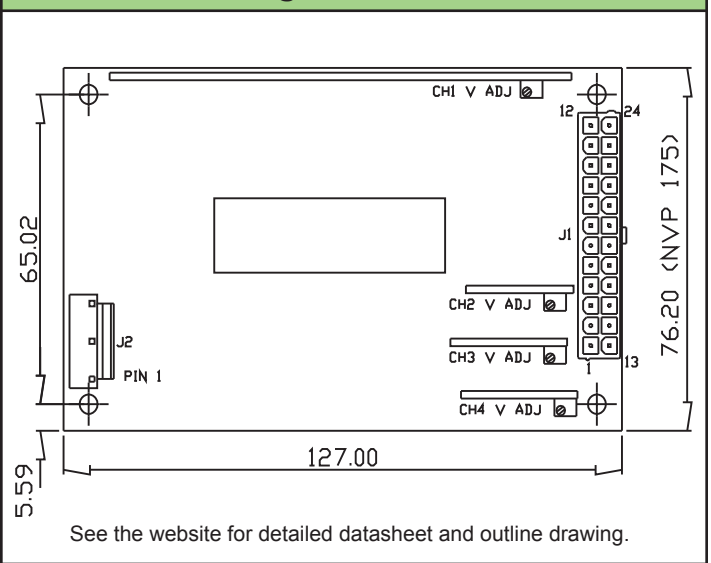
## Stocked Models Quick Selector

Model	CH1 (5)	CH2 (5)	CH3	CH4	CH5 Stand By (6)	Global Option Type
NV1-1T000	12V/15A	-	-	-	-	-
NV1-1G000	24V/7.5A	-	-	-	-	-
NV1-453TT	+5V/25A	+3.3V/15A	+12V/5A	-12V/1A	-	-
NV1-453FF	+5V/25A	+3.3V/15A	+15V/5A	-15V/1A	-	-
NV1-4G5TT	+24V/7.5A	+5V/8A	+12V/5A	-12V/1A	-	-
NV1-4G5FF	+24V/7.5A	+5V/8A	+15V/5A	-15V/1A	-	-
NV1-453TT-N3	+5V/25A	+3.3V/15A	+12V/5A	-12V/1A	5V/2A	N3 (ATX)
NV1-453FF-N3	+5V/25A	+3.3V/15A	+15V/5A	-15V/1A	5V/2A	N3 (ATX)
NV1-4G5TT-N3	+24V/7.5A	+5V/8A	+12V/5A	-12V/1A	5V/2A	N3 (ATX)
NV1-4G5FF-N3	+24V/7.5A	+5V/8A	+15V/5A	-15V/1A	5V/2A	N3 (ATX)

Notes:

- (5) Maximum combined current from CH1 + CH2 = 25A  
5V CH1 models are limited to 175W max. All others 180W, 200Wpk 5 mins
- (6) CH5 is always on regardless of inhibit status. Peak rated at 2.5A, floating output
- (7) Convection cooled maximum ratings: CH1: 55W, CH2: 8.25W, CH3: 9W, CH4: 3W, 75.25W total. 0°C - 40°C temperature range
- (8) 12 - 12.5V if 24V CH3 is fitted.
- (9) 14.5 - 15.5V if 24V CH3 is fitted.
- (10) 24 - 24.5V if 5V CH2 is fitted.  
24 - 26V if 24V CH3 is fitted

## Outline Drawing



## Built to Order Model Selector

CH1	CH1(5)	Adjust.	CH2	Adjust.	CH3	Adjust.	CH4	Adjust.								
	Code	Range	CH2(5)	Code	Code	Range	Code	Range								
+5V / 25A	5	5 - 5.5V	+1.8V / 15A	1	0.9 - 3.3V	T	-12V / 1A	T	Fixed							
			+2.7V / 15A	2			-15V / 1A	F	Fixed							
			+3.3V / 15A	3			-3.3V / 2A	3H	Fixed							
			No output	0			-5V / 2A	5H	Fixed							
+12V / 15A	T	12 - 15V (8)	+5V / 10A	5	3.3 - 5.5V	F	-12V / 2A	TH	Fixed							
							+15V / 12A	F	12 - 15V (9)	No output	0	Fixed				
							+24V / 7.5A	G	24 - 28V (10)	+5V / 8A	5	3.3 - 5.5V	G	-15V / 2A	FH	Fixed
														No output	0	-
						Add "Y" to code for negative polarity output		Add "P" to code for positive polarity output								

## How to Create a Model Number

NV1-	Enter number of outputs	CH1 Code	CH2 Code	CH3 Code	CH4 Code	Global Option	Case Option
------	-------------------------	----------	----------	----------	----------	---------------	-------------

No Option	Blank	Blank	No Case
AC Fail, Remote On/Off, 5V/2A Standby, CH1 DC Good	N	U	U Chassis
AC Fail, Remote On/Off, 12V/1A Standby, CH1 DC Good	N1	C	U Chassis with Cover
AC Fail, Remote On/Off, 13.5V/1A Standby, CH1 DC Good	N2	F	U Chassis, Cover and Fan*
ATX AC Fail+Remote On/Off, 5V/2A Standby, CH1 DC Good	N3	I	U Chassis, Cover and Fan*
ATX AC Fail+Remote On/Off, 12V/1A Standby, CH1 DC Good	N4		and IEC inlet

\* A high output CH4 (3H, 5H, TH, FH) or fan supply 0H must be selected to provide fan option.

## Example

NV1 3 G 5 0 3HP N C

Description: Triple output, 24V/7.5A, 5V/8A, 3.3V/2A, Global option N, U Chassis with cover.

## Mating Parts (Molex)

CONN	Housing	Pins
J1	39-01-2245	44476-3112
J2	09-50-8051	08-52-0113

## Other Industrial Products

NV	300 to 700W Medical, 1-6 outputs
SC40/60	40 to 80W single, dual & triple 3x5 footprint
ZWS/ZWSPAF	5 to 240W single output power supplies

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/nv-series.htm](http://us.tdk-lambda.com/lp/products/nv-series.htm)

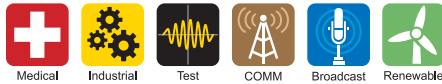


## 350W to 1150W Modular Power Supplies

### Features

- ◆ 1U Form Factor
- ◆ Up to 90% Efficient
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ Up to 8 Outputs (6 for the NV350)
- ◆ No Minimum Loads
- ◆ Medical Certifications
- ◆ Peak power rating of up to 1450W

### Key Market Segments & Applications



### Specifications

Model		NV3	NV7
Output Power	W	350W (660W >180VAC input)	700W (1150W >150VAC input)
Peak Power (Up to 10s)	W	520W (740W >180VAC input)	850W (1450W >150VAC input)
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz, 440Hz with reduced PFC)	
Inrush Current (25°C, Cold Start)	A	<15	<40
Power Factor Harmonics	-	EN61000-3-2 Compliant	
Line Regulation	-	< 0.1% for 90-264VAC input change	
Load Regulation (0-100% change)	-	B, BH Modules: < 1%, DB modules output 2: <2%, DA Modules: <3%	
Cross Regulation	-	< 0.1% for 100% load change on any output, (DA module CH1<0.2%, CH2<3%)	
Ripple & Noise	mV	1% or 50mV, whichever is greater	
Efficiency	-	Up to 90%, configuration dependant	
Minimum Load	A	None	
Overcurrent Protection	-	110 - 150%, hiccup mode (Primary limited)	
Overvoltage Protection	V	Yes	
Overtemperature Protection	-	Yes, recycle AC to reset	
Hold Up Time (Typ at 90VAC Input)	ms	>16ms (12ms for NV700 with >700W output power)	
Leakage Current <sup>(1)</sup>	µA	130µA 120VAC, 60Hz, 260µA 240VAC 60Hz	
Remote Sense	-	Standard on single output modules and output 1 on DB module only	
Module Good	-	Open collector, on indicates output is good (N/A on DA modules)	
Module Inhibit	-	TTL logic level high inhibits the module (both outputs on DB outputs) <sup>(2)</sup>	
AC Fail (Specify as option)	-	High on fail	
Operating Temperature	-	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C <sup>(3)</sup>	
Storage Temperature	-	-40 to +85°C	
Humidity (non condensing)	-	5 - 95% RH	
Cooling	-	Internal fan or 1m/s with system supplied air (NV3 only)	
Isolation	-	Input to Output 4.3kVAC, 5.7kVDC <sup>(5)(7)</sup> , (2 x MOPPs (3rd edition 60601)), Input to Output 4.3kVDC <sup>(6)</sup> , (2 x MOOPs (3rd edition 60601)), Input to Ground 2.3kVDC, Output to Ground 200VDC <sup>(8)</sup>	
Vibration (non operating)	-	2G, 10-500Hz (sweep & endurance at resonance) in all 3 planes	
Shock	-	30G per IEC68-2-27	
Safety Agency Certifications	-	UL, CSA, EN, IEC60950-1, CE for LVD, EN, IEC60601-1, UL, EN, IEC 61010-1	
Immunity	-	EN50082-2: EN61000-4-2, -3, -4, -5, -6, -8, -11	
Conducted Emissions and Flicker	-	EN55011, EN55022 Class B (per CISPR.22), EN61000-3-3	
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.22) <sup>(4)</sup>	
Weight (Typ)	g	800	1160
Size	in	1.6 x 3.75 x 10.8"	1.6 x 4.92 x 10.8
Warranty	yrs	Three Years	

(1) Worse case: <300µA 264VAC, 63Hz (normal condition, <50µA single fault condition)

(2) Output 2 remote on/off inhibits just Output 2 of DB module

(3) -20°C cold start, derate from 45C for NV7 when input voltage < 100VAC

(4) See application note for Class B

(5) C, CC, CM modules only

(6) Units with any other module or primary option fitted

(7) Type tested to 4kVAC (equivalent to 5.7VDC), production tested to 4.3 kVDC

(8) CM modules are rated 500VAC output to ground.

## 1. Configuration Guide

You can create your own NV350 or NV700 configuration online at [www.nv-power.com](http://www.nv-power.com). This method checks your configuration and offers the optimum solution. Alternatively, you can do this manually by using the guide below. Calculate total output power to ensure power requirements within 350W or 1150W, then select required Cooling, Connection and Controls/Signals from the following tables:

Output Power	NV3 NV7	250W with reverse air	NV3	S	S	S	EN5V
Cooling	S R C V	Standard air - forward Reverse air <sup>4</sup> Customer air - no fan <sup>1</sup> Variable speed fan (Std on NV700)					
Input Connection	S I	Screw IEC320 <sup>2</sup>					
Primary Option <sup>2</sup>	ES5V ES12V IS5V IS12V EN5V EN12V IN5V IN12V	AC good, PSU enable, 5V/2A standby AC good, PSU enable, 12V/1A standby AC good, PSU inhibit, 5V/2A standby AC good, PSU inhibit, 12V/1A standby AC good, PSU enable, 5V/2A standby, global module good AC good, PSU enable, 12V/1A standby, global module good AC good, PSU inhibit, 5V/2A standby, global module good AC good, PSU inhibit, 12V/1A standby, global module good					

1 - Thermocoupled sample recommended to ensure adequate cooling - consult sales  
2 - Not with customer air cooling

3 - The Primary Option uses 1 slot  
4 - Not with NV7

## 2. Output Section

Select Output Modules from the Module Tables below ensuring that no more than 6 slots (NV-350) or 8 slots (NV-700) in total are used.

Example - if you require 5.2V 40A :-

- Select B as closest match for voltage & current and prefix with voltage eg 5.2B
- Repeat for other outputs.

This will create a complete product description eg **NV3SSSES5V 5.2B 12/15DB** which represents a three output NV350 with

Forward air cooling, Screw input terminals, 300µA Leakage, ac good, PSU enable and 5V/2A aux supply

Output 1 = 5.2V / 40A  
Output 2 = 12V / 13A with screw terminals  
Output 3 = 15V / 4A with screw terminals  
Max 350W continuous output power

Contact Lambda to validate configuration or visit the NV webpage to validate part number. ([www.nv-power.com](http://www.nv-power.com))

### Single Output Modules

Voltage Range	Curr.	Peak Curr.	#/slots	Mod. Code
3.2V - 3.6V	40A	-	2	B
4.75 - 5.5V	40A <sup>(1)</sup>	-	2	B
7 - 9V	22.5A <sup>(6)</sup>	-	2	B
12 - 15.5V	20A <sup>(2)</sup>	-	2	BH
24 - 28V	10A <sup>(3)</sup>	-	2	BH
12 - 13.2V	37.5A <sup>(7)</sup>	50A <sup>(7)</sup>	3	C
15 - 16.5V	30A <sup>(7)</sup>	37.5A <sup>(7)</sup>	3	C
24 - 26.4V	18.75A <sup>(7)</sup>	25A <sup>(7)</sup>	3	C
27 - 32V	16.6A <sup>(7)</sup>	19.7A <sup>(7)</sup>	3	C
24 - 26.4V	18.75A <sup>(7)</sup>	25A <sup>(7)</sup>	3	CM
48 - 52.8V	18.75A	25A	6	CC
54 - 64V	16.6A	19.7A	6	CC

- NV3: 5.2-5.5V, derate linearly from 40A to 36A  
NV7: 5-5.5V, derate linearly from 40A to 36A
- NV3: 13.2-15.5V, derate linearly from 20A to 16.5A  
NV7: 12.5-15.5V, derate linearly from 20A to 15.5A
- NV3: 25.7-28V, derate linearly from 10A to 8.5A  
NV7: 24-28V, derate linearly from 10A to 8.5A
- 12.5-15V, derate linearly from 13A to 10A
- 25-28V, derate linearly from 7A to 6A
- 8-9V derate linearly from 22.5A to 20A
- NV3: 400W max (to be confirmed)  
NV7: 450W average, 600W peak for 10s
- One DA module per power supply
- For NV3: Limited by total output power

### Dual Output Module (Common 0V)(1 Slot)<sup>(8)</sup>

Output 1	Output 2	Module Code
+12V 3A	-12V 1A	DA

### Dual Output Modules (2 Slots each)

Module Code = DB				
Output 1		Output 2		
Voltage Range	Current	Voltage Range	Current	Max Power
3.2 - 3.6V	25A	3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W
4.75 - 5.5V	25A	3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W
5.5 - 6.5V	25A	3.3 - 5.5V	10A	55W
		12 - 15V	13A <sup>(4)</sup>	5A
24 - 28V	7A <sup>(5)</sup>	24 - 32V	2A	50W
		3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W

For Additional Information, please visit [us.tdk-lambda.com/lp/products/nv-series.htm](http://us.tdk-lambda.com/lp/products/nv-series.htm)



## 300 to 1008W AC-DC Power Module

### Features

- ◆ Low profile, small size
- ◆ 100°C baseplate temperature
- ◆ High power density
- ◆ High Efficiency
- ◆ Suitable for conduction cooling
- ◆ Power Factor Corrected (PFC)



### Key Market Segments & Applications



Specifications					
Model		PFE300S PFE500SA	PFE700S	PFE500F	PFE1000F
AC Input	VAC	85 to 265VAC, 47-63Hz (up to 440Hz) (4)			
Input Current (100 / 220VAC)	A	4.0 / 2.0	8.8 / 4.4	6.8 / 3.4	13.6 / 6.6
Model dependant		6.1 / 2.9			
Inrush Current (100 /200VAC) (1)	A	20 / 40 peak			
Power Factor	-	0.95 minimum, meets EN61000-3-2			
Output Voltage Setpoint Accuracy	-	±2%	±1V	±2%	±2%
Ripple and Noise (1)	-	1%	4V	1%	1%
Over Current Protection	%	105 - 140% (Automatic Recovery)			105 - 140% Manual reset
Over Voltage Protection	-	125 - 145%	60 - 69.6V	125 - 145%	125 - 145%
Series Operation	-	Yes			
Parallel Operation	-	No	Yes (Droop mode)	Yes (Single wire)	Yes (Single wire)
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present			
Auxiliary Supply	-	None	None	10 - 14V, 20mA	10 - 14V, 20mA
Remote On/Off (Opto isolated)	-	None	None	High = On	High = On
Overtemperature Protection	-	Yes			
Operating Baseplate Temp.	°C	-40 to +100°C (2)			
Storage Temperature	°C	-40 to +100°C			
Humidity (non condensing)	-	Operating: 20 - 95%RH, Non Operating: 10 - 95%RH			
Cooling	-	Conduction			
Withstand Voltage (1 min) (3)	-	Input to Output 3kVAC, Input to Baseplate 2.5kVAC, Output to Baseplate 1.5kVDC			
Isolation Resistance	-	Output to baseplate: 100M Ohm at 500VDC, 25°C ambient, 70%RH			
Vibration (non operating)	-	10-55Hz (1 min sweep), constant amplitude 0.825mm (max 49m/s <sup>2</sup> ), X, Y, Z 1 hour each			
Shock	-	196.1m/s <sup>2</sup>			
Safety Certifications	-	UL60950-1, CSA60950-1 (cUL), EN60950-1, CE mark (LVD)			
Weight	g	250	250	300	500
Size (WxHxL)	mm	61 x 12.7 x 116.8mm		70 x 12.7 x 122mm	100 x 13.4 x 160mm
	in	2.4 x 0.5 x 4.6"		2.76 x 0.5 x 4.8"	3.94 x 0.53 x 6.3"
Warranty	yrs	2 years			

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes)

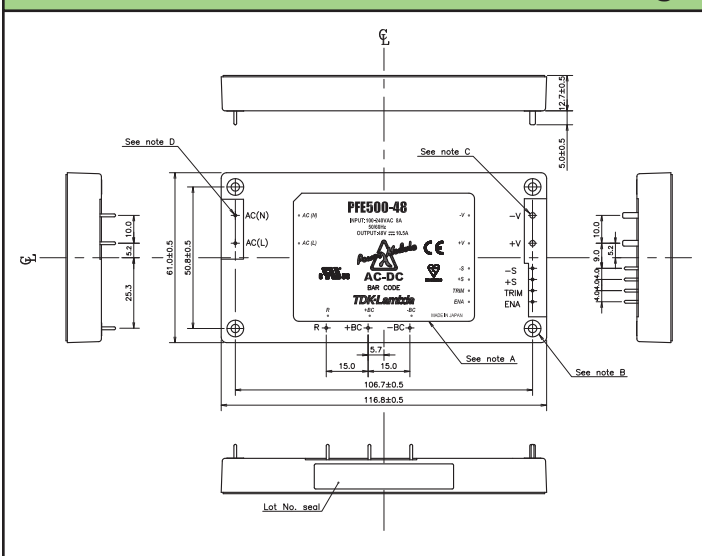
- 1) External components are required, consult Application Notes
- 2) PFE500S-12, PFE500F-12: -40 to 85°C. See instruction manuals for derating curves  
PFE1000F28 & PFE1000F48: -40 to 85°C below 170VAC input voltage.  
See instruction manuals for derating curves
- 3) PFE500F, PFE1000F: 500VDC Output to baseplate
- 4) Reduced PFC above 63Hz. Contact technical support for 440Hz operation.

## Specifications

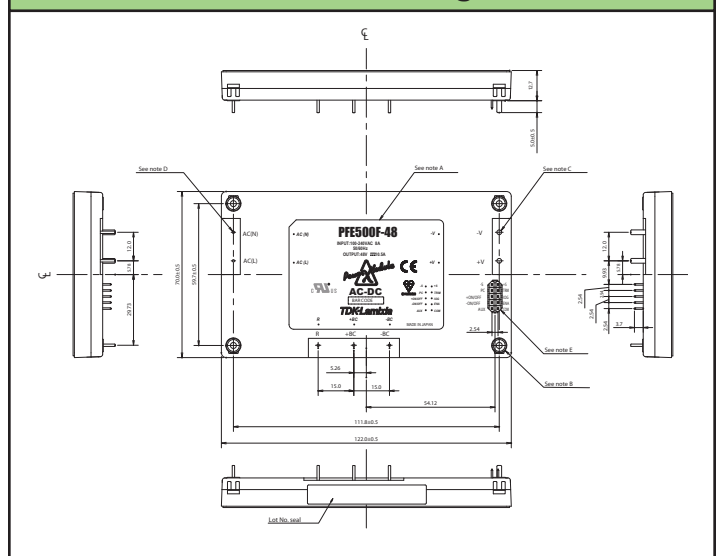
Model	Output Voltage (V)	Adjust. Range (V)	Maximum Current (A)	Maximum Wattage (W)	Load Reg. (mV)	Line Reg. (mV)	Efficiency typ (4)
PFE300S-12	12	9.6 - 14.4	25	300	48	48	81 / 83
PFE500SA-12	12	9.6 - 14.4	33	396	48	48	84 / 86
PFE500F-12	12	9.6 - 14.4	42	504	48	48	81 / 83
PFE1000F-12	12	9.6 - 14.4	60	720	48	48	80 / 82
PFE300S-28	28	22.4 - 33.6	10.8	302	56	56	83 / 85
PFE500SA-28	28	22.4 - 33.6	18	504	56	56	86 / 89
PFE500F-28	28	22.4 - 33.6	18	504	56	56	84 / 86
PFE1000F-28	28	22.4 - 33.6	36	1008	56	56	85 / 87
PFE300S-48	48	38.4 - 57.6	6.3	302	96	96	84 / 86
PFE500SA-48	48	38.4 - 57.6	10.5	504	96	96	88 / 90
PFE500F-48	48	38.4 - 57.6	10.5	504	96	96	84 / 86
PFE1000F-48	48	38.4 - 57.6	21	1008	96	96	84 / 86
PFE700S-48	51	None	14	714	50 - 57V (5)		86 / 89

(4) 100 / 200VAC. Efficiency values at 115/230VAC are 1% higher.  
 (5) Total regulation range

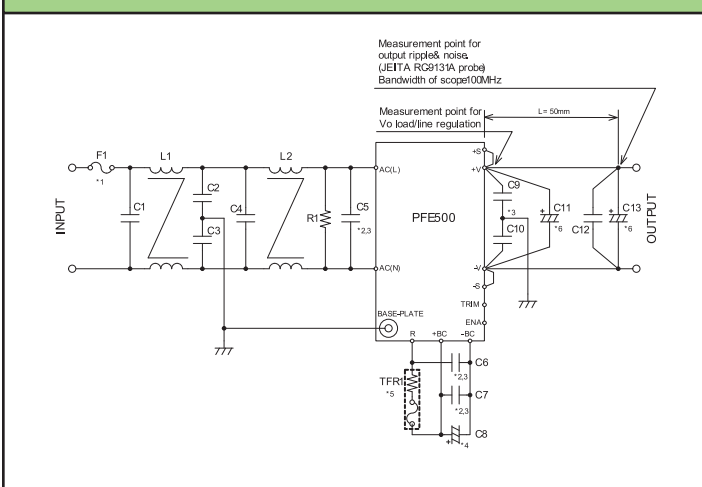
## PFE500S & PFE700S Outline Drawing



## PFE500F Outline Drawing



## PFE500S Basic connection



## Heatsink Table

Heatsink	Size (mm)	PFE Module
HAF-10L	116.8 x 25.4 x 61	PFE300/500S
HAF-15L	116.8 x 38.1 x 61	PFE300/500S
HAF-15T	116.8 x 38.1 x 61	PFE300/500S
HAL-F12T	122 x 35 x 69.9	PFE500F
HAM-F10T	160 x 33.4 x 100	PFE1000F

## Options

Suffix	Description
Blank	M3 tapped mounting inserts (4)
/T	3.3mm non-threaded inserts (4)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/pfe-series.htm](http://us.tdk-lambda.com/lp/products/pfe-series.htm)



## 1600W 1U Front End Power Supplies

### Features

- ◆ 1U High
- ◆ Internal ORing FETs & Current Share
- ◆ High Efficiency
- ◆ I<sup>2</sup>C, PMBus Communication Option



### Key Market Segments & Applications



### Specifications

Model	RFE1600	
Input Voltage Range	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating(2)
Input Current (Max) 100/230VAC	A	14.2 / 8.1A
Inrush Current	A	<35A
Power Factor Correction	-	Meets EN61000-3-2, PF > 0.98 at full load
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	%	105 - 115% (Programmable)
Overvoltage Protection	%	110% (Tracking). Cycle AC to reset or utilize Remote On/Off(1)
Overtemperature Protection	-	Shutdown with automatic reset. Warning signal provided(1)
Hold up time	ms	>10ms, 100/230VAC Input, 80% loading
Leakage Current	mA	< 0.75 / 1.5mA, 100 / 230VAC, 60Hz
Remote Sense Compensation	-	12V: 0.25V/wire; 24V: 0.5/wire; 32V: 0.75V/wire; 48V: 1V/wire
Indicators	-	AC OK: Green LED, DC OK / Fail: Green / Red LED
Remote On/Off	-	Yes, inhibit & enable
Parallel Operation	-	Yes, single wire current share, 5% accuracy of max current, up to 10 units
AC Fail Signal	-	Open Collector, ON when AC is within 85 - 270VAC
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)
Remote Adjust	-	By either external 0 - 5V signal or 1k potentiometer(1)
I <sup>2</sup> C Interface	-	Isolated from output, Add suffix /S, PMBus compatible(1)
Auxiliary Output	-	11.2 - 12.5V, 0.5A, 240mV ripple and noise
Operating Temperature	°C	-10 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C
Storage Temperature	°C	-30 to +85°C
Humidity (Non condensing)	%RH	Operating: 10 - 90%RH, Storage: 10 - 95%RH
Cooling	-	Two variable speed internal fans, airflow exits across input/output connector
Withstand Voltage	-	Input to Output 3kVAC, Input to Output 2kVAC, Output to Ground: RFE1600-12, -24V 500VAC, RFE1600-48 1.5kVAC
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	MIL-810F, method 514.5
Shock (Basic transportation)	G	30G
Safety Agency Certifications	-	UL60950-1, EN60950-1 (2nd Edition), CE Mark
Conducted and Radiated EMI	-	EN55022 & FCC part 15; Conducted class B, Radiated class A
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv 2), -4 (lv2), -5 (lv3,4), -6 (lv2), -8 (lv 4), -11
Size (W x H x D)	in	Power Supply: 3.35 x 1.61 x 12.6
Weight	g	1550
Warranty	yrs	Three

#### Notes

- (1) See installation manual for detailed specifications & test methods
- (2). Derate linearly 1%/V from 100VAC to 85VAC input



## Model Selector

Model	Output Voltage	Adjust. Range(1)	Max Current (Vin>170VAC)	Max Power (Vin>170VAC)	Max Current(2) (100<Vin<170VAC)	Max Power(2) (100<Vin<170VAC)
RFE1600-12	12V	9.6 - 13.2V	133A	1596W	100A	1200W
RFE1600-12/S	12V	9.6 - 13.2V	133A	1596W	100A	1200W
RFE1600-24	24V	19.2 - 29V	67A	1608W	50A	1200W
RFE1600-24/S	24V	19.2 - 29V	67A	1608W	50A	1200W
RFE1600-32	32V	25.6 - 38.4V	47A	1504W	37.5A	1200W
RFE1600-32/S	32V	25.6 - 38.4V	47A	1504W	37.5A	1200W
RFE1600-48	48V	38.4 - 58V	33A	1584W	25A	1200W
RFE1600-48/S	48V	38.4 - 58V	33A	1584W	25A	1200W

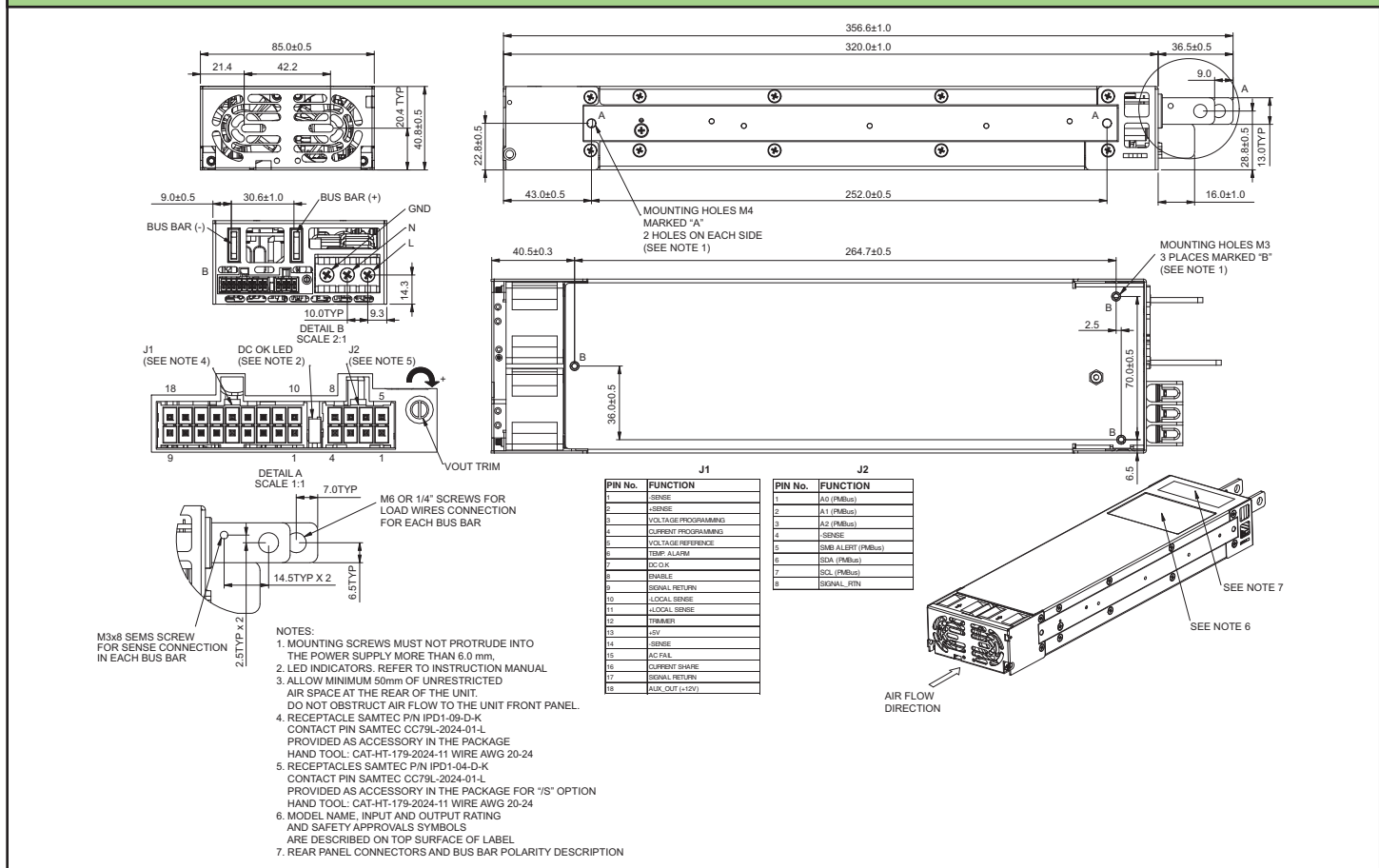
  

Model	Load Reg	Line Reg	Ripple & Noise	Effic. (3)	TC
RFE1600-12	60mV	30mV	240mV	87 / 90%	-
RFE1600-12/S	60mV	30mV	240mV	87 / 90%	Yes
RFE1600-24	120mV	60mV	240mV	88 / 90%	-
RFE1600-24/S	120mV	60mV	240mV	88 / 90%	Yes
RFE1600-32	160mV	80mV	320mV	88 / 90%	-
RFE1600-32/S	160mV	80mV	320mV	88 / 90%	Yes
RFE1600-48	240mV	120mV	480mV	89 / 92%	-
RFE1600-48/S	240mV	120mV	480mV	89 / 92%	Yes

Notes:

(3) At 75% load, 100 / 230VAC input

## Outline Drawing



## Other Related Products

FPS1000	1U 1000W (3 per rack)
HWS1500	1500W Limited lifetime warranty
HFE1600	1U 1600W (5 per rack)
HFE2500	1U 2500W (4 per rack)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/rfe-series.htm](http://us.tdk-lambda.com/lp/products/rfe-series.htm)



## 3 x 5" 40W to 60W AC-DC Power Supplies

### Features

- ◆ Low Cost
- ◆ Single and Multiple Outputs
- ◆ Wide Range AC Input
- ◆ Low profile
- ◆ Global Safety Agency Compliance
- ◆ Meets EN61000-4 (-2 to -6)
- ◆ Industry standard footprint



### Key Market Segments & Applications



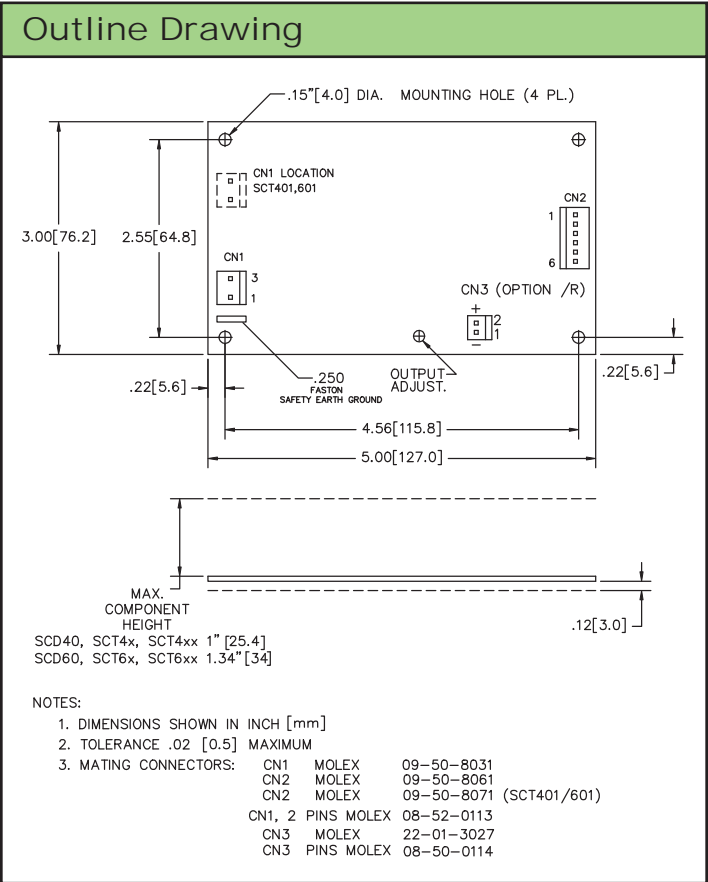
Specifications			SCS40	SCT4x	SCS60	SCD60	SCT6x
Output Power Convection	W		40			60	
Output Power Forced Air	W		55			-	
Main Output Adjustment	V		-5, +10% O/P 1 only			-5, +10%	
Line and Load Regulation	%		Output 1: ±2%, Output 2: ±5% (±7% on 24V models), Output 3: ±5%				
Hold Up Time (typical)	ms		20			20	
Size	(1) in		3 x 5 x 1"			3 x 5 x 1.34"	
AC Input	-		85-265 VAC, 47-63 Hz				
Efficiency	%		Typically 70% full load at nominal AC Line				
Inrush Current Limiting	A		36A typical @230VAC cold start				
Surge Immunity	-		EN61000-4 (-2 through -6) level 3				
EMI	-		FCC Class B, EN55022 B				
Cross Regulation	%		± 2% on output 1, ±5% on outputs 2 & 3 (multiple outputs only)				
Ripple and Noise	%		1% peak to peak				
Overcurrent Protection	-		Short circuit protection, automatic recovery				
Overvoltage Protection	-		Output 1 only, <135%				
Cooling	-		When specified with forced air cooling, flow is 300 LFM (1.5m/s)				
Operating Temp. Range	(2) -		0 to +70°C (Derate linearly to 50% load from 50-70°C)				
Storage Temperature	°C		-20 to +85°C				
Safety Agency Approval	-		UL60950-1, CSA60950-1, IEC/EN60950-1, CE Mark				
Warranty	yr		1 year				

(1) Height is specified as maximum component height

Note: See Installation Manual for full details, test methods of parameters and application notes

(2) -40°C startup, contact factory for details.

Options							
	Model	O/P (V)	Min Load(A)	Convec. (A)	Forced Air(A)	Peak Load(A)**	
Single Output	SCS4024	V1 24.0	-	1.6	2.3	2.5	
	SCS4048	V1 48.0	-	0.9	1.2	1.3	
	SCS6012	V1 12.0	-	5.0	6.7	7.5	
	SCS6024	V1 24.0	-	2.5	3.3	3.8	
	SCS6028	V1 28.0	-	2.1	2.9	3.2	
	SCS6048	V1 48.0	-	1.3	1.7	1.9	
Dual Output	SCD601515	V1 15.0	0.2	2.2	2.9	-	
		V2 -15.0	0.2	1.8	2.4	-	
Triple Output	SCT42	V1 5.0	0.4	4.0	5.0	7.0	
		V2 12.0	0.2	2.0	2.5	4.0	
		V3 -12.0	-	0.5	0.7	1.0	
	SCT45	V1 5.0	0.4	4.0	5.0	7.0	
		V2 15.0	0.2	2.0	2.5	3.0	
		V3 -15.0	-	0.5	0.7	1.0	
	SCT48/R*	V1 5.0	0.4	4.0	5.0	6.0	
		V2 24.0	0.1	1.0	1.5	2.0	
		V3 -5.0	-	0.5	0.7	1.0	
SCT62	V1 5.0	0.7	7.0	-	10.0		
	V2 12.0	0.3	3.0	-	6.0		
	V3 -12.0	-	0.7	-	1.5		
SCT63	V1 5.0	0.7	7.0	-	10.0		
	V2 15.0	0.3	2.8	-	4.0		
	V3 -15.0	-	0.7	-	1.5		
SCT65	V1 5.0	0.7	7.0	-	10.0		
	V2 24.0	0.1	1.5	-	3.0		
	V3 12.0	-	0.7	-	1.5		



Model Selector Notes:

\* /R = Remote Sense. Leave unconnected when not used.

\*\* <30s, 10% duty cycle, average power must not exceed maximum ratings.

