

TDK-Lambda Power Supplies and DC-DC Converters



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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 67 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.



TDK-Lambda offers a broad range of standard power supplies for many applications. This Catalog is designed to provide data sheets of the complete product range. To ease navigation the product ranges are sorted into special categories on the next page. Individual product information is supplied to make a selection of possible models for your application. For additional technical data, please follow the web link at the bottom of each data sheet.

Each product page contains the following symbols to indicate the main applications that each product is designed for. The symbols are intended to give a quick guideline for many applications. For assistance in finding a product for your application, please contact our technical sales department.



Medical



Industrial



COTS



Test



COMM



LED



Railroad



Broadcast



Renewable

Thank you for your interest in TDK-Lambda products

Medical

Listed by Wattage



Medical

Wattage	Series	Page	Wattage	Series	Page
3W	PXC-M3	141	300-400W	EFE300M & EFE400M	103
10W	PXC-M10	143	350-1150W	NV350/700	51
15-40W	KM	77	500W	CSS500	35
40-65W	DTM65-C	129	450-900W	Vega	53
40-65W	CSS65	95	550-900W	Vega-Lite	55
90-110W	DTM110-C	133	1000W	SWS1000L	39
100W	ZMS100	91	1000W	Alpha 1000	57
150W	CSS150	95	Filter 0.5-6A	RSAL	201
175-200W	NV175	99	Filter 3-300A	RSHN	203
300-400W	CFE400M	29			

Industrial

Listed by Wattage



Industrial

Wattage	Series	Page	Wattage	Series	Page
1.5-25W	CC-E	139	120-240W	DPP120-240	119
3W	PXC-M3	141	120-480W	DRF120-480	121
4-15W	KPSA	71	120-960W	DPP120-960	123
7.5-100W	DSP	111	150W	CSS150	95
10W	PXC-M10	143	150-200W	LS200	23
10-20W	PXD	145	150-480W	ZWS-BP	97
10-30W	ZWS10-30B	73	175-200W	NV175	99
14-22W	ZPSA20	83	200-800W	Z+	195
15W	PXB	147	200-800W	Z+ HV	197
15-40W	KM	77	250W	i6A	179
15-90W	NN	15	250-500W	GWS	27
15-100W	DPP	113	300W	ZWS300BAF	107
15-100W	DRB15-100	115	300-317W	iEH	181
15-150W	HWS15A-150A/A	13	300-400W	CFE400M	29
16.5W	iCF	149	300-400W	EFE300 & EFE400	101
20-30W	PXE	151	300-400W	EFE300M & 400M	103
25-150W	LS	17	300-450W	iQG	183
30W	PXD30W	145	300-450W	PAH300-450	185
30-200W	CN-A110	155	300-456W	iHG	187
33W	iCG	157	300-1008W	PFE300SA-1000F	105
33-150W	ZWS50-150BAF	79	300-1500W	HWS300-1500	31
36-83W	iSA	159	350-1150W	NV350/700	51
40-60W	SC40/60	81	450-900W	Vega	53
40-60W	ZPSA40/60	83	480W	DPP480	125
40-60W	DPX	117	500W	CPFE500F	33
40-60W	PXF	161	500W	CSS500	35
40-65W	DTM65-C	129	500-1500W	LZSA	37
50-100W	CN-A24	163	550-900W	Vega-Lite	55
50-150W	PH-A280	165	600W	PAF600F	189
50-600W	RWS-B	21	600-1000W	SWS600/1000L	39
50-1500W	HWS/HD	19	720-1000W	CPFE1000F	41
62-80W	DT62/80-C	131	720-1000W	CPFE1000FI	43
66W	iBF	167	1000W	Alpha 1000	57
66-78W	iEA	169	1000W	FPS1000	63
72-308W	iQL	171	1500W	Alpha 1500	59
75W	CUT75	87	1800W	HWS1800T	47
80-170W	ZWQ	89	1600W	HFE1600	65
90-110W	DTM110-C	129	1600W	RFE1600	45
96-204W	iQE	173	2500W	HFE2500	67
100W	ZMS100	91	Filter 0.5-6A	RSAL	201
100-150W	DT100/150-C	131	Filter 3-300A	RSHN	203
110W	iAF	175	Filter 6-60A	RTAN	205
120W	iJB	177	Filter 6-300A	RTHN	207
120W	SCS120PW	93	Filter 50A	RDEN	209

COTS

Listed by Wattage



COTS

Wattage	Series	Page	Wattage	Series	Page
15-90W	NN	15	500-1500W	LZSA	37
30-1500W	HWS/HD	19	600-602W	PAF600F	189
50-100W	CN-A24	163	720-1008W	CPFE1000F	41
50-150W	PH-A280	165	720-1008W	CPFE1000FI	43
100W	ZMS100	91	1000W	FPS1000	63
300-450W	PAH300-450	185	1600W	HFE1600	65
300-1008W	PFE300SA-1000F	105	2500W	HFE2500	67

Test

Listed by Wattage



Test

Wattage	Series	Page	Wattage	Series	Page
1.5-25W	CC-E	139	150W	CSS150	95
3W	PXC-M3	141	150-200W	LS200	23
4-15W	KPSA	71	150-480W	ZWS-BP	97
10W	PXC-M10	143	175-200W	NV175	99
10-20W	PXD	145	200-800W	Z+	195
10-30W	ZWS10-30B	73	200-800W	Z+ HV	197
14-22W	ZPSA20	75	250W	CUS250LD	25
15W	PXB	147	250W	i6A	179
15-40W	KM	77	250-500W	GWS	27
15-90W	NN	15	300W	ZWS300BAF	107
15-100W	DRB15-100	115	300-317W	iEH	181
15-150W	HWS15A-150A/A	13	300-400W	CFE400M	29
16.5W	iCF	149	300-400W	EFE300 & EFE400	101
20-30W	PXE	151	300-400W	EFE300M & 400M	103
25-150W	LS	17	300-450W	iQG	183
30W	PXD30W	145	300-450W	PAH300-450	185
30-1500W	HWS/HD	19	300-456W	iHG300-456	187
33W	iCG	157	300-1008W	PFE300SA-1000F	105
33-150W	ZWS50-150BAF	79	300-1500W	HWS300-1500	31
36-83W	iSA	159	350-1150W	NV350/700	51
40-60W	SC40/60	81	450-900W	Vega	53
40-60W	ZPSA40/60	83	550-900W	Vega-Lite	55
40-60W	PXF	161	500W	CSS500	35
40-65W	DTM65-C	129	600W	PAF600F	189
50-600W	RWS-B	21	600-1000W	SWS600/1000L	39
62-80W	DT62/80-C	131	1000W	Alpha 1000	57
66W	iBF	167	1000W	FPS1000	63
66-78W	iEA	169	1500W	Alpha 1500	59
72-308W	iQL	171	1800W	HWS1800T	47
75W	CUT75	87	1600W	HFE1600	65
80-170W	ZWQ	89	1600W	RFE1600	45
90-110W	DTM110-C	133	2500W	HFE2500	67
96-204W	iQE	173	Filter 0.5-6A	RSAL	201
100-150W	DT100/150-C	135	Filter 3-300A	RSHN	203
110W	iAF	175	Filter 6-60A	RTAN	205
120W	iJB	177	Filter 6-300A	RTHN	207
120W	SCS120PW	93	Filter 50A	RDEN	209
120-480W	DRF120-480	119			

COMM

Listed by Wattage



COMM

Wattage	Series	Page	Wattage	Series	Page
1.5-25W	CC-E	139	150-200W	LS200	23
3W	PXC-M3	141	150-480W	ZWS-BP	97
4-15W	KPSA	71	175-200W	NV175	99
10W	PXC-M10	143	250W	i6A	179
10-20W	PXD	145	250W	CUS250LD	25
10-30W	ZWS10-30B	73	250-500W	GWS	27
14-22W	ZPSA20	75	300W	ZWS300BAF	107
15W	PXB	147	300-317W	iEH	181
15-40W	KM	77	300-400W	CFE400M	29
15-90W	NN	15	300-400W	EFE300 & EFE400	101
15-150W	HWS15A-150A/A	13	300-400W	EFE300M & 400M	103
16.5W	iCF	149	300-450W	iQG	183
20-30W	PXE	151	300-450W	PAH300-450	185
25-150W	LS	17	300-456W	iHG	187
30W	PXD30W	145	300-1008W	PFE300SA-1000F	105
30-1500W	HWS/HD	19	300-1500W	HWS300-1500	31
33W	iCG	157	350-1150W	NV350/700	51
33-150W	ZWS50-150BAF	79	450-900W	Vega	53
36-83W	iSA	159	500W	CPFE500F	33
40-60W	SC40/60	81	500W	CSS500	35
40-60W	PXF	161	550-900W	Vega-Lite	55
40-60W	ZPSA40/60	83	600-602W	PAF600F	189
40-65W	DTM65-C	129	600-1000W	SWS600/1000L	39
50-150W	PH-A280	165	720-1000W	CPFE1000F	41
50-600W	RWS-B	21	720-1000W	CPFE1000FI	43
62-80W	DT62/80-C	131	1000W	Alpha 1000	57
66W	iBF	167	1000W	FPS1000	63
66-78W	iEA	169	1500W	Alpha 1500	59
72-308W	iQL	171	1800W	HWS1800T	47
80-170W	ZWQ	89	1600W	HFE1600	65
90-110W	DTM110-C	133	1600W	RFE1600	45
96-204W	iQE	173	2500W	HFE2500	67
100-150W	DT100/150-C	135	Filter 0.5-6A	RSAL	201
110W	iAF	175	Filter 3-300A	RSHN	203
120W	SCS120PW	93	Filter 6-60A	RTAN	205
120W	iJB	177	Filter 6-300A	RTHN	207
150W	CSS150	95	Filter 50A	RDEN	209
150W	PH150A-280	165			

LED

Listed by Wattage



LED

Wattage	Series	Page	Wattage	Series	Page
15-150W	HWS15A-150A/A	13	300-1008W	PFE300SA-1000F	105
25-150W	LS	17	300-1500W	HWS300-1500	31
30-1500W	HWS/HD	19	500W	CPFE500F	33
33-150W	ZWS50-150BAF	79	500-1500W	LZSA	37
50-600W	RWS-B	21	600-1000W	SWS600/1000L	39
100W	ZMS100	91	720-1000W	CPFE1000F	41
150-200W	LS200	23	720-1000W	CPFE1000FI	43

Railroad

Listed by Wattage



Railroad

Wattage	Series	Page	Wattage	Series	Page
30-200W	CN-A110	155	50-100W	CN-A24	163

Broadcast

Listed by Wattage



Broadcast

Wattage	Series	Page	Wattage	Series	Page
1.5-25W	CC-E	139	96-204W	iQE	173
3W	PXC-M3	141	100W	ZMS100	91
4-15W	KPSA	71	100-150W	DT100/150-C	135
10W	PXC-M10	143	110W	iAF	175
10-20W	PXD	145	120W	iJB	177
10-30W	ZWS10-30B	73	150W	CSS150	95
14-22W	ZPSA20	75	150-200W	LS200	23
15W	PXB	147	175-200W	NV175	99
15-40W	KM	77	250W	CUS250LD	25
15-90W	NN	15	250W	i6A	179
15-150W	HWS15A-150A/A	13	250-500W	GWS	27
16.5W	iCF	149	300-317W	iEH	181
20-30W	PXE	151	300-400W	CFE400M	29
25-150W	LS	17	300-400W	EFE300 & EFE400	101
40-60W	PXF	161	300-400W	EFE300M & 400M	103
40-60W	ZPSA40/60	83	300-450W	iQG	183
40-65W	DTM65-C	129	300-456W	iHG	187
30W	PXD30W	153	300-1008W	PFE300SA-1000F	105
30-1500W	HWS/HD	19	300-1500W	HWS300-1500	31
33W	iCG	157	350-1150W	NV350/700	51
36-83W	iSA	159	450-900W	Vega	53
50-150W	ZWS50-150BAF	79	500W	CPFE500F	33
50-600W	RWS-B	21	500W	CSS500	35
62-80W	DT62/80-C	131	550-900W	Vega-Lite	55
66W	iBF	167	720-1000W	CPFE1000F	41
66-78W	iEA	169	1000W	FPS1000	63
72-308W	iQL	171	1800W	HWS1800T	47
75W	CUT75	87	1600W	HFE1600	65
80-170W	ZWQ	89	2500W	HFE2500	67
90-110W	DTM110-C	133			

Renewable

Listed by Wattage



Renewable

Wattage	Series	Page	Wattage	Series	Page
300-400W	CFE400M	29	450-900W	Vega	53
300-400W	EFE300 & EFE400	101	550-900W	Vega-Lite	55
300-400W	EFE300M & 400M	103	2500W	EZA2500-32048	191
350-1150W	NV350/700	51			

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.

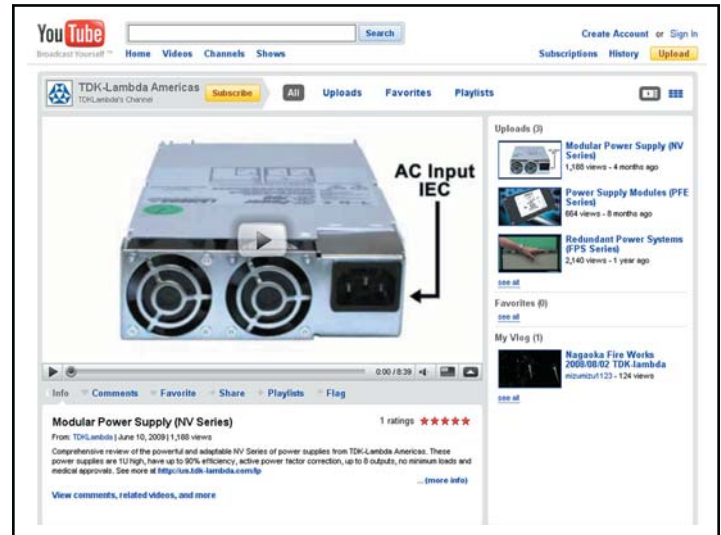
Blog <http://power-topics.blogspot.com>

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.



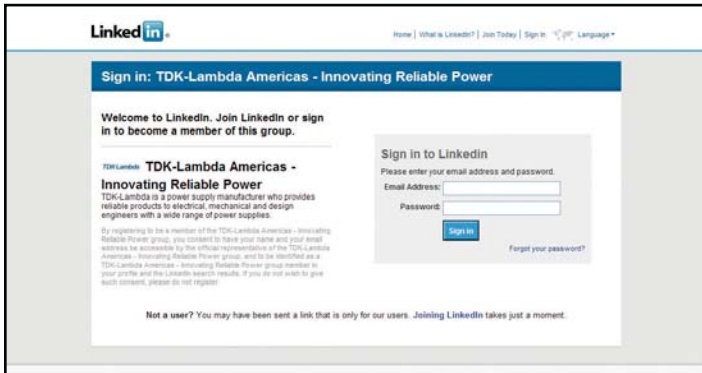
Facebook <http://www.facebook.com/pages/TDK-Lambda-Americas-Inc/109780051681?ref=mf>

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>

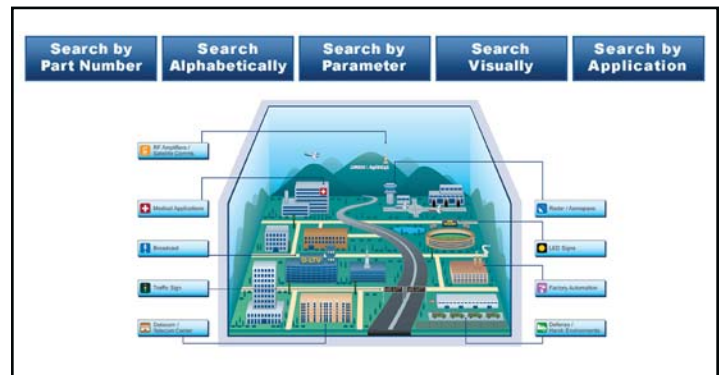
This innovative mobile web app allows the user to select power supplies based on their specific application, for example, Industrial, Medical, Communications, LED, Military, etc. In addition, the user can select the output power level they require and will be given a selection of models that meet their 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

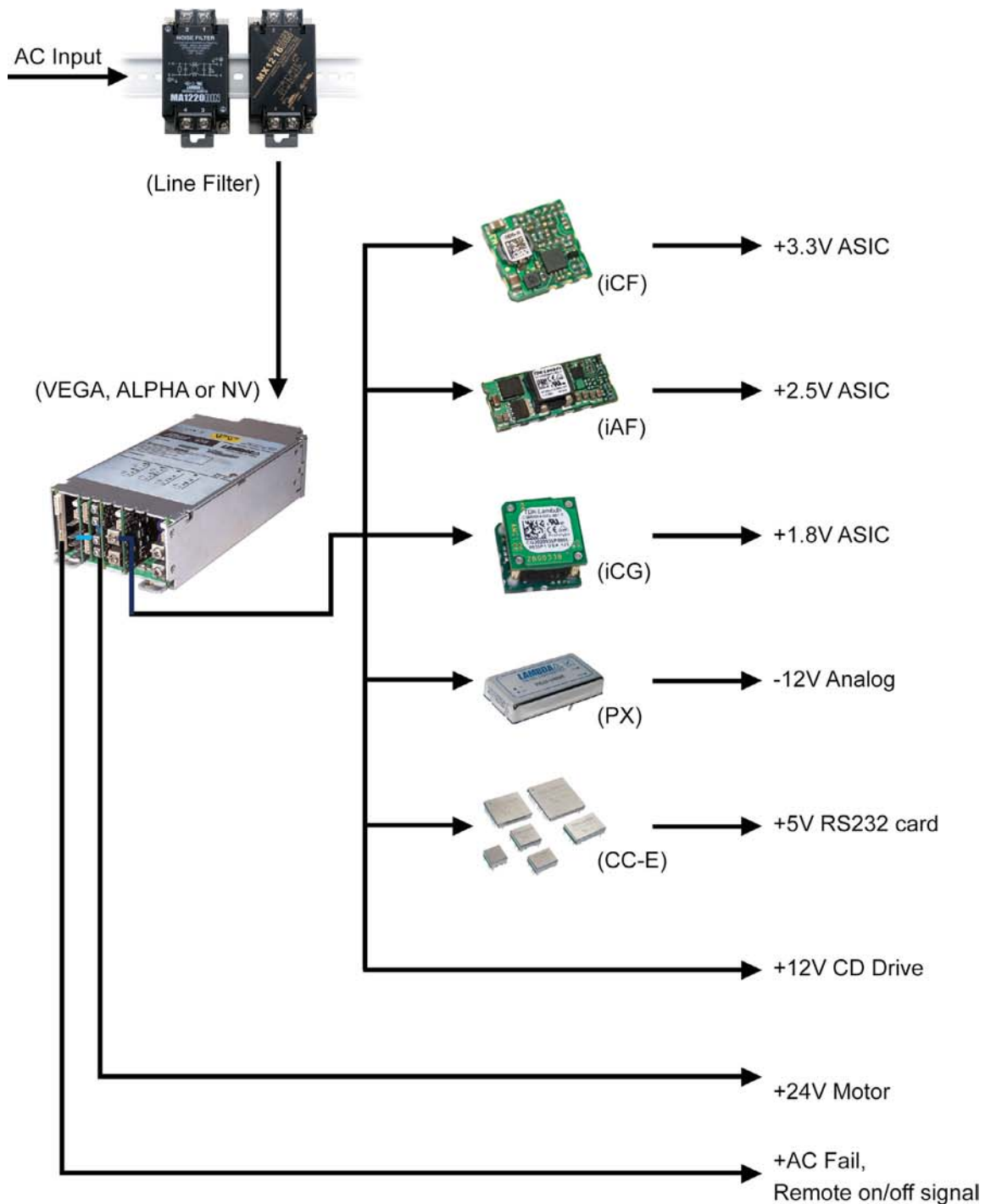


Want Engineering Support?

- ◆ Please call 1-800-LAMBDA-4 (1-800-526-2324) to speak to our inside technical support team, or email 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)

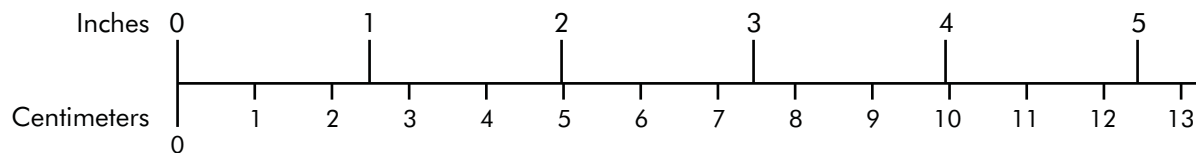


- ✓ Flexible
- ✓ Off the shelf
- ✓ No minimum loads
- ✓ No cross regulation

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) Conversion



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

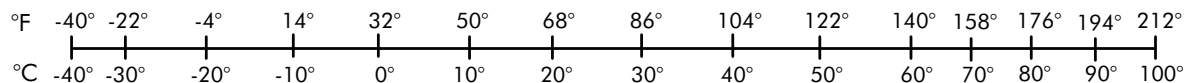
1U = 1.75 inch = 44.45mm

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



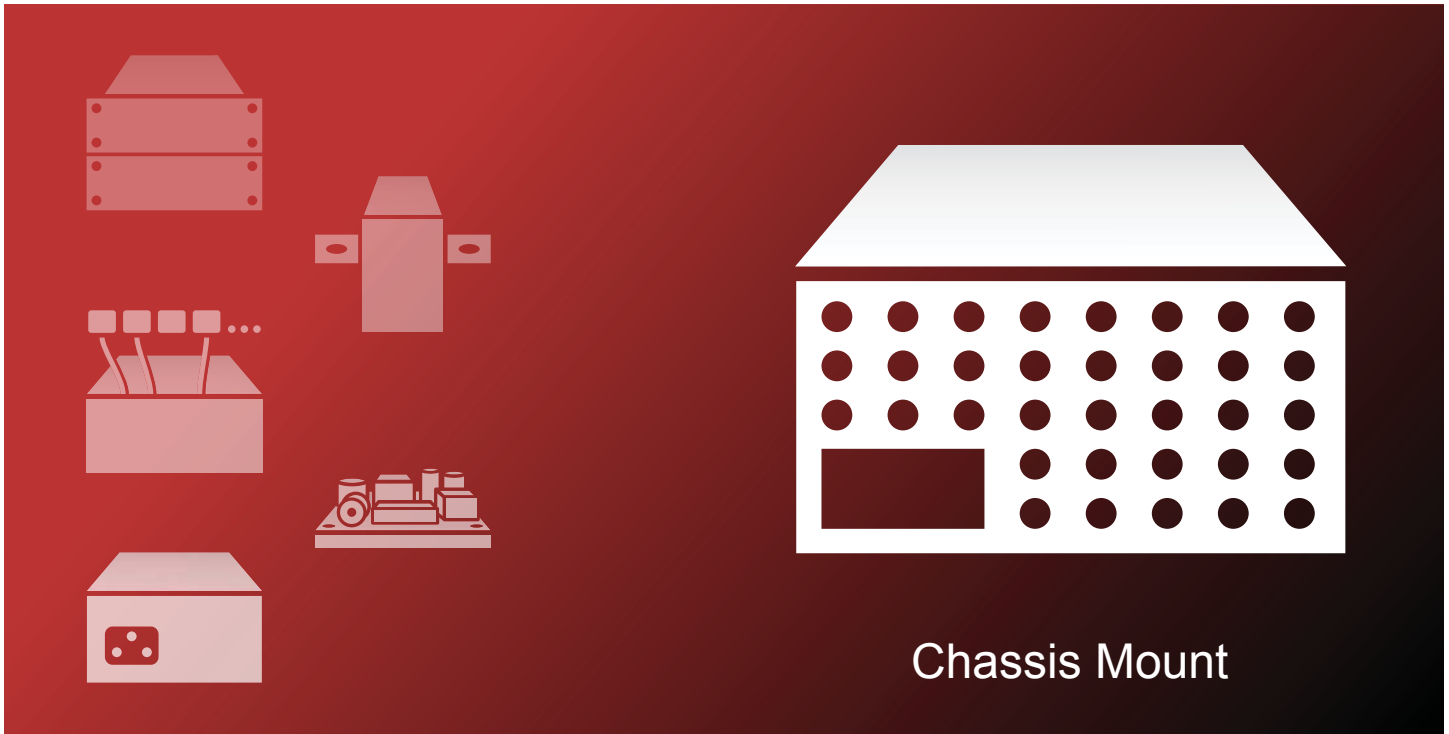
DC Circuit Equations

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

E = Voltage (in volts) R = Resistance (in ohms)
I = Current (in amperes) P = Power (in watts)



AC-DC Power Supplies



Applications

- ◆ Embedded (built-in) power supplies for a broad range of applications
- ◆ Suitable for industrial applications, automation, test equipment
- ◆ High reliability and low cost products available

Features

- ◆ 5 to 1800W output power
- ◆ Single-phase wide range input 85 – 265VAC
Three-phase input 170 – 265VAC
- ◆ Power factor correction meets EN61000-3-2 class A harmonics
- ◆ Input/output connection with screw terminals or PCB connectors
- ◆ Enclosed or open frame case style
- ◆ Safety meets EN/IEC/UL 60950-1 standard. CE marked for Low Voltage Directive

Wattage	Series	Page	Listed by Wattage
15-150W	HWS15A-150A/A.....	13	
15-90W	NN.....	15	
25-150W	LS.....	17	
30-1500W	HWS/HD.....	19	
50-600W	RWS-B.....	21	
150-200W	LS200.....	23	
250W	CUS250LD.....	25	
250-500W	GWS.....	27	
300-400W	CFE400M.....	29	
300-1500W	HWS300/1500.....	31	
500W	CPFE500F.....	33	
500W	CSS500F.....	35	
500-1500W	LZSA.....	37	
600-100W	SWS600L/1000L.....	39	
720-1000W	CPFE1000F.....	41	
720-1000W	CPFE100FI.....	43	
1600W	RFE1600.....	45	
1800W	HWS1800T.....	47	

50-150W 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 ² constant X, Y, Z 1 hour				
Shock	m/s ²	< 196.1 m/s ²				
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

Options	
Suffix	Description
Blank	No cover
/A	Cover
/HD	See HWS/HD datasheet for details. -40°C start up & pcb coating (Not available on HWS15A)
/ME	See HWS/ME datasheet for details. ES/EN/CSA 60601-1 medical certification (Not available on HWS15A)
/R	Remote on/off (HWS50A to HWS150A only)
Example: HWS50A-24/RA	

Other Industrial Products	
HWS300-1800	300W to 1800W
LZSA	500W to 1500W (MIL STD)
DRB, DRF, DSP & DPP	10W to 960W DIN Rail Mount
RWS-B	50W to 600W (5 year warranty)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/hwsa-series.htm



15-90W High Reliability 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



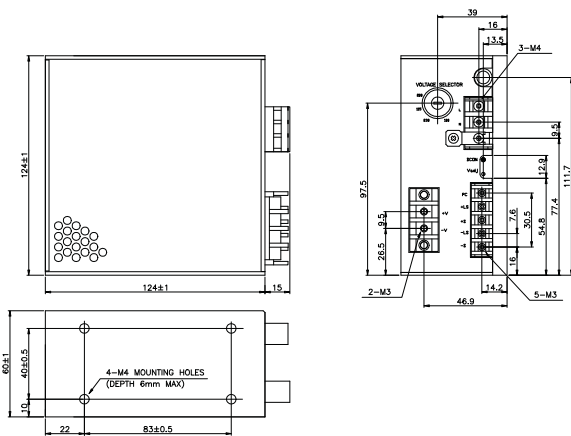
Specifications						
Model		NNS15	NNS30	NNS50	NND15	NND30
AC Input	VAC	85~115, 98~132, 170~230, 195~265VAC (Front panel selectable)				
Input Frequency	Hz	47~440Hz				
EMI	-	FCC Class B, VDE0871 Level B				
Output Adjustment	-	±10%				
Remote Sense	-	Yes	Yes	Yes	None	
Remote Programming	-	1000 Ohm/Volt			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

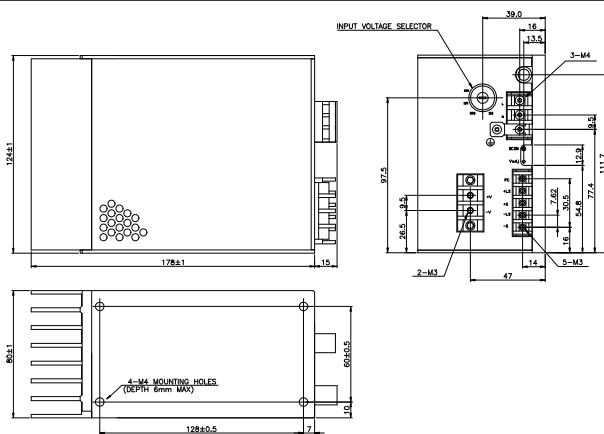
Model Selector

	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	NNS3024	V1	24	2.3	55.2	50
	NNS5024	V1	24	3.8	91.2	56
	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		

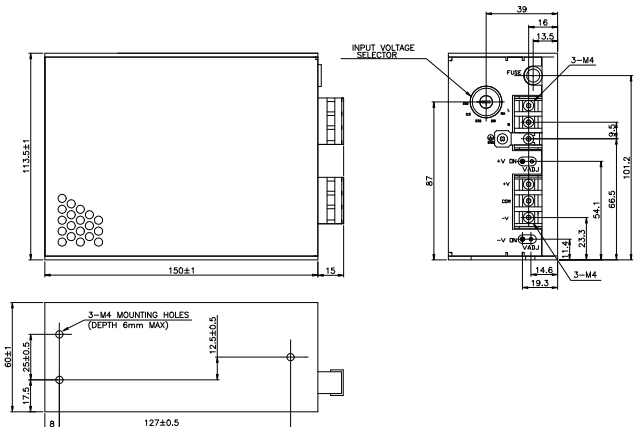
NNS15 Outline Drawing



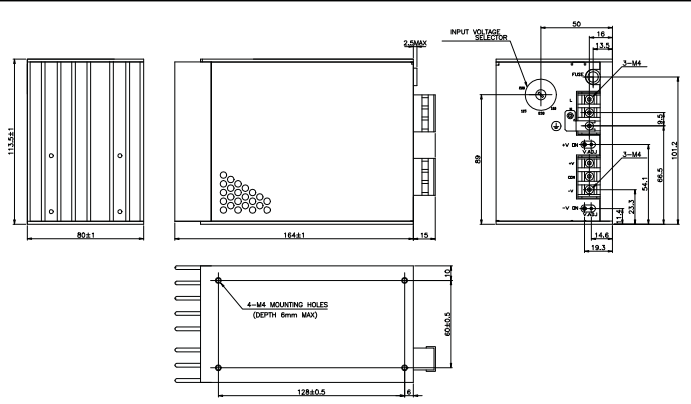
NNS30 Outline Drawing



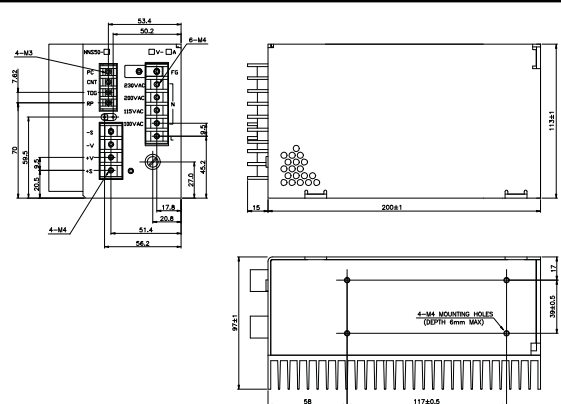
NND15 Outline Drawing



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)
VS & VSC	10 to 150W single output, 115VAC input (switching)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/nn-series.htm



25-150W 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

Model		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 25°C & 70%RH, Output to Ground 500VDC					
Vibration (non operating)	-	10 - 55Hz: 19.6m/s ² constant sweep 1 min X, Y, Z for 1 hour					
Shock	-	< 196.1 m/s ² (20G)					
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11					
Safety Agency Approvals	-	UL /CSA (cUL) /IEC 60950-1 (2nd Ed), CE Mark (Additionally evaluated to EN 60950-1)					
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:

*Safety certified for AC input only

(1) Switch selectable for 115 or 230VAC

(2) LS25-3

LS50, LS75-3 & -5

LS25-5 to 48, LS75-12 to 48

LS100-3 & -5

LS100-12, -15, -24, -36, -48

LS150-3 & -5,

LS150-12, -15, -24, -36, -48

Derate linearly to 60% load from +40 to +70°C.

Derate linearly to 70% load from +50 to +70°C.

Derate linearly to 60% load from +50 to +70°C.

Derate linearly to 60% load from +45 to +70°C. Derate linearly to 80% load from 115V to 88VAC input.

Derate linearly to 60% load from +50 to +70°C. Derate linearly to 80% load from 115V to 88VAC input.

Derate linearly to 50% load from +40 to +70°C.

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



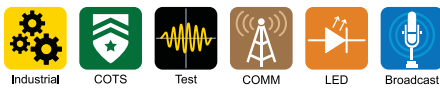
30-1500W Single Output Industrial Power Supplies

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)



Key Market Segments & Applications



Specifications

Model		HWS30A	HWS50A	HWS100A	HWS150A	HWS300	HWS600	HWS1000	HWS1500
Input Voltage range (47-63Hz)	-	85 - 265VAC or 120 - 370VDC**				85-265VAC or 120 - 330VDC**			
Input Current (Typ) (1)	A	0.65 / 0.4	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 / 28				20 / 40			
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	°C	HWS50-150: -10 to +71°C, (Derating applies above 50°C) HWS300-1500: -10°C~+71°C, (Derate linearly to 50% load from +50~+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/s²)							
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, 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, -3, -4, -5, -6, -8, -11, IEC61000-6-2							
Weight (Typ)	g	200	260	420	470	1000	1600	3200	3800
Size (WxHxD)	in	1.04x3.23x3.74	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 and 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)

** Safety certified for AC input only. DC input not available on HWS1500

Output Ratings

Model	Voltage	Adjust Range	Max Curr(A)	Peak Curr(A) ⁴	Max Power(W)	Load Reg(mV)	Line Reg(mV)	Ripple Noise(mV)	Overvoltage (V)	Efficiency (typ)% ¹
HWS30A-3/HD	3.3V	2.97 - 3.96	6	-	20	40	20	120	4.13-4.95	75/77
HWS50A-3/HD	3.3V	2.97 - 3.96	10	-	33	40	20	120	4.13-4.95	82/84
HWS100A-3/HD	3.3V	2.97 - 3.96	20	-	66	40	20	120	4.13-4.95	82/84
HWS150A-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
HWS30A-5/HD	5V	4.0 - 6.0	6	-	30	40	20	120	6.25-7.25	80/82
HWS50A-5/HD	5V	4.0 - 6.0	10	-	50	40	20	120	6.25-7.25	82/84
HWS100A-5/HD	5V	4.0 - 6.0	20	-	100	40	20	120	6.25-7.25	84/86
HWS150A-5/HD	5V	4.0 - 6.0	30	-	150	40	20	120	6.25-7.25	85/87
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
HWS30A-12/HD	12V	9.6 - 14.4	2.5	-	30	96	48	150	15-17.4	84/86
HWS50A-12/HD	12V	9.6 - 14.4	4.3	-	51.6	96	48	150	15-17.4	83/85
HWS100A-12/HD	12V	9.6 - 14.4	8.5	-	102	96	48	150	15-17.4	86/88
HWS150A-12/HD	12V	9.6 - 14.4	13	-	156	96	48	150	15-17.4	85/88
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
HWS30A-15/HD	15V	12.0 - 18.0	2	-	30	120	60	150	18.8-21.8	85/87
HWS50A-15/HD	15V	12.0 - 18.0	3.5	-	52.5	120	60	150	18.8-21.8	83/86
HWS100A-15/HD	15V	12.0 - 18.0	7	-	105	120	60	150	18.8-21.8	86/88
HWS150A-15/HD	15V	12.0 - 18.0	10	-	150	120	60	150	18.8-21.8	86/89
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
HWS30A-24/HD	24V	19.2 - 28.8	1.3	-	31.2	192	96	150	30-34.8	86/88
HWS50A-24/HD	24V	19.2 - 28.8	2.2	-	52.8	192	96	150	30-34.8	84/87
HWS100A-24/HD	24V	19.2 - 28.8	4.5	-	108	192	96	150	30-34.8	87/89
HWS150A-24/HD	24V	19.2 - 28.8	6.5	-	156	192	96	150	30-34.8	88/90
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
HWS30A-48/HD	48V	38.4 - 52.8	0.65	-	31.2	384	192	200	55.2-64.8	86/87
HWS50A-48/HD	48V	38.4 - 52.8	1.1	-	52.8	384	192	200	55.2-64.8	84/86
HWS100A-48/HD	48V	38.4 - 52.8	2.1	-	100.8	384	192	200	55.2-64.8	88/90
HWS150A-48/HD	48V	38.4 - 52.8	3.3	-	158.4	384	192	200	55.2-64.8	89/91
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, DRB, DRF	10W to 480W DIN Rail Mount
PFE	300 to 1000W AC-DC Power Models

For Additional Information, please visit
us.tdk-lambda.com/lp/products/hwsa-series.htm



50-600W Single Output General Purpose Power Supplies

Features

- ◆ Low Cost
- ◆ Wide Range AC Input 85 - 265VAC (300VAC for 5s)
- ◆ UL508 Certification on Select Models
- ◆ Enclosed Construction
- ◆ Compact Size
- ◆ 5 Year Warranty



Key Market Segments & Applications



Specifications						
Model		RWS50B	RWS100B	RWS150B	RWS300B	RWS600B
AC Input Voltage range (1)	VAC	85 - 265VAC (47 - 63Hz), 300VAC for 5 seconds				
DC Input Voltage range	VDC	120 - 370VDC (330VDC for RWS600B)				
Inrush Current (100 / 200VAC)	A	18 / 36	15 / 30	16 / 32	17 / 34	20 / 40
Power Factor (100 / 200VAC)	-	Meets EN61000-3-2 (0.95 / 0.9)				
Input Current (100/200VAC) (Typ)	A	1.1 / 0.7	1.3 / 0.7	1.9 / 1.0	3.8 / 2.1	7.2 / 4.0
Temperature Coefficient	-	<0.02%/°C				
Regulation	-	See sheet 2				
Overcurrent Protection	-	>105%, Constant Current Style				
Overvoltage Protection	V	115-140%, Cycle AC line to reset				
Hold Up Time (Typ at 100% load)	ms	20ms (RWS50B: 15ms at 100VAC input)				
Leakage Current (max)	uA	750uA maximum, typically 175uA at 115VAC, 63Hz				
Remote Sense	-	No				
Operating Temperature	-	-10 to +70°C, derate linearly to 20% load from 50 to 70°C (100-150W from 40 to 70°C) (3)				
Storage Temperature	-	-30 to +75°C				
Operating Humidity (non condensing)	%RH	30 - 90%RH				
Storage Humidity (non condensing)	%RH	10 - 90%RH				
Cooling	-	Convection		Internal Fan		
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/s² (sweep 1 min) X, Y, Z for 1 hour				
Shock	-	< 196.1 m/s²				
Safety Agency Approvals (2)	-	UL / CSA(cUL) / IEC 60950-1 (2nd Ed), UL:508, CSA C22.2 No.107.1-01, CE Mark (Additionally evaluated to EN 60950-1)				
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B, VCCI-B				
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2				
Weight (Typ)	g	230	400	480	900	1600
Size (WxHxD)	mm	82 x 34 x 81.5	94 x 39 x 108	94 x 41 x 128	102 x 41 x 170	120 x 61 x 190
	In	3.23 x 1.34 x 3.2	3.7 x 1.54 x 4.25	3.7 x 1.61 x 5.04	4.02 x 1.61 x 6.7	4.72 x 2.4 x 7.48
Warranty	Yrs	Five Years				

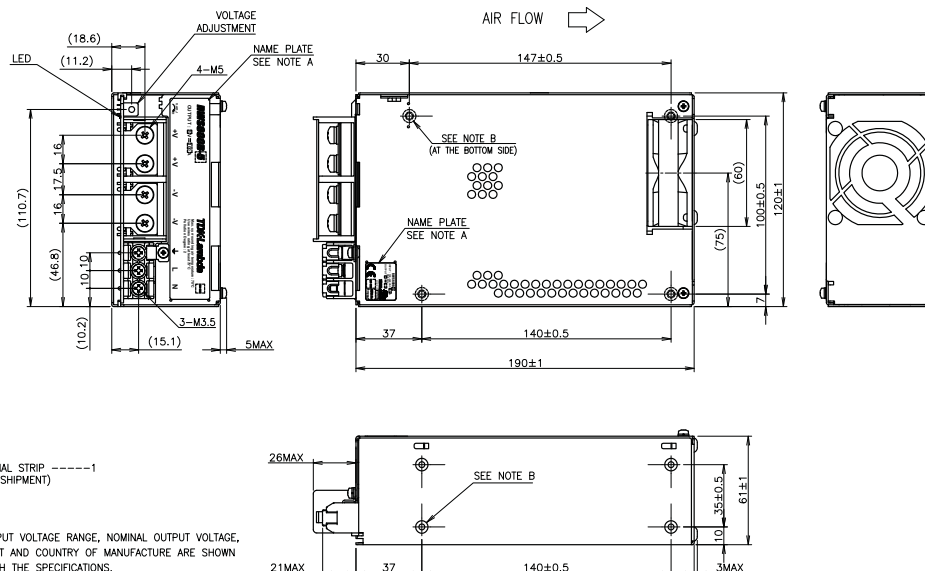
Notes:

- (1) See Instruction Manual for derating below 115VAC input
- (2) UL508 & CSA C22.2 No.107.1-01 on RWS50B-5, -12, -24, RWS100B-5, -12, -24, RWS150B-5, -12, -24 & RWS300B-24 only
- (3) RWS600B operates down to -20°C

Output Ratings

Model	Voltage	Adjust Range (V)	Max Current (A)	Max Output Power	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 100/200VAC
RWS50B-5	5V	4.5-5.75V	10	50	40	20	120	77 / 79
RWS100B-5	5V	4.5-5.75V	14	70	40	20	120	77 / 79
RWS150B-5	5V	4.5-5.75V	21	105	40	20	120	77 / 79
RWS300B-5	5V	4.5-5.75V	50	250	40	20	120	75 / 78
RWS600B-5	5V	4.5-5.75V	100	500	70	20	120	74 / 77
RWS50B-12	12V	10.8-13.8V	4.3	51.6	96	48	150	82 / 84
RWS100B-12	12V	10.8-13.8V	8.5	102	96	48	150	82 / 84
RWS150B-12	12V	10.8-13.8V	13	156	96	48	150	84 / 87
RWS300B-12	12V	10.8-13.8V	25	300	96	48	150	79 / 82
RWS600B-12	12V	10.8-13.8V	50	600	96	48	150	81 / 84
RWS300B-15	15V	13.5-17.2V	20	300	120	60	150	81 / 84
RWS600B-15	15V	13.5-17.2V	40	600	120	60	150	81 / 84
RWS50B-24	24V	21.6-27.6V	2.2	52.8	192	96	150	86 / 87
RWS100B-24	24V	21.6-27.6V	4.5	108	192	96	150	85 / 87
RWS150B-24	24V	21.6-27.6V	6.5	156	192	96	150	86 / 89
RWS300B-24	24V	21.6-27.6V	12.5	300	192	96	150	85 / 88
RWS600B-24	24V	21.6-27.6V	25	600	192	96	150	84 / 88
RWS300B-36	36V	32.4-41.4	8.4	302.4	288	144	200	85 / 88
RWS600B-36	36V	32.4-41.4	16.7	601.2	288	144	200	84 / 88
RWS50B-48	48V	43.2-52.8	1.1	52.8	384	192	200	86 / 88
RWS100B-48	48V	43.2-52.8	2.1	100.8	384	192	200	85 / 87
RWS150B-48	48V	43.2-52.8	3.3	158.4	384	192	200	86 / 89
RWS300B-48	48V	43.2-52.8	6.3	302.4	384	192	200	85 / 88
RWS600B-48	48V	43.2-52.8	12.5	600	384	192	200	85 / 88

Outline Drawing (RWS600B)



Options

Suffix	Description
/CO2	Double Sided Board Coating
/R	Remote On/Off (RWS300B only)
/RFO	Remote On/Off, Remote Sense, Parallel Operation, DC Good Signal (RWS600B only)

Other TDK-Lambda Industrial Products

HWS	15W to 1500W Single output
LS	25W to 200W Single output low cost
SWS-L	600W to 1000W Single output, full featured

For Additional Information, please visit
us.tdk-lambda.com/lp/products/rwsb-series.htm



150-200W Single Output 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			
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 ² constant sweep 1 min X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s ² (20G)	
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Approvals	-	UL /CSA (cUL) /IEC 60950-1 (2nd Ed), CE Mark (Additionally evaluated to EN 60950-1)	
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)

*Safety certified for AC input only

Output Ratings

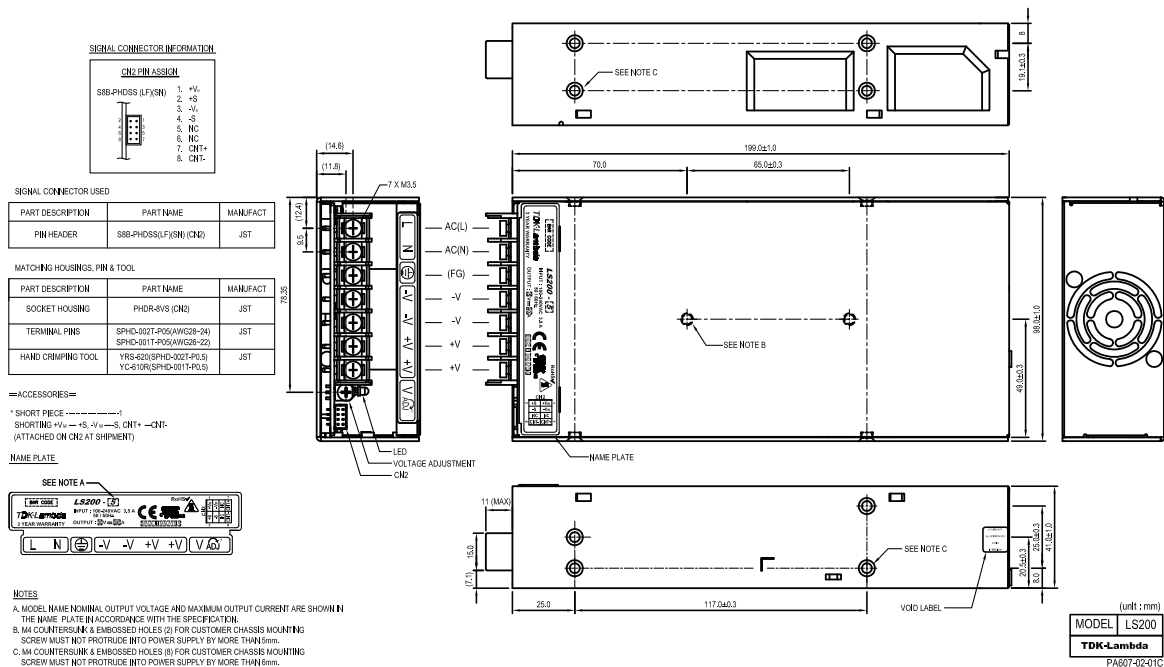
		Adjust Range	Max Current	Max Current	Peak	Load Reg	Line Reg	Ripple Noise	Efficiency
Model	Voltage	(V)	Forced Air(A) ⁽⁴⁾	Convect.(A) ⁽⁵⁾	Current (A)	(mV)	(mV)	(mV)	(typ) % ⁽¹⁾
LS200-3.3	3.3V	3.0 - 3.6	40.0	N/A	-	40	16	80	67 / 68
LS200-5	5V	4.75 - 5.5	40.0	N/A	-	40	20	80	72 / 75
LS200-7.5	7.5V	6.8 - 8.2	26.7	N/A	-	40	20	80	74 / 77
LS200-12	12V	10.8 - 14.4	16.7	N/A	-	96	48	120	76 / 79
LS200-15	15V	13.5 - 16.5	13.4	N/A	-	120	60	120	80 / 83
LS200-24	24V	22 - 28.8	8.4	N/A	10.4	192	96	120	82 / 84
LS200-36	36V	32 - 40	5.6	N/A	6.9	288	144	150	82 / 85
LS200-48	48V	42 - 57.6	4.2	N/A	-	384	192	200	82 / 85
LS200-3.3/L	3.3V	3.0 - 3.6	40.0	26	-	40	16	80	67 / 68
LS200-5/L	5V	4.75 - 5.5	40.0	26	-	40	20	80	72 / 75
LS200-7.5/L	7.5V	6.8 - 8.2	26.7	17.3	-	40	20	80	74 / 77
LS200-12/L	12V	10.8 - 14.4	16.7	11.6	-	96	48	120	76 / 79
LS200-15/L	15V	13.5 - 16.5	13.4	9.3	-	120	60	120	80 / 83
LS200-24/L	24V	22 - 28.8	8.4	5.8	10.4	192	96	120	82 / 84
LS200-36/L	36V	32 - 40	5.6	3.9	6.9	288	144	150	82 / 85
LS200-48/L	48V	42 - 57.6	4.2	2.9	-	384	192	200	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/l-series.htm



250W Single Output Low Profile Power Supplies

Features

- ◆ High Efficiency, up to 90%
- ◆ 1.18" high
- ◆ Wide Range AC Input
- ◆ Convection Cooled
- ◆ Coated pcb as standard
- ◆ 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 ² constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s ² (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

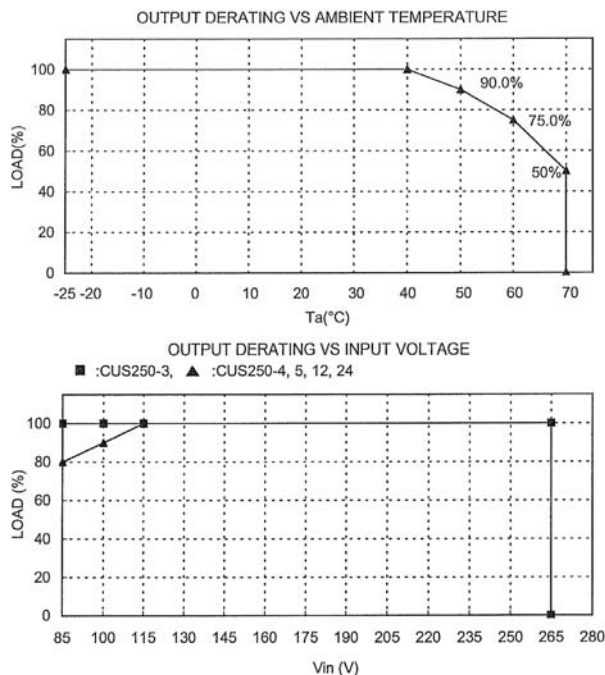
Notes:

- (1) 115 / 230VAC input
- (2) Cycle AC to reset
- (3) See derating curves on page 2. Derates linearly to 80% load from 115VAC to 85VAC input (excluding CUS250LD-3).

