TDK-Lambda Power Supplies and DC-DC Converters





Edition 16

TDK·Lambda

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TDK·Lambda The Power to Shape Your World

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 71 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 manufacturing sites are ISO9001 and ISO14001 certified.
- Our technical support can get your product to market faster. Please call 1-800-LAMBDA-4 (1-800-526-2324).







TDK-Lambda offers a broad range of standard power supplies for many applications. This Catalog is designed to provide easy navigation of product selection by application and product type. The product ranges are sorted into special categories on the next page. Data sheets are 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 Semi-Fab

Thank you for your interest in TDK-Lambda products

Medical

Listed by Wattage

Medical

Wattage	Series	Category	Page	Wattage	Series	Category	Page
3W	PXC-M03	DC-DC	154	250W	DTM250-D	AC-DC	144
6W	PXC-M06	DC-DC	156	300W	DTM300-D	AC-DC	146
10W	PXC-M10	DC-DC	158	350-420W	CUS350M	AC-DC	30
15-40W	KM	AC-DC	90	350-1150W	NV350/700	AC-DC	62
15-60W	KMS-A	AC-DC	92	500W	CSS500	AC-DC	34
30-60W	CUS30M/60M	AC-DC	94	500W	XMS500	AC-DC	36
40-65W	DTM65C8	AC-DC	132	400W	CUS400M	AC-DC	32
40-65W	DTM65-D	AC-DC	134	450-900W	Vega	AC-DC	64
90-110W	DTM110-C	AC-DC	138	550-900W	Vega-Lite	AC-DC	66
100W	CUS100ME	AC-DC	102	600W	CM4	AC-DC	68
110W	DTM110-C8	AC-DC	142	600W	GXE600	AC-DC	40
150W	CUS150M	AC-DC	104	1000-1500W	RWS1000/1500-B/ME	AC-DC	44
175-200W	NV175	AC-DC	106	1500W	CUS1500M	AC-DC	48
200-250W	CUS200M	AC-DC	108	Filter 3-300A	RSHN	Filter	226

Industrial

Listed by Wattage

Industrial

Wattage	Series	Category	Page	Wattage	Series	Category	Page
1.5-25W	CC-E	DC-DC	152	150-200W	LS200	AC-DC	24
2-4W	KAS	AC-DC	82	175-200W	NV175	AC-DC	106
3W	PXC-M03	DC-DC	154	200W	CN-A110	DC-DC	168
4-15W	KPSA	AC-DC	84	200-250W	CUS200M	AC-DC	108
5-25W	KWSA	AC-DC	86	200-800W	Z+	Programmable	220
6W	PXC-M06	DC-DC	156	200-800W	Z+ HV	Programmable	222
10W	PXC-M10	DC-DC	158	250W	i6A	DC-DC	212
10-30W	ZWS10-30B	AC-DC	88	250W	i6A4W	DC-DC	214
10-100W	DRL10-100	AC-DC	120	300W	i7C	DC-DC	216
15W	CCG15	DC-DC	160	300W	ZWS300BAF	AC-DC	114
15-40W	KM	AC-DC	90	300W	iEH	DC-DC	166
15-60W	KMS-A	AC-DC	92	300-450W	iQG	DC-DC	184
15-100W	DRB15-100	AC-DC	122	300-450W	PAH300-450	DC-DC	186
15-150W	HWS15A-150A/A	AC-DC	12	300-456W	iHG	DC-DC	188
20-30W	PXE	DC-DC	162	300-1008W	PFE300SA/500F/1000FA	AC-DC	112
25-150W	LS	AC-DC	14	300-1500W	HWS300-1500	AC-DC	28
30-60W	CUS30M/60M	AC-DC	94	350-420W	CUS350M	AC-DC	30
30-100W	CN-A110	DC-DC	168	350-1150W	NV350/700	AC-DC	62
33-150W	ZWS50-150BAF	AC-DC	96	400W	CUS400M	AC-DC	32
35W	CUT35	AC-DC	98	450-900W	Vega	AC-DC	64
40-60W	DPX	DC-DC	124	480W	DRB480	AC-DC	128
40-60W	PXF	DC-DC	164	500W	CSS500	AC-DC	34
40-65W	CSW65	AC-DC	18	500W	PFH500F	AC-DC	116
40-65W	DTM65-C	AC-DC	132	500W	XMS500	AC-DC	36
40-80W	DT62/80-D	AC-DC	136	500-1500W	LZSA	AC-DC	38
49-204W	iQE	DC-DC	170	550-900W	Vega-Lite	AC-DC	66
50-100W	CN-A24	DC-DC	172	600W	CM4	AC-DC	68
50-150W	PHA-280	DC-DC	174	600W	GXE600	AC-DC	40
50-600W	RWS-B	AC-DC	20	600W	PAF600F	DC-DC	190
50-1500W	HWS/HD	AC-DC	16	700-1500W	QM	AC-DC	70
72-308W	iQL	DC-DC	176	720-1000W	CPFE1000FI	AC-DC	42
75W	CUT75	AC-DC	100	1000W	iJA35A	DC-DC	204
75W	i6AN	DC-DC	196	1000-1500W	RWS1000/1500-B	AC-DC	44
79-153W	CUS200LD	AC-DC	22	1500W	CUS1500M	AC-DC	48
80W	iBH	DC-DC	198	1800W	HWS1800T	AC-DC	52
85W	iCH	DC-DC	200	1600W	HFE1600	AC-DC	76
85W	HQA85	DC-DC	178	1600W	RFE1600	AC-DC	50
90-110W	DTM110-C	AC-DC	138	2000-4000W	TPS4000	AC-DC	58
100W	CUS100ME	AC-DC	102	2500W	HFE2500	AC-DC	78
100W	i3A	DC-DC	202	2500W	RFE2500	AC-DC	54
100-150W	DT100/150-D	AC-DC	140	3200W	TPS3000	AC-DC	56
120W	iJB	DC-DC	206	Filter 3-300A	RSHN	Filter	226
120W	GQA	DC-DC	180	Filter 6-30A	RSEV	Filter	228
120W	HQA120	DC-DC	182	Filter 6-60A	RTAN	Filter	230
120-960W	DRF120-960	AC-DC	126	Filter 6-300A	RTHN	Filter	232
150W	CUS150M	AC-DC	104	Filter 10A	iDQ	Filter	234
150W	iAH	DC-DC	210	Filter 50A	RDEN	Filter	240
150W	iJC	DC-DC	208				

COTS

Listed by Wattage

COTS

Wattage	Series	Category	Page	Wattage	Series	Category	Page
30-1500W	HWS/HD	AC-DC	16	600-602W	PAF600F	DC-DC	190
50-100W	CN-A24	DC-DC	172	720-1008W	CPFE1000FI	AC-DC	42
50-150W	PH-A280	DC-DC	174	1600W	HFE1600	AC-DC	76
85W	HQA85	DC-DC	178	1600W	RFE1600	AC-DC	50
120W	GQA	DC-DC	180	2000-4000W	TPS4000	AC-DC	50
120W	HQA120	DC-DC	182	2500W	HFE2500	AC-DC	58
300-450W	PAH300-450	DC-DC	186	2500W	RFE2500	AC-DC	54
300-1008W	PFE300SA/500F/1000FA	AC-DC	112	3200W	TPS3000	AC-DC	56
500W	PFH500F	AC-DC	116	Filter 20A	FQA	Filter	236
500-1500W	LZSA	AC-DC	38	Filter 20A	FQB	Filter	238
600W	CM4	AC-DC	68				

Test

Listed by Wattage



Test

Wattage	Series	Category	Page
1.5-25W	CC-E	DC-DC	152
2-4W	KAS	AC-DC	82
3W	PXC-M03	DC-DC	154
4-15W	KPSA	AC-DC	84
5-25W	KWSA	AC-DC	86
6W	PXC-M06	DC-DC	156
10W	PXC-M10	DC-DC	158
10-30W	ZWS10-30B	AC-DC	88
10-100W	DRL10-100	AC-DC	120
15W	CCG15	DC-DC	160
15-40W	KM	AC-DC	90
15-60W	KMS-A	AC-DC	92
15-100W	DRB15-100	AC-DC	122
15-150W	HWS15A-150A/A	AC-DC	12
20-30W	PXE	DC-DC	162
25-150W	LS	AC-DC	14
30-60W	CUS30M/60M	AC-DC	94
30-1500W	HWS/HD	AC-DC	16
33-150W	ZWS50-150BAF	AC-DC	96
35	CUT35	AC-DC	98
40-60W	PXF	DC-DC	164
40-65W	CSW65	AC-DC	18
40-80W	DT62/80-D	AC-DC	136
49-204W	iQE	DC-DC	170
50-600W	RWS-B	AC-DC	20
72-308W	iQL	DC-DC	176
75W	CUT75	AC-DC	100
75W	i6AN	DC-DC	196
79-153W	CUS200LD	AC-DC	22
80W	iBH	DC-DC	198
85W	iCH	DC-DC	200
90-110W	DTM110-C	AC-DC	138
100W	CUS100ME	AC-DC	102
100W	i3A	DC-DC	202
100-150W	DT100/150-D	AC-DC	140
110W	DTM110-C8	AC-DC	138
120W	iJB	DC-DC	206
120-960W	DRF120-960	AC-DC	126
150W	CUS150M	AC-DC	104
150W	iAH	DC-DC	210
150W	iJC	DC-DC	208
150-200W	LS200	AC-DC	24
175-200W	NV175	AC-DC	106
200-800W	Z+	Programmable	220
200-800W	Z+ HV	Programmable	222
200-250W	CUS200M	AC-DC	108
240W	ZWS240RC-24	AC-DC	110
250W	CUS250LD	AC-DC	26
250W	DTM250-D	AC-DC	144
250W	i6A	DC-DC	212
250W	i6A4W	DC-DC	214
300W	i7C	DC-DC	216
300W	DTM300-D	AC-DC	146
300W	ZWS300BAF	AC-DC	96
300W	iEH	DC-DC	166
300-450W	iQG	DC-DC	184
300-450W	PAH300-450	DC-DC	186
300-456W	iHG	DC-DC	188
300-1008W	PFE300SA/500F/1000FA	AC-DC	112
300-1500W	HWS300-1500	AC-DC	28
350-420W	CUS350M	AC-DC	30
350-1150W	NV350/700	AC-DC	62
400W	CUS400M	AC-DC	32
450-900W	Vega	AC-DC	64
480W	DRB480	AC-DC	128
500W	CSS500	AC-DC	34
500W	PFH500F	AC-DC	116
500W	XMS500	AC-DC	36
550-900W	Vega-Lite	AC-DC	66
600W	CM4	AC-DC	68
600W	GXE600	AC-DC	40
600W	PAF600F	DC-DC	190
700-1500W	QM	AC-DC	70
1000W	iJA35A	DC-DC	204
1000-1500W	RWS1000/1500-B	AC-DC	44
1500W	CUS1500M	AC-DC	48
1600W	HFE1600	AC-DC	76
1600W	RFE1600	AC-DC	50
1800W	HWS1800T	AC-DC	52
2000-4000W	TPS4000	AC-DC	58
2500W	HFE2500	AC-DC	78
2500W	RFE2500	AC-DC	54
3200W	TPS3000	AC-DC	56
Filter 3-300A	RSHN	Filter	226
Filter 6-30A	RSEV	Filter	228
Filter 6-60A	RTAN	Filter	230
Filter 6-300A	RTHN	Filter	232
Filter 10A	iDQ	Filter	234
Filter 50A	RDEN	Filter	240

COMM

Listed by Wattage



COMM

Wattage	Series	Category	Page
1.5-25W	CC-E	DC-DC	152
2-4W	KAS	AC-DC	82
3W	PXC-M03	DC-DC	154
4-15W	KPSA	AC-DC	84
5-25W	KWSA	AC-DC	86
6W	PXC-M06	DC-DC	156
10W	PXC-M10	DC-DC	158
10-30W	ZWS10-30B	AC-DC	88
15W	CCG15	DC-DC	160
15-40W	KM	AC-DC	90
15-60W	KMS-A	AC-DC	92
15-150W	HWS15A-150A/A	AC-DC	12
20-30W	PXE	DC-DC	162
25-150W	LS	AC-DC	14
30-60W	CUS30M/60M	AC-DC	94
30-1500W	HWS/HD	AC-DC	16
33-150W	ZWS50-150BAF	AC-DC	96
40-60W	PXF	DC-DC	164
40-65W	CSW65	AC-DC	18
40-80W	DT62/80-D	AC-DC	136
49-204W	iQE	DC-DC	170
50-300W	PHA-280	DC-DC	174
50-600W	RWS-B	AC-DC	20
72-308W	iQL	DC-DC	176
75W	i6AN	DC-DC	196
79-153W	CUS200LD	AC-DC	22
80W	iBH	DC-DC	198
85W	iCH	DC-DC	200
85W	HQA85	DC-DC	178
90-110W	DTM110-C	AC-DC	138
100W	i3A	DC-DC	202
100-150W	DT100/150-D	AC-DC	140
110W	DTM110-C8	AC-DC	142
120W	GQA	DC-DC	180
120W	HQA120	DC-DC	182
120W	iJB	DC-DC	206
150W	iAH	DC-DC	210
150W	iJC	DC-DC	208
150-200W	LS200	AC-DC	24
175-200W	NV175	AC-DC	106
200-250W	CUS200M	AC-DC	108
250W	CUS250LD	AC-DC	26
250W	i6A	DC-DC	212
250W	i6A4W	DC-DC	214
250W	DTM250-D	AC-DC	144
300W	DTM300-D	AC-DC	146
300W	ZWS300BAF	AC-DC	96
300W	i7C	DC-DC	216
300W	iEH	DC-DC	166
300-450W	iQG	DC-DC	184
300-450W	PAH300-450	DC-DC	186
300-456W	iHG	DC-DC	188
300-1008W	PFE300SA/500F/1000FA	AC-DC	112
300-1500W	HWS300-1500	AC-DC	28
350-420W	CUS350M	AC-DC	30
350-1150W	NV350/700	AC-DC	62
400W	CUS400M	AC-DC	32
450-900W	Vega	AC-DC	64
500W	CSS500	AC-DC	34
500W	PFH500F	AC-DC	116
500W	XMS500	AC-DC	36
550-900W	Vega-Lite	AC-DC	66
600W	CM4	AC-DC	68
600W	GXE600	AC-DC	40
600-602W	PAF600F	DC-DC	190
700-1500W	QM	AC-DC	70
720-1000W	CPFE1000FI	AC-DC	42
1000W	iJA35A	DC-DC	204
1000-1500W	RWS1000/1500-B	AC-DC	44
1500W	CUS1500M	AC-DC	48
1600W	HFE1600	AC-DC	76
1600W	RFE1600	AC-DC	54
1800W	HWS1800T	AC-DC	52
2000-4000W	TPS4000	AC-DC	58
2500W	HFE2500	AC-DC	78
2500W	RFE2500	AC-DC	54
3200W	TPS3000	AC-DC	56
Filter 3-300A	RSHN	Filter	226
Filter 6-30A	RSEV	Filter	228
Filter 6-60A	RTAN	Filter	230
Filter 6-300A	RTHN	Filter	232
Filter 10A	iDQ	Filter	234
Filter 50A	RDEN	Filter	240

LED

Listed by Wattage



LED

Wattage	Series	Category	Page	Wattage	Series	Category	Page
15-150W	HWS15A-150A/A	AC-DC	12	300-1008W	PFE300SA/500F/1000FA	AC-DC	112
25-150W	LS	AC-DC	14	300-1500W	HWS300-1500	AC-DC	28
30-1500W	HWS/HD	AC-DC	16	400W	CUS400M	AC-DC	32
33-150W	ZWS50-150BAF	AC-DC	96	500W	PFH500F	AC-DC	116
50-600W	RWS-B	AC-DC	20	500-1500W	LZSA	AC-DC	38
79-153W	CUS200LD	AC-DC	22	720-1000W	CPFE1000FI	AC-DC	42
100W	CUS100ME	AC-DC	102	1000-1500W	RWS1000/1500-B	AC-DC	44
150W	CUS150M	AC-DC	104	1500W	CUS1500M	AC-DC	48
150-200W	LS200	AC-DC	24				

Railroad

Listed by Wattage



Railroad

Wattage	Series	Category	Page	Wattage	Series	Category	Page
30-200W	CN-A110	DC-DC	168	50-100W	CN-A24	DC-DC	172