Other AC-DC Products	
ZP	20 to 60W 2" x 4", 1-3 outputs
NV175	175W 3" x 5", 1-5 outputs
ZWS	5 to 240W single output, universal input
VSB, VSC, VSP	10 to 150W single output, 115VAC input
SCS120PW	120W 3" x 5" single output
CSS150	150W 3" x 5" single output

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/sc-series.htm](http://us.tdk-lambda.com/lp/products/sc-series.htm)



## 3 x 5" 120W Single Output Power Supplies

### Features

- ◆ Low Profile
- ◆ Convection cooled
- ◆ Wide Range AC Input with PFC
- ◆ Global Safety Agency Compliance
- ◆ Industry standard footprint



### Key Market Segments & Applications



### Specifications

Model		
Output Power	W	120W
Line & Load Regulation	%	See model selector
Ripple & Noise	%	1%
Hold Up Time (typical)	ms	16ms (Full load at 115VAC input)
Overcurrent Protection	%	105 - 120%
Overvoltage Protection	%	110 - 130%, cycle AC line to reset
Input Voltage Range	-	90-264 VAC, 47-63 Hz (440Hz with reduced PFC)
AC Input Current	A	2.5A Max
Harmonic Correction (PFC)	-	Meets EN61000-3-2 (typically >0.9)
Efficiency	%	Typically 85% full load at nominal AC Line
Inrush Current Limiting	A	<50A peak @ 230VAC cold start
Leakage Current	mA	<0.75mA (264VAC, 60Hz)
Surge Immunity	-	EN61000-4 (-2 through -5)
EMI	-	FCC Class B, EN55022 B
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VDC
Isolation Resistance	-	>20M at 25°C & 70%RH, Output to Ground 500VDC
Operating Temperature	°C	0 to +40°C, derate linearly to 50% load from 40°C to 60°C
Temperature Coefficient	%/°C	±0.05%/°C
Storage Temperature	°C	-10 to +70°C
Humidity (non-condensing)	-	20-90%RH operating, 20-95%RH non-operating
Shock	-	< 196.1m/s <sup>2</sup> (20G)
Vibration	-	10Hz-55Hz amplitude (sweep 1 min), <2G X, Y, Z axis for 1 hour each
Altitude	m	3000m operating, 5000m storage
Safety Agency Approval	-	UL60950-1, CSA60950-1, EN60950-1, CCC, CE Mark (LVD)
Size W x L x H	in	3 x 5 x 1.27"
Weight	g	300
Warranty	yrs	1 year

## Model Selector

Models	Output Voltage	Output Load	Output Regulation)
SCS120PW12	12V	10A	3%
SCS120PW15	15V	8A	2%
SCS120PW18	18V	6.67A	2%
SCS120PW19	19V	6.32A	2%
SCS120PW24	24V	5A	2%
SCS120PW30	30V	4A	2%
SCS120PW32	32V	3.75A	2%
SCS120PW36	36V	3.34A	2%
SCS120PW48	48V	2.5A	2%

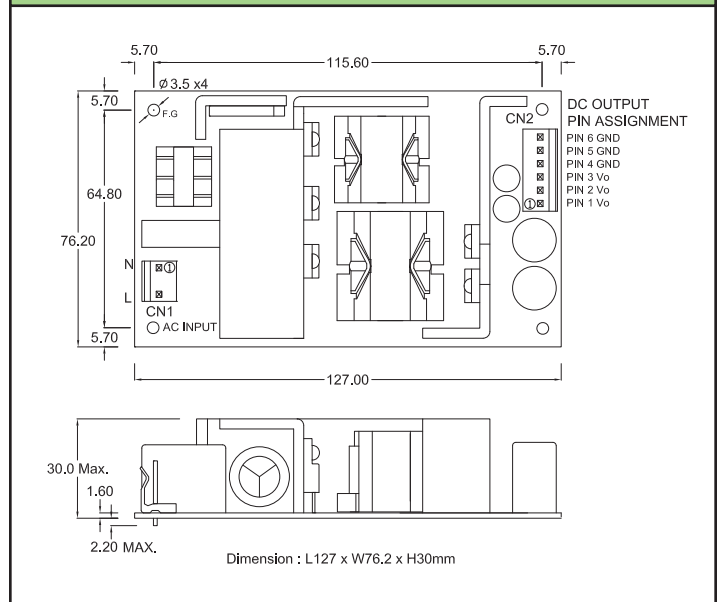
## Mating Connectors

Mating	Molex Connector	Molex Pins
CN1	09-50-8031	08-52-0113
CN2	09-50-8061	08-52-0113

## Other Industrial Products

EFE300	3" x 5" 300W single output
CSS150	3" x 5" 150W single output (Medical)
NV175	3" x 5" 175W single to quad outputs
SC40/60	3" x 5" 40 - 80W single to quad outputs
ZPSA/ZPT	2" X 4" 40 - 60W single to triple outputs
ZWS	5 to 240W single output

## Outline Drawing



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/scs120-series.htm](http://us.tdk-lambda.com/lp/products/scs120-series.htm)



## Single Output General Purpose Power Supplies

### Features

- ◆ Low Cost
- ◆ Power Factor Correction to EN61000-3-2
- ◆ Universal Input (85 - 265VAC)
- ◆ Input Transient Protected IEC61000-4
- ◆ Enclosed
- ◆ Global safety Approvals
- ◆ Level B EMI



### Key Market Segments & Applications



Specifications		SWS50	SWS75	SWS100	SWS150
Input Voltage range (1)	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC			
Inrush Current (115/230VAC)	A	20/40		16/32	
Power Factor	-	Meets EN61000-3-2			
Input Current (115/230VAC)	A	1.2/0.6	1.6/0.8	1.2/0.6	1.8/0.9
Temperature Coefficient	-	<0.02%/°C			
Total Regulation	-	<5%			
Overcurrent Protection	-	>105%, Constant Current Style			
Overvoltage Protection	V	115 -135%, Cycle AC line to reset			
Hold Up Time (Typ)	ms	20ms at 115VAC			
Leakage Current Max.	mA	1mA (0.6mA typ@230VAC)		0.75mA (0.5mA typ@230VAC)	
Remote Sense	-	Not Available			
LED Indicator	-	Green LED = On			
Operating Temperature	-	-10 to +70°C (See table for derating - model specific)			
Storage Temperature	-	-30 to +85°C			
Operating Humidity (2)	°C	30 - 90% RH			
Storage Humidity (2)	°C	10 - 95% RH			
Cooling	-	Convection			
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	19.6m/s <sup>2</sup> (10 - 55Hz (constant sweep 1 min) X, Y, Z for 1 hour)			
Shock	-	< 196.1 m/s <sup>2</sup> (20G)			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark, EN50178			
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B, VCCI-B			
Recommended EMI Filter	-	RSEL-2002W	RSEL-2003W	RSEL-2002W	RSEL-2003W
Immunity	-	EN61000-4-2,-3,-4,-5,-6,-8,-11			
Weight (Typ)	g	400	480	600	750
Size (WxHxD)	in	3.62 x 1.46 x 6.26	3.7 x 1.69 x 6.69	3.78 x 1.77 x 7.4	3.9 x 2 x 7.8
Warranty	yrs	Two Years			

(1) Derate to 85% load below 100VAC input    (2) non condensing

## Model Selector

Model	Voltage	Adjust Range	Max Curr.	Load Reg mV	Line Reg mV	Ripple Noise	Eff. (typ)%
SWS50-3	3.3V	3-3.6V	10	40	20	80	73/70
SWS75-3	3.3V	3-3.6V	15	40	20	80	72/68
SWS100-3	3.3V	3-3.6V	20	40	20	100	69/70
SWS150-3	3.3V	3-3.6V	30	40	20	100	70/72
SWS50-5	5V	4.5-5.5V	10	50	20	80	77/75
SWS75-5	5V	4.5-5.5V	15	50	20	80	77/74
SWS100-5	5V	4.5-5.5V	20	40	20	100	75/77
SWS150-5	5V	4.5-5.5V	30	40	20	100	76/78
SWS50-12	12V	10.8-13.2V	4.3	96	48	80	82/79
SWS75-12	12V	10.8-13.2V	6.3	96	48	80	83/81
SWS100-12	12V	10.8-13.2V	8.5	96	48	100	79/81
SWS150-12	12V	10.8-13.2V	12.5	96	48	100	79/82
SWS50-15	15V	13.5-16.5V	3.5	120	60	100	84/80
SWS75-15	15V	13.5-16.5V	5	120	60	100	85/82
SWS100-15	15V	13.5-16.5V	6.7	120	60	100	81/83
SWS150-15	15V	13.5-16.5V	10	120	60	100	81/83
SWS150-18	18V	16.2-19.8V	8.4	144	72	120	82/84
SWS50-24	24V	21.6-26.4V	2.1	144	96	100	84/80
SWS75-24	24V	21.6-26.4V	3.2	144	96	100	85/82
SWS100-24	24V	21.6-26.4V	4.3	144	96	150	82/84
SWS150-24	24V	21.6-26.4V	6.3	144	96	150	82/85

### Vertical Mount

Convection	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
SWS50	100%	100%	100%	100%	100%	100%	93%	85%
SWS75 (3.3-5V)	100%	100%	100%	100%	93%	85%	73%	60%
SWS75 (12V-24V)	100%	100%	100%	100%	100%	93%	85%	60%
SWS100	100%	100%	100%	100%	100%	87%	73%	60%
SWS150 (3.3-5V)	100%	95%	90%	85%	73%	60%	-	-
SWS150 (12V-24V)	100%	100%	100%	100%	100%	100%	80%	60%

1.2m/s Forced Air	50°C	55°C	60°C	65°C	70°C
SWS75	100%	100%	90%	80%	70%
SWS100	100%	100%	90%	80%	70%
SWS150	100%	100%	90%	80%	70%

Derate to 80% load from 0 to -10°C

## Other Industrial Products

HWS	15W to 1500W Single Output
LS	25W to 200W Low Cost
SWS300/600/1000	300W to 1000W (Higher Power)

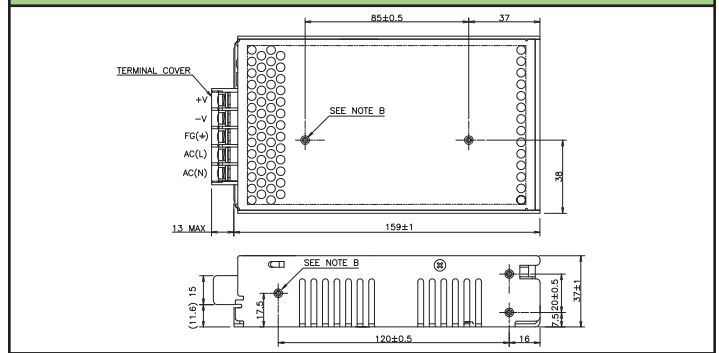
## Options

Suffix	Descriptor
/CO2	Double sided conformal coating

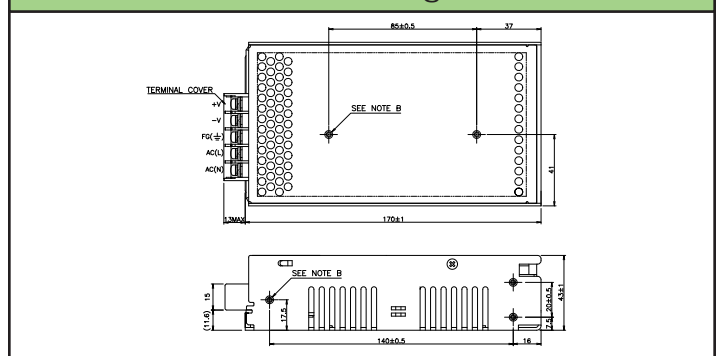
For Additional Information, please visit [us.tdk-lambda.com/lp/products/sws-series.htm](http://us.tdk-lambda.com/lp/products/sws-series.htm)



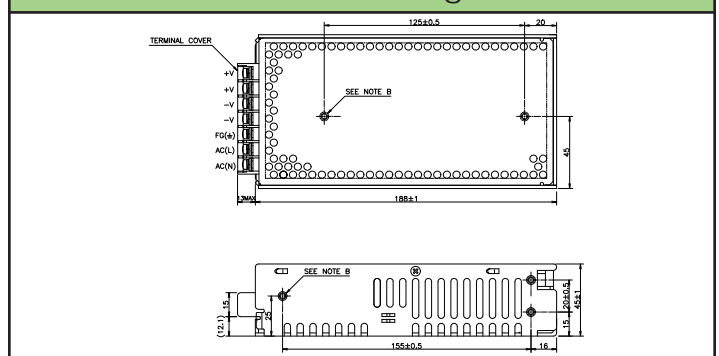
## SWS50 Outline Drawing



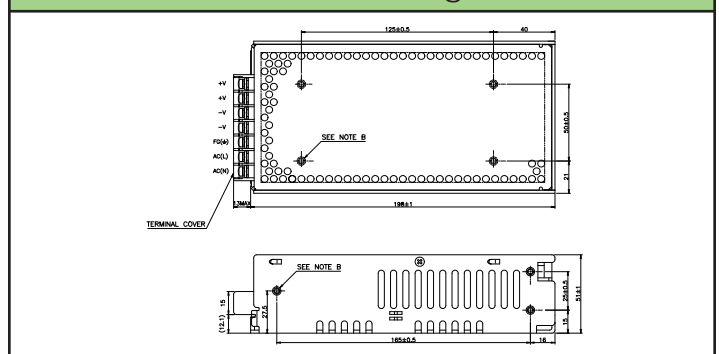
## SWS75 Outline Drawing



## SWS100 Outline Drawing



## SWS150 Outline Drawing



## Single Output General Purpose Power Supplies

### Features

- ◆ Lower Cost
- ◆ Active Power Factor Correction
- ◆ Universal Input (85 - 265VAC)
- ◆ Input Transient Protected IEC61000-4
- ◆ Enclosed
- ◆ Global safety Approvals
- ◆ Level B EMI



### Key Market Segments & Applications



Specifications		
Model		
	SWS300A	SWS600
Input Voltage range (1)	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC
Inrush Current (115 / 230VAC)	A	20 / 40
Power Factor	-	Meets EN61000-3-2
Input Current (100/200VAC)	A	3.6 / 1.8A   7.2 / 3.6A
Temperature Coefficient	-	<0.02%/°C
Overcurrent Protection	-	>105%, Constant current style
Overvoltage Protection	V	Yes, cycle AC to reset
Overtemperature Protection	-	Yes, cycle AC to reset
Hold Up Time (Typ)	ms	20ms at 115/230VAC
Leakage Current (max)	mA	SWS300: 0.75mA , SWS600: 1.5mA
Remote Sense	-	None   Yes
Parallel Connection	-	None   Yes
Remote On/Off	-	None   Yes
AC Fail Signal	-	None   Yes, open collector output
LED Indicator	-	Green LED = On
Operating Temperature	°C	-10 to +65°C (See table for derating - model specific)
Storage Temperature	°C	-30 to +85°C
Humidity (non condensing)	-	30 - 90% RH operating, 10 - 95%RH non operating
Storage Humidity (non condensing)	-	10 - 95% RH
Cooling	-	Internal fan
Withstand Voltage	-	I/P to Grnd 2kVAC, I/P to O/P 3kVAC, O/P to Grnd 500VAC, O/P to CNT 100VAC for 1 min
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz (sweep for 1 min)19.6m/s <sup>2</sup> constant X, Y, Z 1 hour each plane)
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11
Safety Agency Approvals	-	UL60950, CSA60950, EN60950, EN50178, CE Mark
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B
Recommended EMI Filter	-	RSAL2006   RSAN2010
Weight (Typ)	g	950   2000
Size (WxHxD)	in	2.05 x 4.01 x 7.8"   3.62 x 4.72 x 7.48"
Warranty	yrs	Two Years

(1) Derate linearly to 85% load from 115VAC to 85VAC input (derate to 90% load for SWS600-3 & -5)

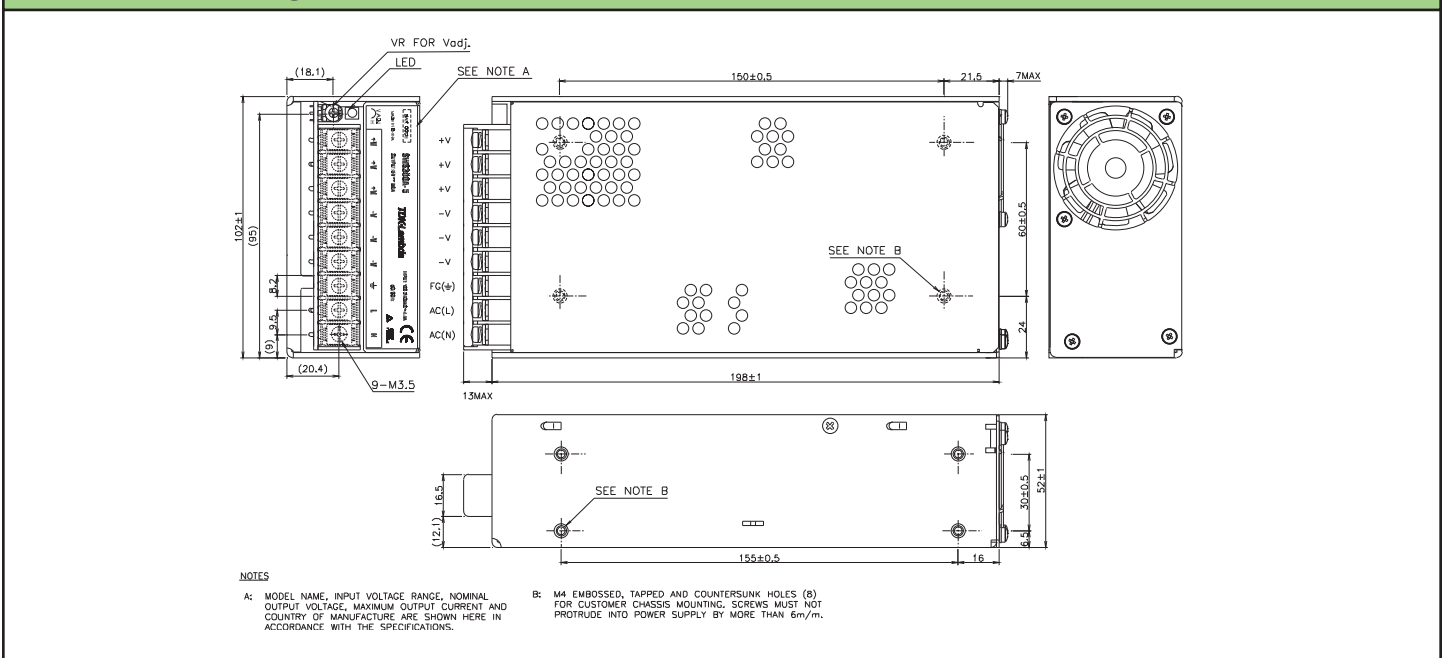


## Model Selector

Model	Voltage	Adjust Range	Max Curr. (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Eff. (typ)%(1)
SWS300A-3	3.3V	2.97 - 3.96V	55A	40	20	120	69 / 72
SWS300A-4	4V	3.6 - 4.8V	55A	40	20	120	72 / 75
SWS300A-5	5V	4.5 - 6V	55A	40	20	120	75 / 78
SWS300A-7R5	7.5V	6 - 9V	40A	60	30	120	77 / 80
SWS300A-12	12V	9.6 - 13.2V	26A	96	48	120	79 / 83
SWS300A-15	15	13.2 - 18.6V	21A	120	48	120	80 / 84
SWS300A-24	24V	20 - 28.8V	13A	120	48	150	82 / 85
SWS300A-28	28V	22.4 - 33.6V	11A	140	56	150	83 / 86
SWS300A-36	36V	28.8 - 40V	8.8A	180	72	200	83 / 87
SWS300A-48	48V	40 - 57.6	6.7A	240	96	240	83 / 86
SWS600-3	3.3V	2.97-3.96V	100 (2)	40	20	100	69/71
SWS600-5	5V	4.5-6V	100 (2)	40	20	100	74/77
SWS600-12	12V	9.6-13.2	50	96	48	120	78/81
SWS600-15	15V	13.2-18V	40	120	48	120	80/83
SWS600-24	24V	20-28.8	25	120	48	150	81/84
SWS600-36	36V	28.8-40V	16.7	180	72	200	81/85
SWS600-48	48V	40-57.6	12.5	240	96	240	82/85

- (2) Peak rating of 120A for 10s
- (3) 115/230VAC

## Outline Drawing (SWS300A)



## Options

Suffix	Descriptor
/CO2	Double sided conformal coating

## Derating

Model	50°C	55°C	60°C	65°C
SWS300A	100%	91.6%	83.3%	50%
SWS600	100%	85%	70%	55%

## Other Industrial Products

HWS	15W to 1500W Single output, high reliability
SWS	50 - 1000W Single Output
ZWS	5 - 240W pcb style single, output

For Additional Information, please visit [us.tdk-lambda.com/lp/products/sws-series.htm](http://us.tdk-lambda.com/lp/products/sws-series.htm)



## Single Output Low Profile Power Supplies

### Features

- ◆ Low Cost
- ◆ Low Profile
- ◆ Active Power Factor Correction
- ◆ Universal Input (85 - 265VAC)
- ◆ Input Transient Protected IEC61000-4
- ◆ Low Acoustical noise
- ◆ Medical Certifications (SWS1000L)
- ◆ Global safety Approvals
- ◆ Variable speed fan



### Key Market Segments & Applications



### Specifications

Model		SWS600L	SWS1000L
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 350VDC	
Inrush Current (115 / 230VAC)	A	20 / 40	
Power Factor	-	Meets EN61000-3-2 Class A	
Input Current (100/200VAC)	A	7.1 / 3.6 (3.3V: 5 / 2.5)	12 / 6
Temperature Coefficient	-	<0.02%/°C	
Overcurrent Protection	-	>105%, Constant current style	
Overvoltage Protection	V	125% -145%	
Overtemperature Protection	-	Yes, cycle AC or Remote On/Off to reset	
Hold Up Time (Typ)	ms	20ms at 115/230VAC	
Leakage Current (max)	mA	<0.75mA	100µA at 115VAC 60Hz(2)
Remote Sense	-	Yes	
Parallel Connection	-	Yes	
Remote On/Off (CNT)	-	Yes	
Voltage Programming (1)	-	Yes	
DC Good & Fan Fail Signal	-	Yes, open collector output	
Auxiliary Output	-	12V 0.1A	
LED Indicator	-	Green LED = On	
Operating Temperature	°C	-40°C start up. -20 to 74°C, derating linearly to 50% load above 50°C	
Storage Temperature	°C	-40 to +85°C	
Humidity (non condensing)	-	20 - 90% RH operating, 10 - 95%RH non operating	
Cooling	-	Variable speed internal fan	
Withstand Voltage(One minute)	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC, Output to CNT 100VAC	Input to Ground 2kVAC, Input to Output 4kVAC, Output to Ground 500VAC, Output to CNT 100VAC
Isolation Resistance	-	>50M at 25C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	MIL-STD-810F 514.5 Cat. 4, 10	
Shock (in packaging)	-	MIL-STD-810F 516.5 Procedure I, VI	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Certification	-	UL, CSA, EN60950-1, UL60601-1 (1000W only), IEC61010-1 (600W only), EN50178, CE Mark	
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B	
Weight (Typ)	g	1600	2300
Size (WxHxD)	in	2.4 x 4.72 x 7.48"	2.4 x 5.91 x 9.45"
Warranty	yrs	Three Years	

(1) 1-6V program voltage input to adjust output 20-120% (typical) of nominal. See instruction manual for details & models with this feature.

(2) Worst case: <300µA at 264VAC, 63Hz (Normal Condition); <500µA (Single Fault Condition).

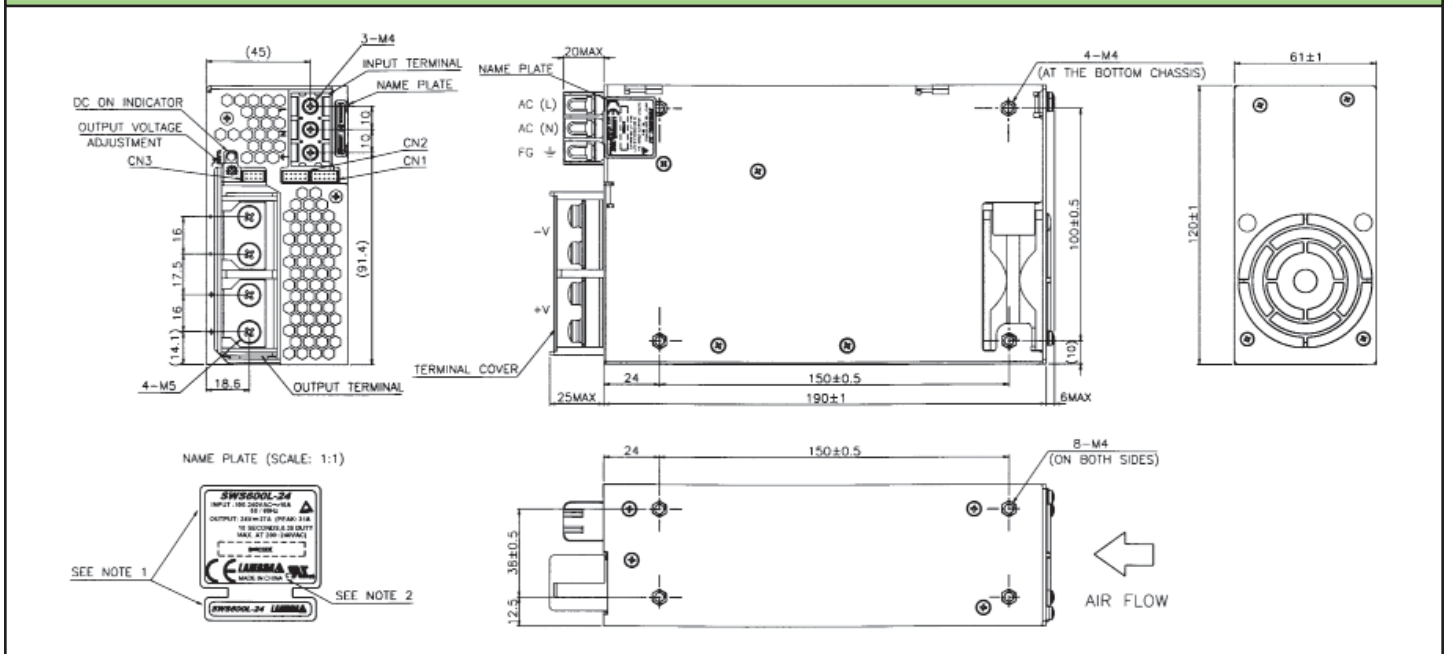
## Model Selector

Model	Voltage	Adjust Range	Curr. (A)	Max Pwr (W)	Max Reg (mV)	Load Reg (mV)	Line Noise (mV)	Ripple Eff. (3) (typ)%
SWS600L-3	3.3V	2.64 - 3.96V	120A	396W	30	20	120	70 / 72
SWS1000L-3	3.3V	2.64 - 3.96V	200A	660W	30	20	120	74 / 76
SWS600L-5	5V	4 - 6V	120A	600W	30	20	120	75 / 77
SWS1000L-5	5V	4 - 6V	200A	1000W	30	20	120	79 / 81
SWS600L-12	12V	9.6 - 14.4V	53A	636W	72	48	150	79 / 82
SWS1000L-12	12V	9.6 - 14.4V	88A	1056W	72	48	150	82 / 84
SWS600L-15	15V	12 - 19.5V	43A	645W	90	60	150	79 / 82
SWS1000L-15	15V	12 - 19.5V	70A	1050W	90	60	150	82 / 84
SWS600L-24	24V	19.2 - 28.8V	27A (31A) <sup>4</sup>	648W(744W)	144	96	150	81 / 84
SWS1000L-24	24V	19.2 - 28.8V	44A (51A) <sup>4</sup>	1056W(1224W)	144	96	150	84 / 86
SWS600L-36	36V	28.8 - 43.2V	18A	648W	216	144	200	82 / 84
SWS1000L-36	36V	28.8 - 43.2V	29A	1044W	216	144	200	84 / 86
SWS600L-48	48V	38.4 - 56V	13A (15A) <sup>4</sup>	624W(720W)	288	192	200	82 / 84
SWS1000L-48	48V	38.4 - 56V	22A (25A) <sup>4</sup>	1056W(1200W)	288	192	200	84 / 86
SWS600L-60	60V	48 - 66V	10A	600W	360	240	200	82 / 84
SWS1000L-60	60V	48 - 66V	17A	1020W	360	240	200	84 / 86

Notes: (3) 115 / 230VAC

(4) Peak current and power possible at 170-265VAC input, 10s max, 35% duty cycle

## SWS600L Outline Drawing



## Other Industrial Products

SWS	50 - 300W Single Output
HWS	15 - 1800W Single output, high reliability
ZWS	5 - 240W pcb style single, output
DLP, DPP, DSP	10 - 480W DIN Rail mount
LS	25 - 200W Single output, low cost

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/sws-series.htm](http://us.tdk-lambda.com/lp/products/sws-series.htm)



## 450 to 900W Multiple Output Modular Power Supply

### Features

- ◆ 1-10 Wide Range Outputs With Adjustment
- ◆ Forward/Reverse/Low Noise/System Air Cooling
- ◆ Output Voltages From 0.5V - 62V
- ◆ 48VDC Input Option
- ◆ Medical Approval Options
- ◆ MIL-STD-810 Shock and Vibration
- ◆ PFC compliant to EN61000-3-2
- ◆ Safety Agency Approvals EN, cULus, BSI, CE



### Key Market Segments & Applications



### Specifications

Model		VEGA 450	VEGA 650	VEGA 900
Input Voltage Range (47-440Hz with reduced PFC)	-	90 - 264VAC 47-63Hz <sup>(1)</sup> or 34-75VDC	90-264VAC 47-63Hz <sup>(1)</sup>	150-264VAC 47-63Hz
Input Current (Typ. at 90VAC)	A	7.7A	11A	9.2A at 150VAC
Efficiency (Typ.)	%	75% at 230VAC (or 48VDC) and full load, configuration dependent		
Nominal Output Voltages	VDC	0.5 - 62 (See configuration guide)		
Output Voltage Adjustment	-	Wide range, via potentiometer or remote adjust pin, module dependent		
Minimum Load	A	0A		
Max Output Power	W	450 <sup>(2)</sup>	650	900
Max Ripple & Noise (pk-pk)	mV	<1% (or 50mV which ever is greater) using EIAJ test method & 20MHz bandwidth		
Regulation (load, line, cross)	%	Less than 0.5%		
Hold Up Time	ms	16ms min at 90VAC (150VAC for 900W, 10ms for 450WDC input)		
Over Voltage Protection	%	120 - 150% (See website for more details)		
Overload/Short Circuit	%	105-125%, constant current characteristic, 150% max short circuit current.		
Remote ON/OFF Control	-	A TTL compatible signal will turn ON/OFF all output modules (optional)		
Remote Sense	V	Compensates for total of 0.75V total line drop (optional on dual output modules)		
Isolation (3)	-	Input-Output 4.3kVDC <sup>(3)</sup> ; (2 x MOPPs (3rd edition 60601)), Input-Ground 2.3kVDC; Output-Ground 200VDC		
Conducted EMI	-	EN55022 Class B, (as per CISPR .22), Class A for 48V input		
Radiated EMI	-	EN55022 Class B, (as per CISPR .22)		
Operating Temperature	°C	0°C to 50°C, derate ea. output @ 2.5%/°C from 50°C to 65°C. <sup>(4)</sup> Consult factory for 70°C operation. -20°C startup requires a 30 min. warm-up period.		
Cooling	-	Forced Air Cooled		
Dynamic Load Response	-	<6% or 300mV of set voltage for 50% load change (above 25% load), recovery to within 1% of nominal within 500 µs		
Regulatory Agency Compliance (601-1 not available on 48V input)	-	UL, CSA, EN, IEC60950-1, EN61010-1, UL, EN, IEC60601-1, CE Mark for LVD		
Vibration	G	MIL-STD-810E, Method 514.4, Pro I, Cat 1, 9 2G, 10-200Hz sweep for 1hr to search for resonant. 6G random, 6-Axis to IEC68-2-64		
Shock	G	MIL-STD-810F, Method 516.5, Pro I, IV, VI; 20G per IEC68-2-27		
Switching Frequency	kHz	200		
Weight (Typ.)	lbs	3.0 lbs. + 0.25 lbs. / used slot; maximum # of slots =5		
Size (L×W×H)	in(mm)	10.6" x 5" x 2.5" (268.4mm x 127mm x 63.5mm)		
Warranty	yrs	3 Years		

Consult datasheet and application notes for detailed specifications and test methods.

(1) Will operate with 130-330VDC

(2) DC Input <44V input 370W

(3) 4kVAC Type tested (non-production test). Refer to CB Report

(4) 450WDC 1.5%/°C

## Configuring Guide

Choose your options for boxes A through E. Select output voltage, single or dual output module code from the tables below, and options (if required) A maximum of 5 module slots may be used. List actual output voltages required to have them pre-set by the factory.

V  A  B  C  D  E

Choose the following power supply options.

**Primary Options**  
(Leave empty if not required)

F AC Fail, Global/fan Inhibit, 5V/100mA standby  
 FV AC Fail, Global/fan Inhibit, 5V/300mA standby  
 xFW<sup>(6,7)</sup> AC Fail, Global/fan Inhibit, 5-15V/1A standby  
 E AC Fail, Global/fan Enable, 5V/100mA standby  
 EV AC Fail, Global/fan Enable, 5V/300mA standby  
 xEW<sup>(6,7)</sup> AC Fail, Global/fan Enable, 5-15V/1A standby  
 (5) Specify value of x from 5-15V.  
 (Increase leakage current by 90µA.).

**Input Filter Choice\***

	120VAC, 60Hz	240VAC, 60Hz	264VAC, 63Hz (9)
S	564µA	1270µA	1.5mA
M	244µA	550µA	650µA
L	109µA	246µA	290µA
R	66µA	148µA	175µA
T	23µA	51µA	60µA

**Input Connection**

F Fast on terminals (7)  
 S Screw terminals  
 I Switched IEC 320 Connector (7)

**Cooling**

F Standard forward air fan  
 Q Quiet fan, forward air (7)  
 R Standard reverse air fan (6)  
 P Quiet fan, reverse air (6) (7)  
 C\*\* Customer air (30 CFM req'd)

**Output Power**

0 450W DC Input  
 4 450W  
 6 650W  
 9 900W

\* Max Leakage calculated at 264VAC, 63Hz. Note: Contact Lambda Technical Support for non-standard leakage options emissions compliance.  
 \*\* Thermocoupled evaluation unit recommended. Consult sales office.  
 (6) Not available on 900W Model (7) Not available on 450WDC Model  
 (8) Only available on 900W Model (9) Type testing result

## Single Output Module Selection †

**Output Options**  
(Leave empty if not required)  
 Inhibit, module good,  
 and current share

**Output Connection**  
 Fast on terminals  
 Screw terminals

N

F

S

Vout    Module    Conn.    Opt.

Example

12B3SN: 12V @ 12A single output module, screw terminal outputs, inhibit option

† Remote sense is standard on single output modules, optional on duals.

## Dual Output Module Selection

V1    V2    Module    Conn.    Opt.

F

S

N

R

**Output Connection**  
 Fast on terminals  
 Screw terminals

**Output Options**  
 Inhibit, module good,  
 and remote sense  
 Remote sense  
 (Leave empty if not required)

Example

3.3/12H1L/3FR: 3.3V @ 12A and 12V @ 6A output, fast on output terminals and remote sense option.

## Full Description Example:

V4FSSFV 5L1S 3.3E1SN 15/15H3/3SR

450W power supply with standard forward air fan, screw terminal input connections, 1.5mA leakage input filter, AC fail with Global/fan inhibit & 5V @ 300mA aux. supply option with the following outputs:

5V @ 35A Screw terminal connections with remote sense standard

3.3V @ 60A Screw terminal connection with output inhibit, module good, and current share options, remote sense standard

15V @ 10A Screw terminal connection with remote sense option (1st half of dual)

15V @ 6A Screw terminal connection with remote sense option (2nd half of dual)  
 Note the module descriptions are to be used as listed in the module tables.

## Model Selector

Module	V Range	Amp	Slots	Module	V Range	Amp	Slots
<b>Single Output</b>							
B1L	1.8-3.8V	20A	1	E4	14-19.9V	30A	2
C1	1.8-4.1V	35A	1	E3H	14-15V	36A	2
C1Y	1.8-4.1V	40A	1	C4	16.2-21.5V	14A	1
D1L	1.8-3.8V	50A	1.5	CC3	18.2-32.4V	18A	2
E1	1.8-3.8V	60A	2	E5L	20-24V	27A	2
F1 <sup>(6)</sup>	1.8-3.8V	80A	2	B5	21.6-31V	6A	1
Z2	1.8-3.8V	95A	3	C5	21.6-31V	10A	1
Z3	1.8-3.8V	114A	4	D5	21-28V	15A	1.5
B1H	3.9-5.5V	20A	1	E5H	24-28V	25A	2
L1	4.2-5.5V	35A	1	Z19 <sup>(8)</sup>	24-28V	36A	3.5
D2	3.8-9V	45A	1.5	HH5/3	25.3-44.2V	5A	1
D1H	3.9-5.5V	50A	1.5	DD4	28-43V	18A	3
E2	3.8-8V	60A	2	EE4 <sup>(6)</sup>	28-38	22.5	4
Z18	4.2-5.5V	66A	2	HH5/4	32.5-53V	4.5A	1
F2 <sup>(6)</sup>	3.8-8V	75A	2	BB4	32.6-43V	10A	2
Z4	3.9-5.5V	95A	3	EE5L <sup>(6)</sup>	40-48	18	4
Z6	3.9-5.5V	104A	3.5	C5B4	43-48V	10A	2
B2	5-9V	25A	1	EE5H <sup>(6)</sup>	48-56	18	4
B3	9.1-16.2V	12A	1	CC5	48.1-62V	10A	2
C3	9.1-16.2V	18A	1	DD5	42-56V	15A	3
D3	8-16.5V	24A	1.5	<b>Wide Range Programmable*</b>			
E3L	8-13.9V	40A	2	W2 <sup>(6)</sup>	1-7.5V	30A	1
Z7	8-16.5V	45A	3	W5	0.5-32V	8.5A	1
EE2	7.6-16V	45A	4	* Refer to Vega Datasheet			
D4	14-21.5V	18A	1.5				

## Model Selector

Module	V1 Min - V1 Max	V1 Amp	V2 Min - V2 Max	V2 Amp	Slots
<b>Dual Output</b>					
H1L/1L	1.8V - 3.8V	12A	1.8V - 3.8V	8A	1
H1L/1H	1.8V - 3.8V	12A	3.9V - 5.5V	8A	1
H1L/2	1.8V - 3.8V	12A	5.6V - 9V	6A	1
H1L/3	1.8V - 3.8V	12A	9.1V - 16.2V	6A	1
H1L/4	1.8V - 3.8V	12A	16.3V - 25V	4.5A	1
H1H/1L	3.9V - 5.5V	12A	1.8V - 3.8V	8A	1
H1H/1H	3.9V - 5.5V	12A	3.9V - 5.5V	8A	1
H1H/2	3.9V - 5.5V	12A	5.6V - 9V	6A	1
H1H/3	3.9V - 5.5V	12A	9.1V - 16.2V	6A	1
H1H/4	3.9V - 5.5V	12A	16.3V - 25V	4.5A	1
H2/1L	5.6V - 9V	10A	1.8V - 3.8V	8A	1
H2/1H	5.6V - 9V	10A	3.9V - 5.5V	8A	1
H2/2	5.6V - 9V	10A	5.6V - 9V	6A	1
H2/3	5.6V - 9V	10A	9.1V - 16.2V	6A	1
H2/4	5.6V - 9V	10A	16.3V - 25V	4.5A	1
H3/1L	9.1V - 16.2V	10A	1.8V - 3.8V	8A	1
H3/1H	9.1V - 16.2V	10A	3.9V - 5.5V	8A	1
H3/2	9.1V - 16.2V	10A	5.6V - 9V	6A	1
H3/3	9.1V - 16.2V	10A	9.1V - 16.2V	6A	1
H3/4	9.1V - 16.2V	10A	16.3V - 25V	4.5A	1
H5/1L	16.2V - 28V	5A	1.8V - 3.8V	8A	1
H5/1H	16.2V - 28V	5A	3.9V - 5.5V	8A	1
H5/2	16.2V - 28V	5A	5.6V - 9V	6A	1
H5/3	16.2V - 28V	5A	9.1V - 16.2V	6A	1
H5/4	16.2V - 28V	5A	16.3V - 25V	4.5A	1

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/vega-series.htm](http://us.tdk-lambda.com/lp/products/vega-series.htm)



## 550 to 900W Multiple Output Modular Power Supply

### Features

- ◆ Suitable for higher volume applications
- ◆ 1-10 Wide Range Outputs With Adjustment
- ◆ Output Voltages From 1.8 - 56V
- ◆ Medical Approval Options
- ◆ MIL-STD-810 Shock and Vibration
- ◆ PFC compliant to EN61000-3-2
- ◆ Safety Agency Approvals EN, cULus, BSI, CE



### Key Market Segments & Applications



Specifications			
Model		VEGA Lite 550	VEGA Lite 750
Input Voltage Range	(1) -	85-264VAC 47-63Hz(2)	85-264VAC 47-63Hz(2)
Efficiency (Typ.)	%	75% at 230VAC and full load, configuration dependent	
Nominal Output Voltages	VDC	1.8 - 56V (See page 2)	
Output Voltage Adjustment	-	Wide range, via potentiometer or remote adjust pin, module dependent	
Minimum Load	A	0A	
Max Output Power	(3) W	700 <sup>(3)</sup>	900 <sup>(3)</sup>
Max Ripple & Noise (pk-pk)	mV	<1% (or 50mV which ever is greater) using EIAJ test method & 20MHz bandwidth	
Regulation (load, line, cross)	%	Less than 0.5%	
Hold Up Time	ms	16ms min at 100VAC and full load	
Over Voltage Protection	%	120% - 150% (See website for more details)	
Overload/Short Circuit	%	105-125%, constant current characteristic, 150% max short circuit current	
Remote ON/OFF Control	-	A TTL compatible signal will turn ON/OFF all output modules (optional)	
Remote Sense	V	Compensates for total of 0.75 volts total line drop (optional on dual output modules)	
Isolation	(4) -	Input-Output 4.3kVDC <sup>(4)</sup> ; (2 x MOPPs (3rd edition 60601)); Input-Ground 2.3kVDC; Output-Ground 200VDC	
Conducted EMI	-	EN55022 Class B, (as per CISPR .22)	
Radiated EMI	-	EN55022 Class B, (as per CISPR .22)	
Operating Temperature	°C	0°C to 50°C, derate ea. output @ 2.5%/°C from 50°C to 65°C. Consult factory for 70°C operation. -20°C startup requires a 30 min. warm-up period.	
Cooling	-	Internal fan	
Dynamic Load Response	-	<6% or 300mV of set voltage for 50% load change (above 25% load), recovery to within 1% of nominal within 500 microseconds.	
Regulatory Agency Compliance	-	UL, CSA, EN, IEC 60950-1, EN61010-1, UL2601-1, EN, IEC6060-1, CE Mark for LVD	
Vibration	G	MIL-STD-810E, Method 514.4, Pro I, Cat 1, 9 2G, 10-200Hz sweep for 1hr to search for resonant. 6G random, 6-Axis to IEC68-2-64	
Shock	G	MIL-STD-810F, Method 516.5, Pro I, IV, VI; 20G per IEC68-2-27	
Switching Frequency	kHz	200	
Weight (Typ.)	lbs	3.0 lbs. + 0.25 lbs. / used slot; maximum # of slots =5	
Size (L×W×H)	in(mm)	10.6" x 5" x 2.5" (268.4mm x 127mm x 63.5mm)	
Warranty	yrs	3 Years	

Consult datasheet and application notes for detailed specifications and test methods.