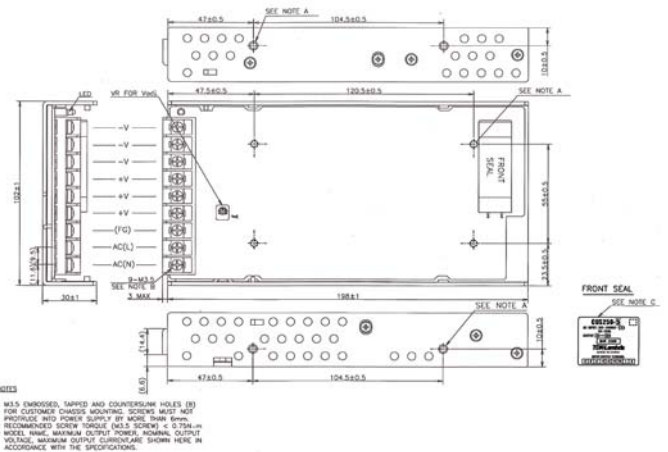
Model Selector

Model	Voltage	Adjust Range (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % ⁽¹⁾
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



250 & 500W Single Output 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			
Model		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 - 16.2V24V: 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 ⁽³⁾ 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 ⁽⁴⁾ for 1 min.	
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s ² constant sweep 1 min X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s ² (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

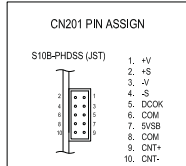
*Safety certified for AC input only

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



SIGNAL CONNECTOR USED

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

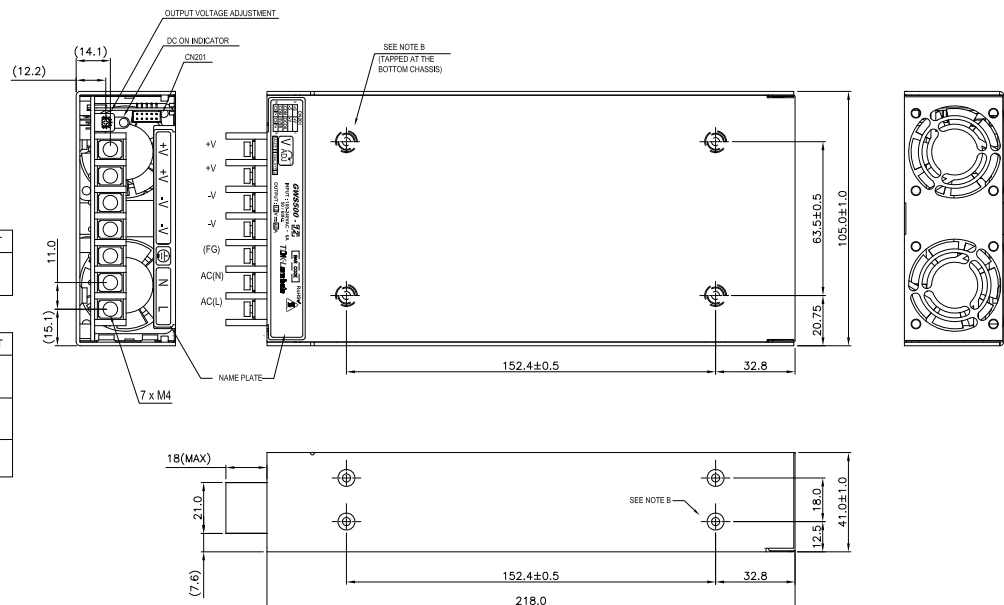
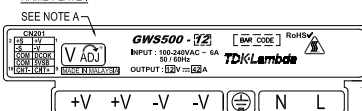
MATCHING HOUSINGS, PIN & TOOL

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:



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.

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



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	<25A 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)	%	Up to 94% (48V & 24V), up to 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 (minimum)	ms	13ms minimum 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 ⁽¹⁾	°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) ⁽³⁾ (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 ⁽²⁾	-	UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN 61010-1, IEC/UL/EN/CSA 60950-1, CE Mark
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 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 ⁽²⁾
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

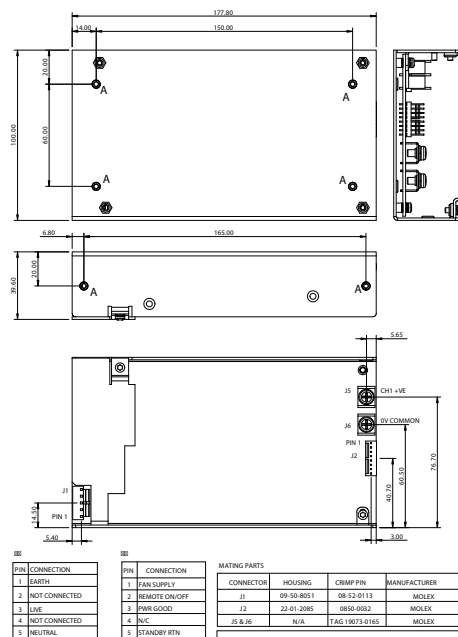
CFE400M	Output V	-	Standby Voltage	-	Fan & Cover Option	ORing FET	Remote On/Off
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NN-U = No fan, no fan supply, no cover
NN-C = No fan, no fan supply, cover

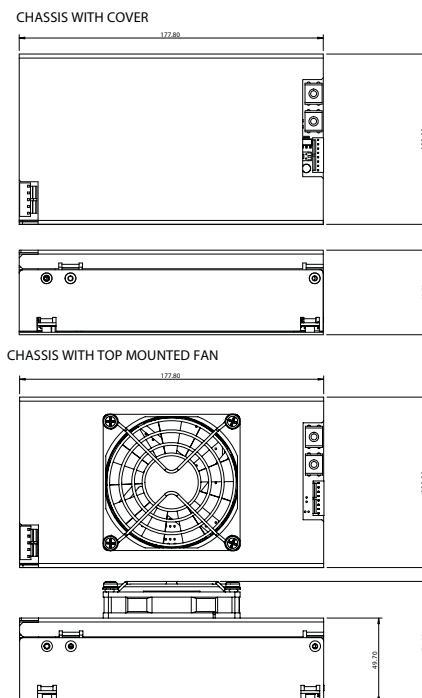
N1-U = 12V fan supply, no cover
N1-C = 12V fan supply, cover
TF-C = Top fan & cover

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

Outline Drawing



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



300-1500W 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

Model		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			
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/s² constant X, Y, Z 1 hour			
Shock	-	< 196.1 m/s²			
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)

(**) Safety certified for AC input only

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 & 60V models)

Options	
Suffix	Description
Blank	HWS300-1500 the cover is fitted as standard
/A	Not Applicable
/PV	HWS300-1500 the cover is fitted as standard 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



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

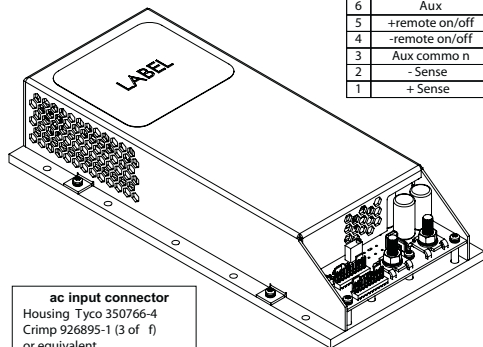
3) Reduces maximum output adjustment range by 1V
Preferred stocking part highlighted in blue.

Outline Drawing

CPFE500F

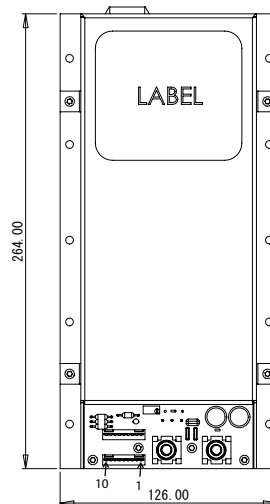
Signals Connections
Housing - Molex 22-01-1 102
Crimp - Molex 50802 series
(or equivalents)

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

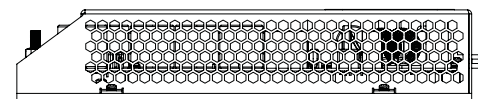
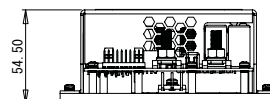
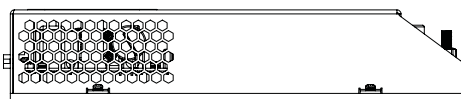
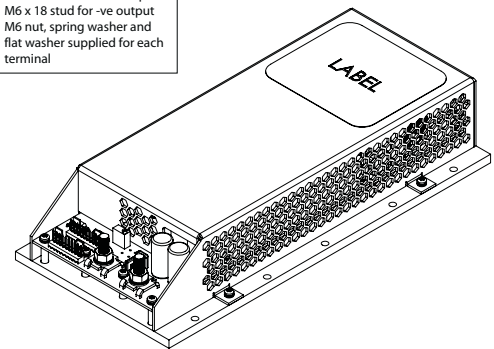


ac input connector
Housing Tyco 350766-4
Crimp 926895-1 (3 of 4)
or equivalent

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



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 ² (10~55Hz:2G Constant, X,Y,Z 60min each.)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	Medical Version: UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, Industrial Version: UL/CSA/IEC/EN 60950-1, 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)

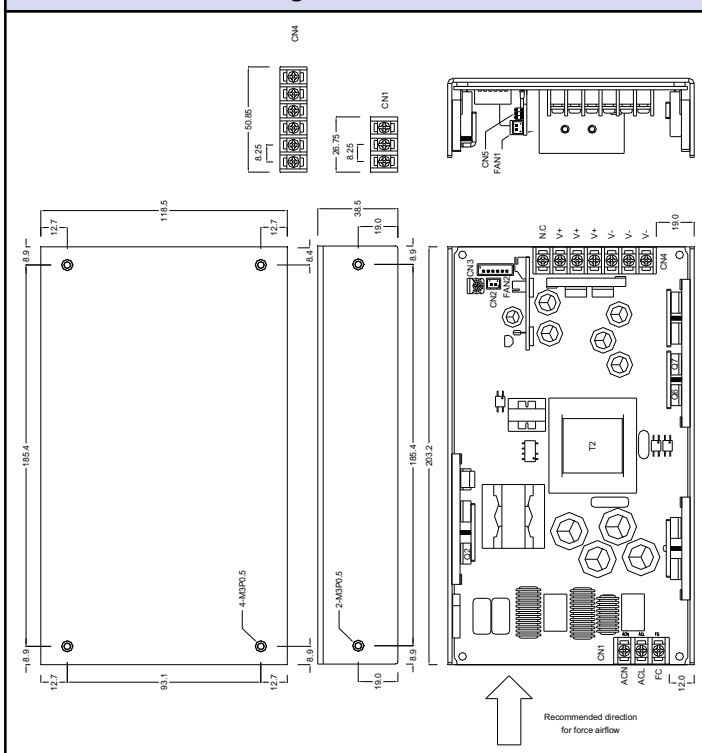
Model Selector

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

Outline Drawing



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



500-1500W 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				
Model		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

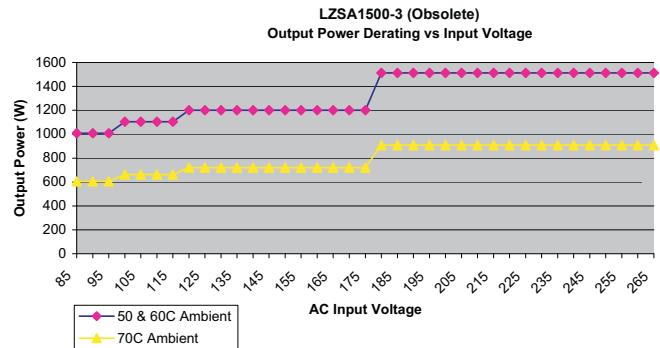
LZSA1500-3-001 & LZSA1500-4
Output Power Derating vs Input Voltage

The graph plots Output Power (W) on the Y-axis (0 to 1600) against AC Input Voltage (V) on the X-axis (85 to 265). Three data series are shown for different ambient temperatures:

- 50C Ambient (Blue line with diamonds):** Output power increases from approximately 1100W at 85V to a peak of about 1500W at 115V, then remains constant at 1500W up to 265V.
- 60C Ambient (Pink line with squares):** Output power increases from approximately 1000W at 85V to a peak of about 1400W at 115V, then remains constant at 1400W up to 265V.
- 70C Ambient (Yellow line with triangles):** Output power increases from approximately 650W at 85V to a peak of about 850W at 115V, then remains constant at 850W up to 265V.

Legend:

- 50C Ambient
- 60C Ambient
- 70C Ambient



FRONT VIEW

- 3.37 [85.9mm]
- 1.10 [28.0mm]
- 3.26 [82.8mm] 2X
- REMOTE ON/OFF ENABLE SWITCH
- 4 POSITION OUTPUT TERMINAL BLOCK
- 0.28 [7.14mm] DIA. (2 HOLES PER BUS BAR)
- 1.04 [26.4mm] 2X
- 0.63 [15.9mm]
- 2.50 [63.5mm]
- INDICATOR LIGHTS
- V OUT ADJ.
- O/V ADJ.
- 2 POSITION AC INPUT TERMINAL BLOCK SCREW SIZE #6-32
- #6-32 SCREW FOR LINE CORD CLAMP
- #6-32 GROUND STANDOFF
- 12 PIN SIGNAL CONNECTOR
- OPTION BOARD
- 15 PIN "D" CONNECTOR RECEPTACLE

SIDE VIEW

- 10.50 [266.7mm]

REAR VIEW

- 4.75 [120.6mm]
- 5.62 [142.9mm]

BOTTOM VIEW

- M4 THREADED INSERTS .20" (5MM) MAXIMUM SCREW PENETRATION (4 PLACES)
- 5.00 [127.0mm]
- 0.75 [19.0mm]
- 3.26 [82.8mm]
- 2.70 [68.6mm]

AIRFLOW (SEE NOTE 1)

NOTES:

- CUSTOMER MUST PROVIDE ADEQUATE CLEARANCE (50MM MIN.) AT FRONT, SIDES, AND TOP SURFACES FOR AIR FLOW.
- CUSTOMER MOUNTING SCREWS (M4x0.7) MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 1/4" (6MM).
- SEE INSTRUCTION MANUAL FOR ADDITIONAL INFORMATION.
- DIMENSIONS ARE IN INCHES, EXCEPT DIMENSIONS IN [] ARE IN MM.

Model	Nominal Voltage (V)	Adjustment Range (V)	Maximum Current (A)	Maximum Power (W)
LZSA1000-2	12	10 - 15.75	84	1008
LZSA500-3	24	18 - 29.4	21	504
LZSA1000-3	24	18 - 29.4	42	1008
LZSA1500-3	24	18 - 29.4	63	1512
LZSA1500-3-001	24	18 - 29.4	63	1512
LZSA1500-4	48	36 - 56	31.5	1512

HWS	15W to 1800W Single Output
DLP, DPP, DSP	15W to 960W DIN Rail
PFE	300W to 1000W Power Modules



600-100W 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, 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/EN 60950-1, UL/CSA/IEC/EN 60601-1 & ANSI/AAMI ES60601-1, (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).

*Safety certified for AC input only

**2 x MOPPs (3rd edition 60601)

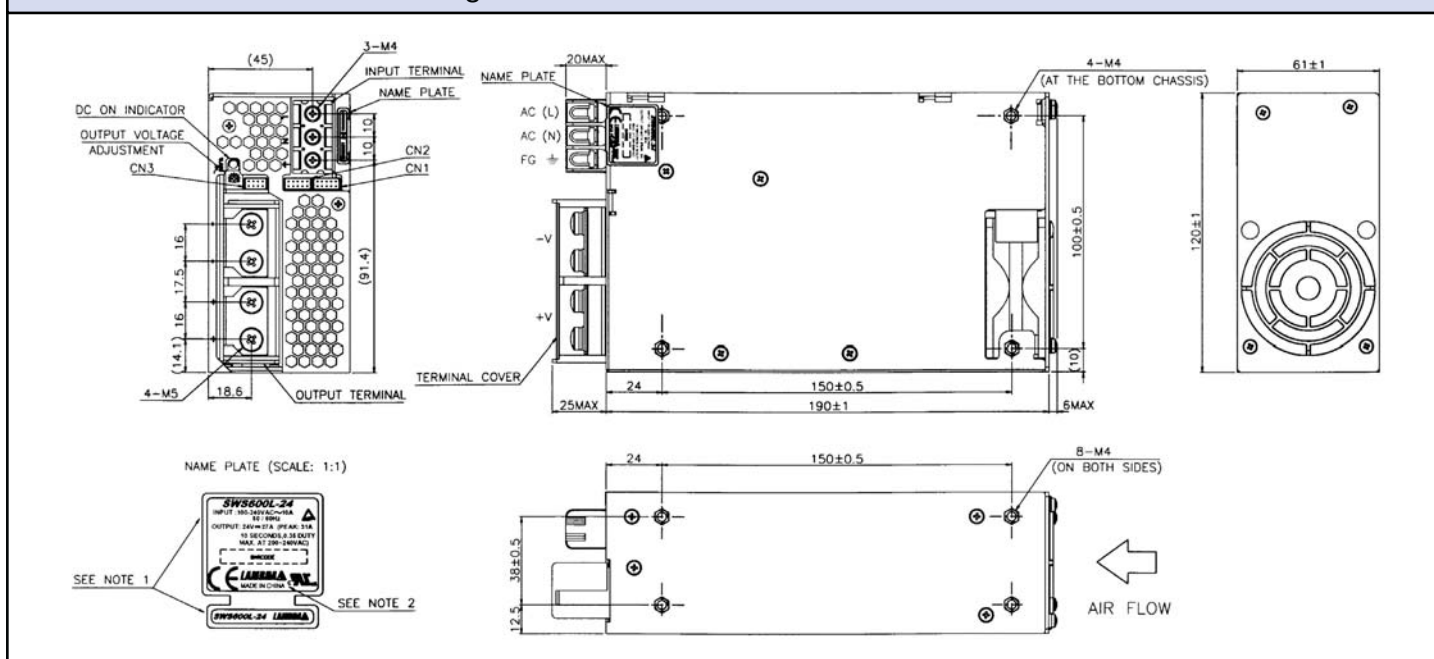
Model Selector

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) ⁴	648W(744W)	144	96	150	81 / 84
SWS1000L-24	24V	19.2 - 28.8V	44A (51A) ⁴	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) ⁴	624W(720W)	288	192	200	82 / 84
SWS1000L-48	48V	38.4 - 56V	22A (25A) ⁴	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



720-1000W Conduction Cooled Power Supplies

Features

- ◆ Base plate cooled, no fan required
- ◆ High efficiency
- ◆ Protective coating
- ◆ MIL STD 461/462D CE102 EMC
- ◆ I²C 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 ² 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.

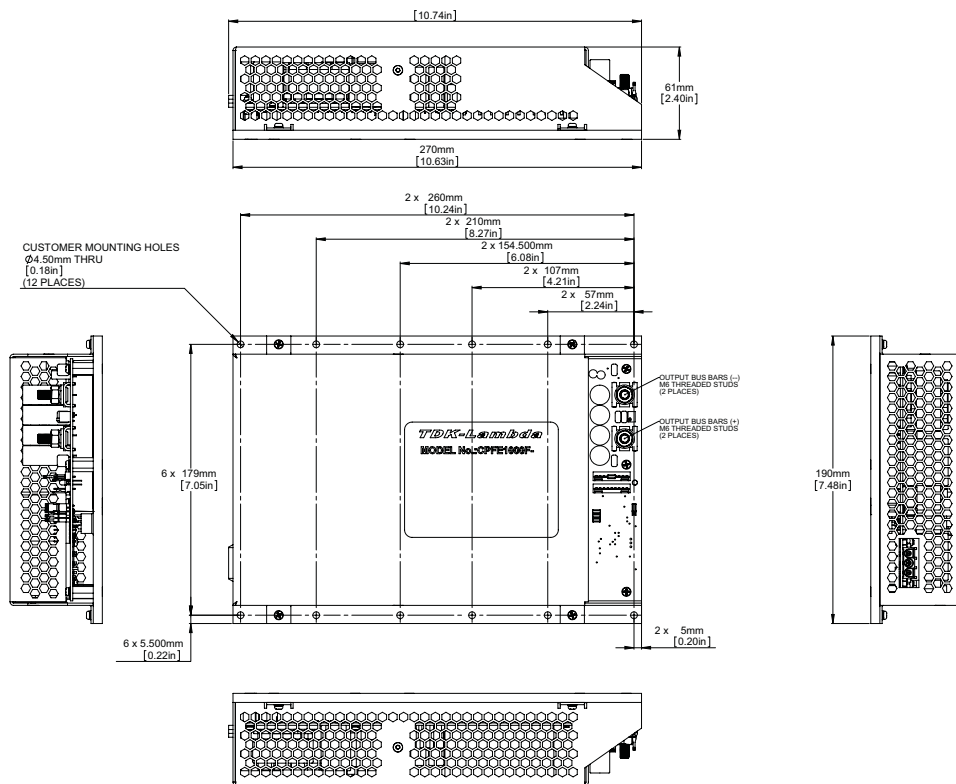
Model Selector

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	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



720-1000W Conduction Cooled Power Supplies

Features

- ◆ Smaller size than CPFE1000F
- ◆ Base plate cooled, no fan required
- ◆ Protective coating option
- ◆ I²C 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 (110 / 220VAC)	A	20 / 40 peak
Power Factor	-	Meets EN61000-3-2
Efficiency (typical) (2)	%	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) (3)	-	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	20ms @ 25°C and warmer
Leakage Current (at 230VAC, 50Hz)	uA	< 1.5mA
Remote Sense	-	Yes, compensates up to 500mV cable drop
I ² 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	-40 to +70°C (See reverse side for derating)
Storage Temperature	°C	-40 to +100°C
Humidity	-	Operating: 20 - 90%RH, Non operating 10 - 95%RH (Pcb assembly protective coated)
Cooling	-	Conduction cooled
Withstand Voltage	-	Input to Output 4242VDC, Input to Ground 2121VDC, Output to ground 500VDC
Vibration (non operating)	-	MIL-STD-810F, Method 514.5, Proc 1, Category 1, 10
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 3), -6 (Lvl 3), -8 (Lvl 3), -11 (Class 3), -12 (Lvl 3), -14 (Class 3)
Weight (Typ)	g	1240g (without cover)
Size (L x W x H)	mm	254 x 112 x 44mm (262mm including AC connector)
Warranty	yrs	2 years

(1) 100/220VAC

(2) 100% loading required

(3) Warm up period of 30 minutes below -30°C for ripple

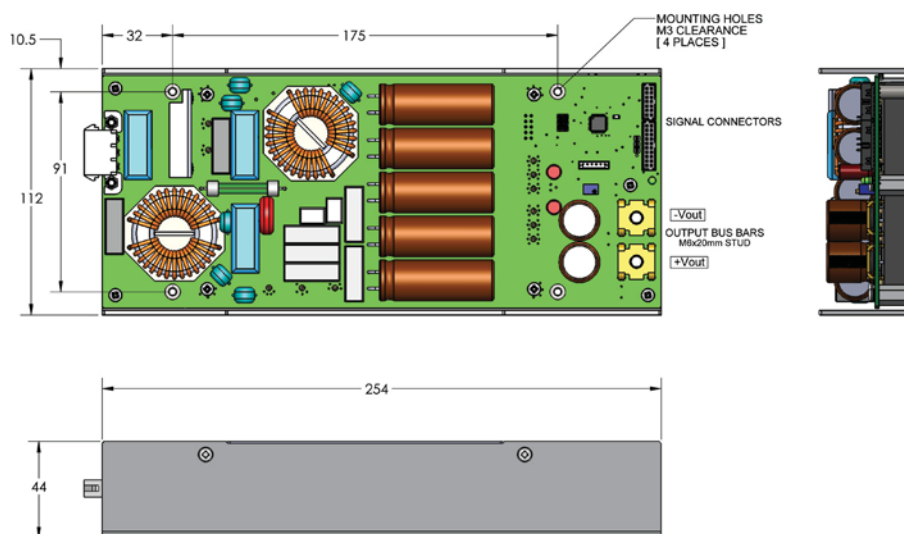
Model Selector

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)⁽⁴⁾

Model	Input Voltage	Output Power (W)			
		45°C	50°C	60°C	70°C
CPFE1000FI-12	85VAC to 170VAC	720	720	720	720
	170VAC to 265VAC	720	720	720	720
CPFE1000FI-28	85VAC to 170VAC	1008	980	952	896
	170VAC to 265VAC	1008	1008	1008	1008
CPFE1000FI-48	85VAC to 170VAC	1008	1008	1008	1008
	170VAC to 265VAC	1008	1008	1008	1008

Outline Drawings



(4) Models mounted in the horizontal orientation. See instruction manual for alternative mounting positions and the corresponding derating guidelines.

Options

Suffix	Description
/C	Cover
/H	Pcb coating
/P	No U channel (pcb type)
Example:	CPFE1000FI-28/CH

For Additional Information, please visit
us.tdk-lambda.com/lp/products/cpfe1000fi-series.htm



1600W 1U Front End Power Supplies

Features

- ◆ 1U High
- ◆ Internal ORing FETs & Current Share
- ◆ High Efficiency
- ◆ I²C, 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 ² 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

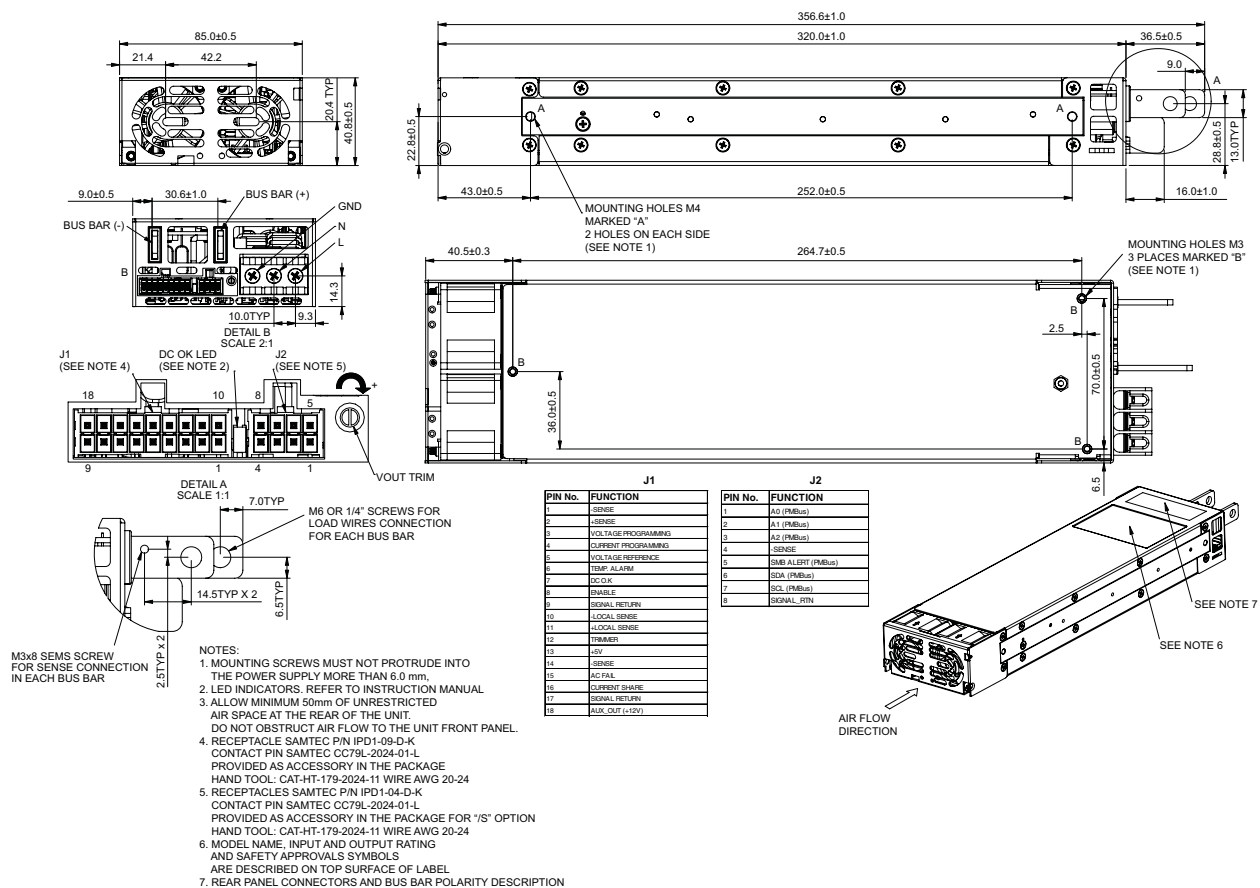
Model	Output Voltage	Adjust. Range(1)	Max Current (Vin>170VAC)	Max Power (Vin>170VAC)	Max Current(2) (100<Vin<170VAC)	Max Power(2) (100<Vin<170VAC)
RFE1600-12	12V	9.6 - 13.2V	133A	1596W	100A	1200W
RFE1600-12/S	12V	9.6 - 13.2V	133A	1596W	100A	1200W
RFE1600-24	24V	19.2 - 29V	67A	1608W	50A	1200W
RFE1600-24/S	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



1800W 3ph Industrial Power Supplies

Features

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



Key Market Segments & Applications



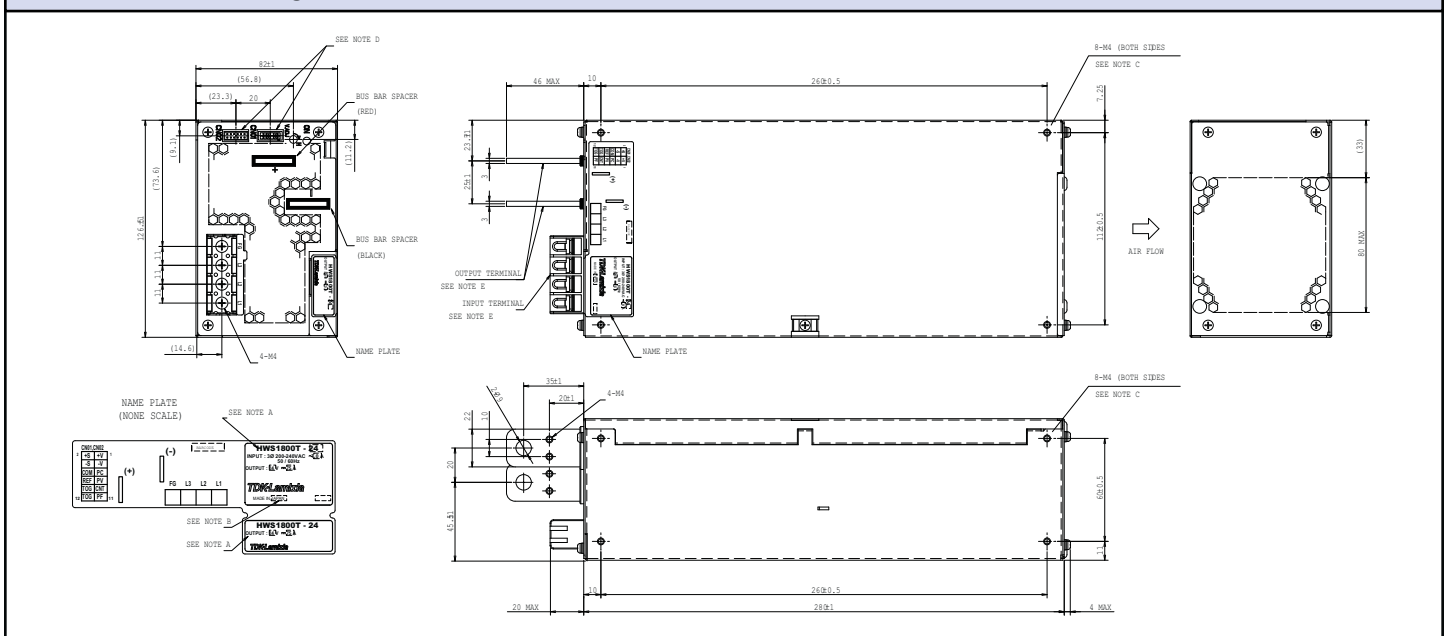
Specifications

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 ² constant X, Y, Z 1 hour
Shock (In package)	-	< 196.1 m/s ²
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

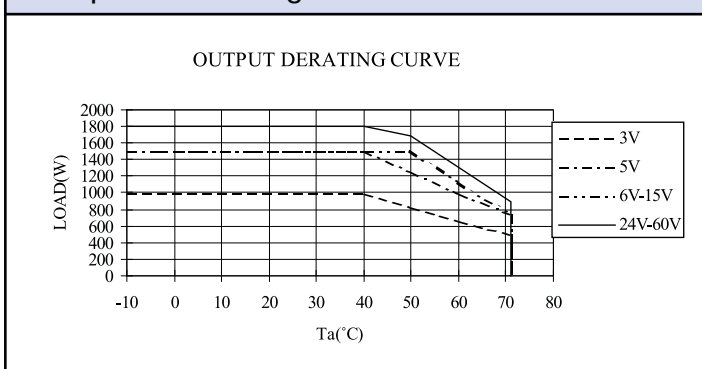
Model	Voltage V	Adjust Range V	Max Curr. A	Peak Curr. A(2)	Max Power W	Peak Power W2	Load Reg mV	Line Reg mV(3)	Ripple Noise mV	Overvoltage V	Efficiency (typ) %
HWS1800T-3	3.3	2.64 - 3.96	300	-	990	-	60	36	120	4.12 - 4.62	75
HWS1800T-5	5	4 - 6	300	-	1500	-	60	36	120	6.25 - 7.0	81
HWS1800T-6	6	4.8 - 7.2	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

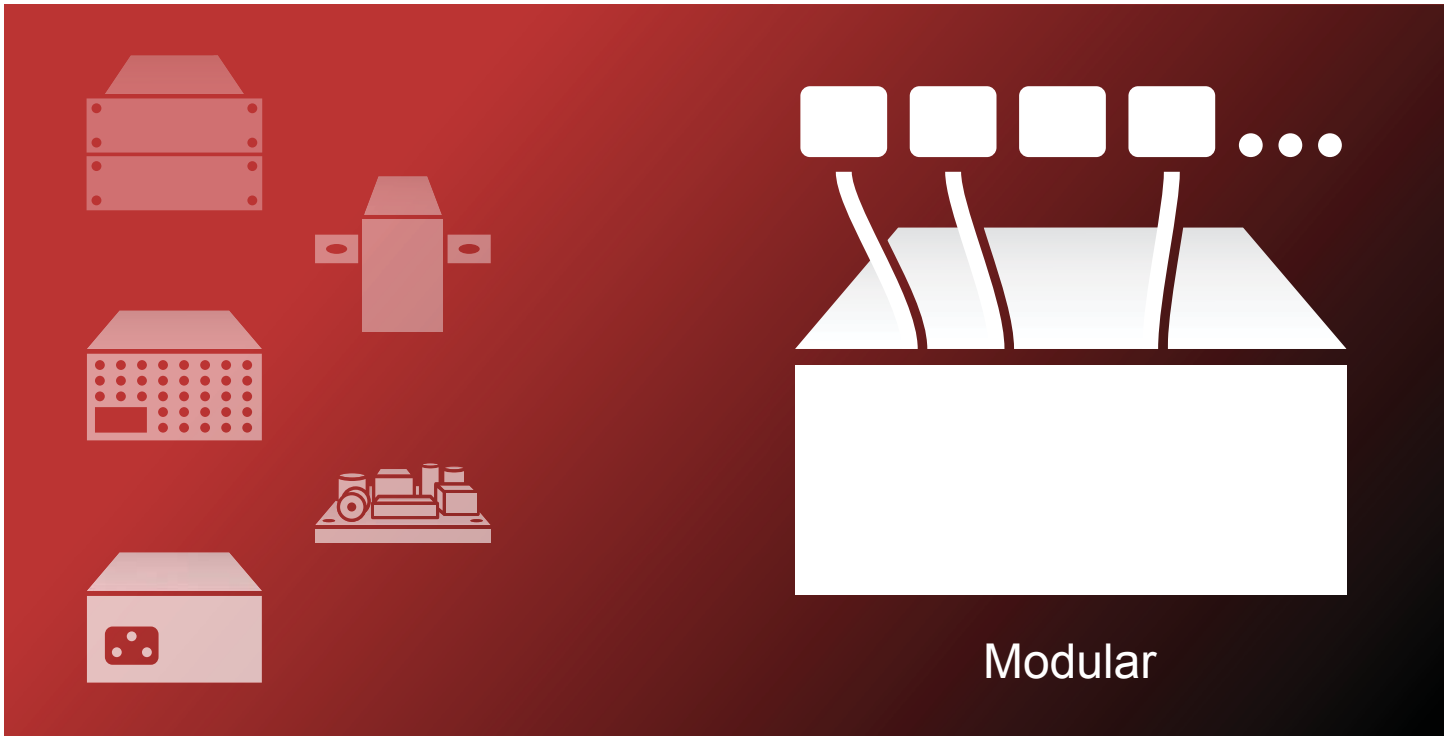
HWS	15W to 1500W single output, single phase
LZSA	500W to 1500W single output
SWS	50W to 1000W, low cost
DPP, DLP & DSP	10W to 960W DIN Rail mount

For Additional Information, please visit
us.tdk-lambda.com/lp/products/hws-series.htm





AC-DC Power Supplies



Applications

Many but especially:

- ◆ Equipment needing several different or uncommon output voltages
- ◆ Systems with different output voltage requirements in same package style

Features

- ◆ 350W to 1500W output power
- ◆ 1 to 16 separate output voltages
- ◆ Single-phase, wide-range input
- ◆ Broad range of output voltages from 0.5V to 62VDC
- ◆ Signal options on primary and secondary side
- ◆ Filter options with low leakage current for medical applications
- ◆ Cooling with integrated fans or external airflow (customer air)
- ◆ Safety approvals for international use
- ◆ Fast time to market
- ◆ Easy to configure with Quick Product Finder on TDK-Lambda website
- ◆ Combining outputs in parallel (for increased current or N+1 redundancy) and series (for increased output voltage) is possible with many of the product ranges, contact technical support for details

Wattage	Series	Page	Listed by Wattage
350-1150W	NV350/700.....	51	
450-900W	Vega.....	53	
550-900W	Vega-Lite.....	55	
1000W	Alpha1000.....	57	
1500W	Alpha1500.....	59	

350W-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 ⁽¹⁾	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) ⁽²⁾			
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 ⁽³⁾			
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 ⁽⁵⁾⁽⁷⁾ , (2 x MOPPs (3rd edition 60601)), Input to Output 4.3kVDC ⁽⁶⁾ , (2 x MOOPs (3rd edition 60601)), Input to Ground 2.3kVDC, Output to Ground 200VDC ⁽⁸⁾			
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/IEC/EN 60950-1, UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1; IEC/EN 61010-1; CE Mark			
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) ⁽⁴⁾			
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, <500µA single fault condition)

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

(3) -20°C cold start, derate from 45°C 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. 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	350W / 660W 250W with reverse air 700W / 1150W	NV3	S	S	S	EN5V
Cooling	S R C V	Standard air - forward Reverse air ⁴ Customer air - no fan ¹ Variable speed fan (Std on NV700)					
Input Connection	S I	Screw IEC320 ²					
Primary Option2	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 that 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)

Single Output Modules

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

- (1) NV3: 5.2-5.5V, derate linearly from 40A to 36A
NV7: 5-5.5V, derate linearly from 40A to 36A
- (2) NV3: 12.5-15.5V, derate linearly from 20A to 16.5A
NV7: 12.5-15.5V, derate linearly from 20A to 15.5A
- (3) NV3: 25.7-28V, derate linearly from 10A to 8.5A
NV7: 24-28V, derate linearly from 10A to 8.5A
- (4) 12.5-15V, derate linearly from 13A to 10A
- (5) 25-28V, derate linearly from 7A to 6A
- (6) 8-9V derate linearly from 22.5A to 20A
- (7) NV3: 400W max (to be confirmed)
NV7: 450W average, 600W peak for 10s
- (8) One DA module per power supply
- (9) For NV3: Limited by total output power

Dual Output Module (Common 0V)(1 Slot)⁽⁸⁾

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 ⁽⁴⁾	3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W
24 - 28V	7A ⁽⁵⁾	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



450-900W 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 ⁽¹⁾ or 34-75VDC	90-264VAC 47-63Hz ⁽¹⁾	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 ⁽²⁾	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 ⁽³⁾ ; (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. ⁽⁴⁾ 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		
Safety Agency Approvals (601-1 not available on 48V input)	-	UL/CSA/IEC/EN 60950-1, UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN 61010-1, CE Mark		
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, CE Mark safety approval only applies.