Broadcast

Listed by Wattage



Broadcast

Wattage	Series	Category	Page	Wattage	Series	Category	Page
1.5-25W	CC-E	DC-DC	152	150W	iJC	DC-DC	208
2-4W	KAS	AC-DC	82	150-200W	LS200	AC-DC	24
3W	PXC-M03	DC-DC	154	175-200W	NV175	AC-DC	106
4-15W	KPSA	AC-DC	84	200-250W	CUS200M	AC-DC	108
5-25W	KWSA	AC-DC	86	250W	CUS250LD	AC-DC	26
6W	PXC-M06	DC-DC	156	250W	DTM250-D	AC-DC	144
10W	PXC-M10	DC-DC	158	250W	i6A	DC-DC	212
10-30W	ZWS10-30B	AC-DC	88	250W	i6A4W	DC-DC	214
15W	CCG15	DC-DC	160	300W	i7C	DC-DC	216
15-40W	KM	AC-DC	90	300W	DTM300-D	AC-DC	146
15-60W	KMS-A	AC-DC	92	300W	iEH	DC-DC	166
15-150W	HWS15A-150A/A	AC-DC	12	300-450W	iQG	DC-DC	184
20-30W	PXE	DC-DC	162	300-456W	iHG	DC-DC	188
25-150W	LS	AC-DC	14	300-1008W	PFE300SA/500F/1000FA	AC-DC	112
30-60W	CUS30M/60M	AC-DC	94	300-1500W	HWS300-1500	AC-DC	28
30-1500W	HWS/HD	AC-DC	16	350-420W	CUS350M	AC-DC	30
35W	CUT35	AC-DC	98	350-1150W	NV350/700	AC-DC	62
40-60W	PXF	DC-DC	164	400W	CUS400M	AC-DC	32
40-65W	CSW65	AC-DC	18	450-900W	Vega	AC-DC	64
40-80W	DT62/80-D	AC-DC	136	500W	CSS500	AC-DC	34
49-204W	iQE	DC-DC	170	500W	PFH500F	AC-DC	116
50-150W	ZWS50-150BAF	AC-DC	96	500W	XMS500	AC-DC	36
50-600W	RWS-B	AC-DC	20	550-900W	Vega-Lite	AC-DC	66
72-308W	iQL	DC-DC	176	600W	CM4	AC-DC	68
75W	CUT75	AC-DC	100	600W	GXE600	AC-DC	40
75W	i6AN	DC-DC	196	700-1500W	QM	AC-DC	70
79-153W	CUS200LD	AC-DC	22	720-1000W	CPFE1000FI	AC-DC	42
80W	iBH	DC-DC	198	1000W	iJA35A	DC-DC	204
85W	iCH	DC-DC	200	1000-1500W	RWS1000/1500-B	AC-DC	46
90-110W	DTM110-C	AC-DC	138	1500W	CUS1500M	AC-DC	48
100W	CUS100ME	AC-DC	102	1600W	HFE1600	AC-DC	76
100W	i3A	DC-DC	202	1800W	HWS1800T	AC-DC	52
100-150W	DT100/150-D	AC-DC	140	2000-4000W	TPS4000	AC-DC	58
100W	DTM110-C8	AC-DC	142	2500W	HFE2500	AC-DC	78
120W	iJB	DC-DC	206	3200W	TPS3000	AC-DC	56
150W	CUS150M	AC-DC	104	Filter 10A	iDQ	Filter	234
150W	iAH	DC-DC	210				

Renewable

Listed by Wattage

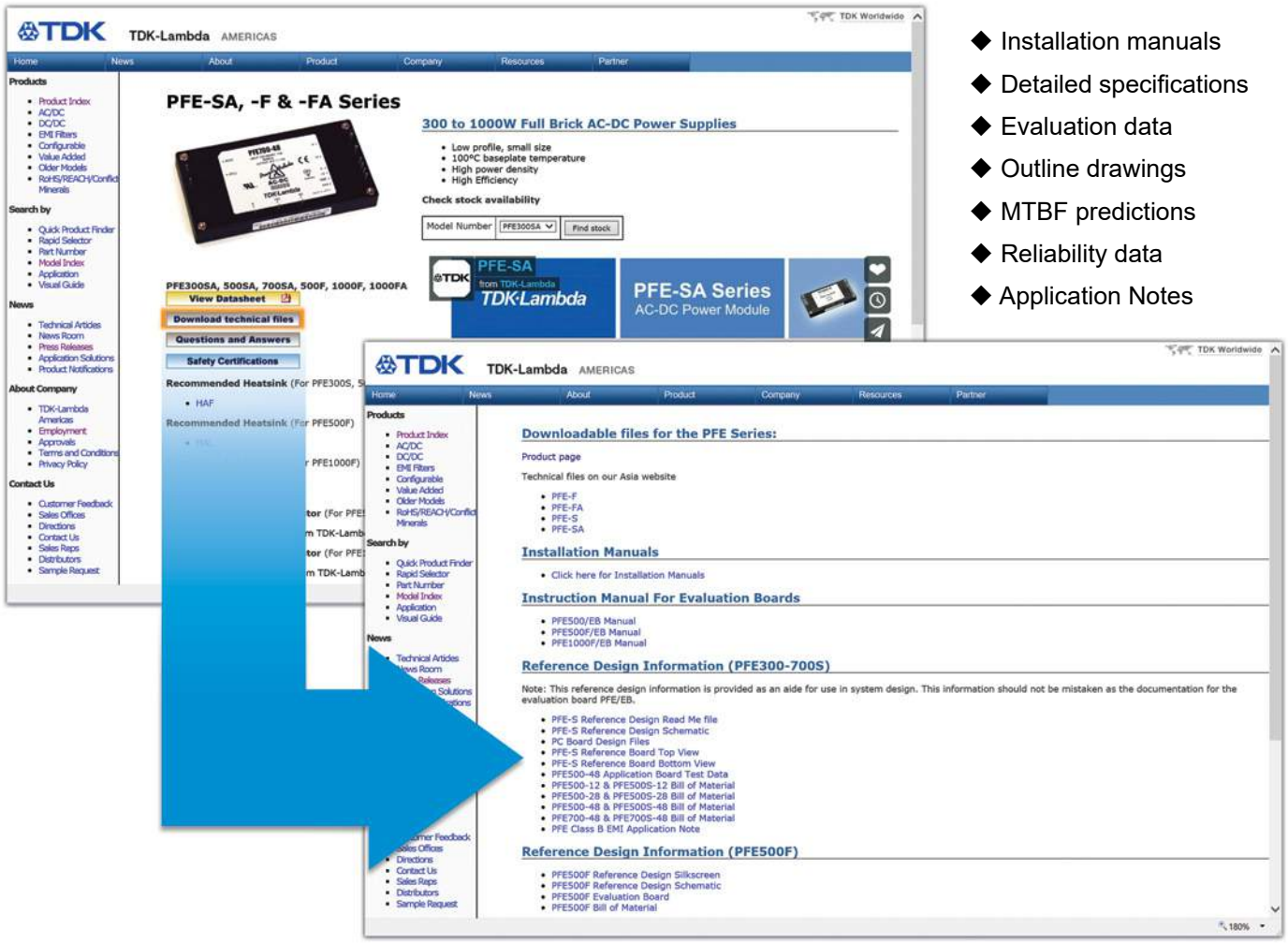


Renewable

Wattage	Series	Category	Page	Wattage	Series	Category	Page
350-1150W	NV350/700	AC-DC	62	600W	CM4	AC-DC	68
450-900W	Vega	AC-DC	64	700-1500W	QM	AC-DC	70
500W	XMS500	AC-DC	36	11,000W	EZA11K-320240	DC-DC	192
550-900W	Vega-Lite	AC-DC	66				

TDK·Lambda Need Technical Information?

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



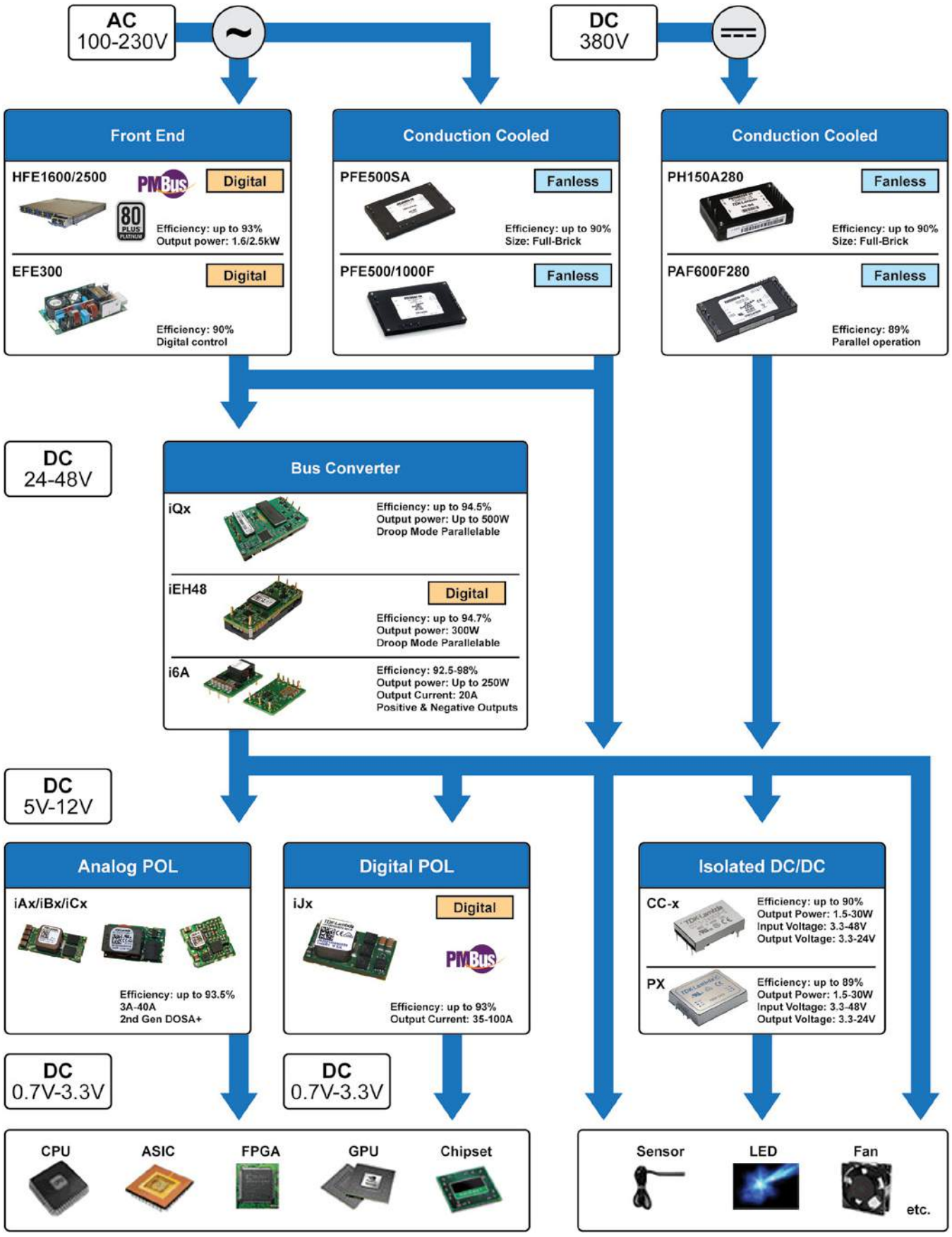
- Installation manuals
- Detailed specifications
- Evaluation data
- Outline drawings
- MTBF predictions
- Reliability data
- Application Notes

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.

The Complete Power Solution



AC-DC Power Supplies



Applications

- Industrial
- Medical
- Test & Measurement
- Communications
- Broadcast
- Lighting
- Transportation
- COTS (Commercial off the shelf)
- Renewables

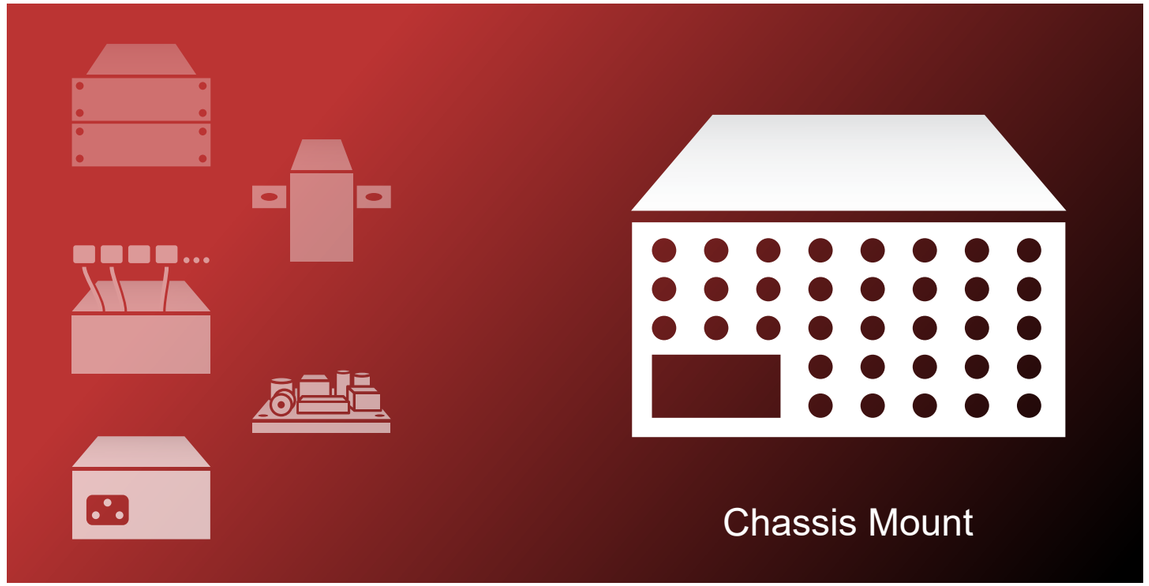
Features

- Very broad product offering
- High reliability & quality
- Single & three phase input models
- ITE & medical safety approvals
- Convection conduction & forced air cooled
- Enclosed, open frame & module type
- High MTBF
- High efficiency
- Long warranties (up to lifetime)

Wattage	Number of Outputs	Series	Page	Wattage	Number of Outputs	Series	Page
2-4W	1	KAS	82	240W	1	ZWS240RC-24	110
4-15W	1	KPSA	84	250W	1	CUS250LD	22
5-25W	1	KWSA	86	250W	1	DTM250-D	144
10-30W	1	ZWS10-30B	88	300W	1	DTM300-D	146
10-100W	1	DRL	120	300W	1	ZWS300BAF	114
15-40W	1,2,3	KM	90	300-1000W	1	PFE300SA/500F/1000FA	112
15-60W	1	KMS-A	92	300-1500W	1	HWS300/1500	28
15-100W	1	DRB15-100	122	350-420W	1	CUS350M	30
15-150W	1	HWS15A-150A/A	12	350-1150W	1-8	NV350/700	62
25-150W	1	LS	14	400	1	CUS400M	32
30-60W	1	CUS30/60M	94	450-900W	1-10	Vega	64
30-1500W	1	HWS/HD	16	480W	1	DRB480	128
33-150W	1	ZWS50-150BAF	96	500W	1	CSS500	34
35W	3	CUT35	98	500W	1	PFH500F	116
40-65W	1	CSW65	18	500W	1	XMS500	36
40-65W	1	DTM65-C8	132	500-1500W	1	LZSA	38
40-65	1	DTM65-D	134	550-900W	1-10	Vega-Lite	66
50-600W	1	RWS-B	20	600W	1	GXE600	40
62-80W	1	DT62-80D	136	600W	1-4	CM4	68
75W	3	CUT75	100	700-1500W	1-18	QM	70
79-153W	1	CUS200LD	22	720-1000W	1	CPFE1000FI	42
90-110W	1	DTM110-C	138	1000-1500W	1	RWS1000/1500-B	44
100W	1	CUS100ME	102	1000-1500W	1	RWS1000/1500-B/ME	46
100-150W	1	DT100-150-D	140	15000W	1	CUS1500M	48
110W	1	DTM110C-8	142	1600W	1	RFE1600	50
120-960W	1	DRF120-960	126	1600W	1	HFE1600	76
150W	1	CUS150M	104	1800W	1	HWS1800T	52
150-200W	1	LS200	24	2000-4080W	1	TPS4000	58
175-200W	1-5	NV175	106	2500W	1	HFE2500	78
200-800W	1	Z+	220	2500W	1	RFE2500	54
200-800W	1	Z+ HV	222	3200W	1	TPS3000	56
200-250W	1	CUS200M	108				

Listed by Wattage

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
15-150W	HWS15A-150A/A	12
25-150W	LS	14
30-1500W	HWS/HD	16
40-65W	CSW65	18
50-600W	RWS-B	20
79-153W	CUS200LD	22
150-200W	LS200	24
250W	CUS250LD	26
300-1500W	HWS300/1500	28
350-420W	CUS350M	30
400W	CUS400M	32
500W	CSS500	34
500W	XMS500	36
500-1500W	LZSA	38
600W	GXE600	40
720-1000W	CPFE100FI	42
1000-1500W	RWS1000/15000-B	44
1000-1500W	RWS1000/15000-B/ME	46
1500W	CUS1500M	48
1600W	RFE1600	50
1800W	HWS1800T	52
2000-4080W	TPS4000	54
2500W	RFE2500	56
3200W	TPS3000	58

Listed by Wattage

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

Industrial Test COMM LED Broadcast

RoHS

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	M Ohms	>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	m/s²	< 196.1 m/s²				
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508, CE Mark				
Line Dips	-	SEMI-F47 (200VAC input)				
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
MTBF - Telcordia SR-332 issue 3**	Hours	12,116,851	8,169,868	3,726,622	2,963,512	2,676,081
Warranty	-	Limited lifetime warranty (See website for terms & conditions)				

* Safety certified for AC input only ** 24V output model, 25°C ambiient, full load, 230VAC input

(1) 100/200VAC
(2) HWS15A/A derates linearly to 50% load from 50 to 70°C

TDK·Lambda HWS15A-150A/A Series

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

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)
- Five year warranty



Key Market Segments & Applications

Industrial Test COMM LED Broadcast

RoHS

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 25C & 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	Five Years					

Notes: *Safety certified for AC input only

(1) Switch selectable for 115 or 230VAC

(2)
LS25-3	Derate linearly to 60% load from +40 to +70°C.
LS50, LS75-3 & -5	Derate linearly to 70% load from +50 to +70°C.
LS25-5 to 48, LS75-12 to 48	Derate linearly to 60% load from +50 to +70°C.
LS100-3 & -5	Derate linearly to 60% load from +45 to +70°C. Derate linearly to 80% load from 115V to 88VAC input.
LS100-12, -15, -24, -36, -48	Derate linearly to 60% load from +50 to +70°C. Derate linearly to 80% load from 115V to 88VAC input.
LS150-3 & -5,	Derate linearly to 50% load from +40 to +70°C.
LS150-12, -15, -24, -36, -48	Derate linearly to 70% load from +50 to +70°C.