- (1) 440Hz with reduced PFC, consult factory
- (2) Will operate with 130-330VDC
- (3) See input derating curves
- (4) 4kVAC type tested (non-production test). Refer to CB report

## Configuring Guide

Choose your options for boxes A through C. Select output voltage, single or dual output module code from the tables below, and options (if required) A maximum of 5 module slots may be used. List actual output voltages required to have them pre-set by the factory.

V	A	F	S	B	C	Choose the following power supply options.
						<b>Primary Options</b> (Leave empty if not required)
						F AC Fail, Global/fan Inhibit, 5V/100mA standby
						E AC Fail, Global/fan Enable, 5V/100mA standby
						<b>Input Filter Choice*</b>
						120VAC, 60Hz 240VAC, 60Hz 264VAC, 63Hz (5)
						S 564µA 1270µA 1.5mA
						L 109µA 246µA 290µA
						<b>Output Power</b>
						5 550W
						7 750W

\* Max Leakage calculated at 264VAC, 63Hz. Note: Contact Lambda Technical Support for non-standard leakage options emissions compliance.  
(5) Type testing result

## Single Output Module Selection †

**Output Options**  
(Leave empty if not required)  
Inhibit, module good,  
and current share

N	Vout	Module	S	Opt.

Example  
12C3SN: 12V @ 18A single output module, with inhibit, module good, and current share option.

† Remote sense is standard on single output modules, optional on duals.

## Dual Output Module Selection

V1	V2	Module	S	Opt.

**Output Options**  
Inhibit, module good,  
and remote sense

N

(Leave empty if not required)

Example  
12/12H3/3SN: 12V @ 10A and 12V @ 6A, dual output module with inhibit, module good, and remote sense option.

**Full Description Example:**  
V5FSSF 5L1SN 12/12H3/3S 24C5S

550W power supply with standard forward air fan, screw terminal input connections, 1.5mA leakage input filter, AC fail with Global/fan inhibit & 5V @ 100mA aux. supply option with the following outputs:

5V @ 35A With O/P inhibit, module good & current share options  
12V @ 10A  
12V @ 6A  
24V @ 10A

Note the module descriptions are to be used as listed in the module tables.

## Vega Output Modules

Module	V Range	Amp	Slots	Module	V Range	Amp	Slots
<b>Single Output</b>							
C1S	1.8-3.4V	35A	1	D4S	14-18V	18A	1.5
D1LS	1.8-3.4V	50A	1.5	E4S	14-19V	30A	2
E1S	1.8-3.4V	60A	2	C4S	16.3-18V	14A	1
L1S	4.2-5.1V	35A	1	C5S	21.6-30V	10A	1
D2S	3.8-7.5V	45A	1.5	D5S	21-28V	15A	1.5
D1HS	3.9-5.1V	50A	1.5	E5HS	24-28V	25A	2
E2S	3.8-7.5V	60A	2	HH5/4S	32.5-48V	4.5A	1
B2S	5-8V	25A	1	BB4S	32.6-40V	10A	2
C3S	9.1-15V	18A	1	C5B4S	43-48V	10A	2
D3S	8-15V	24A	1.5	DD5S	42-56V	15A	3
E3LS	8-12.5V	40A	2				

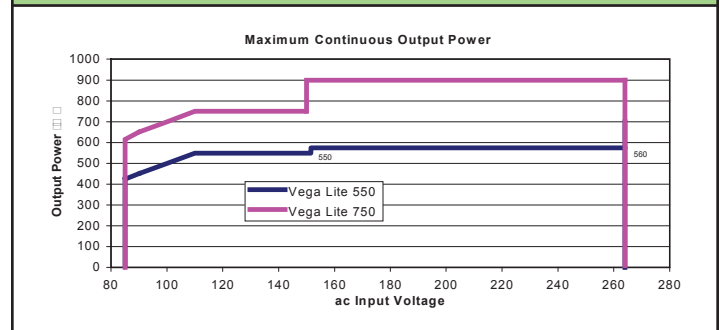
## Vega Output Modules

Module	V1 Min - V1 Max	V1 Amp	V2 Min - V2 Max	V2 Amp	Slots
<b>Dual Output</b>					
H1H/1LS	3.9V - 5.1V	12A	1.8V - 3.4V	8A	1
H1H/3S	3.9V - 5.1V	12A	9.1V - 15.5V	6A	1
H3/1HS	9.1V - 15.5V	10A	3.9V - 5.1V	8A	1
H3/3S	9.1V - 15.5V	10A	9.1V - 15.5V	6A	1
H5/1HS	16.2V - 28V	5A	3.9V - 5.1V	8A	1
H5/3S	16.2V - 28V	5A	9.1V - 15.5V	6A	1
H5/4S	16.2V - 28V	5A	16.3V - 24V	4.5A	1

For Additional Information, please visit [us.tdk-lambda.com/lp/products/vega-series.htm](http://us.tdk-lambda.com/lp/products/vega-series.htm)



## Derating Curve



## 2 x 3.5" 14-22W AC-DC Power Supplies

### Features

- ◆ Wide Range AC Input
- ◆ Low profile, Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ Class B conducted EMI



### Key Market Segments & Applications



### Specifications

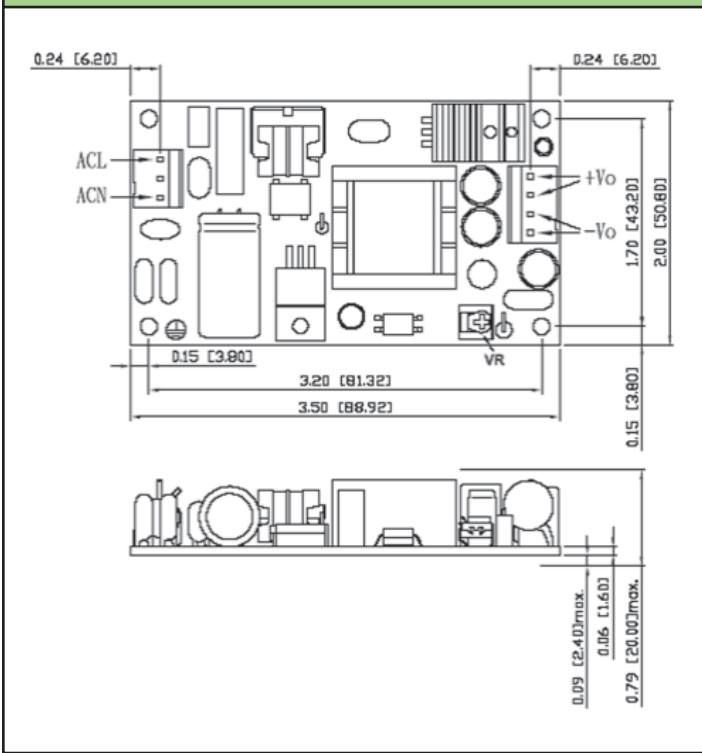
Model	ZPSA20	
Input Voltage range (1)	-	85 - 264VAC (47 - 440Hz) or 120 - 370VDC
Inrush Current	A	40A maximum at 240VAC input, 25°C ambient cold start
Input Current (115/230VAC)	A	0.25 / 0.12
Leakage Current	mA	0.6mA maximum (264VAC, 60Hz)
Hold Up Time (Typ)	ms	8ms at 115VAC input
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	-	±1%
Adjustment Range	-	None
Minimum Load	A	None
Load Regulation	-	±1% (10 - 100% load change)
Line Regulation	-	±0.5% (100 - 240VAC line change)
Ripple & Noise (2)	mV	1% or 50mV whichever is greater
Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	110 - 130% of nominal (Zener clamp)
Efficiency	%	82% typical
LED Indicator	-	Green LED = OK
Operating Temperature	°C	0 to +70°C derate linearly to 37.5% load from 45 to 70°C
Storage Temperature	°C	-20 to +85°C
Humidity (non condensing)	-	10 - 95% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Certification	-	UL60950-1, CSA60950-1 (cUL), EN60950-1, CE Mark
Conducted & Radiated EMI	-	EN55022-B, FCC Class B
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8
Weight (Typ)	g	100g
Size (WxLxH)	mm	2 x 3.5 x 0.79 (including underside components)
Warranty	yrs	Two Years

(1) Safety certified for 47 - 63Hz input only

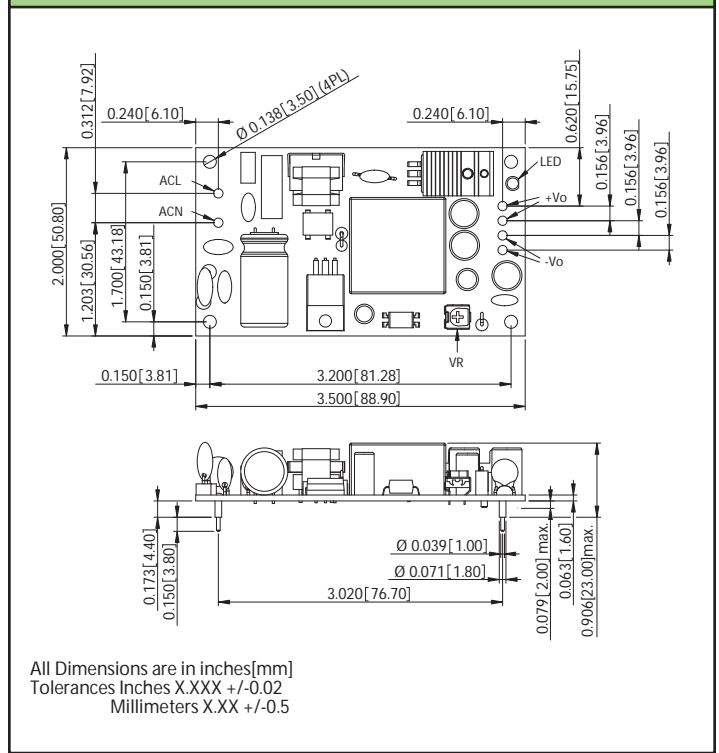
(2) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW



## Outline Drawings (ZPSA20)



## Outline Drawings (ZPSA20xx/P)



## Model Selector

Model	Output (V)	Maximum Output (A)	Peak Load(A) (3)	Output Power (W)
ZPSA20-3R3	3.3	4.4	6.6	14.5
ZPSA20-5	5	4.4	6.6	22
ZPSA20-9	9	2.45	4.0	22
ZPSA20-12	12	1.8	2.7	22
ZPSA20-15	15	1.4	2.1	21
ZPSA20-24	24	0.92	1.4	22

(3) Average not to exceed max power, <30s, 10% duty cycle

## Options

Suffix	Description
Blank	Molex connectors
/P	PCB mount pins

## Other Industrial Products

KPSA	5 - 15W pcb mount
KM	15 - 40W pcb mount medical
ZPSA/ZPD/ZPT	40 - 60W, single, dual and triple output
ZWS	5 - 240W single output

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/zpsa-series.htm](http://us.tdk-lambda.com/lp/products/zpsa-series.htm)



## 2 x 4" 40W to 60W AC-DC Power Supplies

### Features

- ◆ Single Output
- ◆ Wide Range AC Input
- ◆ Low 1.07" profile
- ◆ Industry Standard Footprint
- ◆ Global Safety Agency Compliance
- ◆ Up to 88% efficiency



### Key Market Segments & Applications



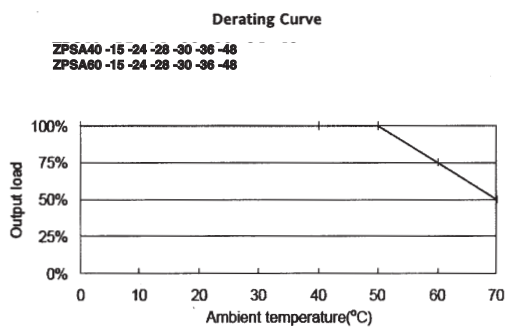
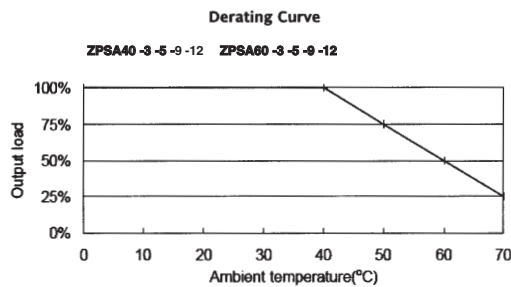
Specifications			
Model		ZPSA40	ZPSA60
Input Voltage range	-	90 - 264VAC (47 - 440Hz) or 120 - 370VDC	
Inrush Current (115 / 230VAC)	A	25 / 50	
Input Current	A	< 1.2A	< 1.4A
Leakage Current	mA	0.8mA maximum (264VAC, 60Hz)	
Temperature Coefficient	-	±0.05%/°C	
Voltage Accuracy	%	±1%	
Minimum Load	-	None	
Load Regulation	%	±1%	
Line Regulation	%	±0.5%	
Ripple & Noise	mV	1% or 50mV whichever is greater	
Short Circuit Protection	-	Continuous - hiccup mode	
Overvoltage Protection	V	Typically 110-130% of nominal	
Hold Up Time (Typ)	ms	8ms at 115VAC input	
LED Indicator	-	Green LED = OK	
Operating Temperature	°C	0 to +70°C derate according to charts on page 2	
Storage Temperature	°C	-20 to +85°C	
Humidity (non condensing)	-	10 - 95% RH	
Cooling	-	Convection	
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.	
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	-23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)	
Shock	-	< 196.1 m/s <sup>2</sup> (20G)	
Safety Agency Certification	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark	
Conducted & Radiated EMI	-	EN55022-B, FCC Class B	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Weight (Typ)	g	130	
Size (WxLxH)	in	2 x 4 x 1.07 (including underside components)	
Warranty	yrs	Two Years	

## Model Selector

Model	Output (V)	Adjustment Range (V)	Maximum Output (A)	Peak Load (A)(4)	Output Power (W)	Efficiency (%)
ZPSA40-3R3	3.3	-	6.0	7.2	20	74
ZPSA60-3R3	3.3	-	8.0	8.5	26	74
ZPSA40-5	5	-	6.0	7.2	30	79
ZPSA60-5	5	-	8.0	9.0	40	79
ZPSA40-9	9	-	4.45	5.34	40	83
ZPSA60-9	9	-	6.67	8.0	60	83
ZPSA40-12	12	-	3.34	4.0	40	85
ZPSA60-12	12	-	5.0	6.0	60	85
ZPSA40-15	15	-	2.67	3.2	40	85
ZPSA60-15	15	-	4.0	4.8	60	85
ZPSA40-24	24	-	1.67	2.0	40	86
ZPSA60-24	24	-	2.5	3.0	60	86
ZPSA40-28	28	-	1.43	1.7	40	86
ZPSA60-28	28	-	2.14	2.6	60	86
ZPSA40-30	30	-	1.33	1.6	40	87
ZPSA60-30	30	-	2.0	2.4	60	87
ZPSA40-36	36	-	1.11	1.33	40	87
ZPSA60-36	36	-	1.67	2.0	60	87
ZPSA40-48	48	-	0.834	1.0	40	88
ZPSA60-48	48	-	1.25	1.5	60	88

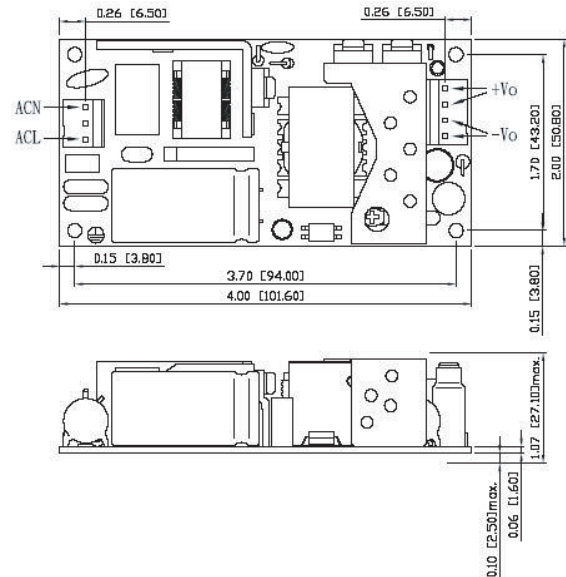
(4) Average not to exceed max power, <30s, 10% duty cycle

## Derating Curve



## Outline Drawings

All Dimensions are in inches[mm]  
Tolerances : XX±.02[.XX±.5] unless otherwise noted



## Other Industrial Products

SC40/60	40 to 80W, 3x5", 1 - 3 outputs
NV175	175W, 3x5", 1-5 outputs
ZWS	5 to 240W, single output
KPSA	5 to 15W, pcb mount
ZPD, ZPT	40W, 2x4" dual and triple outputs

## Options

Suffix	Description
Blank	Molex connectors
/P	PCB mount pins

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/zpsa-series.htm](http://us.tdk-lambda.com/lp/products/zpsa-series.htm)



## 80W to 170W Quad Output Power Supplies

### Features

- ◆ Universal Input (85 - 265VAC)
- ◆ Power Factor Corrected
- ◆ Floating Adjustable Fourth Output
- ◆ Low Profile <1U High



### Key Market Segments & Applications



Specifications		ZWQ80	ZWQ80	ZWQ80	ZWQ80	ZWQ130	ZWQ130	ZWQ130	ZWQ130
Model		-5222	-5223	-5224	-5225	-5222	-5223	-5224	-5225
Input Voltage	-	85-265VAC (47-63Hz), 120-370VDC							
Input Current (1)	A	1.6 / 0.8				2.6 / 1.3			
Inrush Current (1)	A	14/28							
Power Factor	-	Meets EN61000-3-2							
Temperature Coefficient	-	<0.02%/°C							
Max Output Power (convection)	W	80				130			
Max Output Power (forced air)	W	104	88.7	104	104	170	149.6	170	170
Overpower Protection (2)	W	>109	>93	>109	>109	>173	>152	>173	>173
Minimum Load	A	V1: 0.9A Conv, 1.4A Forced Air				V1: 1.5A Conv, 2.1A Forced Air			
Output Voltage Accuracy	%	±5% for outputs V2 and V3							
Efficiency (Typ)	%	72							
Hold Up Time (1)	ms	20							
Leakage Current	-	0.75mA max, 0.2mA (Typ) at 100VAC / 0.44mA(Typ) at 230VAC							
Remote On / Off	-	See installation manual (Not available with /A cover option)							
Oper Temp (convection cooled)	°C	-10°C to 60°C, derate linearly to 50% load from 40°C to 60°C. (3)							
Oper Temp (forced air cooled)	°C	-10°C to 70°C, derate linearly to 50% load from 50°C to 70°C. (>30cfm airflow)(3)							
Storage Temperature	°C	-30° to +85°C							
Humidity (non condensing)	-	Operating: 30 - 90% RH; Non-operating 10-95% RH							
Withstand Voltage	-	I/P~Grnd 2kVAC (20mA), I/P~O/P 3kVAC (20mA), O/P~Grnd 500VAC (100mA) for 1 min.							
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC							
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour							
Shock	-	< 196.1 m/s <sup>2</sup>							
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark, EN50178							
Conducted & Radiated EMI	-	EN55011, EN55022-B, FCC Class B, VCCI-B							
Immunity	-	EN61000-4-2,-3,-4,-5,-6,-8,-11							
Weight (Typ)	g	550				730			
Size (W x H x D)	mm	93.5 x 35 x 210 (refer to outline drawing)				106 x 35 x 225 (refer to outline drawing)			
Warranty	yrs	One Year							

(1) 100/200VAC

(2) Avoid prolong operation in overload

(3) /A version - additional derating, see installation manual

Model Selector									
Model	Output	Voltage (V)	Voltage Adjust Range (V)	Convect. (A)	Peak or Forced Air (A)(4)	Max Load Reg (mV)	Max Line Reg (mV)	Ripple Noise (mV)	OVP (V)(5)
ZWQ80-5222	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	12	11.4-12.6	3.0	4.0	300	48	150	13.8-16.2
ZWQ80-5223	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	3.3	2.0-3.63	7.0	9.0	100	20	120	3.79-4.95
ZWQ80-5224	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	24	22.8-25.2	1.5	2.0	400	96	200	27.6-32.4
ZWQ80-5225	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	5	2.0-5.25	7.0	9.0	100	20	120	5.7-7.0
ZWQ130-5222	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	12	11.4-12.6	4.0	5.0	300	48	150	11.4-12.6
ZWQ130-5223	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	3.3	2.0-3.63	10.0	12.0	100	20	120	3.79-4.95
ZWQ130-5224	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	24	22.8-25.2	2.0	2.5	400	96	200	27.6-32.4
ZWQ130-5225	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	5	2.0-5.25	10.0	12.0	100	20	120	5.7-7.0

\* User selectable via connector or PCB. Outputs are floating from V1 & V4. Can be connected in series for 24/30V.

Other Industrial Products	
ZWS/ZWD	5W to 480W Single and dual output
SC	30W to 120W Single, dual, & triple output
NV	175 to 700W Single and multiple output
HWS	15 to 1500W Single output

Options	
Suffix	Description
blank	No cover or L Bracket
/L	L Bracket
/A	Cover and L Bracket

- (4) The peak current draw must not exceed a 10 sec. duration with a duty cycle of 35%.
- (5) An overvoltage condition on any output will shut down all outputs, the power supply must be re-set by cycling the AC input.

For Additional Information, please visit [us.tdk-lambda.com/lp/products/zwq-series.htm](http://us.tdk-lambda.com/lp/products/zwq-series.htm)



## 10W to 30W Single Output, High Reliability Power Supplies

### Features

- ◆ Universal Input (85 - 265VAC)
- ◆ 5 year warranty
- ◆ Small Size
- ◆ <0.5W off load power draw
- ◆ 10 year E-cap lifetime



### Key Market Segments & Applications



Specifications		ZWS10B	ZWS15B	ZWS30B
Input Voltage range (1)	V	85 - 265VAC (47 - 63Hz), 120 - 370VDC		
Input Current (100 / 200VAC)	A	0.25 / 0.13A	0.34 / 0.17A	0.65 / 0.35A
Inrush Current (100 / 200VAC)	A	15 / 30A		
No Load Power Draw	W	Typically 0.2W at 100/200VAC, 0.5W maximum		
Leakage Current (100 / 200VAC)	mA	< 150uA / 300uA		
Temperature Coefficient	°C	<0.02%/°C		
Overcurrent Protection	%	> 105% of maximum current rating		
Hold Up Time (Typ) @ 100VAC	ms	20ms		
Operating Temperature Convection Cooled	°C	ZWS10B: -10 to +70°C, derate linearly to 20% load from 50 to 70°C ZWS15B: -10 to +70°C, derate linearly to 40% load from 50 to 70°C ZWS30B: -10 to +70°C, derate linearly to 20% load from 50 to 70°C		
Operating Temperature Forced Air Cooled (0.7m/s)	°C	-10 to +70°C, derate linearly to 70% load from 60 to 70°C		
Storage Temperature	°C	-30 to +75°C		
E-cap Lifetime	-	10 year E-cap lifetime (80% load, 24 hours per day, 50°C ambient)		
Humidity (non condensing)	%RH	Operating 30 - 90%RH, Storage 10 - 90%RH		
Cooling	-	Convection or forced air		
Withstand Voltage	VAC	Input to Ground 2kVAC (10mA), Input to Output 3kVAC (10mA) Output to Ground 500VAC (20mA) for 1 minute		
Isolation Resistance	M	>100M at 25°C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)	Hz	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant. X, Y, Z for 1 hour each		
Shock	m/s <sup>2</sup>	< 196m/s <sup>2</sup>		
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 (OV II), CE Mark		
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B, VCCI-B		
Immunity	-	IEC61000-4-2 (lv 4), -3 (lv 3), -4 (lv 4), -5 (lv 4), -6 (lv 3), -8 (lv 4), -11		
Weight (Typ)	g	45g	55g	105g
Size (WxHxD)	mm	50 x 22 x 73.5mm	50 x 22 x 87.5mm	50 x 26.5 x 105mm
Warranty	yrs	Five Years		

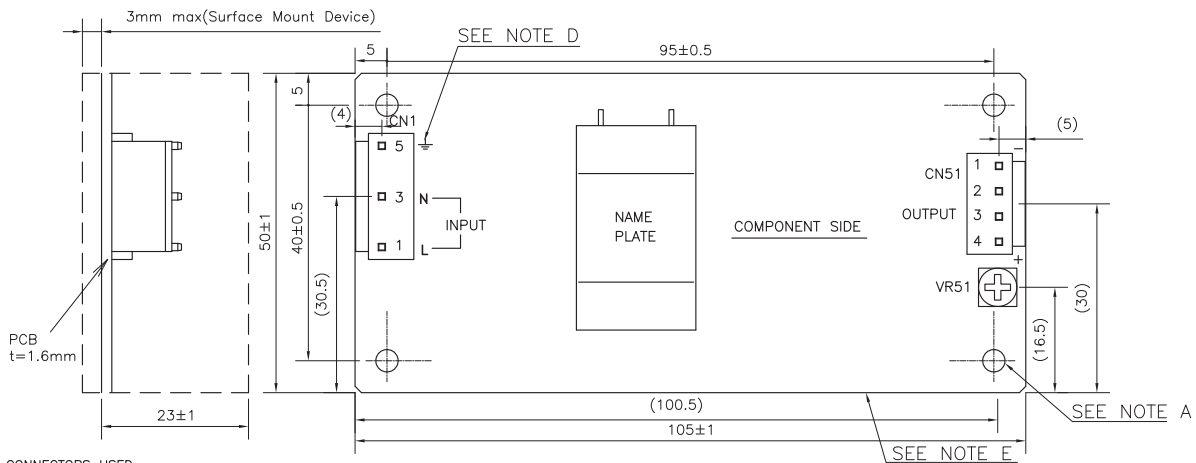
#### Notes:

- (1) Derate linearly to 90% load from 90VAC to 85VAC input  
Refer to detailed specifications and application notes on web page

## Model Selector

Model	Voltage	Adjust Range	Max Current A	Load Reg mV	Line Reg mV	Ripple Noise mV	Efficiency %	OVP V
ZWS10B-3	3.3V	2.97-3.63	2	40	20	120	70 / 70	4 - 5.25
ZWS15B-3	3.3V	2.97-3.63	3	40	20	120	70 / 71	4 - 5.25
ZWS30B-3	3.3V	2.97-3.63	6	40	20	120	75 / 77	4 - 5.25
ZWS10B-5	5V	4.5-5.5	2	40	20	120	77 / 78	5.75 - 7
ZWS15B-5	5V	4.5-5.5	3	40	20	120	76 / 78	5.75 - 7
ZWS30B-5	5V	4.5-5.5	6	96	48	120	80 / 82	5.75 - 7
ZWS10B-12	12V	10.8-13.2	0.9	96	48	150	82 / 83	13.8 - 16.2
ZWS15B-12	12V	10.8-13.2	1.3	96	48	150	80 / 83	13.8 - 16.2
ZWS30B-12	12V	10.8-13.2	2.5	120	60	150	84 / 86	13.8 - 16.2
ZWS10B-15	15V	13.5-16.5	0.7	120	60	150	83 / 84	17.3 - 20.3
ZWS15B-15	15V	13.5-16.5	1	120	60	150	81 / 84	17.3 - 20.3
ZWS30B-15	15V	13.5-16.5	2	120	60	150	85 / 87	17.3 - 20.3
ZWS10B-24	24V	21.6-26.4	0.5	150	96	150	84 / 85	27.6 - 32.4
ZWS15B-24	24V	21.6-26.4	0.7	150	96	150	82 / 85	27.6 - 32.4
ZWS30B-24	24V	21.6-26.4	1.3	150	96	150	86 / 88	27.6 - 32.4

## ZWS30-B Outline Drawing



### CONNECTORS USED:

PART DESCRIPTION	PART NAME	MANUFACT.	QTY
PIN HEADER (INPUT SIDE CN1)	B3P5-VH	JST	1
PIN HEADER(OUTPUT SIDE C51)	B4P-VH	JST	1

### MATCHING HOUSINGS AND PINS(NOT INCLUDED WITH THE PRODUCT):

SOCKET HOUSING (CN1)	VHR-5N	JST	1
SOCKET HOUSING (CN51)	VHR-4N	JST	1
TERMINAL PINS	SVH-21T-P1.1	JST	7

### NAME PLATE



### NOTES

- A: THE 4- $\phi$ 3.5 HOLE ARE CUSTOMER CHASSIS MOUNTING HOLES. ALL MUST BE SCREWED IN ORDER TO CONFORM THE VIBRATION SPEC.
- B: MODEL NAME, MAXIMUM OUTPUT POWER, NOMINAL OUTPUT VOLTAGE, MAXIMUM OUTPUT CURRENT, ARE SHOWN HERE IN ACCORDANCE WITH THE SPECIFICATIONS.
- C: COUNTRY OF MANUFACTURE WILL BE SHOWN HERE.
- D:  $\perp$  IS FOR SAFETY GROUND CONNECTION.
- E: TO KEEP THE DISTANCE MORE THAN 4mm BETWEEN PC-BOARD EDGE AND CUSTOMER'S CHASSIS.

## Other Industrial Products

ZWS-BAF	50W to 150W Active PFC
ZWD/ZWQ	100W to 440W Single & multiple output
NV175	175W, 1-4 outputs 3 x 5"
HWS	15W to 1800W Single output enclosed

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/zws-b-series.htm](http://us.tdk-lambda.com/lp/products/zws-b-series.htm)

## Single Output, High Reliability AC-DC Power Supplies

### Features

- ◆ 33W to 150W
- ◆ Universal Input (85 - 265VAC)
- ◆ Power factor Corrected
- ◆ Convection Cooled
- ◆ 5 year warranty
- ◆ Compact Design



### Key Market Segments & Applications



Specifications		ZWS50BAF	ZWS75BAF	ZWS100BAF	ZWS150BAF
AC Input Voltage range	-	85-265VAC (47-63Hz)			
DC Input Voltage range	-	120 - 370VDC			
Input Current (Typical)	A	0.65 / 0.35	0.95 / 0.5	1.3 / 0.65	1.9 / 0.95
Inrush Current	A	14 / 28 25°C ambient, cold start			
Power Factor (Active)	-	Meets EN61000-3-2 (Typically 0.97/0.91)			
Maximum Ripple and Noise	mV	3.3 & 5V: 120mV, 12 to 24V: 150mV, 48V: 200mV			
Temperature Coefficient	-	<0.02%/°C			
Overcurrent Protection (1)	-	>105% of maximum output current			
Hold Up Time (Typ) at 100VAC	ms	20ms			
Leakage Current	-	0.5mA max, 0.4mA typ at 230VAC			
Remote On / Off	-	None		Optional	
Operating Temperature (Convection)	°C	-10 to +70°C, derate linearly to 50% load from 50 to 70°C			
Operating Temperature (Forced Air)	°C	N/A		-10 ~+70°C, derate linearly to 75% load from 60 ~70°C	
Storage Temperature	°C	-30 to +75°C			
Humidity (non condensing)	-	Operating: 30 - 90%RH, storage: 10 - 90%RH			
Withstand Voltage	-	I/P to Grnd 2kVAC (10mA), I/P to O/P 3kVAC (10mA), O/P to Grnd 500VAC (20mA) for 1 min.			
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour			
Shock	-	< 196.1 m/s <sup>2</sup>			
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 (OV II), CE Mark			
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC-B, VCCI-B			
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv3), -4 (lv 3), -5 (lv 3,4), -6 (lv 3), -8 (lv 4), -11			
Weight (Typ)	g	165	230	290	390
Size (W x H x D)	in	1.97 x 1.02 x 5.2"	1.97 x 1.3 x 5.9"	2.44 x 1.3 x 6.1"	2.95 x 1.66 x 6.3"
Warranty	yrs	Five Years			

#### Notes:

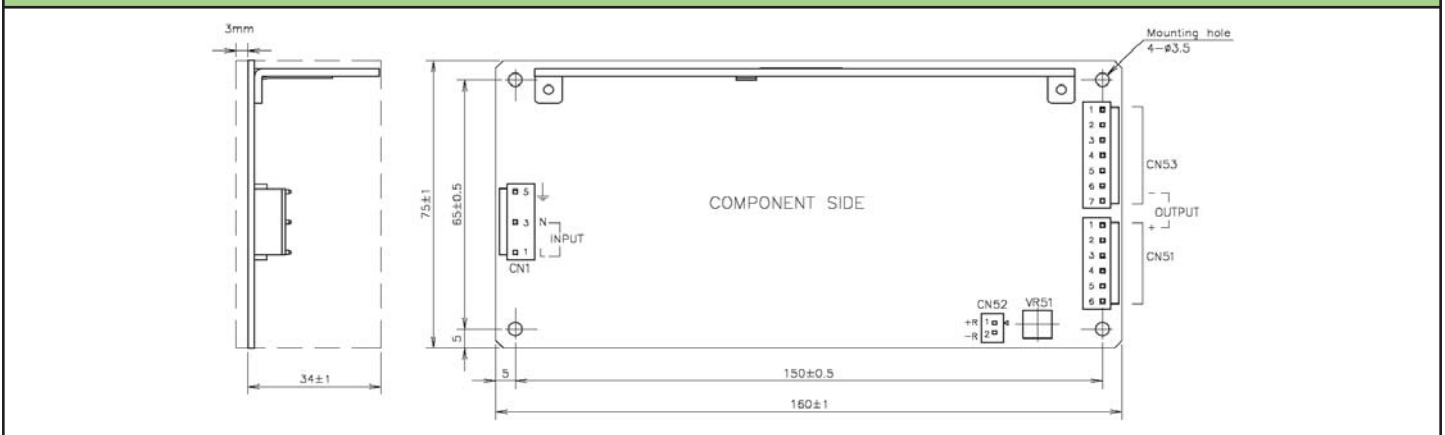
- (1) Avoid prolonged operation in overload
- (2) 100 / 200VAC Input
- (3) 60°C: 70% load



## Model Selector

Model	Adjust Voltage	Max Range	Current	Efficiency (typ) %	Load Reg (mV)	Line Reg (mV)	OVP (V)
ZWS50BAF-3	3.3V	2.97-3.63V	10A	76 / 78	40	20	3.79-4.95
ZWS75BAF-3	3.3V	2.97-3.63V	15A	76 / 78	40	20	3.79-4.95
ZWS100BAF-3	3.3V	2.97-3.63V	20A	82 / 84	40	20	3.79-4.95
ZWS150BAF-3	3.3V	2.97-3.63V	30A	82 / 84	40	20	3.79-4.95
ZWS50BAF-5	5V	4.5-5.5V	10A	82 / 84	40	20	5.75-7.0
ZWS75BAF-5	5V	4.5-5.5V	15A	82 / 84	40	20	5.75-7.0
ZWS100BAF-5	5V	4.5-5.5V	20A	84 / 86	40	20	5.75-7.0
ZWS150BAF-5	5V	4.5-5.5V	30A	85 / 87	40	20	5.75-7.0
ZWS50BAF-12	12V	10.8-13.2V	4.3A	83 / 85	96	48	13.8-16.2
ZWS75BAF-12	12V	10.8-13.2V	6.3A	83 / 85	96	48	13.8-16.2
ZWS100BAF-12	12V	10.8-13.2V	8.5A	86 / 88	96	48	13.8-16.2
ZWS150BAF-12	12V	10.8-13.2V	12.5A	85 / 88	96	48	13.8-16.2
ZWS50BAF-15	15V	13.5-16.5V	3.5A	83 / 86	120	60	17.3-20.3
ZWS75BAF-15	15V	13.5-16.5V	5A	84 / 86	120	60	17.3-20.3
ZWS100BAF-15	15V	13.5-16.5V	6.7A	86 / 88	120	60	17.3-20.3
ZWS150BAF-15	15V	13.5-16.5V	10A	86 / 89	120	60	17.3-20.3
ZWS50BAF-24	24V	21.6-26.4V	2.1A	84 / 87	150	96	27.6-32.4
ZWS75BAF-24	24V	21.6-26.4V	3.2A	84 / 87	150	96	27.6-32.4
ZWS100BAF-24	24V	21.6-26.4V	4.3A	87 / 89	150	96	27.6-32.4
ZWS150BAF-24	24V	21.6-26.4V	6.3A	88 / 90	150	96	27.6-32.4
ZWS50BAF-48	48V	39.5-52.8V	1.1A	84 / 86	240	192	55.2-64.8
ZWS75BAF-48	48V	39.5-52.8V	1.6A	85 / 88	240	192	55.2-64.8
ZWS100BAF-48	48V	39.5-52.8V	2.1A	88 / 90	240	192	55.2-64.8
ZWS150BAF-48	48V	39.5-52.8V	3.2A	89 / 91	240	192	55.2-64.8

## Outline Drawing ZWS150BAF



## Other Industrial Products

HWS	15W to 1800W Single output
ZPSA	20W to 60W Single, Dual & Triple output
NV	175W to 300W Single, Dual, Triple & Quad output
CSS	40W to 150W Single output

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/zws-series.htm](http://us.tdk-lambda.com/lp/products/zws-series.htm)



## Options

Suffix	Description	Notes
-	Open Frame	-
/L	With L bracket case	-
/A	With L bracket & Cover	-
/R	Remote On/Off	Not on ZWS50 or 75BAF
/CO2	Conformal Coating	-

## 300W Single Output, Convection Cooled Power Supplies

### Features

- ◆ Universal Input (85 - 265VAC)
- ◆ Power Factor Corrected
- ◆ Convection cooling (300W) or Forced Air (336-338W)
- ◆ Five year warranty
- ◆ Less than 0.5mA earth leakage current



### Key Market Segments & Applications



Specifications		ZWS300BAF
Model		ZWS300BAF
Input Voltage	V	85-265VAC (47-63Hz), 120-370VDC
Input Current	A	3.6 / 1.8 (Convection cooled rating)
Inrush Current <sup>(1)(2)</sup>	A	15 / 30
Power Factor	-	0.97 at 100VAC, 0.93 at 200VAC, Meets EN61000-3-2
Leakage Current	mA	0.5mA Max. Typically 0.2mA (100VAC), 0.4mA (230VAC)
Off Load Power Draw	W	Typically 0.1W at 100VAC, 0.5W at 200VAC, 0.8W at 265VAC when unit is in inhibit
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection <sup>(3)</sup>	-	>116% of convection cooled rated output current
Overvoltage Protection	V	24V: 28.8-33.6V, 36V: 41.4-48.6V, 48V: 55.2-64.8V
Hold Up Time (Typ) <sup>(1)</sup>	ms	18ms at 100VAC input (Convection cooled rating)
Efficiency <sup>(1)</sup>	%	88 / 91% (Convection cooled rating)
Remote On/Off	-	Optional, see instruction manual
Operating Temperature	°C	Convection: -10°C to +70°C, derate linearly to 40% load from 45°C to 70°C 0.7m/s Airflow: -10°C to +70°C, derate linearly to 60% load from 50°C to 70°C 1.47m/s Airflow: -10°C to +70°C, derate linearly to 70% load from 60°C to 70°C
Storage Temperature	°C	-30 to +75°C
Humidity (non condensing)	%RH	Operating: 30 - 90%RH, Storage: 10 - 90%RH
Cooling	-	Convection or forced air
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA), Output to Ground 500VAC (20mA) for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour each
Shock	-	< 196.1 m/s <sup>2</sup>
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 OV II, CE Mark
Conducted & Radiated EMI <sup>(4)</sup>	-	EN55011/EN55022-B, FCC Class B, VCCI-B
Immunity	-	EN61000-4-2 (Iv2, 3), -3 (Iv3), -4 (Iv3), -5 (Iv3, 4), -6 (Iv3), -8 (Iv4), -11; EN61000-6-2
Weight (Typ)	g	540g (open frame)
Size (WxHxD)	in (mm)	3.31 x 1.65 x 7.09" (84 x 42 x 180) open frame
Warranty	yrs	Five Years

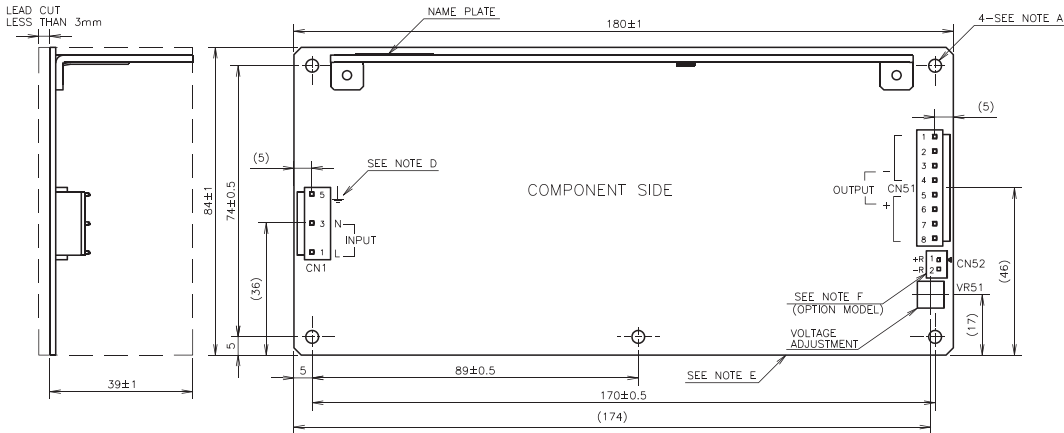
#### Notes:

- (1) 100 / 200VAC Input
- (2) 25°C ambient (cold start)
- (3) Avoid prolonged operation in overload
- (4) Forced air rating: Class A radiated

## Model Selector

Model	Output Voltage	Adjustment Range	Max Current Convection	Max Current Forced Air	Line Reg (mV)	Load Reg (mV)	Ripple & Noise (mV)
ZWS300BAF24	24V	21.6 - 27.5V	12.5A	14A	96	150	150
ZWS300BAF36	36V	32.4 - 39.6V	8.4A	9.4A	144	240	250
ZWS300BAF48	48V	39.5 - 52.8V	6.3A	7A	192	240	250

## Outline Drawing



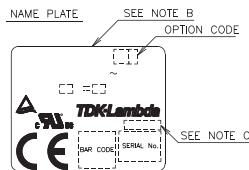
### CONNECTORS USED:

PART DESCRIPTION	PART NAME	MANUFACT.	QTY
PIN HEADER (INPUT SIDE CN1)	B3P5-VH	JST	1
PIN HEADER (OUTPUT SIDE CN51)	B8P-VH	JST	1

\*OUTPUT CURRENT OF EACH CONNECTOR PIN MUST BE LESS THAN 5A.