(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

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^(5,7) 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^(5,7) 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

Model Selector

Module	V Range	Amp	Slots	Module	V Range	Amp	Slots
Single Output							
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 ⁽⁶⁾	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 ⁽⁸⁾	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 ⁽⁸⁾	28-38	22.5	4
Z18	4.2-5.5V	66A	2	HH5/4	32.5-53V	4.5A	1
F2 ⁽⁶⁾	3.8-8V	75A	2	BB4	32.6-43V	10A	2
Z4	3.9-5.5V	95A	3	EE5L ⁽⁸⁾	40-48	18	4
Z6	3.9-5.5V	104A	3.5	C5B4	43-48V	10A	2
B2	5-9V	25A	1	EE5H ⁽⁸⁾	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				
E3L	8-13.9V	40A	2	Wide Range Programmable*			
Z7	8-16.5V	45A	3	W2 ⁽⁶⁾	1-7.5V	30A	1
EE2	7.6-16V	45A	4	W5	0.5-32V	8.5A	1
D4	14-21.5V	18A	1.5	* Refer to Vega Datasheet			

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.

/

Output Connection

Fast on terminals

Screw terminals

Output Options

Inhibit, module good,
and remote sense

Remote sense

(Leave empty if not required)

N

R

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	V1 Min - V1 Max	V1 Amp	V2 Min - V2 Max	V2 Amp	Slots
Dual Output					
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



550-900W 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 ⁽³⁾	900 ⁽³⁾	
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 ⁽⁴⁾ ; (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.		
Safety Agency Approvals	-		UL/CSA/IEC/EN 60950-1, UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN 61010-1, CE Mark		
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, CE Mark safety approval only applies.
 (3) See input derating curves
 (4) 4kVAC type tested (non-production test). Refer to CB report

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.

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

Module	V Range	Amp	Slots	Module	V Range	Amp	Slots
Single Output							
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				

Module	V1 Min - V1 Max	V1 Amp	V2 Min - V2 Max	V2 Amp	Slots
Dual Output					
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



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

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

V1	V2	Module	S	Opt.

Output Options
 Inhibit, module good, and remote sense

(Leave empty if not required)

Full Description Example:
V5ESSF 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:

With O/P inhibit, module good & current share options

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

Maximum Continuous Output Power

ac Input Voltage (V)	Vega Lite 550 Output Power (W)	Vega Lite 750 Output Power (W)
80	400	600
100	550	700
120	550	750
140	550	750
150	550	900
160	550	900
180	550	900
200	550	900
220	550	900
240	550	900
260	550	900
270	550	900

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
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	13 ms min at 90Vac and 100% rated power
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/EN 60950-1, UL/CSA/IEC/EN60601-1 ⁽¹⁾ , ANSI/AAMI ES60601-1, IEC/EN 61010-1 ⁽²⁾ , 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) ⁽¹⁾
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-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



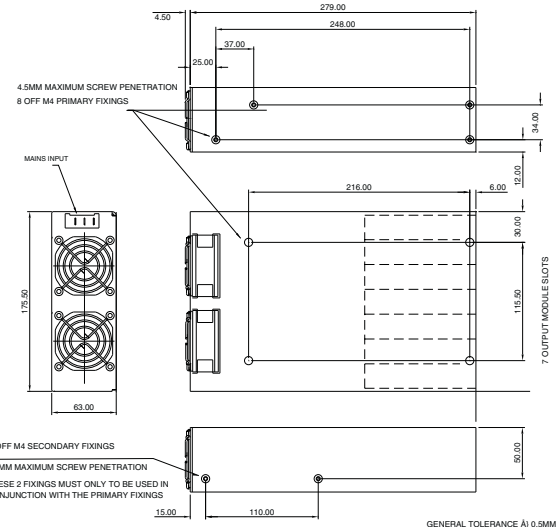
3 Option Codes

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 ²	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
IN ³	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 ⁽⁴⁾
		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	8 ms min at 207Vac and 100% rated power
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 ⁽¹⁾ , 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) ⁽¹⁾
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

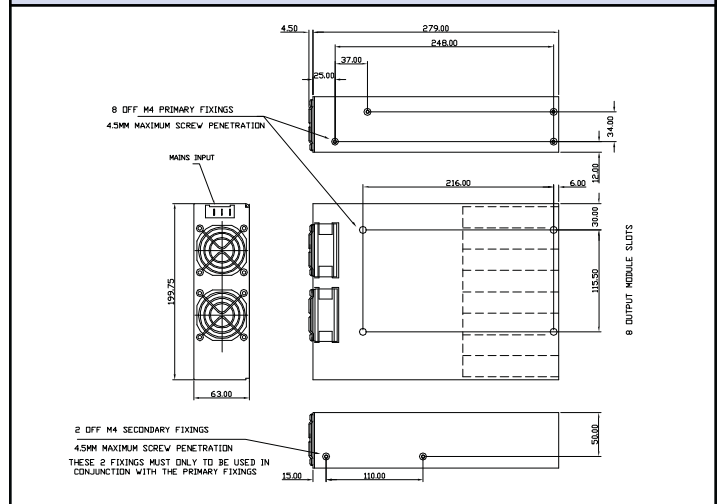
3 Option Codes

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 ²	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
IN ³	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 264VAC, 63Hz ⁽⁴⁾ Conducted EMI		
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



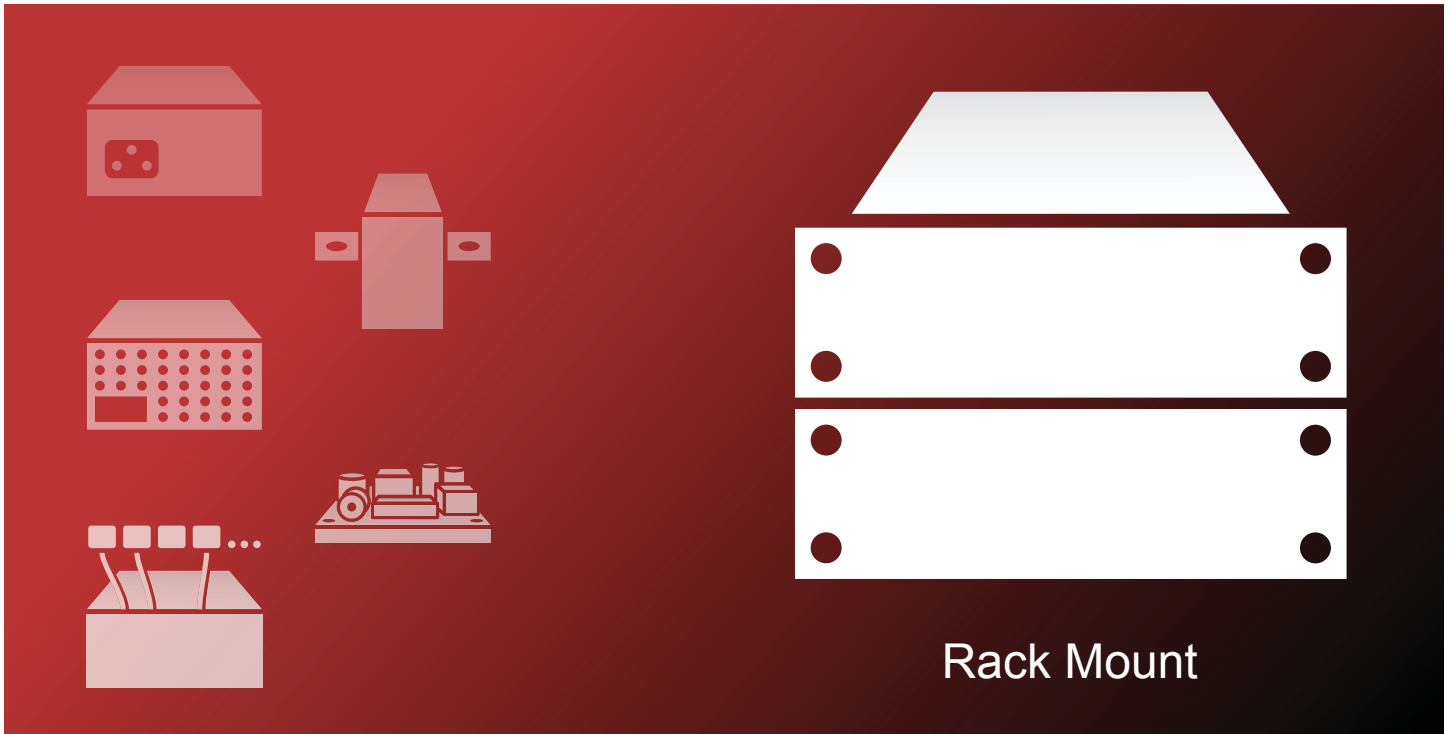
For Additional Information, please visit
us.tdk-lambda.com/lp/products/alpha-series.htm



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



AC-DC Power Supplies



Applications

- ◆ High reliability applications with n+1 redundancy
- ◆ High power applications for cabinet mounting
- ◆ Broadcast, RF-amplifiers, Telecoms

Features

- ◆ 19" rack with hot-swap power modules – up to 10kW in 1U
- ◆ Modules have integrated ORing MOSFETs for redundant operation
- ◆ Individual IEC connectors or terminal blocks for mains input
- ◆ Parallel operation between racks with active current sharing for higher output power levels
- ◆ 12V, 24V, 32V and 48V supplies for bus-voltages in distributed power architecture and other applications

Wattage	Series	Page	Listed by Wattage
1000W	FPS1000.....	63	
1600W	HFE1600.....	65	
2500W	HFE2500.....	67	

Also see:

200-800W	Z+.....	195
200-800W	Z+ HV.....	197

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	-	Compensates 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 ² , 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 PCIB24W9M400A1 (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			

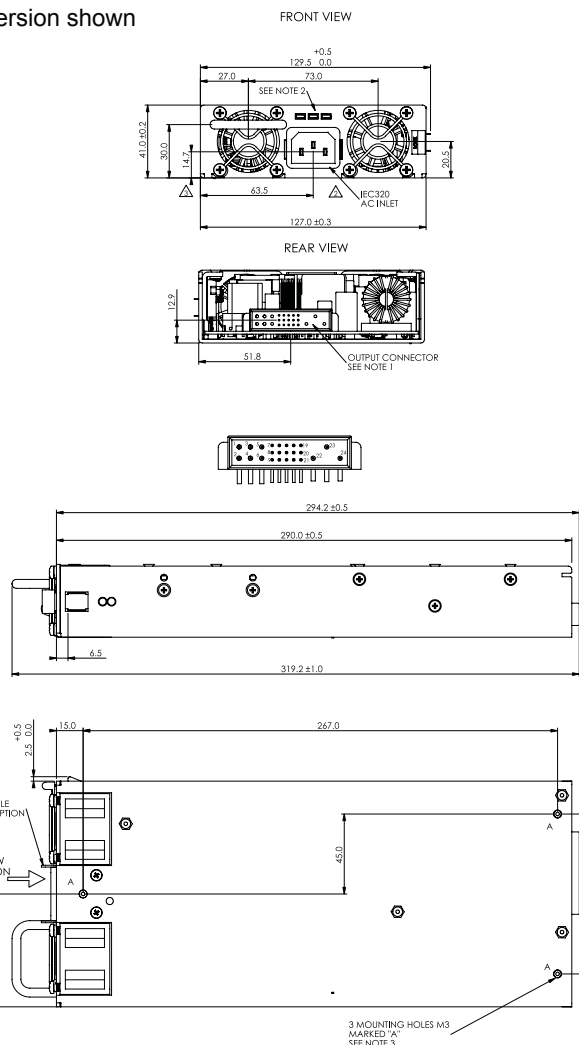
(1) Via Trim pin on output connector

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

*Safety certified for AC input only

FPS1000 Outline Drawing

/P Version shown



Accessories

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

Options

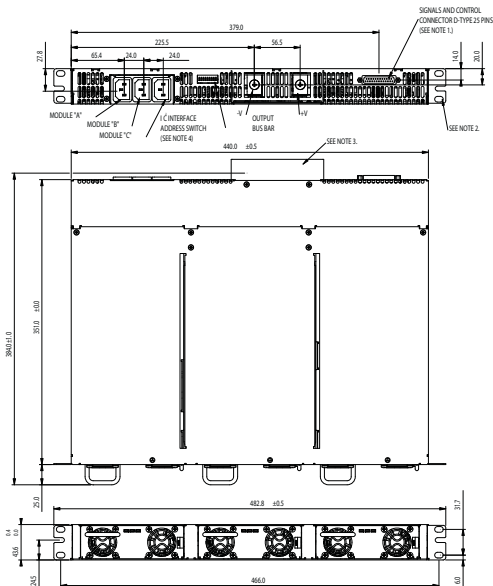
Suffix	Description
/POE*	1500VAC Output to Ground Isolation (Output noise 400mV)

* FPS100048 only.

Other Industrial Products

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

FPSS1U Outline Drawing



Model Selector

Front AC Input Configuration	Output Voltage	Output Current	Maximum Power	I ² 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 ² 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)			

Full Systems (3 units + rack)

Front AC Input Configuration	Output Voltage	Output Current	Maximum Power	I ² 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



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 ² 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

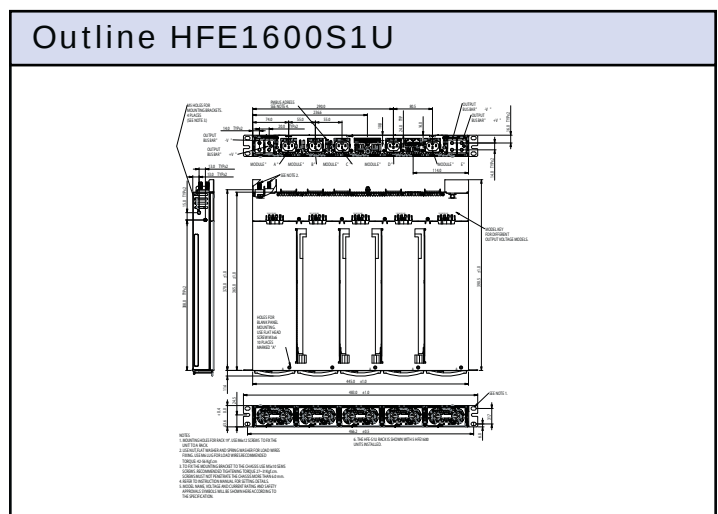
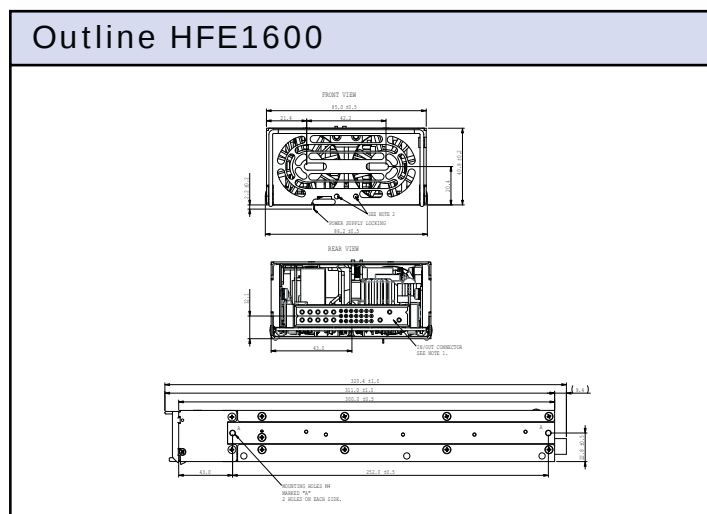
(2) Derate output power linearly 1%/V from 100VAC to 85VAC input

(3) Reverse air - contact factory

Model Selector						
Model	Output Voltage	Adjust Range ⁽¹⁾	Max Current (Vin>170VAC)	Max Power (Vin>170VAC)	Max Current (100<Vin<170VAC) ⁽²⁾	Max Power (100<Vin<170VAC) ⁽²⁾
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 ⁽¹⁾	Efficiency (%) ⁽⁴⁾	I ² 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)



For Additional Information, please visit
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 ² 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

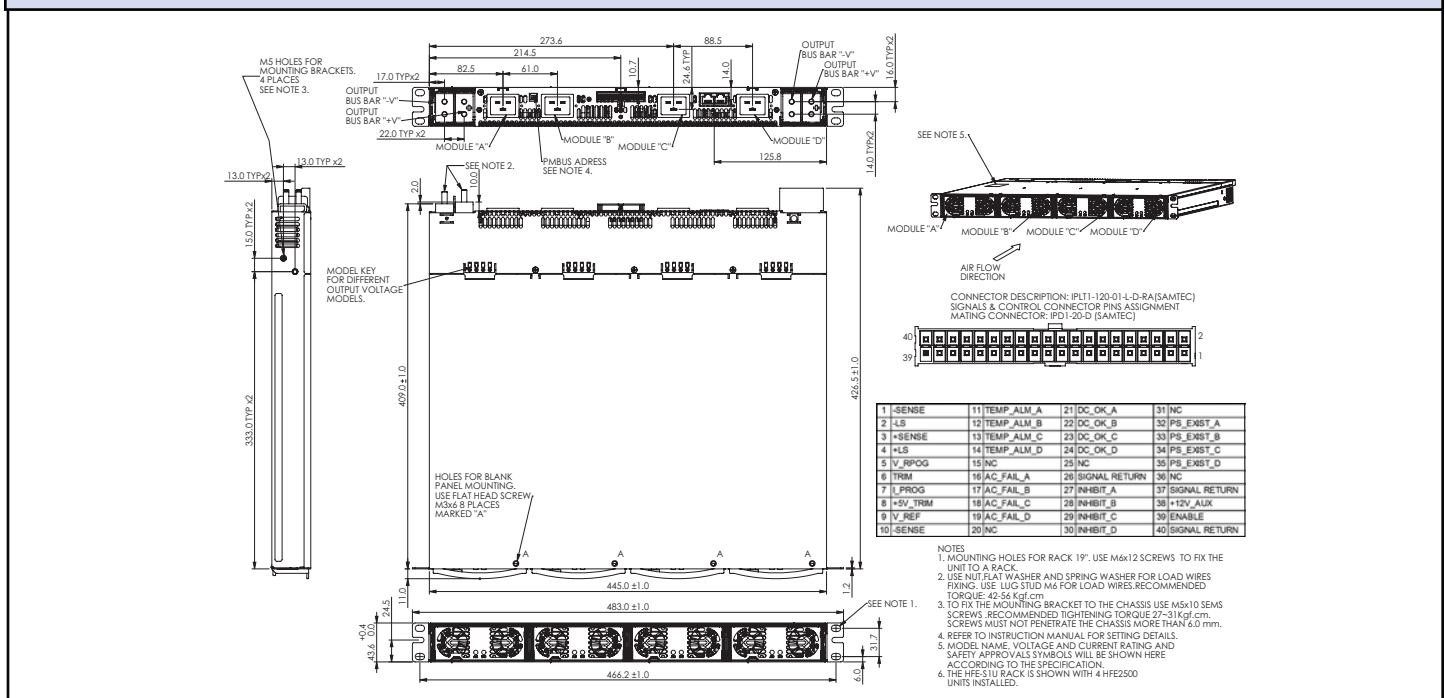
Model	Output Voltage	Adjust Range ⁽¹⁾	Max Current (Vin>180VAC)	Max Power (Vin>180VAC)	Max Current (100<Vin<132VAC) ⁽²⁾	Max Power (100<Vin<132VAC) ⁽²⁾
HFE2500-12	12V	9.6 - 13.2V	200A	2400W	125A	1500W
HFE2500-12/S	12V	9.6 - 13.2V	200A	2400W	125A	1500W
HFE2500-24	24V	19.2 - 29V	104A	2496W	62.5A	1500W
HFE2500-24/S	24V	19.2 - 29V	104A	2496W	62.5A	1500W
HFE2500-48	48V	38.4 - 58V	52A	2496W	31.25A	1500W
HFE2500-48/S	48V	38.4 - 58V	52A	2496W	31.25A	1500W
Model	Load Reg	Line Reg	Ripple & Noise ⁽¹⁾	Efficiency (%) ⁽⁴⁾	I ² 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

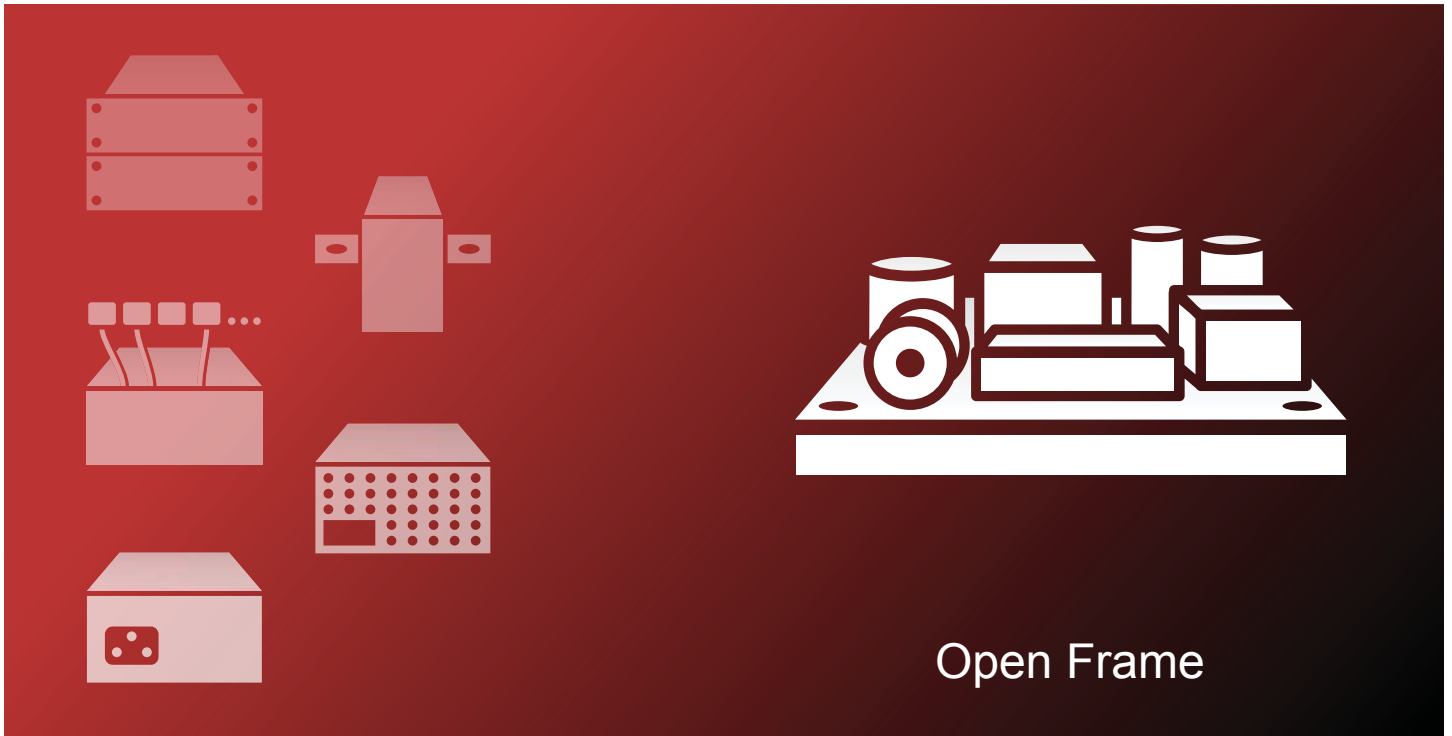


For Additional Information, please visit
us.tdk-lambda.com/lp/products/hfe-series.htm





AC-DC Power Supplies



Applications

Power Modules

- ◆ Distributed power architectures
- ◆ Customized designs with specific dimensions
- ◆ Low power applications

Features

- ◆ 5 to 1000W output power
- ◆ Single-phase wide range input 85 – 265VAC
- ◆ Flexibility for different cooling concepts

Wattage	Series	Page	Listed by Wattage
4-15W	KPSA.....	71	
10-30W	ZWS10-30B.....	73	
14-22W	ZPSA20.....	75	
15-40W	KM.....	77	
33-150W	ZWS50-150BAF.....	79	
40-60W	SC40/60.....	81	
40-60W	ZPSA40/60.....	83	
40-65W	CSS65.....	85	
75W	CUT75.....	87	
80-170W	ZWQ.....	88	
100W	ZMS100.....	91	
120W	SCS120PW.....	93	
150W	CSS150.....	95	
150-480W	ZWSBP.....	97	
175-200W	NV175.....	99	
300-400W	EFE300/400.....	101	
300-400W	EFE300M/400M.....	103	
300-1000W	PFE300SA-1000F.....	105	
300W	ZWS300BAF.....	107	

4-15W 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				
Model		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	14ms 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 ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)		
Shock	-	< 196.1 m/s ² (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:

*Safety certified for AC input only

(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

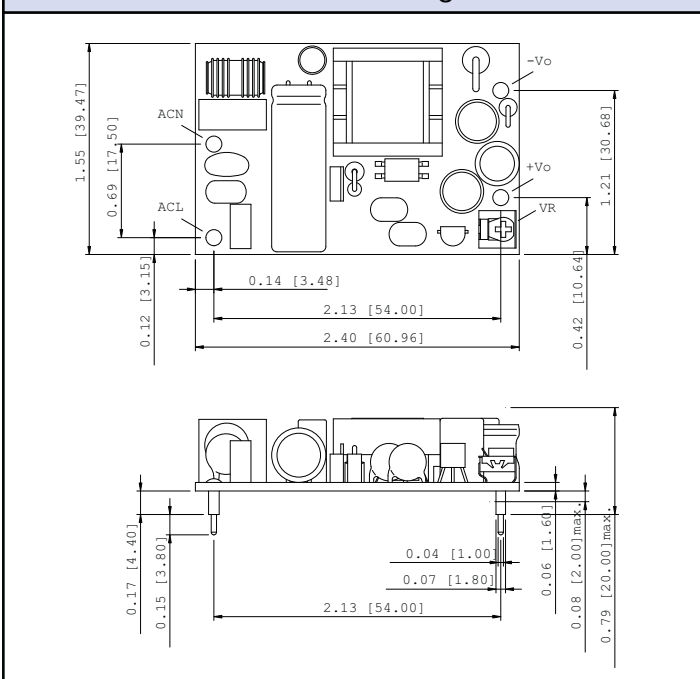
Model Selector (other voltages available)

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

KPSA10 Outline Drawing



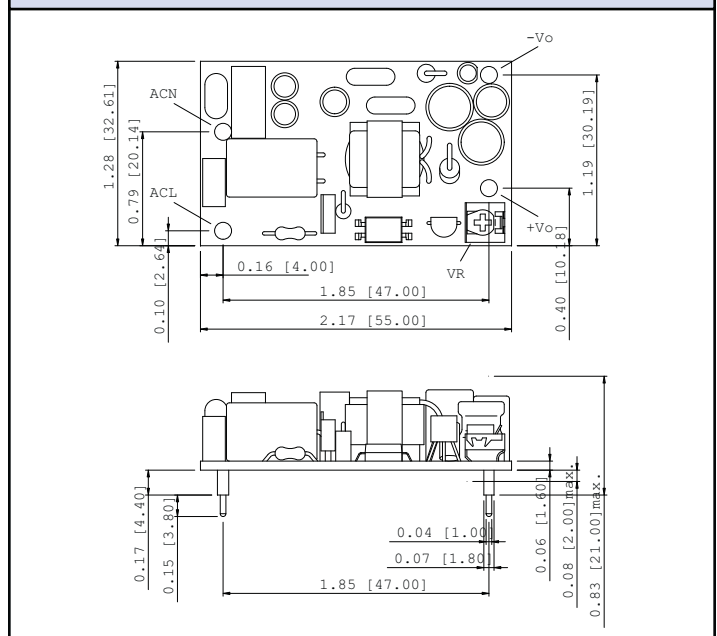
Other Industrial Products

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

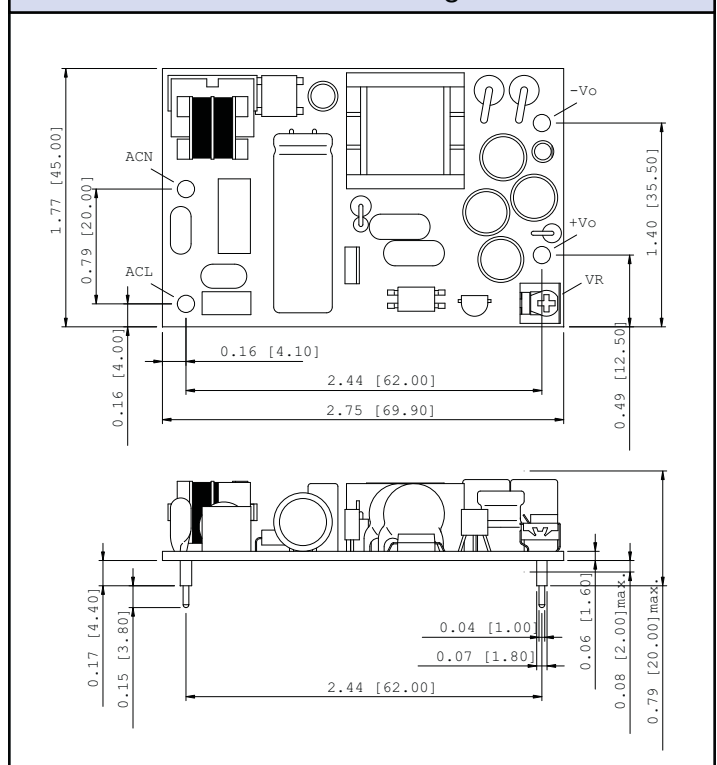
For Additional Information, please visit
us.tdk-lambda.com/lp/products/kps-series.htm



KPSA5 Outline Drawing



KPSA15 Outline Drawing



10-30W 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



ZWS15B Shown



Specifications				
Model		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/s² constant. X, Y, Z for 1 hour each		
Shock	m/s²	< 196m/s²		
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 (Iv 4), -3 (Iv 3), -4 (Iv 4), -5 (Iv 4), -6 (Iv 3), -8 (Iv 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:

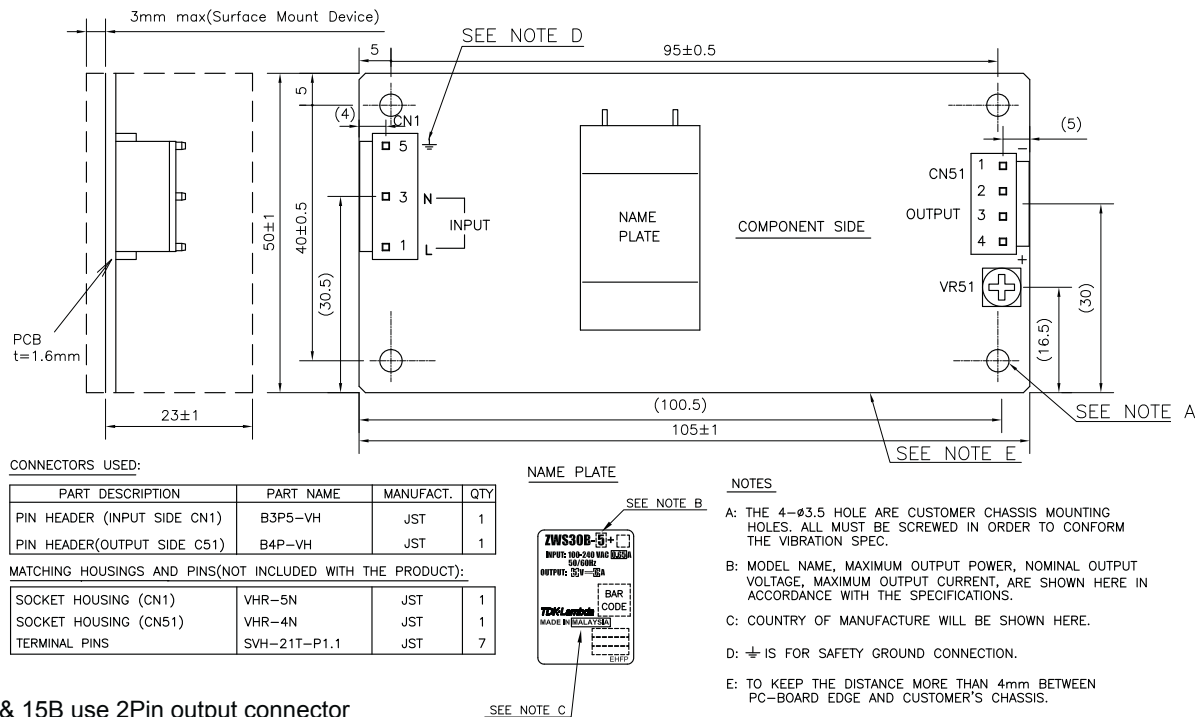
- (1) Derate linearly to 90% load from 90VAC to 85VAC input
Refer to detailed specifications and application notes on web page

*Safety certified for AC input only

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 (see website for ZWS10B & 15B outlines)



ZWS10B & 15B use 2Pin output connector

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

14-22W, 2 x 3.5" 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



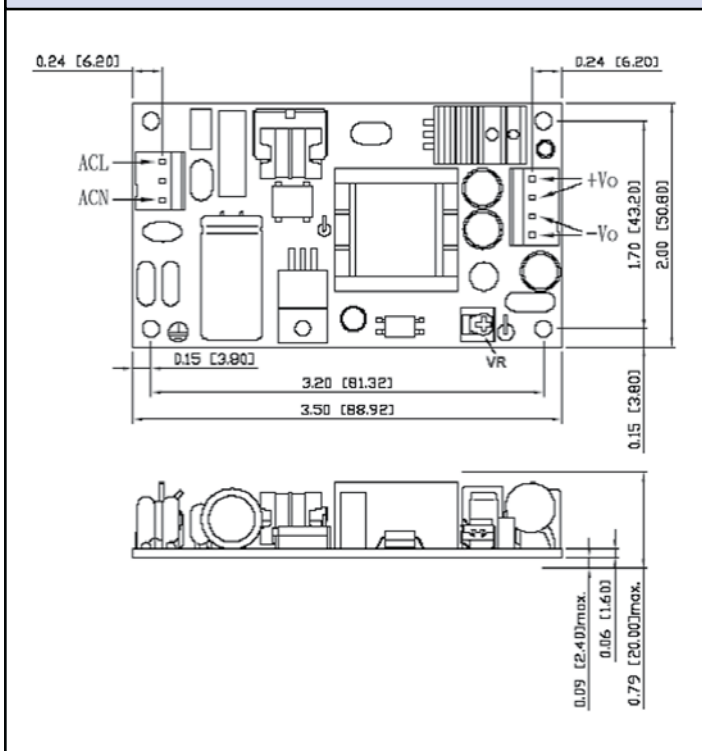
Specifications

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	0.4 / 0.25
Leakage Current	mA	0.6mA maximum (264VAC, 60Hz)
Hold Up Time (Typ)	ms	12ms 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 ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (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

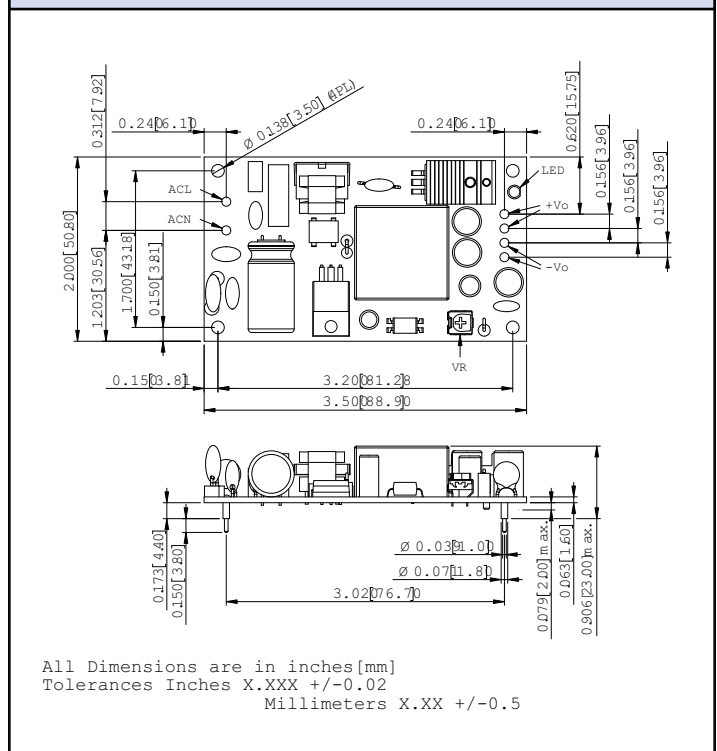
(1) Safety certified for 47 - 63Hz input only

(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 (220-240VAC).

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



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		
Model		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 0.08 max 0.06 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	-	UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN60950-1, CE Mark
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

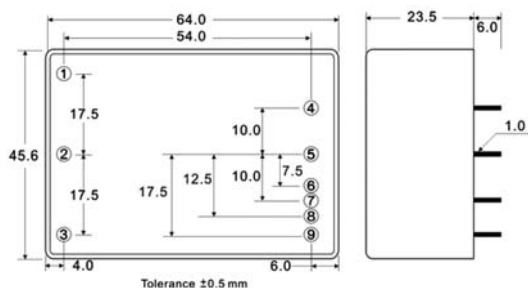
(1) KM15 derates linearly to 40% load

*Safety certified for AC input only

Output Ratings

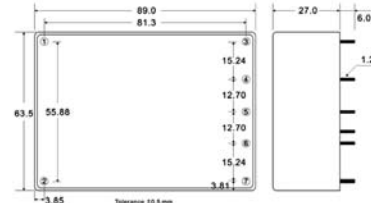
		Output Voltage	Minimum Current	Maximum Current	Power	Output Set Accuracy	Line Regulation	Load Regulation (1)	Cross Regulation	Efficiency
Model		(V)	(A)	(A)	(W)	(%)	(%)	(%)		(%)
Single Output										
KMS15-3P3	V1	3.3V	0A	3.00A	9.9W	±2%	0.5%	1%	-	74%
KMS40-3P3	V1	3.3V	80mA	8.00A	26.4W	±2%	0.5%	1%	-	75%
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%
Dual Output										
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%	
Triple Output										
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



33-150W 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					
Model		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 ² constant X, Y, Z 1 hour			
Shock	-	< 196.1 m/s ²			
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 1.46 x 6.3"
Warranty	yrs	Five Years			

Notes:

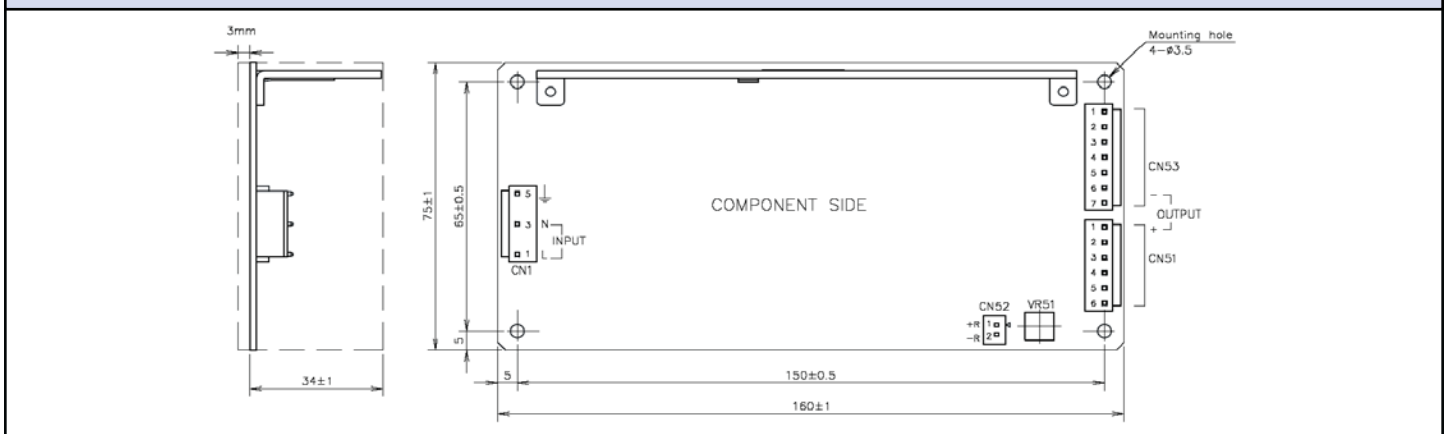
- (1) Avoid prolonged operation in overload
- (2) 100 / 200VAC Input
- (3) 60°C: 70% load

*Safety certified for AC input only

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



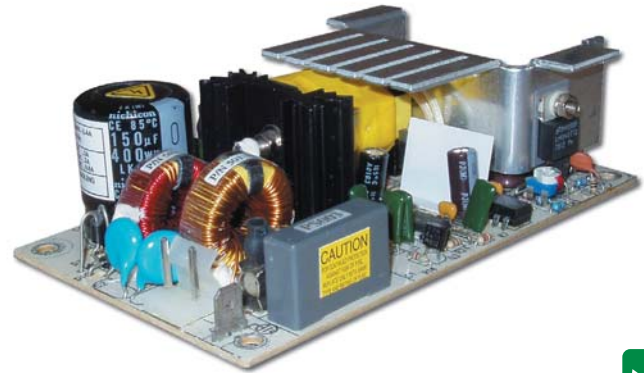
Options

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	-

40-60W, 3 x 5" 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						
Model		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

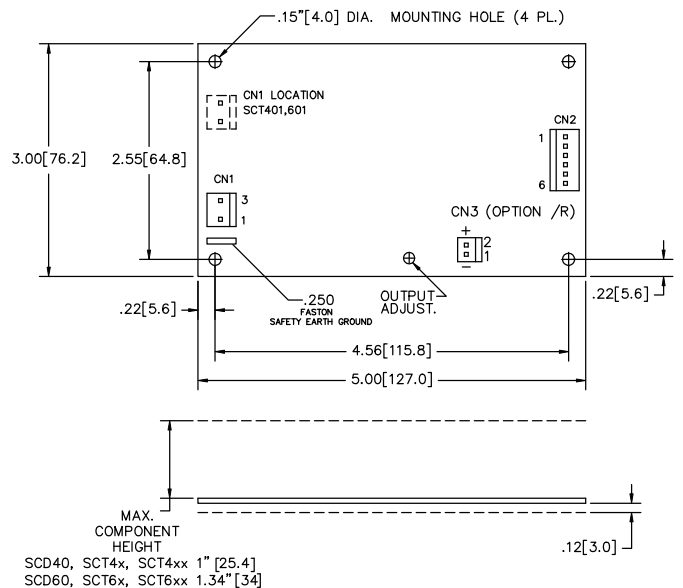
Note: See Installation Manual for full details, test methods of parameters and application notes

(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
Triple Output	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

Outline Drawing



NOTES:

1. DIMENSIONS SHOWN IN INCH [mm]
2. TOLERANCE .02 [0.5] MAXIMUM
3. MATING CONNECTORS:

CN1	MOLEX	09-50-8031
CN2	MOLEX	09-50-8061
CN2	MOLEX	09-50-8071 (SCT401/601)
CN1, 2 PINS	MOLEX	08-52-0113
CN3	MOLEX	22-01-3027
CN3	PINS MOLEX	08-50-0114

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
VS, 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



40-60W, 2 x 4" 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		ZPSA40ZPSA60
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 ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (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

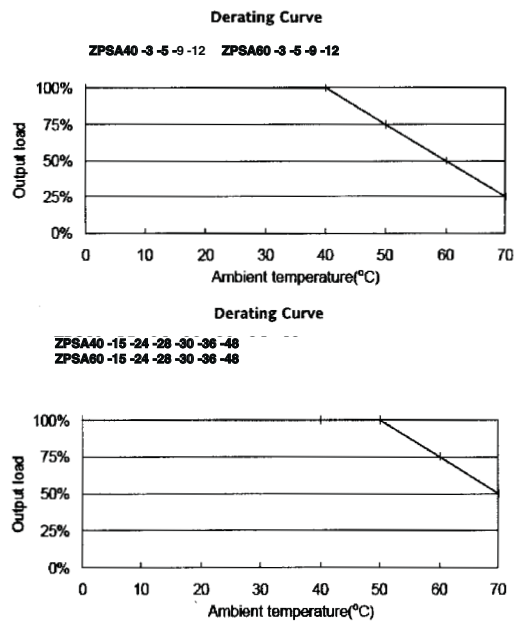
*Safety certified for 47-63Hz input only

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	86
ZPSA60-30	30	-	2.0	2.4	60	86
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	87
ZPSA60-48	48	-	1.25	1.5	60	87

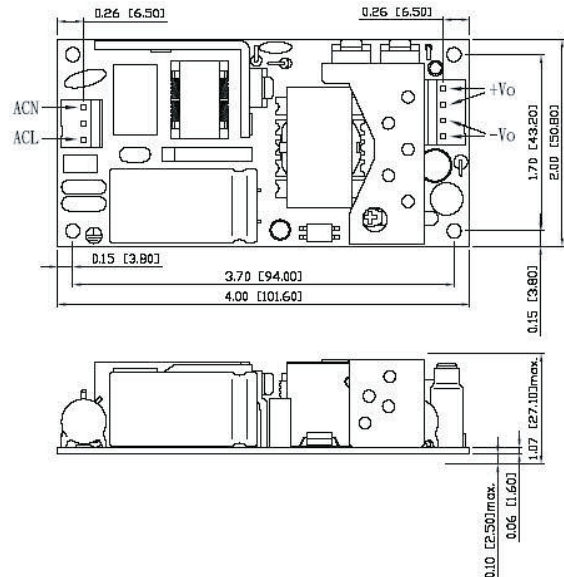
(4) Average not to exceed max power, <30s, 10% duty cycle

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



40-65W, 2 x 4" 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	-25 to +85°C
Humidity (non condensing)	-	10 - 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 ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, CE Mark
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

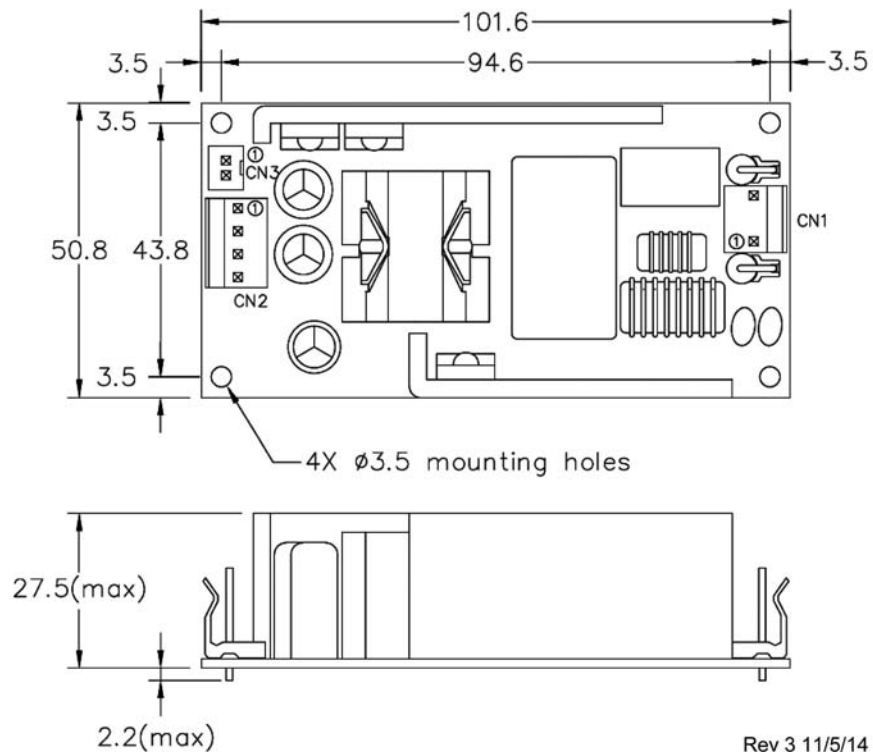
*Safety certified for AC input only

Outline Drawing

CN1 (AC Input)
Pin 1 Neutral
Pin 2 No connection
Pin 3 Line

CN2 (DC Output)
Pin 1 +Vout
Pin 2 +Vout
Pin 3 0V
Pin 4 0V

CN3 (Remote Sense)
Pin 1 - sense
Pin 2 + sense



Rev 3 11/5/14

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



- ◆ 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

75W Dual or Triple Output Low Profile Power Supplies

Features

- ◆ 3 x 5 x 1.06" footprint
- ◆ Output 1 isolated from outputs 2 & 3
- ◆ No minimum loading
- ◆ Convection Cooled
- ◆ Three year warranty



Key Market Segments & Applications



Specifications		
Model		
		CUT75-522
		CUT75-5FF
AC Input Voltage (1)	VAC	85 - 265VAC
Input Frequency	Hz	47 - 63Hz
DC Input Voltage	VDC	120 - 370VDC (No safety certification)
Inrush Current (cold start)	A	18A at 100VAC, 36A at 200VAC
Power Factor	-	Meets EN61000-3-2
Input Current (100 / 200VAC)	A	2 / 1
Temp. Coefficient (-20 to +70°C)	-	V1: <0.02%/°C, V2 & 3 <0.03%/°C
Overcurrent Protection	-	> 105%
Overvoltage Protection (2)	V	V1: 5.7-7.0, V2: 13.8 - 18.8V V1: 5.7-7.0, V2: 17.2 - 21.0V
Efficiency (Typical)	%	85% at 200VAC input
Hold Up Time (115 / 230V input)	ms	20ms
Leakage Current (265VAC 50Hz)	mA	<0.3mA
Operating Temperature (3)	-	-20 to +70°C. Derate linearly to 60% load from +50 to +70°C
Storage Temperature	-	-30 to +85°C
Op. Humidity (non condensing)	-	5 - 95% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC, V1 to V2 / V3 500VAC for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s ² constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s ² (20G)
Immunity	-	IEC61000-4-2 (lv 3, 4), -3 (lv3), -4 (lv 4), -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	-	EN55011/EN55022-B, FCC--B
Weight (Typ)	g	210 (open frame version)
Size (WxLxH)	in (mm)	3 x 5 x 1.06" (76 x 127 x 27)
Warranty	-	Three Years

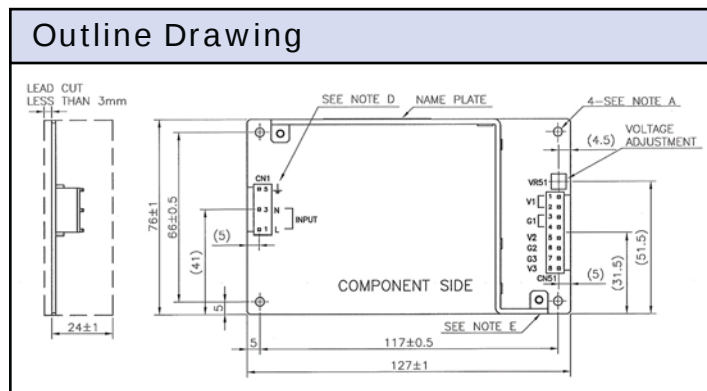
(1) Derate linearly to 60% load from 100VAC to 85VAC input

(2) Cycle AC to reset

(3) See derating curves in installation manual for all mounting orientations

Model Selector								
Model		Voltage (V)	Adjust Range (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)
CUT75-522	V 1	5V	5.0 - 5.25	8	40	100	50	120
	V2	+12V	Fixed	3	36	600	240	150
	V3	-12V	Fixed	1		600	240	150
CUT75-522	V1	5V	5.0 - 5.25	8	40	100	50	120
	V2	24V	Fixed	1	24	750	300	150
	(Leave common terminal unconnected)							
CUT75-5FF	V1	5V	5.0 - 5.25	8	40	100	50	120
	V2	+15V	Fixed	2.5	37.5	750	300	150
	V3	-15V	Fixed	1		750	300	150
CUT75-5FF	V1	5V	5.0 - 5.25	8	40	100	50	120
	V2	30V	Fixed	1	30	750	300	150
	(Leave common terminal unconnected)							

Note: CUT75 can be configured as a dual or triple output.