TDK·Lambda LS Series

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

Industrial COTS Test COMM LED Broadcast

RoHS

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**(4)			
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 Dips	-	SEMI-F47 (200VAC input)							
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
MTBF - Telcordia SR-332 issue 3**	hours	8,169,868	3,726,622	2,963,512	2,676,081	2,145,809	1,998,996	1,087,031	1,152,309
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
(4) No DC Input for HWS1500

* Class 1 Div 2 option (/RYHD suffix)
** Safety certified for AC input only. DC input not available on HWS1500
*** 24V output model, 25°C ambient, full load, 230VAC input

TDK·Lambda HWS-/HD Series

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	1050	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

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

40-65W 90-305V AC-DC Power Supplies



Features

- ◆ Accepts 115/230/277VAC Nominal Inputs
- ◆ DIN Rail Mount Option
- ◆ Global Safety Agency Compliance
- ◆ <150mW Off-Load Power Consumption
- ◆ DOE Efficiency Level VI, ErP Tier 2
- ◆ Class 2 24V Model to UL1310

Key Market Segments & Applications

Industrial Test COMM Broadcast

RoHS

Specifications

Model		CSW65
Input Voltage range	-	90 - 305VAC (47 - 63Hz)
Inrush Current (230VAC)	A	Less than 65A, 25°C ambient cold start
Input Current (115/230VAC)	A	2 / 1
Hold Up Time (Typ)	ms	>10ms at 115VAC input
Off-Load Power Consumption	W	<150mW
Average Efficiency	%	5V: 87.2%, 12-54V: 89%
Temperature Coefficient	%/°C	±0.05%/°C
Output Voltage Accuracy	%	±1%
Output Adjustment Range	-	None
Remote Sense	-	No
Minimum Load	A	None
Output Regulation	%	5-24V: ±3%, 28-54V: ±2%
Ripple & Noise	%	See Model Selector
Overcurrent Protection	-	105 - 160%, Auto-Recovery
Overvoltage Protection	V	See Model Selector (Cycle AC to reset)
Operating Temperature	°C	-10 to +70°C derate linearly to 50% load from 50 to 70°C*
Storage Temperature	°C	-20 to +85°C
Humidity (non condensing)	%RH	5 - 95%RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Ground 1.5kVAC, Input to Output 3kVAC Output to Ground 500VDC
Isolation Resistance	MΩ	>20MΩ at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	23.52m/s² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s² (20G)
Safety Agency Certifications	-	UL/CSA/IEC/EN60950-1, UL1310 Class 2 (1), CE Mark
Conducted & Radiated EMI	-	EN55032-B, FCC Class B
Immunity	-	EN55024
Weight (Typ)	g	U channel: 250, /A: 270, /D: 290
Size (WxLxH) U-Channel	in mm	2.5 x 4.75 x 1.5” 63.5 x 120.7 x 38.1mm
Warranty	yrs	Three Years

Note:

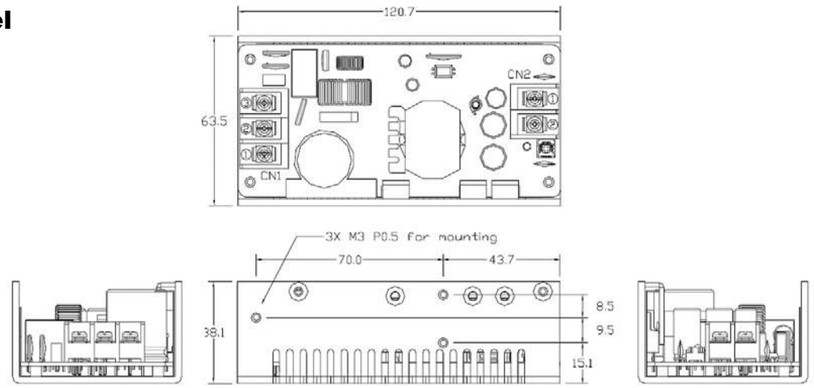
* Derate linearly to 90% load from 0°C to -10°C

(1) NEC Class 2 in accordance with UL1310. CSW65-24 only)

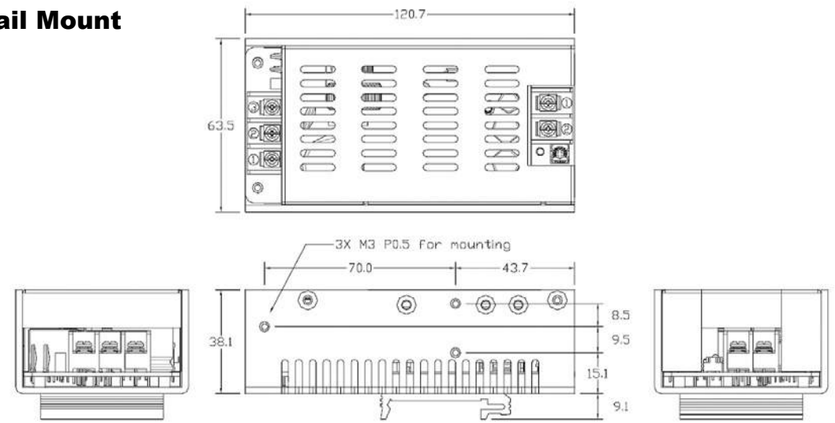
TDK·Lambda CSW65 Series

Outline Drawings

U Channel



/D DIN Rail Mount



Model Selector

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	Ripple and Noise (mV)	Overvoltage (V)
CSW65-5	5	8.0	40	100	6 - 8
CSW65-12	12	5.42	65	120	13.2 - 15.6
CSW65-15	15	4.34	65	150	16.5 - 19.5
CSW65-18	18	3.62	65	180	19.8 - 23.4
CSW65-24	24	2.71	65	240	26.4 - 31.2
CSW65-28	28	2.33	65	280	30.8 - 36.4
CSW65-48	48	1.36	65	280	52.8 - 62.4
CSW65-54	54	1.21	65	280	59.4 - 64.8

Options

Suffix	Description
Blank	U-Channel
/A	U-Channel & Cover
/D	U-Channel, Cover & DIN Rail Bracket

For Additional Information, please visit
us.tdk-lambda.com/lp/products/csw-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
- 7 Year Warranty



Key Market Segments & Applications

Industrial Test COMM LED Broadcast Semi-Fab

RoHS

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 (115/230VAC) (Typ)	A	1.0 / 0.65	1.2 / 0.6 (5V: 0.9/0.45)	1.8 / 0.9 (5V: 1.3/0.7)	3.6 / 1.9 (5V: 3.1/1.6)	6.6 / 3.6 (5V: 6.2/3.2)
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	-	-20 to +70°C, see note (3) and instruction manual for low temperature derating				
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				
Line Dips	-	SEMI-F47 (200VAC input)				
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
MTBF - Telcordia SR-332 issue 3**	Hours	4,170,949	1,978,533	2,235,743	2,027,824	2,157,340
Warranty	Yrs	Seven Years				

*Safety certified for AC input only ** 24V output model, 25°C ambiient, full load, 230VAC input

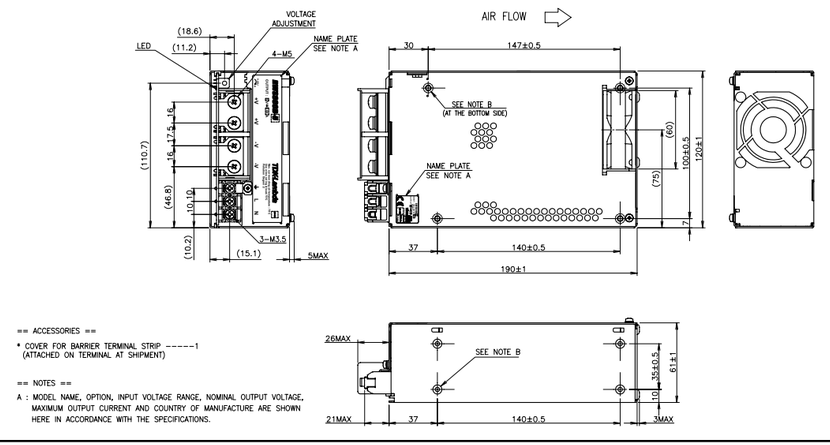
Notes: (1) See instruction manual for derating below 115VAC input
(2) UL508 & CSA C22.2 No.107.1-01 on RWS50B-5, -12, -24, RWS100B-5, -12, -24, RWS150B-5, -12, -24, RWS300B-12, -15, -24, -36 & -48 RWS600B-24 only
(3) RWS50-100B derates linearly above 45°C to 20% load at 70°C, 150B derates above 40°C and 300-600B derates above 50°C to 50% load at 70°C

TDK·Lambda RWS-B Series

Output Ratings

Model	Voltage	Adjust Range (V)	Max Current (A)	Max Output Power	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230VAC
RWS50B-5	5V	4.5-5.75V	10	50	40	20	120	78 / 79
RWS100B-5	5V	4.5-5.75V	14	70	40	20	120	77.5 / 79
RWS150B-5	5V	4.5-5.75V	21	105	40	20	120	77.5 / 79.5
RWS300B-5	5V	4.5-5.75V	50	250	40	20	120	75 / 78.5
RWS600B-5	5V	4.5-5.75V	100	500	70	20	120	74 / 77.5
RWS50B-12	12V	10.8-13.8V	4.3	51.6	96	48	150	83 / 84
RWS100B-12	12V	10.8-13.8V	8.5	102	96	48	150	83 / 84
RWS150B-12	12V	10.8-13.8V	13	156	96	48	150	84.5 / 87.5
RWS300B-12	12V	10.8-13.8V	25	300	96	48	150	79.5 / 82.5
RWS600B-12	12V	10.8-13.8V	50	600	96	48	150	82 / 84.5
RWS100B-15	15V	13.5-17.25V	6.8	102	120	60	150	84 / 85
RWS150B-15	15V	13.5-17.25V	10	150	120	60	150	84.5 / 87.5
RWS300B-15	15V	13.5-17.2V	20	300	120	60	150	81.5 / 84.5
RWS600B-15	15V	13.5-17.2V	40	600	120	60	150	82 / 84.5
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	86 / 87.5
RWS150B-24	24V	21.6-27.6V	6.5	156	192	96	150	86.5 / 89.5
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	85 / 88.5
RWS150B-28	28V	25.2-32.2V	5.4	151.2	224	112	180	86.5 / 89.5
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 / 88.5
RWS50B-48	48V	43.2-52.8	1.1	52.8	384	192	200	87 / 88
RWS100B-48	48V	43.2-52.8	2.1	100.8	384	192	200	86 / 87
RWS150B-48	48V	43.2-52.8	3.3	158.4	384	192	200	86.5 / 89.5
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 / 88/5

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
RWS1000/1500B	1000W to 1500W Single output (including medical /ME)

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

79-153W Single Output Power Supplies

Features

- Convection or Conduction Cooled
- Up to 206W Peak Power Capability
- Low 31mm Height
- -40°C Ambient temperature Start Up



Key Market Segments & Applications

Industrial LED Test COMM Broadcast

RoHS

Specifications

Model		CUS200LD
AC Input Voltage	VAC	85 - 265VAC (1)
Input Frequency	Hz	47 - 63Hz
Inrush Current (cold start)	A	20A at 115VAC, 40A at 230VAC
Power Factor	-	Meets EN61000-3-2 (Typical PF 0.95/0.9) (2)
Input Current	A	Varies by model, please see detailed specification on website
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	-	> 101% of peak current rating
Overvoltage Protection (3)	V	See model selector
Hold Up Time (115 / 230V input)	ms	20ms typical
Leakage Current	mA	<0.75mA at 265VAC, 60Hz
Ripple and Noise	%	3.3-7.5V: 120mV, 12-24V: 150mV, 28-48V: 200mV
Line and Load Regulation	%	See model selector
Remote Sense	-	No
Operating Temperature	°C	-25 to +70°C. Start up at -40°C Convection cooled: Derate linearly to 40% load from +40 to +70°C Conduction cooled: Derate linearly to 40% load from +45 to +70°C
Storage Temperature	°C	-40 to +85°C
Humidity (non condensing)	%RH	10 - 95%RH (Operating & Storage)
Cooling	-	Convection or Conduction Cooled (Mounted on a 2mm thick aluminium plate 400x400mm)
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC
Isolation Resistance	MΩ	>100MΩ 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	-	IEC/UL/CSA/EN 60950-1, CE Mark
Conducted & Radiated EMI	-	EN55011-B, EN55032-B, FCC Class B
Weight (Typ)	g	430
Size (LxWxH)	mm (in)	160 x 62 x 31mm (6.3 x 2.44 x 1.22")
Warranty	yrs	Three Years

Notes:
See specification for conditions and test methods
(1) 4.2V model: Derate linearly to 90% load from 115 to 85VAC input. 5-48V models: Derate linearly to 80% load from 115 to 85VAC input
(2) 115 / 230VAC input
(3) Cycle AC to reset