### MATCHING HOUSINGS, PINS & TOOL (NOT INCLUDED WITH THE PRODUCT):

PART DESCRIPTION	PART NAME	MANUFACT.	QTY
SOCKET HOUSING (CN1)	VHR-5N	JST	1
SOCKET HOUSING (CN51)	VHR-8N	JST	1
TERMINAL PINS	SVH-21T-P1-1	JST	11
	BVH-21T-P1-1	JST	11
HAND CRIMPING TOOL	YC-160R	JST	-



SCALE FOR NAME PLATE : 2/1

### NOTES

- A: 4- $\phi$ 3.5 HOLES ARE FOR CUSTOMER'S CHASSIS MOUNTING HOLES. ALL MUST BE SCREWED IN ORDER TO CONFORM THE VIBRATION SPEC.
- B: MODEL NAME, INPUT VOLTAGE RANGE, NOMINAL OUTPUT VOLTAGE, AND MAXIMUM OUTPUT CURRENT ARE SHOWN HERE IN ACCORDANCE WITH THE SPECIFICATIONS.
- C: COUNTRY OF MANUFACTURE WILL BE SHOWN HERE.
- D:  $\perp$  IS FOR SAFETY GROUND CONNECTION.
- E: TO KEEP THE DISTANCE MORE THAN 4mm BETWEEN PCB EDGE AND CUSTOMER'S CHASSIS.
- F: OPTION MODEL(ZWS300BAF-\*/R)  
 REMOTE ON/OFF CONTROL CONNECTOR (CN52) : B2B-XH-AM (JST)  
 MATCHING HOUSING : XHP-2 (JST)  
 MATCHING TERMINAL : BXH-001T-P0.6 (JST) OR SXH-001T-P0.6 (JST)  
 HAND CRIMPING TOOL : YC-110R (JST) OR YRS-110 (JST)  
 MATCHING HOUSING AND TERMINAL --- NOT INCLUDED WITH THE PRODUCT

(unit : mm)	
MODEL NAME	ZWS300BAF
<b>TDK-Lambda</b>	
A254-02-01	

## Similar Products

ZWS-B, -BAF, -BP	10W to 240W Single output
HWS	15W to 1800W Single Output, Enclosed
EFE	300W to 400W Single Output, Medical & ITE
CFE400M	300W to 400W Single Output, Medical & ITE

## Options

Suffix	Description
-	JST Connectors
/L	L Bracket
/A	Cover & L Bracket
/R	Remote On/Off
/T	Screw Terminals
/CO2	PCB Coating
Example	ZWS300BAF24/TL

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/zws-series.htm](http://us.tdk-lambda.com/lp/products/zws-series.htm)



## 150W to 480W Single Output Power Supplies

### Features

- ◆ Universal Input (85 - 265VAC)
- ◆ Power factor Corrected
- ◆ Up to 200% Peak Power capability
- ◆ Five year warranty
- ◆ Less than 0.5mA earth leakage current



### Key Market Segments & Applications



Specifications			
Model		ZWS150BP	ZWS240BP
Input Voltage	V	85-265VAC (47-63Hz), 120-370VDC (Derate to 80% load below 90VAC Input)	
Input Current	A	1.9 / 0.95	2.8 / 1.5
Inrush Current	(1)(2) A	14 / 28	15 / 30
Power Factor	V	0.98 at 100VAC, 0.93 at 200VAC, Meets EN61000-3-2	
Leakage Current	mA	0.5mA Max. Typically 0.2mA (100VAC), 0.4mA (230VAC)	
Temperature Coefficient	%/°C	<0.02%/°C	
Overcurrent Protection	(3) -	>101% of peak current capability (constant current style)	
Overvoltage Protection	V	24V: 27.6-32.4V, 36V: 41.4-48.6, 48V: 55.2-64.8V	
Hold Up Time (Typ)	(1) ms	20	
Efficiency	(1) %	87 / 90%	88 / 91%
Remote On/Off	-	Optional, contact factory	
Line Regulation	%	0.4%	
Load Regulation	%	0.8%	
Ripple & Noise	%	1%	
Operating Temperature	°C	-10°C to +70°C, derate linearly to 50% load from 50°C to 70°C	
Storage Temperature	°C	-30 to +75°C	
Humidity (non condensing)	%RH	Operating: 30 - 90%RH, Storage: 10 - 90%RH	
Cooling	-	Convection	
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA), Output to Ground 500VAC (20mA) for 1 min.	
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour each	
Shock	-	< 196.1 m/s <sup>2</sup>	
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 OV II, CE Mark	
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC Class B, VCCI-B	
Immunity	-	EN61000-4-2 (Ivl2, 3), -3 (Ivl 3), -4 (Ivl 3), -5 (Ivl 3, 4), -6 (Ivl 3), -8 (Ivl 4), -11	
Weight (Typ)	g	360g	520g
Size (WxHxD)	in(mm)	2.95 x 1.46 x 6.3 (75 x 37 x 160)	3.31 x 1.65 x 7.09 (84 x 42 x 180)
Warranty	yrs	Five Years	

Notes:

- (1) 100/200VAC
- (2) 25°C ambient (cold start)
- (3) Avoid prolonged operation in overload

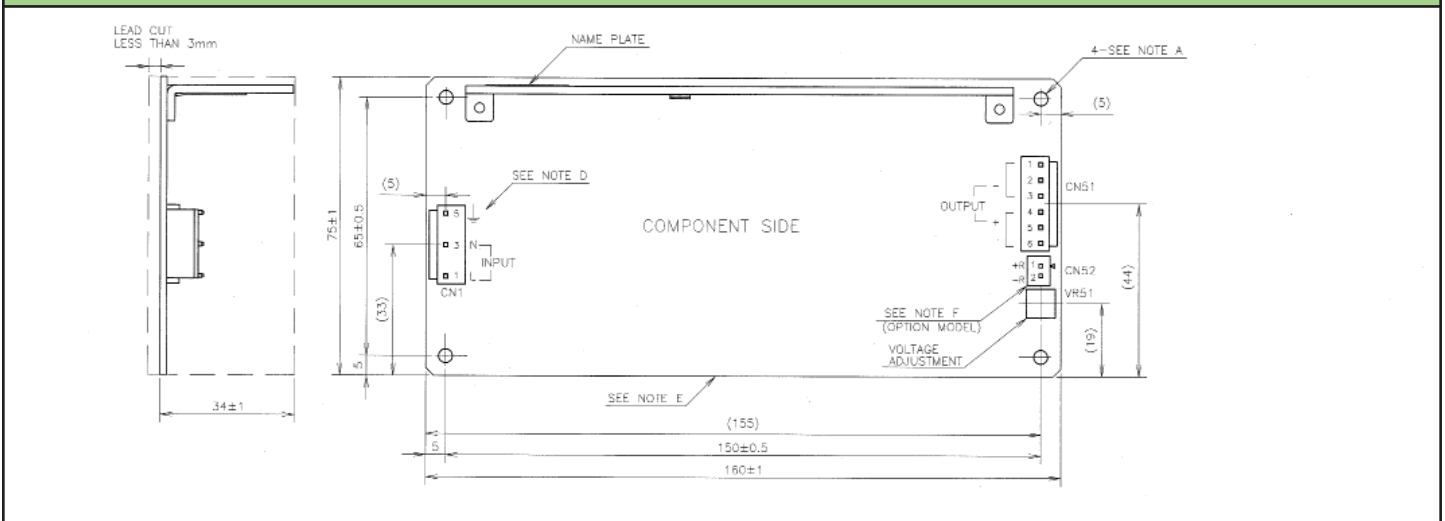
## Model Selector

Model	Output Voltage	Adjust Range	Max Current	Max Power	Peak Current <sup>(4)</sup>	Peak Power <sup>(4)</sup>
ZWS150BP24	24V	21.6 - 26.4V	6.3A	151.2W	12A	288W
ZWS240BP24	24V	21.6 - 26.4V	10A	240W	20A	480W
ZWS150BP36	36V	32.4 - 39.6V	4.2A	151.2W	8A	288W
ZWS240BP36	36V	32.4 - 39.6V	6.7A	241.2W	13.4A	482.4W
ZWS150BP48	48V	39.6 - 52.8V	3.2	153.6W	6A	288W
ZWS240BP48	48V	39.6 - 52.8V	5A	240W	10A	480W

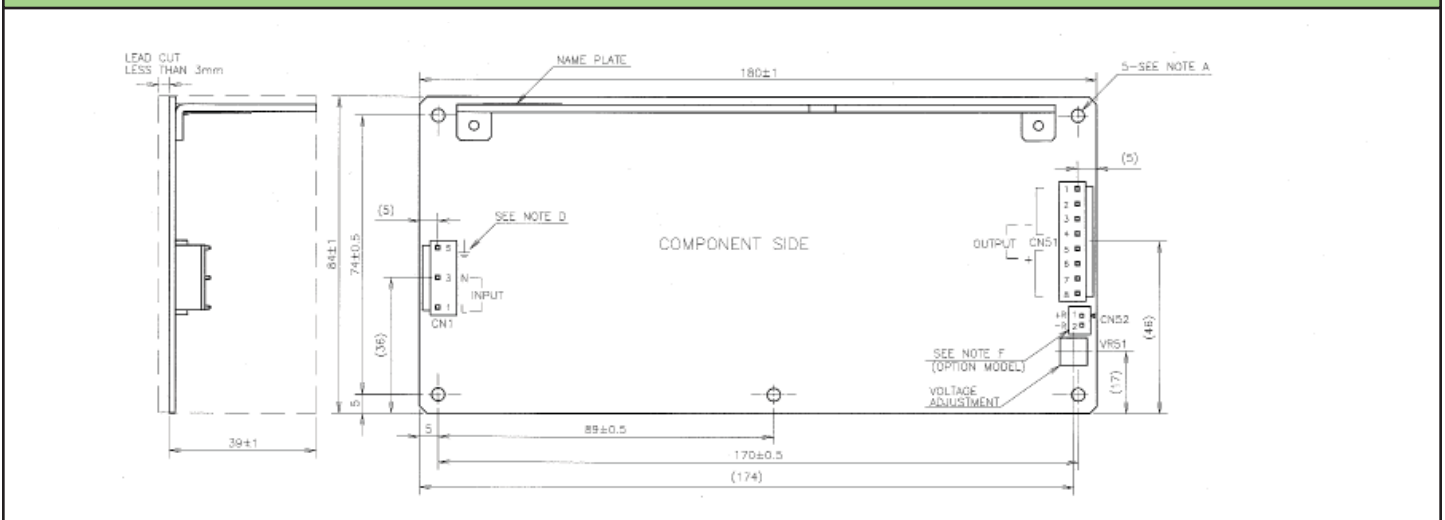
Note 4: For 5s maximum, 15% duty cycle, average power not to exceed maximum ratings.

See website for ratings of duty cycles up to 35%

## ZWS150BP Outline Drawing



## ZWS240BP Outline Drawing



## Other Industrial Products

ZWS-B, -BAF	10W to 150W Single output
HWS	15W to 1800W Single Output, Enclosed
MWS65	65W 2x4" Single Output, Medical & ITE
NV175, EFE	175W to 400W Single Output, Medical & ITE

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/zws-series.htm](http://us.tdk-lambda.com/lp/products/zws-series.htm)



## 200 to 800W Programmable Power Supplies

### Features

- ◆ 2U high
- ◆ Built-in USB, RS-232 & RS-485 Interface
- ◆ Optional LAN, GPIB & Isolated Analog Programming
- ◆ Bench or Rack Mount
- ◆ Constant Current or Voltage Modes
- ◆ Five Year Warranty

### Key Market Segments & Applications



### Model Selector

Model	Voltage Adjust Range	Current Adjust Range	Max Power (W)	Ripple 5Hz-1MHz (mV)	Noise 20MHz BW (mV)	Ripple 5Hz-1MHz (mA)	Efficiency % (100-200VAC)	Front Panel Output Jacks (Option)
Z10-20-U	0 - 10	0 - 20	200	5	50	50	80 / 82	Yes
Z10-40-U	0 - 10	0 - 40	400	5	50	50	80 / 82	Yes
Z10-60-U	0 - 10	0 - 60	600	6.25	75	75	80 / 82	Yes
Z10-72-U	0 - 10	0 - 72	720	6.25	75	75	80 / 82	Yes
Z20-10-U	0 - 20	0 - 10	200	5	50	30	82 / 84	Yes
Z20-20-U	0 - 20	0 - 20	400	5	50	30	81 / 83	Yes
Z20-30-U	0 - 20	0 - 30	600	6.25	75	45	82 / 84	Yes
Z20-40-U	0 - 20	0 - 40	800	6.25	75	45	82 / 84	Yes
Z36-6-U	0 - 36	0 - 6	216	5	50	15	83 / 85	Yes
Z36-12-U	0 - 36	0 - 12	432	5	50	15	83 / 85	Yes
Z36-18-U	0 - 36	0 - 18	648	6.25	75	22	84 / 85	Yes
Z36-24-U	0 - 36	0 - 24	864	6.25	75	22	84 / 85	Yes
Z60-3.5-U	0 - 60	0 - 3.5	210	5	50	8	83 / 85	Yes
Z60-7-U	0 - 60	0 - 7	420	5	50	8	83 / 85	Yes
Z60-10-U	0 - 60	0 - 10	600	6.25	75	12	83 / 85	Yes
Z60-14-U	0 - 60	0 - 14	840	6.25	75	12	83 / 85	Yes
Z100-2-U	0 - 100	0 - 2	200	8	80	3	83 / 85	No
Z100-4-U	0 - 100	0 - 4	400	8	80	3	84 / 86	No
Z100-6-U	0 - 100	0 - 6	600	10	100	4.5	84 / 86	No
Z100-8-U	0 - 100	0 - 8	800	10	100	4.5	84 / 86	No

### Factory Installed Options

	Option Code
Front panel terminals (60V or 24A max)*	-L
<b>Only one of the options below can be included:</b>	
GPIB Interface*	-IEEE
Voltage Programming Isolated Analog Interface*	-IS510
Current Programming Isolated Analog Interface*	-IS420
LAN Interface (Complies with "LXI" Class C)	-LAN

### Part Number Example

Z10-20-LAN-L-U

\*Requires wide body (105mm) case style

### Accessories

	Part Number
19" Rack Housing	
(Accepts four 105mm width units or six 70mm width units)	Z-NL100
Blanking Panel for 19" Rack (70mm)	Z-BP
Blanking Panel for 19" Rack (105mm)	Z-WBP
Dual/Triple Housing	
(Accepts two 105mm case units or three 70mm case units)	Z-NL200
Serial Link Cable (One is included with each power supply)	Z-RJ45
Communication Cable RS485	Z-485-9
Communication Cable RS232	Z-232-9
North American Line Cord (One included with -U suffix)	Z-U

## Specifications (See website for detailed specifications)

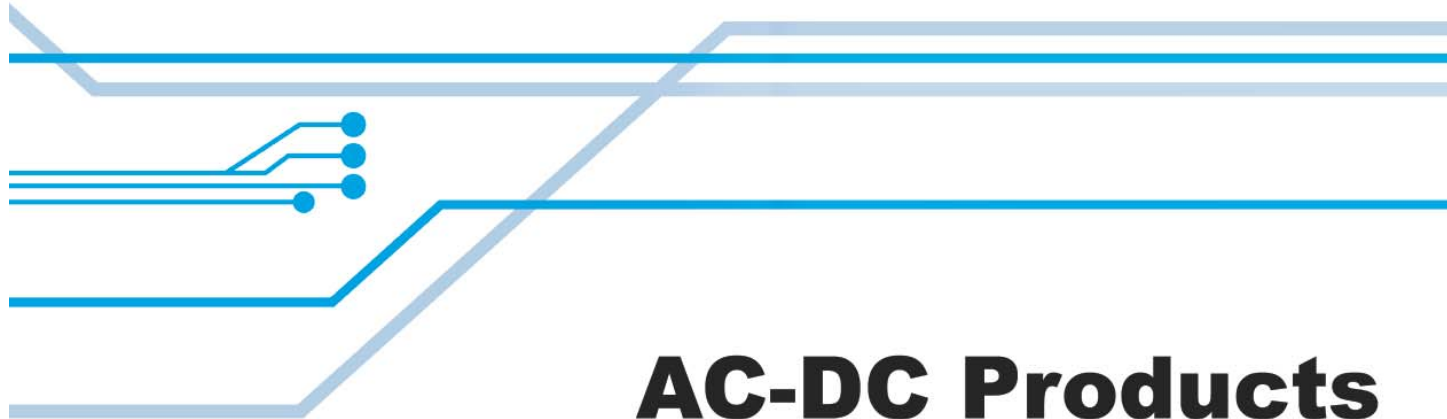
Model		Z10	Z20	Z36	Z60	Z100
Load Regulation	CV	2mV + 0.01% of rated voltage over 0 - 100% load change				
Line Regulation	CV	2mV + 0.01% of rated voltage over a 85 - 132 or 170 - 265VAC line change				
Recovery Time (1)	CV	1ms				
Temperature Coefficient	CV	30ppm/°C following 30 minute warm up				
Temperature Stability	CV	0.02% of rated voltage over 8 hours following 30 minute warm up time				
Warm up Drift (2)	CV	<0.05% of rated voltage + 2mV of rated output voltage				
Up programming response time (10-90% or 90-10% of Vmax)	CV	15ms	30ms	30ms	50ms	50ms
Down programming resp time (CV) (10-90% or 90-10% of Vmax)	Full load	10ms	30ms	30ms	50ms	50ms
Down programming resp time (CV) (90-10% of Vmax)	Zero load	190ms	200ms	250ms	310ms	900ms
Load Regulation	CC	5mA + 0.01% of rated current over 0 - 100% Vout change				
Load Regulation thermal drift	CC	< 0.05% of rated current over 30 minutes after load change				
Line Regulation	CC	2mA + 0.01% of rated current over a 85 - 132 or 170 - 265VAC line change				
Temperature Coefficient	CC	100ppm/°C of rated current after 30 minute warm up time				
Temperature Stability	CC	0.05% of rated current over 8 hours following 30 minute warm up time				
Warm up Drift (2)	CC	<±0.1% of rated current				
Vout & Iout programming & readback resolution	Digitally	< 0.012% of rated voltage/current				
Vout & Iout programming & readback accuracy	Digitally	< 0.05% of rated voltage, < 0.1% of rated current				
Voltage & Current Programming	Analog	By either Voltage (0-5V or 0-10V) or Resistance (0-5k or 0-10k)				
Voltage & Current Monitoring	Analog	0-5V or 0-10V Voltage (user selectable), ±1% accuracy				
Overvoltage Shutdown (user programmable)	V	0.5 - 12	1 - 24	2 - 40	5 - 66	5 - 110
Overtemperature Protection	-	User selectable - latched or non-latching				
Display - Voltage	-	4 digits. Accuracy 0.5% of rated voltage or current ±1 count				
Remote On/Off	-	By applied voltage or dry contact relay (user selectable logic)				
Output Good	-	Open Collector, Low on fail				
Remote Sense Compensation (per wire)	V	1	1	2	3	5
Communication Interface	-	RS232, RS485 & USB standard, IEEE488 (GPIB) & LAN optional				
Series Operation	-	Up to two identical units (with external diodes)				
Parallel Operation	-	Up to six units in master-slave configuration				
Input Voltage / Frequency (3)	-	85-265VAC, 47-63Hz				
Inrush Current	-	< 25A				
Hold Up Time (Typical)	ms	16ms				
Power Factor Correction	-	Complies with EN61000-3-2 Class A (0.99 typ)				
Operating Temperature	°C	0 - 50°C				
Storage Temperature	°C	-20 to +85°C				
Humidity (non condensing)	%RH	Operating: 10 - 90%RH, Storage 10 - 95%RH				
Cooling	-	Internal temperature controlled fan				
Withstand Voltage	-	I/P to GND 2kVAC, I/P to O/P 3kVAC, O/P to GND 1380VDC 1 min				
Insulation Resistance	-	>100M at 25°C & 70%RH				
Vibration (non operating)	-	IEC60068-2-64				
Shock	-	<20G, half sine, 11ms. IEC60068-2-27				
Safety Agency Certifications	-	UL61010-1, EN61010-1, IEC61010 (Designed to meet UL/EN60950-1)				
Immunity	-	IEC61326 (Designed to meet EN55022 / EN55024)				
Conducted & Radiated EMI	-	EN55022-B, FCC part 15-B, VCCI-B				
Size (H x W x D) (Excluding handles and busbars)	mm	Standard body 83 x 70 x 350mm; Wide Body 83 x 105 x 350mm				
Weight	kg	Standard body 1.9kg; Wide Body 2.4kg				
Warranty	yrs	Five Years				

### Notes:

- (1) Recovery to within 0.5% of rated voltage after a load change of 10-90% (Output current 10-100% of Imax)
- (2) Over 30 minute warm up time after power on
- (3) Derate for 85-100 VAC; Z10-72-U (66A), Z20-40-U (36A), Z36-24-U (20A), Z60-14-U (12.5A), Z100-8-U (7.5A)

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/zplus-series.htm](http://us.tdk-lambda.com/lp/products/zplus-series.htm)

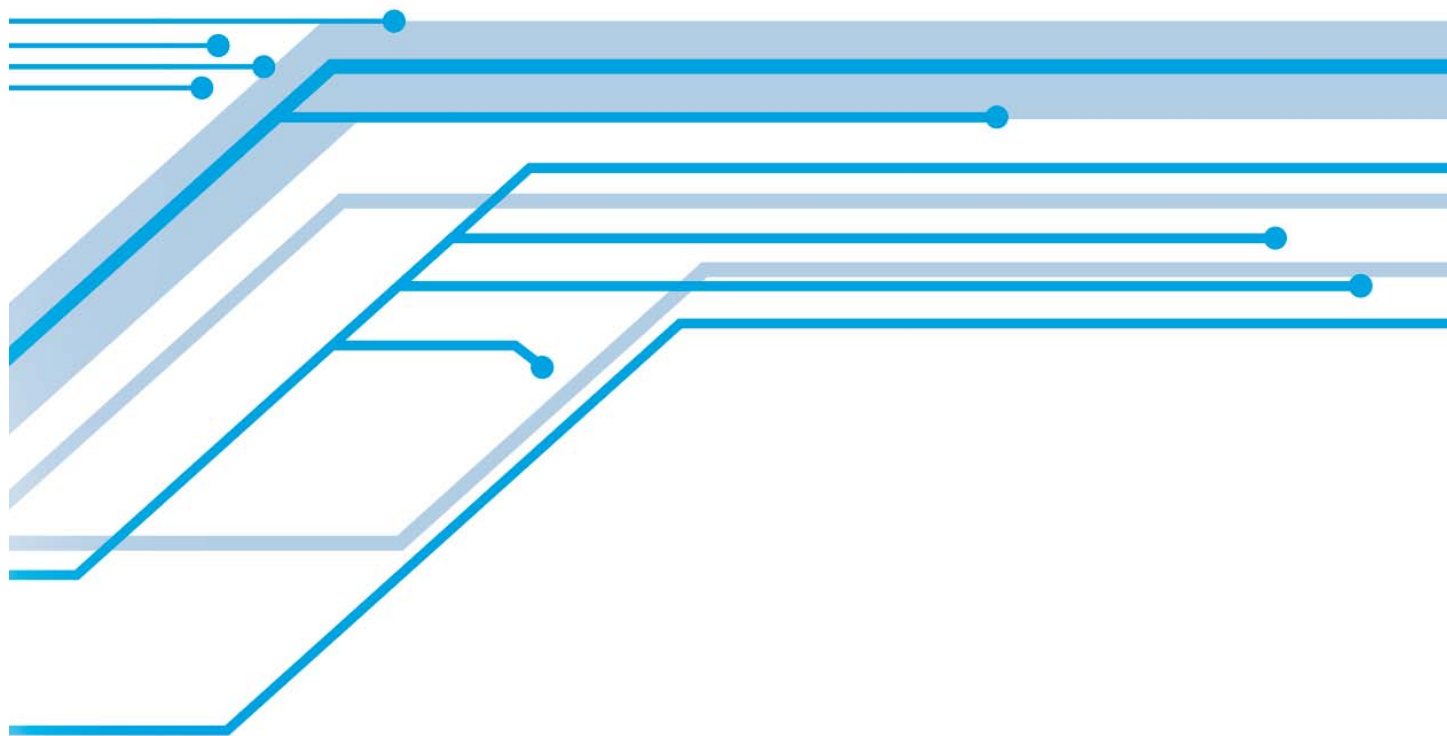




**AC-DC Products**

**DC-DC Products**

**Filters**





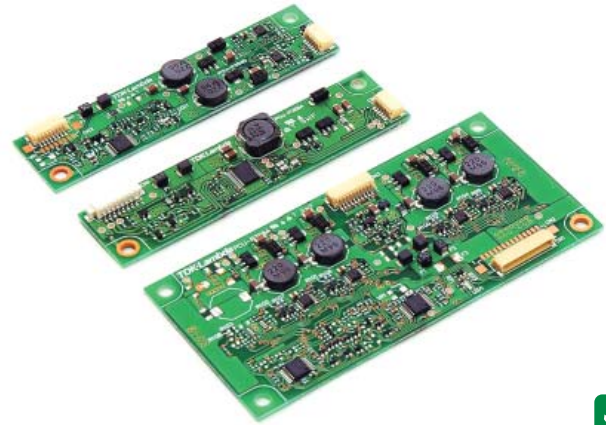
		Output Power							
		3	10	30	50	100	150	300	600
Nominal Input Voltage	Number of Outputs	Output Power							
		3	10	30	50	100	150	300	600
5V	Single/Dual	□□-□		i series □□□□□					
		□□-□		□□					
12V	Single	□□-□		□□					
		□□-□		□□					
		□□-□		□□					
	Dual	□□-□		□□					
		□□-□		□□					
	Triple	□□-□		□□					
□□-□		□□							
24V	Single	□□-□		□□-A					
		□□-□		□□					
		□□-□		□□					
		□□-□		□□					
		□□-□		□□					
		□□-□		□□					
	Dual	□□-□		□□					
		□□-□		□□					
		□□-□		□□					
	Triple	□□-□		□□					
		□□-□		□□					
		□□-□		□□					
48V	Single	□□-□		□□-A					
		□□-□		□□					
		□□-□		□□					
		□□-□		□□					
		□□-□		□□					
		□□-□		□□					
	Dual	□□-□		□□					
		□□-□		□□					
		□□-□		□□					
	Triple	□□-□		□□					
		□□-□		□□					
		□□-□		□□					
82-185V	Single	□□-□/□□-□						□□	
200-400V	Single	□□-□/□□-□□□□-A						□□	

□ See website

## LED Backlighting DC-DC Converters

### Features

- ◆ Two to Five Strings
- ◆ 12VDC Input
- ◆ Analog or Resistive Dimming
- ◆ Low Profile
- ◆ Off the shelf solution



### Key Market Segments & Applications



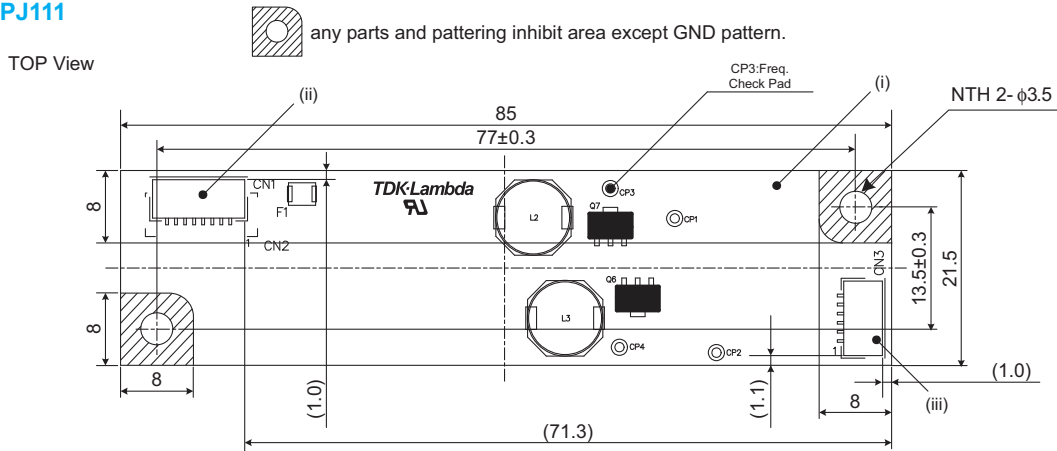
Specifications		ALD-214012PJ111	ALD-310012PJ125	ALD-414012PJ126	ALD-514012PJ134
Number of LED Strings	-	2	3	4	5
DC Input	VDC	10.8 - 13.2VDC			
Input Current Max.(norm./inhib.)	A	1.2 / 0.001A	1.5 / 0.001A	2.0 / 0.001A	2.5 / 0.001A
Output Current (each string)	mA	140mA	100mA	140mA	140mA
Dimming Frequency	Hz	200Hz	225Hz	200Hz	200Hz
Analog Dim. (Dark to Light) Vbr	VDC	2.5V to 0V	0V to 4V (Vbr2)	2.5V to 0V	2.5V to 0V
Analog Dim. (Dark to Light) Rbr	kΩ	50 - 0kΩ	0 - 10kΩ	50 - 0kΩ	50 - 0kΩ
PWM Dimming	VDC	2.5V to 0V	0 to 2.5V	2.5V to 0V	2.5V to 0V
Remote On/Off (Vrmt)	VDC	OFF: 0V - 0.4V, ON: 2.5V - Vin			
Maximum Output Voltage	VDC	44V	38V	44V	44V
Oversvoltage Alarm	VDC	Approximately 5V if any one string is open			
Operating Temperature	°C	-30 to +85°C			
Storage Temperature	°C	-40 to +85°C			
Maximum Humidity (1)	%RH	95%RH (Storage or Operating)			
Cooling	-	Convection			
Input to Output Isolation	-	None			
Vibration	-	588m/s <sup>2</sup> (60G) 11ms Half-sine wave once each axis X,Y,Z,-X,-Y,-Z total 6 times			
Shock	-	5~10Hz Amplitude 10mm 10~200Hz Accelerated Velocity 21.6m/s <sup>2</sup> (2.2G)			
Weight (Typ)	g	9g	9g	22g	22g
Size (LxWxH)	mm	85 x 21.5 x 5mm	85 x 21.5 x 5.5mm	100 x 50 x 5.2mm	100 x 50 x 5.2mm
Warranty	yr	One Year			

Note: See Installation Manual for full details, test methods of parameters and application notes

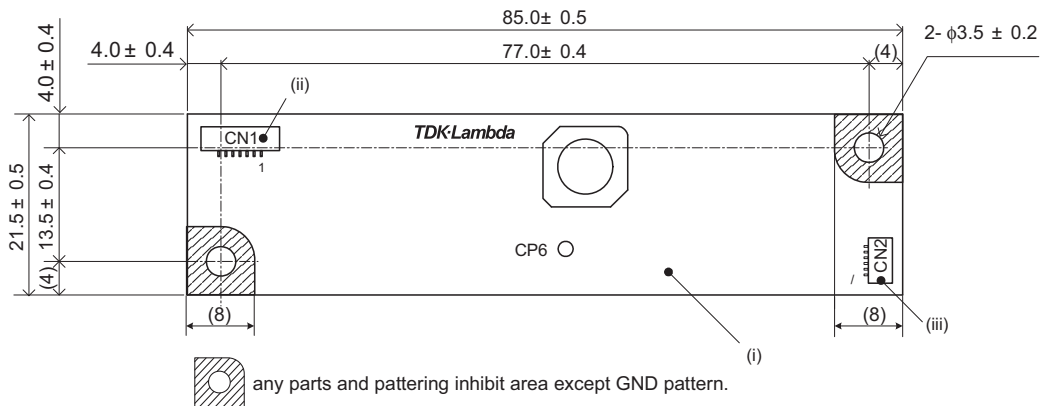
(1) non condensing

## Outline Drawing

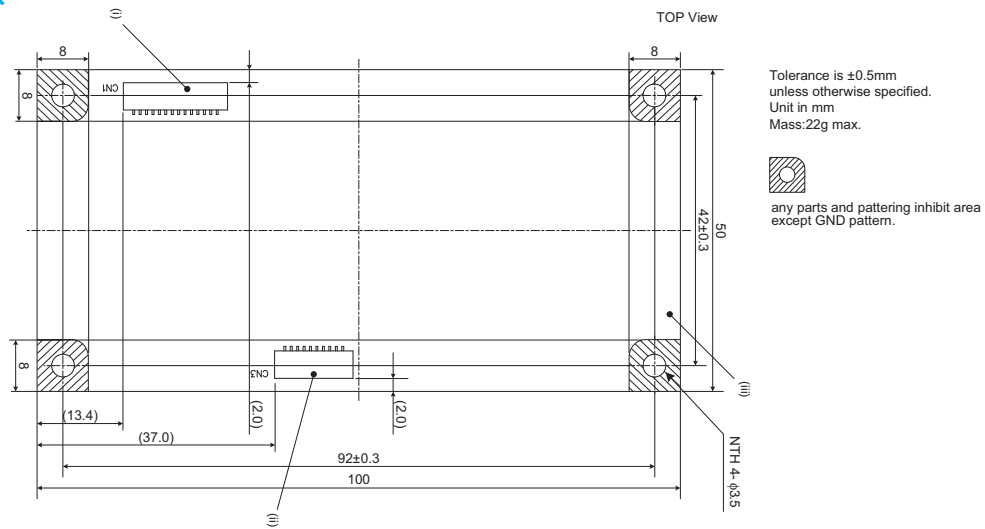
### ALD-214012PJ111



### ALD-310012PJ125



### ALD-414012PJ126 & ALD-514012PJ134



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/ald-series.htm](http://us.tdk-lambda.com/lp/products/ald-series.htm)



## Ultra Compact, 1.5W to 25W Single and Dual DC-DC Converters

### Features

- ◆ Compact Footprint / Low Profile
- ◆ Through Hole or SMT Versions
- ◆ 5V, 12V, 24V & 48V Inputs
- ◆ 3.3 to 30V1 Single, ±12 to 15V Dual Outputs
- ◆ Output Voltage Adjustment
- ◆ Input - Output Isolation
- ◆ RoHS Compliant
- ◆ 5 Year Warranty
- ◆ Self contained
- ◆ Multiple Input Voltage configurations
- ◆ Open frame (no potting)



### Key Market Segments & Applications



Specifications					
Model					
Nominal Output Voltage	V	3.3V	5V	12/15V	±12/15 (24/30) <sup>1</sup>
DC Input	V	5V: 4.5-9.0V, 12V: 9-18V, 24V: 18-36V, 48V: 36-76V			
Efficiency	%	71 to 90% model dependant			
Output Voltage Tolerance	%	1.5-10W: ±3%, 15-25W: ±5%			±5%
Output Adjustment (via trim pin)	V	3.15-3.6V (5)	4.75-6.0V (5)	11.4-15V	22.8 - 30V
Line Regulation	mV	20 (40 CC15; 30 CC25)		40	80
Load Regulation	mV	40 (120 CC15; 200 CC25)		100	600 <sup>2</sup>
Temperature Coefficient	%	<± 0.02%/°C			
Preload	-	No preload required			
Output Ripple (typ./max.BW 50MHz)	mV	40/120		30/120	
Overcurrent Protection	-	Output current limiting with automatic recovery, shutdown CC15, 25 type			
Overvoltage Protection	-	No			
Remote On/ Off	-	CC1R5, 3, 6, & 10: RC terminal open, output is OFF; RC terminal to -Vin (0-0.4V), output is ON CC15 & CC25: RC terminal open, output is ON; RC terminal to +Vin, output is OFF			
Operating Temp.- Convection	°C	-40 to 85°C, derates linearly to 40% load from 50°C to 85°C			
Operating Temp.- Forced Air	°C	-40°C to 85°C with 1m/s air full load			
Storage Temperature	°C	-40°C to 85°C			
Humidity (non Condensing)	-	95% RH max.(maximum wet-bulb temperature: 38°C)			
Isolation Voltage	-	500VAC 1 min. Input to output, input to case, output to case			
Isolation Resistance	-	Input to output, input to case, output to case: 50M ohm min. (500VDC)			
Shock	m/s <sup>2</sup>	980m/s <sup>2</sup> (100G) 6ms (6 directions, each 3 times)			
Vibration (non Operating)	-	10 to 55Hz (sweep for 15min) 1.52mm constant, 3 directions X, Y, Z each 2 hours			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark			
Weight	g	CC1R5: 3.2, CC3: 4.5, CC6: 5.8, CC10:10.0, CC15: 12.5, CC25: 20.0			
Size (L x W x H) (DIP Through Hole and SMD package) (SIP Through Hole only)	in	CC1R5: 0.650 x 0.654 x 0.335; CC3: 0.900 x 0.654 x 0.335; CC6: 0.900 x 0.831 x 0.335 CC10: 1.400 x 0.890 x 0.335; CC15: 1.500 x 1.264 x 0.295; CC25: 1.701 x 1.768 x 0.295 CC3 (SIP): 1.09 x 0.362 x 0.705			
Warranty	yrs	5 years			

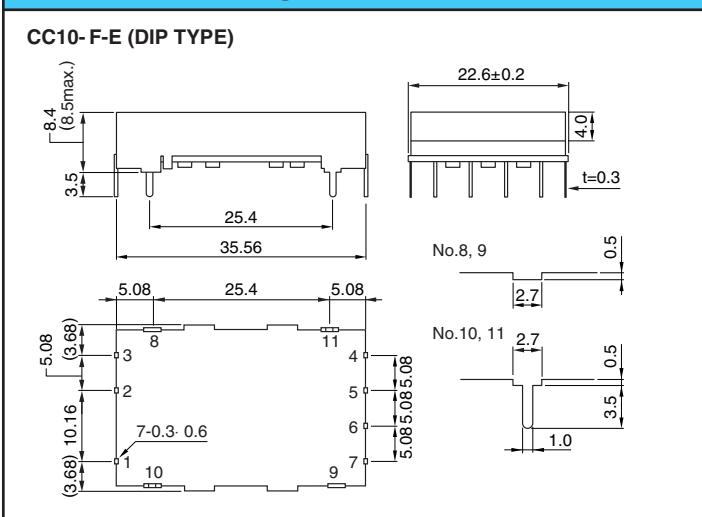
1. For 24V/30V output - connect across +Vout & -Vout and leave "common out" pin not connected
2. Based upon equal load current from both outputs

3. For 15V output connect trim to -Vout
4. See Installation Manual for full specs, test methods of parameters & application notes
5. Not available on CC15 and CC25 models