Options	
Suffix	Description
Blank	Open frame with JST connectors
/A	Cover with JST connectors
/B	Baseplate with JST connectors
/T	Open frame with screw connections
/TA	Cover with screw connections
/TB	Baseplate with screw connections

Preferred Model

Similar Models	
SC40-60	3x5" 40W to 60W 1 to 3 outputs
ZPT	2x4" 40W 1 to 3 outputs
NV175	3x5" 175W, 1 to 4 outputs
ZMS100	2x4" 100W single output

For Additional Information, please visit
us.tdk-lambda.com/lp/products/cut75-series.htm



80-170W 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 -5222	ZWQ80 -5223	ZWQ80 -5224	ZWQ80 -5225	ZWQ130 -5222	ZWQ130 -5223	ZWQ130 -5224	ZWQ130 -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/s² constant X, Y, Z 1 hour							
Shock	-	< 196.1 m/s²							
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

*Safety certified for AC input only

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

- (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.

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

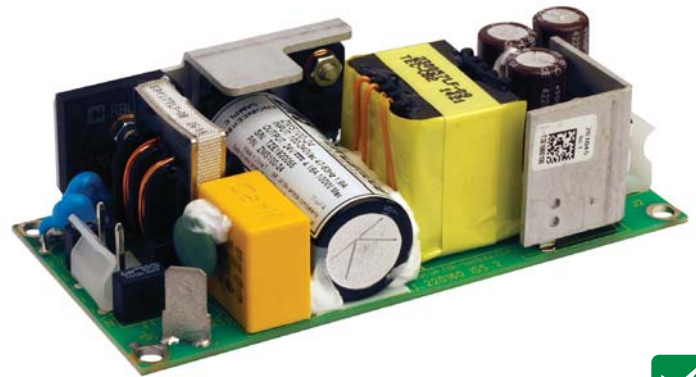
For Additional Information, please visit
us.tdk-lambda.com/lp/products/zwq-series.htm



100W, 2 x 4" AC-DC Power Supplies

Features

- ◆ 80W Convection, 100W with Forced Air
- ◆ ITE & Medical Certifications (2 x MOPP)
- ◆ Long Capacitor Lifetimes
- ◆ Class I and Class II operation
- ◆ Compact 2 x 4 x 1.25" Size



Key Market Segments & Applications



Specifications

Model		ZMS100
Input Voltage range (1)	-	90 - 264VAC (47 - 63Hz)
Inrush Current (Cold start at 264VAC input)	A	<40A
Input Current (100W load)	A	2.0 / 1.0A (115 / 230VAC)
Hold Up Time (Typ)	ms	5ms at 100VAC input, 50ms at 230VAC
Harmonic Compliance	-	EN/IEC61000-3-2 class A
Leakage Current	uA	<100uA at 100VAC 60Hz input, <250uA at 230VAC 50Hz
Touch Current (enclosure leakage)	uA	<100uA
Temperature Coefficient	-	±0.02%/°C
No Load Power Draw at 230VAC input	W	<0.5W
Ripple & Noise	mV (pk-pk)	≤2%
Load Regulation	mV	≤1% (0 - 100% load)
Line Regulation	mV	≤0.5% (90 - 264VAC)
Short Circuit Protection	-	Hiccup mode, automatic recovery
Overvoltage Protection	V	Latching (unit shutdown), cycle AC input to reset
Efficiency	%	Up to 90%
Active Average Efficiency	%	>87%
Operating Temperature	°C	-20 to +70°C, derate linearly to 50% load from 50 to 70°C
Storage Temperature	°C	-40 to +85°C
Humidity (non condensing)	%RH	5 - 95%RH
Cooling	-	Convection cooling 80W Forced air 100W (see technical datasheet on website)
Withstand Voltage	VAC	Input to Ground 1.5kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP)
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Insulation Class	-	Construction suitable for Class II installation
Vibration (non operating)	-	10 to 500Hz at 2G, IEC610068-2-6, 19.6m/s ² constant sweep X, Y, Z for 1 hour
Shock	-	30G EN610068-2-27, -47, MIL-STD-810E
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1. ES60601-1. Designed to meet IEC61010-1, CQC safety standard GB4943.1-2011
Conducted & Radiated EMI	-	EN55011 / EN55022-B conducted, -A radiated
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8 (Level 3 criteria A) -11 (class 3), -12 (level 3)
Weight (Typ)	g	150
Size (WxLxH)	Inch (mm)	2 x 4 x 1.26" (50.8 x 101.6 x 31.9mm)
Warranty	yrs	Three years
Connectors	-	MoLEX as standard with separate ground faston Input MoLEX 10-63-4027, output MoLEX 09-65-2048

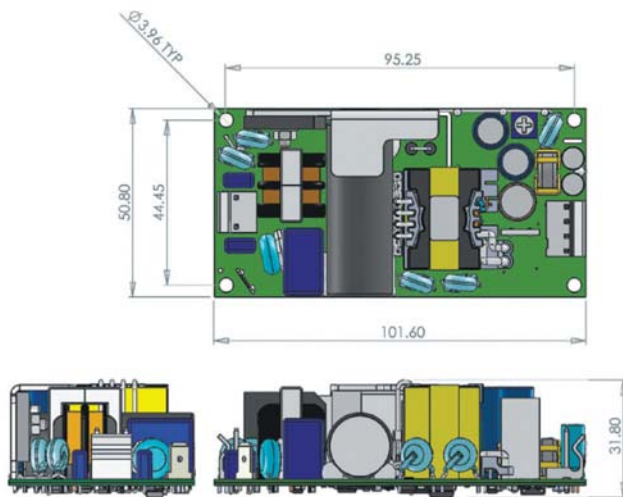
1) ZMS100-12 derate linearly to 90% load from 100V to 90VAC input

Model Selector

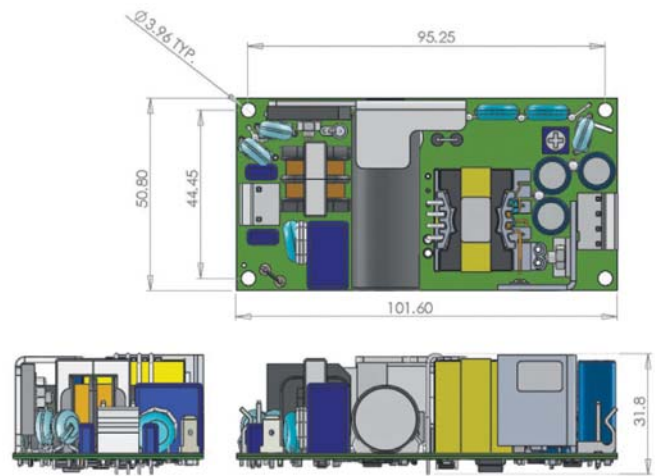
Model	Output Voltage (V)	Adjustment Range (V)	Maximum Current (Convection)	Maximum Current (Forced Air)	Maximum Power (Convection)	Maximum Power (Forced Air)
Single Output						
ZMS100-12	12	11.4 - 13.2V	6.7A	8.4A	80.4W	100.8W
ZMS100-15	15	14.25 - 16.5V	5.4A	6.7A	81.0W	100.5W
ZMS100-24	24	22.8 - 26.4V	3.4A	4.2A	81.6W	100.8W
ZMS100-36	36	32.4 - 39.6V	2.25A	2.8A	81.0W	100.8W
ZMS100-48	48	45.6 - 52.8V	1.67A	2.1A	80.2W	100.8W

Outline Drawing

ZMS100 12 - 15V Series



ZMS100 24 - 48V Series



Other TDK-Lambda AC-DC Products

ZPSA20-60	20 to 60W single output
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

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zms-series.htm



120W, 3 x 5" 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 ² (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%

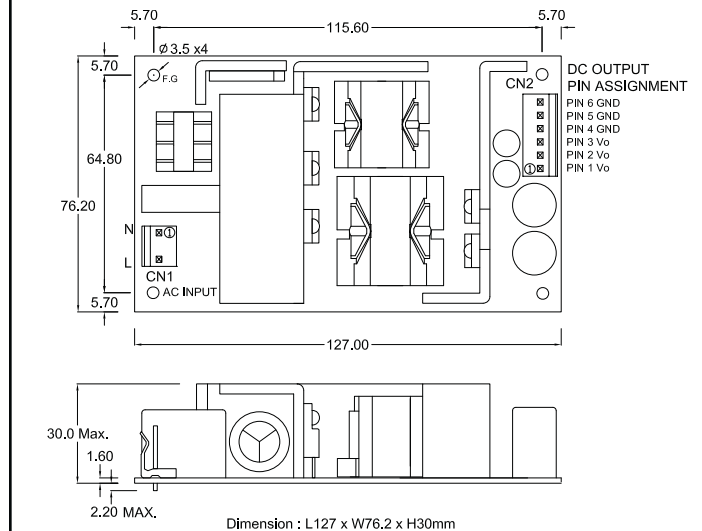
Mating Connectors

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



150W, 3 x 5" 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



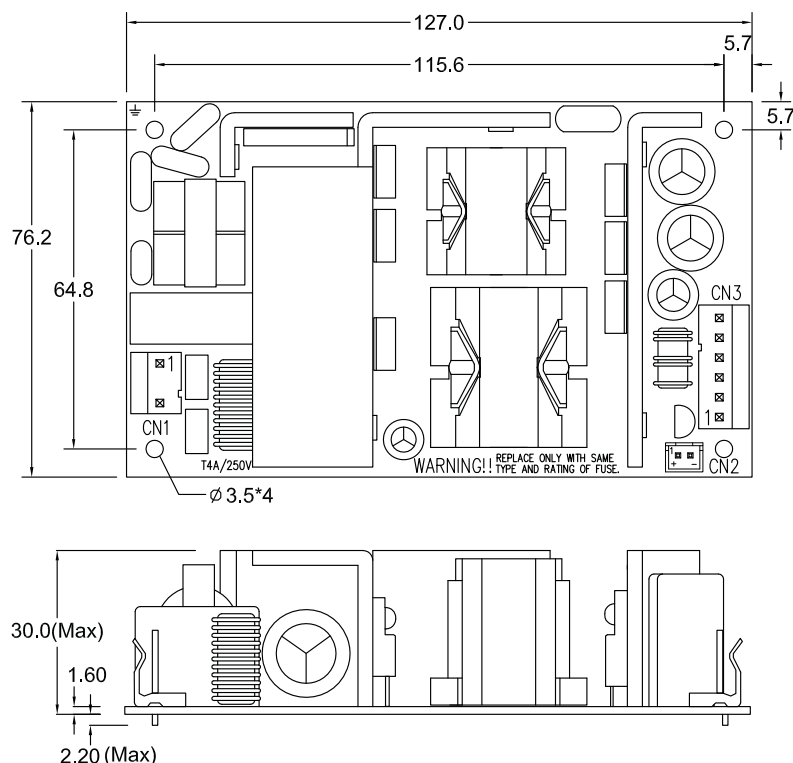
Specifications

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)	-	10 - 95% RH
Cooling	-	Convection or forced air (2.5m/s)
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC (2 x MOOPs 3rd Edition), Output to Ground 500VDC for 1 min.
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	19.6m/s ² (10~55Hz:2G Constant, X,Y,Z 60min each.)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	UL/CSA/IEC/EN 60950-1, UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, CE Mark
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.

*Safety certified for AC input only

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



150-480W 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)	(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 ² constant X, Y, Z 1 hour each	
Shock	-	< 196.1 m/s ²	
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 (lvl 2, 3), -3 (lvl 3), -4 (lvl 3), -5 (lvl 3, 4), -6 (lvl 3), -8 (lvl 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

*Safety certified for AC input only

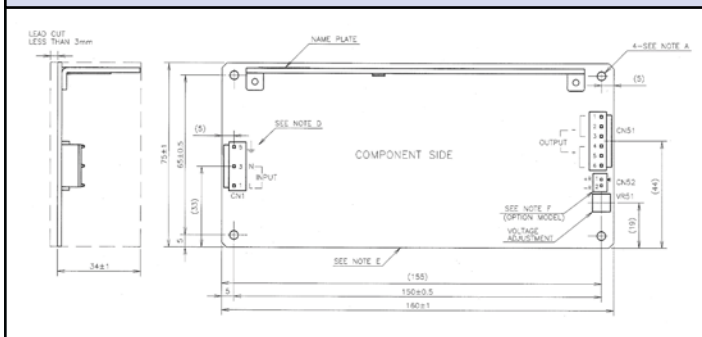
Model Selector

Model	Output Voltage	Adjust Range	Max Current	Max Power	Peak Current ⁽⁴⁾	Peak Power ⁽⁴⁾
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

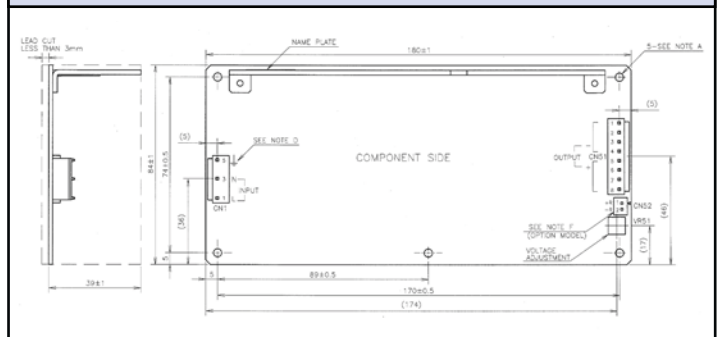
Note 4: For 5s maximum, 15% duty cycle, average power not to exceed maximum ratings.

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



Model Selector

Models suffix	Description
Blank	JST Connectors, no Cover
/L	JST Connectors, L bracket
/A	JST Connectors, Cover
/R	JST Connectors, Remote On/Off
/T	Screw terminals, no Cover or L Bracket*
/TL	Screw terminals, L Bracket*
/TA	Screw terminals, Cover*
/CO2	JST Connectors, pcb coating

* ZWS240BP only

175-200W, 3" x 5" 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	-	UL/CSA/IEC/EN 60950-1, UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN 61010-1, CE Mark
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.

See NV175-M for reinforced medical insulation

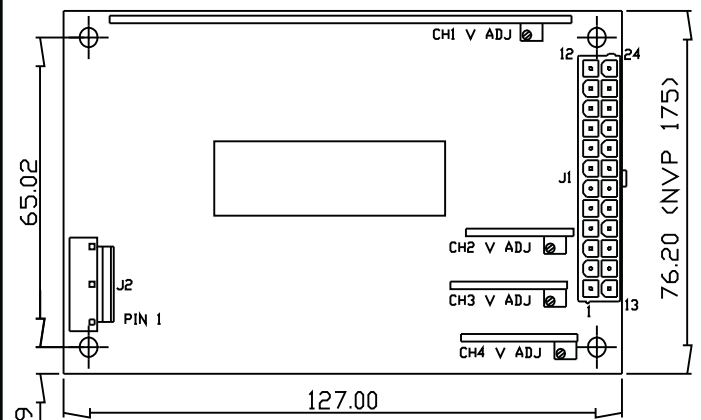
Stocked Models Quick Selector

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



See the website for detailed datasheet and outline drawing.

Built to Order Model Selector

CH1	CH1(5)	Adjust.		CH2	Adjust.	CH3	Adjust.		CH4	Adjust.	
	Code	Range	CH2(5)	Code	Range	CH3	Code	Range	CH4	Code	Range
+5V / 25A	5	5 - 5.5V	+1.8V / 15A	1	0.9 - 3.3V				-12V / 1A	T	Fixed
			+2.7V / 15A	2	2.5 - 3.3V				-15V / 1A	F	Fixed
			+3.3V / 15A	3	2.5 - 3.3V				-3.3V / 2A	3H	Fixed
			No output	0	-				-5V / 2A	5H	Fixed
						+12V / 5A	T	12 - 15V	-12V / 2A	TH	Fixed
						+15V / 5A	F	12 - 15V	-15V / 2A	FH	Fixed
+12V / 15A	T	12 - 15V (8)	+5V / 10A	5	3.3 - 5.5V	+24V / 2.5A	G	18 - 24V	Fan Supply only	0H	Fixed
+15V / 12A	F	12 - 15V (9)	No output	0	-	No output	0	-	No output	0	
						Add "Y" to code for negative polarity output			Add "P" to code for positive polarity output	Add "P" to code for positive polarity output	
+24V / 7.5A	G	24 - 28V (10)	+5V / 8A	5	3.3 - 5.5V						
			No output	0	-						

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
AC Fail, Remote On/Off, 5V/2A Standby, CH1 DC Good
AC Fail, Remote On/Off, 12V/1A Standby, CH1 DC Good
AC Fail, Remote On/Off, 13.5V/1A Standby, CH1 DC Good
ATX AC Fail+Remote On/Off, 5V/2A Standby, CH1 DC Good
ATX AC Fail+Remote On/Off, 12V/1A Standby, CH1 DC Good

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

Blank
N
N1
N2
N3
N4

Blank
U
C
F
I

No Case
U Chassis
U Chassis with Cover
U Chassis, Cover and Fan*
U Chassis, Cover and Fan* and IEC inlet

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



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	
Input Frequency	-	45 - 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

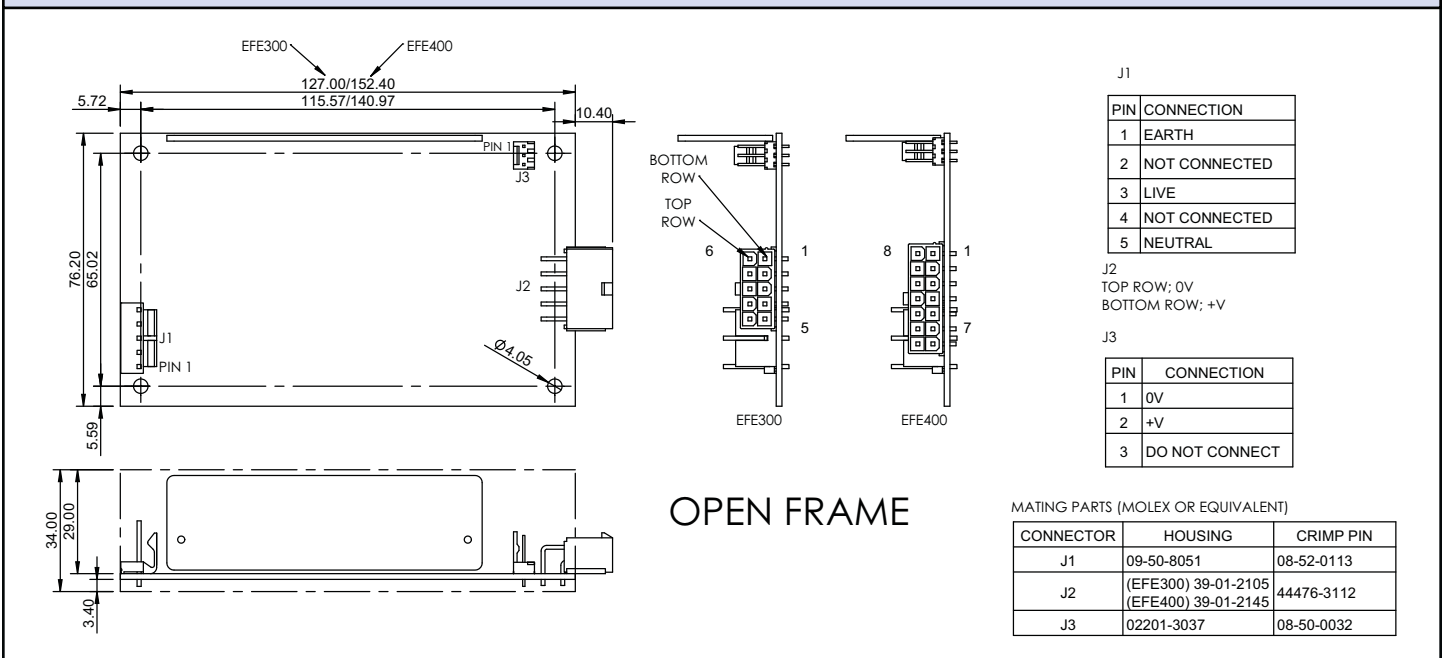
Model Selector

Product Code	Part Description	Style	Output Voltage (V)	Output Current (A)	Average Output Power (W)	Peak Output Current (A) ⁽⁵⁾	Peak Output Power (W) ⁽⁵⁾
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



Options

Part Description Suffix	U Chassis	Cover	Internal Fan
-CNMDs	N	N	N
-CUMDs	Y	N	N
-CCMDs	Y	Y	N
-ECMDs	Y	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



300-400W 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
Input Frequency	-	45 - 63Hz, 440Hz with reduced PFC
Inrush Current	A	<40A at 25°C 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 ⁽³⁾ , (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	-	UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN 61010-1 ⁽⁴⁾ , IEC/UL/EN/CSA 60950-1, CE Mark
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
Size (Open frame style) (1)	in	3 x 6 x 1.34"
Warranty	hrs	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) ⁽⁵⁾	Peak Output Power (W) ⁽⁵⁾
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	530
U6Y001H	EFE400M-12-5-HNMDL-YT	Open Frame	12	33.3	400	44.17	530
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	22.08	530
U6Y002J	EFE400M-24-5-HNMDL-YT	Open Frame	24	16.67	400	22.08	530
U5Y0166	EFE300M-48-5-ECMDL-YT	With Fan	48	6.25	300	7.29	350
U5Y0201	EFE300M-48-5-HNMDL-YT	Open Frame	48	6.25	300	7.29	350
U6Y009R	EFE400M-48-5-ECMDL-YT	With Fan	48	8.33	400	9.79	470
U6Y003K	EFE400M-48-5-HNMDL-YT	Open Frame	48	8.33	400	9.79	470

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

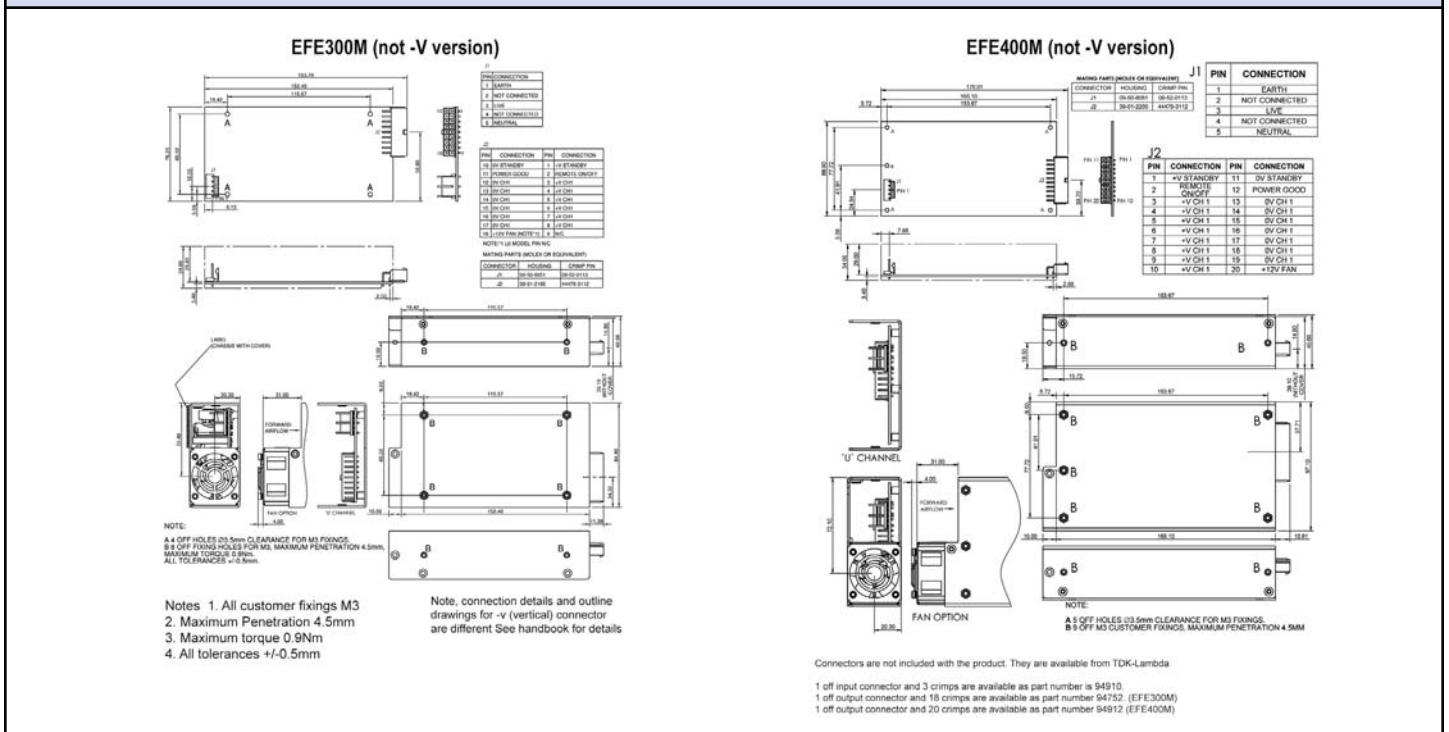
Note: The EFE300M is also available with 28V and 50V.

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



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



300-1008W 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		PFE300SA PFE500SA	PFE700SA	PFE500F	PFE1000F
AC Input	VAC	85 to 265VAC, 47-63Hz (up to 440Hz) (4)			
Input Current (100 / 220VAC)	A	3.5 / 2.0	8.3 / 4.0	6.8 / 3.4	13.6 / 6.6
Model dependant		6.0 / 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 ²), X, Y, Z 1 hour each			
Shock	-	196.1m/s ²			
Safety Certifications	-	UL60950-1, CSA60950-1 (cUL), EN60950-1, CE mark (LVD)			
Weight	g	200	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	5 years		2 years	

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

- 1) External components are required, consult Application Notes
- 2) PFE500SA-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.

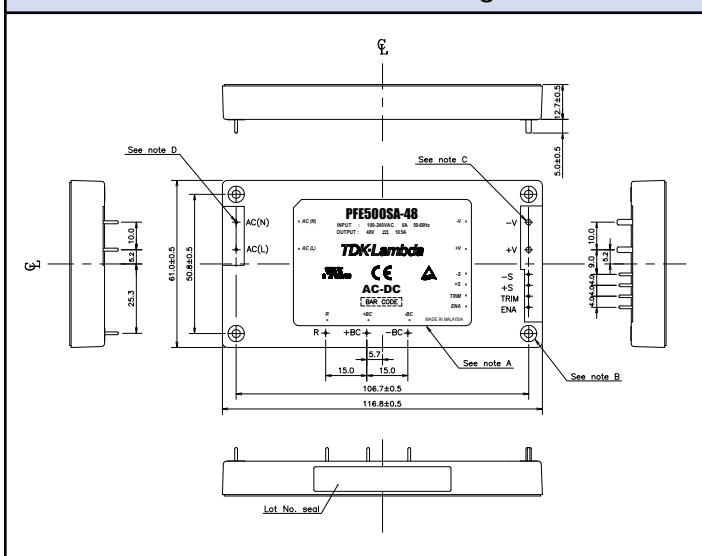
Specifications

Model	Output Voltage (V)	Adjust. Range (V)	Maximum Current (A)	Maximum Wattage (W)	Load Reg. (mV)	Line Reg. (mV)	Efficiency typ (4)
PFE300SA-12	12	9.6 - 14.4	25	300	48	48	84 / 85
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
PFE300SA-28	28	22.4 - 33.6	10.8	302	56	56	86 / 88
PFE500SA-28	28	22.4 - 33.6	18	504	56	56	87 / 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
PFE300SA-48	48	38.4 - 57.6	6.3	302	96	96	87 / 89
PFE500SA-48	48	38.4 - 57.6	10.5	504	96	96	89 / 91
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
PFE700SA-48	51	None	14	714	50 - 57V (5)		88 / 91

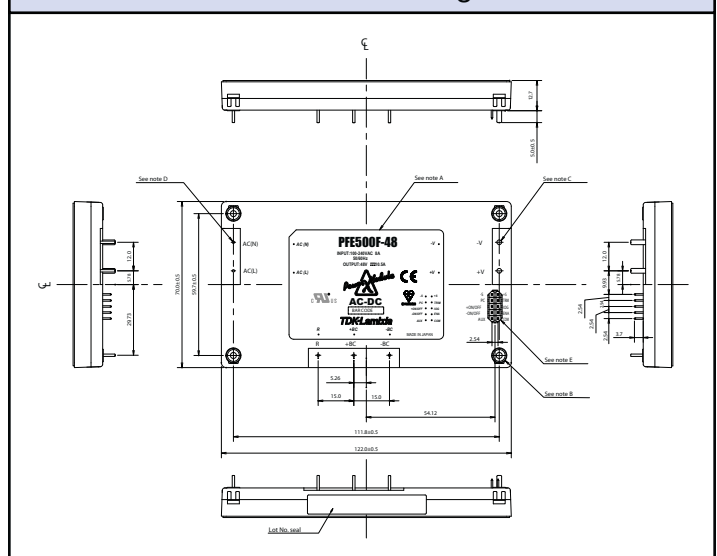
(4) 100 / 200VAC. Efficiency values at 115/230VAC are 1% higher.

(5) Total regulation range

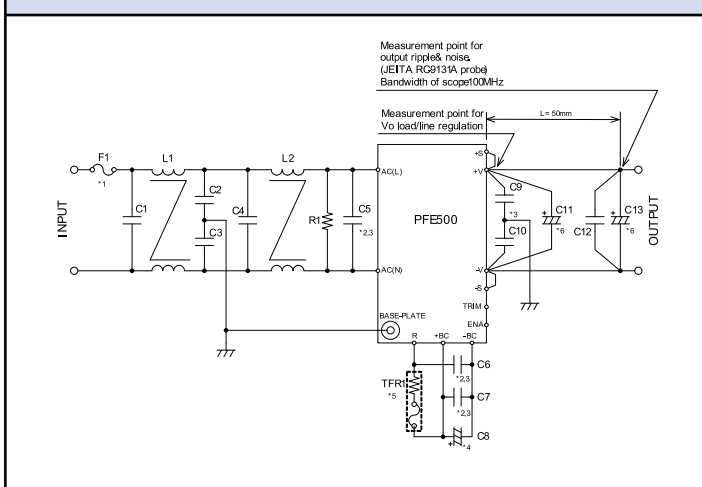
PFE500SA Outline Drawing



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



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

Model		ZWS300BAF
Input Voltage	V	85-265VAC (47-63Hz), 120-370VDC ⁽⁵⁾
Input Current	A	3.7 / 1.9 (Convection cooled rating)
Inrush Current ⁽¹⁾⁽²⁾	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 ⁽³⁾	-	>116% of convection cooled rated output current (>105% for 12V model)
Overvoltage Protection	V	12V: 13.8-16.2V, 15V: 17.3-20.3V, 24V: 28.8-33.6V, 36V: 41.4-48.6V, 48V: 55.2-64.8V
Hold Up Time (Typ) ⁽¹⁾	ms	18ms at 100VAC input (Convection cooled rating)
Efficiency ⁽¹⁾	%	12 & 15V models: 86 / 89%, 24V, 36V & 48V models: 88 / 91% (Convection cooled rating)
Remote On/Off	-	Optional, see instruction manual
Operating Temperature 12V & 15V Models	°C	Convection: -10°C to +70°C, derate linearly to 40% load from 40°C to 70°C 1.4m/s Airflow: -10°C to +70°C, derate linearly to 60% load from 50°C to 70°C
Operating Temperature 24V, 36V & 48V Models	°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 1.4m/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 ² constant X, Y, Z 1 hour each
Shock	-	< 196.1 m/s ²
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 OV II, CE Mark
Conducted & Radiated EMI ⁽⁴⁾	-	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; 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

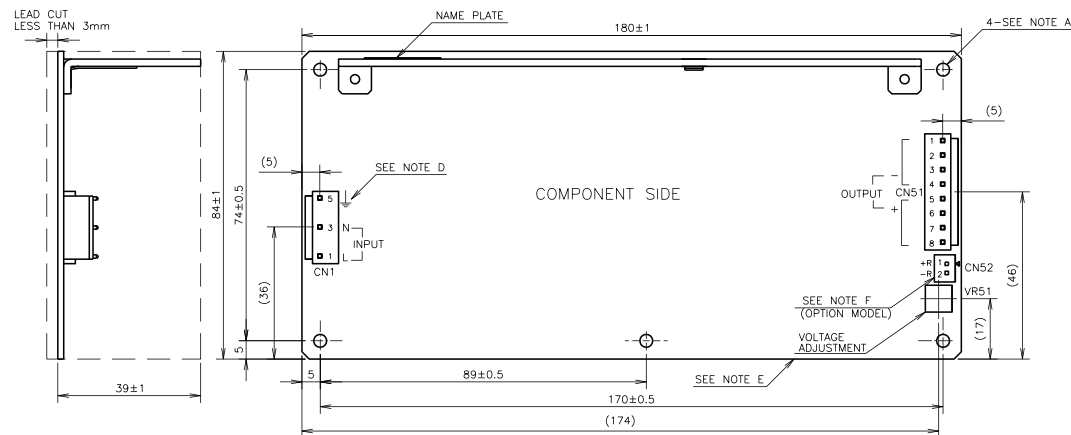
Notes:

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

Model Selector

Model	Output Voltage	Adjustment Range	Max Current Convection	Max Current Forced Air	Line Reg (mV)	Load Reg (mV)	Ripple & Noise (mV)
ZWS300BAF12	12V	9.6 - 13.2V	25A	25A	48	100	100
ZWS300BAF15	15V	13.5 - 20.3V	20A	22A	60	120	120
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



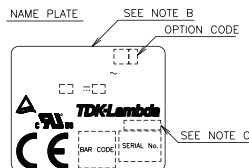
CONNECTORS USED:

PART DESCRIPTION	PART NAME	MANUFACT.	QTY
PIN HEADER (INPUT SIDE CN1)	B3PS-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
HAND CRIMPING TOOL	YC-160R	JST	-



SCALE FOR NAME PLATE : 2/1

NOTES

- A: 4- ϕ 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: $\downarrow$ 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
TDK-Lambda	
A254-02-01	

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

Similar Products

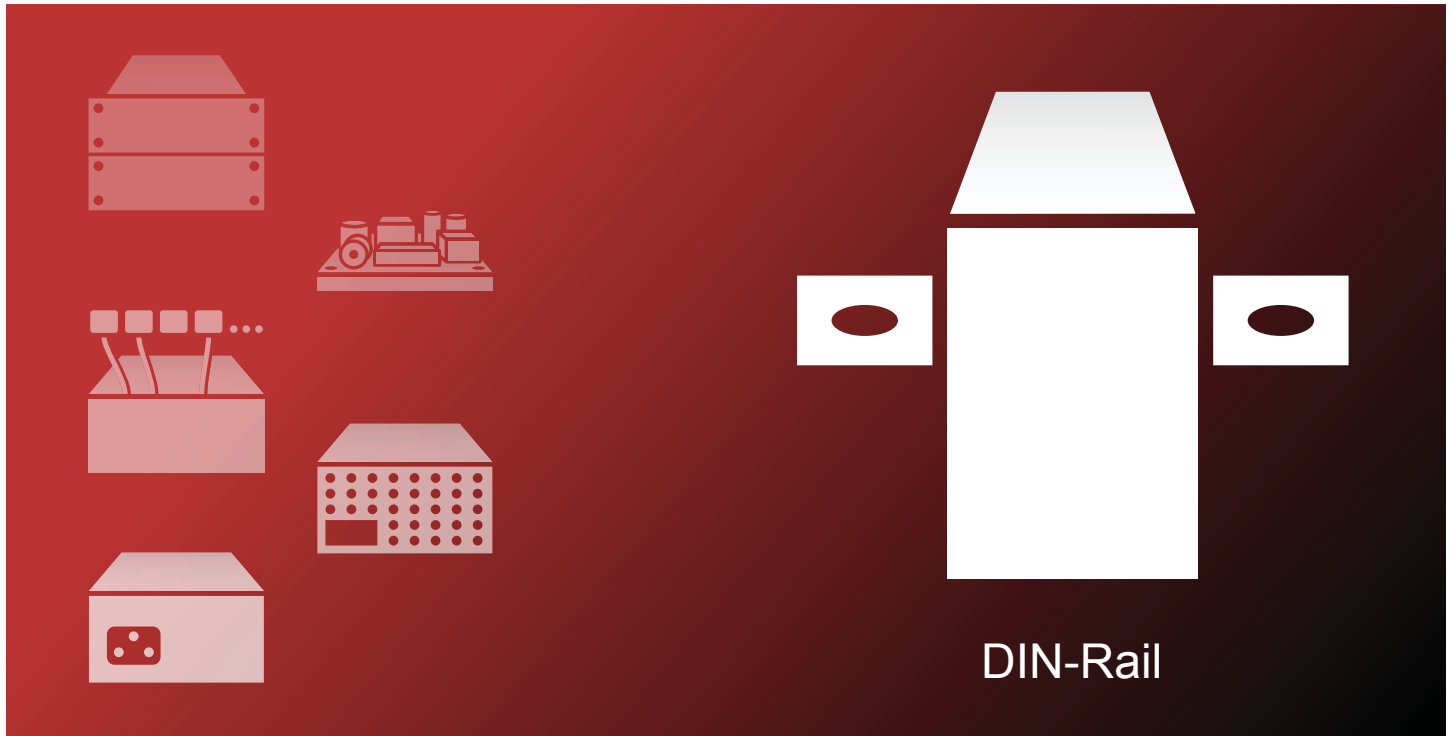
ZWS-B, -BAF, -BP	10W to 240W Single output
HWS	15W to 1800W Single Output, Enclosed
EFE	300W to 400W Single Output, Medical & ITE
CFE400M	300W to 400W Single Output, Medical & ITE

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zws-series.htm





AC-DC Power Supplies



Applications

- ◆ Factory Automation and controls
- ◆ Facility & Hotel or Home Automation
- ◆ Food & Beverage Industry
- ◆ Robot Controls
- ◆ Paper Handling, Sorting, Delivery Systems
- ◆ Process Automation
- ◆ Conveyors, Elevators, Escalators
- ◆ Typical for DIN-Rail mounting in cabinets

Features

- ◆ Efficiency up to 94% – NEW DRF-Series
- ◆ Mainly with 24V output, but also other output voltages from 5V to 48V are available
- ◆ Power range from 10W to 960W with convection-cooling
- ◆ Single-phase and three-phase input (for 120-960W models)
- ◆ Plastic cases for low-power units up to 100W, metal cases for higher output power
- ◆ Flat shape for wall mounted cabinets
- ◆ Slim shape for industrial cabinets
- ◆ UL 508 Listed
- ◆ Additional DC/DC-Converters up to 60W for DIN-Rail are also available

Wattage	Series	Page	Listed by Wattage
7.5-100W	DSP.....	111	
15-100W	DPP.....	113	
15-100W	DRB15-100.....	115	
40-60W	DPX (DC Input).....	117	
120-240W	DPP120-240.....	119	
120-480W	DRF120-480.....	121	
120-960W	DPP120-960.....	123	
480W	DPP480.....	125	

7.5-100W Low Profile DIN Rail Mount Power Supplies

Features

- ◆ Low Profile for Building Automation
- ◆ 5V to 24V Outputs
- ◆ Wide Range AC Input
- ◆ UL1310 Class 2⁽¹⁾
- ◆ 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 ⁽¹⁾ , 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	-	Flame Retardant Polycarbonate (UL94 V-0)			
Warranty	yrs	Three years			

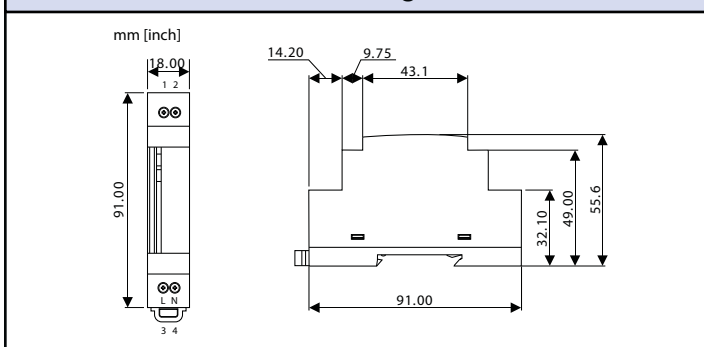
(1) See model selector on page 2.