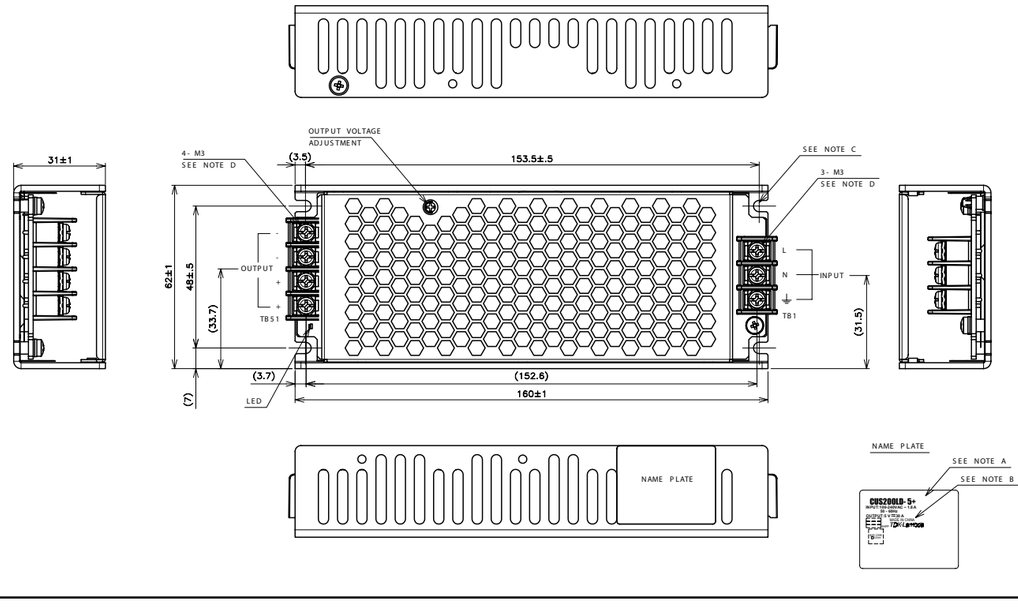
TDK·Lambda CUS200LD Series

Model Selector

Model	Output Voltage	Adjust Range (V)	Max Current Convection (A)	Max Power Convection (W)	Max Current Conduction (A)	Max Power Conduction (W)	Peak Current (4) (A)	Load Reg (mV)	Line Reg (mV)	Overvoltage	Efficiency (typ) % (5)
CUS200LD-3	3.3V	2.97 - 3.63V	24A	79.2W	30A	99W	40A	26mV	13mV	3.8 - 5.44V	82 / 83%
CUS200LD-4	4.2V	3.78 - 4.62V	24A	100.8W	30A	126W	40A	33mV	16mV	4.83 - 6.51V	85 / 87%
CUS200LD-5	5V	4.5 - 5.5V	24A	120W	30A	150W	40A	40mV	20mV	5.75 - 7.5V	87 / 89%
CUS200LD-7R5	7.5V	6.375 - 8.25V	16A	120W	20A	150W	26.6A	60mV	30mV	8.63 - 10.87V	88 / 90%
CUS200LD-12	12V	10.8 - 13.2V	10A	120W	12.5A	150W	16.7A	96mV	48mV	13.8 - 17.4V	87 / 89%
CUS200LD-15	15V	13.5 - 16.5V	8A	120W	10A	150W	13.4A	120mV	60mV	17.25 - 21.75V	87 / 89%
CUS200LD-24	24V	21.6 - 26.4V	5A	120W	6.3A	151.2W	8.4A	192mV	96mV	27.6 - 34.8V	87 / 89%
CUS200LD-28	28V	25.2 - 30.8V	4.3A	120.4W	5.4A	151.2W	7.2A	224mV	112mV	32.2 - 40.6V	87 / 90%
CUS200LD-48	48V	43.2 - 52.8V	2.5A	120W	3.15A	151.2W	4.2A	384mV	192mV	55.2 - 69.6V	88 / 90%

Notes:
See specification for conditions and test methods
(4) Convection cooling: Peak current for less than 10 seconds, with a duty cycle of <35%
Conduction cooling: Peak current for less than 5 seconds, with a duty cycle of <35%
(5) 115 / 230VAC input. Conduction cooled ratings

Outline Drawing



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

150-200W Single Output General Purpose Power Supplies

Features

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



Key Market Segments & Applications

Industrial Test COMM LED Broadcast

RoHS

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	Five 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

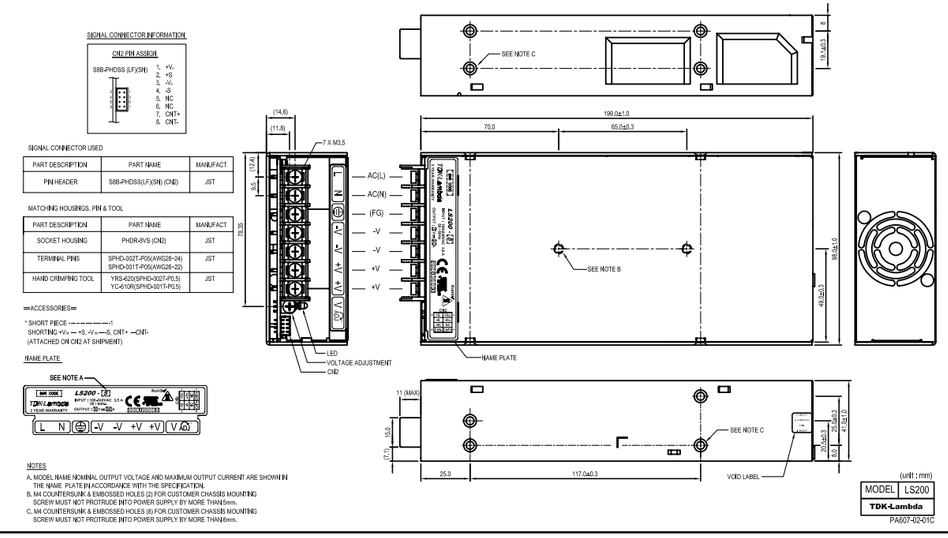
TDK·Lambda LS200 Series

Output Ratings

Model	Voltage	Adjust Range (V)	Max Current Forced Air(A)[4]	Max Current Convect.(A)[5]	Peak Current (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (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/ls-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

LED Test COMM Broadcast

RoHS

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, 4.2V: 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	U Channel: -25 to +70°C. Full load at 40°C. Derate to 50% load at 70°C With Cover: -25 to +70°C. Full load at 40°C. Derate to 40% load at 70°C
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	MΩ	>100MΩ 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(mm)	U Channel: 7.8 x 4 x 1.18” (198 x 102 x 30) With Cover: 7.8 x 4 x 1.34” (198 x 102 x 34)
Warranty	yrs	Three Years

Notes:

(1) 115 / 230VAC input

(2) Cycle AC to reset

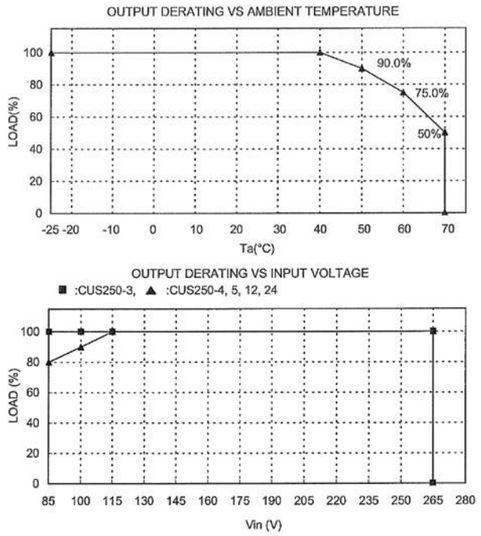
(3) See derating curves on page 2. Derates linearly to 80% load from 115VAC to 85VAC input (excluding 3.3V model). -40°C start up above 88VAC input.

TDK·Lambda CUS250LD Series

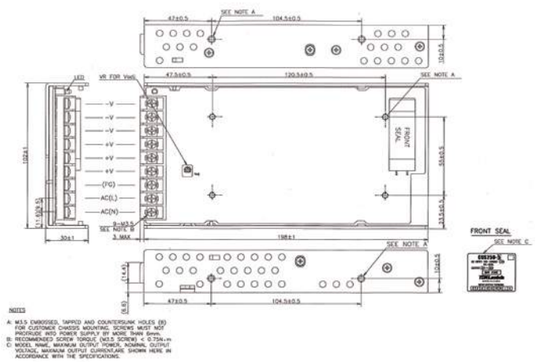
Model Selector

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 (See website for covered version)



Outline Drawing (See website for covered version)



Options

Suffix	Description
Blank	No cover
/A	Cover

For Additional Information, please visit
us.tdk-lambda.com/lp/products/cus-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

Industrial Test COMM LED Broadcast Semi-Fab

RoHS

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	<1.2mA		<1.5mA
Remote Sense		-	Yes			
Indicator		-	Green LED = ON			
Remote on/off		-	Yes (Isolated from output)			
Parallel operation		-	Single wire connection (up to 5 units)			
DC Good		-	Yes			
Remote Adjust (PV)		-	External voltage adjusts output, see options table			
Operating Temperature		-	-10°C to +70°C, derate linearly to 50% load from 50C to 70C (2, 3)			
Storage Temperature		°C	-30 to +85°C			
Humidity (non condensing)		-	Operating: 10 - 90%RH, Non operating 10 - 95%RH			
Cooling		-	Internal fan			
Withstand Voltage	(4)	-	Input to Ground 2.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance		-	>100M at 25°C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)		-	10 - 55Hz (1 minute sweep), 19.6m/s^2 constant X, Y, Z 1 hour			
Shock		-	< 196.1 m/s^2			
Safety Agency Certifications	(5)	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508, CE Mark			
Line Dips		-	SEMI-F47 (200VAC input)			
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”
MTBF - Telcordia SR-332 issue 3***		hours	2,145,809	1,998,996	1,087,031	1,152,309
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
(***) 24V output model, 25°C ambient, full load, 230VAC input

TDK·Lambda HWS300-1500 Series

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 HWS300-1500 the cover is fitted as standard
/PV	HWS300, 600 (Standard on HWS1000 & 1500): 1-6V program voltage input to adjust output 20-120% of nominal (20-110% for 48V) (12V-48V models only)
/HD	See HWS50-1500/HD Datasheet for details.-40 to +71(74)°C operation, conformally coated PCBs
/ME	See HWS30-1500/ME Datasheet for details. UL60601-1, EN60950-1 medical certification
/RY	ISA 12.12.01 (UL1604) - Class 1 Div 2 with dry contact relay DC Good signal (300W, 600W and 1500W 24V output models only, no UL508 certification, no remote on/off function.)

Other Industrial Products

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

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

Single Output 350W/420W Medical & ITE Power Supplies

Features

- ◆ High Efficiency, up to 94%
- ◆ 1.6” high
- ◆ 350W Convection Cooled, 420W Forced Air Rating
- ◆ BF Rated
- ◆ 5V Standby & 12V Fan Output



Key Market Segments & Applications

Medical Industrial Test COMM Broadcast

RoHS

Specifications

Model		CUS350M/F
AC Input Voltage	VAC	85 - 265VAC(1)
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 0.99/0.95)(2)
Input Current (115/230VAC)	A	350W: 4 / 2A; 420W: 4.5 / 2.3A (typical)
Off-load Power Draw	W	<0.5W at 230VAC (In standby mode using remote on/off)
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	-	12V: >38A, 18V: > 26A, 24V: > 20A, 36V: >13A, 48V: > 10A
Overvoltage Protection (3)	V	12V: 13.8-16.2V, 18V: 20.7-24.3V, 24V: 27.6-32.4V, 36V: 41.4-48.6V, 48V: 55.2-64.8V
Hold Up Time (115 / 230V input)	ms	20ms typical at 350W output
Leakage Current	mA	<0.3mA at 265VAC, 60Hz
Ripple and Noise	%	1%
Line Regulation	%	0.5%
Load Regulation	%	1%
Remote Sense	-	Yes, compensates for 0.5V total cable drop
Remote On/Off	-	Apply voltage to isolated terminals to shut unit down
Power Good (/F or /PG option)	-	Isolated transistor, On = Good. Gives >5ms warning of AC power loss
Standby Voltage	-	5V 0.5A
Fan Supply (/F or /FN options)	-	12V 0.3A
Operating Temperature	°C	-20 to +70°C. See derating curves
Storage Temperature	°C	-40 to +85°C
Humidity (non condensing)	%RH	10 - 95%RH (Operating & Storage)
Cooling	-	Convection or Forced Air Cooled (1.5m/s across terminals)
Withstand Voltage	-	Input to Ground 2kVAC (1xMOPP), Input to Output 4kVAC (2xMOPPs), Output to Ground 1.5kVAC (1xMOPP) BF Rated
Isolation Resistance	-	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s² constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s² (20G)
Immunity	-	IEC61000-4-2 (lv 2, 3), -3 (lv3), -4 (lv 3), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11, EN60601-1-2:2015 (Ed4)
Safety Agency Certifications	-	EN/IEC/UL/ES/CSA 60601-1, EN/IEC/UL/CSA60950-1, CE Mark
Conducted & Radiated EMI	-	EN55011-B, FCC Class B (Radiated Class A) 350W output
Weight (Typ)	g	850
Size (LxWxH)	mm(in)	190 x 87 x 40mm (7.5 x 3.4 x 1.6”)
Warranty	yrs	Three Years

Notes:

See specification for conditions and test methods

(1) Derate linearly to 80% load from 115 to 85VAC input (convection); derate linearly to 90% load from 95 to 85VAC (forced air cooling)

(2) 115 / 230VAC input

(3) Cycle AC to reset

TDK·Lambda CUS350M Series

Model Selector

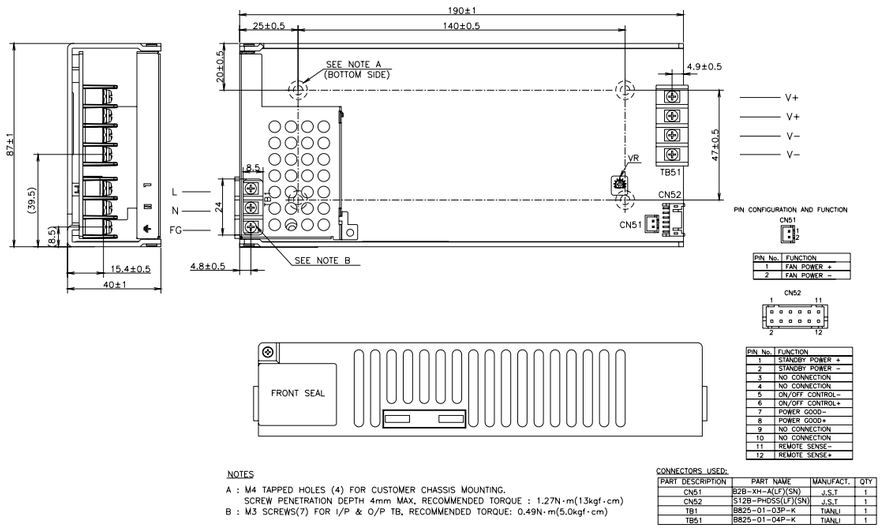
Model	Voltage	Adjust Range (V)	Max Current (A) Convection	Max Power (W) Convection	Max Current (A) Forced Air	Max Power (W) Forced Air	Ripple Noise (mV)	Efficiency (typ) % (4)
CUS350M-12/F	12V	11.4 - 12.6	29.0	348.0	34.5	414.0	120	91 / 93
CUS350M-18/F	18V	17.1 - 18.9	19.4	349.2	23.0	414.0	180	91 / 94
CUS350M-24/F	24V	22.8 - 25.2	14.7	352.8	17.5	420.0	240	91 / 94
CUS350M-36/F	36V	34.2- 37.8	9.7	349.2	11.5	414.0	240	91 / 94
CUS350M-48/F	48V	45.6 - 50.4	7.3	350.4	8.7	417.6	480	91 / 94

Notes:

See specification for conditions and test methods

(4) 115 / 230VAC input. Convection and forced air ratings

Outline Drawing



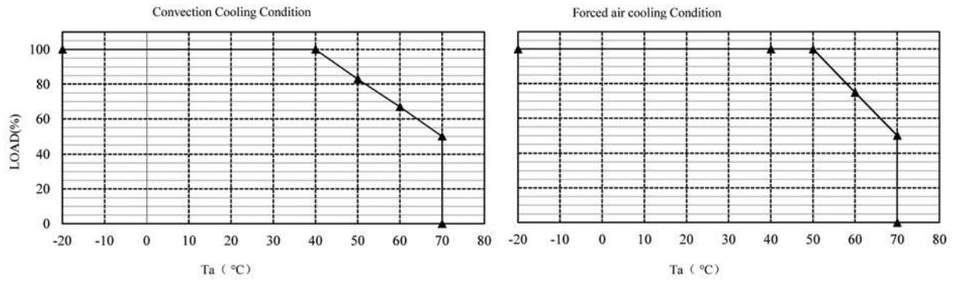
NOTES

A : M4 TAPPED HOLES (4) FOR CUSTOMER CHASSIS MOUNTING.
SCREW PENETRATION DEPTH 4mm MAX. RECOMMENDED TORQUE : 1.27N·m(13kgf·cm)
B : M3 SCREWS(7) FOR I/P & O/P TB. RECOMMENDED TORQUE: 0.49N·m(5.0kgf·cm)

CONNECTORS USED:

PART DESCRIPTION	PART NAME	MANUFACT.	QTY
CN51	B2B-XH-A(LF)(SN)	J.S.T	1
CN52	S12B-PHDSS(LF)(SN)	J.S.T	1
TB1	B825-01-03P-K	TIANLI	1
TB51	B825-01-04P-K	TIANLI	1

Derating Curve



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

3 x 5” 400W AC-DC Power Supplies

Features

- 250W (400W Peak) Convection Rating
- 400W with Forced Air
- Medical Certifications (2 x MOPP)
- Class B Conducted and Radiated EMI
- Suitable for Class I and Class II installations
- Compact 3 x 5 x 1.4” Footprint
- Enclosure & Signal Options