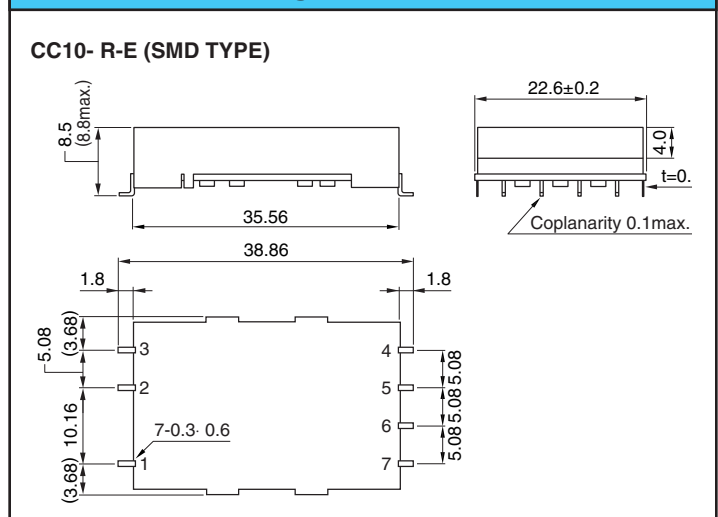
## Model Selector

Output Voltage (V)	Output Current (A)	Output Power (W)	5V Input	12V Input	24V Input	48V Input
<b>Single Outputs</b>						
3.3	0.4	1.5	CC1R5-0503SF-E	CC1R5-1203SF-E	CC1R5-2403SF-E	CC1R5-4803SF-E
3.3	0.8	3	CC3-0503SF-E	CC3-1203SF-E	CC3-2403SF-E	CC3-4803SF-E
3.3	1.2	6	CC6-0503SF-E	CC6-1203SF-E	CC6-2403SF-E	CC6-4803SF-E
3.3	2.5	10	CC10-0503SF-E	CC10-1203SF-E	CC10-2403SF-E	CC10-4803SF-E
3.3	4.5	15	-	-	CC15-2403SF-E	-
3.3	7.5	25	-	-	CC25-2403SF-E	-
5	0.3	1.5	CC1R5-0505SF-E	CC1R5-1205SF-E	CC1R5-2405SF-E	CC1R5-4805SF-E
5	0.6	3	CC3-0505SF-E	CC3-1205SF-E	CC3-2405SF-E	CC3-4805SF-E
5	1.0	5	CC6-0505SF-E	-	-	-
5	1.2	6	-	CC6-1205SF-E	CC6-2405SF-E	CC6-4805SF-E
5	2.0	10	CC10-0505SF-E	CC10-1205SF-E	CC10-2405SF-E	CC10-4805SF-E
5	3.0	15	-	-	CC15-2405SF-E	-
5	5.0	25	-	-	CC25-2405SF-E	-
12(15)	0.125(0.1)	1.5	CC1R5-0512SF-E	CC1R5-1212SF-E	CC1R5-2412SF-E	CC1R5-4812SF-E
12(15)	0.25(0.2)	3	CC3-0512SF-E	CC3-1212SF-E	CC3-2412SF-E	CC3-4812SF-E
12(15)	0.5(0.4)	6	CC6-0512SF-E	CC6-1212SF-E	CC6-2412SF-E	CC6-4812SF-E
12(15)	0.8(0.64)	10	CC10-0512SF-E	-	-	-
12(15)	1.0(0.8)	10	-	CC10-1212SF-E	CC10-2412SF-E	CC10-4812SF-E
<b>Dual Outputs</b>						
±12 (15)3	0.06(0.05)	1.5	CC1R5-0512DF-E	CC1R5-1212DF-E	CC1R5-2412DF-E	CC1R5-4812DF-E
±12 (15)3	0.125(0.1)	3	CC3-0512DF-E	CC3-1212DF-E	CC3-2412DF-E	CC3-4812DF-E
±12 (15)3	0.25(0.2)	6	CC6-0512DF-E	CC6-1212DF-E	CC6-2412DF-E	CC6-4812DF-E
±12 (15)3	0.4(0.32)	10	CC10-0512DF-E	-	-	-
±12 (15)3	0.45(0.36)	10	-	CC10-1212DF-E	CC10-2412DF-E	CC10-4812DF-E

## Outline Drawing



## Outline Drawing



## Options

Version	Description
F-E	Through hole mounting (DIP pkg)
R-E	Surface mount (DIP pkg)
S-E	Through hole mounting (SIP pkg - CC3)

## Other Industrial Products

PX	10 - 40W 12, 24, 48V DC-DC converters
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks

## Pinout (CC1R5, 3, 6, and 10)

Pin	Single	Dual
1	+Vin	+Vin
2	RC	RC
3	-Vin	-Vin
4	NC	-Vout
5	-Vout	Common out
6	TRM	TRM
7	+Vout	+Vout

For CC15 and 25 see Installation Manual online

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/cc-series.htm](http://us.tdk-lambda.com/lp/products/cc-series.htm)



## 50 & 100W 14.4 to 36VDC Input DC-DC Converters

### Features

- ◆ 14.4 - 36VDC Input
- ◆ IEC 61373 Shock and Vibration
- ◆ Base-plate Cooled
- ◆ Full Power at 100°C base plate
- ◆ Small Size
- ◆ Quarter Brick Footprint
- ◆ Wide input range



### Key Market Segments & Applications



Specifications				
Model				
Model		5V	12V	24V
Nominal Output Voltage	VDC	5V	12V	24V
Input Voltage Range	VDC	14.4 - 36VDC (40V transient for 3 seconds)		
Input Current	A	2.48 - 4.91A (model dependant)		
Output Voltage Adjustment	VDC	4.5 - 6	10.8 - 13.2	21.6 - 26.4
Ripple & Noise (max) pk-pk	mV	100	150	240
Line Regulation (max)	mV	20	48	96
Load Regulation (max)	mV	40	96	192
Overcurrent Protection	%	105 - 140%		
Overvoltage Protection	%	125 - 145% (Cycle input or remote on/off to reset)		
Remote Sense	-	Yes		
Remote On/Off	-	Yes; Low = ON, Open = OFF		
Operating Temperature	°C	-40°C to +100°C Baseplate		
Storage Temperature	°C	-40°C to +100°C		
Temperature Coefficient	%/°C	0.02%/°C		
Humidity (non condensing)	%RH	5 - 95% RH Operating and Non Operating		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Withstand Voltage	VAC	Input to Base-plate: 2kVAC; Input to Output 3.0kVAC for 1 min.; Output to Base-plate: 500VAC for 1 min		
Isolation Resistance	-	>100M at 25C and 70%RH, Output to Base plate 500VDC		
Vibration (1)	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each IEC61373 - Category 1, Grade B		
Shock (1)	-	196.1m/s <sup>2</sup> , IEC61373 - Category 1, Grade B		
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1		
Weight (Typ)	g	70g		
Size (WxHxD)	in(mm)	1.45 x 0.5 x 2.28" (36.8 x 12.7 x 57.9)		
Warranty	yrs	5 Years		

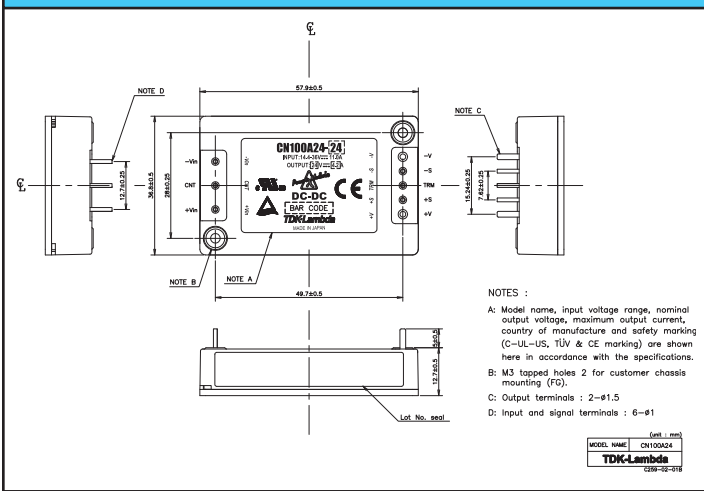
Note: See Installation Manual for full details, test methods of parameters and application notes

(1) Compliant to EN50155 & IEC60571

## Model Selector

Model	Voltage (V)	Output Current (A)	Maximum Power (W)	Input Current (A)	Efficiency (%) (100% load, 24VDC In)
CN50A24-5	5	10	50	2.48	85
CN100A24-5	5	20	100	4.91	86
CN50A24-12	12	4.2	50.4	2.47	86
CN100A24-12	12	8.4	100.8	4.83	88
CN50A24-24	24	2.1	50.4	2.47	86
CN100A24-24	24	4.2	100.8	4.83	88

## Outline Drawing



## Option

Suffix	Description
/CO	Pcb coating for EN50155 & IEC60571 compliance
Example	CN50A24-5/CO

For Additional Information, please visit [us.tdk-lambda.com/lp/products/cn-series.htm](http://us.tdk-lambda.com/lp/products/cn-series.htm)



## Single, Dual & Triple Output 40W to 60W DIN Mount DC-DC Converters

### Features

- ◆ DIN Rail Mount Version of TDK-Lambda's PX Series
- ◆ 1600VDC Input to Output Isolation
- ◆ Wide Operating Temperature Range
- ◆ Internally Protected
- ◆ All In One Package



### Key Market Segments & Applications



Industrial



RoHS

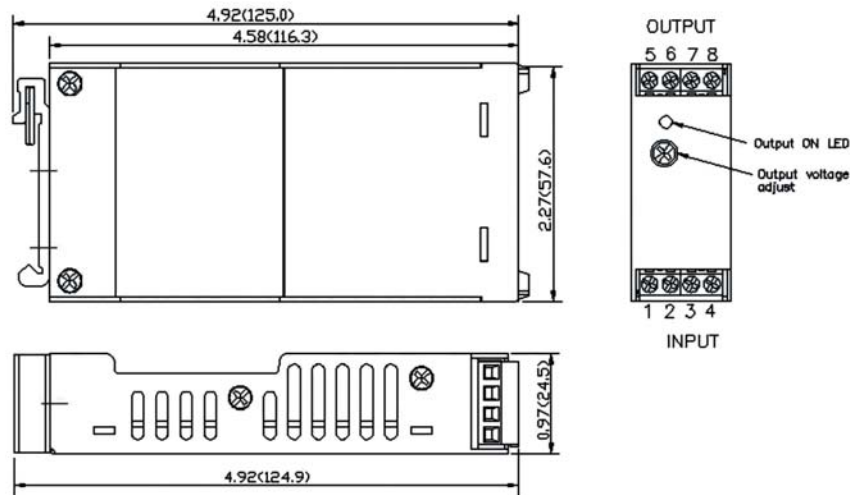
### Specifications

Model		DPX40	DPX60
Max Output Power	W	40W	60W
Efficiency	%	85% typical at nominal input & full load	
Voltage Accuracy	%	Single, Dual & Triple Main $\pm 1\%$ , Triple auxiliaries $\pm 5\%$	
Volt. Adjust. (Single Output Only)	%	$\pm 10\%$	
Minimum Load, each output (1)	%	Single output 0%, Dual & Triple outputs 10%	
Line Regulation	%	Single / Dual $\pm 0.5\%$ , Triple (main) $\pm 1\%$ , (auxiliaries) $\pm 5\%$	
Load Regulation (10% to 100%)	%	Single $\pm 0.5\%$ , Dual $\pm 1\%$ , Triple (main) $\pm 2\%$ , (auxiliaries) $\pm 5\%$	
Cross Regulation (25% to 100%)	%	Triple (main) $\pm 1\%$ , Dual / Triple (auxiliaries) $\pm 5\%$	
Start up time	ms	100ms typ.	
Remote on/off (ref. to neg. input)	-	Positive Logic: ON: Open or 3.5-12V, OFF: Short or $< 1.2V$	
Temperature Coefficient	%/°C	$< \pm 0.02\%/^{\circ}C$	
Operating Temperature	°C	-40 to 85°C, derate linearly to 20% load from 60°C to 85°C	
Storage Temperature	°C	-40 to 85°C	
Thermal Shock	-	MIL-STD-810D	
Relative Humidity	%RH	5 to 95%RH (non condensing)	
Trans. Resp.(25% step load chng.)	ms	250 $\mu$ s recovery	
Overvolt. Protection (Zener clamp)	-	5V: 6.2V, 12V: 15V, 15V: 18V	
Overcurr. & Short Circuit Protection	-	Typically at 150%, hiccup with self recovery	
Input Surge Volt. (Max. for 100ms)	-	12V input: 36V, 24V input: 50V, 48V input: 100V	
Isolation Voltage	VDC	1600VDC minimum	
Isolation Resistance	$\Omega$	$10^9$ Ohms minimum	
Typical Switching Frequency (Fixed)	kHz	300kHz (typ)	
Shock & Vibration	-	MIL-STD-810F	
Conducted & Radiated Emissions	-	EN55022 Level B	
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A	
Safety Agency Approval	-	CE Mark	
Size (W x H x L)	in(mm)	0.96 x 2.27 x 4.92" (24.5 x 57.6 x 125mm)	
Weight	g	182g	
Warranty	yrs	Two Years	

1. No load operation will not damage the unit



## Outline Drawing



## Model Selector

Output Voltage (V)	Output Current (A)	Input Voltage (VDC)	Model	Ripple & Noise (Pk to Pk mV)	Max Load Cap (uF)
<b>Single Outputs</b>					
5V	8A	9.5 - 36VDC	DPX4024WS05	50mV	13600uF
12V	3.33A	9.5 - 36VDC	DPX4024WS12	75mV	2360uF
15V	2.67A	9.5 - 36VDC	DPX4024WS15	75mV	1510uF
5V	8A	18 - 75VDC	DPX4048WS05	50mV	13600uF
12V	3.33A	18 - 75VDC	DPX4048WS12	75mV	2360uF
15V	2.67A	18 - 75VDC	DPX4048WS15	75mV	1510uF
5V	12A	18 - 36VDC	DPX6024S05	75mV	20400uF
12V	5A	18 - 36VDC	DPX6024S12	100mV	3550uF
15V	4A	18 - 36VDC	DPX6024S15	100mV	2300uF
5V	12A	36 - 75VDC	DPX6048S05	75mV	20400uF
12V	5A	36 - 75VDC	DPX6048S12	100mV	3550uF
15V	4A	36 - 75VDC	DPX6048S15	100mV	2300uF
<b>Dual Outputs</b>					
±12	1.667A	9.5 - 36VDC	DPX4024WD12	120mV	±1200uF
±15	1.333A	9.5 - 36VDC	DPX4024WD15	150mV	±1510uF
±12	1.667A	18 - 75VDC	DPX4048WD12	120mV	±1200uF
±15	1.333A	18 - 75VDC	DPX4048WD15	150mV	±1510uF
<b>Triple Outputs</b>					
+5V, ±12V	6, ±0.4A	9.5 - 18VDC	DPX4012T0512	50 / 75mV	6800uF, ±330uF
+5V, ±15V	6, ±0.3A	9.5 - 18VDC	DPX4012T0515	50 / 75mV	6800uF, ±110uF
+5V, ±12V	6, ±0.4A	18 - 36VDC	DPX4024T0512	50 / 75mV	6800uF, ±330uF
+5V, ±15V	6, ±0.3A	18 - 36VDC	DPX4024T0515	50 / 75mV	6800uF, ±110uF
+5V, ±12V	6, ±0.4A	36 - 75VDC	DPX4048T0512	50 / 75mV	6800uF, ±330uF
+5V, ±15V	6, ±0.3A	36 - 75VDC	DPX4048T0515	50 / 75mV	6800uF, ±110uF

## Other Industrial Products

DPP / DSP	10W to 960W, 5V to 48V power supplies
DLP	75W to 240W, 24V power supplies
DLP-PU	Redundancy Module (20A)
R Series	6A to 30A, single and three phase EMI filters

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dpx-series.htm](http://us.tdk-lambda.com/lp/products/dpx-series.htm)



## 20A Non-isolated SMT Point Of Load

### Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ Edge Plated Castellations (EPC)
  - Inspectable Solder Joints
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



### Key Market Segments & Applications



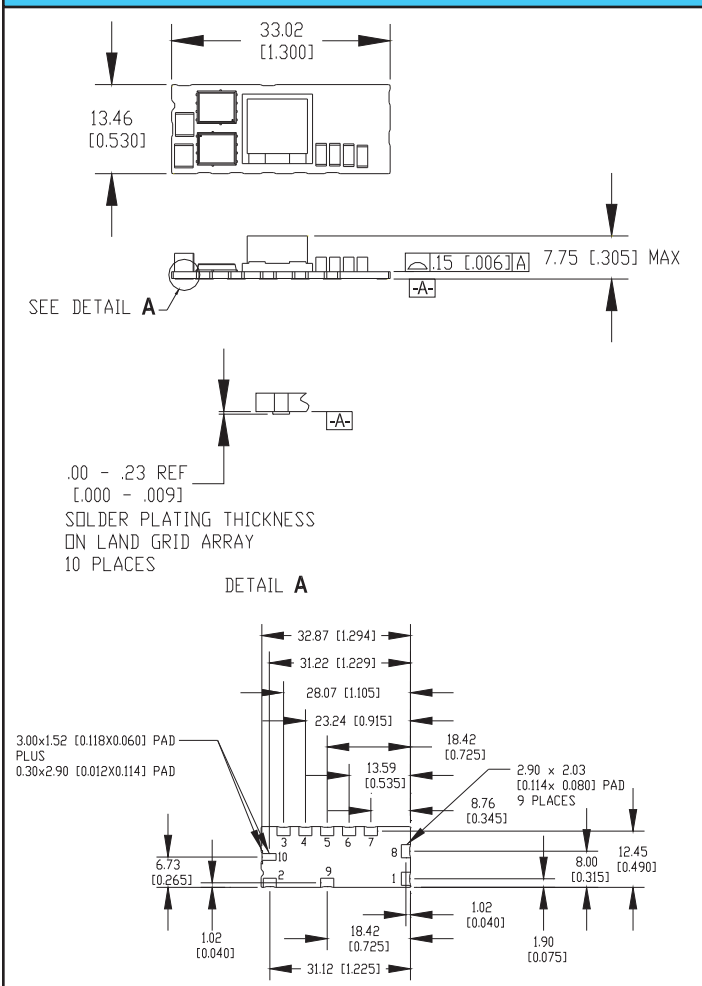
Specifications		
Model		
DC Output Voltage	V	0.6 - 3.63
DC Input Voltage	V	2.4 - 5.5
Efficiency	%	85 - 93.5
Output Voltage Tolerance	%	±3
Switching Frequency	kHz	600
Line Regulation	mV	4
Load Regulation	mV	7
External Load Capacitance	uF	200 - 2000
Output Ripple and Noise	mVpp	20
Overcurrent Protection	A	Hiccup Type
Remote On / Off	-	Negative Logic (For Positive Logic Contact Factory)
Remote Sense	-	(+) Sense, compensating up to 0.5V
Power Good	-	Not available
Operating Temp	°C	-40 to 115 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No.60950-1-03; VDE CB scheme (IEC60950-1, EN60950-1)
Weight	g / oz	5.5g / 0.194 oz
Size (LxWxH)	mm / in.	33 x 13.46 x 7.75 / 1.3 x 0.53 x 0.305
Warranty	yrs	3 years

## Model Selector

Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing	EPC Solder Bumping
iAF05020A006V-003-R	2.4 - 5.5	20	0.6 - 3.63	-	yes	-	yes*
iAF12020A007V-003-R	4.5 - 14	20	0.7 - 5.5	-	yes	-	yes*

\* For LGA solder bumping specify -007-R module suffix

## Outline Drawing



## Pinout

PIN	Function	PIN	Function
1	ON / OFF	6	TRIM
2	VIN	7	SENSE (+)
3	Reserved	8	Reserved
4	GND	9	PWR GOOD
5	VOUT	10	Reserved

## Other Industrial Products

CC-E	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iBF, iCF, iCG	3 - 12A DOSA2 non isolated DC-DC converters

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/iaf-series.htm](http://us.tdk-lambda.com/lp/products/iaf-series.htm)



## 12A Non-isolated SMT Point Of Load

### Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ Edge Plated Castellations (EPC)
  - Inspectable Solder Joints
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



### Key Market Segments & Applications



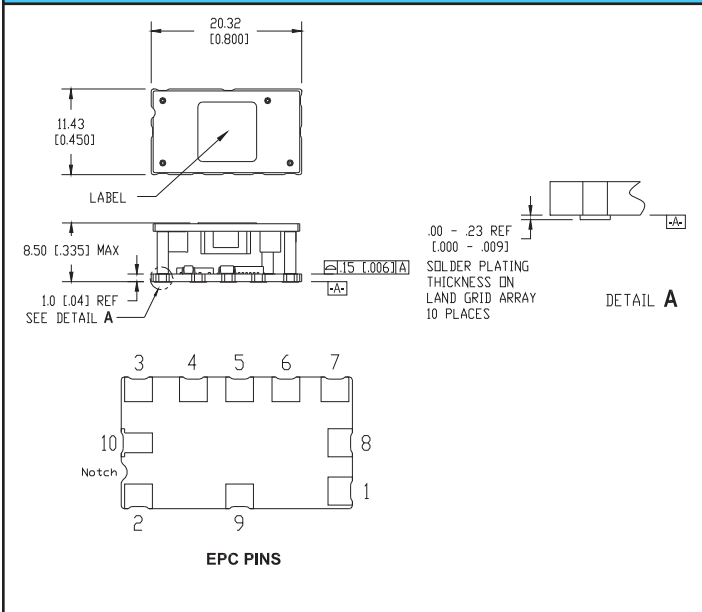
Specifications			
Model		iBF05	iBF12
DC Output Voltage	V	0.6 - 3.63	0.7 - 5.5
DC Input Voltage	V	2.4 - 5.5	4.5 - 14
Efficiency	%	84 - 93	83 - 94.5
Output Voltage Tolerance	%	±3	
Switching Frequency	kHz	600	
Line Regulation	mV	3	6
Load Regulation	mV	4	5
External Load Capacitance	uF	188 - 1800	100 - 1500
Output Ripple and Noise	mVpp	20	30
Overcurrent Protection	A	Hiccup Type	
Remote On / Off	-	Negative Logic (For Positive Logic Contact Factory)	
Remote Sense	-	(+) Sense, compensating up to 0.5V	
Power Good	-	Not available	Yes, Low on fail
Operating Temp	°C	-40 to 115 (see thermal data on website)	
Storage Temperature	°C	-55 to 125	
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No.60950-1-03; VDE CB scheme (IEC60950-1, EN60950-1)	
Weight	g / oz	5.5g / 0.194 oz	
Size (LxWxH)	mm / in.	20.32 x 11.43 x 8.5 / 0.80 x 0.45 x 0.335	
Warranty	yrs	3 years	

## Model Selector

Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing	EPC Solder Bumping
iBF05012A006V-003-R	2.4 - 5.5	12	0.6 - 3.63	-	yes	-	yes*
iBF12012A007V-003-R	4.5 - 14	12	0.7 - 5.5	-	yes	-	yes*

\*For LGA solder bumping specify -007-R model suffix

## Outline Drawing



## Pinout

PIN	Function	PIN	Function
1	ON / OFF	6	VOUT
2	VIN	7	SENSE (+)
3	Reserved	8	Reserved
4	GND	9	PWR GOOD
5	TRIM	10	Reserved

## Other Industrial Products

CC-E	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iAF, iCF, iCG	3 - 20A DOSA2 non isolated DC-DC converters

For Additional Information, please visit [us.tdk-lambda.com/lp/products/ibf-series.htm](http://us.tdk-lambda.com/lp/products/ibf-series.htm)



## 3A Non-isolated SMT Point Of Load

### Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ Edge Plated Castellations (EPC)
  - Inspectable Solder Joints
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



### Key Market Segments & Applications



### Specifications

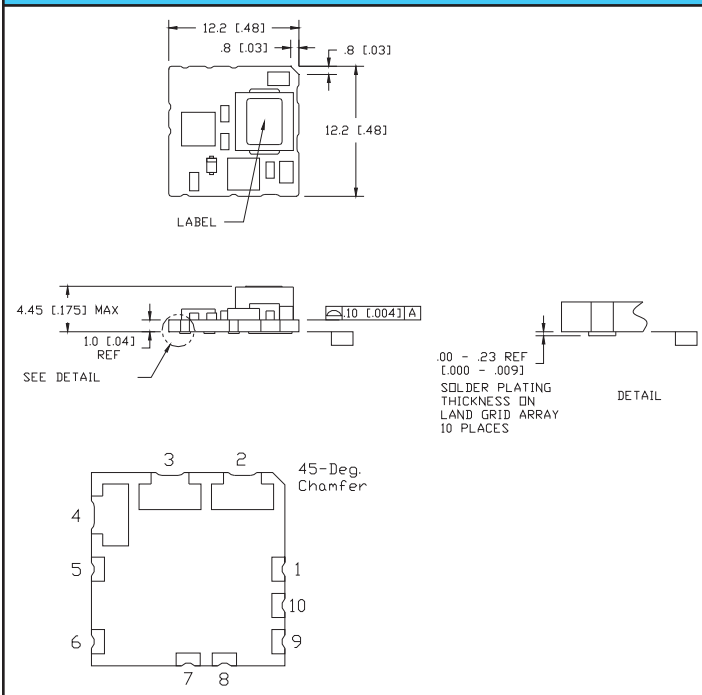
Model		iCF05	iCF12
DC Output Voltage	V	0.6 - 3.63	0.7 - 5.5
DC Input Voltage	V	2.4 - 5.5	4.5 - 14
Efficiency	%	82 - 92	85 - 93.5
Output Voltage Tolerance	%	±3	
Switching Frequency	kHz	600	
Line Regulation	mV	3	3
Load Regulation	mV	6	6
External Load Capacitance	uF	47 - 1000	
Output Ripple and Noise	mVpp	25	15
Overcurrent Protection	A	Hiccup Type	
Remote On / Off	-	Negative Logic (For Positive Logic Contact Factory)	
Remote Sense	-	(+) Sense, compensating up to 0.5V	
Power Good	-	Not available	Yes, Low on fail
Operating Temp	°C	-40 to 115 (see thermal data on website)	
Storage Temperature	°C	-55 to 125	
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No.60950-1-03; VDE CB scheme (IEC60950-1, EN60950-1)	
Weight	g / oz	1.5g / 0.53 oz	
Size (LxWxH)	mm / in.	12.2 x 12.2 x 4.45 / 0.48 x 0.48 x 0.175	
Warranty	yrs	3 years	

## Model Selector

Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing	EPC Solder Bumping
iCF05003A006V-003-R	2.4 - 5.5	3	0.6 - 3.63	-	yes	-	yes*
iCF12003A007V-003-R	4.5 - 14	3	0.7 - 5.5	-	yes	-	yes*

\*For LGA solder bumping specify -007-R model suffix

## Outline Drawing



## Pinout

PIN	Function	PIN	Function
1	ON / OFF	6	TRIM
2	VIN	7	GND
3	GND	8	no connection
4	VOUT	9	no connection
5	SENSE	10	PWR GOOD

## Other Industrial Products

CC-E	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iAF, iBF, iCG	6 - 20A DOSA2 non isolated DC-DC converters

For Additional Information, please visit [us.tdk-lambda.com/lp/products/icf-series.htm](http://us.tdk-lambda.com/lp/products/icf-series.htm)



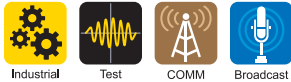
## 6A Non-isolated SMT Point Of Load

### Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ Edge Plated Castellations (EPC)
  - Inspectable Solder Joints
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



### Key Market Segments & Applications



Specifications			
Model		iCG05	iCG12
DC Output Voltage	V	0.6 - 3.63	0.7 - 5.5
DC Input Voltage	V	2.4 - 5.5	4.5 - 14
Efficiency	%	84 - 93	84 - 94
Output Voltage Tolerance	%	±3	
Switching Frequency	kHz	600	
Line Regulation	mV	3	3
Load Regulation	mV	6	6
External Load Capacitance	uF	47 - 1000	
Output Ripple and Noise	mVpp	15	15
Overcurrent Protection	A	Hiccup Type	
Remote On / Off	-	Negative Logic (For Positive Logic Contact Factory)	
Remote Sense	-	(+) Sense, compensating up to 0.5V	
Power Good	-	Not available	Yes, Low on fail
Operating Temp	°C	-40 to 115 (see thermal data on website)	
Storage Temperature	°C	-55 to 125	
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No.60950-1-03; VDE CB scheme (IEC60950-1, EN60950-1)	
Weight	g / oz	3g / 0.106 oz	
Size (LxWxH)	mm / in.	12.2 x 12.2 x 8.5 / 0.48 x 0.48 x 0.335	
Warranty	yrs	3 years	

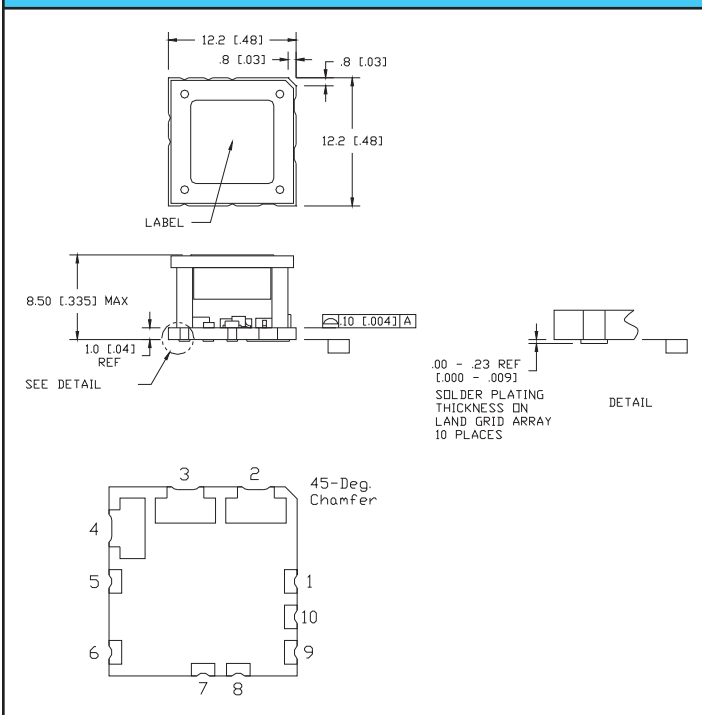


## Model Selector

Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing	EPC Solder Bumping
iCG05006A006V-003-R	2.4 - 5.5	6	0.6 - 3.63	-	yes	-	yes*
iCG12006A007V-003-R	4.5 - 14	6	0.7 - 5.5	-	yes	-	yes*

\*For LGA solder bumping specify -007-R model suffix

## Outline Drawing



## Pinout

PIN	Function	PIN	Function
1	ON / OFF	6	TRIM
2	VIN	7	GND
3	GND	8	no connection
4	VOUT	9	reserved
5	SENSE	10	PWR GOOD

## Other Industrial Products

CC-E	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iAF, iBF, iCF	3 - 20A DOSA2 non isolated DC-DC converters

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/icg-series.htm](http://us.tdk-lambda.com/lp/products/icg-series.htm)



## 96 - 204W Quarter Brick Converter

### Features

- ◆ Standard Quarter Brick Footprint
- ◆ 18-36, 36-75VDC Inputs
- ◆ 3.3V 40A - 15V 10A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ Low 10.41mm Profile
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (>90%)
- ◆ Constant switching frequency
- ◆ Low component count



### Key Market Segments & Applications



Specifications					
Model					
Nominal Output Voltage	VDC	3.3	5	12	15
Input Voltage Range	VDC	See Model Selector			
Input Current (max)	A	10			
Efficiency	-	Typically 90% at full load			
Output Voltage Tolerance	VDC	3.2 - 3.4	4.85 - 5.15	11.58 - 12.42	14.48 - 15.52
Ripple & Noise (max)(pk to pk) (1)	mV	150	150	150	150
Line Regulation (max)	mV	10	15	30	30
Load Regulation (max)	mV	10	30	30	30
Overload Protection (typ)	%	Inception- 133-158% of rated output; Short circuit - auto recovery			
Overvoltage Protection	VDC	3.8 - 4.6	5.7 - 6.7	13.6 - 16.5	16.7 - 21
Remote Sense	-	Yes			
Remote On / Off	-	Positive or Negative Logic available, see Model Selector			
Temperature (operating)	°C	-40 to 125			
Temperature (storage)	°C	-55 to 125			
Humidity (operating)	-	20-95% RH Non condensing			
Humidity (storage)	-	10-95% RH Non condensing			
Cooling	-	Convection or forced air			
Isolation Voltage	VDC	1500			
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s <sup>2</sup> ), and 50 to 500Hz @ 1.5g (14.7m/s <sup>2</sup> ) per Bellcore TR-EOP-000063-5.4.4			
Shock	-	196.1m/s <sup>2</sup>			
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)			
Weight (max)	g	50			
Size	mm	57.9 x 36.8 x 10.41			
Warranty	-	3 Years			

Notes: See website for detailed specifications

- (1) Measured across one 22µF and one 0.1µF ceramic capacitor;  
BW = 20MHz

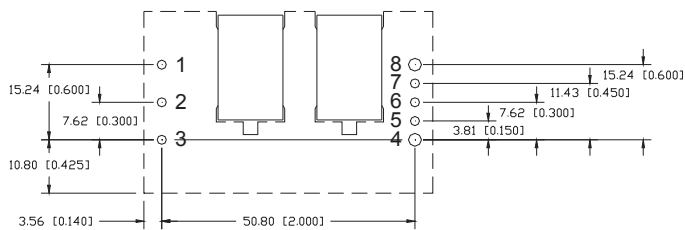
## Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	On/Off Polarity	Pin Length
iQE48040A033V-001-R	36 - 75	3.3	2.97 - 3.63	40	132	Neg	0.145
iQE24024A050V-001-R	18 - 36	5	4.5 - 5.5	24	120	Neg	0.145
iQE48030A050V-001-R	36 - 75	5	4.5 - 5.5	30	150	Neg	0.145
iQE24009A120V-001-R	18 - 36	12	10.8 - 13.2	9	108	Neg	0.145
iQE4W011A120V-001-R	18 - 60	12	10.8 - 13.2	11	132	Neg	0.145
iQE48017A120V-001-R	36 - 75	12	10.8 - 13.2	17	204	Neg	0.145
iQE48010A150V-007-R	36 - 75	15	13.5 - 16.5	10	150	Neg	0.180

### Preferred Model

Other models available for volume opportunities. Contact factory.

## Recommended Footprint (Top View)



## Pinout

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Sense (-)
6	Trim
7	Sense (+)
8	Vout (+)

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/iqe-series.htm](http://us.tdk-lambda.com/lp/products/iqe-series.htm)



## 300 to 396W Quarter Brick Converters

### Features

- ◆ Standard Quarter Brick Footprint
- ◆ 36-75VDC Input
- ◆ 12V 25A or 33A Output
- ◆ Through Hole Mounting
- ◆ Low 13.2mm Profile
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 95%)
- ◆ Constant switching frequency
- ◆ Starts with pre-biased output
- ◆ Baseplate cooled
- ◆ Parallel Operation (400W model)



### Key Market Segments & Applications



Specifications		iQG48025A120V	iQG48033A120V-000~xx9	iQG48033A120V-1D9
Nominal Output Voltage	VDC	11.6V	11.5V	11.8V
Input Voltage Range	VDC	36 - 75VDC		
Input Current (max)	A	9A	10.5A	10.5A
Efficiency (48V Input)	%	94-95% Load Dependent		
Output Voltage Tolerance	VDC	11.2 - 12V	11.15 - 11.85V	11.6 - 12V
Output Voltage Adjustment	-	None		
Ripple & Noise (max) (pk - pk)	mV	70mV	125mV	150mV
Line Regulation (typical)	mV	50mV	20mV	20mV
Load Regulation (typical)	mV	50mV	35mV	20mV/A
Overload Protection (typ)	A	30A - auto recovery	39A - auto recovery	39A - auto recovery
Overvoltage Protection	VDC	13.7 - 15.6V (Latching)		
Remote Sense	-	None		
Remote On / Off	-	Negative Logic standard. Positive logic available, contact factory		
Current Share (Droop Mode)	-	None	None	Yes, 20mV/A
Current Share Accuracy	-	Not Applicable	Not Applicable	±10% (50-100% of total load)
Temperature (operating)	°C	-40 to 124°C (See detailed datasheet for derating)		
Temperature (storage)	°C	-55 to 125		
Humidity (operating)	%RH	20-95% RH Non condensing		
Humidity (storage)	%RH	10-95% RH Non condensing		
Cooling	-	Conduction, convection or forced air (See detailed datasheet for derating)		
Isolation Voltage	VDC	1500VDC Input to Output, Input to Baseplate		
Vibration (non operating)	-	5~50Hz @ 0.5g (4.9m/s <sup>2</sup> ), and 50~500Hz @ 1.5g (14.7m/s <sup>2</sup> ) per Bellcore TR-EOP-000063-5.4.4		
Shock	-	196.1m/s <sup>2</sup>		
Safety Agency Certifications	-	UL60950-1 (US and Canada), VDE0805 (IEC60950-1), CB scheme (IEC60950-1), CE Mark		
Weight (max)	g	55g open frame, 70g with baseplate		70g
Size (LxWxH)	mm	57.91 x 36.83 x 13.21		
Warranty	Yrs	3 Years		

Note: See website for detailed specifications and test methods

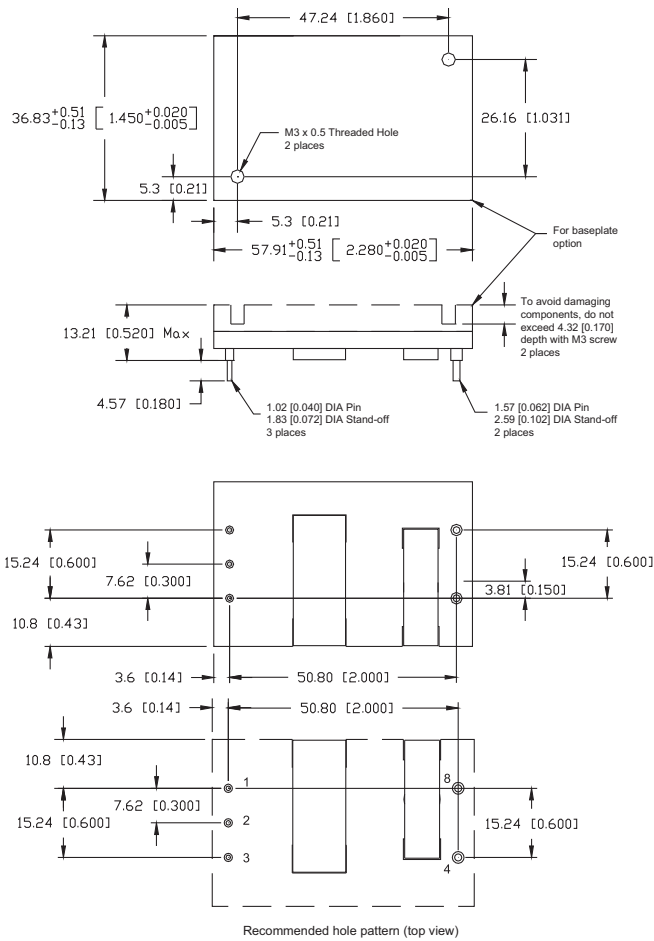
## Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Max. Curr. (A)	Max. Output Power (W)	On/Off Polarity	Pin Length	Base Plate
iQG48025A120V-101-R	36 - 75	12	25	300	Neg	0.145"	Yes
iQG48025A120V-109-R	36 - 75	12	25	300	Neg	0.180"	Yes
iQG48033A120V-109-R	36 - 75	12	33	396	Neg	0.180"	Yes
iQG48033A120V-1D9-R	36 - 75	12	33	396	Neg	0.180"	Yes

## Preferred Model

## Recommended Footprint (Top View)

Dimensions are in mm [in]. Unless otherwise specified tolerances are: x.x ± 0.5 [0.2], x.xx and x.xxx ± 0.25 [0.010]



## Pinout

PIN	Function	PIN	Function
1	Vin (+)	5	None
2	On / Off	6	None
3	Vin (-)	7	None
4	Vout (-)	8	Vout (+)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/iqg-series.htm](http://us.tdk-lambda.com/lp/products/iqg-series.htm)



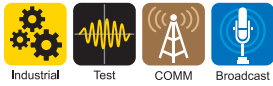
## 72-308W Quarter Brick Converter

### Features

- ◆ Standard Quarter Brick Footprint
- ◆ 18-36, 36-75VDC Inputs
- ◆ 2.5V 60A, 28V 11A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ 1500VDC Basic Isolation
- ◆ Baseplate cooling
- ◆ High operating efficiency (up to 93.5%)
- ◆ Constant switching frequency