*Safety certified for AC only

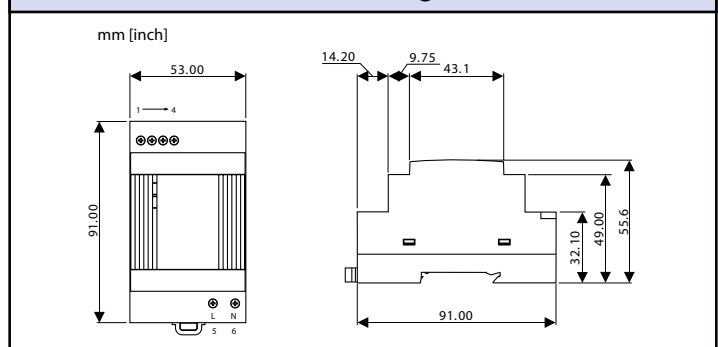
Model Selector

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	-

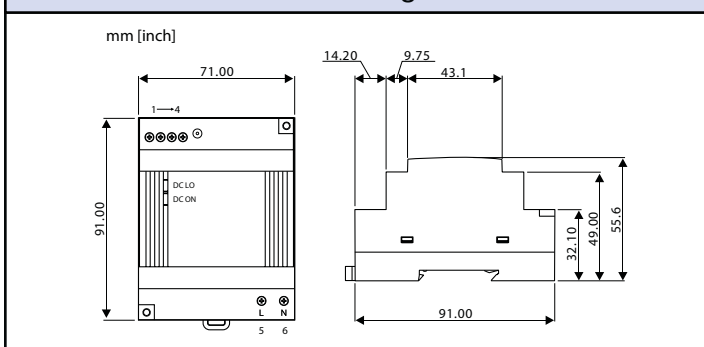
DSP10 Outline Drawing



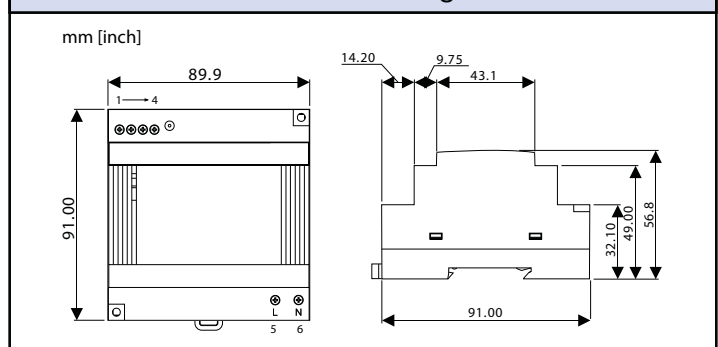
DSP30 Outline Drawing



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



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

Features

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



Key Market Segments & Applications



Industrial



RoHS

Specifications

Model		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%			
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 ² /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 ⁽²⁾ , EN60950-1, CE Mark, ISA 12.12 ⁽³⁾			
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 3, 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	-	Flame Retardant Polycarbonate (UL94 V-0)			
MTBF (MIL-HDBK-217F, GF25)	Hours	287,000	>288,000	269,000	239,000
Warranty	yrs	Three years			

(1) Recommend 1" clearance on all sides.

(2) See model selector. Evaluated to NEC NFPA70 Class 2 output per UL1310.

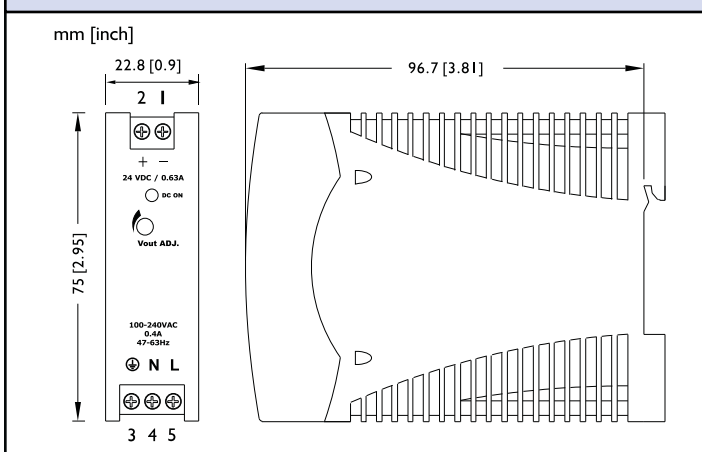
(3) See model selector.

*Safety certified for AC input only

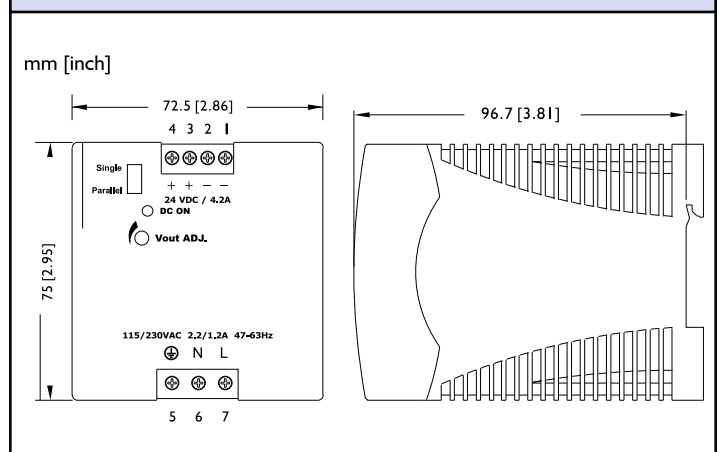
Model Selector

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

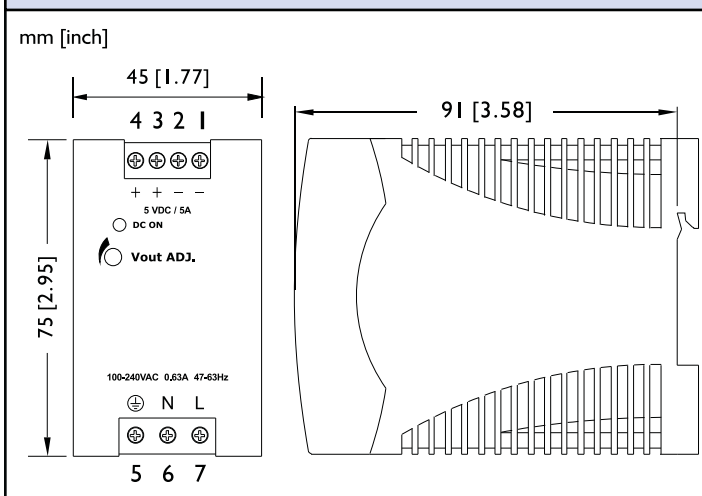
DPP15 Outline



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 0.5-2.5mm² (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



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					
Model		DRB15	DRB30	DRB50	DRB100
Input Voltage range	V	85 - 264VAC, 120 - 373VDC* (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 from 55 to 70°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 ² (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 (lvl 4) , -3 (lvl 3), -4 (lvl 4) -5 (norm mode lvl 3, com mode lvl 4), -6 (lvl 3), -8 (lvl 4), -11 (class 3)			
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

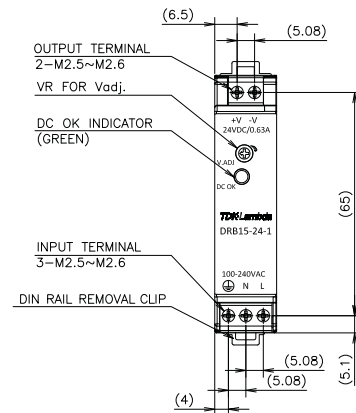
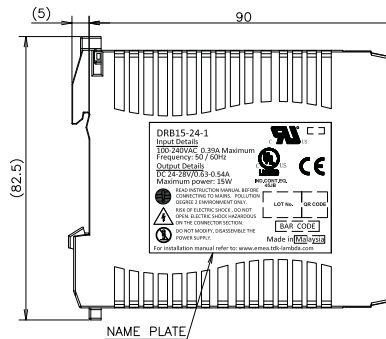
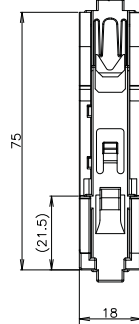
* Safety certified for AC input only

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	3.4A	51W(2)	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

(2) With output set at 15V. 40.8W maximum power when output is set at 12V.

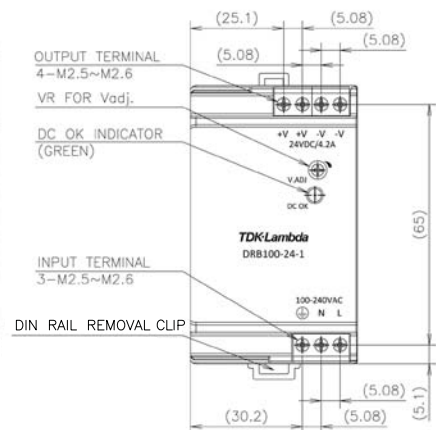
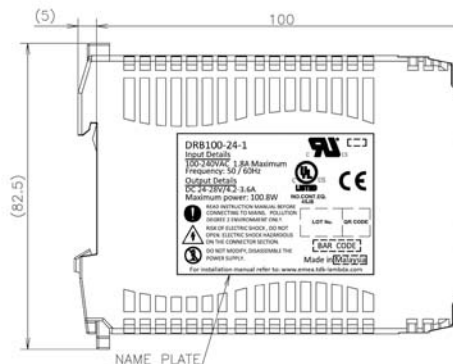
Outline DRB15

DIN RAIL REMOVAL BUTTON
BY PUSHING



Outline DRB100

DIN RAIL REMOVAL BUTTON
BY PUSHING



For Additional Information, please visit
us.tdk-lambda.com/lp/products/drbs-series.htm



40-60W Single, Dual & Triple Output 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



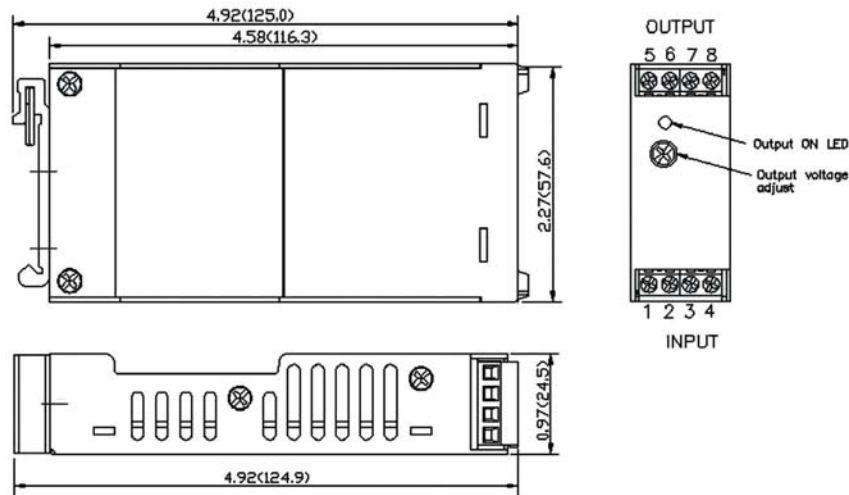
Key Market Segments & Applications



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	%/ $^{\circ}C$	$< \pm 0.02\%/^{\circ}C$		
Operating Temperature	$^{\circ}C$	-40 to $85^{\circ}C$, derate linearly to 20% load from $60^{\circ}C$ to $85^{\circ}C$		
Storage Temperature	$^{\circ}C$	-40 to $85^{\circ}C$		
Thermal Shock	-	MIL-STD-810D		
Relative Humidity	%RH	5 to 95%RH (non condensing)		
Trans. Resp.(25% step load chng.)	ms	250 μ 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	Ω	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)
Single Outputs					
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
Dual Outputs					
±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
Triple Outputs					
+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



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⁽²⁾ to +71°C Operation

Key Market Segments & Applications



Industrial



RoHS

Specifications

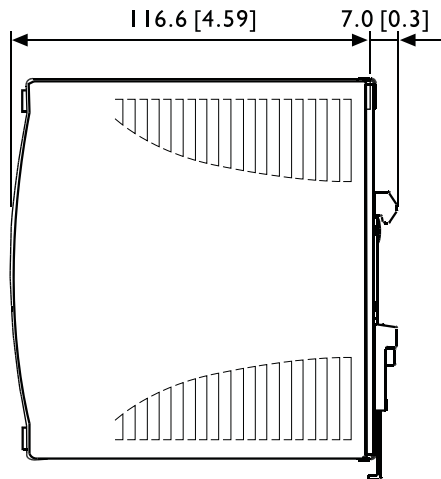
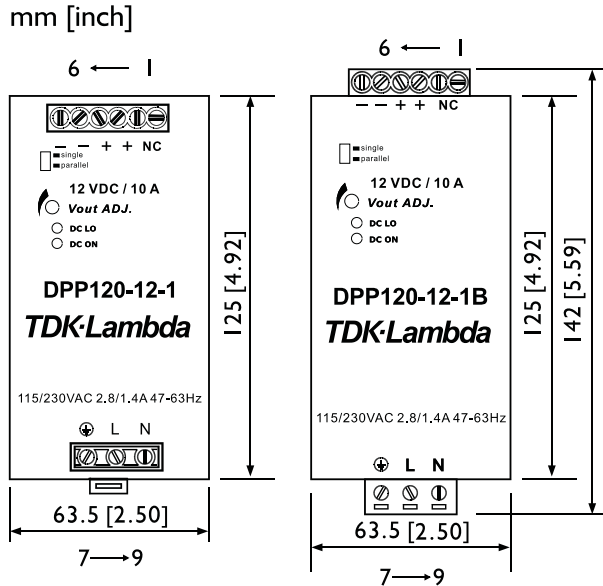
Model		DPP120-xx-1	DPP240-xx-1
AC Input Voltage range	VAC	93 - 132 / 186 - 264VAC, single phase. Auto select	
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage range	VDC	210 - 370VDC*	
Inrush Current (115 / 230VAC)	A	24 / 48A	30 / 60A
Power Factor	-	Meets EN61000-3-2	
Input Current (115 / 230VAC)	A	2.8 / 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 ⁽²⁾ 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 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	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	Three years	

(1) Recommend 1" clearance on all sides

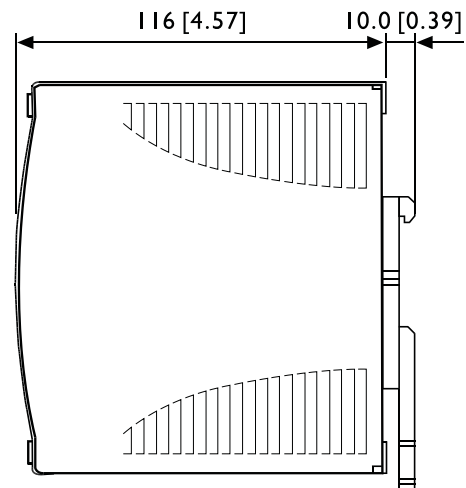
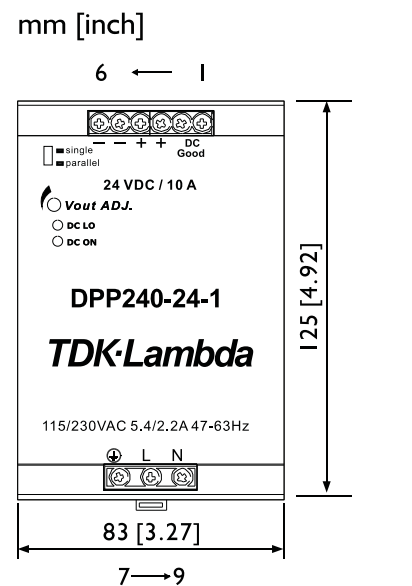
(2) DPP120 -35°C

*Safety certified for AC input only

Outline Drawing (DPP120)



Outline Drawing (DPP240)



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%

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

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

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



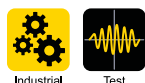
120-480W, 24V Output DIN Rail Mount Power Supplies

Features

- ◆ Very Compact Size
- ◆ High Efficiency (Up to 94%)
- ◆ 150% Peak Power Capability for 4s
- ◆ ErP Compliant Design
- ◆ Low Standby Power Draw
- ◆ Remote On/Off
- ◆ Remote Voltage Adjustment



Key Market Segments & Applications



Specifications				
Model		DRF120	DRF240	DRF480
AC Input Voltage range	VAC	85 - 264VAC (Withstands 300VAC for 5 seconds)		
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	-	>105% 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 ² (2G) Constant; X,Y,Z each 1 hour		
Shock	-	<196m/s ²		
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 (contact lvl 2, air lvl 3) , -3 (lvl 3), -4 (lvl 3) -5 (norm mode lvl 3, com mode lvl 4), -6 (lvl 3), -8 (lvl 4), -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

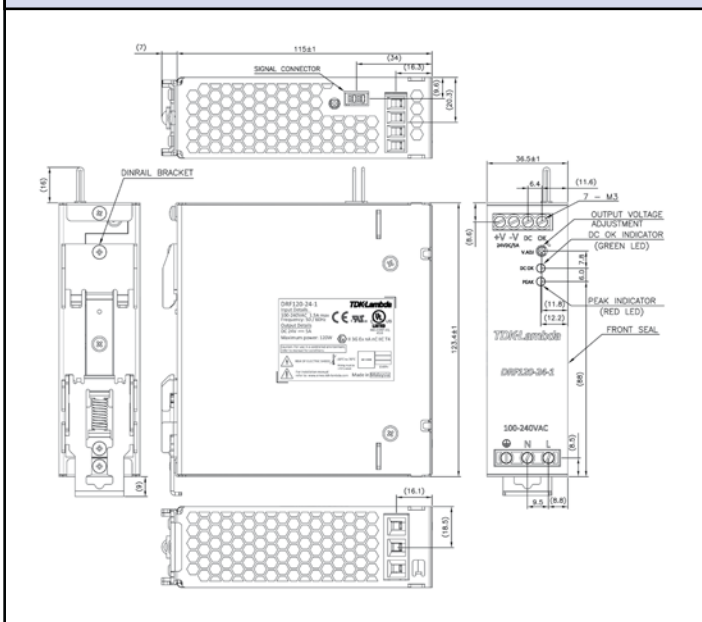
(2) See options table

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

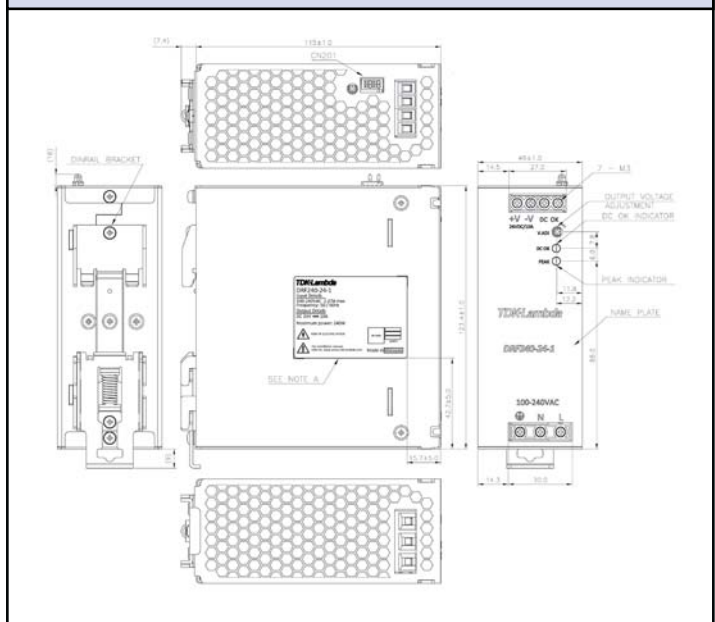
Model Selector

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

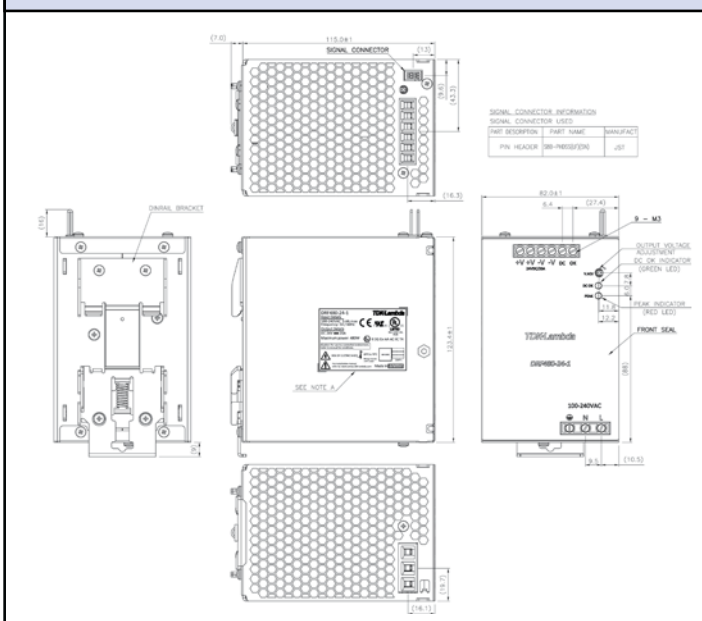
Outline DRF120-24-1



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/drif-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⁽³⁾ to +71°C Operation



Key Market Segments & Applications



Specifications					
Model		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 ⁽³⁾ to +71°C (Derate linearly 2.5%/°C from 61 to 71°C, 3.5%/°C for DPP960)"			
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	Three years			

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

(2) Passive, meets EN61000-3-2

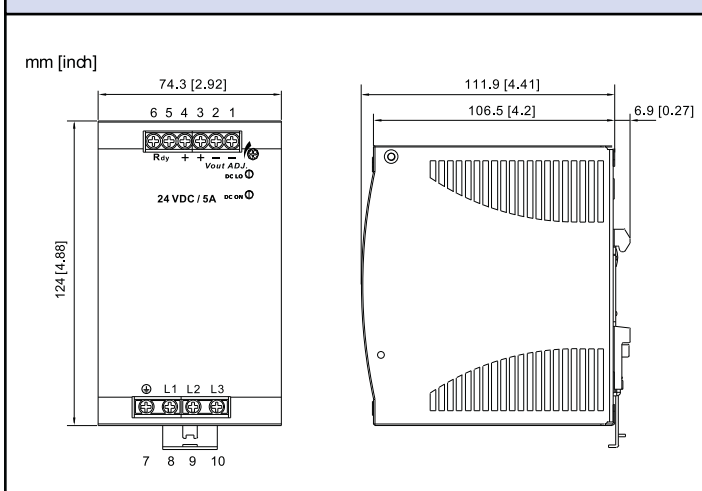
(3) DPP480 -30°C

*Safety certified for AC input only

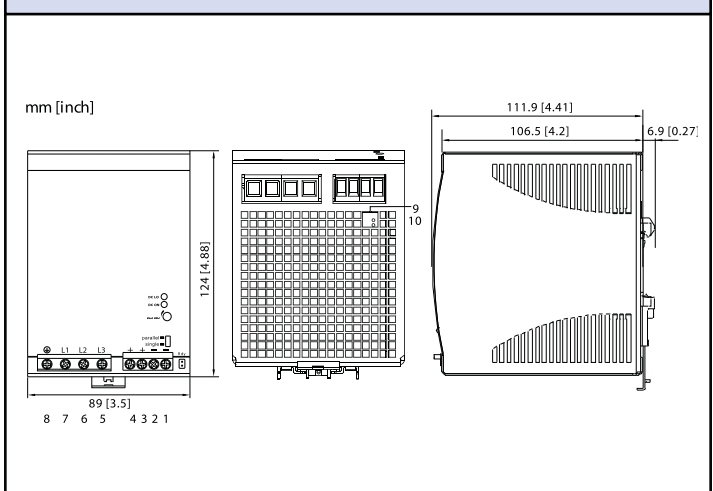
Model Selector

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%

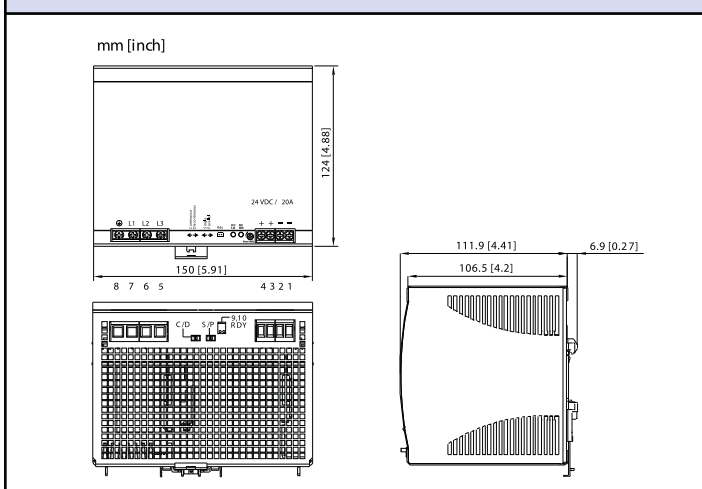
DPP120 Outline



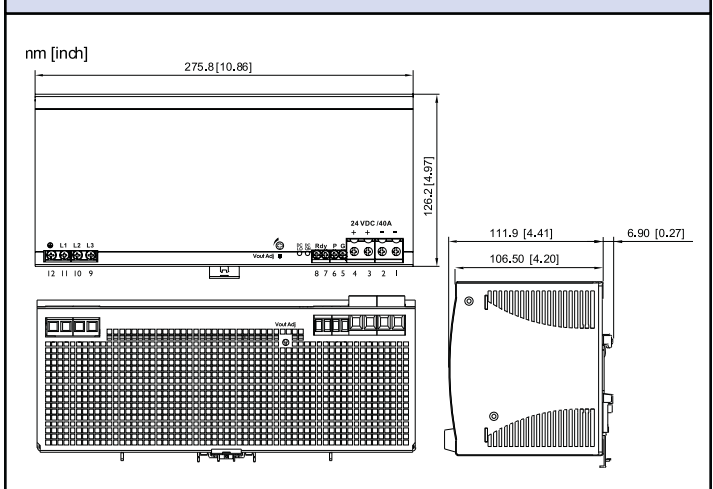
DPP240 Outline



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



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	Three years

(1) Recommend 1" clearance on all sides

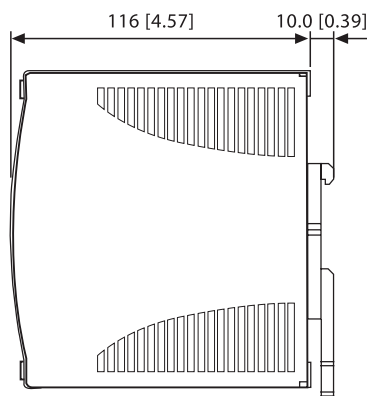
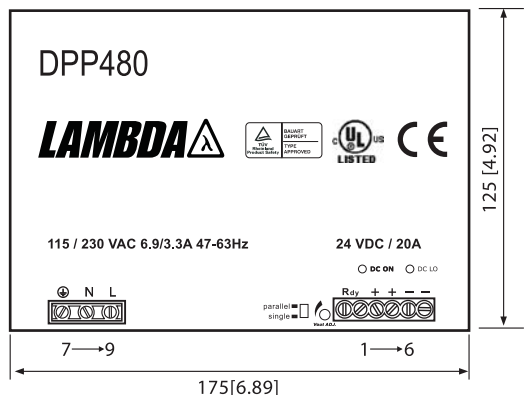
*Safety certified for AC input only

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

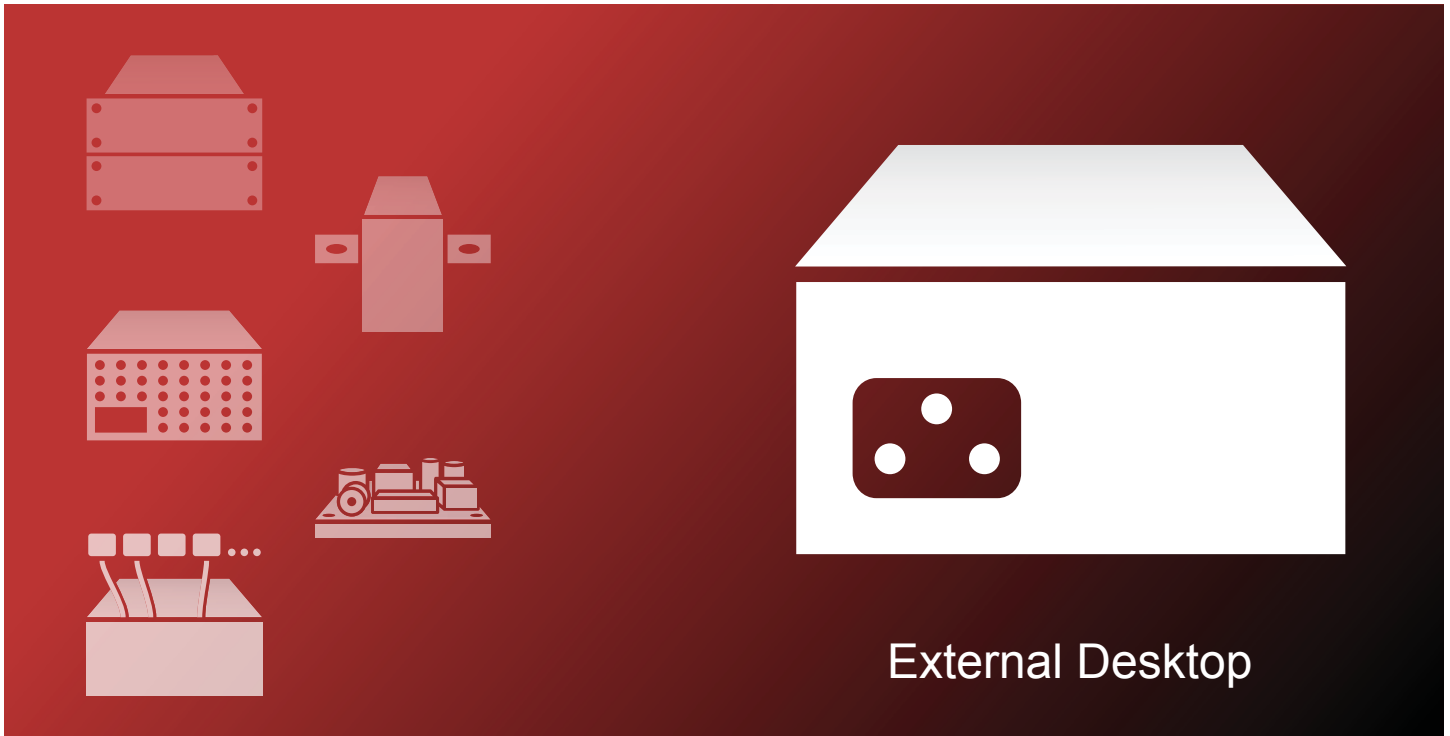
DPP/DSP	10W to 960W, 5V to 48V power supplies
DLP	75W to 240W power supplies
DLP-PU	Redundancy Module (20A)
R Series	6A to 1000A single & three phase EMI Filters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dpp-series.htm





AC-DC Power Supplies



External Desktop

Applications

- ◆ External power supplies as accessory for end equipment
- ◆ Typically used for portable equipment

Features

- ◆ Fully enclosed plastic case
- ◆ Plug and play – no input range setting or output voltage adjustment required
- ◆ IEC AC input connection
- ◆ DC output cable and connector
- ◆ ErP, CEC and EISA compliant models
- ◆ DTM series suitable for medical equipment

Wattage	Series	Page	Listed by Wattage
40-65W	DTM65-C.....	129	
62-80W	DT62-80C.....	131	
90-110W	DTM110-C.....	133	
100-150W	DT100-150-C.....	135	

40-65W Medical AC-DC External Power Supplies

Features

- ◆ CEC, EISA⁽¹⁾ & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Medical Certifications
- ◆ 85% Efficient, >87% average (12V models & above)



Key Market Segments & Applications



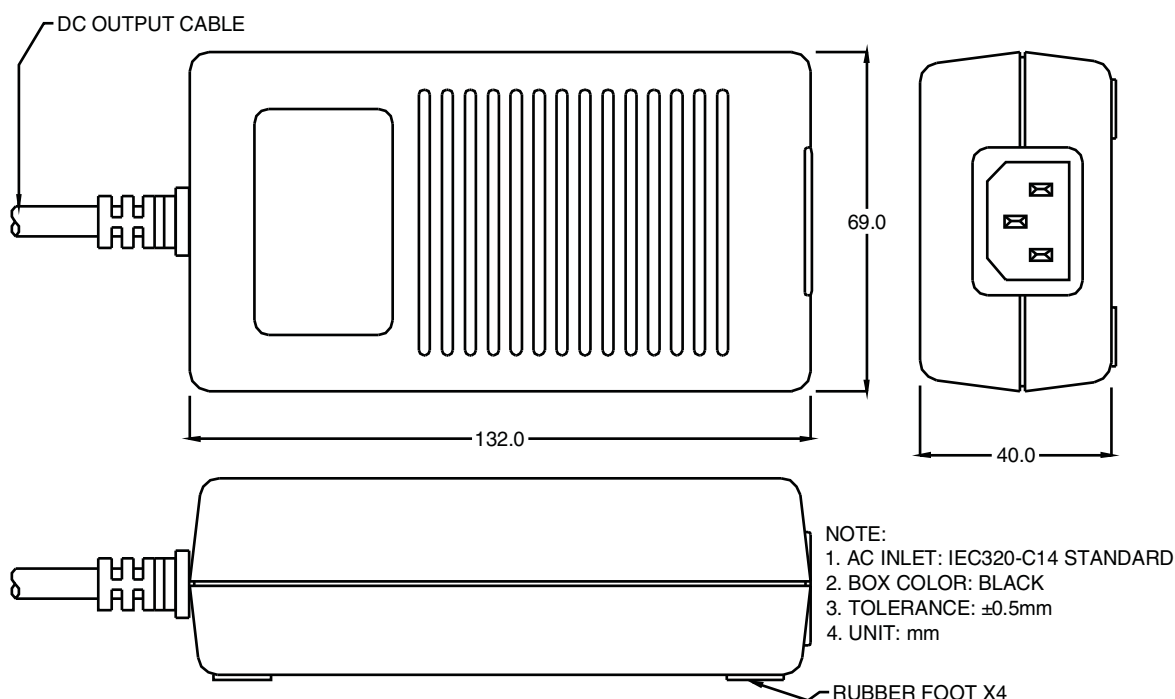
Specifications		
Model		
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<100A at 230VAC input, 25°C ambient cold start
Input Current	A	2A at 90VAC, Full Load
Power Factor	-	None
Leakage Current (264VAC 63Hz)	µA	<300µA
Hold Up Time (Typ)	ms	16ms at 115VAC input
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	%	±1%
Adjustment Range	-	None
Minimum Load	A	None
Total Regulation	-	5V to 15V Models: ±5%, >15V models ±3%
Ripple & Noise	%	1% or 100mV whichever is the greater
Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	110 - 150% of nominal (Cycle input power to reset)
Efficiency	%	>87%, average efficiency for 12V and greater models, >75% <12V models
Operating Temperature	-	0 to +50°C
Storage Temperature	-	-10 to +70°C
Humidity (non condensing)	-	10 - 90% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 4kVAC (Reinforced) (2 x MOPPS 3rd Edition) (Output is connected to Ground)
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, CE Mark
California Energy Commission (CEC)	-	See model selector
EISA	-	See model selector
Offload Power Consumption	-	< 0.5W
Conducted & Radiated EMI	-	EN55011, EN60601-1-2 Class B
Immunity	-	EN55011: 2007 +A2: 2007
Weight (Typ)	g	460g
Size (WxLxH)	in	2.72 x 5.2 x 1.57
Cable Length	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
Warranty	yrs	Two Years

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

Output Ratings

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	CEC	EISA Efficiency Level
DTM65PW050C	5	8.0	40	-	-
DTM65PW120C	12	5.0	60	V	V
DTM65PW150C	15	4.0	60	V	V
DTM65PW180C	18	3.6	65	V	V
DTM65PW240C	24	2.7	65	V	V
DTM65PW360C	36	1.8	65	V	V
DTM65PW480C	48	1.35	65	V	V

Outline Drawing



Other AC-DC Products

DT62-C	62W CEC Compliant Adapters
DT80-C	80W CEC Compliant Adapters
DT100 / 150-C	100W & 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



62-80W AC-DC External Power Supplies

Features

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

Key Market Segments & Applications



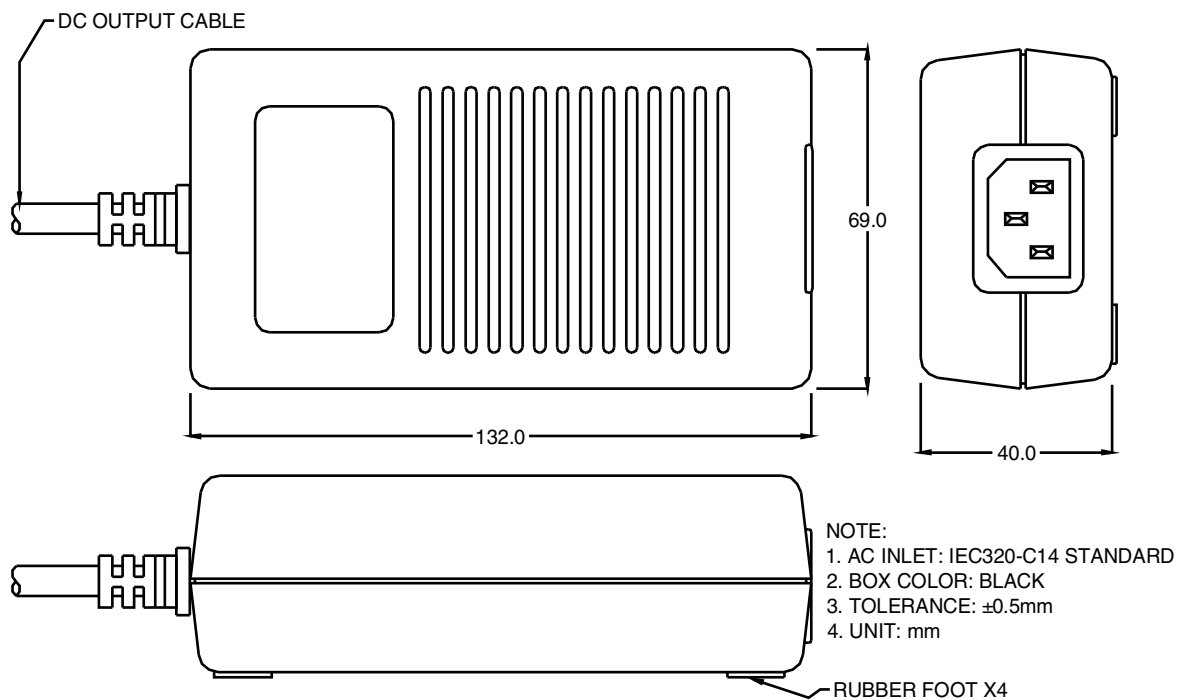
Specifications			
Model		DT62PWxxx-C	DT80PWxxx-C
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)	
Inrush Current	A	<50A at 230VAC input, 25°C ambient cold start	
Input Current (Maximum)	A	2.5A	
Power Factor	-	None	Typically 0.9 at full load(Meets EN61000-3-2)
Leakage Current (typ, 264VAC 63Hz)	mA	0.7mA	
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 ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)	
Shock	-	< 196.1 m/s ² (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



90-110W Medical AC-DC External Power Supplies

Features

- ◆ CEC, EISA⁽¹⁾ & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Medical Certifications
- ◆ > 87% Average Efficiency



Key Market Segments & Applications



Specifications

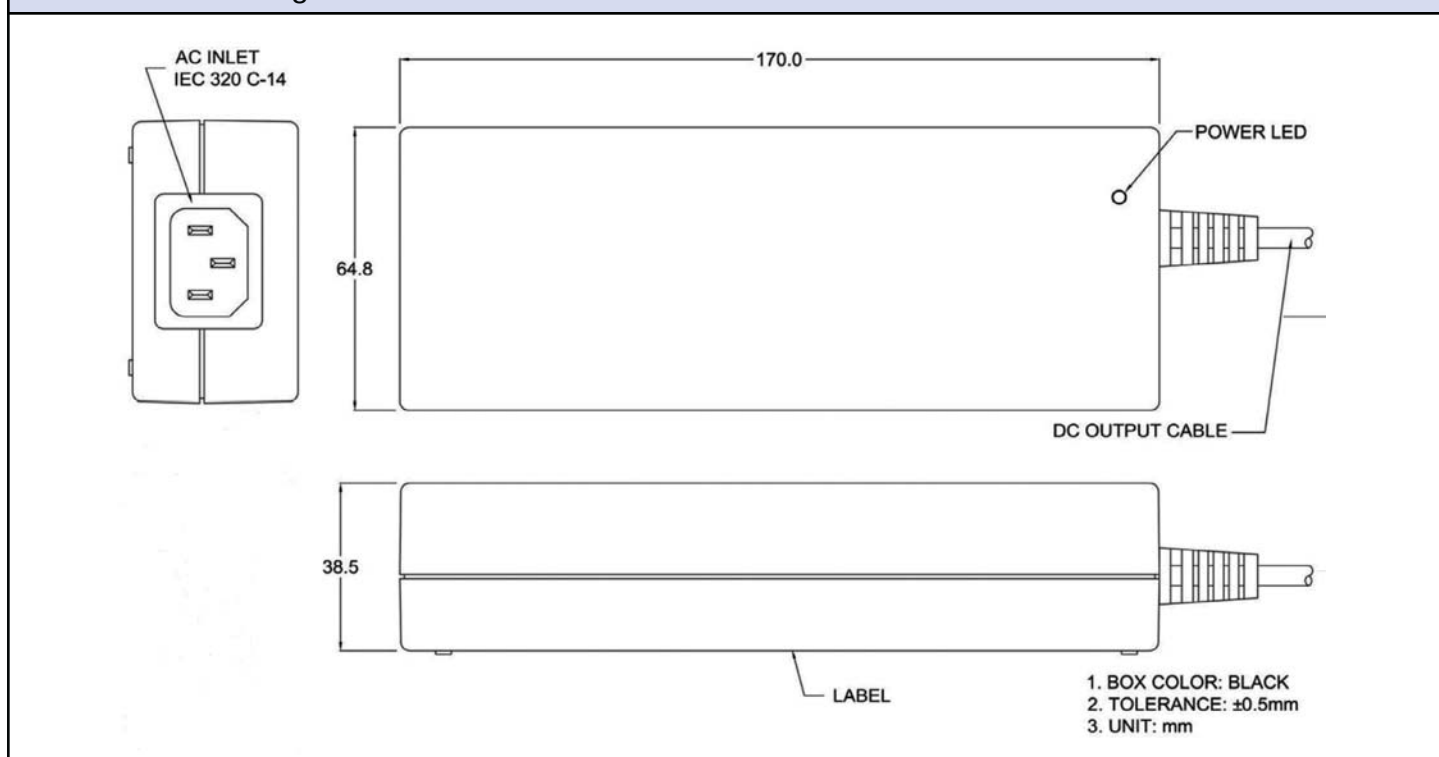
Model		DTM110PWxxx-C
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<100A at 230VAC input, 25°C ambient cold start
Input Current	A	2A at 90VAC, Full Load
Power Factor	-	Meets EN61000-3-2. >0.9 PF
Leakage Current (264VAC 60Hz)	μA	<300μA
Hold Up Time (Typ)	ms	>10ms
Temperature Coefficient	%/°C	±0.05%/°C
Voltage Accuracy	%	±1%
Adjustment Range	V	None
Minimum Load	A	None
Total Regulation	%	12V to 15V Models: ±5%, >15V models ±3%
Ripple & Noise	%	1%
Short Circuit Protection	-	<160% - hiccup mode
Overvoltage Protection	V	110 - 150% of nominal (Cycle input power to reset)
Efficiency	%	>87% average efficiency
Operating Temperature	°C	0 to +40°C
Storage Temperature	°C	-10 to +70°C
Humidity (non condensing)	%RH	10 - 90%RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Ground 1.5kVAC, Input to Output 4kVAC (Reinforced) (2 x MOPPS 3rd Edition) (Output is isolated from Ground)
Vibration (non operating)	-	23.52m/s ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s ² (20G)
Safety Agency Approvals	-	UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, CE Mark
California Energy Commission (CEC)	-	See model selector
EISA	-	See model selector
Offload Power Consumption	W	< 0.5W
Conducted & Radiated EMI	-	EN55022, EN60601-1-1-2, FCC Part 18 Class B
Immunity	-	EN55024
Weight (Typ)	g	605g
Size (WxLxH)	Inches	2.55 x 6.7 x 1.51"
Cable Length	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
Warranty	yrs	Two Years

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

Output Ratings

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	CEC	EISA Efficiency Level
DTM110PW120C	12	7.5	90	V	V
DTM110PW135C	13.5	6.67	90	V	V
DTM110PW150C	15	6.67	100	V	V
DTM110PW190C	19	5.8	110	V	V
DTM110PW200C	20	5.5	110	V	V
DTM110PW240C	24	4.6	110	V	V

Outline Drawing



Other AC-DC Products

DT62-C	62W CEC Compliant Adapters
DTM65-C	40W to 65W Medical Adapters
DT80-C	80W CEC Compliant Adapters
DT100 / 150-C	100W & 150W CEC Compliant Adapters

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dt-c-series.htm



100-150W AC-DC External Power Supplies

Features

- ◆ CEC, EISA¹ & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Power Factor Correction
- ◆ Low Profile & Lightweight
- ◆ 87% Avg. Active Efficiency