Key Market Segments & Applications

Medical Industrial Test LED COMM Broadcast

RoHS

Specifications

Model		CUS400M
Input Voltage range	VAC	85 - 264VAC (47 - 63Hz). See derating curves
Input Current	A	<4A at 115V and <2A at 230V
Inrush Current (Cold start at 230VAC input)	A	<40A
Hold Up Time	mS	>12ms (400W load)
Harmonic Compliance	-	EN/IEC61000-3-2 class A
Leakage Current	uA	<250uA at 240VAC 63Hz
Touch Current (enclosure leakage)	uA	<100uA
Temperature Coefficient	%/°C	±0.02%/°C
No Load Power Consumption	W	<0.5W when unit is inhibited. 230Vac input
Ripple & Noise	%Vout	<1% (0°C - 70°C)
Load Regulation	%Vout	1% (0 - 100% load)
Line Regulation	%Vout	0.1% (90 - 264VAC)
Remote Sense	-	0.5V total compensation
Remote on/off	-	Opto-isolated. Inhibit: High = ON, Low = OFF, Enable: High = OFF, Low = ON
DC Good Signal	-	Opto isolated, <500ms after output good
AC Fail Signal	-	Opto isolated, 5ms warning before DC loss
Over Current Protection	%	101 to 140%. Hiccup mode, automatic recovery
Overvoltage Protection	-	Latching (unit shutdown), cycle AC input to reset
Overtemperature Protection	-	Latching (unit shutdown), cycle AC input to reset
Efficiency	%	Up to 93%
Operating Temperature	-	-20 to +70°C, derate linearly above 50°C to 50% load
Storage Temperature	°C	-40 to +85°C (70°C maximum for fan version /F)
Operational Altitude	m	5,000m
Humidity (non condensing)	%RH	5 - 95%RH (15 - 90%RH for /F fan version)
Cooling	-	Convection cooling or forced air
Withstand Voltage	VAC	Input to Ground 1.5kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP)
Insulation Class	-	Construction suitable for Class I or Class II installation
Vibration (non operating)	-	2G, 10-200Hz for 1 hour
Shock	-	30G, 11ms half sine
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1, ES60601-1, IEC/EN/UL62368-1. Designed to meet IEC61010-1 & IEC60065-1
Conducted & Radiated EMI	-	EN55032/EN55011-B (See application notes for conditions)
Immunity	-	EN61000-4-2 (Lvl 4), -3 (Lvl 3), -4 (Lvl 4), -5 (Lvl 3), -6 (Lvl 3), -8 (Lvl 4) -11 (class 3), -12 (3), -14 (class 3), EN60601-1-2:2015 (Ed4)
Weight (Typ)	g	TBD
Size (WxLxH)	In (mm)	Open frame version: 3 x 5 x 1.4” (76.5 x 127 x 35mm)
Connectors	-	Input: JST VAR-2, Output: M3 screws, Fan: Molex 51191-0200, Signals: Molex 51110-1051
Warranty	yrs	Five years

PRELIMINARY

TDK·Lambda CUS400M Series

Model Selector

Model	Nominal Output Voltage (V)	Output Adjustment (V)	Maximum Current Convection (A)	Maximum Current Forced Air (A)	Maximum Power Convection (W)	Maximum Power Forced Air (W)
CUS400M-12	12	12 - 13.2	20.83	33.5	250	402
CUS400M-15	15	15 - 16.5	16.67	26.7	250	400.5
CUS400M-19	19	19 - 20.9	13.16	21.05	250	399.95
CUS400M-24	24	24 - 26.4	10.42	16.7	250	400.8
CUS400M-28	28	28 - 30.8	8.93	14.3	250	400.4
CUS400M-36	36	36 - 39.6	6.94	11.2	250	403.2
CUS400M-48	48	48 - 49.9	5.21	8.5	250	408

Part Numbering Scheme

CUS400M	12	/	U	E	X1

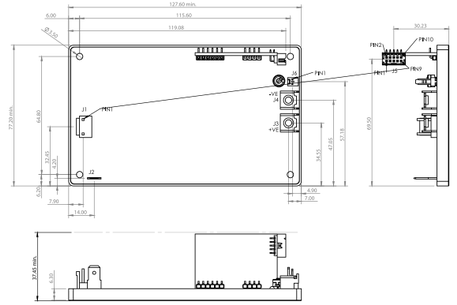
Output voltage	
	12
	15
	19
	24
	28
	36
	48

blank	open frame
U	U channel
A	U channel with cover
F	U channel, cover and top fan

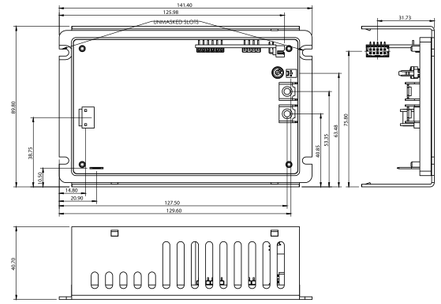
blank	dual fuses
E	single input fuse in line

Standby/ Signals	
X1	5V 0.5A standby supply, remote on/off (enable), dc good, ac fail
X2	5V 2.0A standby supply, remote on/off (enable), dc good, ac fail
X3	12V 1.0A standby supply, remote on/off (enable), dc good, ac fail
X4	5V 0.5A standby supply, remote on/off (inhibit), dc good, ac fail
X5	5V 2.0A standby supply, remote on/off (inhibit), dc good, ac fail
X6	12V 1.0A standby supply, remote on/off (inhibit), dc good, ac fail

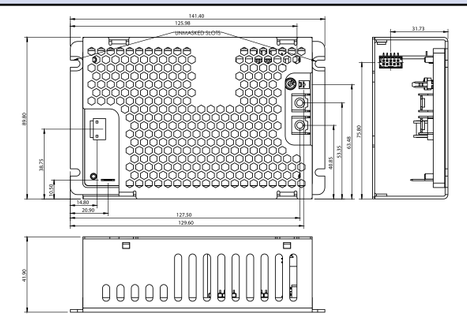
Outline drawing Open Frame



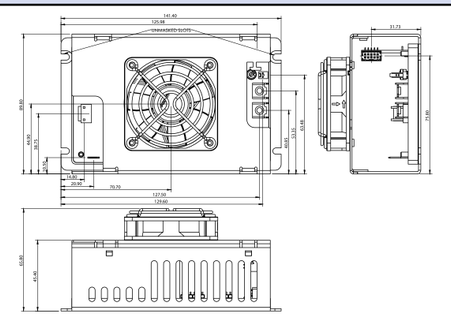
Outline Drawing U Channel (/U)



Outline Drawing U Channel with Cover (/A)



Outline Drawing U Channel, Cover & Fan (/F)



For Additional Information, please visit
http://www.us.tdk-lambda.com/lp/products/cus-m-series

PRELIMINARY

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

Medical Industrial Test COMM Broadcast

RoHS

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
Remote Sense	-	Yes
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)

TDK·Lambda CSS500 Series

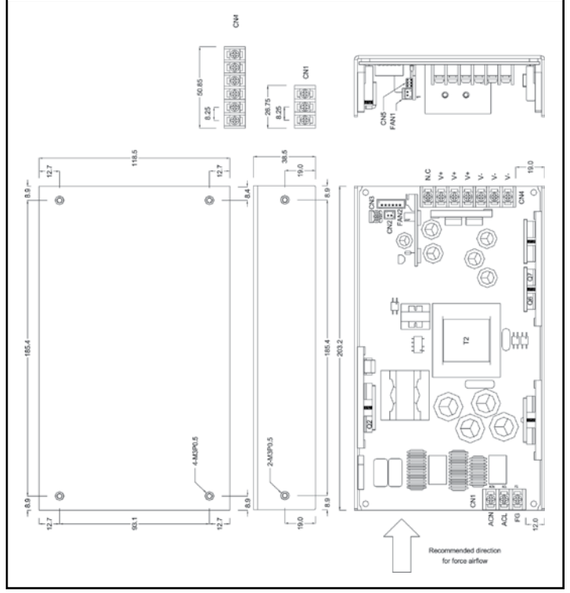
Model Selector

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

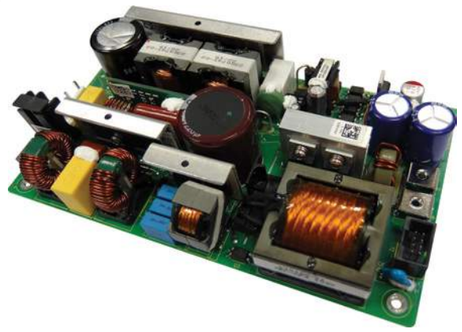
KM	15 - 40W pcb mount medical
CSS65, 150	40 - 150W open frame
NV175	175 - 200W 1-4 outputs
NV300	300W 1-4 outputs

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

500W Configurable AC-DC Power Supplies

Features

- ITE & Medical Certifications (2 x MOPP)
- Class I and Class II operation with Level B EMC
- Compact 4 x 7.1” Footprint
- Suitable for B and BF Rated Equipment
- Five Year Warranty



Key Market Segments & Applications

Medical Industrial Test COMM Broadcast Renewable

RoHS

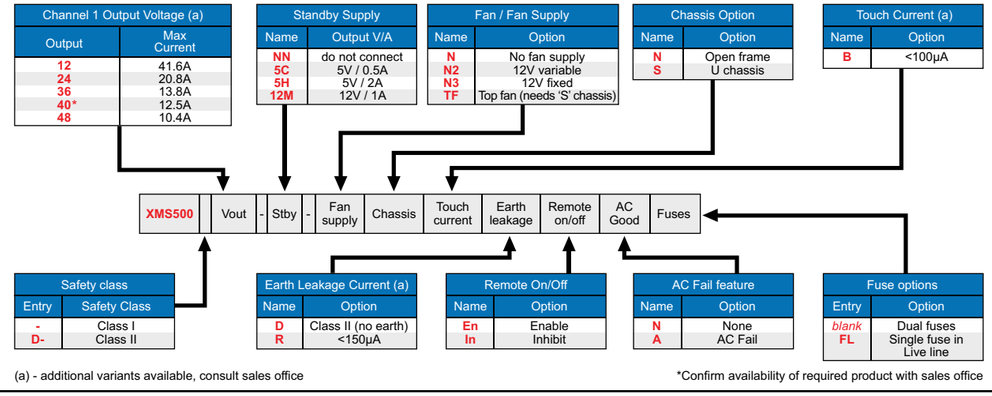
Specifications (1)

Model		XMS500
Input Voltage range		90 - 264VAC (47 - 63Hz)
Inrush Current (Cold start at 264VAC input)	A	<40A
Hold Up Time (Typ)	ms	≥16ms
Harmonic Compliance	-	EN/IEC61000-3-2 compliant. 0.97 at 110Vac input
Leakage Current	uA	<150uA (Class I construction) - See model selector
Touch Current (enclosure leakage)	uA	<100uA - See model selector
Ripple & Noise	mV (pk-pk)	≤1%
Total Regulation	%	≤2% (Line, load and temperature)
Short Circuit Protection	-	Hiccup mode, automatic recovery
Overvoltage Protection	V	Latching (unit shutdown), cycle AC input to reset
Efficiency	%	Up to 92% (230VAC input, 100% load)
Operating Temperature	°C	0 to +70°C, derate linearly to 50% load from 50 to 70°C. -20°C start-up
Storage Temperature	°C	-40 to +85°C (+70°C for top fan versions)
Humidity (non condensing)	%RH	5 - 95%RH
Cooling	-	Forced air (500W): 1m/s airflow or top mount fan; Convection (250W minimum)(2)
Withstand Voltage	VAC	Input to Ground 1.5kVAC (1xMOPP) Class I only, Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP) Class I only
Insulation Class	-	Class I or Class II - See model selector
Vibration (non operating)	-	10 to 200Hz at 2G. Conforms to IEC610068-2-6, IEC68-2-6 MIL-STD-810G, Method 514.6, Pro I, Cat 4,10
Shock	-	±3 x 30g shocks in each plane, total 18 shocks, 30g shock = 11ms (±0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810G, Method 516.6, Pro I, IV
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1. ANSI/AAMI ES60601-1. Designed to meet IEC61010-1
Altitude	m	-200 to 5000m operational (3000m for 60601-1) (-200 to 5000m storage/transportation)
Conducted & Radiated EMI	-	EN55011 / EN55032 Class B, EN60601-1-2:2015 4th Edition
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11, -12 and -14, EN60601-1-2:2015 4th Edition
Weight (Typ)	g	See application notes
Size (WxLxH) Open frame version	In (mm)	4 x 7.1 x 1.46” (102 x 180 x 37mm)
Warranty	yrs	Five years
Connectors	-	Molex as standard with separate ground faston See Installation Manual for part numbers

Note: 1. See website for detailed specifications
2. Higher convection rating possible depending on configuration, mounting orientation, and specific application operating conditions. Please contact Tech Support with detailed requirements.

TDK·Lambda XMS500 Series

How to Create a Product Description



(a) - additional variants available, consult sales office

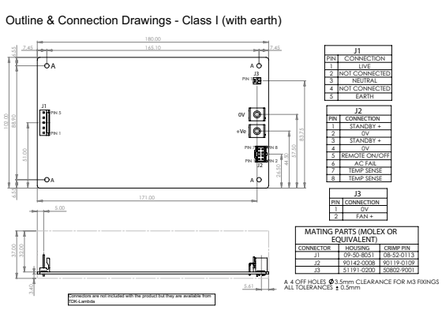
*Confirm availability of required product with sales office

Quick Selector (Standard models)*

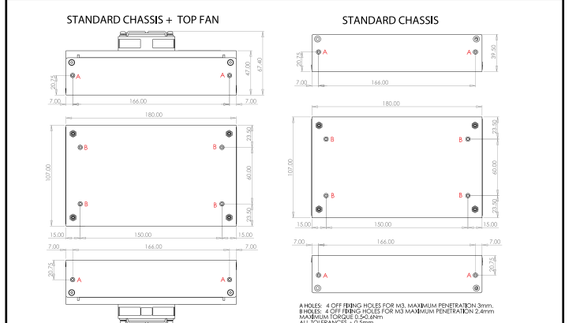
Output Volts	Output Current	Cover / Chassis / Fan type	Class I Product Description	Class I Order Code	Class II Product Description	Class II Order Code
12V	41.6A	Open Frame	XMS500-12-5H-N2NBRInA	XMS5001M	XMS500D-12-5H-N2NBDInA	XMS50024
		U chassis	XMS500-12-5H-N2SBRInA	XMS5003X	XMS500D-12-5H-N2SBDInA	XMS5004F
		Top fan	XMS500-12-5H-TFSBRInA	XMS5005Y	XMS500D-12-5H-TFSBDInA	XMS5006G
24V	20.8A	Open Frame	XMS500-24-5H-N2NBRInA	XMS50070	XMS500D-24-5H-N2NBDInA	XMS5008H
		U chassis	XMS500-24-5H-N2SBRInA	XMS50091	XMS500D-24-5H-N2SBDInA	XMS500BN
		Top fan	XMS500-24-5H-TFSBRInA	XMS500C6	XMS500D-24-5H-TFSBDInA	XMS500DP
36V	13.8A	Open Frame	XMS500-36-5H-N2NBRInA	XMS500FR	XMS500D-36-5H-N2NBDInA	XMS500G8
		U chassis	XMS500-36-5H-N2SBRInA	XMS500HS	XMS500D-36-5H-N2SBDInA	XMS500JT
		Top fan	XMS500-36-5H-TFSBRInA	XMS500KB	XMS500D-36-5H-TFSBDInA	XMS500LV
48V	10.4A	Open Frame	XMS500-48-5H-N2NBRInA	XMS500MC	XMS500D-48-5H-N2NBDInA	XMS500NW
		U chassis	XMS500-48-5H-N2SBRInA	XMS500PX	XMS500D-48-5H-N2SBDInA	XMS500RY
		Top fan	XMS500-48-5H-TFSBRInA	XMS500SG	XMS500D-48-5H-TFSBDInA	XMS500T0

*Note: Additional variants available - see ‘How To Create A Product Description’
Standard models include: ‘5H’ standby (5V / 2A), ‘N2’ fan supply (12V / 0.3A variable supply voltage) [except on Top fan variants], ‘B’ touch current (<100µA), ‘In’ remote on/off (inhibit) and ‘A’ AC Fail. Class I standard models include ‘R’ earth leakage (<150µA).