### Key Market Segments & Applications



Specifications		iQL					
Model		2.5	3.3	5	8.3	12	28
Nominal Output Voltage	VDC	2.5	3.3	5	8.3	12	28
Input Voltage Range	VDC	See Model Selector					
Ripple & Noise (max)(pk-pk) (1)	mV	30	100	80	100	120	500
Line Regulation (max)	mV	5	6.6	10	30	60	100
Load Regulation (max)	mV	5	15	10	40	60	100
Overload Protection Threshold (3)	A	69	70	50	34	27.5	12.4
Overvoltage Protection (Typ) (2)	VDC	3.1	4.1	6.1	10	14.7	33.6
Overtemperature Protection (3)	-	Yes					
Remote Sense	-	Yes	Yes	Yes	No	No <sup>(4)</sup>	No
Remote On / Off	-	Negative Logic					
Temperature (operating)	°C	-40 to 115	-40 to 115	-40 to 125	-40 to 119	-40 to 118	-40 to 115
Temperature (storage)	°C	-55 to 125					
Humidity (operating)	-	20 to 95% (non-condensing)					
Humidity (storage)	-	10 to 95% (non-condensing)					
Cooling	-	Conduction, convection, or forced air					
Isolation Voltage	VDC	1500 Input - Output, 1500 Input - Baseplate					
Vibration (non operating)	-	5 to 50Hz@0.5g (4.9m/s <sup>2</sup> ), and 50 to 500Hz@1.5g (14.7m/s <sup>2</sup> ) per Bellcore TR-EOP-000063-5.4.4					
Shock	-	50 G at 6 ms pulse in three axes					
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805, CB scheme (IEC950), CE Mark (EN60950)					
Weight (max)	g	55g open frame, 70g with base plate					
Size	mm	57.9 x 36.8 x 13.21					
Warranty	yrs	3 Years					

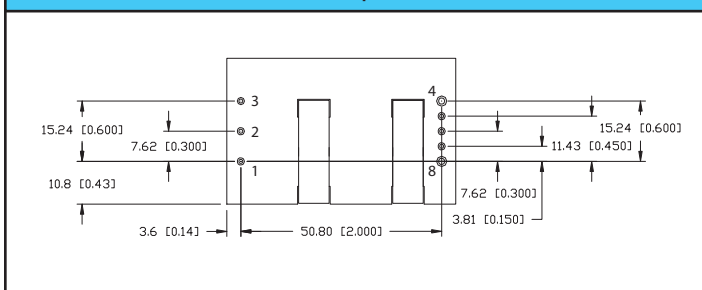
- (1) See website for detailed specification and test methods.  
 (2) Latching  
 (3) Non-latching  
 (4) iQL24021A120V has remote sense

## Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Base Plate	Efficiency at Full Load (%)	Pin Length (in)
iQL48060A025V-0B9-R	36 - 75	2.5	2.0 - 2.75	60	150.0	No	89.0	0.180
iQL24050A033V-009-R	18 - 36	3.3	2.64 - 3.63	50	165.0	Yes	90.5	0.180
iQL48025A033V-003-R	36 - 75	3.3	2.64 - 3.63	25	82.5	Yes	91.0	0.180
iQL48060A033V-009-R	36 - 75	3.3	2.64 - 3.63	60	198.0	Yes	91.0	0.180
iQL48060A033V-0B9-R	36 - 75	3.3	2.64 - 3.63	60	198.0	No	91.0	0.180
iQL24040A050V-009-R	18 - 36	5.0	4.0 - 5.5	40	200.0	Yes	91.0	0.180
iQL48045A050V-009-R	36 - 75	5.0	4.0 - 5.5	45	225.0	Yes	91.0	0.180
iQL48045A050V-0B9-R	36 - 75	5.0	4.0 - 5.5	45	225.0	No	91.0	0.180
iQL24024A083V-009-R	18 - 36	8.3	6.64 - 9.13	24	199.2	Yes	89.0	0.180
iQL48030A083V-009-R	36 - 75	8.3	6.64 - 9.13	30	249.0	Yes	90.5	0.180
iQL24021A120V-009-R	20 - 36	12.0	9.28 - 12.76	21	252.0	Yes	92.0	0.180
iQL48025A120V-009-R	36 - 75	12.0	9.6 - 13.2	25	300.0	Yes	93.5	0.180
iQL48025A120V-0B9-R	36 - 75	12.0	9.6 - 13.2	25	300.0	No	93.5	0.180
iQL48011A280V-009-R	36 - 75	28.0	27.4 - 28.6	11	308.0	Yes	92.5	0.180

### Preferred Model

### Recommended Footprint (Bottom View)



### Pinout

PIN	Function	PIN	Function
1	Vin (+)	5	Sense (-)(if applicable)
2	On / Off	6	Trim
3	Vin (-)	7	Sense (+)(if applicable)
4	Vo (-)	8	Vo (+)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/iql-series.htm](http://us.tdk-lambda.com/lp/products/iql-series.htm)



## 24V & 48V Input Full brick DC-DC Converters

### Features

- ◆ 12V output for driving non-isolated converters
- ◆ Safety Approved
- ◆ Up to 80A output current (48V models)
- ◆ Full power at 100°C baseplate
- ◆ Opto Isolated Remote On / Off
- ◆ Wide Adjustable Output Range
- ◆ Parallel Pin
- ◆ ASIC Design
- ◆ No potting materials



### Key Market Segments & Applications

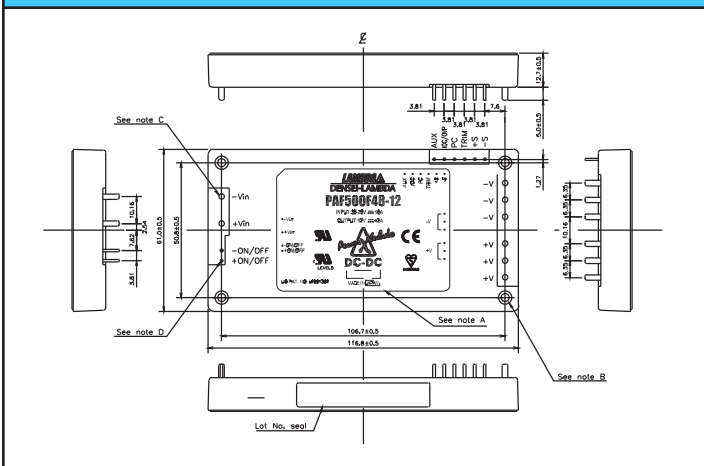


Specifications		PAF500F48-3.3	PAF500F48-5	PAF500F24-12	PAF500F24-28
Model				PAF500F48-12	PAF500F48-28
Nominal Output Voltage	VDC	3.3	5	12	28
Output Current (Max)	A	80	80	42	18
Max Output Power	W	264	400	504	504
Efficiency (Typ)	%	78	83	89	90
Input Voltage range	VDC	36-76		19-36 or 36-76	18-36 or 36-76
Input Current (Typ) (24V/48V)	A	7.3	10.4	24 / 12.2	23.8 / 12.1
Output Voltage Accuracy	%	±1			
Output Voltage Adjustment	VDC	2 - 4	3 - 6	7.2 - 13.2	16.8 - 30.8
Max Ripple & Noise	mV	100	100	200	280
Max Line Regulation	mV	10	10	24	56
Max Load Regulation	mV	10	10	24	56
Overcurrent Protection	%	105 - 140%			
Overvoltage Protection	%	130-160	125-145	115-135	115-135
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, DC Good (12, 28V models), Adjustable OVP (3.3, 5V models), 7-10V Auxiliary voltage			
Operating Temperature	-	-40°C to +100°C baseplate			
Cooling	-	Conduction (See Installation Manual for heatsink selection)			
Isolation Voltage	VDC	Input - Baseplate 1500V, Input - Output 1500V, Output-Baseplate 500V			
Shock	-	196.1m/s <sup>2</sup>			
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.)			
Amplitude	-	0.825mm constant (Max 49m/s <sup>2</sup> ) X, Y, Z 1 hour each			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD			
Weight (Typ)	g	250			
Size (WxHxD)	in(mm)	2.4x0.5x4.6 (61x12.7x116.8) See outline drawing			
Warranty	yrs	2 years			

Note: See Installation Manual for full details, test methods of parameters and application notes.



## PAF Outline Drawing



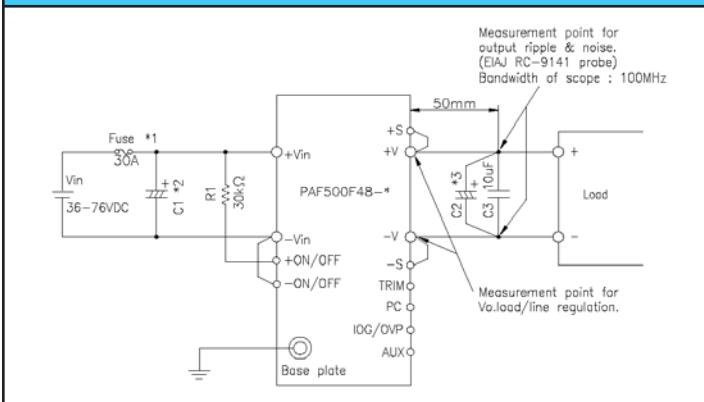
## Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
- ON/OFF	Remote On/Off negative terminal
+ON/OFF	Remote On/Off positive terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	7-10V Aux voltage
IOG/OVP	DC Good / OVP adjustment
PC	Parallel control connection
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

## Other DC-DC Products

PAF	Full Brick 400-700W DC-DC
PAH	Half brick DC-DC
PAQ	Quarter brick DC-DC
PX	10-60W, 12-48V DC-DC

## Connection Example



## Heatsink Table

Heatsink	Size (mm)	Thermal Resistance
HAF-10L	116.8 x 25.4 x 61	2.2°C/W
HAF-15L	116.8 x 38.1 x 61	1.9°C/W
HAF-15T	116.8 x 38.1 x 61	1.5°C/W

## Options

Suffix	Description
Blank	M3 tapped inserts (4)
/T	3.3mm non-threaded inserts (4)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/paf-series.htm](http://us.tdk-lambda.com/lp/products/paf-series.htm)



## 24V & 48V Input Full brick DC-DC Converters

### Features

- ◆ 12V output for driving non-isolated converters
- ◆ Safety Approved
- ◆ Full power at 100°C baseplate
- ◆ Opto Isolated Remote On / Off
- ◆ Wide Adjustable Output Range
- ◆ Parallel Pin
- ◆ ASIC Design
- ◆ 24V & 48V Inputs



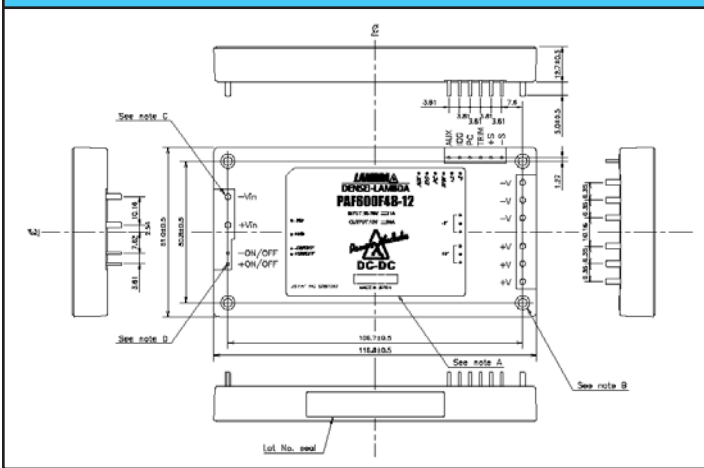
### Key Market Segments & Applications



Specifications		PAF600F24-12		PAF600F24-28	
Model		PAF600F48-12		PAF600F48-28	
Nominal Output Voltage	VDC	12		28	
Output Current (Max)	A	50		21.5	
Output Power (Max)	W	600		602	
Efficiency (Typ)	%	89 to 90%			
Input Voltage Range	VDC	20-36 / 36-76		19-36 / 36-76	
Input Current (Typ) 24/48V input	A	28.9 / 14.2		28.9 / 14.1	
Output Voltage Accuracy	%	±1			
Output Voltage Adjustment	VDC	7.2 - 13.2		16.8 - 30.8	
Ripple & Noise (Max)	mV	200		280	
Line Regulation (Max)	mV	24		56	
Load Regulation (Max)	mV	24		56	
Temperature Coefficient	-	0.02%/°C			
Overcurrent Protection	%	105 - 140%			
Overvoltage Protection	%	115-135%			
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, DC Good, 7-10V Auxiliary voltage			
Operating Temperature	-	-40°C to +100°C baseplate			
Humidity (operating)	-	30-95% RH Non condensing			
Humidity (storage)	-	10-95% RH Non condensing			
Cooling	-	Conduction (See Installation Manual for heatsink selection)			
Isolation Voltage	VDC	Input - Baseplate 1500V, Input - Output 1500V, Output-Baseplate 500V (for 1 min.)			
Shock	-	196.1m/s <sup>2</sup>			
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD (48V model only)			
Weight (Typ)	g	250			
Size (WxHxD)	in(mm)	2.4 x 0.5 x 4.6 (61 x 12.7 x 116.8) See outline drawing			
Warranty	yrs	2 years			

Note: See Installation Manual for full details, test methods of parameters and application notes.

## PAF Outline Drawing



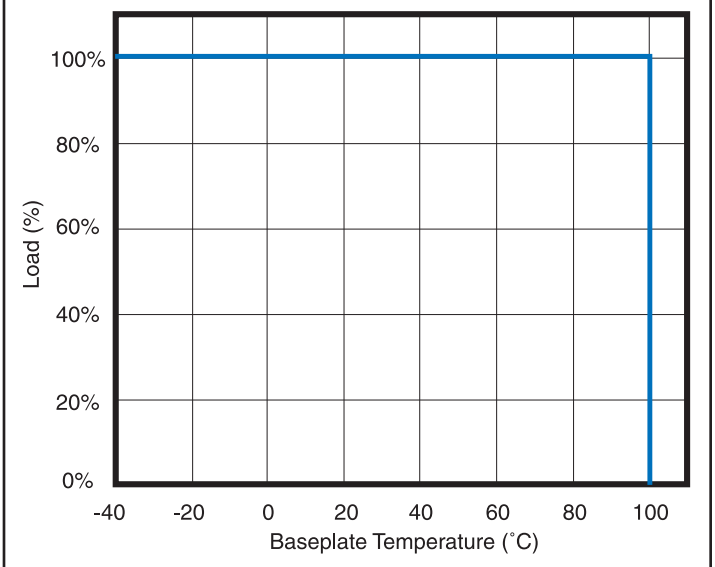
## Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
- ON/OFF	Remote On/Off Negative Terminal
+ON/OFF	Remote On/Off Positive Terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	7-10V Aux Voltage
IOG	DC Good
PC	Parallel Control Connection
TRIM	Output Adjustment Trim Pin
+S	Positive Remote Sense
-S	Negative Remote Sense

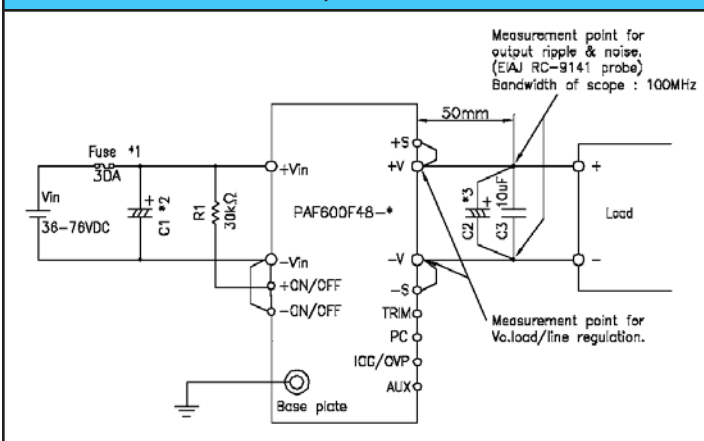
## Other DC-DC Products

PAF	Full brick 400-700W DC-DC
PAH	Half brick DC-DC
PAQ	Quarter brick DC-DC
PX	10-60W, 12-48V DC-DC

## Derating Curve



## Connection Example



## Heatsink Table

Heatsink	Size (mm)	Thermal Resistance
HAF-10L	116.8 x 25.4 x 61	2.2°C/W
HAF-15L	116.8 x 38.1 x 61	1.9°C/W
HAF-15T	116.8 x 38.1 x 61	1.5°C/W

## Options

Suffix	Description
Blank	
/T	No thread in mounting holes.

For Additional Information, please visit [us.tdk-lambda.com/lp/products/paf-series.htm](http://us.tdk-lambda.com/lp/products/paf-series.htm)



## 48V Input Full brick DC-DC Converters

### Features

- ◆ 12V output for driving non-isolated converters
- ◆ Safety Approved
- ◆ Full power at 85°C baseplate, operation to 100°C
- ◆ Opto Isolated Remote On / Off
- ◆ Wide Adjustable Output Range
- ◆ Parallel Pin
- ◆ ASIC Design



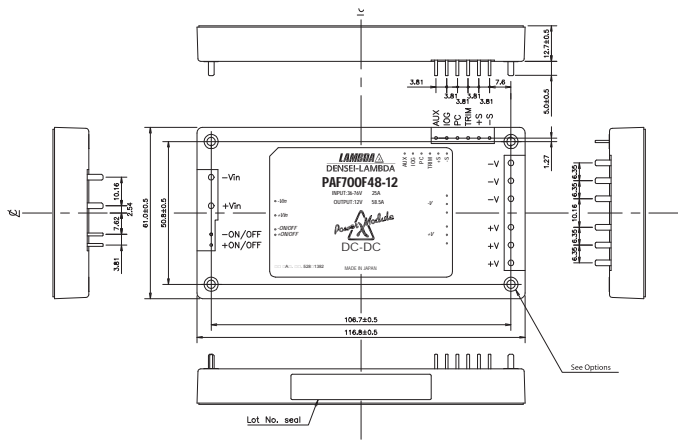
### Key Market Segments & Applications



Specifications			
Model		PAF700F48-12	PAF700F48-28
Nominal Output Voltage	VDC	12	28
Output Current (Max)	A	58.5	25
Output Power (Max)	W	702	700
Efficiency (Typ)	%	90 to 91%	
Input Voltage Range	VDC	36-76	
Input Current (Typ)	A	16.5	16.4
Output Voltage Accuracy	%	±1	
Output Voltage Adjustment	VDC	7.2 - 13.8	16.8 - 32.2
Ripple & Noise (Max)	mV	200	280
Line Regulation (Max)	mV	24	56
Load Regulation (Max)	mV	24	56
Temperature Coefficient	-	0.02%/°C	
Overcurrent Protection	%	105 - 140%	
Overvoltage Protection	%	120 - 135%	
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, DC Good, 7-10V Auxiliary voltage	
Operating Temperature	°C	-40°C to +100°C baseplate	
Humidity (operating)	-	20-95% RH Non condensing	
Humidity (storage)	-	10-95% RH Non condensing	
Cooling	-	Conduction (See Installation Manual for heatsink selection)	
Isolation Voltage	VDC	Input - Baseplate 1500V, Input - Output 1500V, Output-Baseplate 500V (for 1 min.)	
Shock	-	196.1m/s <sup>2</sup>	
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each	
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD	
Weight (Typ)	g	200	
Size (WxHxD)	in(mm)	2.4 x 0.5 x 4.6 (61 x 12.7 x 116.8) See outline drawing	
Warranty	yrs	2 years	

Note: See Installation Manual for full details, test methods of parameters and application notes.

## PAF Outline Drawing



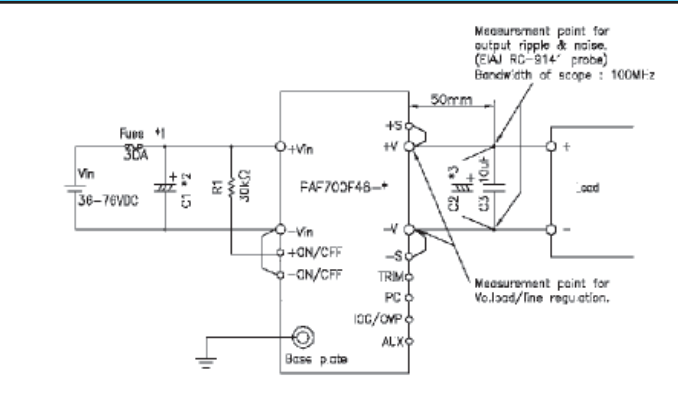
## Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
- ON/OFF	Remote On/Off Negative Terminal
+ON/OFF	Remote On/Off Positive Terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	7-10V Aux Voltage
IOG	DC Good
PC	Parallel Control Connection
TRIM	Output Adjustment Trim Pin
+S	Positive Remote Sense
-S	Negative Remote Sense

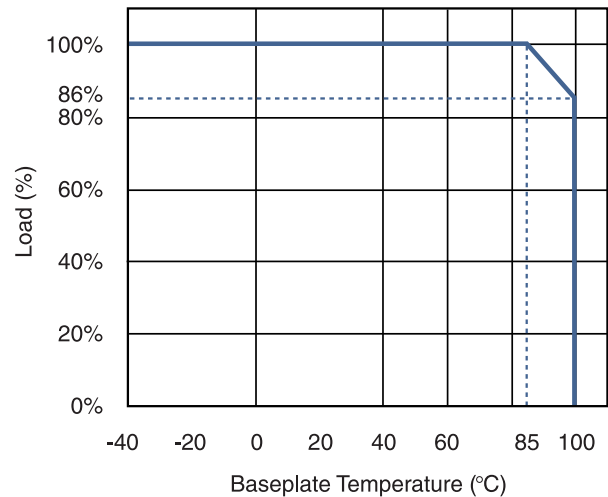
## Other DC-DC Products

PAF	Full Brick 400-700W DC-DC
PAH	Half brick DC-DC
PAQ	Quarter brick DC-DC
PX	10-60W, 12-48V DC-DC

## Connection Example



## Derating Curve



## Options

Suffix	Description
Blank	M3 tapped inserts (4)
/T	3.3mm non-threaded inserts (4)

## Heatsink Table

Heatsink	Size (mm)	Thermal Resistance
HAF-10L	116.8 x 25.4 x 61	2.2°C/W
HAF-15L	116.8 x 38.1 x 61	1.9°C/W
HAF-15T	116.8 x 38.1 x 61	1.5°C/W

For Additional Information, please visit [us.tdk-lambda.com/lp/products/paf700-series.htm](http://us.tdk-lambda.com/lp/products/paf700-series.htm)



## 300W to 450W Half Brick Converters

### Features

- ◆ Standard Half Brick Footprint
- ◆ 18-36 or 36-76VDC Inputs
- ◆ 12V 29A - 48V 9.4A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ Low 12.7mm Profile
- ◆ High operating efficiencies (up to 92%)
- ◆ Constant switching frequency
- ◆ Baseplate cooling



### Key Market Segments & Applications



Specifications				
Model		PAH300S, 350S, 450S (see model selector)		
Nominal Output Voltage	VDC	12V	28V	48V
Input Voltage range	VDC	18-36 or 36-76		
Input Current (max)	A	6.8-17.4A (model dependant)		
Output Voltage Adjustment	VDC	7.2 - 13.2	16.8 - 33	28.8 - 57.6(5)
Ripple & Noise (max) (pk to pk)	mV	200	280(1)	480
Line Regulation (max)	mV	24	56	96
Load Regulation (max)	mV	24	56	96
Overload Protection	%	105 - 140%, constant current with auto recovery		
Overvoltage Protection (3)	%	115-135%	125-140%(2)	125-145%(6)
Remote Sense	-	Yes		
Remote On / Off (See options)	-	Standard; Low = ON, Open = OFF /P option; Low = OFF, Open = ON		
Temperature (operating)	°C	-40°C to +100°C baseplate, full power(4)		
Temperature (storage)	°C	-40°C to +100°C		
Temperature Coefficient	-	0.02%/°C		
Humidity (operating)	-	5-95% RH Non condensing		
Humidity (storage)	-	5-95% RH Non condensing		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Isolation Voltage	VDC	1500VDC Input to output & baseplate, 500VDC Output to baseplate		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.)		
Amplitude	-	0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each		
Shock	-	196.1m/s <sup>2</sup>		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD (48V input models only)		
Weight (Typ)	g	110		
Size (WxHxD)	in(mm)	2.4x0.5x2.28 (61x12.7x57.9) See outline drawing		
Warranty	yrs	2 Years		

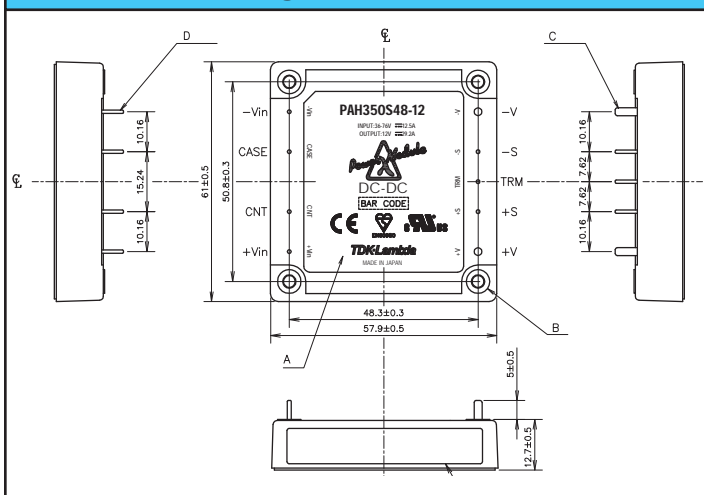
Note: See Installation Manual for full details, test methods of parameters and application notes

- (1) 240mV for PAH300
- (2) 125-145% for PAH450S48-28
- (3) Manual reset
- (4) PAH350S24-28 & -48: derate linearly to 85% load from 90°C to 100°C
- (5) 28.8-52.8 PAH350S28-48
- (6) 115-140% PAH350S28-48

## Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency Typ. (%)
PAH300S24-12	18 - 36	12	25	300	87
PAH300S48-12	36 - 76	12	25	300	90
PAH350S48-12	36 - 76	12	29.2	350	89
PAH300S24-28	18 - 36	28	11	308	88
PAH350S24-28	18 - 36	28	12.5	350	88
PAH350S24-48	18 - 36	48	7.3	350	87
PAH300S48-28	36 - 76	28	11	308	90
PAH350S48-28	36 - 76	28	12.5	350	89
PAH450S48-28	36 - 76	28	16	448	92
PAH450S48-48	36 - 76	48	9.4	451	92

## Outline Drawing



## Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	On / Off Control terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

## Options

Suffix	Description
-	M3 Tapped inserts for mounting
/T	M3 clearance inserts for mounting
/P	Positive logic remote On/Off (Not on PAH450S)

## Other DC-DC Products

PAF	400-700W Full brick DC-DC
PAH	Other half brick DC-DC converters
PAQ	Quarter brick DC-DC converters
PAE	Eighth brick DC-DC converters
PX	10-48W, 12-48V DC-DC

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/pah300-series.htm](http://us.tdk-lambda.com/lp/products/pah300-series.htm)



## 150W 200 to 425VDC Input DC-DC Converters

### Features

- ◆ 200 - 425VDC Input
- ◆ Base-plate Cooled
- ◆ Full Power at 100°C base plate
- ◆ Quarter Brick Footprint



### Key Market Segments & Applications



Specifications				
Model				
Nominal Output Voltage	VDC	12V	24V	48V
Input Voltage Range	VDC	200 - 425VDC		
Input Current	A	0.42 - 0.62A (model dependant)		
Output Voltage Adjustment	VDC	9.6 - 13.2	19.2 - 26.4	38.4 - 52.8
Ripple & Noise (max) pk-pk	mV	150	240	400
Line Regulation (max)	mV	24	48	96
Load Regulation (max)	mV	24	48	96
Overcurrent Protection	%	102 - 150% (Constant current style)		
Overvoltage Protection (1)	%	115 - 145	115 - 145	115 - 145
Remote Sense	-	Yes		
Remote On/Off	-	Yes; Low = ON, Open = OFF		
Operating Temperature	°C	-40°C to +100°C Base-plate, -40°C to +85°C Ambient		
Storage Temperature	°C	-55°C to +100°C		
Temperature Coefficient	%/°C	0.02%/°C		
Humidity (non condensing)	%RH	5 - 95% RH Operating and Non Operating		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Withstand Voltage	VAC	Input to Base-plate: 2.5kVAC; Input to Output 3.0kVAC for 1 min.;		
	-	Output to Base-plate: 500VAC for 1 min		
Isolation Resistance	-	>100M at 25°C and 70%RH, Output to Base plate 500VDC		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.)		
	-	Amplitude 0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each"		
Shock	-	196.1m/s <sup>2</sup>		
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark		
Weight (Typ)	g	55		
Size (WxHxD)	in (mm)	1.46 x 0.5 x 2.30" (37.2 x 12.7 x 58.3)		
Warranty	yrs	5 Years		

Note: See Installation Manual for full details, test methods of parameters and application notes

(1) Cycle input or remote on/off to reset

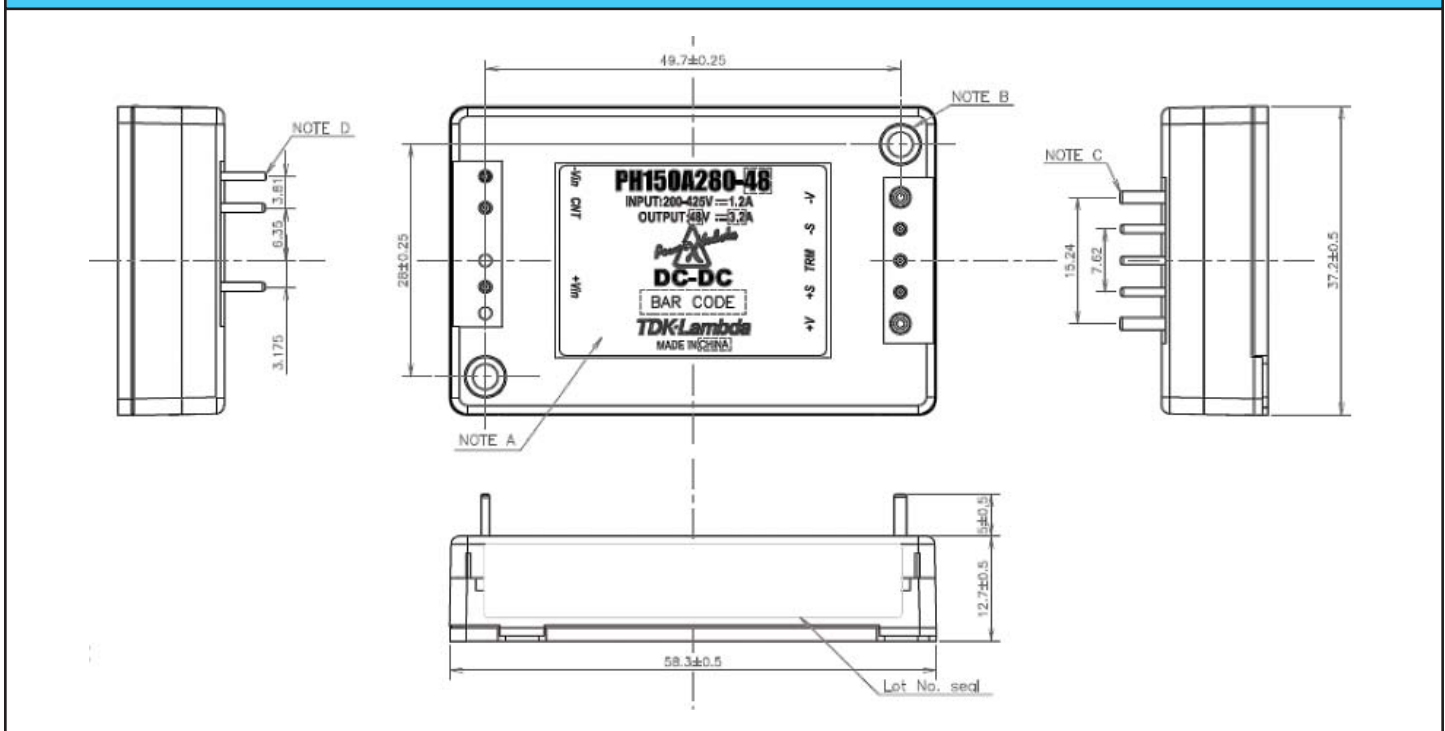


## Model Selector

Model	Voltage (V)	Output Current (A)	Maximum Power (W)	Input Current (A)	Efficiency (%) (100% load, 280VDC In)
PH150A280-12	12	12.5	150	0.62	88
PH150A280-24	24	6.3	151.2	0.61	89
PH150A280-48	48	3.2	153.6	0.6	90

PH50A280, PH75A280 & PH100A280 models to be launched in 2014

## Outline Drawing



## Other DC-DC Products

CN-A110 50 to 200W Quarter & Half Brick, 60 - 160VDC Input

For Additional Information, please visit [us.tdk-lambda.com/lp/products/pha-series.htm](http://us.tdk-lambda.com/lp/products/pha-series.htm)



## Full function, 50 to 300W DC-DC converters

### Features

- ◆ High Density
- ◆ Wide Range Input
- ◆ Wide output adjustment capability
- ◆ Remote On/Off
- ◆ Fixed Switching Frequency
- ◆ International Safety Approvals
- ◆ Parallel Operation
- ◆ Low component count
- ◆ Signals to support N+1 redundancy



### Key Market Segments & Applications



Specifications		2V	3.3V	5V	12V	15V	24V	28V
Input range	VDC	24V nom: 18-36, 48V nom: 36-76V, 110V nom: 82-185V, 280V nom: 200-400V						
Output Voltage Adj. Range	VDC	1.6~2.4	2.64~3.96	2~6	4.8~14.4	6~18	9.6~28.8	11.2~33.6
Line Regulation	-	0.4% or 20mV (whichever is greater) over entire input range with constant load						
Load Regulation	-	0.8% or 40mV (whichever is greater) from no load to full load with constant input line						
Ripple and Noise	pk-pk	100mV		150mV		240mV	280mV	
Series Operation	-	Possible - Refer to installation manual						
Over Voltage Protection	%	150 - 180%		125 - 145%				
Overload Protection	%	Approximately 105 - 140%, automatic recovery						
Remote On/Off	-	Low = ON, Open = OFF						
Remote Sensing	-	Yes						
Parallel operation	-	Using current share pin (PC). Will share within 5%, see app. notes for connection details						
Inverter Good signal	-	Signal available for status of inverter						
Auxiliary Bias Supply	-	8V 10mA auxiliary voltage to supply power to interface circuits (AUX pin)						
Thermal Protection	-	Internal sensing, self resetting						
Cooling	-	Conduction or forced air. See application notes for cooling and heatsink selection						
Operating Temperature Range	°C	Baseplate temperature -20°C to +85°C. -40°C start up possible - consult factory						
Storage Temperature	°C	-40°C to +85°C						
Temperature Coefficient	-	0.02%/°C						
Isolation	-	Input to output: 3000VAC, Input to Baseplate: 2500VAC(1)						
Isolation Resistance	-	Output to Baseplate -100MΩ at 500VDC and 70%RH						
Safety Agency Approval	-	UL60950-1, CSA60950-1, EN60950-1 and CE Mark.						
Warranty	yrs	Two years						

Note: See Installation Manual for full details, test methods of parameters and application notes

(1) 24V input models input to output: 2kVAC; input to baseplate: 2kVAC

Model Selector						
Nominal Output Voltage (V)	Output Current (A)	Output Power (W)	24V input	48V input	110V input	280V input
2.0	15.0	30	-	PH75F48-2	PH75F110-2	PH75F280-2
2.0	20.0	40	PH100F24-2	-	-	-
2.0	30.0	60	-	PH150F48-2	PH150F110-2	PH150F280-2
2.0	60.0	120	-	PH300F48-2	PH300F110-2	PH300F280-2
3.3	15.0	45	-	PH75F48-3	PH75F110-3	PH75F280-3
3.3	20.0	60	PH100F24-3	-	-	-
3.3	30.0	90	-	PH150F48-3	PH150F110-3	PH150F280-3
3.3	60.0	180	-	PH300F48-3	PH300F110-3	PH300F280-3
5.0	15.0	75	-	PH75F48-5	PH75F110-5	PH75F280-5
5.0	20.0	100	PH100F24-5	-	-	-
5.0	30.0	150	-	PH150F48-5	PH150F110-5	PH150F280-5
5.0	60.0	300	-	PH300F48-5	PH300F110-5	PH300F280-5
12.0	6.3	75	-	PH75F48-12	PH75F110-12	PH75F280-12
12.0	8.4	100	PH100F24-12	-	-	-
12.0	12.5	150	-	PH150F48-12	PH150F110-12	PH150F280-12
12.0	20.0	240	PH300F24-12	-	-	-
12.0	25.0	300	-	PH300F48-12	PH300F110-12	PH300F280-12
15.0	5.0	75	-	PH75F48-15	PH75F110-15	PH75F280-15
15.0	6.7	100	PH100F24-15	-	-	-
15.0	10.0	150	-	PH150F48-15	PH150F110-15	PH150F280-15
15.0	20.0	300	-	PH300F48-15	PH300F110-15	PH300F280-15
24.0	3.2	75	-	PH75F48-24	PH75F110-24	PH75F280-24
24.0	4.2	100	PH100F24-24	-	-	-
24.0	6.3	150	-	PH150F48-24	PH150F110-24	PH150F280-24
24.0	12.6	300	-	PH300F48-24	PH300F110-24	PH300F280-24
28.0	2.7	50	-	PH75F48-28	PH75F110-28	PH75F280-28
28.0	3.6	100	PH100F24-28	-	-	-
28.0	5.4	150	-	PH150F48-28	PH150F110-28	PH150F280-28
28.0	10.8	300	PH300F24-28	PH300F48-28	PH300F110-28	PH300F280-28

Pinout	
Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
+S	Positive Remote sense
-S	Negative Remote sense
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	Bias voltage output (secondary reference)
IOG	DC Good
TRIM	Output adjustment trim pin
CNT	On/Off Control Terminal
SG	Signal (CNT RTN)
PC	Parallel control connection

Other DC-DC Products	
PH Simple Func.	50 - 300W, lower cost version of PH
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks
PX	10-40W, 12-48V input, DC-DC
CC-E	1.5-30W, 5-48V input, DC-DC

For Additional Information, please visit [us.tdk-lambda.com/lp/products/ph-series-ff.htm](http://us.tdk-lambda.com/lp/products/ph-series-ff.htm)



## Simple function, 50 to 600W DC-DC converters

### Features

- ◆ High Density
- ◆ Wide Range Input
- ◆ Output adjustment Capability
- ◆ Remote On/Off
- ◆ Fixed Switching Frequency
- ◆ International Safety Approvals
- ◆ Low component count



### Key Market Segments & Applications



Specifications								
Model		3.3V	5V	12V	15V	24V	28V	48V
Input range	VDC	24V nom: 18-36, 48V nom: 36-76V, 110V nom: 82-185V, 280V nom: 200-400V						
Output Voltage Adj. Range	VDC	2.97~3.63	4.5~5.5	10.8~13.2	13.5~16.5	21.6~26.4	25.2~30.8	43.2~52.8
Line Regulation	-	0.4% or 20mV (whichever is greater) over entire input range with constant load						
Load Regulation	-	0.8% or 40mV (whichever is greater) from no load to full load with constant input line						
Ripple and Noise	pk-pk	100mV		150mV		240mV	280mV	480mV
Series Operation	-	Possible - Refer to installation manual						
Over Voltage Protection	%	150 - 180%	125 - 145%					
Overload Protection	%	Approximately 105 - 140%, automatic recovery						
Remote On/Off	-	Low = ON, Open = OFF						
Remote Sensing	-	PH100S, PH150S, PH300S, PH600S models						
Parallel operation	-	PH300S & PH600S only: Requires external circuitry						
Inverter Good signal	-	PH300S & PH600S only: Signal available for status of inverter						
Thermal Protection	-	Internal sensing, self resetting						
Cooling	-	Conduction or forced air. See application notes for cooling and heatsink selection						
Operating Temperature Range	°C	Baseplate temperature -20°C to +85°C (100°C on PH300 & PH600). -40°C start up possible - consult factory						
Storage Temperature	°C	-40°C to +85°C (+100°C on PH300 & PH600)						
Temperature Coefficient	-	0.02%/°C						
Isolation	-	Input to output: 3000VAC, Input to Baseplate: 2500VAC(1)						
Isolation Resistance	-	Output to Baseplate -100MΩ at 500VDC and 70%RH						
Safety Agency Approval	-	UL60950-1, CSA60950-1, EN60950-1 and CE Mark.						
Warranty	yrs	Two years						