Key Market Segments & Applications



Specifications

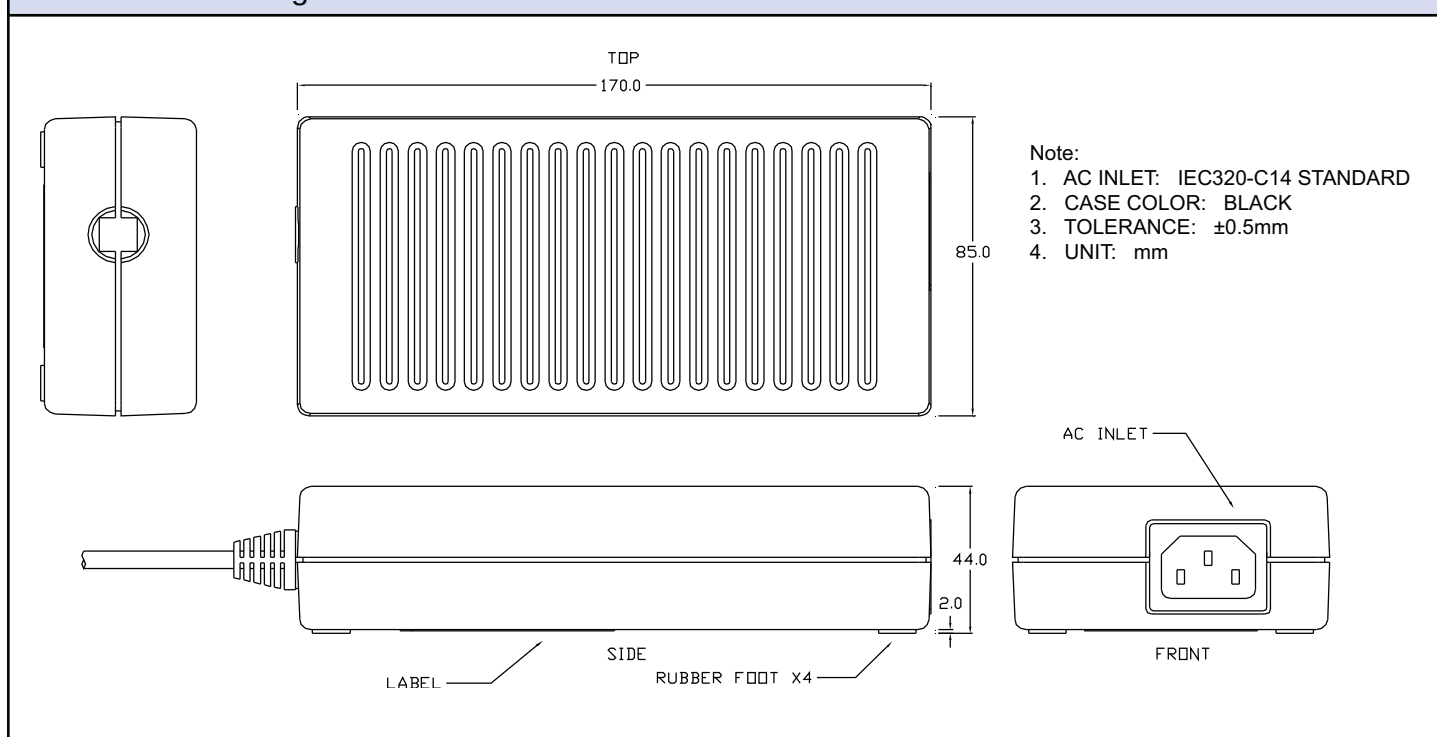
Model		DT100PWxxx-C	DT150PWxxx-C
Input Voltage range	-	90 - 264VAC (47 - 63Hz)	
Inrush Current	A	<60A at 230VAC input, 25°C ambient cold start	
Input Current (Maximum)	A	2.5A	
Power Factor	-	Typically 0.9 at full load (Meets EN61000-3-2)	
Leakage Current	µA	<600uA at 264VAC 60Hz	
Hold Up Time (Typ)	ms	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 ² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)	
Shock	-	< 196.1 m/s ² (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





DC-DC Converters



Applications DC/DC Converters

- ◆ Distributed Power Architecture with DC Bus
- ◆ Small subsystems with battery backup

Applications Bidirectional DC/DC Converters

- ◆ Electrical motor energy re-generation/storage (lifts, cranes, etc)
- ◆ Battery tests systems energy re-generation to avoid energy waste
- ◆ Smart-grid, particularly “micro-grid” applications

Features DC-DC Converters

- ◆ Galvanic isolation between input and output
- ◆ Power range from 1.5W to 700W
- ◆ Convection cooling, conduction cooling with baseplate or forced air cooling
- ◆ Input voltage ranges 2:1 or 4:1
- ◆ Nominal input voltages 5V, 12V, 24V, 48V, 110V or 280V

Features Point of Load Converters

- ◆ No galvanic isolation
- ◆ High efficiency
- ◆ Very fast transient response time
- ◆ SMT or through hole mounting
- ◆ Supply of logic voltages below 5V direct at the load

Features Bidirectional DC/DC Converters

- ◆ Grid voltage 320Vdc nominal, (300-380Vdc)
- ◆ Battery voltage 48Vdc nominal, (36-60Vdc)
- ◆ High efficiency up to 94.6%

Wattage	Series	Page	Listed by Wattage
1.5-25W	CC-E.....	139	
3W	PXC-M3.....	141	
10W	PXC-M10.....	143	
10-20W	PXD.....	145	
15W	PXB.....	147	
16.5W	iCF.....	149	
20-30W	PXE.....	151	
30W	PXD30W.....	153	
30-200W	CN-A110.....	155	
33W	iCG.....	157	
36-83W	iSA.....	159	
40-60W	PXF.....	161	
50-100W	CN-A24.....	163	
50-150W	PH-A280.....	165	
66W	iBF.....	167	
66-78W	iEA.....	169	
72-308W	iQL.....	171	
96-204W	iQE.....	173	
110W	iAF.....	175	
120W	iJB.....	177	
250W	i6A.....	179	
300-317W	iEH.....	181	
300-450W	iQG.....	183	
300-450W	PAH300/450.....	185	
300-456W	iHG.....	187	
600W	PAF600F.....	189	
2500W	EZA2500.....	191	

1.5-25W, Ultra Compact 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) ¹
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 ²
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 ²	980m/s ² (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)	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			
(DIP Through Hole and SMD package)		CC3 (SIP): 1.09 x 0.362 x 0.705			
(SIP Through Hole only)					
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

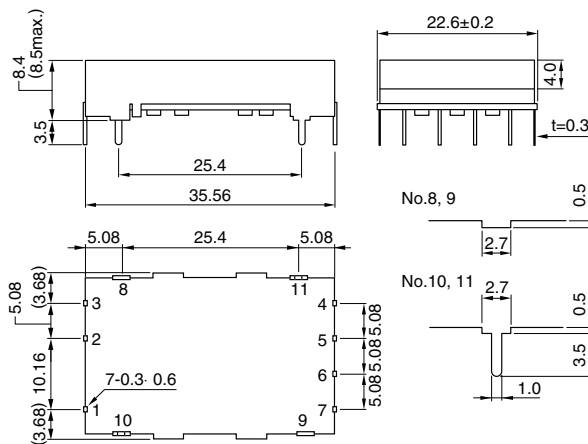
3. For 15V output connect trim to -Vout
4. See Installation Manual for full specs, test methods of parameters & application notes
5. Not available on CC15 and CC25 models

Model Selector

Output Voltage (V)	Output Current (A)	Output Power (W)	5V Input	12V Input	24V Input	48V Input
Single Outputs						
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
Dual Outputs						
±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

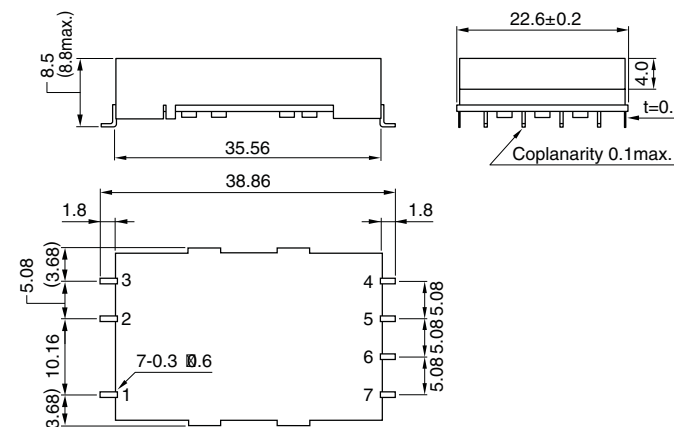
Outline Drawing

CC10-F-E (DIP TYPE)



Outline Drawing

CC10-R-E (SMD TYPE)



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,	50 - 700W quarter, half & full bricks
PAH, PAF	

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



3W Medical & Industrial DC-DC Converters

Features

- ◆ IndustryStandard DIP-24 Package
- ◆ 9-36V or 18-75VDC Input
- ◆ Medical & ITE Safety Certifications
- ◆ 5kVAC Isolation (2xMOPPs)
- ◆ 2uA Leakage Current
- ◆ Low Off-Load Power Draw



Key Market Segments & Applications



Specifications			
Model		PXC-M03	PXC-M03W
Max Output Power	W	3W	
Voltage Accuracy	%	±1%	
Voltage Adjustment (T)	%	±10% (-10% +20% on 15V & 24V single output models) (see options table)	
Minimum Load	-	None	
Line Regulation	%	Single Output: ±0.2%, Dual Output: ±0.5%	
Load Regulation	%	Single Output: ±0.2%, Dual Output: ±1%	
Cross Regulation	%	±5% (25-100% load)	
Ripple and Noise	-	See table	
Start up time	ms	30ms	
Remote on/off	-	See options table	
Temperature Coefficient	%/°C	<±0.02%/°C	
Operating Temperature (1)	°C	-40 to +105°C, derating necessary above 94°C	
Storage Temperature	°C	-55 to 125/°C	
Thermal Shock	-	MIL-STD-810F	
Relative Humidity (non condensing)	%RH	5 to 95%RH	
Transient Response (25% step load change)	µs	< 250µs recovery	
Overvoltage Protection	V	Single Output: 3.3V: 3.7-5V, 5V: 5.6-7V, 12V: 13.5-16V, 15V: 18.3-22V, 24V: 29.1-34.5V Dual Output: 5V: 5.6-7V, 12V: 13.5-18.2V, 15V: 17-22V	
Overcurrent and Short Circuit Protection	%	Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)	V	5V input: 16V, 24V input: 50V, 48V input: 100V	
Isolation Voltage	V	5,000VAC	
Isolation Resistance	Ω	10 ⁹ Ω minimum	
Isolation Capacitance (max)	pF	17pF maximum	
Typical Switching Frequency (Fixed)	kHz	150kHz (±15kHz)	
MTBF (MIL-HDBK-217F)	Hours	6,444,000	
Vibration	-	MIL-STD-810F	
Conducted and Radiated Emissions	-	See Installation Diagrams	
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A	
Safety Agency Certifications	-	IEC/UL/EN60950-1, IEC/EN60601-1, ES60601-1, CE Mark	
Size (L x W x H)	mm(")	31.8 x 20.3 x 10.2mm (1.25 x 0.8 x 0.4")	
Weight	g	14g	
Warranty	Yrs	Two Years	

Notes:

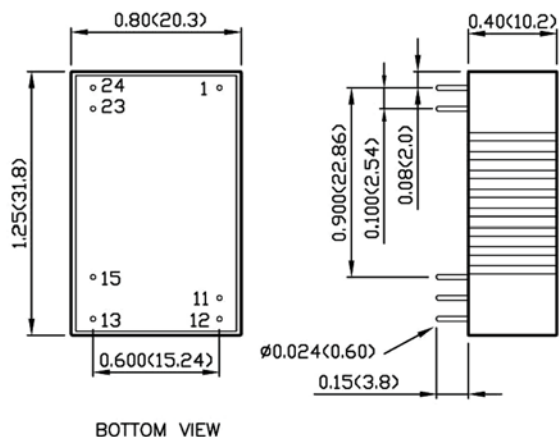
See installation manual for full specifications and test measurements.

(1) Convection cooling. See installation manual for forced air ratings.

Model Selector

Model	Output Voltage (V)	Output Current (A)	Output Power (W)	Input Voltage (V)	Input Current No Load (mA)	Efficiency (%)	Ripple & Noise (Pk-Pk mV)	Max Load Capacitance (uF)
Single Outputs								
PXC-M03-24WS3P3-A	3.3	1	3.3	9 - 36	6	82.0	30	1050
PXC-M03-48WS3P3-A	3.3	1	3.3	18 - 75	4	81.0	30	1050
PXC-M03-24WS05-A	5	0.6	3.0	9 - 36	6	84.5	30	750
PXC-M03-48WS05-A	5	0.6	3.0	18 - 75	4	84.0	30	750
PXC-M03-24WS12-A	12	0.25	3.0	9 - 36	6	87.0	40	130
PXC-M03-48WS12-A	12	0.25	3.0	18 - 75	4	87.0	40	130
PXC-M03-24WS15-A	15	0.2	3.0	9 - 36	6	87.0	40	100
PXC-M03-48WS15-A	15	0.2	3.0	18 - 75	4	86.5	40	100
PXC-M03-24WS24-A	24	0.125	3.0	9 - 36	6	87.0	50	39
PXC-M03-48WS24-A	24	0.125	3.0	18 - 75	4	86.5	50	39
Dual Outputs								
PXC-M03-24WD05-A	±5	±0.3	3.0	9 - 36	6	83.0	30	±430
PXC-M03-48WD05-A	±5	±0.3	3.0	18 - 75	4	83.0	30	±430
PXC-M03-24WD12-A	±12	±0.125	3.0	9 - 36	6	87.0	40	±75
PXC-M03-48WD12-A	±12	±0.125	3.0	18 - 75	4	86.0	40	±75
PXC-M03-24WD15-A	±15	±0.1	3.0	9 - 36	6	86.0	40	±56
PXC-M03-48WD15-A	±15	±0.1	3.0	18 - 75	4	86.0	40	±56

Outline Drawing, Pinout Style A



Options

-A	Pinout style A (Standard Version)
No suffix	Pinout style B (No remote on/off & no trim pin)
-P	Pinout style B (Positive remote on/off & no trim pin)
-T	Pinout style B (Trim pin & no remote on/off)
-PT	Pinout style B (Positive remote on/off & trim pin)

Other DC-DC Products

PX	10 - 60W, 12V, 24V, 48V input DC-DC
CC-E	1.5 - 25W, 5V, 12V, 24V & 48V input DC-DC
i6A	14A, 9-40V input POL
iA, iB, iC, iJ	3 - 60A, 5V & 12V input POL

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pxc-m.htm



Pinout (Style A)

PIN #	Single Output	Dual Output
1	+ Input	+ Input
11	No pin	Common
12	- Output	No pin
13	+ Output	- Output
15	No pin	+ Output
23	- Input	- Input
24	- Input	- Input

(See website for Pinout Style B)

10W Medical & Industrial DC-DC Converters

Features

- ◆ Industry Standard DIP-24 Package
- ◆ 9-36V or 18-75VDC Input
- ◆ Medical & ITE Safety Certifications
- ◆ 5kVAC Isolation (2xMOPPs)
- ◆ 2uA Leakage Current
- ◆ Low Off-Load Power Draw



Key Market Segments & Applications



Specifications			
Model		PXC-M10	PXC-M10W
Max Output Power	W	10W	
Voltage Accuracy	%	±1%	
Voltage Adjustment (T)	%	+/- 10% (-10% +20% on 15V & 24V single output models) (see options table)	
Minimum Load	-	None	
Line Regulation	%	Single Output: ±0.2%, Dual Output: ±0.5%	
Load Regulation	%	Single Output: ±0.2%, Dual Output: ±1%	
Cross Regulation	%	±5% (25-100% load)	
Ripple and Noise	-	See table	
Start up time	ms	30ms	
Remote on/off	-	See options table	
Temperature Coefficient	%/°C	<±0.02%/°C	
Operating Temperature (1)	°C	-40 to +105°C, derating necessary above 77°C	
Storage Temperature	°C	-55 to 125°C	
Thermal Shock	-	MIL-STD-810F	
Relative Humidity (non condensing)	%RH	5 to 95%RH	
Transient Response (25% step load change)	µs	< 250µs recovery	
Overvoltage Protection	V	Single Output: 3.3V: 3.7-5V, 5V: 5.6-7V, 12V: 13.5-16V, 15V: 18.3-22V, 24V: 29.1-34.5V Dual Output: 5V: 5.6-7V, 12V: 13.5-18.2V, 15V: 17-22V	
Overcurrent and Short Circuit Protection	%	Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)	V	5V input: 16V, 24V input: 50V, 48V input: 100V	
Isolation Voltage	V	5,000VAC	
Isolation Resistance	Ω	10 ⁹ Ω minimum	
Isolation Capacitance (max)	pF	17pF maximum	
Typical Switching Frequency (Fixed)	kHz	300kHz (±30kHz)	
MTBF (MIL-HDBK-217F)	Hours	3,849,000	
Vibration	-	MIL-STD-810F	
Conducted and Radiated Emissions	-	See Installation Diagrams	
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A	
Safety Agency Certifications	-	IEC/UL/EN60950-1, IEC/EN60601-1, ES60601-1, CE Mark	
Size (L x W x H)	mm(")	31.8 x 20.3 x 10.2mm (1.25 x 0.8 x 0.4")	
Weight	g	14g	
Warranty	yrs	Two Years	

Notes:

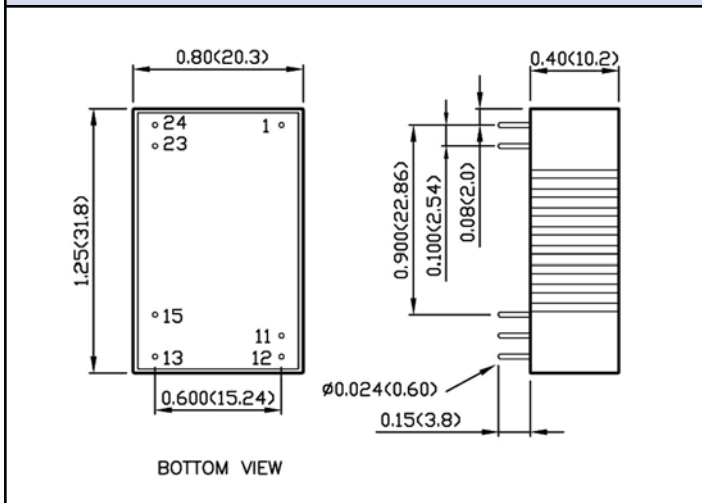
See installation manual for full specifications and test measurements.

(1) Convection cooling. See installation manual for forced air ratings.

Model Selector

Model	Output Voltage (V)	Output Current (A)	Output Power (W)	Input Voltage (V)	Input Current No Load (mA)	Efficiency (%)	Ripple & Noise (Pk-Pk mV)	Max Load Capacitance (uF)
Single Outputs								
PXC-M10-24WS3P3-A	3.3	2.5	8.3	9 - 36	6	83.0	30	3000
PXC-M10-48WS3P3-A	3.3	2.5	8.3	18 - 75	4	82.5	30	3000
PXC-M10-24WS05-A	5	2	10.0	9 - 36	6	86.5	30	2500
PXC-M10-48WS05-A	5	2	10.0	18 - 75	4	86.5	30	2500
PXC-M10-24WS12-A	12	0.83	10.0	9 - 36	6	89.0	40	430
PXC-M10-48WS12-A	12	0.83	10.0	18 - 75	4	89.0	40	430
PXC-M10-24WS15-A	15	0.67	10.1	9 - 36	6	89.0	40	350
PXC-M10-48WS15-A	15	0.67	10.1	18 - 75	4	89.0	40	350
PXC-M10-24WS24-A	24	0.416	10.0	9 - 36	6	89.0	50	125
PXC-M10-48WS24-A	24	0.416	10.0	18 - 75	4	88.5	50	125
Dual Outputs								
PXC-M10-24WD05-A	±5	±1	10.0	9 - 36	6	85.0	30	±1440
PXC-M10-48WD05-A	±5	±1	10.0	18 - 75	4	85.0	30	±1440
PXC-M10-24WD12-A	±12	±0.416	10.0	9 - 36	6	89.0	40	±250
PXC-M10-48WD12-A	±12	±0.416	10.0	18 - 75	4	88.0	40	±250
PXC-M10-24WD15-A	±15	±0.333	10.0	9 - 36	6	88.0	40	±180
PXC-M10-48WD15-A	±15	±0.333	10.0	18 - 75	4	88.0	40	±180

Outline Drawing, Pinout Style A



Options

-A	Pinout style A (Standard Version)
No suffix	Pinout style B (No remote on/off & no trim pin)
-P	Pinout style B (Positive remote on/off & no trim pin)
-T	Pinout style B (Trim pin & no remote on/off)
-PT	Pinout style B (Positive remote on/off & trim pin)

Other DC-DC Products

PX	10 - 60W, 12V, 24V, 48V input DC-DC
CC-E	1.5 - 25W, 5V, 12V, 24V & 48V input DC-DC
i6A	14A, 9-40V input POL
iA, iB, iC, iJ	3 - 60A, 5V & 12V input POL

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pxc-m.htm



Pinout (Style A)

PIN #	Single Output	Dual Output
1	+ Input	+ Input
11	No pin	Common
12	- Output	No pin
13	+ Output	- Output
15	No pin	+ Output
23	- Input	- Input
24	- Input	- Input

(See website for Pinout Style B)

10-20W Single and Dual Output 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 ⁹ 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	See Installation Diagrams		
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
Dual Outputs					
±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

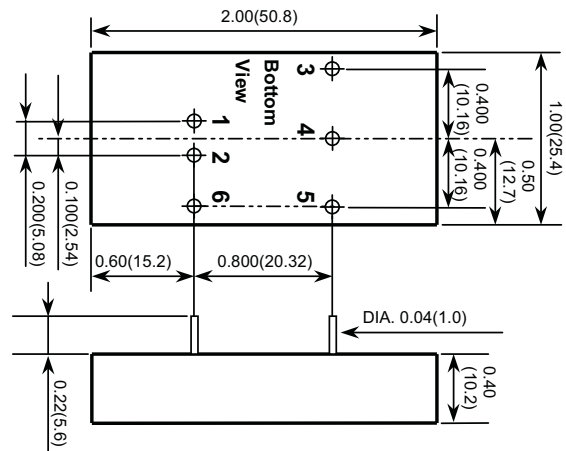
Suffix	Function
-P*	Positive Logic (* Included in PXD20 models)
-N	Negative Logic

Example: PXD1548S12-N

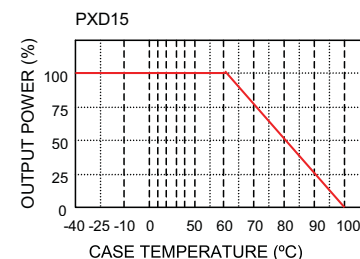
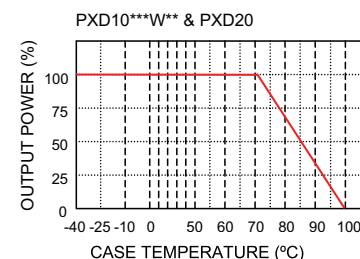
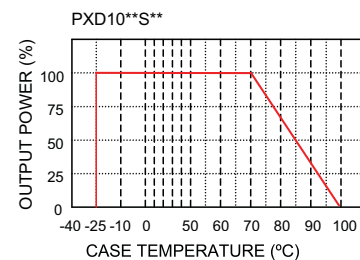
Heat Sink (0.22" high)

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



15W Single & Dual Output 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				
Model		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	-	See Installation Diagrams		
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

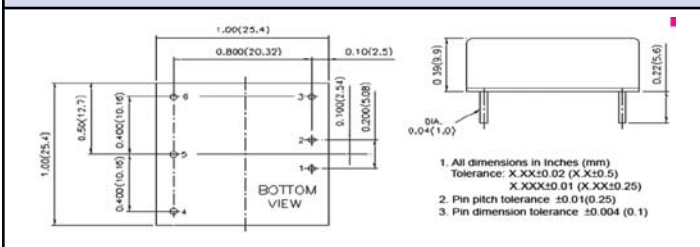
Model Selector

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

Dual Outputs

±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



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

Heat Sink (0.22" high)

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

For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm



Other Industrial Products

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

16.5W, 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

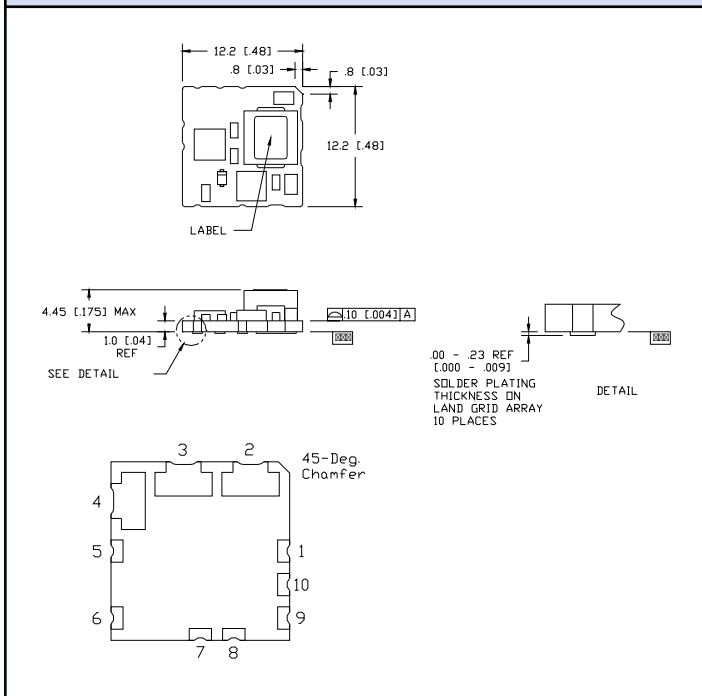
Model		iCF05	iCF12
DC Output Voltage	V	0.6 - 3.63	0.7 - 5.5
DC Input Voltage	V	2.4 - 5.5	4.5 - 14
Efficiency	%	82 - 92	85 - 93.5
Output Voltage Tolerance	%	±3	
Switching Frequency	kHz	600	
Line Regulation	mV	3	3
Load Regulation	mV	6	6
External Load Capacitance	uF	47 - 1000	
Output Ripple and Noise	mVpp	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	Solder Bumping
iCF05003A006V-001-R	2.4 - 5.5	3	0.60 - 3.63	-	X	X	EPC
iCF05003A006V-003-R	2.4 - 5.5	3	0.60 - 3.63	-	X	-	EPC
iCF05003A006V-006-R	2.4 - 5.5	3	0.60 - 3.63	X	-	-	LGA
iCF05003A006V-007-R	2.4 - 5.5	3	0.60 - 3.63	-	X	-	LGA
iCF12003A007V-003-R	4.5 - 14	3	0.70 - 5.5	-	X	-	EPC
iCF12003A007V-007-R	4.5 - 14	3	0.70 - 5.5	-	X	-	LGA
iCF12005A007V-006-R	4.5 - 14	5	0.70 - 5.5	X	-	-	LGA
iCF12005A007V-007-R	4.5 - 14	5	0.70 - 5.5	-	X	-	LGA

Preferred Model

Outline Drawing (EPC Type)



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



20-30W Single and Dual Output 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
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)	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 ⁹ 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	See Installation Diagrams	
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

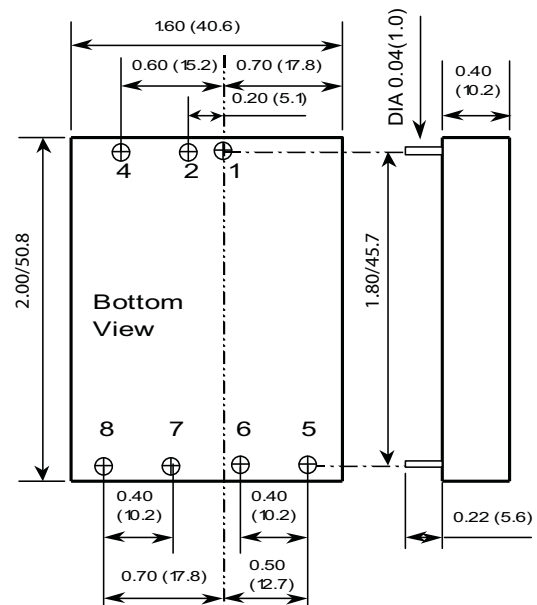
Model Selector

Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (VDC)	Model	Eff.(%)
Single Outputs					
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
Dual Outputs					
±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

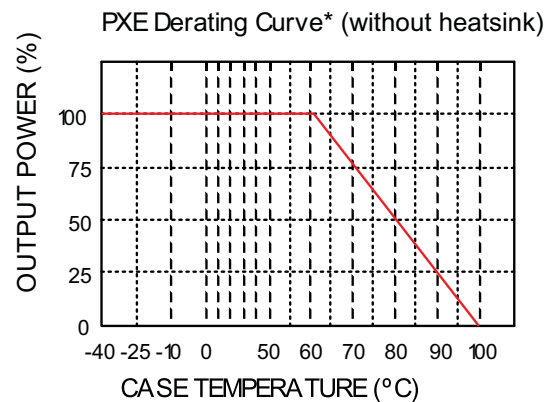
Pinout

PIN #	Function	
	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

Outline Drawing



Derating Curves



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	50 - 700W quarter, half & full bricks
PAH	
PAF	

For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm



30W Single and Dual Output 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)	See Installation Diagrams	
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:

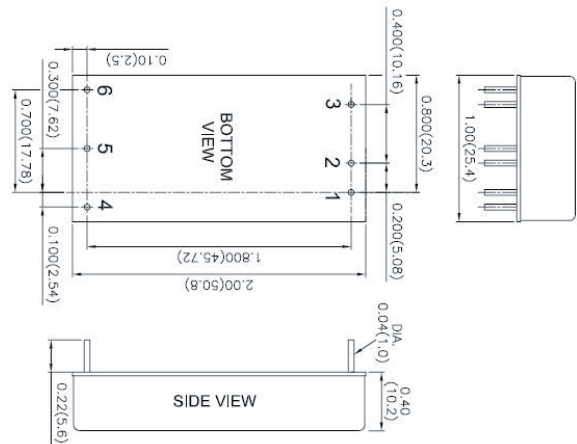
(1) With external ceramic capacitor (24V: 4.7uF, 48V: 2.2uF) connected across input pins

(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.(%)
Single Outputs					
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%
Dual Outputs					
±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	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

Remote On/Off Option

Suffix	Function
No Suffix	Positive Logic
-N	Negative Logic

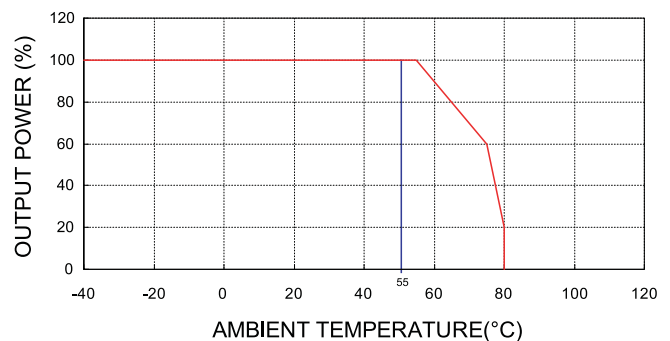
Heat Sink (0.22" high)

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
Non Wide Range Input Modes (W)	
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

Derating Curves



For Additional Information, please visit
us.tdk-lambda.com/lp/products/px-series.htm



30-200W, 60 to 160VDC Input DC-DC Converters

Features

- ◆ 60 - 160VDC Input
- ◆ IEC 61373 Shock and Vibration
- ◆ Base plate Cooled
- ◆ Full Power at 100°C base plate
- ◆ Parallel Operation (200W Only)
- ◆ Small Size
- ◆ Quarter / Half Brick Footprint
- ◆ Full Power from -40 to +100°C
- ◆ Parallel Function (CN200)



Key Market Segments & Applications



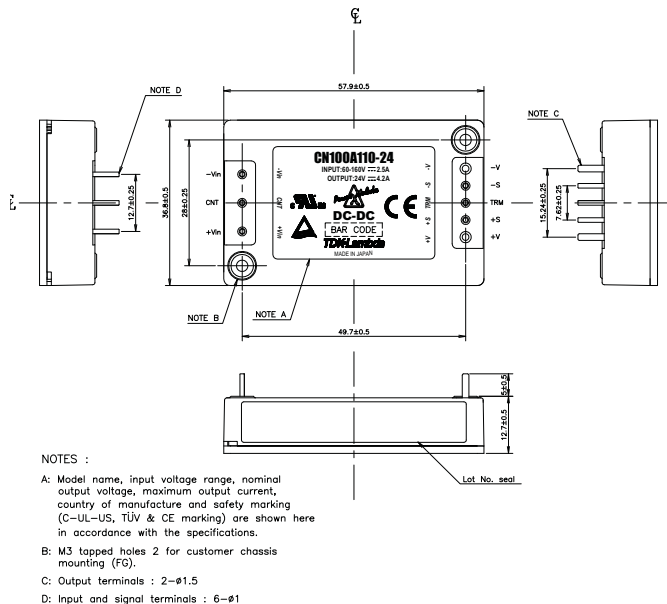
Specifications					
Model					
Nominal Output Voltage	VDC	5V	12V	15V	24V
Input Voltage Range	VDC	60 - 160VDC			
Input Current	A	0.34 - 2.16A (model dependant)			
Output Voltage Adjustment	VDC	4.5 - 6	10.8 - 13.2	13.5 - 16.5	21.6 - 26.4
Ripple & Noise (max) pk-pk	mV	100	150	150	240
Line Regulation (max)	mV	20	48	60	96
Load Regulation (max)	mV	40	96	120	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			
Parallel Operation	-	CN200A 12V, 15V & 24V only			
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 Baseplate: 1.5kVAC; Input to Output 3.0kVAC for 1 min.; Output to Baseplate: 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 ²) X,Y,Z 1 hour each IEC61373 - Category 1, Grade B			
Shock	-	196.1m/s ² , IEC61373 - Category 1, Grade B			
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD			
Weight (Typ)	g	CN30A-100A: 70g, CN200A 150g			
Size (WxHxD)	in	CN30A-100A: 1.45 x 0.5 x 2.28", CN200A: 2.4 x 0.5 x 2.28"			
Warranty	yrs	5 Years			

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

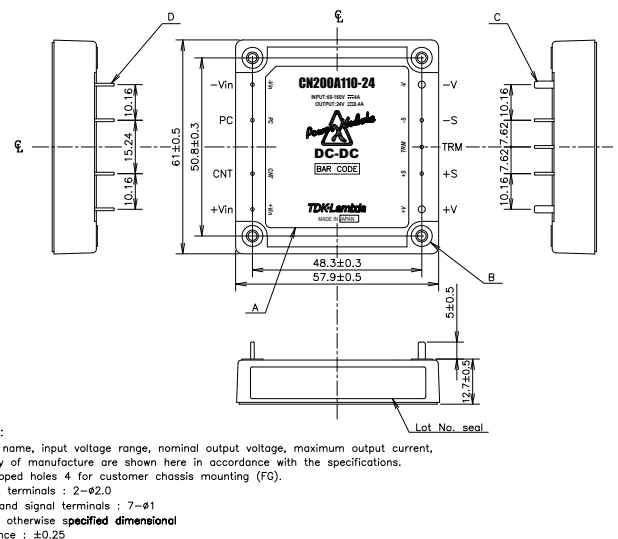
Model Selector

Model	Voltage (V)	Output Current (A)	Maximum Power (W)	Input Current (A)	Efficiency (%) (100% load, 110VDC In)
CN30A110-5	5	6	30	0.34	83
CN50A110-5	5	10	50	0.55	84
CN100A110-5	5	20	100	1.08	85
CN200A110-5	5	40	200	2.16	85
CN30A110-12	12	2.5	30	0.34	84
CN50A110-12	12	4.2	50.4	0.55	86
CN100A110-12	12	8.4	100.8	1.05	88
CN200A110-12	12	16.7	200.4	2.09	88
CN30A110-15	15	2	30	0.34	84
CN50A110-15	15	3.4	51	0.55	86
CN100A110-15	15	6.7	100.5	1.05	88
CN200A110-15	15	13.4	201	2.1	88
CN30A110-24	24	1.3	31.2	0.34	84
CN50A110-24	24	2.1	50.4	0.55	86
CN100A110-24	24	4.2	100.8	1.05	88
CN200A110-24	24	8.4	201.6	2.11	88

Outline Drawing CN30A to CN100A



Outline Drawing CN200A



Option

Suffix Description

/CO Pcb coating for EN50155 & IEC60571 compliance
 Example CN50A110-5/CO

For Additional Information, please visit
us.tdk-lambda.com/lp/products/cn-series.htm



33W, 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

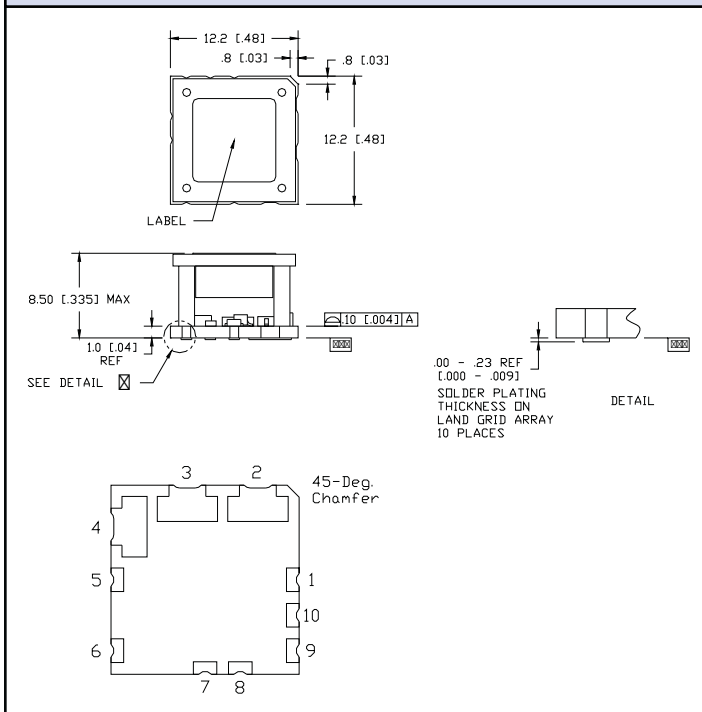
Model		iCG05	iCG12
DC Output Voltage	V	0.6 - 3.63	0.7 - 5.5
DC Input Voltage	V	2.4 - 5.5	4.5 - 14
Efficiency	%	84 - 93	84 - 94
Output Voltage Tolerance	%	±3	
Switching Frequency	kHz	600	
Line Regulation	mV	3	3
Load Regulation	mV	6	6
External Load Capacitance	uF	47 - 1000	
Output Ripple and Noise	mVpp	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	Solder Bumping
iCG05006A006V-001-R	2.4 - 5.5	6	0.60 - 3.63	-	X	X	EPC
iCG05006A006V-003-R	2.4 - 5.5	6	0.60 - 3.63	-	X	-	EPC
iCG05006A006V-006-R	2.4 - 5.5	6	0.60 - 3.63	X	-	-	LGA
iCG05006A006V-007-R	2.4 - 5.5	6	0.60 - 3.63	-	X	-	LGA
iCG12006A007V-001-R	4.5 - 14	6	0.70 - 5.5	-	X	X	EPC
iCG12006A007V-003-R	4.5 - 14	6	0.70 - 5.5	-	X	-	EPC
iCG12006A007V-006-R	4.5 - 14	6	0.70 - 5.5	X	-	-	LGA
iCG12006A007V-007-R	4.5 - 14	6	0.70 - 5.5	-	X	-	LGA

Preferred Model

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



36-83W Sixteenth Brick Converter

Features

- ◆ Standard Sixteenth Brick Footprint (DOSA)
- ◆ 36 - 75VDC Input
- ◆ 1.2V 30A - 12V 6.5A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ Low 12.7mm Profile
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 90%)
- ◆ Constant switching frequency
- ◆ 44% smaller than eighth bricks



Key Market Segments & Applications



Specifications								
Model		iSA480						
Nominal Output Voltage	VDC	1.2	1.5	1.8	3.3	5	12	
Input Voltage Range	VDC	36 - 75						
Input Current (max)	A	4						
Output Voltage Tolerance	VDC	1.164-1.236	1.45-1.55	1.74-1.86	3.20-3.40	4.85-5.15	11.58-12.42	
Ripple & Noise (max) (pk - pk)	mV	75mV			100mV		200mV	
Line Regulation (typical)	mV	2			7	10	24	
Load Regulation (typical)	mV	3			8	10	24	
Overload Protection (typ)	A	39		40	32	22	9.5	
Overvoltage Protection	VDC	1.5 - 2.0V	1.7 - 2.3	2.1 - 2.6	3.75-4.65	5.7-6.7	13.6-15.7	
Remote Sense	-	Yes						
Remote On / Off	-	Yes						
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 ²), and 50 to 500Hz @ 1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4						
Shock	-	196.1m/s ²						
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)						
Weight	g	30.4						
Size	mm	33 x 22.9 x 12.7						
Warranty	-	3 Years						

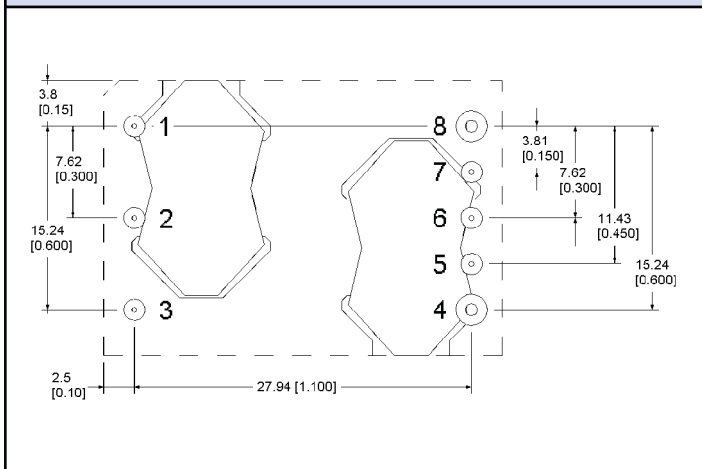
Notes: See website for detailed specifications

Model Selector

Model	Output Voltage (V)	Output Adjust (V)	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Pos. Logic On/Off	Neg. Logic On/Off	Pin Length
iSA48030A012V-000-R	1.2	1.08 - 1.32	30	36	75	X	-	0.145
iSA48030A012V-001-R	1.2	1.08 - 1.32	30	36	75	-	X	0.145
iSA48030A015V-001-R	1.5	1.35 - 1.65	30	45	79	-	X	0.145
iSA48030A018V-001-R	1.8	1.62 - 1.98	30	54	82	-	X	0.145
iSA48025A025V-001-R	2.5	2.25 - 2.75	25	62.5	85	-	X	0.145
iSA48025A033V-000-R	3.3	2.97 - 3.63	25	82.5	88	X	-	0.145
iSA48025A033V-001-R	3.3	2.97 - 3.63	25	82.5	88	-	X	0.145
iSA48015A050V-001-R	5	4.5 - 5.5	15	75	90	-	X	0.145
iSA48007A120V-001-R	12	10.8 - 13.2	6.5	78	90	-	X	0.145
iSA48007A120V-007-R	12	10.8 - 13.2	6.5	78	90	-	X	0.180

Preferred Model

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/isa-series.htm



Other DC-DC Products

Series	Isolation	Rating	Output	Input
CC-E	Isolated	1.5 - 30W	1 - 2 Outputs	5 - 48VDC
PX	Isolated	10 - 60W	1 - 3 Outputs	12 - 48VDC
iSA	Isolated	36 - 82.5W	1.2 - 12V	36 - 75VDC
iEA	Isolated	48 - 78W	5 - 28V	36 - 75VDC
iEH	Isolated	300 - 317W	9.6 - 12V	36 - 75VDC
PAE50/100	Isolated	50 - 100W	1.8 - 5V	36 - 76VDC
iQL	Isolated	72 - 308W	1.2 - 28V	18 - 75VDC
iQE	Isolated	49.4 - 204W	3.3 - 12V	18 - 75VDC
iQG	Isolated	300 - 450W	9.6 - 12V	36 - 75VDC
iHG	Isolated	300 - 456W	12V	36 - 75VDC
PAH	Isolated	30 - 450W	2.5 - 48V	18 - 76VDC
PAF	Isolated	450 - 700W	3.3 - 48V	36 - 75VDC
iJB	POL, Digital	60A	0.6 - 2.0V	8 - 14VDC
i6A	POL	250W	3.3 - 20V	9 - 40VDC
iA,iB,iC	POL	3,6,12,20A	0.6 - 5.5V	2.4 - 14VDC

40W & 60W Single, Dual, Triple Output 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	See Installation Diagrams
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(uF)
Single Outputs						
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
Dual Outputs						
±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
Triple Outputs						
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)

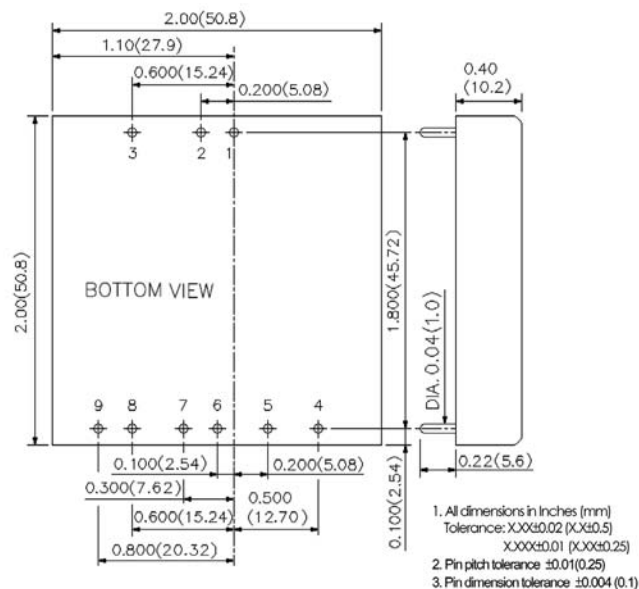
HAPXF	(includes thermal adhesive pad)
HAPXFCLIP	(two clips required when used)