Outline Drawing



Outline Drawing



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

500-1500W Single Output Industrial Power Supplies

Features

- 5 Year Warranty
- -40ºC to +71ºC 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

Industrial COTS LED Semi-Fab

RoHS

Specifications

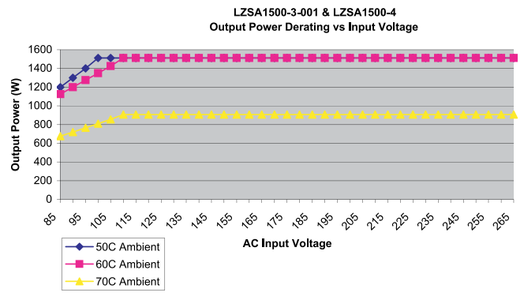
Model		LZSA500	LZSA1000	LZSA1500
Input Voltage (47-440Hz) (*)	-	85 - 265VAC (LZSA1500 - see output derating graphs on page 2), 100-380VDC (1)		
Inrush Current (110 / 220VAC)	A	25 / 45A	30 / 40A	
Power Factor	-	EN61000-3-2 Class A		
Efficiency (typical)	%	84%		
Ripple & Noise (Pk-Pk)(max)	-	75mV	75mV	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	ºC	-40º to +71ºC, derate linearly to 60% load from 60ºC~71ºC (20 min warm up period needed for <-30ºC)		
Storage Temperature	ºC	-40º to +85ºC		
Temperature Coefficient	-	0.01%/ºC		
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		

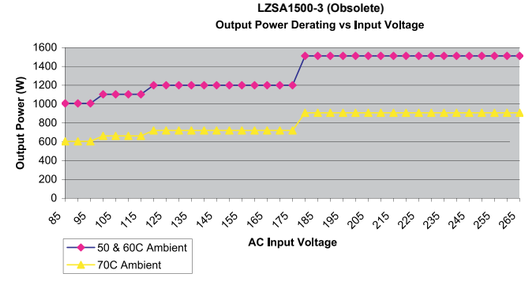
(1) Startup > 110VDC

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

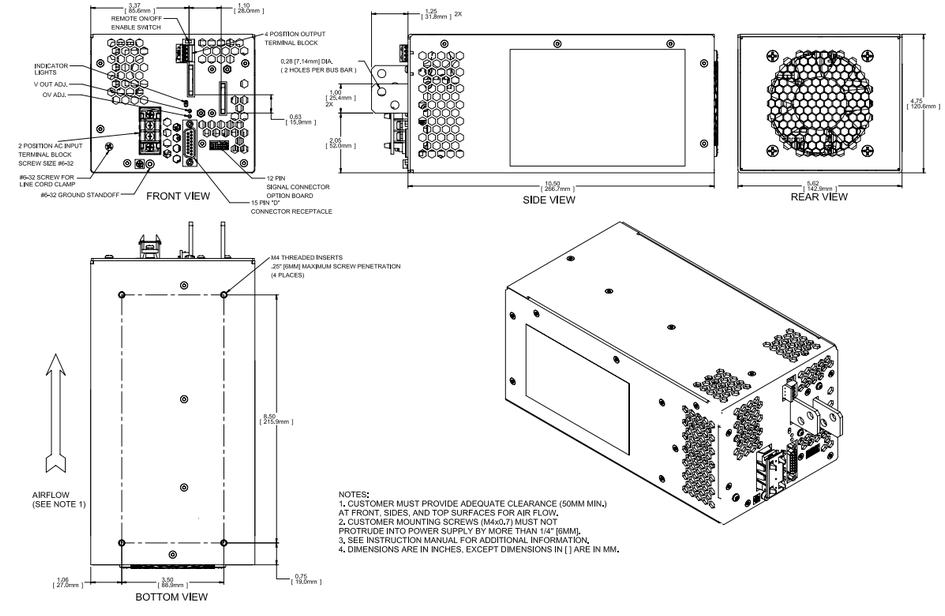
TDK·Lambda LZSA Series

Derating Charts





Outline Drawing (LZSA1500)



Options

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

*Model highlighted in blue is obsolete. Please use LZSA1500-3-001.

Other Industrial Products

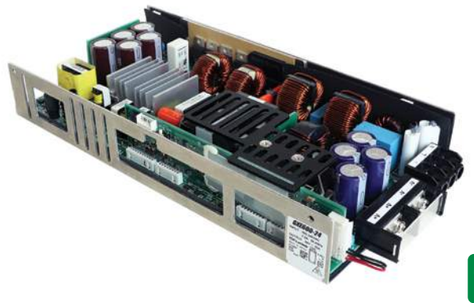
HWS	15W to 1800W Single Output
DLP, DPP, DSP	15W to 960W DIN Rail
PFE	300W to 1000W Power Modules

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

Single output 600W Programmable Medical and ITE Power Supplies

Features

- Convection Cooled
- Up to 95% Efficient
- RS-485 Read-Write Communication (Modbus RTU protocol)
- Constant Voltage & Constant Current Modes
- Monitoring & Programming Functions
- Digital or Analog Programming
- Seven Year Warranty



Key Market Segments & Applications

Medical Industrial Test COMM Broadcast

RoHS

Specifications

Model		GXE600-24	GXE600-48
AC Input Voltage range (1)	VAC	85 - 265VAC (47 - 63Hz). Withstands 300VAC for 5s	
Inrush Current (100 / 200VAC)	A	40 / 40A	
Power Factor (100 / 200VAC)	-	Meets EN61000-3-2 (0.99 / 0.95)	
Input Current (115/230VAC) (Typ)	A	6.1 / 3.1A	
Nominal Output Voltage	VDC	24V	48V
Maximum Output Current	A	25A	12.5A
Output Voltage Range (Manual Adjust)	VDC	19.2 - 28.8V	38.4 - 57.6V
Output Voltage Range (Via Programming) (2)	VDC	4.8 - 28.8V	9.6 - 57.6V
Current Limit Set Point (Via Programming) (2)	A	5 - 28.8A	2.5 - 14.4A
Temperature Coefficient	%/°C	<0.02%/°C	
Regulation	-	See Model Selector	
Overcurrent Protection (3)	-	>28.8A	>14.4A
Overvoltage Protection (3)	V	28.8 - 31.2V	57.6 - 62.4V
Hold Up Time (Typ at 100% load)	ms	20ms	
Leakage Current (max)	mA	<0.3mA	
Standby Voltage Vsb)	-	4.8V - 5.2V 1A	
Remote Sense	-	Yes	
Remote On/Off	-	Isolated opto-coupler. Unit off when current is flowing through the opto diode	
Power Fail Signal	-	Signal is high when the output voltage drops due to AC loss or OCP, OVP, OTP	
AC Fail Signal	-	Signal goes high when the AC input is not present	
Parallel Operation	-	Yes, up to five units	
Operating Temperature (-40°C start up)	°C	Convection: -20 to +70°C, derate linearly to 50% load from 50 to 70°C (4)	
Storage Temperature	°C	-40 to +85°C	
Operating Humidity (non condensing)	%RH	20 - 90%RH	
Storage Humidity (non condensing)	%RH	10 - 90%RH	
Cooling	-	Convection or forced air cooling	
Withstand Voltage	VAC	Input to Ground 2kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP), Output to Signals 100VAC for 1 min.	
Isolation Resistance	MΩ	>100MΩ 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 Certifications	-	IEC/UL/CSA/EN60950-1, IEC/UL/CSA/EN62368-1, IEC/ES/CSA/EN60601-1, IEC/EN62477-1 (OVC III), CE Mark	
Line Dips	-	SEMI-F47 (200VAC input)	
Conducted & Radiated EMI	-	EN55011 / EN55032-B, FCC Class B, VCCI-B	
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2, IEC60601-1-2 Ed 4	
Weight (Typ)	g	1300	
Size (WxHxD)	mm/In	127 x 41 x 254mm / 5 x 1.61 x 10”	
MTBF - Telcordia SR-332 issue 3*	Hours	511,677 hours	
Warranty	Yrs	Seven Years	

(1) 85Vac: 360W, 100 to <170Vac: 500W, 170V to 265Vac: 600W (Convection cooled). 600W when forced air is applied (see installation manual)
(2) Using RS-485 communications or external 1-6V voltage source. See installation manual for details
(3) Overcurrent & Overvoltage limits and recovery modes can be set using the RS-485 communications
(4) See installation manual for full derating curves *24V output model, 25°C ambient, full load, 230VAC input

TDK·Lambda GXE600 Series

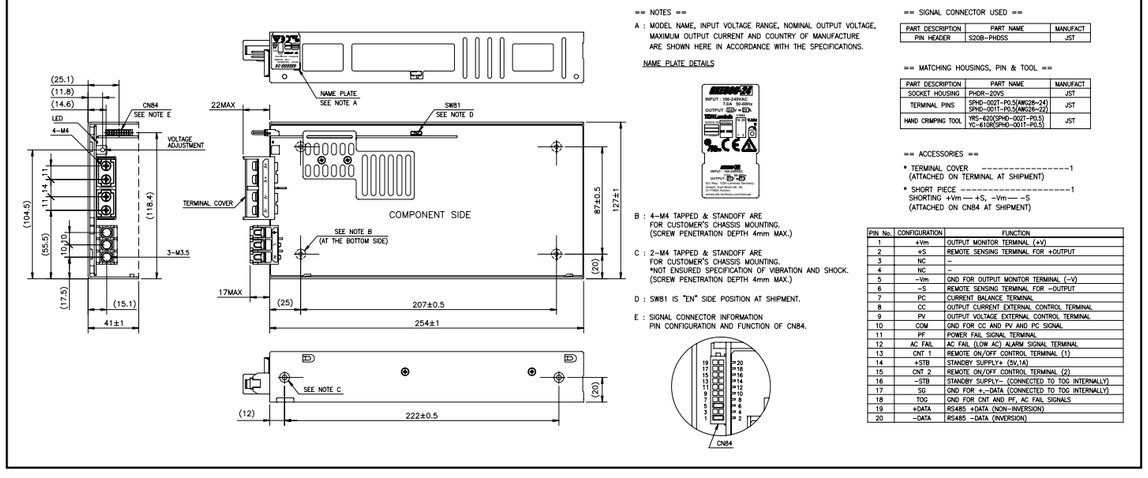
Model Selector

Model	Output Voltage (V)	Max Output Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230 VAC
GXE600-24	24	600	144	96	150	92 / 95
GXE600-48	48	600	288	192	350	92 / 95

Monitoring and Programming Functions

Function	Digital (RS-485) Control	Analog Control
Output Voltage Monitor	Read back	No
Output Current Monitor	Read back	No
Output Voltage Programming	Adjustable	Adjustable, use a 1-6V external voltage source
Output Current Programming	Adjustable	Adjustable, use a 1-6V external voltage source
Over Voltage Protection Set Point	Adjustable	Fixed
Over Voltage Recovery	Auto-recovery or manual settings	Cycle AC input or use the remote on/off
Over Current Set Point	Adjustable	Fixed
Over Current Recovery	Auto recovery: Constant current, hiccup or foldback Latching: Constant current or foldback	Constant current, auto-recovery
Over Temperature Recovery	Cycle AC input or use the remote on/off	Cycle AC input or use the remote on/off
Remote On/Off	Yes, enable or inhibit type	Yes, enable or inhibit type
Internal Temperature Monitoring	Yes, -20 to +100oC	No
Operating Run Time Log	Records more than 20 years of data	No
Remaining Electrolytic Capacitor Life	Indicates hours left	No
Alarm History	OCP, OVP, OTP, remote on/off, system error	No
Slew Rate (Rise-time) Control	Voltage and current	No
Communication Configuration	ID, Baud Rate, Parity	Not applicable
Product Information	Model #, serial #, lot #, firmware version	Not applicable
Power Fail Signal Threshold	Adjustable for either output voltage or current	Fixed (voltage only)

Outline Drawing



Options

Suffix	Description
./A	Cover

For Additional Information, please visit us.tdk-lambda.com/lp/products/gxe-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

Industrial COTS COMM LED Broadcast

RoHS

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
I²C 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		°C	-40 to +70°C ambient, (See reverse side for derating) (85°C baseplate, maximum)
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 4, 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) 110/220VAC
(2) 100% loading required.
(3) Warm up period of 30 minutes below -30°C for ripple. Jeita RC-9131C Method, see instruction manual for test methods.

TDK·Lambda CPFE1000FI Series

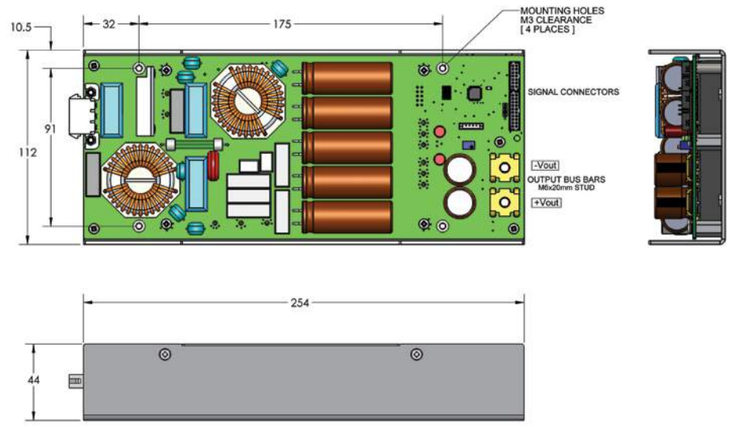
Model Selector

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

TDK·Lambda RWS1000/1500-B Series

1000W to 1500W Single Output General Purpose Power Supplies

Features

- Cost Effective
- Wide Range AC Input 85 - 265VAC
- Enclosed Construction
- Compact Sizes
- SEMI F47 Line Dips
- 7 Year Warranty



Key Market Segments & Applications

Industrial Test COMM LED Broadcast Semi-Fab

RoHS

Specifications

Model		RWS1000B	RWS1500B
AC Input Voltage range (1)	VAC	85 - 265VAC (47 - 63Hz)	
DC Input Voltage range*	VDC	120 - 340VDC*	
Inrush Current (100 / 200VAC)	A	60 / 60A	
Power Factor (100 / 200VAC)	-	Meets EN61000-3-2 (0.98 / 0.95)	
Input Current (100/200VAC) (Typ)	A	13 / 7A	19 / 10A
Temperature Coefficient	%/°C	<0.02%/°C	
Regulation	-	See Model Selector	
Overcurrent Protection	-	>105%, Constant Current Style. After 5s unit will shutdown	
Overvoltage Protection (2)	V	Shuts down output, cycle AC line or remote on/off to reset	
Hold Up Time (Typ at 100% load)	ms	20ms	
Leakage Current (max)	mA	<1.2mA	
Standby Voltage (Vsb)	-	5V 1A (always on). See options table (/S suffix)	
Remote Sense	-	Yes	
Remote On/Off	-	See options table. Apply external voltage or Vsb to enable output voltage	
DC Good, Fan Alarm	-	See options table	
Parallel Operation	-	See options table	
Series Operation	-	Yes	
Operating Temperature	°C	-20 to +60°C, derate linearly to 60% load from 50 to 60°C	
Storage Temperature	°C	-30 to +75°C	
Operating Humidity (non condensing)	%RH	20 - 90%RH	
Storage Humidity (non condensing)	%RH	10 - 90%RH	
Cooling	-	Internal Fan, air intake from input/output terminals	
Withstand Voltage	VAC	Input to Ground 2kVAC, Input to Output 4kVAC, Output to Ground 1.5kVAC for 1 min.	
Isolation Resistance	MΩ	>100MΩ 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 Certifications	-	UL60950-1, CSA60950, EN60950-1, CE Mark	
Line Dips	-	SEMI-F47 (200VAC input)	
Conducted & Radiated EMI	-	EN55011 / EN55032-B, FCC Class B, VCCI-B	
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2	
Weight (Typ)	g	2,000g	3,000g
Size (WxHxD)	mm	127 x 63 x 198mm	127 x 63 x 261mm
	In	5 x 2.48 x 7.8”	5 x 2.48 x 10.28”
MTBF - Telcordia SR-332 issue 3**	hours	1,834,313	1,222,361
Warranty	yrs	Seven Years	

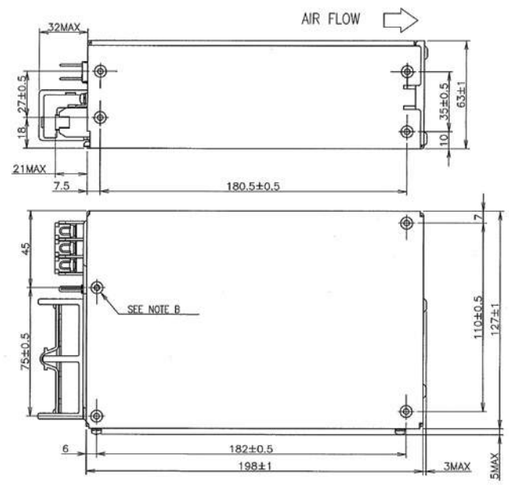
(1) Derate linearly to 80% load from 90 to 85VAC input *Safety certified for AC input only **24V output model, 25°C ambient, full load, 230VAC input
(2) See specifications on website for individual limits. Note the remote on/off function is an option - see options table