Note: See Installation Manual for full details, test methods of parameters and application notes

Model Selector						
Nominal Output Voltage (V)	Output Current (A)	Output Power (W)	24V input	48V input	110V input	280V input
3.3	10.0	33.0	-	PH50S48-3.3	-	PH50S280-3.3
3.3	15.0	49.5	-	PH75S48-3.3	-	PH75S280-3.3
3.3	20.0	66.0	-	PH100S48-3.3	-	PH100S280-3.3
3.3	30.0	99.0	-	PH150S48-3.3	-	PH150S280-3.3
3.3	50.0	165.0	-	-	-	PH300S280-3.3
3.3	100.0	330.0	-	-	-	PH600S280-3.3
5.0	10.0	50.0	PH50S24-5	PH50S48-5	PH50S110-5	PH50S280-5
5.0	15.0	75.0	-	PH75S48-5	PH75S110-5	PH75S280-5
5.0	20.0	100.0	-	PH100S48-5	-	PH100S280-5
5.0	30.0	150.0	-	PH150S48-5	PH150S110-5	PH150S280-5
5.0	50.0	250.0	-	-	-	PH300S280-5
5.0	100.0	500.0	-	-	-	PH600S280-5
12.0	4.2	50.0	PH50S24-12	PH50S48-12	PH50S110-12	PH50S280-12
12.0	6.3	75.0	-	PH75S48-12	PH75S110-12	PH75S280-12
12.0	8.4	100.0	-	PH100S48-12	-	PH100S280-12
12.0	12.5	150.0	-	PH150S48-12	PH150S110-12	PH150S280-12
12.0	25.0	300.0	-	-	-	PH300S280-12
12.0	50.0	600.0	-	-	-	PH600S280-12
15.0	3.4	50.0	PH50S24-15	PH50S48-15	PH50S110-15	PH50S280-15
15.0	5.0	75.0	-	PH75S48-15	PH75S110-15	PH75S280-15
15.0	6.7	100.0	-	PH100S48-15	-	PH100S280-15
15.0	10.0	150.0	-	PH150S48-15	PH150S110-15	PH150S280-15
15.0	20.0	300.0	-	-	-	PH300S280-15
15.0	40.0	600.0	-	-	-	PH600S280-15
24.0	2.1	50.0	PH50S24-24	PH50S48-24	PH50S110-24	PH50S280-24
24.0	3.2	75.0	-	PH75S48-24	PH75S110-24	PH75S280-24
24.0	4.2	100.0	-	PH100S48-24	-	PH100S280-24
24.0	6.3	150.0	-	PH150S48-24	PH150S110-24	PH150S280-24
24.0	12.5	300.0	-	-	-	PH300S280-24
24.0	25.0	600.0	-	-	-	PH600S280-24
28.0	1.8	50.0	PH50S24-28	PH50S48-28	PH50S110-28	PH50S280-28
28.0	2.7	75.0	-	PH75S48-28	PH75S110-28	PH75S280-28
28.0	3.6	100.0	-	PH100S48-28	-	PH100S280-28
28.0	5.4	150.0	-	PH150S48-28	PH150S110-28	PH150S280-28
28.0	10.8	302.0	-	-	-	PH300S280-28
28.0	21.5	602.0	-	-	-	PH600S280-28
48.0	6.3	302.0	-	-	-	PH300S280-48
48.0	12.5	600.0	-	-	-	PH600S280-48

Pinout	
Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
+S	Positive Remote sense
-S	Negative Remote sense
+V	Positive Output Terminal
-V	Negative Output Terminal
IOG	Inverter Good Signal
TRIM	Output adjustment trim pin
CNT	On/Off Control Terminal
CS	Current Monitor Signal

Other DC-DC Products	
PH Full Function	50 - 300W, full function versions of PH
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks
PX	10-40W, 12-48V input, DC-DC
CC-E	1.5-30W, 5-48V input, DC-DC

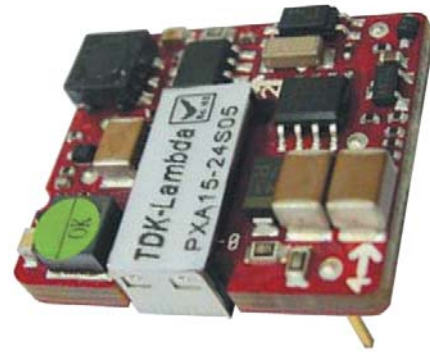
For Additional Information, please visit [us.tdk-lambda.com/lp/products/ph-series-sf.htm](http://us.tdk-lambda.com/lp/products/ph-series-sf.htm)



## Single Output 15W DC-DC Converters

### Features

- ◆ Industry Standard 1" x 1" Footprint
- ◆ Through hole or Surface Mount versions
- ◆ Agency Approved
- ◆ 12V, 24V and 48V Inputs
- ◆ Wide range input (PXA15W)



### Key Market Segments & Applications



Specifications		PXA15	PXA15W
Model		PXA15	PXA15W
Max Output Power	W	15W	15W
Voltage Accuracy	%		±1%
Voltage Adjustment (T Suffix)	%		±10%
Minimum Load	-		None
Line Regulation	%		±0.2%
Load Regulation (0% to 100%)	%		±0.2%
Start up time	ms		30ms
Remote on/off	-	Negative Logic /N (standard): ON: Short or <1.2V, OFF: Open or 3-15V Positive Logic /P (optional): ON: Open or 3-15V, OFF Short or <1.2V	
Temperature Coefficient	°C		<±0.02%/°C
Operating Temperature	°C	-40 to +85°C (See derating curves)	
Storage Temperature	°C	-55 to 125°C	
Thermal Shock	-	MIL-STD-810F	
Relative Humidity (non condensing)	%	5 to 95%	
Transient Response (25% step load change)	µs	200µs recovery	300µs recovery
Overvoltage Protection (Zener clamp)	V	1.5-3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V	
Overcurrent and Short Circuit Protection	%	Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)	VDC	12V input: 36V, 24V input: 50V, 48V input: 100V	
Reflected input ripple (peak to peak)	mA	30mA	
Isolation Voltage	VDC	2250VDC minimum	
Isolation Resistance	Ω	109 Ohms minimum	
Isolation Capacitance (max)	pF	1000pF	1500pF
Typical Switching Frequency (Fixed)	kHz	3.3, 5V: 270kHz; 12,15V: 470kHz	3.3, 5V: 350kHz; 12,15V: 400kHz
MTBF (BELLCORE TR-NWT-000332)	Hours	2,200,000	1,322,000
Vibration	-	MIL-STD-810F	
Conducted and Radiated Emissions	-	EN55022 Level A	
Immunity	-	EN61000-4-3,-4,-5,-6	
Safety Agency Approval	-	IEC60950-1, UL60950-1, EN60950-1, CE Mark	
Size (L x W x H)	in	1.1 x 0.94 x 0.34"	
Mounting	-	Through Hole standard; Surface Mount (option "S")	
Weight	g	10.5	
Warranty	yrs	Two Years	

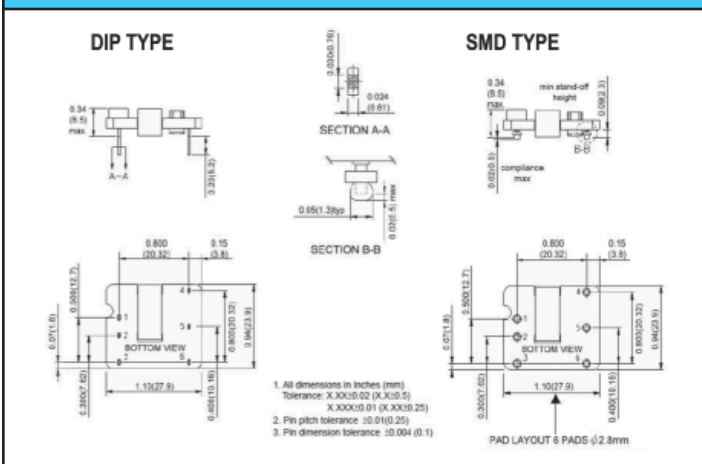
Notes:

See installation manual

## Model Selector

Output Voltage (VDC)	Output Current (A)	Output Power (W)	Input Voltage (VDC)	Model	Ripple & Noise (Pk-Pk mV)	Nominal Input Current (mA)	Efficiency (%)	Maximum Load Capacitance (uF)
3.3	4	13.2	9 - 36	PXA15-24WS3P3/NT	100	680	85	1000
3.3	3.5	11.5	18 - 36	PXA15-24S3P3/NT	75	587	86	1000
3.3	4	13.2	18 - 75	PXA15-48WS3P3/NT	100	340	85	1000
3.3	3.5	11.5	36 - 75	PXA15-48S3P3/NT	75	297	85	1000
5	3	15	9 - 36	PXA15-24WS05/NT	100	754	87	1000
5	3	15	18 - 36	PXA15-24S05/NT	75	753	87	1000
5	3	15	18 - 75	PXA15-48WS05/NT	100	377	87	1000
5	3	15	36 - 75	PXA15-48S05/NT	75	377	87	1000
12	1.3	15.6	9 - 36	PXA15-24WS12/NT	100	793	86	330
12	1.25	15	18 - 36	PXA15-24S12/NT	100	753	87	330
12	1.3	15.6	18 - 75	PXA15-48WS12/NT	100	397	86	330
12	1.25	15	36 - 75	PXA15-48S12/NT	100	377	87	330
15	1	15	9 - 36	PXA15-24WS15/NT	100	763	86	220
15	1	15	18 - 36	PXA15-24S15/NT	100	744	88	220
15	1	15	18 - 75	PXA15-48WS15/NT	100	382	86	220
15	1	15	36 - 75	PXA15-48S15/NT	100	372	88	220

## Outline Drawing



For Additional Information, please visit [us.tdk-lambda.com/lp/products/px-series.htm](http://us.tdk-lambda.com/lp/products/px-series.htm)



## Pinout

Pin #	Function
1	+ Input
2	- Input
3	Remote On/Off
4	+ Output
5	Trim
6	- Output

## Options

N	Negative logic remote on/off
P	Positive logic remote on/off
S	Surface mount termination
T	Trim - remote adjust
Preferred	Example PXA15-24WS3P3/NT

## Other Industrial Products

CC-E	1.5 - 30W, 5, 12, 24 & 48V DC-DC
PX	10 - 60W, 12, 24 & 48V DC-DC

## Single & Dual Output 15W DC-DC Converters

### Features

- ◆ Industry Standard 1" x 1" Footprint
- ◆ Through Hole
- ◆ Agency Approved
- ◆ Wide range input (PXB15-xxW)
- ◆ Six sided shielding



### Key Market Segments & Applications



Specifications		PXB15-xxS	PXB15-xxWS	PXB15-xxD	PXB15-xxWD
Max Output Power	W	15W			
Voltage Accuracy	%	±1%			
Voltage Adjustment (T Suffix)	%	±10%		n/a	
Minimum Load	-	None		25% each output	
Line Regulation	%	±0.2%		±0.5%	
Load Regulation (0% to 100%)	%	±0.2%		±1.0%	
Start up time	ms	30ms			
Remote on/off	-	Negative Logic /N (standard): ON: Short or <1.2V, OFF: Open or 3-15V Positive Logic /P (optional): ON: Open or 3-15V, OFF Short or <1.2V			
Temperature Coefficient	°C	<±0.02%/°C			
Operating Temperature	°C	-40 to +85°C (See derating curves)			
Maximum Case Temperature	°C	105°C			
Storage Temperature	°C	-55 to 125°C			
Thermal Shock	-	MIL-STD-810F			
Relative Humidity (non condensing)	%	5 to 95%			
Transient Response (25% step load change)	µs	250µs recovery			
Overvoltage Protection (Zener clamp)	VDC	3.3V (3.7-5.4); 5V (5.6-7.0); 12V (13.5-19.6); 15V (16.8-20.5)			
Overcurrent and Short Circuit Protection	-	Typically at 150%, hiccup with self recovery			
Input Surge Voltage (Maximum for 100ms)	VDC	12V input: 36V, 24V input: 50V, 48V input: 100V			
Reflected input ripple (peak to peak)	mA	30mA			
Isolation Voltage (Input to Output)	VDC	1600VDC minimum			
Isolation Voltage I/P to Case , O/P to Case	VDC	1000VDC minimum			
Isolation Resistance	Ω	109 Ohms minimum			
Isolation Capacitance (max)	pF	1000pF			
Typical Switching Frequency (Fixed)	Hz	400kHz			
MTBF (BELLCORE TR-NWT-000332)	Hours	1,330,000			
Vibration	-	MIL-STD-810F			
Conducted and Radiated Emissions	-	EN55022 Level A			
Immunity	-	EN61000-4-2,-3,-4,-5,-6			
Safety Agency Approval	-	IEC60950-1, UL60950-1, EN60950-1, CE Mark			
Size (L x W x H)	in	1 x 1 x 0.39"			
Mounting	-	Through Hole			
Weight	g	15			
Warranty	yrs	Two Years			

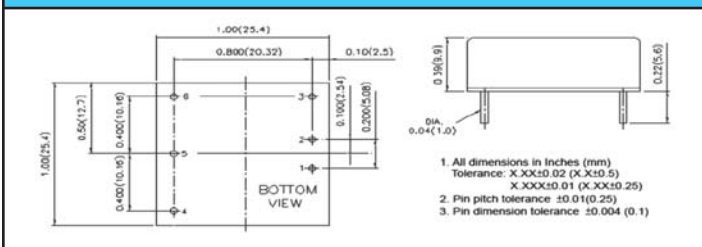
Notes:  
See installation manual



## Model Selector

Output Voltage (VDC)	Output Current (A)	Output Power (W)	Input Voltage (VDC)	Model	Ripple & Noise (Pk-Pk mV)	Nominal Input Current (mA)	Efficiency (%)	Maximum Load Capacitance (uF)
3.3	4	13.2	9 - 18	PXB15-12S3P3/NT	75	1375	84	1000
3.3	4	13.2	9 - 36	PXB15-24WS3P3/NT	75	688	86	1000
3.3	4	13.2	18 - 36	PXB15-24S3P3/NT	75	671	86	1000
3.3	4	13.2	18 - 75	PXB15-48WS3P3/NT	75	336	86	1000
3.3	4	13.2	36 - 75	PXB15-48S3P3/NT	75	336	86	1000
5	3	15	9 - 18	PXB15-12S05/NT	75	1524	86	1000
5	3	15	9 - 36	PXB15-24WS05/NT	75	762	86	1000
5	3	15	18 - 36	PXB15-24S05/NT	75	763	86	1000
5	3	15	18 - 75	PXB15-48WS05/NT	75	382	86	1000
5	3	15	36 - 75	PXB15-48S05/NT	75	372	88	1000
12	1.3	15.6	9 - 18	PXB15-12S12/NT	100	1605	85	330
12	1.3	15.6	9 - 36	PXB15-24WS12/NT	100	783	87	330
12	1.3	15.6	18 - 36	PXB15-24S12/NT	100	783	87	330
12	1.3	15.6	18 - 75	PXB15-48WS12/NT	100	392	87	330
12	1.3	15.6	36 - 75	PXB15-48S12/NT	100	387	88	330
15	1	15	9 - 18	PXB15-12S15/NT	100	1506	87	220
15	1	15	9 - 36	PXB15-24WS15/NT	100	753	87	220
15	1	15	18 - 36	PXB15-24S15/NT	100	744	88	220
15	1	15	18 - 75	PXB15-48WS15/NT	100	377	87	220
15	1	15	36 - 75	PXB15-48S15/NT	100	372	88	220
<b>Dual Outputs</b>								
±5	±1.5	15	9-18	PXB15-12D05/N	100	1543	85	±500
±5	±1.5	15	9-36	PXB15-24WD05/N	100	772	85	±500
±5	±1.5	15	18-36	PXB15-24D05/N	100	772	85	±500
±5	±1.5	15	18-75	PXB15-48WD05/N	100	386	85	±500
±5	±1.5	15	36-75	PXB15-48D05/N	100	386	85	±500
±12	±0.625	15	9-18	PXB15-12D12/N	100	1506	87	±150
±12	±0.625	15	9-36	PXB15-24WD12/N	100	753	87	±150
±12	±0.625	15	18-36	PXB15-24D12/N	100	744	88	±150
±12	±0.625	15	18-75	PXB15-48WD12/N	100	382	86	±150
±12	±0.625	15	36-75	PXB15-48D12/N	100	368	89	±150
±15	±0.500	15	9-18	PXB15-12D15/N	100	1488	88	±100
±15	±0.500	15	9-36	PXB15-24WD15/N	100	744	88	±100
±15	±0.500	15	18-36	PXB15-24D15/N	100	744	88	±100
±15	±0.500	15	18-75	PXB15-48WD15/N	100	377	87	±100
±15	±0.500	15	36-75	PXB15-48D15/N	100	372	88	±100

## Outline Drawing



## Heat Sink (0.22" high)

HAPXB	(includes thermal adhesive pad)
HAPXBDCLIP	(two clips required when used)

## Pinout

Pin #	Single Output	Dual Output
1	+ Input	+ Input
2	- Input	- Input
3	Remote On/Off	Remote On/Off
4	+ Output	+ Output
5	Trim	Common
6	- Output	- Output

## Options

N	Negative logic remote on/off
P	Positive logic remote on/off
T	Trim - remote adjust (single output models only)
Preferred	Example PXB15-24WS3P3/NT

## Other Industrial Products

CC-E	1.5 - 30W, 5, 12, 24 & 48V DC-DC
PX	10 - 60W, 12, 24 & 48V DC-DC

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/px-series.htm](http://us.tdk-lambda.com/lp/products/px-series.htm)



## Single and Dual Output 10 to 20W DC-DC Converters

### Features

- ◆ Industry Standard 2" x 1" Footprint
- ◆ Six Sided Shielding
- ◆ Agency Approved
- ◆ 12V, 24V and 48V Inputs
- ◆ UL, CSA, EN, CE approvals
- ◆ Wide range input



### Key Market Segments & Applications



Specifications			
Model	PXD10	PXD15	PXD20
Max Output Power	10W	15W	20W
Voltage Accuracy	±2%	±1%	±1%
Voltage Adjustment (Single Output Only)	None	None	±10%
Minimum Load, each output (1)	10%	10%	Single 0%; Dual 10%
Line Regulation	±1%	±1%	±0.2%
Load Regulation (10% to 100%)	Single Output: ±1% Dual Output: ±2%	Single Output: ±1% Dual Output: ±2%	±0.5%
Cross Regulation (25% to 100%)	±5%		
Ripple and Noise	Single 50mV, Dual 75mV		Single 75mV, Dual 100mV
Start up time	20ms		10ms
Remote on/off (3)	Positive Logic: ON: Open or 3.5-12V, OFF Short or <1.2V Negative Logic: ON: Short or <1.2V, OFF: Open or 3.5-12V		
Temperature Coefficient	<±0.02%/°C		
Operating Temperature	See derating curves		
Maximum Case Temperature	100°C		
Storage Temperature	-55 to 105°C		
Thermal Shock	MIL-STD-810D		
Relative Humidity	5 to 95% (non condensing)		
Transient Response (25% step load chg.)	500us recovery	500us recovery	300us recovery
Overvoltage Protection (Zener clamp)	1.5-3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V		
Overcurrent & Short Circuit Protection	Typically at 150%, hiccup with self recovery		
Input Surge Voltage (Max. for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V		
Reflected input ripple (peak to peak) (2)	30mA	20mA	20mA
Isolation Voltage	1600VDC minimum		
Isolation Resistance	10 <sup>9</sup> Ohms minimum		
Isolation Capacitance (max)	300pF		1000pF
Typical Switching Frequency (Fixed)	300kHz	Single: 500kHz Dual: 300kHz	500kHz
MTBF (BELLCORE TR-NWT-000332)	1,976,000 hours	2,041,000 hours	1,791,000 hours
Vibration	10 - 55Hz, 2G, 30 minutes each X, Y, Z axis		
Conducted and Radiated Emissions	EN55022 Level A		
Immunity	EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2		
Safety Agency Approval	IEC60950-1, UL60950-1, EN60950-1, CE Mark (48V input only)		
Size (L x W x H)	2x1x0.4"		
Weight	0.95 oz (27g)		
Warranty	Two Year		

#### Notes:

- (1) To meet regulation & noise specifications. Operation at zero load will not damage the device \* See website for detailed specifications  
 (2) 12uH source impedance in series with + input  
 (3) Positive logic standard on 20W (see options table). Input current 2.5mA

## Model Selector

Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (V)	Model	Eff.(%)
3.3	2.0	6.6	9 - 18VDC	PXD10-12S3P3	80
3.3	2.0	6.6	18 - 36VDC	PXD10-24S3P3	80
3.3	2.0	6.6	36 - 75VDC	PXD10-48S3P3	79
3.3	5.0	16.5	9 - 18VDC	PXD20-12S3P3	84
3.3	5.0	16.5	18 - 36VDC	PXD20-24S3P3	86
3.3	5.0	16.5	36 - 75VDC	PXD20-48S3P3	87
5	2.0	10	9 - 36VDC	PXD10-24WS05	80
5	2.0	10	18 - 75VDC	PXD10-48WS05	80
5	4.0	20	9 - 18VDC	PXD20-12S05	87
5	4.0	20	18 - 36VDC	PXD20-24S05	89
5	4.0	20	36 - 75VDC	PXD20-48S05	89
12	0.83	10	9 - 36VDC	PXD10-24WS12	82
12	0.83	10	18 - 75VDC	PXD10-48WS12	84
12	1.67	20	9 - 18VDC	PXD20-12S12	85
12	1.67	20	18 - 36VDC	PXD20-24S12	87
12	1.67	20	36 - 75VDC	PXD20-48S12	88
15	0.67	10	9 - 36VDC	PXD10-24WS15	80
15	0.67	10	18 - 75VDC	PXD10-48WS15	84
15	1.33	20	9 - 18VDC	PXD20-12S15	85
15	1.33	20	18 - 36VDC	PXD20-24S15	87
15	1.33	20	36 - 75VDC	PXD20-48S15	87
<b>Dual Outputs</b>					
±5	±1.5	15	9 - 18VDC	PXD15-12D05	83
±5	±1.5	15	18 - 36VDC	PXD15-24D05	84
±5	±1.5	15	36 - 75VDC	PXD15-48D05	85
±12	±0.416	10	9 - 36VDC	PXD10-24WD12	80
±12	±0.416	10	18 - 75VDC	PXD10-48WD12	78
±12	±0.833	20	9 - 18VDC	PXD20-12D12	86
±12	±0.833	20	18 - 36VDC	PXD20-24D12	87
±12	±0.833	20	36 - 75VDC	PXD20-48D12	88
±15	±0.333	10	9 - 36VDC	PXD10-24WD15	80
±15	±0.333	10	18 - 75VDC	PXD10-48WD15	81
±15	±0.667	20	9 - 18VDC	PXD20-12D15	86
±15	±0.667	20	18 - 36VDC	PXD20-24D15	87
±15	±0.667	20	36 - 75VDC	PXD20-48D15	87

## Pinout

PIN#	PXD10/PXD15		PXD20	
	Single	Dual	Single	Dual
1			+Vin	
2			-Vin	
3			+Vout	
4	No Pin	Com	Trim	Com
5			-Vout	
6	Remote On/Off*		Remote On/Off	

\* optional, see table below. If not requested, Pin is not fitted.

## Remote On/Off Option

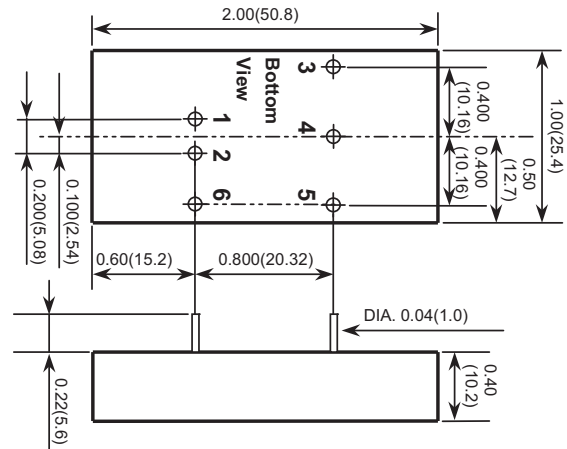
Suffix	Function
-P*	Positive Logic (* Included in PXD20 models)
-N	Negative Logic

Example: PXD1548S12-N

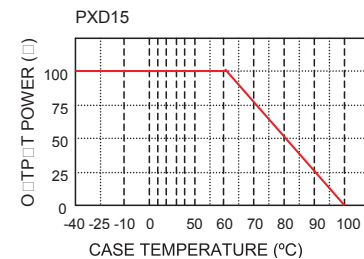
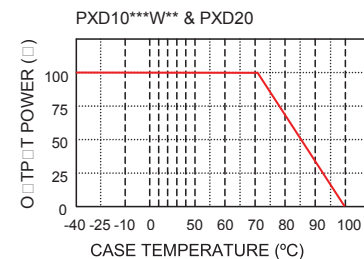
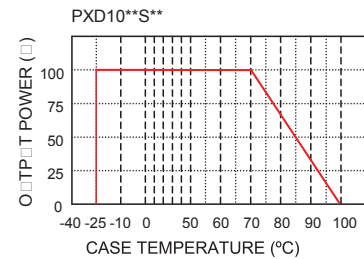
## Heat Sink (0.22" high)

HAPXD	(includes thermal adhesive pad)
HAPXBDCLIP	(two clips required when used)

## Outline Drawing



## Derating Curves



## Other Industrial Products

CC-E	1.5-30W, 5 to 48VDC input
PAQ,PAH,PAF	50-700W quarter, half & full bricks

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/px-series.htm](http://us.tdk-lambda.com/lp/products/px-series.htm)



## Single and Dual Output 30W DC-DC Converters

### Features

- ◆ Industry Standard 2" x 1" Footprint
- ◆ Six Sided Shielding
- ◆ Safety Agency Certifications
- ◆ 9-36V or 18-75VDC Input
- ◆ Wide range input



### Key Market Segments & Applications



Specifications		
Model	Single Output	Dual Output
Max Output Power		30W
Voltage Accuracy		±1%
Voltage Adjustment	±10%	None
Minimum Load		None
Line Regulation		±0.2%
Load Regulation	±0.5%	±1%
Cross Regulation (25% to 100%)	-	±5%
Ripple and Noise (peak to peak)	<5.1V output: 100mV, 12-15V output: 150mV	
Start up time	30ms	
Remote on/off	Positive Logic: ON: Open or 3-12V, OFF Short or <1.2V Negative Logic: ON: Short or <1.2V, OFF: Open or 3-12V	
Temperature Coefficient	<±0.02%/°C	
Operating Temperature	-40 to +85°C, derating necessary above 50°C	
Maximum Case Temperature	105°C (Overtemperature Protection 115°C)	
Storage Temperature	-55 to 125°C	
Thermal Shock	MIL-STD-810F	
Relative Humidity (non condensing)	5 to 95%	
Transient Response (25% step load change)	250us recovery	
Overvoltage Protection (Zener clamp)	3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V	
Overcurrent and Short Circuit Protection	Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)	24V input: 50V, 48V input: 100V	
Reflected input ripple (peak to peak)	20mA	
Isolation Voltage	1600VDC minimum	
Isolation Resistance	109 Ohms minimum	
Isolation Capacitance (max)	1500pF	
Typical Switching Frequency (Fixed)	430kHz	
MTBF (BELLCORE TR-NWT-000332)	3,163,000 hours	
Vibration	MIL-STD-810F	
Conducted and Radiated Emissions (1)	EN55022 Level A	
Immunity (2)	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A	
Safety Agency Certifications	IEC60950-1, UL60950-1, EN60950-1, CE Mark	
Size (L x W x H)	2x1x0.4"	
Weight	1.07 oz (30.5g)	
Warranty	Two Year	

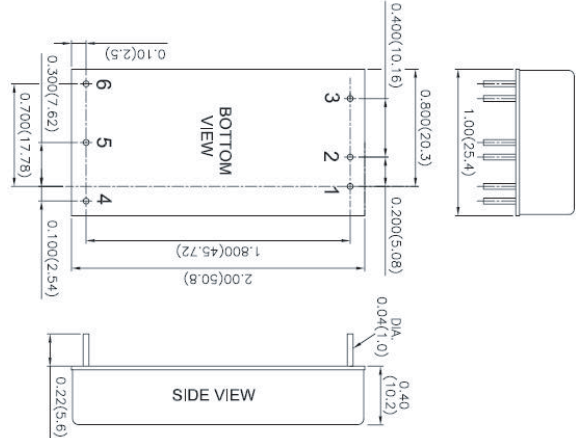
#### Notes:

- (1) With external ceramic capacitor (24V: 4.7uF, 48V: 2.2uF) connected across input pins
- (2) For EN61000-4-4 & -5 compliance fit external electrolytic capacitor (24V: 330uF, 48V: 220uF) connected across input pins

## Model Selector

Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (V)	Model	Eff.(%)
<b>Single Outputs</b>					
3.3V	7.5A	24.75W	9 - 36VDC	PXD30-24WS3P3	86%
3.3V	7.5A	24.75W	18 - 75VDC	PXD30-48WS3P3	86%
5V	6.0A	30W	9 - 36VDC	PXD30-24WS05	88%
5V	6.0A	30W	18 - 75VDC	PXD30-48WS05	88%
12V	2.5A	30W	9 - 36VDC	PXD30-24WS12	89%
12V	2.5A	30W	18 - 75VDC	PXD30-48WS12	90%
15V	2.0A	30W	9 - 36VDC	PXD30-24WS15	89%
15V	2.0A	30W	18 - 75VDC	PXD30-48WS15	91%
<b>Dual Outputs</b>					
±5V	±3.0A	30W	9 - 36VDC	PXD30-24WD05	88%
±5V	±3.0A	30W	18 - 75VDC	PXD30-48WD05	88%
±12V	±1.25A	30W	9 - 36VDC	PXD30-24WD12	87%
±12V	±1.25A	30W	18 - 75VDC	PXD30-48WD12	88%
±15V	±1.0A	30W	9 - 36VDC	PXD30-24WD15	87%
±15V	±1.0A	30W	18 - 75VDC	PXD30-48WD15	88%

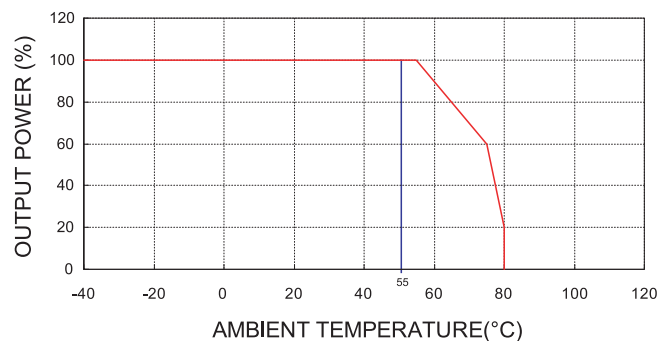
## Outline Drawing



## Pinout

Pin #	Function	
	Single Output	Dual Output
1	+ Input	+ Input
2	- Input	- Input
3	Remote On/Off	Remote On/Off
4	+ Output	+ Output
5	- Output	Common
6	Trim	- Output

## Derating Curves



## Remote On/Off Option

Suffix	Function
No Suffix	Positive Logic
-N	Negative Logic

## Heat Sink (0.22" high)

HAPXD	(includes thermal adhesive pad)
HAPXBDCLIP	(two clips required when used)

## Other Industrial Products

PXD10, 20	10-20W, 12V, 24V, 48V input 2x1" DC-DC
PXE20, 30	20-30W, 12V, 24V, 48V input 2x1.6" DC-DC
PXF30-40	30-40W, 12V, 24V, 48V input 2x2" DC-DC
CC-E	1.5 - 25W, 5V, 12V, 24V & 48V input DC-DC
<b>Non Wide Range Input Modes (W)</b>	
PXD30-12Sxx	30W, 9-18VDC 2x1" DC-DC
PXD30-12Dxx	30W, 9-18VDC 2x1" DC-DC
PXD30-24Sxx	30W, 18-36VDC 2x1" DC-DC
PXD30-24Dxx	30W, 18-36VDC 2x1" DC-DC
PXD30-48Sxx	30W, 36-75VDC 2x1" DC-DC
PXD30-48Dxx	30W, 36-75VDC 2x1" DC-DC

For Additional Information, please visit [us.tdk-lambda.com/lp/products/px-series.htm](http://us.tdk-lambda.com/lp/products/px-series.htm)



## Single and Dual Output 20W to 30W DC-DC Converters

### Features

- ◆ Industry Standard 2" x 1.6" Footprint
- ◆ Six Sided Shielding
- ◆ Agency Approved
- ◆ 12V, 24V and 48V Inputs
- ◆ UL, CSA, EN, CE approvals
- ◆ Wide range input



### Key Market Segments & Applications



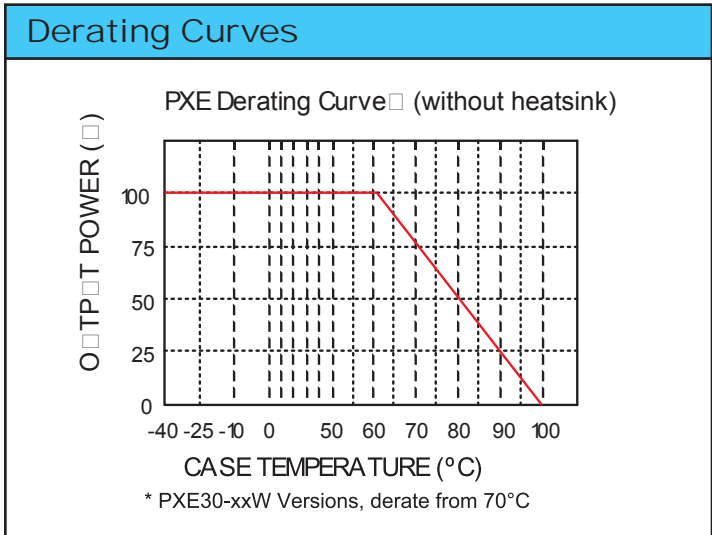
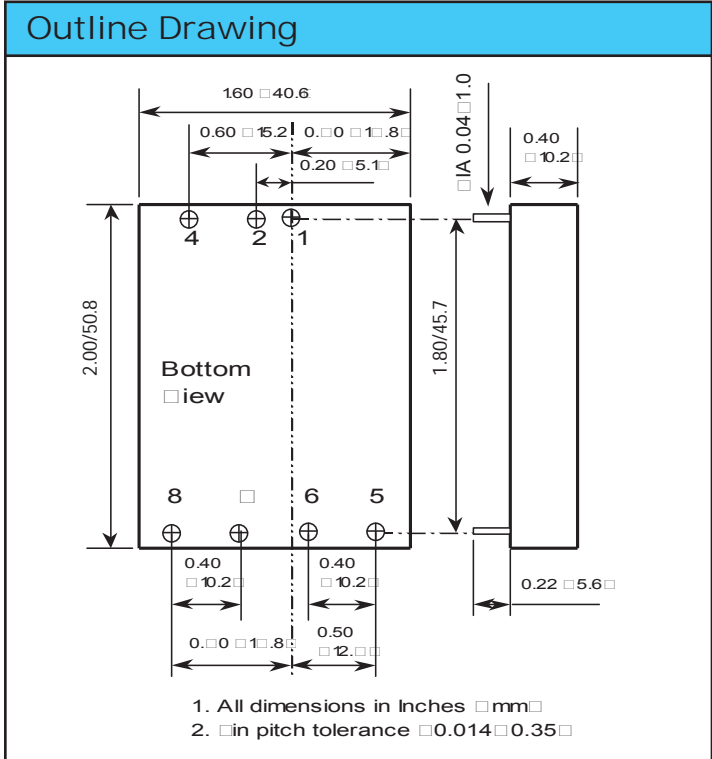
Specifications		
Model	PXE20	PXE30
Max Output Power	20W	30W
Voltage Accuracy	±2%	±1%
Voltage Adjustment	±10%	
Minimum Load, each output (1)	10%	10%
Line Regulation	±0.2% for single, ±0.5% for dual	
Load Regulation (25% to 100%)	Single ±0.5%, Dual ±3%	Single ±0.5%, Dual ±1%
Cross Regulation (25% to 100%)	Dual ±5%	
Ripple and Noise (P-P)	Single: 75mV; Dual: 100mV	
Start up time	20ms - 1100ms typ.	10 - 25ms typ.
Remote on/off (3)	Positive Logic: ON: Open or 3.5-12V, OFF Short or <1.2V	
Temperature Coefficient	<±0.02%/°C	
Operating Temperature	-40 to +100°C, see derating curve	
Maximum Case Temperature	100°C (Over temperature protection at 115°C - PXE30 model)	
Storage Temperature	-55 to 105°C	
Thermal Shock	MIL-STD-810D	
Relative Humidity (non condensing)	5 to 95%	
Transient Response (25% step load change)	500us recovery	300us recovery
Oversvoltage Protection (Zener clamp)	3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V	
Overcurrent and Short Circuit Protection	Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V	
Reflected input ripple (peak to peak) (2)	25mA	30mA
Isolation Voltage	1600VDC minimum (Input-Output, Input-Case)	
Isolation Resistance	10 <sup>9</sup> Ohms minimum	
Isolation Capacitance (max)	300pF	1000pF
Typical Switching Frequency (Fixed)	300kHz	
MTBF (BELLCORE TR-NWT-000332)	1,976,000 hours	1,535,000 hours
Vibration	10 - 55Hz, 2G, 30 minutes each X, Y, Z axis	
Conducted and Radiated Emissions	EN55022 Level A	
Immunity	EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2	
Safety Agency Approval	IEC60950-1, UL60950-1, EN60950-1, CE Mark (48V input only)	
Size (L x W x H)	2 x 1.6 x 0.4"	
Weight	1.69 oz (48g)	
Warranty	Two Year	

#### Notes:

- (1) To meet regulation & noise specifications. Operation at zero load will not damage the device
- (2) 12uH source impedance in series with + input
- (3) Max sink current 20mA (PXE20), 2.5mA (PXE30); The on/off pin is referenced to the negative input

Model Selector					
Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (VDC)	Model	Eff.(%)
<b>Single Outputs</b>					
3.3	6.0	18	9 - 18	PXE30-12S3P3	85
3.3	6.0	20	10 - 40	PXE30-24WS3P3	87
3.3	6.0	18	18 - 36	PXE30-24S3P3	86
3.3	6.0	20	18 - 75	PXE30-48WS3P3	87
3.3	6.0	18	36 - 75	PXE30-48S3P3	87
5	4.0	20	9 - 36	PXE20-24WS05	79
5	4.0	20	18 - 75	PXE20-48WS05	80
5	6.0	30	9 - 18	PXE30-12S05	87
5	6.0	30	10 - 40	PXE30-24WS05	87
5	6.0	30	18 - 36	PXE30-24S05	88
5	6.0	30	18 - 75	PXE30-48WS05	88
5	6.0	30	36 - 75	PXE30-48S05	89
12	1.67	20	9 - 36	PXE20-24WS12	81
12	1.67	20	18 - 75	PXE20-48WS12	81
12	2.5	30	9 - 18	PXE30-12S12	88
12	2.5	30	10 - 40	PXE30-24WS12	87
12	2.5	30	18 - 36	PXE30-24S12	89
12	2.5	30	18 - 75	PXE30-48WS12	87
12	2.5	30	36 - 75	PXE30-48S12	90
15	1.33	20	9 - 36	PXE20-24WS15	81
15	1.33	20	18 - 75	PXE20-48WS15	81
15	2.0	30	9 - 18	PXE30-12S15	88
15	2.0	30	10 - 40	PXE30-24WS15	88
15	2.0	30	18 - 36	PXE30-24S15	89
15	2.0	30	18 - 75	PXE30-48WS15	88
15	2.0	30	36 - 75	PXE30-48S15	90
<b>Dual Outputs</b>					
±5	±2.0	20	9 - 36	PXE20-24WD05	79
±5	±2.0	20	18 - 75	PXE20-48WD05	79
±12	±0.833	20	9 - 36	PXE20-24WD12	81
±12	±0.833	20	18 - 75	PXE20-48WD12	83
±12	±1.25	30	9 - 18	PXE30-12D12	87
±12	±1.25	30	18 - 36	PXE30-24D12	88
±12	±1.25	30	36 - 75	PXE30-48D12	88
±15	±0.666	20	9 - 36	PXE20-24WD15	82
±15	±0.666	20	18 - 75	PXE20-48WD15	84
±15	±1.0	30	9 - 18	PXE30-12D15	87
±15	±1.0	30	18 - 36	PXE30-24D15	88
±15	±1.0	30	36 - 75	PXE30-48D15	88