Other Industrial Products

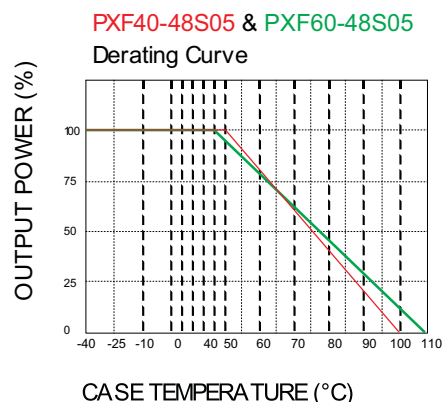
CC-E	1.5 - 30W, 5 to 48VDC input
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks

Outline Drawing

PXF40-xx(S,T,D)



Derating Curves



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



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					
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/s²) X,Y,Z 1 hour each IEC61373 - Category 1, Grade B			
Shock (1)	-	196.1m/s², 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			

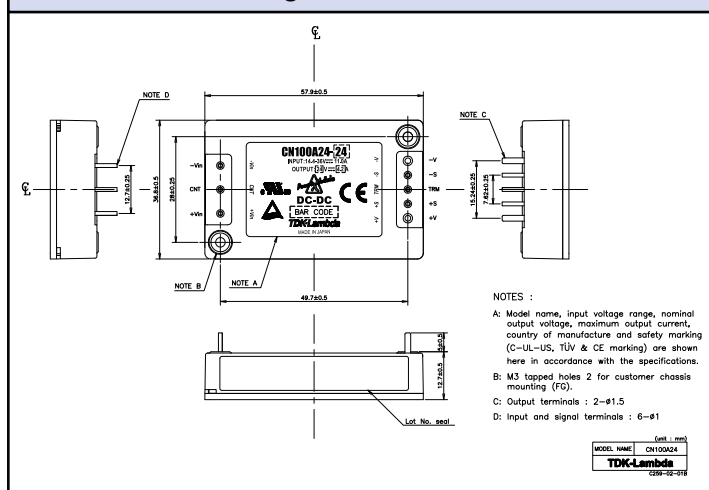
Note: See Installation Manual for full details, test methods of parameters and application notes

(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



50-150W, 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		5V	12V	24V	48V
Nominal Output Voltage	VDC	5V	12V	24V	48V
Input Voltage Range	VDC	200 - 425VDC			
Input Current	A	0.42 - 0.62A (model dependant)			
Output Voltage Adjustment	VDC	4 - 6	9.6 - 13.2	19.2 - 26.4	38.4 - 52.8
Ripple & Noise (max) pk-pk	mV	100	150	240	400
Line Regulation (max)	mV	10	24	48	96
Load Regulation (max)	mV	10	24	48	96
Overcurrent Protection	%	102 - 150% (Constant current style)			
Overvoltage Protection (1)	%	125 - 150	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 ²) X,Y,Z 1 hour each			
Shock	-	196.1m/s ²			
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	-	5 Years			

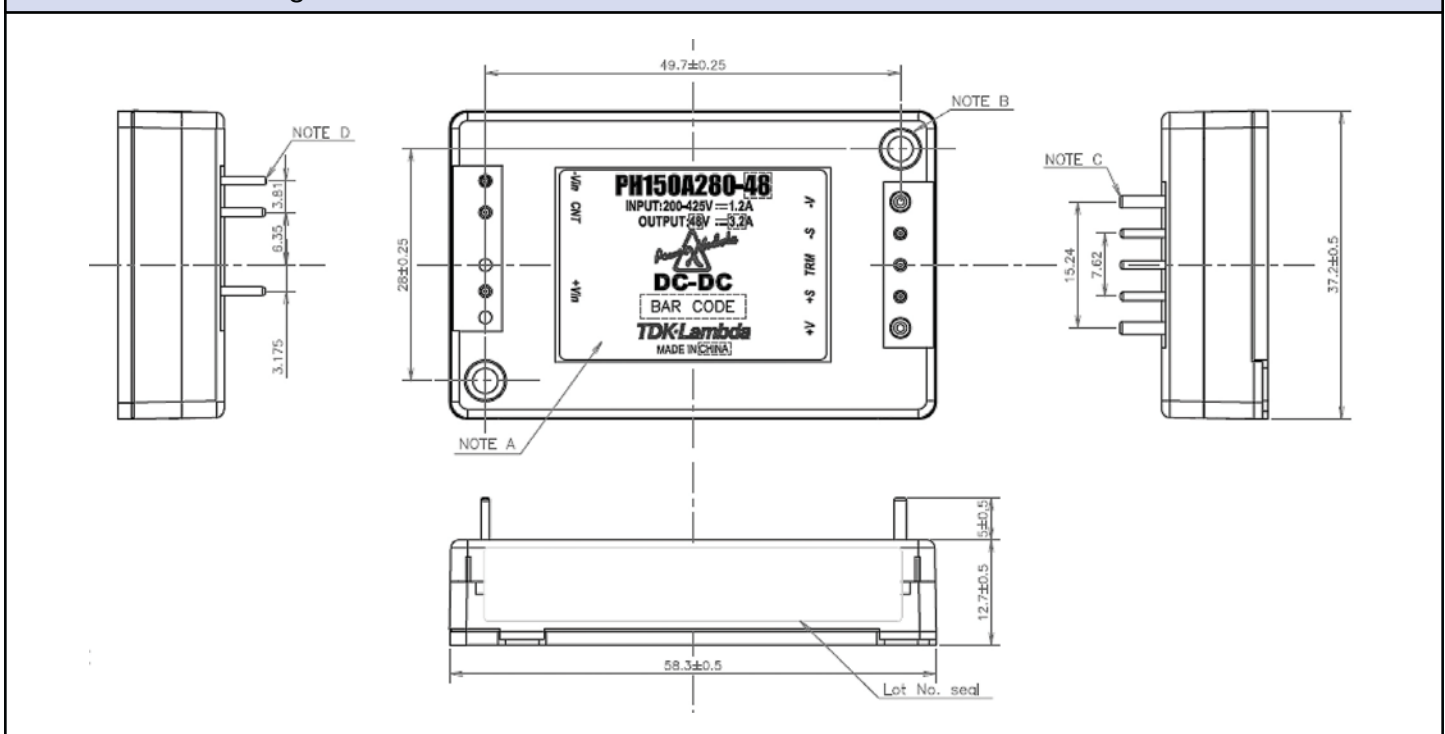
Note: See Installation Manual for full details, test methods of parameters and application notes

(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)
PH50A280-5	5	10	50.0	0.21	86
PH75A280-5	5	15	75.0	0.32	86
PH100A280-5	5	20	100.0	0.42	86
PH50A280-12	12	4.2	50.4	0.21	88
PH75A280-12	12	6.3	75.6	0.31	88
PH100A280-12	12	8.4	100.8	0.41	88
PH150A280-12	12	12.5	150.0	0.62	88
PH50A280-24	24	2.1	50.4	0.21	88
PH75A280-24	24	3.2	76.8	0.31	89
PH100A280-24	24	4.2	100.8	0.41	89
PH150A280-24	24	6.3	151.2	0.61	89
PH50A280-48	48	1.1	52.8	0.21	89
PH75A280-48	48	1.6	76.8	0.31	90
PH100A280-48	48	2.1	100.8	0.4	90
PH150A280-48	48	3.2	153.6	0.6	90

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



66W, 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



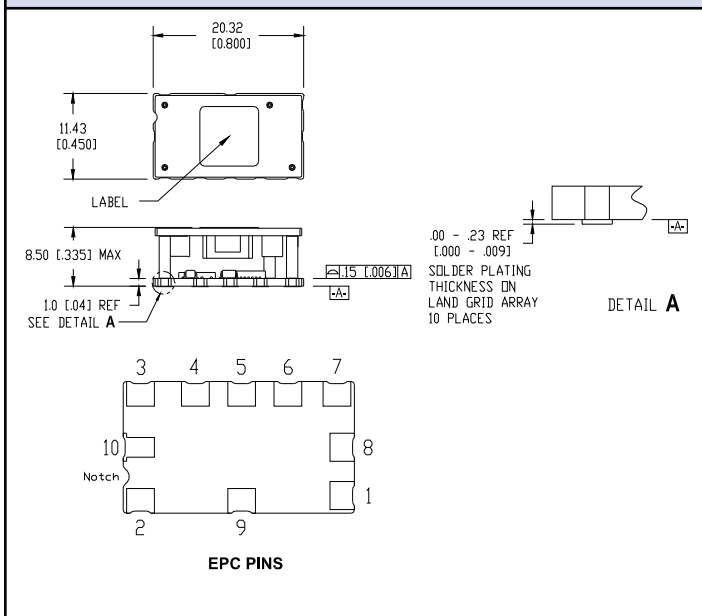
Specifications				
Model		iBF05		iBF12
DC Output Voltage	V	0.6 - 3.63		0.7 - 5.5
DC Input Voltage	V	2.4 - 5.5		4.5 - 14
Efficiency	%	84 - 93		83 - 94.5
Output Voltage Tolerance	%	±3		
Switching Frequency	kHz	600		
Line Regulation	mV	3		6
Load Regulation	mV	4		5
External Load Capacitance	uF	188 - 1800		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	Solder Bumping
iBF05012A006V-003-R	2.4 - 5.5	12	0.6 - 3.63	-	Yes	-	EPC
iBF05012A006V-007-R	2.4 - 5.5	12	0.6 - 3.63	-	Yes	-	LGA
iBF12012A007V-001-R	4.5 - 14	12	0.7 - 5.5	-	Yes	Yes	EPC
iBF12012A007V-003-R	4.5 - 14	12	0.7 - 5.5	-	Yes	-	EPC
iBF12012A007V-007-R	4.5 - 14	12	0.7 - 5.5	-	Yes	-	LGA

Preferred Model

Outline Drawing (EPC Type)



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

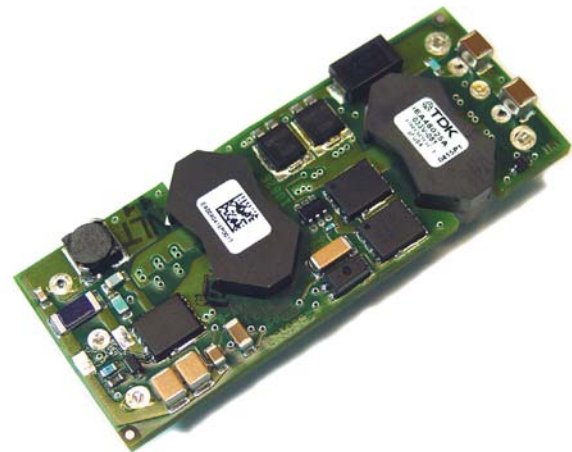
For Additional Information, please visit
us.tdk-lambda.com/lp/products/ibf-series.htm



66-78W Eighth Brick DC-DC Converters

Features

- ◆ Standard Eighth Brick Footprint
- ◆ 36-75VDC Input
- ◆ 3.3V 20A - 28V 2.67A Nominal Output
- ◆ Through Hole Mounting
- ◆ Low 8.8mm Profile
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 91%)
- ◆ Constant switching frequency
- ◆ Open frame design



Key Market Segments & Applications



Specifications							
Model							
Nominal Output Voltage	VDC	3.3	5	12	15	18	28
Input Voltage Range	VDC	36 - 75					
Input Current (max)	A	4.5					
Output Voltage Tolerance	VDC	3.20 - 3.40	4.85 - 5.15	11.58 - 12.42	14.47 - 15.52	17.28 - 18.72	26.88 - 29.12
Ripple & Noise (max) (pk-pk) (1)	mV	100	125	200	150	200	250
Line Regulation (max)	mV	7	10	24	35	45	70
Load Regulation (max)	mV	8	10	24	35	45	70
Overload Protection (typ)	A	29	20	8.5	6	4.4	4
Overvoltage Protection	VDC	3.75 - 4.4	5.7 - 6.7	13.6 - 15.7	16.8 - 22.0	20.0 - 26.0	32.0 - 38.0
Remote Sense	-	Yes					
Remote On / Off	-	Positive or Negative Logic, 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)	-	5~50Hz@0.5g (4.9m/s ²), & 50~500Hz@1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4					
Shock	-	196.1m/s ²					
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)					
Weight (max)	g	30.4					
Size	mm	58.4 x 22.9 x 8.8					
Warranty	yrs	3 Years					

Notes: See website for detailed specifications

(1) Measured across one 1.0 μ F ceramic capacitor and one 10 μ F tantalum capacitor; BW = 20MHz

Model Selector

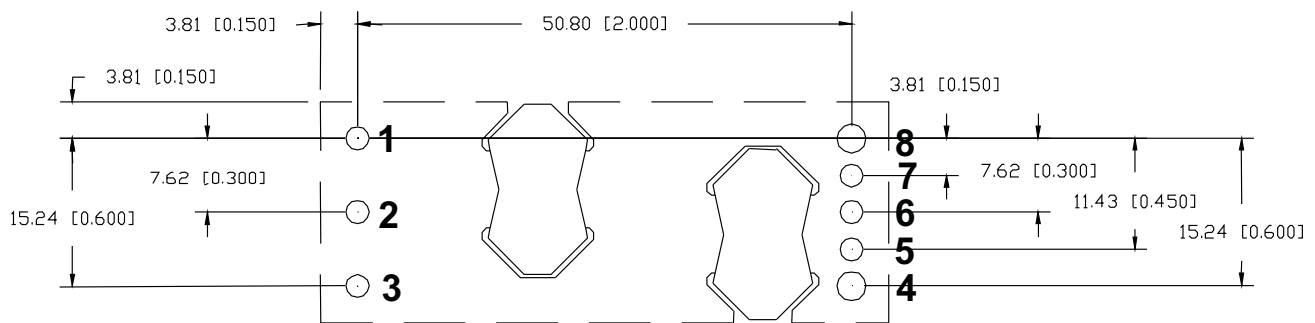
Model	Voltage Output (V)	Voltage Adjust (V)	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Pos. Logic On/Off	Neg. Logic On/Off
iEA48015A050V-000-R	5	4.5 - 5.5	15	75	90	X	-
iEA48015A050V-001-R	5	4.5 - 5.5	15	75	90	-	X
iEA4W004A120V-003-R (3)	12	-	4	48	91	-	X
iEA48007A120V-000-R	12	10.8 - 13.2	6.5	78	91	X	-
iEA48007A120V-001-R	12	10.8 - 13.2	6.5	78	91	-	X
iEA48007A120V-005-R (2)	12	10.8 - 13.2	6.5	78	91	-	X
iEA48005A150V-001-R	15	13.5 - 16.5	4.5	67.5	90	-	X
iEA48004A180V-001-R	18	16.2 - 19.8	3.75	67.5	90.5	-	X
iEA48003A280V-001-R	28	19.6 - 30.8	2.67	75	90	-	X

(2) 0.200" Pin Length.

(3) 0.110" Pin Length, Input Voltage 18 - 60V.

Preferred Model

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/iea-series.htm



72-308W Quarter Brick Converter

Features

- ◆ Standard Quarter Brick Footprint
- ◆ 18-36, 36-75VDC Inputs
- ◆ 1.2V 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							
Model		iQL					
Nominal Output Voltage	VDC	1.2	2.5	3.3	5	12	28
Input Voltage Range	VDC	See Model Selector					
Ripple & Noise (max)(pk-pk) (1)	mV	60	30	100	80	120	500
Line Regulation (max)	mV	1	5	6.6	10	60	100
Load Regulation (max)	mV	1	5	15	10	60	100
Overload Protection Threshold (3)	A	71	69	70	50	27.5	12.4
Overvoltage Protection (Typ) (6)	VDC	1.4	3.1	4.1	6.1	14.7	33.6
Overtemperature Protection (3)	-	Yes					
Remote Sense	-	Yes	Yes	Yes	No	No ⁽⁴⁾	No
Remote On / Off	-	Negative Logic (5)					
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 ²), and 50 to 500Hz@1.5g (14.7m/s ²) 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.

(5) iQL48011A 280V-008-R has positive logic.

(6) All models have the latching type except for model numbers with note (3).

Model Selector

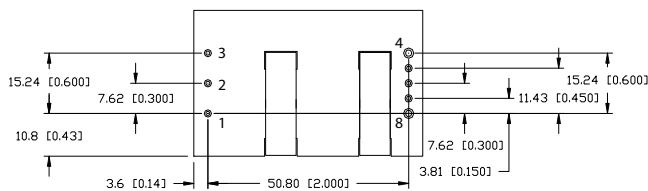
Model	Input Voltage (V)	Output Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Base Plate	Efficiency at Full Load (%)	Pin Length (in)
iQL48060A012V-0B3-R (3)	36 - 75	1.2	0.96 - 1.32	60	72.0	No	83.5	0.145
iQL48060A025V-0B3-R (3)	36 - 75	2.5	2.0 - 2.75	60	150.0	No	89.0	0.145
iQL48060A025V-0B9-R	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
iQL48060A033V-003-R (3)	36 - 75	3.3	2.64 - 3.63	60	198.0	Yes	91.0	0.145
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-001-R (2)	18 - 36	5.0	4.0 - 5.5	40	200.0	Yes	91.0	0.145
iQL24040A050V-009-R	18 - 36	5.0	4.0 - 5.5	40	200.0	Yes	91.0	0.180
iQL48045A050V-001-R	36 - 75	5.0	4.0 - 5.5	45	225.0	Yes	91.0	0.145
iQL48045A050V-0B3-R (3)	36 - 75	5.0	4.0 - 5.5	45	225.0	No	91.0	0.145
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
iQL24021A120V-001-R (2)	20 - 36	12.0	9.6 - 13.2	21	252.0	Yes	92.0	0.145
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
iQL48025A120V-001-R	36 - 75	12.0	9.6 - 13.2	25	300.0	Yes	94.0	0.145
iQL48011A280V-0A9-R	36 - 75	28.0	16.8 - 30.8	11	308.0	Yes	92.5	0.180
iQL48011A280V-008-R	36 - 75	28.0	22.4 - 30.8	11	308.0	Yes	92.5	0.180
iQL48011A280V-009-R	36 - 75	28.0	27.4 - 28.6	11	308.0	Yes	92.5	0.180

(2) Latching.

(3) Non-latching.

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



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 ²), and 50 to 500Hz @ 1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4			
Shock	-	196.1m/s ²			
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

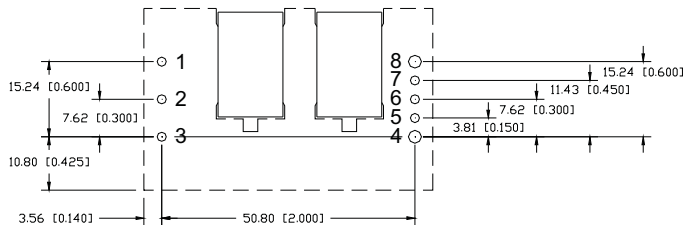
Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	On/Off Polarity	Pin Length
iQE24015A033V-031-R	16 - 40	3.3	2.97 - 3.63	15	49.5	Neg	0.145
iQE24030A033V-001-R	18 - 36	3.3	2.97 - 3.63	30	99	Neg	0.145
iQE24030A033V-007-R	18 - 36	3.3	2.97 - 3.63	30	99	Neg	0.180
iQE24024A050V-001-R	18 - 36	5	4.5 - 5.5	24	120	Neg	0.145
iQE24024A050V-007-R	18 - 36	5	4.5 - 5.5	24	120	Neg	0.180
iQE48030A050V-000-R	36 - 75	5	4.5 - 5.5	30	150	Pos	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-000-R	36 - 75	12	10.8 - 13.2	17	204	Pos	0.145
iQE48017A120V-001-R	36 - 75	12	10.8 - 13.2	17	204	Neg	0.145
iQE48017A120V-007-R	36 - 75	12	10.8 - 13.2	17	204	Neg	0.180
iQE24007A150V-001-R	18 - 36	15	13.5 - 16.5	7	105	Neg	0.145
iQE48010A150V-001-R	36 - 75	15	13.5 - 16.5	10	150	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



110W, 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



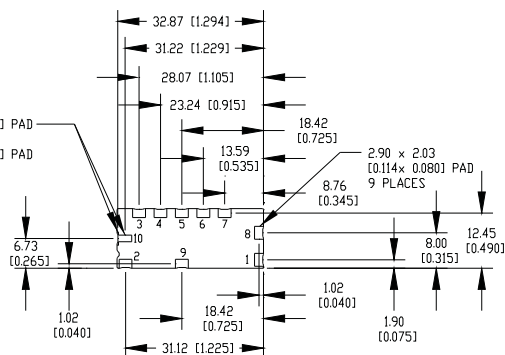
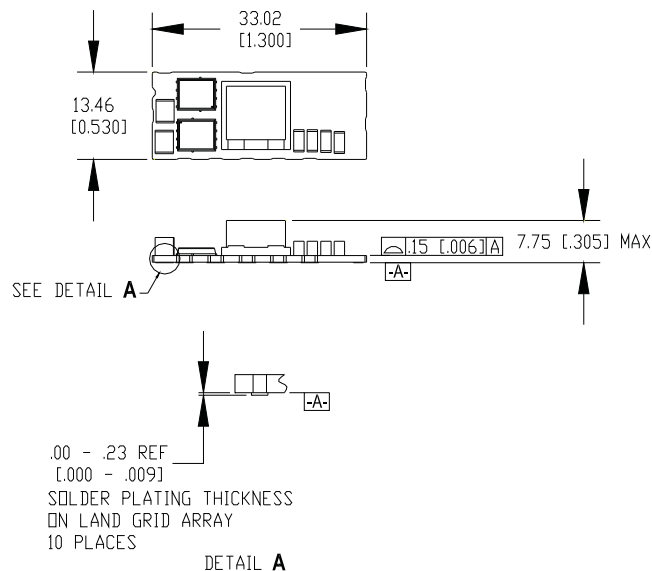
Specifications				
Model		iAF05		iAF12
DC Output Voltage	V	0.6 - 3.63		0.7 - 5.5
DC Input Voltage	V	2.4 - 5.5		4.5 - 14
Efficiency	%	85 - 93.5		82 - 93.5
Output Voltage Tolerance	%	±3		
Switching Frequency	kHz	600		
Line Regulation	mV	4		3
Load Regulation	mV	7		7
External Load Capacitance	uF	200 - 2000		
Output Ripple and Noise	mVpp	20		10
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.	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	Solder Bumping
iAF05020A006V-003-R	2.4 - 5.5	20	0.6 - 3.63	-	yes	-	EPC
iAF05020A006V-007-R	2.4 - 5.5	20	0.6 - 3.63	-	yes	-	LGA
iAF12020A007V-003-R	4.5 - 14	20	0.7 - 5.5	-	yes	-	EPC
iAF12020A007V-007-R	4.5 - 14	20	0.7 - 5.5	-	yes	-	LGA

Preferred Model

Outline Drawing (EPC Type)



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



120W, 60A Non-isolated SMT Point of Load with PMBus

Features

- ◆ Only 1.0 in² Board Space
- ◆ PMBus Compliant (Read & Write)
- ◆ Surface Mountable
- ◆ Digital Adaptive Control
- ◆ Parallel Operation with Current Sharing
- ◆ Configurable Sequence & Fault Management



Key Market Segments & Applications



Specifications			
Model		iJB12	
DC Output Voltage	V	0.6 - 2.0V	
DC Input Voltage	V	8 - 14V	
Efficiency	%	85 - 93%	
Output Voltage Tolerance	%	±1.2	
Line Regulation	mV	4 (Typical)	
Load Regulation	mV	4 (Typical)	
External Load Capacitance	uF	1000 - 5000	
Output Ripple and Noise	mVpp	20	
Overcurrent Protection (Typ)	A	65A	
Remote On / Off	-	Negative Logic or Positive Logic (See model selector)	
Remote Sense	-	Yes	
Power Good	-	Yes	
Operating Temp	°C	-40 to 120 (see thermal data on website)	
Storage Temperature	°C	-55 to 125	
Safety Agency Approvals	-	Pending	
Weight	g / oz	12.2g / 0.43 oz	
Size (LxWxH)	mm / in.	26.8 x 24.08 x 9.68 (1.05 x 0.95 x 0.381")	
Warranty	yrs	3 years	

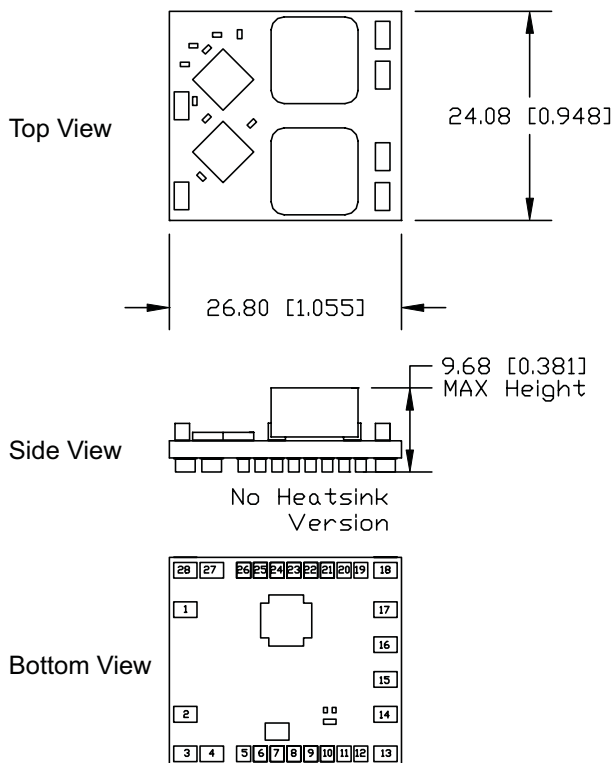
Model Selector

Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Remote On/Off	OCP/OVP Recovery
iJB12060A006V-001-R (1)	8 - 14	60	0.6 - 2.0	Negative	Automatic
iJB12060A006V-002-R	8 - 14	60	0.6 - 2.0	Positive	Automatic
iJB12060A006V-003-R	8 - 14	60	0.6 - 2.0	Negative	Automatic

(1) Standard Transient Response.

Preferred Model

Outline Drawing



Pinout

PIN	Function	PIN	Function
1	+V Input	15	+V Output
2	+V Input	16	+V Output
3	Power Ground (0V)	17	+V Output
4	Power Ground (0V)	18	Power Ground (0V)
5	Signal Ground (0V)	19	PMBus Clock
6	Not Connected	20	PMBus Data
7	Output Trim	21	PMBus Alarm
8	PMBus Address	22	Remote On/Off
9	Not Connected	23	Fault Mgmt
10	Set Parallel Operation (PSET)	24	Power Good
11	+ Remote Sense	25	Current Share
12	- Remote Sense	26	Synchronize
13	Power Ground (0V)	27	Power Ground (0V)
14	+V Output	28	Power Ground (0V)

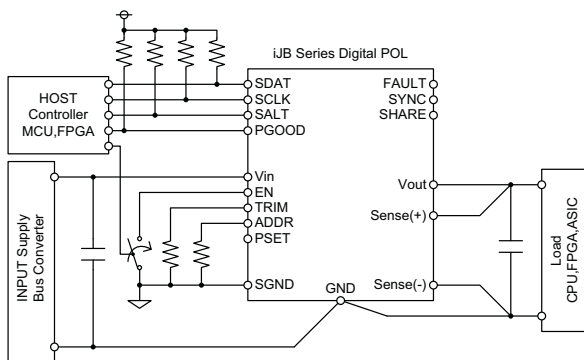
Other Industrial Products

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, iCG	3 - 20A DOSA2 non isolated DC-DC converters
iQE, iQL, iQG	96 - 400W Quarter bricks
iEH	300W Eighth brick

For Additional Information, please visit
us.tdk-lambda.com/lp/products/ijb-series.htm



Typical Application Circuit



250W, 9-40V Input Non-isolated Point of Load

Features

- ◆ 250W 14A Output
- ◆ 1/6th brick Footprint
- ◆ Wide Output Adjustment 3.3 to 20V
- ◆ Minimal External Components Needed
- ◆ Constant Switching Frequency



Key Market Segments & Applications



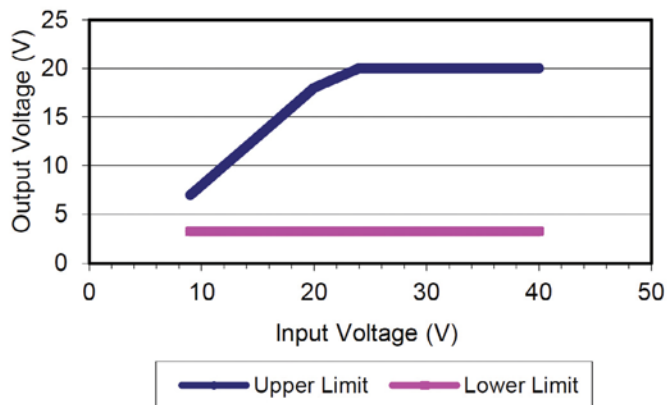
Specifications		
Model		i6A
DC Output Voltage	V	3.3 - 20
DC Input Voltage	V	9 - 40 (Turn on at 10V or greater)
Efficiency	%	92.5 - 98
Output Voltage Tolerance	%	±4
Switching Frequency	kHz	400
Line Regulation	%	0.3
Load Regulation	%	1
External Load Capacitance	uF	0 - 2000
Output Ripple and Noise	mVpp	20
Overcurrent Protection	A	22A typical
Remote On / Off	-	Negative Logic (For Positive Logic Contact Factory)
Remote Sense	-	(+) Sense, compensating up to 0.5% of output voltage
Power Good	-	Optional on Full Feature Version
Sync & Sequencing	-	Optional on Full Feature Version
Operating Temperature	°C	-40 to 125 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Certifications	-	Pending
Weight	g / oz	15g / 0.53 oz
Size (LxWxH)	mm / in.	33 x 22.9 x 12.7 / 1.3 x 0.9 x 0.5
Warranty	yrs	3 years

Model Selector

Input Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Full Feature
i6A24014A033V-001-R	9 - 40	14	3.3 - 20	-	yes	-

Note: Output voltage cannot exceed input voltage (see graph below).

Output Voltage vs Input Voltage Operating Range



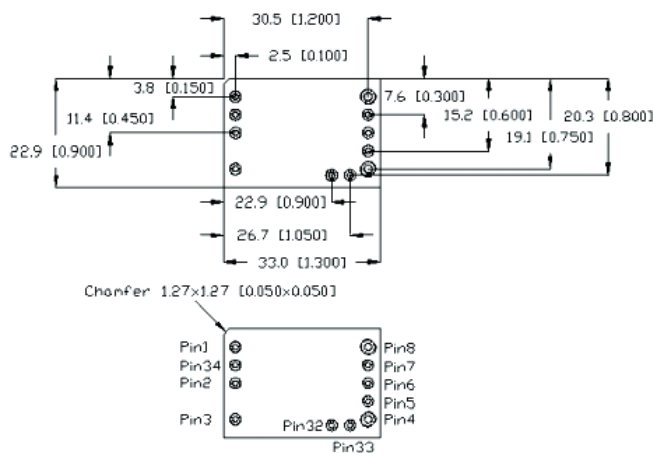
Pinout

PIN	Function	PIN	Function
1	VIN (+)	7	SENSE (+)
2	ON / OFF	8	VOUT (+)
3	VIN (-)	32	Sync (Option)
4	VOUT (-)	33	MS (Option)
5	PWR GOOD (Option)	34	SEQ (Option)
6	TRIM		

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
iAH, iBF, iBH, iCF, iCH, iCG	3 - 20A DOSA2 non isolated DC-DC converters
iJA, iJB	35 - 60A non isolated DC-DC converters with PMBus

Outline Drawing



For Additional Information, please visit
us.tdk-lambda.com/lp/products/i6a-series.htm



300-317W Eighth Brick Converter

Features

- ◆ Standard Eighth Brick Footprint
- ◆ 36-75, 38-55VDC Inputs
- ◆ 9.6V, 10.2V, 10.8V or 12V Nominal Outputs
- ◆ Through Hole Mounting
- ◆ 2250VDC Basic Isolation
- ◆ Digital adaptive control for fast transient response
- ◆ High Operating Efficiency (up to 95.5%)
- ◆ Constant Switching Frequency
- ◆ Baseplate Cooled
- ◆ Parallel Operation (9.6V & 10.2V models)



Key Market Segments & Applications



Specifications					
Model		iEH			
Nominal Output Voltage	VDC	9.6	10.2	10.8	12
Input Voltage Range	VDC	45-55	38-55	36-75	36-75*
Ripple & Noise (max) (pk-pk) (1)	mV	90	175	150	120
Line Regulation (max)	mV	40	40	50	60
Load Regulation (max)	mV	-	-	100	60
Overload Protection Threshold (3)	A	40.5	35	36	29.5
Overvoltage Protection (Typ) (2)	VDC	12.1	12.3	13.1	14.8
Overtemperature Protection (3)	-	Yes			
Remote On / Off	-	Negative Logic			
Temperature (operating)	°C	-40 to 125	-40 to 125	-40 to 124	-40 to 130
Temperature (storage)	°C	-55 to 125	-55 to 125	-55 to 125	-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	2250VDC Input to Output, 1500VDC Input to Baseplate			
Vibration (non operating)	-	5-50Hz @ 0.5g (4.9m/s ²), and 50-500Hz @ 1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4			
Shock	-	196.1m/s ²			
Safety Agency Approvals	-	UL60950 (US and Canada), CB scheme IEC 60950-1 (2nd edition) AM1, CE Mark EN 60950-1/A12			
Weight (max)	g	50			
Size	mm/in.	50.42 x 22.86 x 12.70 / 2.02 x 0.9 x 0.49			
Warranty	yrs	3 Years			

*When operating below 40V input, the module will operate, but load regulation may be out of specification.

(1) See website for detailed specification and test methods.

(2) Latching

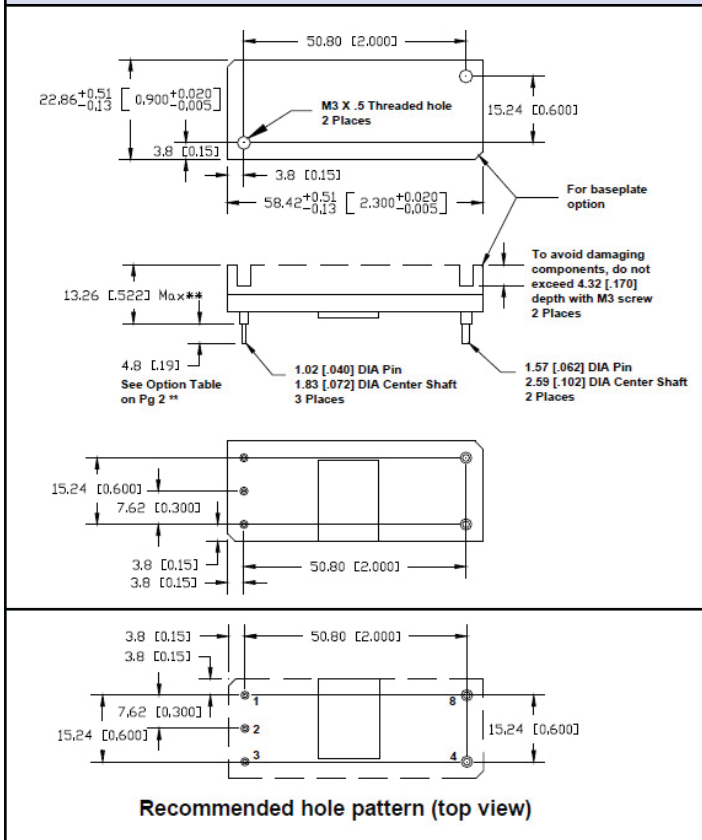
(3) Non-Latching

Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Droop Share	Max. Curr. (A)	Max. Output Power (W)	Base Plate	Efficiency at Full Load (%)	Pin Length (in)
iEH48025A120V-109-R	36-75	12	No	25	300	Yes	94.6	0.19

Preferred model

Outline Drawing



Pinout

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

For Additional Information, please visit
us.tdk-lambda.com/lp/products/ieh-series.htm



300-450W Quarter Brick Converters

Features

- ◆ Standard Quarter Brick Footprint
- ◆ 36-75VDC Input
- ◆ 9.6 or 12V Outputs
- ◆ 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				
Model		iQG48047A096V-1D1	iQG48033A120V-000~109	iQG48033A120V-1D1 & 1D9
Nominal Output Voltage	VDC	9.6V	12V	12V
Input Voltage Range	VDC		36 - 75VDC	
Input Current (max)	A	12A	10.5A	
Efficiency (48V Input)	%	95.2%	94.5%	
Output Voltage Tolerance	VDC	9.51 - 9.81	11.15 - 11.85	11.6 - 12.0
Output Voltage Adjustment	-	None		
Ripple & Noise (max) (pk - pk)	mV	100mV	125mV	150mV
Line Regulation (typical)	mV	15mv	20mV	
Load Regulation (typical)	mV	n/a	35mv	n/a
Overload Protection (typ)	A	53A (non-latching)	39A (non-latching)	
Overvoltage Protection	VDC	13.7 - 15V (latching)	13.7 - 15.6V (latching)	
Remote Sense	-	None		
Remote On / Off	-	Negative		
Current Share (Droop Mode)	-	Yes	No	Yes
Current Share Accuracy	-	±10% (50-100% of total load)	-	±10% (50-100% of total load)
Temperature (operating)	°C	-40 to 125°C (1)	-40 to 124°C (1)	
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/s²), and 50~500Hz @ 1.5g (14.7m/s²) per Bellcore TR-EOP-000063-5.4.4		
Shock	-	196.1m/s²		
Safety Agency Certifications	-	UL60950-1 (US and Canada), VDE0805 (IEC60950-1), CB scheme (IEC60950-1), CE Mark		
Weight (max)	g	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

(1) See detailed datasheet for derating

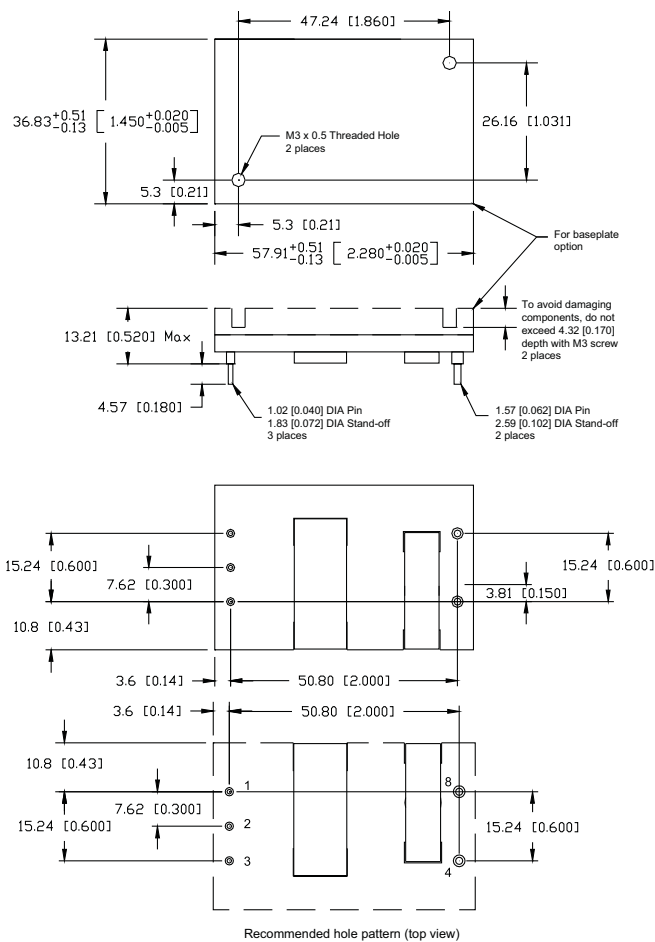
Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Max. Curr. (A)	Max. Output Power (W)	On/Off Polarity	Pin Length	Base Plate
iQG48047A096V-1D1-R	36 - 75	9.6	47	450	Neg	0.145"	Yes
iQG48025A120V-001-R	36 - 75	12	25	300	Neg	0.145"	No
iQG48025A120V-101-R	36 - 75	12	25	300	Neg	0.145"	Yes
iQG48025A120V-009-R	36 - 75	12	25	300	Neg	0.180"	No
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
iQG48033A120V-101-R	36 - 75	12	33	400	Neg	0.145"	Yes
iQG48033A120V-1D1-R	36 - 75	12	33	400	Neg	0.145"	Yes
iQG48033A120V-009-R	36 - 75	12	33	400	Neg	0.180"	No

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



300-450W 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 ²) X,Y,Z 1 hour each		
Shock	-	196.1m/s ²		
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

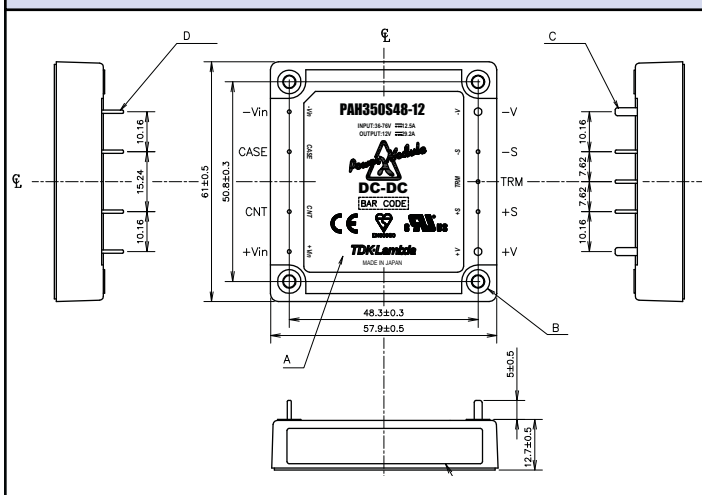
(5) 28.8-52.8 PAH350S28-48

(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



300-456W, 48V Input Half Brick Converter

Features

- ◆ Standard Half Brick Footprint with Baseplate
- ◆ 36 -75VDC Input
- ◆ 12V Nominal Output
- ◆ Through Hole Mounting
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 94%)
- ◆ Constant switching frequency
- ◆ Low component count



Key Market Segments & Applications



Specifications				
Model		iHG48025A120V-101-R		iHG48038A120V-109-R
Nominal Output Voltage	VDC	12		
Input Voltage Range	VDC	36 - 75		38 - 75
Efficiency	%	94		92.5
Ripple & Noise (max)(pk-pk) (1)	mV	250		280
Line Regulation (max)	mV	12		15
Load Regulation (max)	mV	10		15
Overload Protection Threshold (3)	A	30		45
Overvoltage Protection (2)	VDC	14.7		14.7
Overtemperature Protection (3)	-		Yes	
Remote Sense	-		Yes	
Remote On-Off	-		Negative Logic	
Temperature (operating)	°C		-40 to 116	
Temperature (storage)	°C		-55 to 125	
Humidity (operating)	-		20 to 95% (non-condensing)	
Humidity (storage)	-		10 to 95% (non-condensing)	
Cooling	-		Convection or Forced Air	
Isolation Voltage	VDC		1500	
Vibration (non operating)	-	5 to 50Hz@0.5g (4.9m/s ²), and 50 to 500Hz@1.5g (14.7m/s ²) per Bellcore TR-EOP-000063-5.4.4		
Shock	-	50 G at 6ms pulse in three axes		
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805, CB scheme (IEC950), CE Mark (EN60950)		
Weight (max)	g		105	
Size	mm		59.94 x 56.90 x 13.21	
Warranty	yrs		3 years	

Notes:

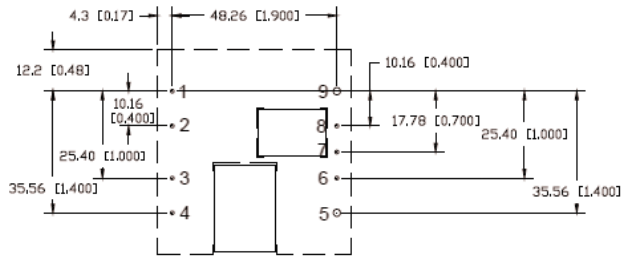
- (1) Measured across one 10uf, one 0.47uf, one 0.1uf ceramic capacitors, and one 220uf electrolytic capacitor. BW = 20MHz.
- (2) Latching
- (3) Non-latching

Model Selector

Model	Input Volt. (V)	Output Volt. (V)	Adjust Range (V)	Max. Current (A)	Max. Output Power (W)	On/Off Logic	Pin Length
iHG48025A120V-101-R	36 - 75	12	6 - 13.2	25	300	Neg	0.145
iHG48038A120V-109-R	38 - 75	12	6 - 13.2	38	456	Neg	0.180

Preferred Model

Outline Drawing



Recommended hole pattern (top view)

PIN Assignments

PIN	Function	PIN	Function
1	Vin (+)	6	Sense (-)
2	On / Off	7	Trim
3	Case	8	Sense (+)
4	Vin (-)	9	Vout (+)
5	Vout (-)		

For Additional Information, please visit
us.tdk-lambda.com/lp/products/iHG-series.htm



Other DC-DC Products

Series	Isolation	Rating	Output	Input
CC-E	Isolated	1.5 - 30W	1 - 2 Outputs	5 - 48VDC
PX	Isolated	10 - 60W	1 - 3 Outputs	12 - 48VDC
iSA	Isolated	36 - 82.5W	1.2 - 12V	36 - 75VDC
iEA	Isolated	48 - 78W	5 - 28V	36 - 75VDC
iEH	Isolated	300 - 317W	9.6 - 12V	36 - 75VDC
PAE50/100	Isolated	50 - 100W	1.8 - 5V	36 - 76VDC
iQL	Isolated	72 - 308W	1.2 - 28V	18 - 75VDC
iQE	Isolated	49.4 - 204W	3.3 - 12V	18 - 75VDC
iQG	Isolated	300 - 450W	9.6 - 12V	36 - 75VDC
iHG	Isolated	300 - 456W	12V	36 - 75VDC
PAH	Isolated	30 - 450W	2.5 - 48V	18 - 76VDC
PAF	Isolated	450 - 700W	3.3 - 48V	36 - 75VDC
iJB	POL, Digital	60A	0.6 - 2.0V	8 - 14VDC
i6A	POL	250W	3.3 - 20V	9 - 40VDC
iA,iB,iC	POL	3,6,12,20A	0.6 - 5.5V	2.4 - 14VDC

600W, 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



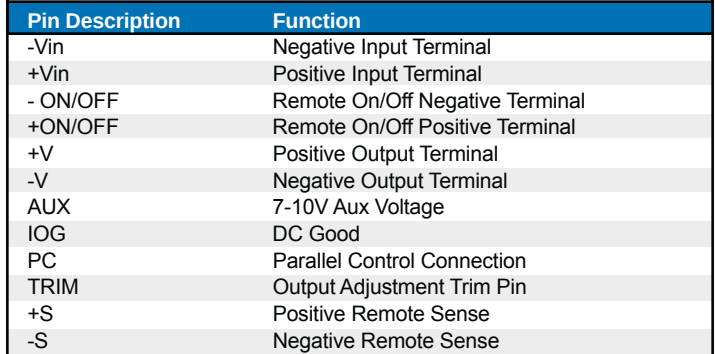
Key Market Segments & Applications



Specifications				
Model		PAF600F24-12 PAF600F48-12		PAF600F24-28 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 ²		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s ²) 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.