TDK·Lambda RWS1000/1500-B Series

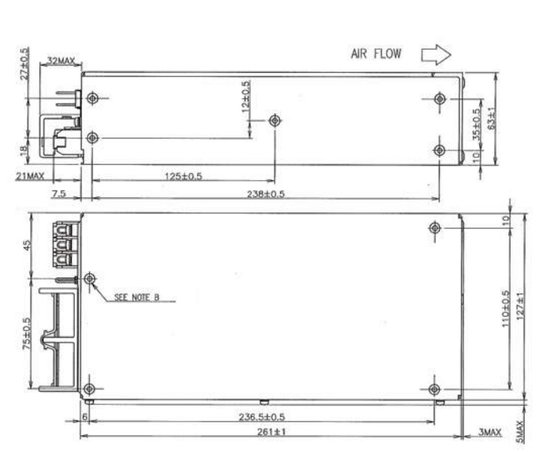
Output Ratings

Model	Voltage	Adjust Range (V)	Max Current (A)	Max Output Power (w)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230VAC
RWS1000B-12	12V	10.2-13.8V	84	1008	96	48	150	82 / 85
RWS1000B-12/S	12V	10.2-13.8V	84	1008	96	48	150	82 / 85
RWS1500B-12	12V	10.2-14.4V	125	1500	96	48	150	81 / 85
RWS1500B-12/S	12V	10.2-14.4V	125	1500	96	48	150	81 / 85
RWS1000B-15	15V	12.8-17.2V	67	1005	120	60	150	82 / 85
RWS1000B-15/S	15V	12.8-17.2V	67	1005	120	60	150	82 / 85
RWS1500B-15	15V	12.8-18.0V	100	1500	120	60	150	82 / 85
RWS1500B-15/S	15V	12.8-18.0V	100	1500	120	60	150	82 / 85
RWS1000B-24	24V	20.4-28.8V	42	1008	144	96	180	85 / 88
RWS1000B-24/S	24V	20.4-28.8V	42	1008	144	96	180	85 / 88
RWS1500B-24	24V	20.4-28.8V	63	1512	144	96	180	85 / 88
RWS1500B-24/S	24V	20.4-28.8V	63	1512	144	96	180	85 / 88
RWS1000B-36	36V	30.6-41.4	28	1008	216	144	250	85 / 88
RWS1000B-36/S	36V	30.6-41.4	28	1008	216	144	250	85 / 88
RWS1500B-36	36V	30.6-43.2	42	1512	216	144	250	85 / 88
RWS1500B-36/S	36V	30.6-43.2	42	1512	216	144	250	85 / 88
RWS1000B-48	48V	40.8-57.6	21	1008	288	192	300	85 / 88
RWS1000B-48/S	48V	40.8-57.6	21	1008	288	192	300	85 / 88
RWS1500B-48	48V	40.8-57.6	32	1536	288	192	300	85 / 88
RWS1500B-48/S	48V	40.8-57.6	32	1536	288	192	300	85 / 88

Outline Drawing RWS 1000B



Outline Drawing RWS 1500B



Options

Suffix	Description
/CO2	Double Sided Board Coating
/FO	Parallel Operation, DC Good and Fan Alarm Signals
/R	Remote On/Off
/RF	Reverse Fan (Air exits over input/output terminals)
/RFO	Remote On/Off, Parallel Operation, DC Good and Fan Alarm Signals
/S	Remote On/Off, 5V 1A Standby Output

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

TDK·Lambda RWS1000/1500-B/ME Series

1000W to 1500W Single Output Medical Power Supplies

Features

- Cost Effective
- Wide Range AC Input 85 - 265VAC
- Enclosed Construction
- Compact Sizes
- Suitable for B & BF Rated Equipment
- 7 Year Warranty



Key Market Segments & Applications

Medical

RoHS

Specifications

Model		RWS1000B/ME	RWS1500B/ME
AAC Input Voltage range (1)	VAC	85 - 265VAC (47 - 63Hz)	
DC Input Voltage range*	VDC	120 - 340VDC*	
Inrush Current (100 / 200VAC)	A	60 / 60A	
Power Factor (100 / 200VAC)	-	Meets EN61000-3-2 (0.98 / 0.95)	
Input Current (100/200VAC) (Typ)	A	13 / 7A	19 / 10A
Temperature Coefficient	%/°C	<0.02%/°C	
Regulation	-	See Model Selector	
Overcurrent Protection	-	>105%, Constant Current Style. After 5s unit will shutdown	
Overvoltage Protection	V	120-145% (115-125% for 48V), Cycle AC line to reset	
Hold Up Time (Typ at 100% load)	ms	20ms	
Leakage Current (max)	mA	<0.3mA	
Remote Sense	-	Yes	
Remote On/Off	-	See options table. Apply external voltage to enable output voltage	
DC Good, Fan Alarm	-	See options table	
Parallel Operation	-	See options table	
Series Operation	-	Yes	
Operating Temperature	°C	-20 to +60°C, derate linearly to 60% load from 50 to 60°C	
Storage Temperature	°C	-30 to +75°C	
Operating Humidity (non condensing)	%RH	20 - 90%RH	
Storage Humidity (non condensing)	%RH	10 - 90%RH	
Cooling	-	Internal Fan, air intake from input/output terminals	
Withstand Voltage	VAC	Input to Ground 2kVAC (1xMoPP), Input to Output 4kVAC (2xMoPP), Output to Ground 1.5kVAC (1xMoPP) for 1 min.	
Isolation Resistance	MΩ	>100MΩ 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 Certifications	-	ES60601-1, CSA60601, EN60601-1, CE Mark	
Line Dips	-	SEMI-F47 (200VAC input)	
Conducted & Radiated EMI	-	EN55011 / EN55032-A, FCC Class A, VCCI-A	
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2, EN60601-1-2	
Weight (Typ)	g	2,000g	3,000g
Size (WxHxD)	mm	127 x 63 x 198mm	127 x 63 x 261mm
	In	5 x 2.48 x 7.8”	5 x 2.48 x 10.28”
MTBF - Telcordia SR-332 issue 3**	hours	1,834,313	1,222,361
Warranty	yrs	Seven Years	

*Safety certified for AC input only **24V output model, 25°C ambient, full load, 230VAC input

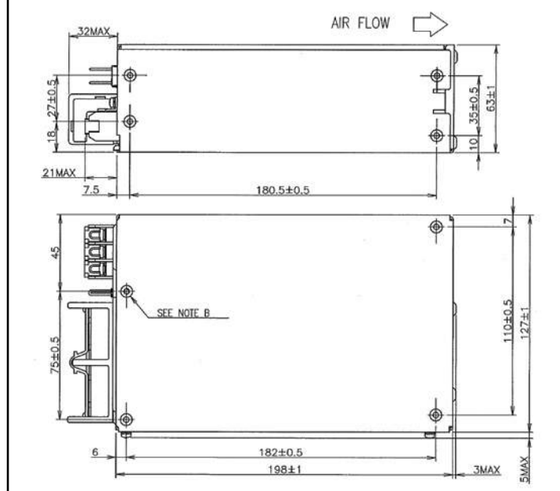
(1) Derate linearly to 80% load from 90 to 85VAC input

TDK·Lambda RWS1000/1500-B/ME Series

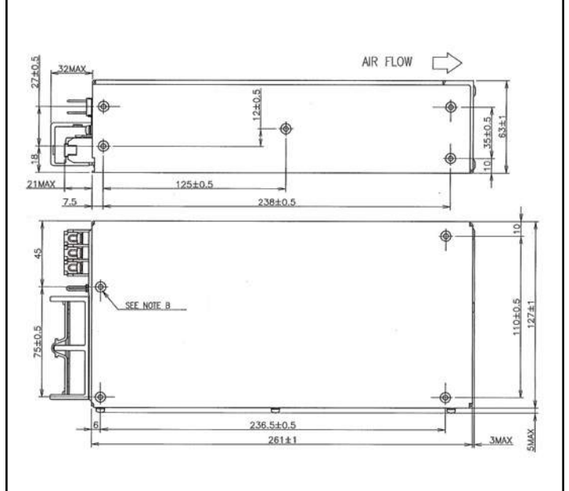
Output Ratings

Model	Voltage	Adjust Range (V)	Max Current (A)	Max Output Power (w)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230VAC
RWS1000B-12/ME	12V	10.2-13.8V	84	1008	96	48	150	82 / 85
RWS1500B-12/ME	12V	10.2-13.8V	125	1500	96	48	150	81 / 85
RWS1000B-15/ME	15V	12.8-17.2V	67	1005	120	60	150	82 / 85
RWS1500B-15/ME	15V	12.8-17.2V	100	1500	120	60	150	82 / 85
RWS1000B-24/ME	24V	20.4-27.6V	42	1008	144	96	180	85 / 88
RWS1500B-24/ME	24V	20.4-27.6V	63	1512	144	96	180	85 / 88
RWS1000B-36/ME	36V	30.6-41.4	28	1008	216	144	250	85 / 88
RWS1500B-36/ME	36V	30.6-41.4	42	1512	216	144	250	85 / 88
RWS1000B-48/ME	48V	40.8-52.8	21	1008	288	192	300	85 / 88
RWS1500B-48/ME	48V	40.8-52.8	32	1536	288	192	300	85 / 88

Outline Drawing RWS 1000B



Outline Drawing RWS 1500B



Options (Contact Sales for availability)

Suffix	Description
/CO2	Double Sided Board Coating
/FO	Parallel Operation, DC Good and Fan Alarm Signals
/R	Remote On/Off
/RF	Reverse Fan (Air exits over input/output terminals)
/RFO	Remote On/Off, Parallel Operation, DC Good and Fan Alarm Signals

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

1500W Medical and Industrial Power Supplies

Features

- Low Audible Noise (<45dBA)
- EN55011/55032-B EMI
- Enclosed Construction
- Compact Size
- Medical and Industrial Certifications
- 7 Year Warranty



Key Market Segments & Applications

Medical Industrial Test COMM LED Broadcast

RoHS

Specifications

Model		CUS1500M
AC Input Voltage range (1)	VAC	85 - 265VAC (47 - 63Hz)
DC Input Voltage range*	VDC	120 - 340VDC*
Inrush Current (100 / 200VAC)	A	60 / 60A
Power Factor (100 / 200VAC)	-	Meets EN61000-3-2 (0.98 / 0.95)
Input Current (115/230VAC) (Typ)	A	16 / 8A
Temperature Coefficient	%/°C	<0.02%/°C
Regulation	-	See Model Selector
Overcurrent Protection	-	>105%, Constant Current Style. After 5s unit will shutdown
Overvoltage Protection	V	125-150% (115-125% for 48V), Cycle AC line to reset
Hold Up Time (Typ at 100% load)	ms	20ms
Leakage Current (max)	mA	<0.3mA
Standby Voltage	A	5V 1A (always on)
Remote Sense	-	Yes
Remote On/Off	-	Yes. Apply external or Standby voltage to enable output voltage
DC Good, Fan Alarm	-	Open collector signal, high on fail
Parallel Operation	-	Yes, up to 5 units
Series Operation	-	Yes
Operating Temperature	°C	-20 to +60°C, derate linearly to 60% load from 50 to 60°C
Storage Temperature	°C	-30 to +75°C
Operating Humidity (non condensing)	%RH	20 - 90%RH
Storage Humidity (non condensing)	%RH	10 - 90%RH
Cooling	-	Internal variable speed fan, air intake from front. <45dBA noise
Withstand Voltage	VAC	Input to Ground 2kVAC (1xMoPP), Input to Output 4kVAC (2xMoPP), Output to Ground 1.5kVAC (1xMoPP) for 1 min.
Isolation Resistance	MΩ	>100MΩ 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 Certifications	-	IEC/ES/EN/CSA60601-1, IEC/UL/EN/CSA60950-1, IEC/UL/EN62368-1 (in progress), EN62477-1 (OVC III), CE Mark
Line Dips	-	SEMI-F47 (200VAC input)
Conducted & Radiated EMI	-	EN55011 / EN55032-B, FCC Class B, VCCI-B
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2, IEC60601-1-2 Ed.4
Weight (Typ)	g	3,000g
Size (WxHxD)	mm/In	127 x 63 x 261mm / 5 x 2.48 x 10.28”
MTBF - Telcordia SR-332 issue 3 **	Hours	769,670 hours
Warranty	yrs	Seven Years

*Safety certified for AC input only **24V output model, 25°C ambient, full load, 230VAC input

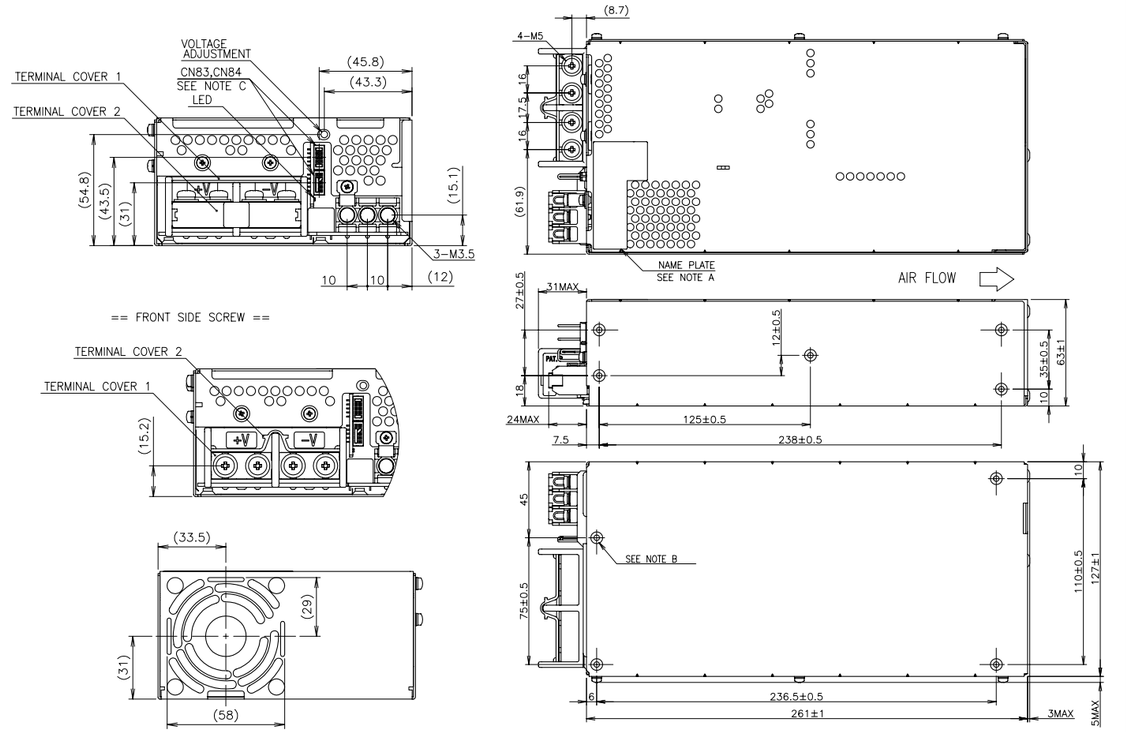
(1) Derate linearly to 80% load from 90 to 85VAC input

TDK·Lambda CUS1500M Series

Output Ratings

Model	Voltage (V)	Adjust Range (V)	Max Current (A)	Max Output Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230VAC
CUS1500M-12	12	10.2 -14.4	125	1500	96	48	150	82 / 85
CUS1500M-15	15	12.8 - 18	100	1500	120	60	150	82 / 85
CUS1500M-24	24	20.4 - 28.8	63	1512	144	96	180	85 / 88
CUS1500M-36	36	30.6 - 43.2	42	1512	216	144	250	85 / 88
CUS1500M-48	48	40.8 - 52.8	32	1536	288	192	300	85 / 88

Outline Drawing



Options

Suffix	Description
/SF	Single fuse (Line input)
/RF (Contact factory)	Reverse Fan (Air exits over input/output terminals)

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

1600W 1U Industrial Power Supplies

Features

- 1U High
- Internal ORing FETs & Current Share
- High Efficiency
- I²C, PMBus Communication Option



Key Market Segments & Applications

Industrial COTS Test COMM

RoHS

Specifications

Model		RFE1600
Input Voltage Range	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating(2)
Input Current (Max) 115/230VAC	A	11.6 / 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)
I²C 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 Ground 2kVAC, Output to Ground: RFE1600-12, -24V 500VAC, RFE1600-48 2250VDC 1 min, (POE)
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