Pinout		
PIN #	Single Output	Dual Output
1	+ Input	+ Input
2	- Input	- Input
4	Remote on/off	Remote on/off
5	No Pin	+ Output
6	+ Output	Common
7	- Output	- Output
8	Trim	Trim



### Heat Sink (0.22" high)

HAPXE (includes thermal adhesive pad)  
HAPXECLIP (two clips required when used)

### Other Industrial Products

CC-E 1.5-25W, 5 to 48VDC input  
PAQ }  
PAH } 50 - 700W quarter, half & full bricks  
PAF }

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/px-series.htm](http://us.tdk-lambda.com/lp/products/px-series.htm)



## Single, Dual, Triple Output 40W & 60W DC-DC Converters

### Features

- ◆ Industry Standard 2" x 2" Footprint
- ◆ Six Sided Shielding
- ◆ Agency Approved
- ◆ 12, 24V, and 48V Inputs (including 4:1 ranges)
- ◆ UL, CSA, EN, CE approvals
- ◆ Wide range input



### Key Market Segments & Applications



Specifications	
Model	
Maximum Output Power	40W or 60W
Voltage Accuracy (Full Load, Nom. Vin)	Single, Dual and Triple Main $\pm 1\%$ , Triple Auxiliaries $\pm 5\%$
Voltage Adjustment (1)	$\pm 10\%$ (Single and Dual Output Only)
Minimum Load, each output (2)	Single Output = 0%, Dual and Triple = 10% of full load rating
Line Regulation	Single / Dual $\pm 0.5\%$ , Triple (main) $\pm 1\%$ , Triple (auxiliary) $\pm 5\%$
Load Regulation (10% to 100%) (3)	Single $\pm 0.5\%$ , Dual $\pm 1\%$ , Triple (main) $\pm 2\%$ , Triple (auxiliary) $\pm 5\%$
Cross Regulation (25% to 100%) (4)	Triple (main) $\pm 1\%$ , Dual/Triple (auxiliary) $\pm 5\%$
Start up time	PXF40: 25ms typ., PXF40xxW, PXF60: 20ms max.
Remote on/off (referenced to negative input)	Positive Logic: ON: Open or 3.0-12V, OFF Short or $< 1.2V$
Temperature Coefficient	$< \pm 0.02\%/^{\circ}C$
Operating Temperature	See derating curves
Maximum Case Temperature	PXF40: 100°C, PXF40-xxW 105°C, PXF60 110°C
Storage Temperature	PXF40: -55 to 105°C, PXF40xxW, PXF60 125°C
Thermal Shock	MIL-STD-810F
Relative Humidity (non condensing)	5 to 95%
Transient Response (25% step load change)	250us recovery
Overvoltage Protection (Zener clamp)	Typical 3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V
Overcurrent and Short Circuit Protection	Typically at 150%, hiccup with self recovery
Input Surge Voltage (Maximum for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V
Reflected input ripple (peak to peak) (6)	PXF40: 40mA, PXF40xxW, PXF60: 20mA
Isolation Voltage	Input - Output, Input to Case: 1600VDC minimum
Isolation Resistance	$10^9$ Ohms minimum
Isolation Capacitance (max)	PXF40, PXF60: 1000pF, PXF40xxW: 2500pF
Switching Frequency (Fixed)	300kHz (typ.)
MTBF (BELLCORE TR-NWT-000332)	PXF40: 1,398,000; PXF40xxW: 1,105,000, PXF60: 1.093,000 hours
Vibration	10 - 55Hz, 10G, 30 minutes each X, Y, Z axis
Conducted and Radiated Emissions	EN55022 Level A, see installation manual
Immunity	EN61000-4-2, -3, -4, -5, -6
Safety Agency Approval	IEC60950-1, UL60950-1, EN60950-1, CE Mark (48V input only)
Size (L x W x H)	2 x 2 x 0.4"
Weight	2.11 oz (60g)
Warranty	Two Year

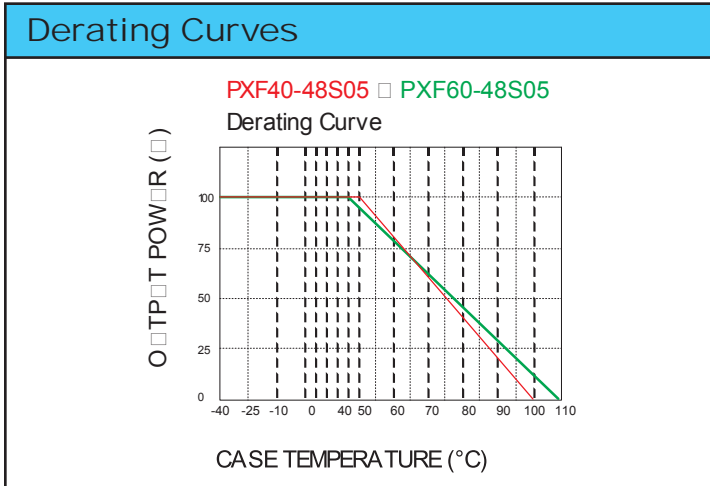
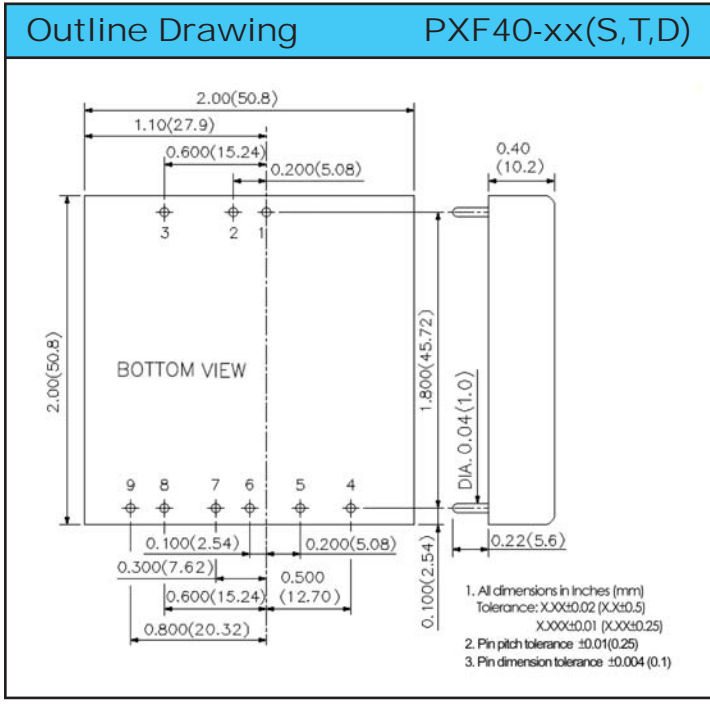
- (1) Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +Sense and - Sense should be connected to their corresponding outputs; + output, -output.
- (2) Dual and Triple output models require a minimum load of 10% on the output to maintain specified regulation. No load operation will not damage the device.
- (3) Load regulation for triple output: Main output: 10-100%, with 10-100% balanced load on auxiliaries. Auxiliary outputs: 10% to 100% balanced on all outputs.
- (4) Cross regulation for dual output: asymmetrical load 25% / 100% full load. Cross regulation for triple output: Main output 100% load, auxiliary 100%, other auxiliary 25% to 100%. Auxiliary outputs: main output 100% load, auxiliary 100%, other auxiliary 25% to 100% or main output 25%, auxiliary 25%, other auxiliary 25% to 100%.
- (5) An external filter capacitor is required for normal operation. The capacitor should be capable of handling a 1A ripple current for 48V and 24V models.
- (6) Simulated Source impedance of 12uH placed in series with + input.



Model Selector						
Output Volt(V)	Output Curr(A)	Input Volt(VDC)	Model	Ripple/Noise (mV)	Eff.(%)	Max Load Cap(µF)
<b>Single Outputs</b>						
3.3	8	9 - 18	PXF40-12S3P3	50	84	21000
3.3	10	9 - 36	PXF40-24WS3P3	50	86	25750
3.3	8	18 - 36	PXF40-24S3P3	50	87	21000
3.3	10	18 - 75	PXF40-48WS3P3	50	86	25750
3.3	14	18 - 36	PXF60-24S3P3	75	89	36000
3.3	8	36 - 75	PXF40-48S3P3	50	88	21000
3.3	14	36 - 75	PXF60-48S3P3	75	89	36000
5	8	9 - 18	PXF40-12S05	50	86	13600
5	8	9 - 36	PXF40-24WS05	50	87	13600
5	8	18 - 36	PXF40-24S05	50	89	13600
5	8	18 - 75	PXF40-48WS05	50	88	13600
5	8	36 - 75	PXF40-48S05	50	90	13600
5	12	18 - 36	PXF60-24S05	75	90	20400
5	12	36 - 75	PXF60-48S05	75	90	20400
12	3.333	9 - 18	PXF40-12S12	75	86	2360
12	3.333	9 - 36	PXF40-24WS12	75	87	2360
12	3.333	18 - 36	PXF40-24S12	75	88	2360
12	3.333	18 - 75	PXF40-48WS12	75	87	2360
12	3.333	36 - 75	PXF40-48S12	75	89	2360
12	5	18 - 36	PXF60-24S12	100	90	3550
12	5	36 - 75	PXF60-48S12	100	90	3550
15	2.666	9 - 18	PXF40-12S15	75	87	1510
15	2.666	9 - 36	PXF40-24WS15	75	87	1510
15	2.666	18 - 36	PXF40-24S15	75	89	1510
15	2.666	18 - 75	PXF40-48WS15	75	87	1510
15	2.666	36 - 75	PXF40-48S15	75	89	1510
15	4	18 - 36	PXF60-24S15	100	90	2300
15	4	36 - 75	PXF60-48S15	100	90	2300
<b>Dual Outputs</b>						
±12	±1.667	9 - 36	PXF40-24WD12	120	86	±1200
±12	±1.8	9 - 18	PXF40-12D12	120	85	±1200
±12	±1.8	18 - 36	PXF40-24D12	120	87	±1200
±12	±1.667	18 - 75	PXF40-48WD12	120	86	±1200
±12	±1.8	36 - 75	PXF40-48D12	120	87	±1200
±15	±1.333	9 - 36	PXF40-24WD15	150	86	±750
±15	±1.4	9 - 18	PXF40-12D15	150	85	±750
±15	±1.4	18 - 36	PXF40-24D15	150	87	±750
±15	±1.333	18 - 75	PXF40-48WD15	150	86	±750
±15	±1.4	36 - 75	PXF40-48D15	150	87	±750
<b>Triple Outputs</b>						
3.3V,±12V6.0,±0.4		9 - 18	PXF40-12T3312	50 / 75	83	13000,±330
3.3V,±12V6.0,±0.4		18 - 36	PXF40-24T3312	50 / 75	85	13000,±330
3.3V,±12V6.0,±0.4		36 - 75	PXF40-48T3312	50 / 75	86	13000,±330
5V,±12V 6.0,±0.4		9 - 18	PXF40-12T0512	50 / 75	85	6800, ±330
5V,±12V 6.0,±0.4		18 - 36	PXF40-24T0512	50 / 75	87	6800, ±330
5V,±12V 6.0,±0.4		36 - 75	PXF40-48T0512	50 / 75	88	6800, ±330
5V, ±15V6.0, ±0.3		9 - 18	PXF40-12T0515	50/75	86	6800, ±110
5V, ±15V6.0, ±0.3		18 - 36	PXF40-24T0515	50/75	87	6800, ±110
5V, ±15V6.0, ±0.3		36 - 75	PXF40-48T0515	50/75	88	6800, ±110

Heat Sink (0.22" high)	
HAPXF	(includes thermal adhesive pad)
HAPXFCLIP	(two clips required when used)

Other Industrial Products	
CC-E	1.5 - 30W, 5 to 48VDC input
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks



Pinout PXF40-xx(S,T,D)			
PIN#	Function	Dual Output	Triple Output
1	+ Input	+ Input	+ Input
2	- Input	- Input	- Input
3	Remote on/off	Remote on/off	Remote on/off
4	No Connection	No Pin	+ Aux
5	- Sense (Note 1)	+ VO	Common
6	+ Sense (Note 1)	Common	-Aux
7	+ Output	Common	+ Output
8	- Output	- VO	- Output (Com)
9	Trim	Trim	N/C

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/px-series.htm](http://us.tdk-lambda.com/lp/products/px-series.htm)





**AC-DC Products**  
**DC-DC Products**



**Filters**

New  Discontinuation  Rail Mount

<input type="checkbox"/> Maximum Input Voltage	<input type="checkbox"/> Output	<input type="checkbox"/> Current A									
		1	6	10	15	30	50	150	300	1000	
250V	Input	RA									
		R									
		R									
500V	Output		RA								
			RA								
		R									

See website

## 0.5A to 6A, 250VAC EMI Filters

### Features

- ◆ High Voltage Pulse Attenuation
- ◆ Lug or Wire Terminations
- ◆ Low Earth Leakage Current Option
- ◆ Conforms to UL, CSA and
- ◆ EN Safety Agency Certifications



### Key Market Segments & Applications



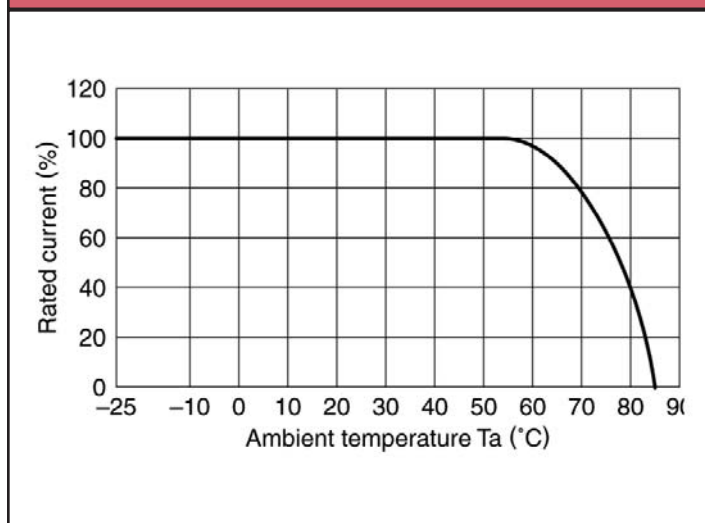
### Specifications

Model	RSAL-20R5W / RSAL-20R5A / RSAL-20R5WL / RSAL-20R5AL RSAL-2001W / RSAL-2001A / RSAL-2001WL / RSAL-2001AL RSAL-2002W / RSAL-2002A / RSAL-2002WL / RSAL-2002AL RSAL-2003W / RSAL-2003A / RSAL-2003WL / RSAL-2003AL RSAL-2006W / RSAL-2006A / RSAL-2006WL / RSAL-2006AL						
	Rated Voltage (AC, DC)	V	250V				
Rated Current	A	0.5A	1A	2A	3A	6A	
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)					
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)					
Leakage Current (max)	A	RSAL-20xxx 1mA; RSAL20xxxL 10uA (250VAC, 60Hz)					
DC Resistance (total)	mΩ	700	600	250	150	80	
Operating Temperature	°C	-25 to +85°C (Derate above 55°C, see derating curve)					
Storage Temperature	°C	-25 to +85°C					
Safety Agency Certifications	-	UL1283, CSA C22.2 No.8, EN60939					
Weight	g	61g Maximum					
Warranty	yr	1 Year					

### Options

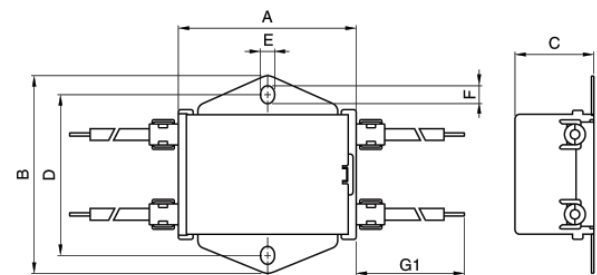
Wire Terminations	RSAL-20xxW
Lug Terminations	RSAL-20xxA
Wire Terminations & Low Leakage Current	RSAL-20xxWL
Lug Terminations & Low Leakage Current	RSAL-20xxAL

### Derating

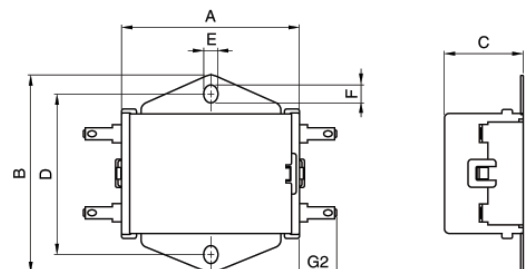


### Outline Drawing

RSAL-20R5/2001/2002/2003/2006W(L)

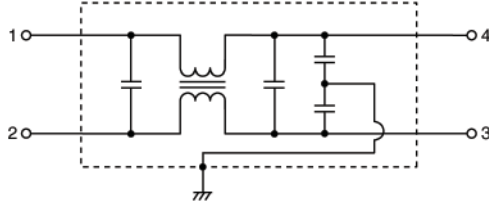


RSAL-20R5/2001/2002/2003/2006A(L)

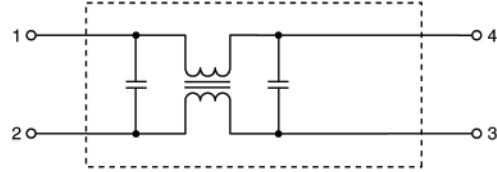


## Circuit

RSAL-2 \*\*\* W  
RSAL-2 \*\*\* A

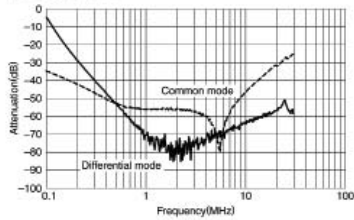


RSAL-2 \*\*\* WL  
RSAL-2 \*\*\* AL

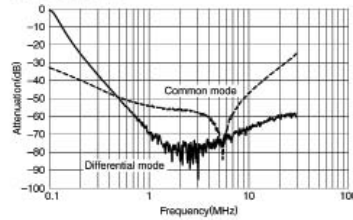


## Attenuation Characteristics

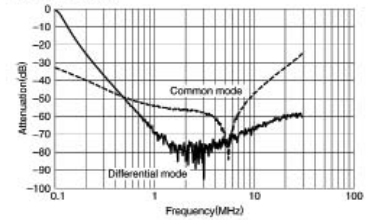
RSAL-20R5W/A



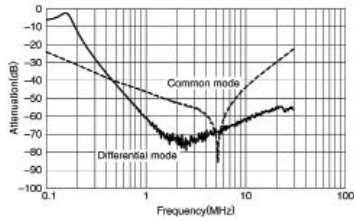
RSAL-2001W/A



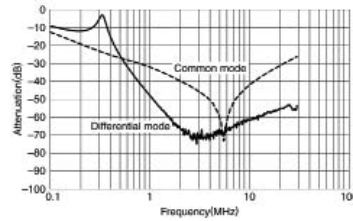
RSAL-2002W/A



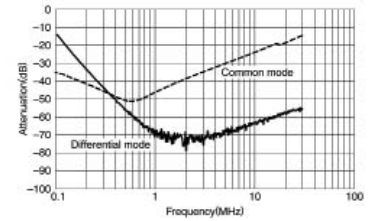
RSAL-2003W/A



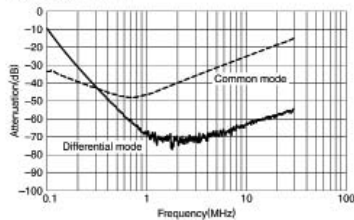
RSAL-2006W/A



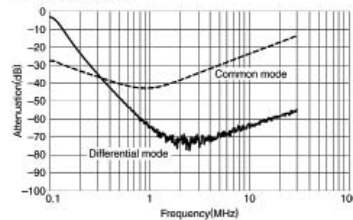
RSAL-20R5WL/AL



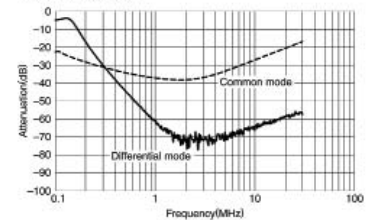
RSAL-2001WL/AL



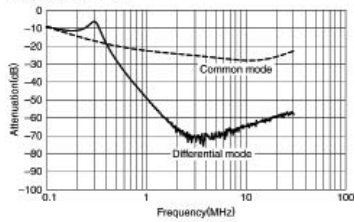
RSAL-2002WL/AL



RSAL-2003WL/AL



RSAL-2006WL/AL



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/r-series.htm](http://us.tdk-lambda.com/lp/products/r-series.htm)



## 3A to 300A, 250VAC EMI Filters

### Features

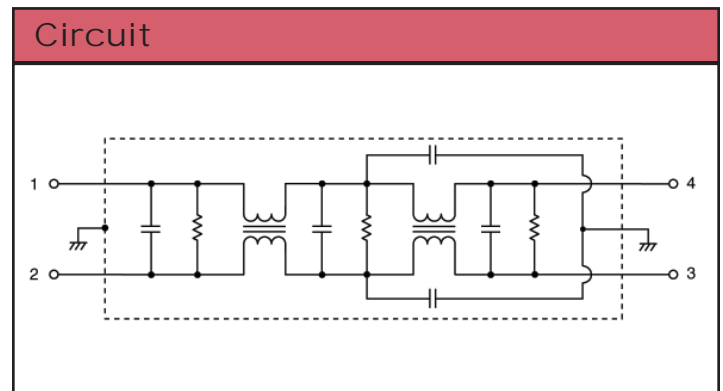
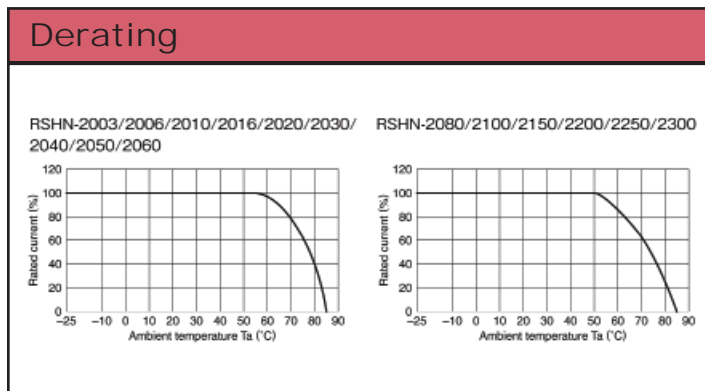
- ◆ Two Stage Filter for Better Performance
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Low Earth Leakage Current Option (Up to 30A)
- ◆ Conforms to UL, CSA and EN Safety Agency Certifications



### Key Market Segments & Applications



Specifications						
Model		RSHN-2003 RSHN-2003D RSHN-2003L	RSHN-2006 RSHN-2006D RSHN-2006L	RSHN-2010 RSHN-2010D RSHN-2010L	RSHN-2016 RSHN-2016D RSHN-2016L	RSHN-2020 RSHN-2020D RSHN-2020L
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	3A	6A	10A	16A	20A
DC Resistance (total)	mΩ	350	140	60	35	22
Model		RSHN-2030 RSHN-2030D RSHN-2030L	RSHN-2040	RSHN-2050	RSHN-2060	RSHN-2080
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	30A	40A	50A	60A	80A
DC Resistance (total)	mΩ	12	10	8	6	7
Model		RSHN-2100	RSHN-2150	RSHN-2200	RSHN-2250	RSHN-2300
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	100A	150A	200A	250A	300A
DC Resistance (total)	mΩ	6	4	3	2	1.5
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	RSHN-20xx 1mA; RSHN20xxL 100uA (250VAC, 60Hz)				
Operating Temperature	°C	-25 to +85°C (Derate above 50 / 55°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	Up to 30A Models - UL1283, CSA C22.2 No.8, EN60939				
Weight	g	190g to 13000g model dependant (See weights chart on website)				
Warranty	yr	1 Year				

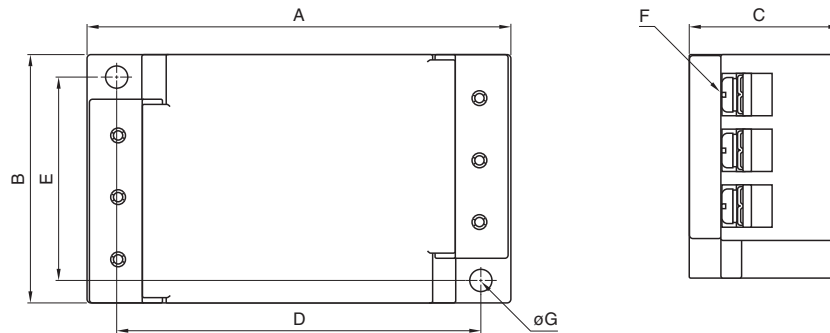


### Options

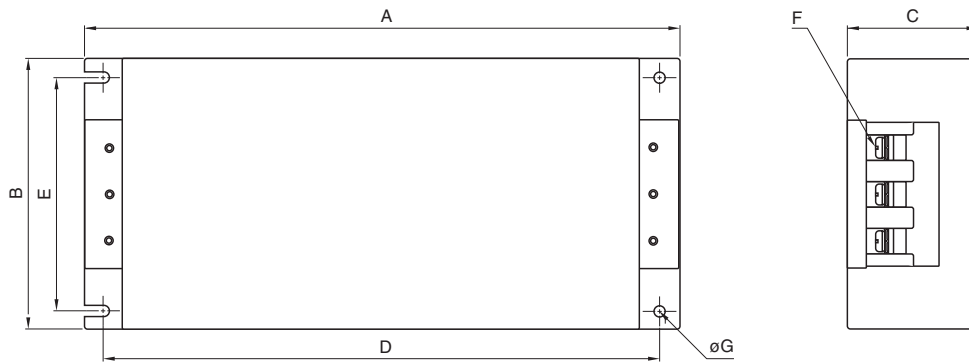
Chassis Mount & Standard Leakage Current	RSHN-20xx
DIN Rail Mount & Standard Leakage Current	RSHN-20xxD
Chassis Mount & Low Leakage Current	RSHN-20xxL

Outline Drawing

RSHN-2003/2006/2010/2016/2020/2030



RSHN-2040/2050/2060/2080/2100/2150/2200/2250/2300



Dimensions in mm

Part No.	A	B	C	D	E	F	G	Recommended clamping torque
RSHN-2003	98	52	35	86	43	M4	4.5	1.27N m
RSHN-2006								
RSHN-2010								
RSHN-2016	127	52	35	115	43	M4	4.5	1.27N m
RSHN-2020								
RSHN-2030								
RSHN-2040	272	100	60	254	82	M5	5.5	2.5N m
RSHN-2050								
RSHN-2060								
RSHN-2080	430	161	85	410	135	M8	6.5	7.64N m
RSHN-2100								
RSHN-2150								
RSHN-2200	593	195	103	573	169	M10	6.5	11.8N m
RSHN-2250								
RSHN-2300								

For Additional Information, please visit [us.tdk-lambda.com/lp/products/r-series.htm](http://us.tdk-lambda.com/lp/products/r-series.htm)



## 6A to 60A, 500VAC EMI Filters

### Features

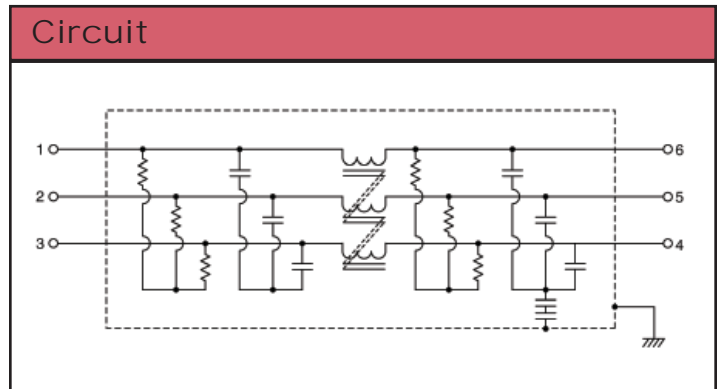
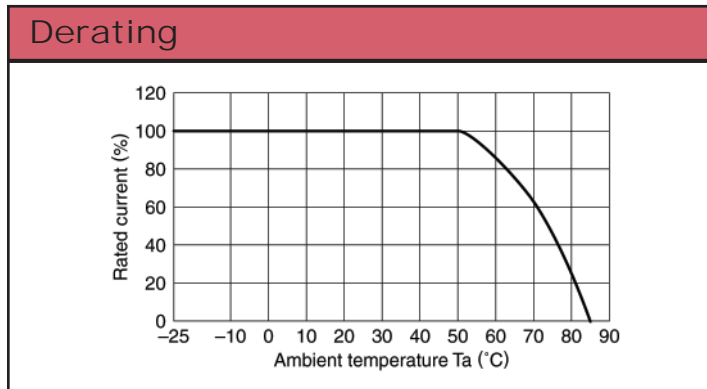
- ◆ High Voltage Pulse Attenuation
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Conforms to UL and EN Safety Agency Certifications



### Key Market Segments & Applications



Specifications		RTAN-5006	RTAN-5010	RTAN-5020	RTAN-5030	RTAN-5040
Model		RTAN-5006D	RTAN-5010D	RTAN-5020D	RTAN-5030D	
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	350	140	60	35	22
Model		RTAN-5050	RTAN-5060			
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	50A	60A			
DC Resistance (total)	mΩ	7	5			
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 & EN60939				
Weight	g	360g to 1120g model dependant (See weights chart on website)				
Warranty	yr	1 Year				



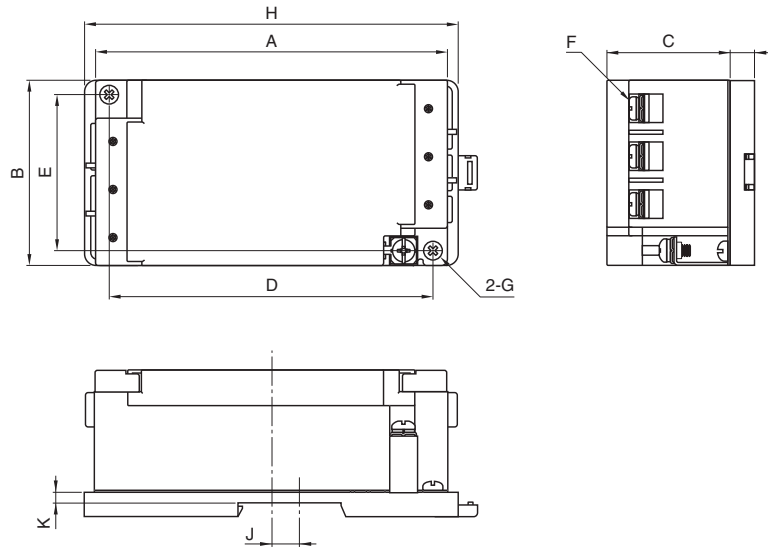
### Options

Chassis Mount	RTAN-50xx
DIN Rail Mount (Models up to 30A)	RTAN-50xxD

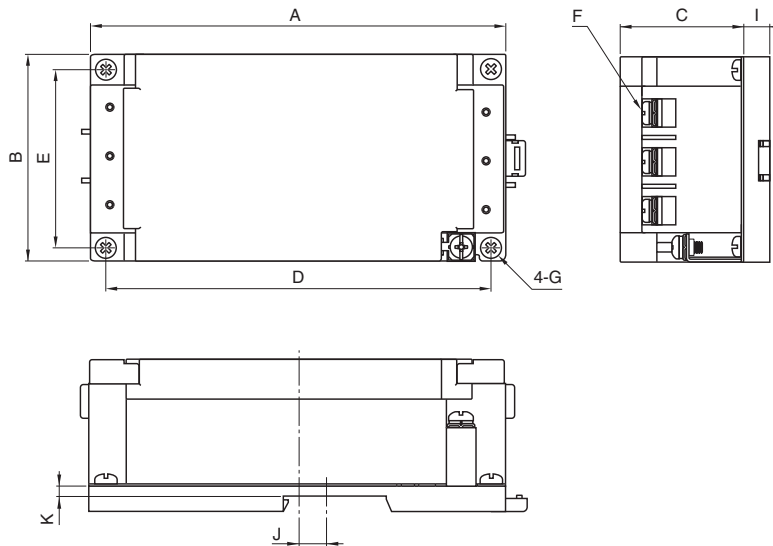


## Outline Drawing

RTAN-5006D/5010D



RTAN-5020D/5030D



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/r-series.htm](http://us.tdk-lambda.com/lp/products/r-series.htm)



## 6A to 300A, 500VAC EMI Filters

### Features

- ◆ Two Stage Filter for Better Performance
- ◆ Low Profile
- ◆ Conforms to UL and EN Safety Agency Certifications



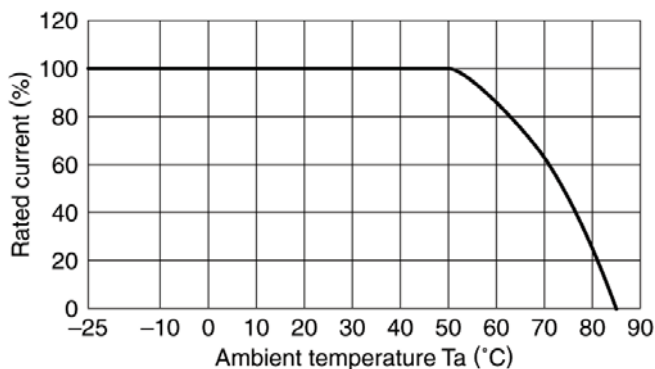
### Key Market Segments & Applications



### Specifications

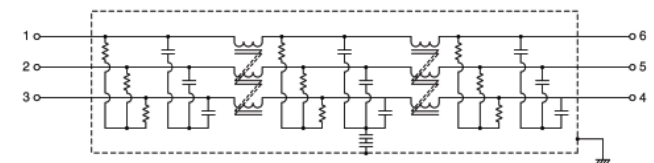
Model		RTHN-5006	RTHN-5010	RTHN-5020	RTHN-5030	RTHN-5040
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	290	120	50	25	20
Model		RTHN-5050	RTHN-5060	RTHN-5080	RTHN-5100	RTHN-5150
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	50A	60A	80A	100A	150A
DC Resistance (total)	mΩ	14	10	10	8	6
Model		RTHN-5200	RTHN-5250	RTHN-5300		
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	200A	250A	300A		
DC Resistance (total)	mΩ	4	3	2		
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	mA	6A to 300A Models: 2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz 400A to 1000A Models: 17.5mA at 250VAC 60Hz, 35mA at 500VAC 60Hz				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 (Up to 150A) & EN60939 (Up to 300A)				
Weight	g	700g to 18000g model dependant (See weights chart on website)				
Warranty	yr	1 Year				

### Derating

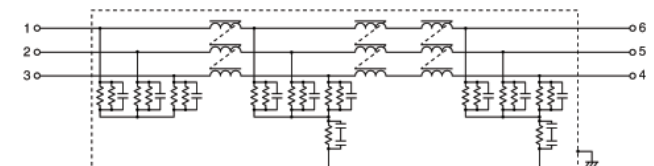


### Circuit

RTHN-5006/5010/5020/5030/5040/5050/5060/5080/5100/5150/5200/5250/5300

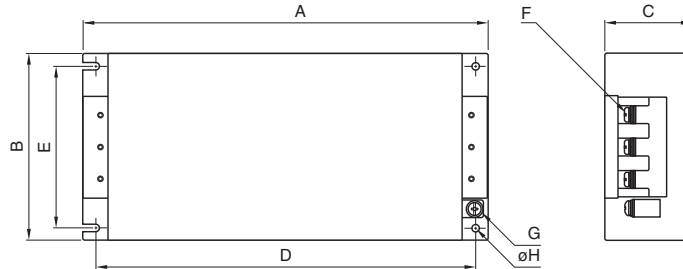


RTHN-5400/5600/5A00

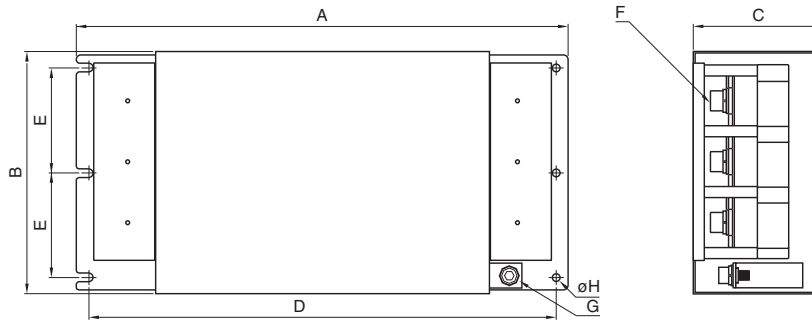


Outline Drawing

RTHN-5006/5010/5020/5030/5040/5050/5060/5080/5100/5150



RTHN-5200/5250/5300



Dimensions in mm

Part No.	A	B	C	D	E	F	G	φ H	Recommended clamping torque
RTHN-5006	210	95	50	195	78	M4	M4	4.5	M4 : 1.27N · m M5 : 2.5N · m M6 : 4.8N · m M8 : 7.64N · m M10 : 11.8N · m
RTHN-5010									
RTHN-5020									
RTHN-5030	240	105	55	225	85	M4	M4		
RTHN-5040									
RTHN-5050									
RTHN-5060	300	128	68	280	102	M5	M4		
RTHN-5080									
RTHN-5100									
RTHN-5150	473	190	88	453	164	M8	M6	6.5	
RTHN-5200									
RTHN-5250									
RTHN-5300	593	195	103	573	84.5	M10	M8		

For Additional Information, please visit [us.tdk-lambda.com/lp/products/r-series.htm](http://us.tdk-lambda.com/lp/products/r-series.htm)



The choice and application of the power supply is an important one. Working with TDK-Lambda can help you save time and money, from design concept to years after your system or product is first installed.

## Why TDK-Lambda?

- ◆ Over the last 60 years, TDK-Lambda has developed a worldwide reputation and heritage for high quality, robust power products.
- ◆ We at TDK-Lambda stand behind our products with industry leading warranties of up to a lifetime (limited).
- ◆ Our research and development budget is one of the largest in the industry, helping you design-in reliable, cutting edge technology, ahead of your competition.
- ◆ A broad range of product enables our customers to choose the right model for the application, and assists with their vendor reduction programs.
- ◆ Multiple manufacturing and design facilities across the globe. We can provide crucial local support when programs move between Asia, North America, and Europe. With those multiple factories we also have proven risk mitigation against natural disasters. Plus, our products are RoHS compliant and our sites are ISO9001 and ISO14001 certified.
- ◆ Our technical support can get your product to market faster. Please see next page for more details.
- ◆ As our Customer's product requirements became more diverse, we responded by broadening our product range from low cost 5W open frame AC-DC power supplies up to 22,500W hot-swap rack mount systems.
- ◆ We developed a large DC-DC converter portfolio to power applications in the growing fields of digital networking, communications, and medical equipment. We continue to launch leading-edge products to support these and other high tech markets.



- ◆ The need for fast customization has been met by our large array of Configurable Power Supplies and by our New York-based Custom Product Solutions Engineering Team. A wide variety of products can be developed, ranging from simple modifications, value-added solutions, or complete custom products.
- ◆ Not all of our Customer needs are product based though. Financial stability and the resources to continue to invest even in down markets, play a key factor in partner selection. Backed by the multi-billion dollar resources of the TDK Corporation\*, we have increased our R&D and capital expenditures to offer our customers the latest in leading edge technologies.
- ◆ The end products that use TDK-Lambda power supplies are often designed on one continent and built in another. We can truly provide that global support with nine manufacturing sites, nine R&D facilities, sales and service offices across the world, and our authorized distribution network.

Thank you for your interest in TDK-Lambda products.

\* In 2005 Lambda was acquired by the TDK Corporation of Japan (NYSE: TDK) thus combining Lambda's expertise in power supply innovation with TDK's global excellence in Ferrites and Multilayer Capacitor technology



## **Ilfracombe Plant (U.K.)**

Manufacturing and R&D  
Modular (Vega, Alpha, Sirius) & DC-DC power supplies



## **Nagaoka (Japan)**

Manufacturing & R&D  
AC-DC, DC-DC & custom power supplies



## **Senai Plant (Malaysia)**

Manufacturing  
AC-DC, DC-DC power modules & custom products



## **Wuxi Plant (China)**

Manufacturing and R&D  
AC-DC Converters, filters & custom products



## **Kuantan Plant (Malaysia)**

Manufacturing  
AC-DC Converters & custom products



## **Karmiel Plant (Israel)**

Manufacturing & R&D  
AC-DC & programable products



**TDK-Lambda**  
3055 Del Sol Blvd  
San Diego, CA 92154

1-800-526-2324 • [www.us.tdk-lambda.com/lp/](http://www.us.tdk-lambda.com/lp/)