Pinout

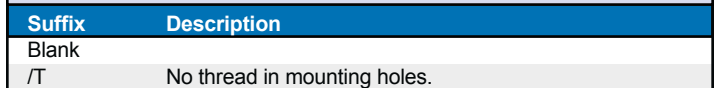


Derating Curve

The graph shows a constant load of 100% across the temperature range from -40°C to 100°C. At 100°C, the load drops to 0%.

Baseplate Temperature (°C)	Load (%)
-40	100
-20	100
0	100
20	100
40	100
60	100
80	100
100	0

Options



For Additional Information, please visit
us.tdk-lambda.com/lp/products/paf-series.htm



2500W Bi-Directional DC-DC Converter

Features

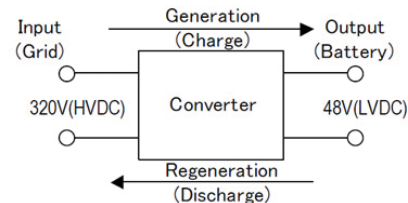
- ◆ 1U rackmount
- ◆ Battery Side 48VDC
- ◆ Grid Side 320VDC
- ◆ High Efficiency (92%)
- ◆ RS-485 Communications & Control



Key Market Segments & Applications



Basic Operation



Specifications

Model		Low Voltage DC (Battery Side)	High Voltage DC (Grid Side)
Voltage Range (1)(2)	VDC	36 - 60VDC (48V Nominal)	300 - 380VDC (320V Nominal)
Output Current (Maximum)	A	±52A	±7.8A
Constant Current Programming Range (1)(2)	A	2.4 - 56A	0.5 - 8.5A
Maximum Output Power	W	±2,496W	±2,496W
Efficiency	%	92%	92%
Pre-charge Voltage (required)	VDC	> 36V	>300V
Inrush Current (Typical)	A	5.5A	3.6A
Line Regulation (Maximum)	-	240mV	1.52V
Load Regulation (Maximum)	-	480mV	3.04V
Temperature Regulation (Maximum)	-	300mV	1.9V
Output Ripple & Noise (Maximum pk-pk)	-	480mV	3.2V
Sink Current (When applied V > output set V)	mA	300mA	50mA
Overcurrent Protection (Manual reset)	A	60A	9.5A
Overpower Protection	W	2600W (Constant power)	2600W (Constant power)
Input Current Limit (typical)	A	-	56A
Under & Overvoltage Protection (2)	V	32 - 68V	260 - 425V
Overtemperature Protection	-	Yes, Alarm signal is given	
Remote On/Off & Reset (2)	-	Yes	
Parallel Operation	-	Yes (Droop mode, can be set via RS-485)	
Front panel Indicators and Settings	-	Operating mode (Generating, Regenerating & Alarm), Alarm clear & RS-485 address selection	
Operating Temperature	°C	-10 to +40°C, full load	
Storage Temperature	°C	-20 to +70°C	
Humidity (Non condensing)	%RH	Operating: 30 - 90%RH, Storage: 10 - 95%RH	
Cooling	-	Internal fan	
Vibration (Non operating)	-	10-500Hz (1 min sweep), 10.2m/s ² constant for 1 hour in each direction: X, Y & Z axis	
Shock	-	196.1m/s ² maximum	
Withstand Voltage	-	Input (HVDC) to Output (LVDC) 3kVAC, Input to Ground 2kVAC, Output to Ground 500VAC	
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC	
Safety Certification	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark (LVD & RoHS2)	
Size (W x H x D)	mm	422.8 x 43.6 x 400mm	
Weight	g	8000g	
Warranty	Yrs	Five Years	

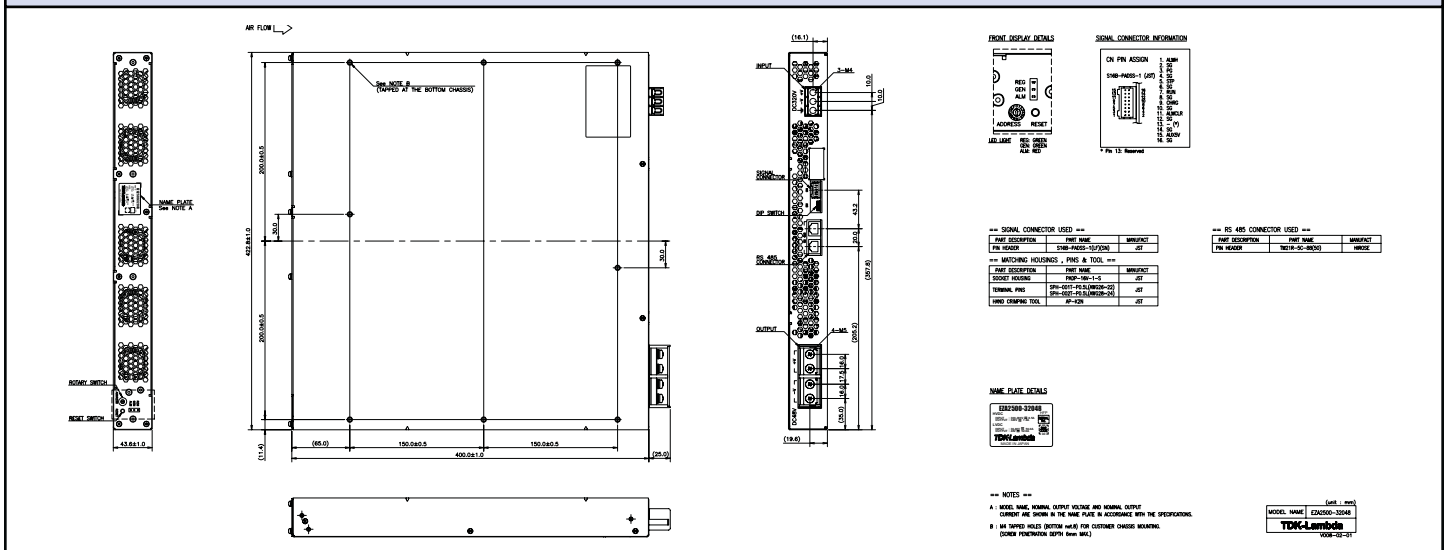
Notes

- (1) See installation manual for detailed specifications & test methods
- (2) Can be set via RS-485

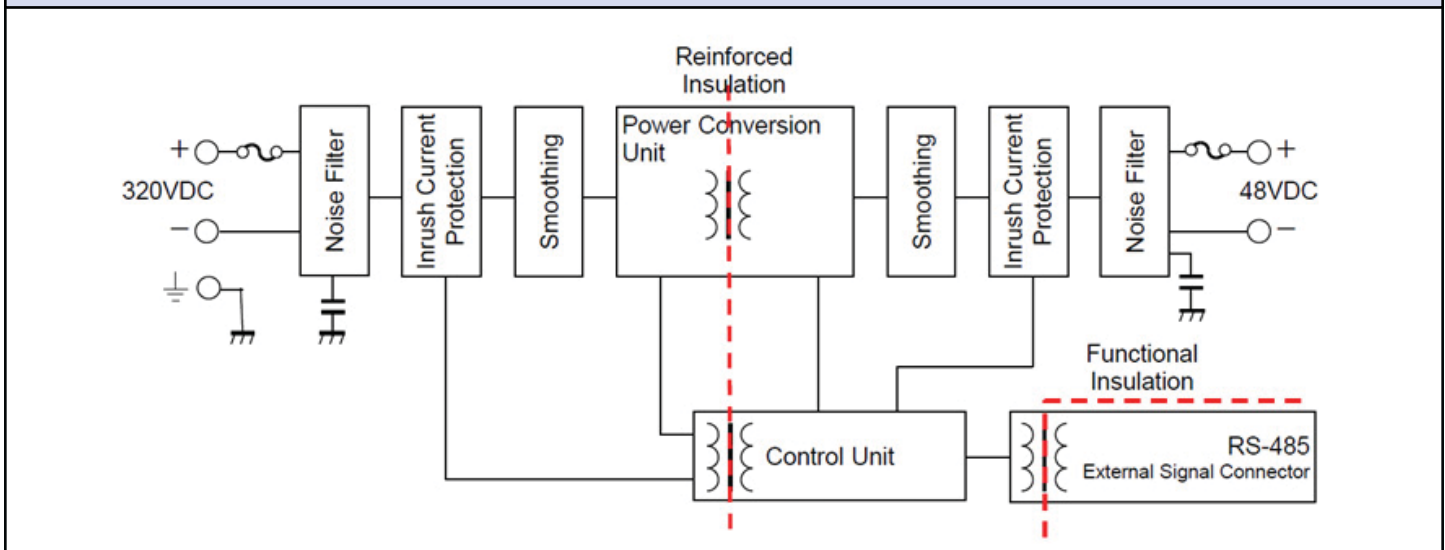
RS-485 Functions

Model		Low Voltage DC (Battery Side)	High Voltage DC (Grid Side)
Voltage Setting Accuracy	-	$< \pm 0.6V$	$< \pm 4V$
Current Setting Accuracy	-	$< \pm 0.8A$	$< \pm 0.125A$
Voltage Setting Resolution	-	$< 60mV$	$< 0.4V$
Current Setting Resolution	-	$< 50mA$	$< 8mA$
Voltage Reading Accuracy	-	$< \pm 0.6V$	$< \pm 4V$
Current Reading Accuracy	-	$< \pm 0.8A$	$< \pm 0.125A$
Voltage Reading Resolution	-	$< 60mV$	$< 0.4V$
Current Reading Resolution	-	$< 50mA$	$< 8mA$
RS-485 Baud Rate	-	19.2kbps / 33.6kbps / 57.6kbps (Set by DIP Switch)	
RS-485 Maximum Connection	-	14	

Outline Drawing



Block Diagram



For Additional Information, please visit
us.tdk-lambda.com/lp/products/eza-series.htm





Programmable Power Supplies



Applications

- ◆ ATE Systems
- ◆ Battery simulation
- ◆ Component burn-in
- ◆ Plating and etching

Features

- ◆ Output voltage up to 650V, output current up to 72A. Outputs in series-two max; outputs in parallel-six max.
- ◆ Constant voltage or constant current operation with automatic crossover
- ◆ Last setting memory stores latest settings when power supply is switched off
- ◆ Analog programming and monitoring for output voltage and current with 0-5V or 0-10V scale
- ◆ Integrated RS232/RS485 (and USB for Z+) communication interface as standard
- ◆ IEEE, LAN and isolated analog optional interfaces
- ◆ Comprehensive parameter setting menus via front panel or digital interface
- ◆ Parallel operation with active current share and advanced parallel mode
- ◆ Arbitrary function generation and storage on Z+
- ◆ Suitable for benchtop use or 19" rack integration

Wattage	Series	Page	Listed by Wattage
200-800W	Z+.....	195	
200-800W	Z+ HV.....	197	

200-800W 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
Only one of the options below can be included:	
GPIB Interface*	-IEEE
Voltage Programming Isolated Analog Interface*	-IS510
Current Programming Isolated Analog Interface*	-IS420
LAN Interface	-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



200-800W 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)
Z160-1.3-U	0 - 160	0 - 1.3	208	10	100	1.2	79 / 81
Z160-2.6-U	0 - 160	0 - 2.6	416	10	100	1.5	84 / 86
Z160-4-U	0 - 160	0 - 4	640	10	100	2.0	86.5 / 88.5
Z160-5-U	0 - 160	0 - 5	800	10	100	2.0	86.5 / 88.5
Z320-0.65-U	0 - 320	0 - 0.65	208	25	150	0.8	79 / 81
Z320-1.3-U	0 - 320	0 - 1.3	416	25	150	1.0	84 / 86
Z320-2-U	0 - 320	0 - 2	640	30	150	1.5	87 / 88.5
Z320-2.5-U	0 - 320	0 - 2.5	800	30	150	1.5	86.5 / 89
Z650-0.32-U	0 - 650	0 - 0.32	208	60	250	0.5	79 / 81
Z650-0.64-U	0 - 650	0 - 0.64	416	60	250	0.6	84 / 86
Z650-1-U	0 - 650	0 - 1	650	60	250	1.0	86.5 / 88.5
Z650-1.25-U	0 - 650	0 - 1.25	812	60	250	1.0	87 / 89

Factory Installed Options

	Option Code
IEC320 cable USA plug (Included in model number above)	-U
Only one of the options below can be included:	
GPIB Interface*	-IEEE
Voltage Programming Isolated Analog Interface*	-IS510
Current Programming Isolated Analog Interface*	-IS420
LAN Interface	-LAN

Part Number Example

Z160-1.3-LAN-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 brochure on website for full detailed specifications)

Model		Z160	Z320	Z650
Load Regulation	CV	0.01% of rated voltage over 0 - 100% load change		
Line Regulation	CV	0.01% of rated voltage over 0 - 100% input change		
Recovery Time (1)	CV	2ms		
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 of rated output voltage		
Up programming response time (10-90% or 90-10% of Vmax)	CV	80ms	150ms	150ms
Down programming resp time (CV) (10-90% or 90-10% of Vmax)	Full load	100ms	150ms	150ms
Down programming resp time (CV) (90-10% of Vmax)	Zero load	2ms	2.5ms	3ms
Load Regulation	CC	0.09% 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	0.02% 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 + 0.05% of actual, 0.2% 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	5 - 176	5 - 353	5 - 717
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	5	5	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	-	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: 20 - 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 EMI	-	IEC/EN61326-1 Industrial location B, FCC part 15-B, VCCI-B		
Radiated EMI	-	IEC/EN61326-1 Industrial location A, FCC part 15-A, VCCI-A		
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

For Additional Information, please visit
us.tdk-lambda.com/lp/products/zplus-series.htm





EMC/EMI Filters



Applications

- ◆ Improve EMC performance in complex equipment
- ◆ Improve EMC performance with long mains wires

Features

- ◆ Single-phase, three-phase and three-phase with Neutral
- ◆ 0.5A to 300A line current
- ◆ Single-stage and two-stage filters with high attenuation over a wide frequency range
- ◆ With surge protection
- ◆ Medical versions with reduced leakage currents
- ◆ Models for DIN-Rail mounting

Wattage	Series	Page	Listed by Amps
0.5-6A	RSAL.....	201	
3-300A	RSHN.....	203	
6-60A	RTAN.....	205	
6-300A	RTHN.....	207	
50A	RDEN.....	209	

*For additional models offered, please see TDK Lambda’s web page.

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



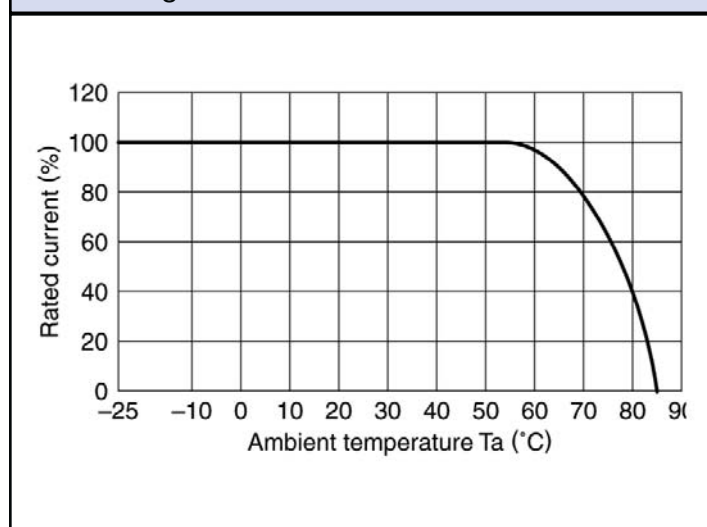
Specifications

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
		0.5A	1A	2A	3A	6A
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

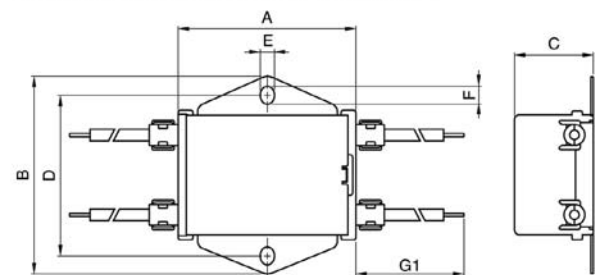
Wire Terminations	RSAL-20xxW
Lug Terminations	RSAL-20xxA
Wire Terminations & Low Leakage Current	RSAL-20xxWL
Lug Terminations & Low Leakage Current	RSAL-20xxAL

Derating

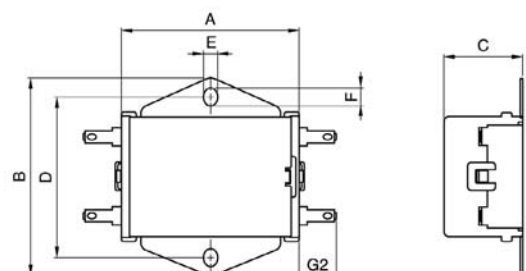


Outline Drawing

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

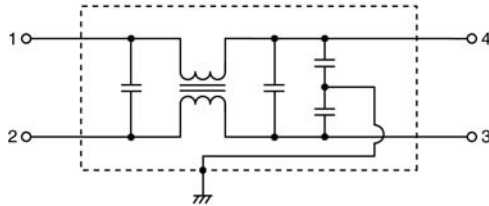


RSAL-20R5/2001/2002/2003/2006A(L)

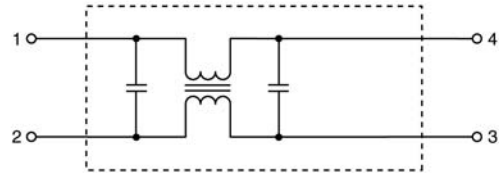


Circuit

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

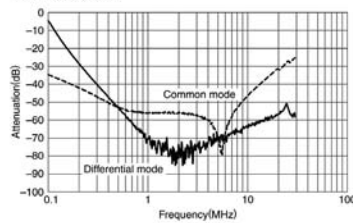


RSAL-2 *** WL
RSAL-2 *** AL

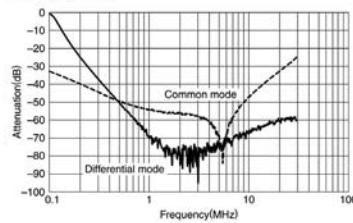


Attenuation Characteristics

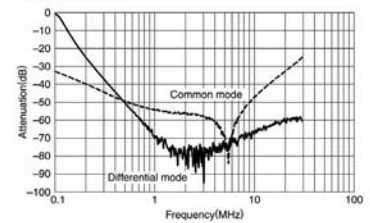
RSAL-20R5W/A



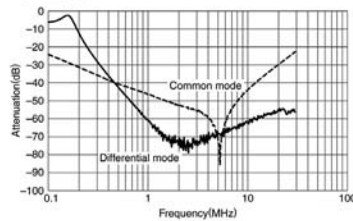
RSAL-2001W/A



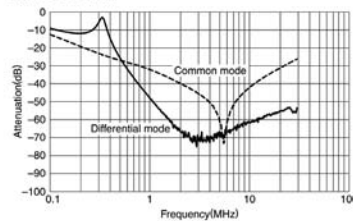
RSAL-2002W/A



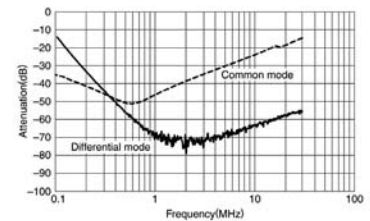
RSAL-2003W/A



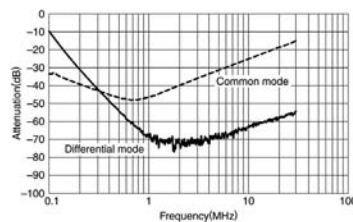
RSAL-2006W/A



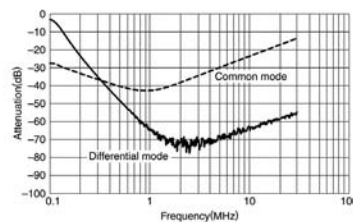
RSAL-20R5WL/AL



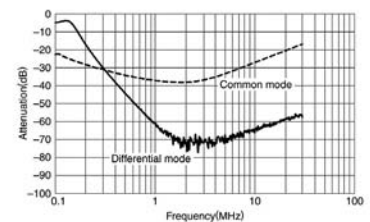
RSAL-2001WL/AL



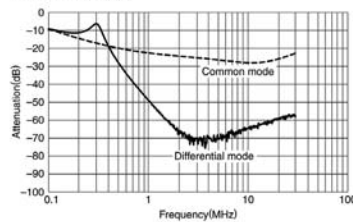
RSAL-2002WL/AL



RSAL-2003WL/AL



RSAL-2006WL/AL



For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



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



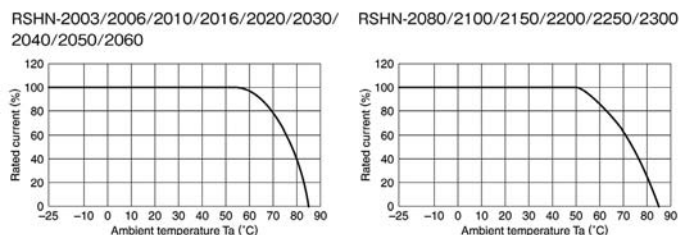
Key Market Segments & Applications



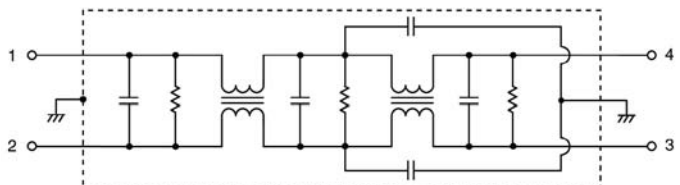
Specifications

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				

Derating



Circuit

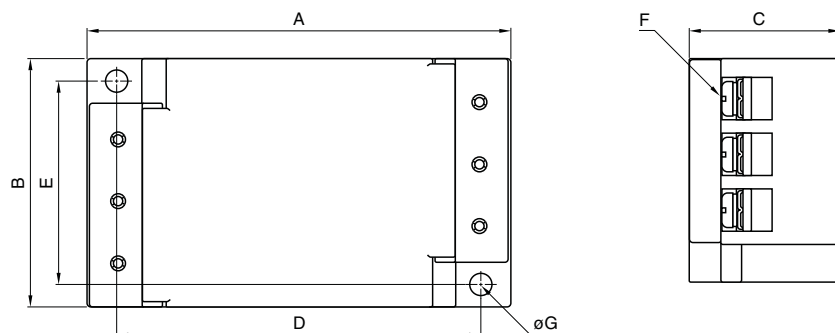


Options

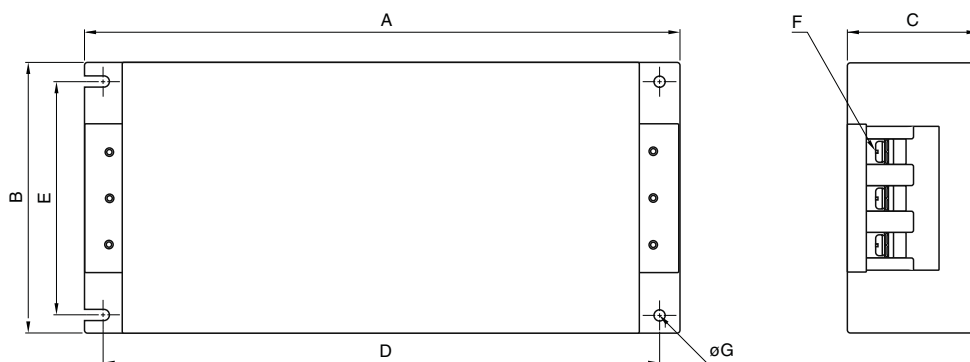
Chassis Mount & Standard Leakage Current	RSHN-20xx
DIN Rail Mount & Standard Leakage Current	RSHN-20xxD
Chassis Mount & Low Leakage Current	RSHN-20xxL

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



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



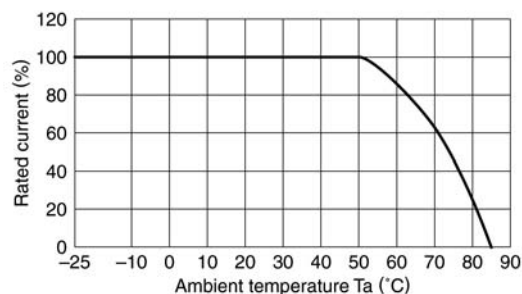
Key Market Segments & Applications



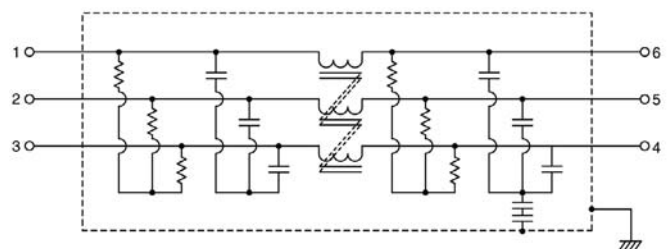
Specifications

Model		RTAN-5006 RTAN-5006D	RTAN-5010 RTAN-5010D	RTAN-5020 RTAN-5020D	RTAN-5030 RTAN-5030D	RTAN-5040
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				

Derating



Circuit

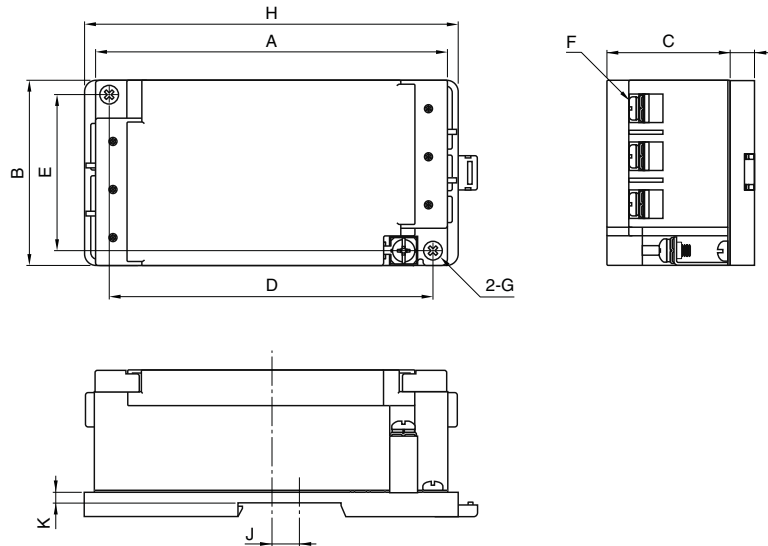


Options

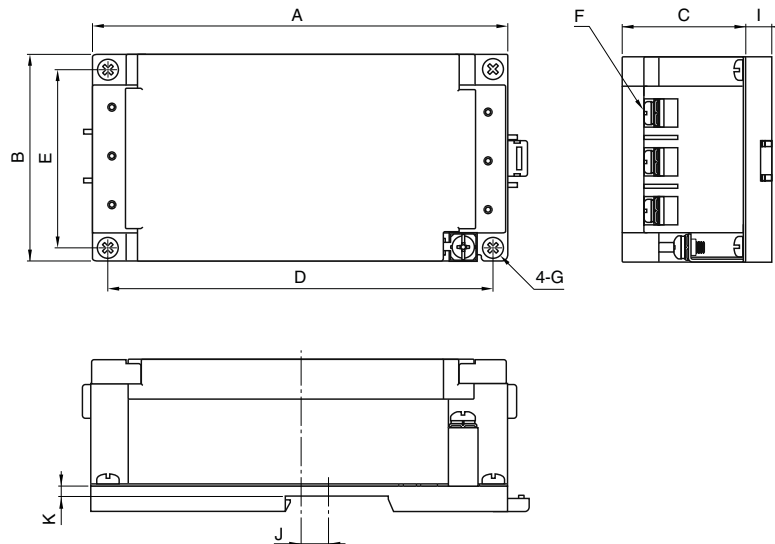
Chassis Mount	RTAN-50xx
DIN Rail Mount (Models up to 30A)	RTAN-50xxD

Outline Drawing

RTAN-5006D/5010D



RTAN-5020D/5030D



For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



6A to 300A, 500VAC EMI Filters

Features

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

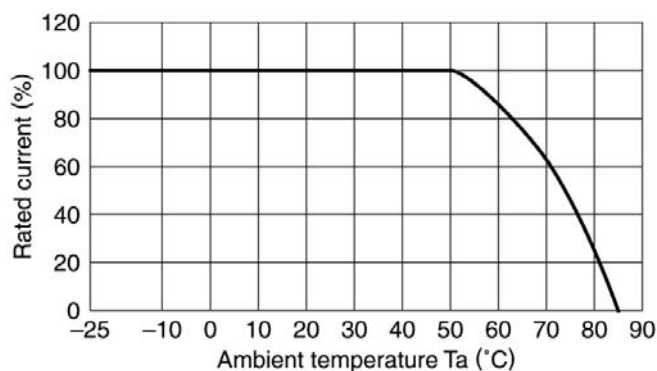
Key Market Segments & Applications



Specifications

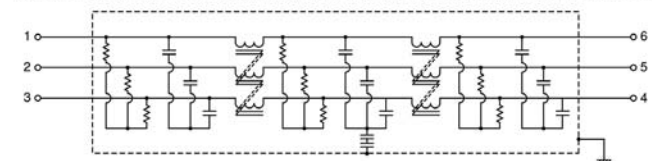
Model		RTHN-5006		RTHN-5010	RTHN-5020	RTHN-5030	RTHN-5040
Rated Voltage (AC, DC)	V			500V Three phase			
Rated Current	A	6A	10A	20A	30A	40A	
DC Resistance (total)	mΩ	290	120	50	25	20	
Model		RTHN-5050		RTHN-5060	RTHN-5080	RTHN-5100	RTHN-5150
Rated Voltage (AC, DC)	V			500V Three phase			
Rated Current	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

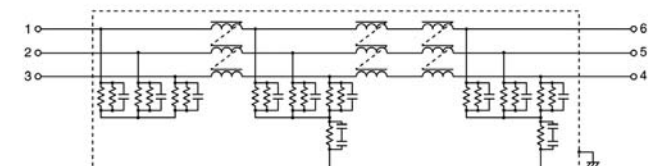


Circuit

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

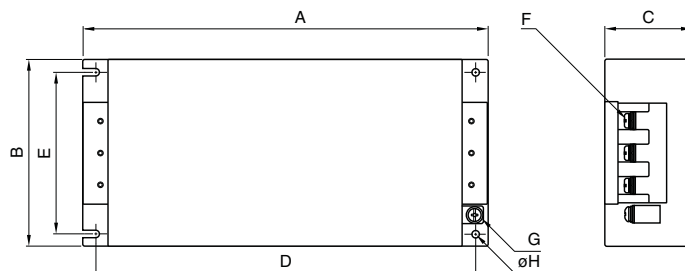


RTHN-5400/5600/5A00

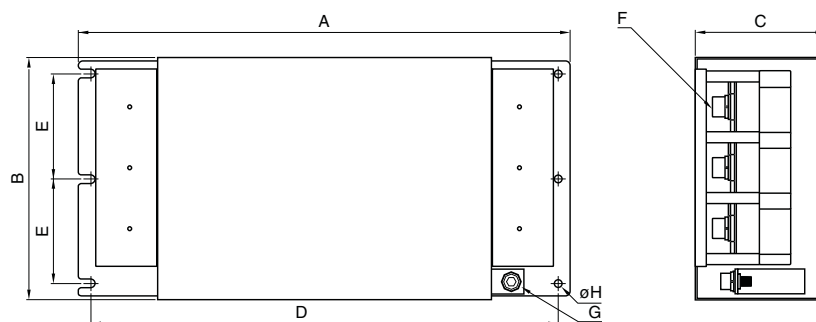


Outline Drawing

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	240	105	55	225	85	M4	M4		
RTHN-5030									
RTHN-5040	300	128	68	280	102	M5	M4	5.5	
RTHN-5050									
RTHN-5060									
RTHN-5080	430	161	85	410	135	M8	M6	6.5	
RTHN-5100									
RTHN-5150	473	190	88	453	164	M8	M6		
RTHN-5200	593	195	103	573	84.5	M10	M8		
RTHN-5250									
RTHN-5300									

For Additional Information, please visit
us.tdk-lambda.com/lp/products/r-series.htm



50A 48VDC EMI Filters

- Features
- ◆ High Attenuation
 - ◆ Stud Terminal Connection
 - ◆ Compact Size



Key Market Segments & Applications

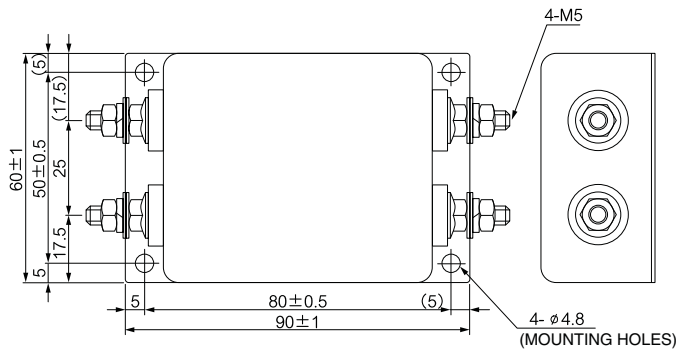
Industrial

Test

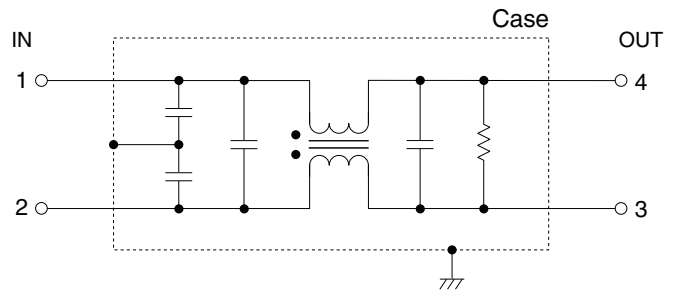
COMM

Specifications		
Model		RDEN-048050
Rated Voltage	VDC	48VDC (76VDC Max)
Rated Current	A	50A
Withstand Voltage	VDC	Terminals to Case: 1500VDC 60s
Isolation Resistance	MΩ	500MΩ minimum at 500VDC for 1 minute
Leakage Current	mA	Not Applicable
DC Resistance	mΩ	3
Operating Temperature	°C	-30 to +85 (see derating curve)
Storage Temperature	°C	-30 to +85
Safety Agency Certification	-	UL/CSA60950-1, EN60939
Weight (Typ)	g	310
Warranty	yrs	1 Year

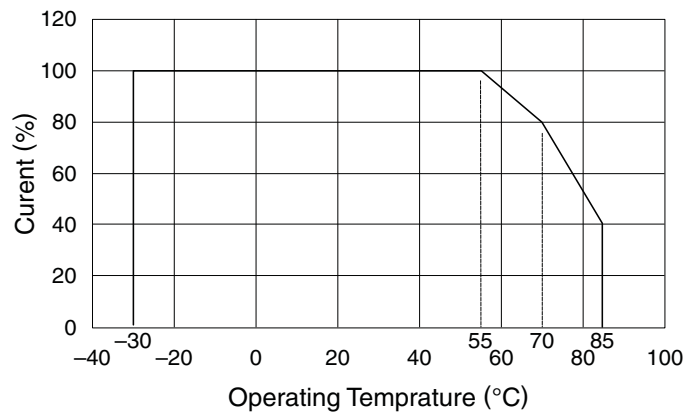
Outline Drawing



Circuit

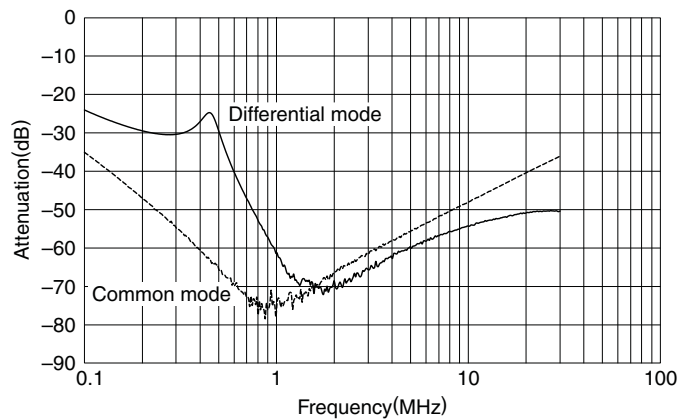


Derating



Attenuation Characteristics

RDEN-048050



For Additional Information, please visit
us.tdk-lambda.com/lp/products/rden-series.htm



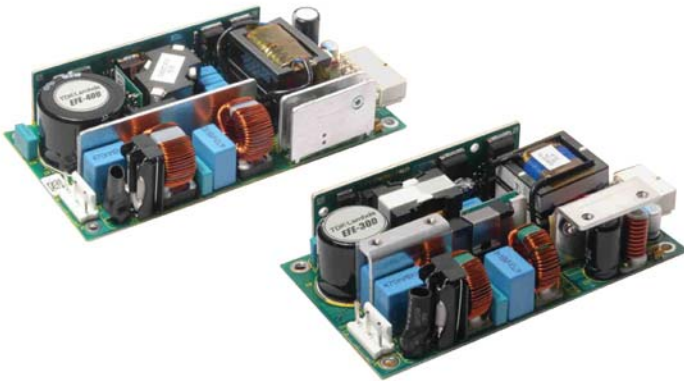


Features

- ◆ Technical draft
- ◆ Field-proven technology from our standard products
- ◆ Careful component selection
- ◆ Design Verification Test (DVT)
- ◆ Approvals (Safety, EMC, Environment and etc...)

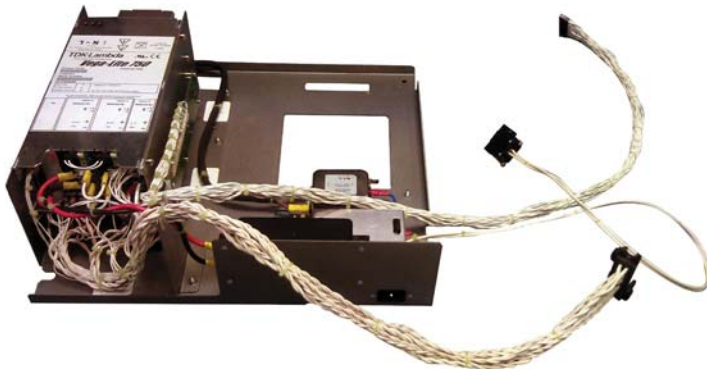
Modified Standard (Low Complexity)

- ◆ A slight modification (electrical or physical) to a Standard / Existing TDK-Lambda product.
- ◆ The product retains the inherent reliability of the product from which it was modified.
- ◆ Examples include Input/Output connector, signal, output voltage, or paint changes, reduced leakage current, and addition of test points or indicator lights.



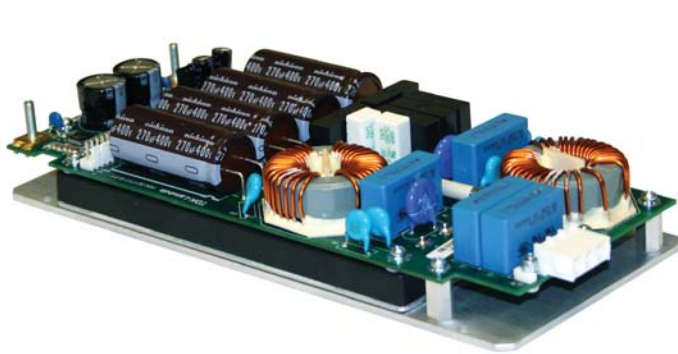
Value-Added (Medium Complexity)

- ◆ A customized power solution which builds added circuitry or packaging around a Standard/ Existing TDK-Lambda Power Supply to meet exact specifications.
- ◆ Any TDK-Lambda supply may be used as a starting point and these customized solutions also retain the proven reliability of the product from which it was modified.
- ◆ Examples include custom racks or enclosures, special wire harnesses, switches, fuses, fans, or heat sinks, and additional functionality to a standard product.



Brick-on-Board (Medium Complexity)

- ◆ A customized power solution which builds added circuitry around Standard / Existing TDK-Lambda PCB Power Modules.
- ◆ Oftentimes, custom enclosures are built around the brick-on-board power supply.
- ◆ These high reliability customized solutions are built around TDK-Lambda's industry leading power modules and designs have fast turnaround times.

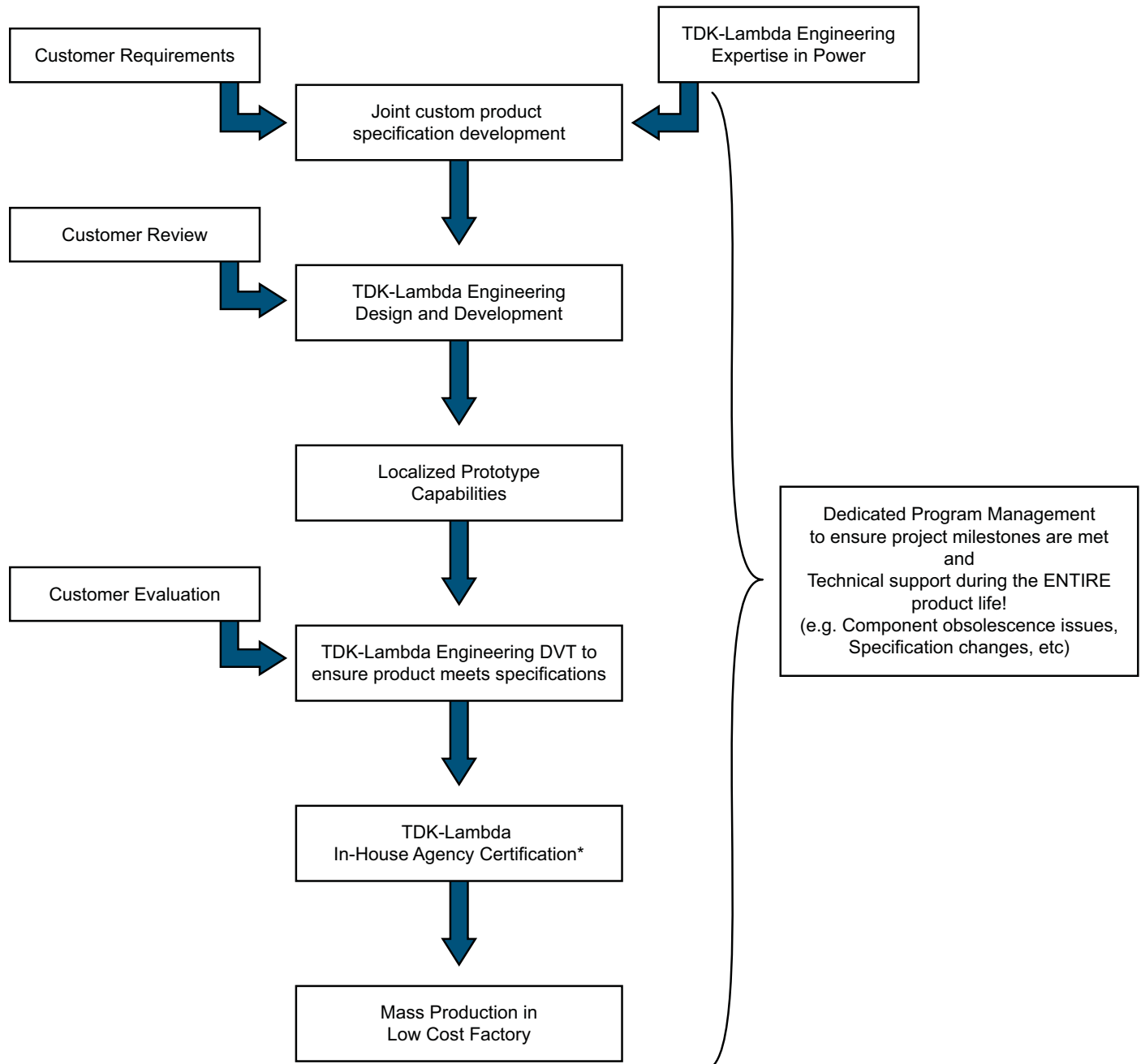


Full Custom (High Complexity)

- ◆ A power supply designed "from scratch" electrically using discrete components to meet the customer's unique set of requirements.
- ◆ Designs may build upon existing circuitry, but packaging is typically unique.
- ◆ Examples include multiple input/output, high power density, high technology, severe temperature range, or very low noise.



Process Flow



* For Modified Standard Products. New designs will be tested by external agencies.



Ilfracombe Plant (U.K.)

Manufacturing and R&D

Modular (Vega, Alpha, NV) & 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 & programmable products

Alpha1000.....	57	iQL.....	171
Alpha1500.....	59	iSA.....	159
CC-E.....	139	KM.....	77
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CN-A24.....	163	LS.....	17
CN-A110.....	155	LS200.....	23
CPFE500F.....	33	LZSA.....	37
CPFE1000F.....	41	NN.....	15
CPFE1000FI.....	43	NV175.....	99
CSS65.....	85	NV350/700.....	51
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