TDK·Lambda RFE1600 Series

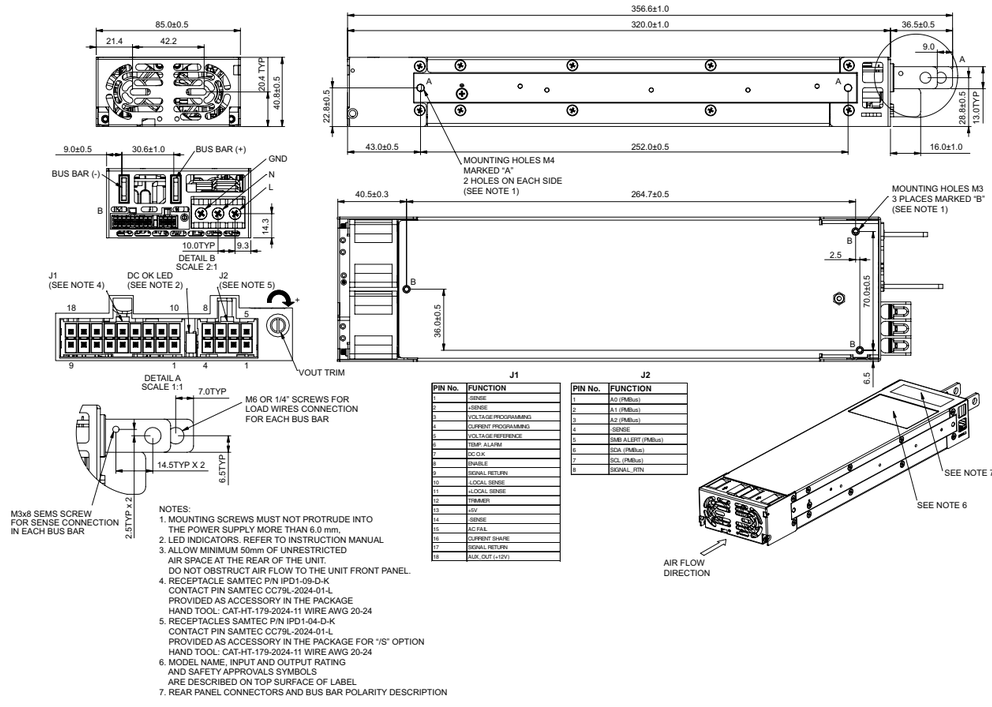
Model Selector

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)	I²C
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, 115 / 230VAC input

Outline Drawing



PIN No.	FUNCTION
1	-SENSE
2	+SENSE
3	VOLTAGE PROGRAMMING
4	CURRENT PROGRAMMING
5	VOLTAGE REFERENCE
6	TEMP. ALARM
7	DC O.K.
8	ENABLE
9	SIGNAL RETURN
10	-LOCAL SENSE
11	+LOCAL SENSE
12	TRIMMER
13	+5V
14	-SENSE
15	AC FAIL
16	CURRENT SHARE
17	SIGNAL RETURN
18	AUX. OUT (+12V)

J1

PIN No.	FUNCTION
1	A0 (PMBus)
2	A1 (PMBus)
3	A2 (PMBus)
4	-SENSE
5	SMB ALERT (PMBus)
6	SDA (PMBus)
7	SCL (PMBus)
8	SIGNAL_RTN

J2

NOTES:
1. MOUNTING SCREWS MUST NOT PROTRUDE INTO THE POWER SUPPLY MORE THAN 6.0 mm,
2. LED INDICATORS. REFER TO INSTRUCTION MANUAL
3. ALLOW MINIMUM 50mm OF UNRESTRICTED AIR SPACE AT THE REAR OF THE UNIT. DO NOT OBSTRUCT AIR FLOW TO THE UNIT FRONT PANEL.
4. RECEPTACLE SAMTEC P/N IPD1-09-D-K CONTACT PIN SAMTEC CC79L-2024-01-L PROVIDED AS ACCESSORY IN THE PACKAGE HAND TOOL: CAT-HT-179-2024-11 WIRE AWG 20-24
5. RECEPTACLES SAMTEC P/N IPD1-04-D-K CONTACT PIN SAMTEC CC79L-2024-01-L PROVIDED AS ACCESSORY IN THE PACKAGE FOR "/S" OPTION HAND TOOL: CAT-HT-179-2024-11 WIRE AWG 20-24
6. MODEL NAME, INPUT AND OUTPUT RATING AND SAFETY APPROVALS SYMBOLS ARE DESCRIBED ON TOP SURFACE OF LABEL
7. REAR PANEL CONNECTORS AND BUS BAR POLARITY DESCRIPTION

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

Industrial Test COMM Broadcast Semi-Fab

RoHS

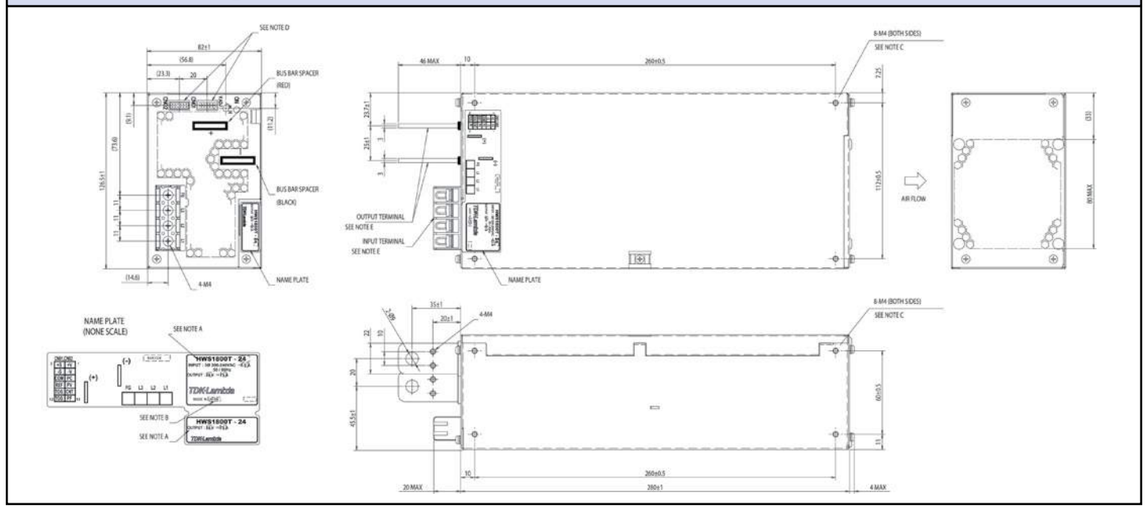
Specifications

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

TDK·Lambda HWS1800T Series

Outline Drawing

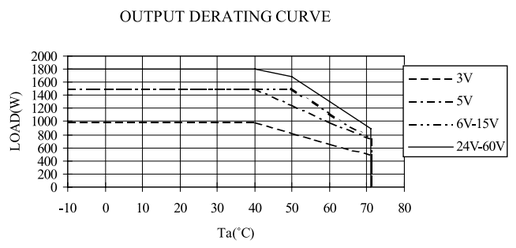


Output Ratings

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

2500W 1U Industrial Power Supplies

Features

- 1U High
- Internal ORing FETs & Current Share
- High Efficiency
- I²C, PMBus Communication Option



Key Market Segments & Applications

Industrial COTS Test COMM

RoHS

Specifications

Model		RFE2500
Input Voltage Range	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating(2)
Input Current (Max) 115/230VAC	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	%	115VAC: >110%; 230VAC: 105 - 120%
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	< 0.8 / 1.6mA, 115 / 230VAC, 60Hz
Remote Sense Compensation	-	12V: 0.25V/wire; 24V: 0.5V/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 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	-	By either external 0 - 5V signal or 1k potentiometer(1)
I²C 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 Ground 2kVAC, Output to Ground: RFE2500-12, -24V 500VAC, RFE2500-48 2250VDC 1 min, (POE)
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	Meets IEC61068-2-64 (Basic transportation)
Shock (Basic transportation)	-	Meets IEC61068-2-27 (Basic transportation) 20G
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) (Excluding busbars)	in	4.21 x 1.61 x 13.6”
	mm	107 x 41 x 345mm
Weight	g	2500
Warranty	yrs	Three Years

Notes
(1) See installation manual for detailed specifications & test methods
(2) Derate linearly 1.3%/VAC from 100VAC to 85VAC input

TDK·Lambda RFE2500 Series

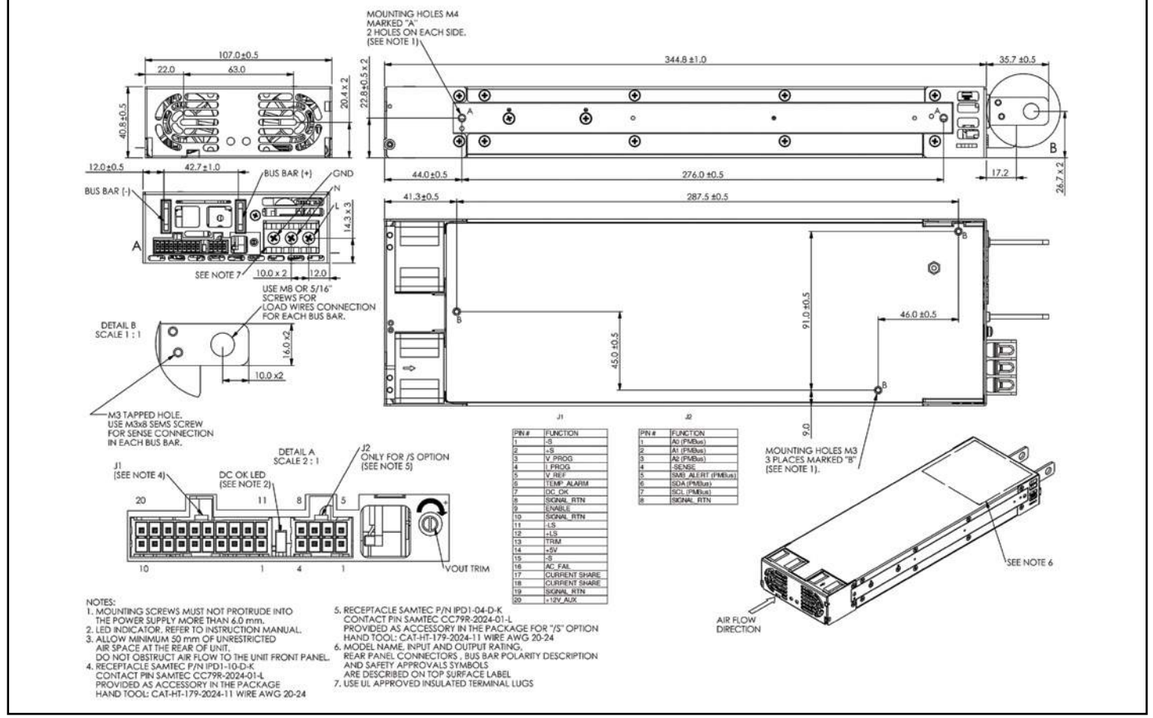
Model Selector

Model	Output Voltage	Adjust. Range(1)	Max Current (Vin>180VAC) (2)	Max Power (Vin>180VAC) (2)	Max Current (100<Vin<170VAC) (2)	Max Power (100<Vin<170VAC) (2)
RFE2500-12	12V	9.6 - 13.2V	200A	2400W	125A	1500W
RFE2500-12/S	12V	9.6 - 13.2V	200A	2400W	125A	1500W
RFE2500-24	24V	19.2 - 29V	96A	2304W	62.5A	1500W
RFE2500-24/S	24V	19.2 - 29V	96A	2304W	62.5A	1500W
RFE2500-48	48V	38.4 - 58V	52A	2496W	31.25A	1500W
RFE2500-48/S	48V	38.4 - 58V	52A	2496W	31.25A	1500W

Model	Load Reg	Line Reg	Ripple & Noise	Efficiency(3)	I²C
RFE2500-12	60mV	30mV	240mV	90 / 92%	-
RFE2500-12/S	60mV	30mV	240mV	90 / 92%	Yes
RFE2500-24	120mV	60mV	240mV	90 / 92%	-
RFE2500-24/S	120mV	60mV	240mV	90 / 92%	Yes
RFE2500-48	240mV	120mV	480mV	91 / 93%	-
RFE2500-48/S	240mV	120mV	480mV	91 / 93%	Yes

Notes:
(3) At 75% load, 115 / 230VAC input

Outline Drawing



Other Related Products

RFE1000-1600	1U 1000W and 1600W
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

3200W 3 Phase Input Industrial Power Supplies



Features

- 400/440/480 VAC (Nominal) 3 Phase Delta or Wye
- Fully Regulated, Wide Range Adjustable Output
- Voltage and Current Programming
- -40°C (start up) to +70°C operation
- >92% Efficiency
- PMBus™ Communication
- Built in ORing FETs & Active I share for parallel operation
- Fully Featured

Key Market Segments & Applications

Industrial COTS Test COMM Broadcast

RoHS

Specifications

Model		TPS3000-24	TPS3000-48
Input Voltage (47-63Hz)	VAC	350 - 528VAC, Delta or Wye 3 phase	
Input Current	A	6A per phase max, steady state	
Inrush Current	A	<15A per phase (excluding initial spike charging EMI capacitors lasting <2ms)	
Power Factor Correction	-	0.93 typical	
Efficiency (1)	%	92.5%	92.5%
Ripple & Noise (Pk-Pk) (max) (2)	mV	130mV	260mV
Line Regulation	%	<0.25%	
Load Regulation	%	<0.5%	
Overcurrent Protection	-	Adjustable (70-105% of rated current)	
Overvoltage Protection	V	115% of setpoint (tracking)	
Thermal Protection	-	Internal thermostat. Automatic reset	
Hold Up Time	ms	>10mS at 80% of rated current, nominal input/output voltage	
Remote Sense	-	Compensates for a total of 1V cable drop	
Dropped Phase (2)	-	Open collector signal; off during normal operation, strobing during dropped phase state	
Remote On / Off	-	Selectable logic - Enable or Inhibit	
AC Fail Signal	-	Open Collector, ON when AC is above 340VAC and unit is enabled	
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)	
Remote Adjust	-	0 - 5V adjusts output from V max to V min	
Parallel Connection	-	Single wire current share, up to 8 units. Built in ORing FET	
Standby Voltage	-	11.2 - 12.5V, 0.3A	
Operating Temperature	°C	-40 to +70°C, see derating curve (20 min warm up needed for <-10°C)	
Storage Temperature	°C	-40 to +85°C	
Temperature Coefficient	%/°C	0.02%/°C	
Humidity (non condensing)	%RH	10 - 90%RH	
Cooling	-	Internal variable speed fan	
Withstand Voltage	VAC	Input - Ground 2,000VAC, Input - Output 3,000VAC, Output - Ground 500VAC	
Isolation Resistance	MΩ	>100MΩ (25deg, 70%RH)	
Vibration	-	Designed to meet MIL-STD-810F, Method 514.5, Proc I, Category 4, 10	
Shock	-	Designed to meet MIL-STD-810F, Method 516.5, Procedure I, IV & VI	
Safety Agency Certifications	-	UL/CSA60950-1, EN60950-1, CE mark for LVD and RoHS2	
Voltage Dips	-	SEMI F47-0706	
Leakage Current	mA	<3mA	
Conducted & Radiated Emissions	-	EN55022 Class A, FCC part 15 Class-A	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Altitude	m	4,000m	
Weight	kg	3.5	
Size (W x H x D)	mm	107 x 84.4 x 324mm (excluding output busbars)	
Warranty	yrs	Three Years	

(1) Typical, 75-100% at rated current (2) Consult Installation Manual for detailed specifications, test methods and application notes

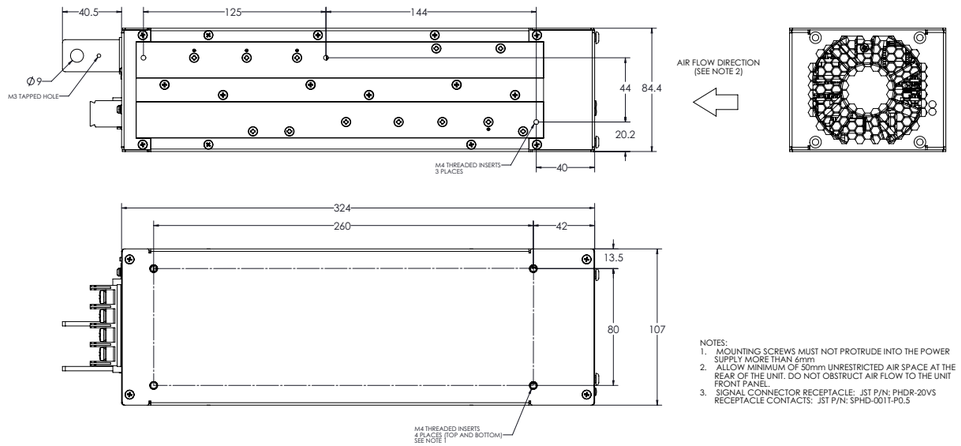
TDK·Lambda TPS3000 Series

Specifications

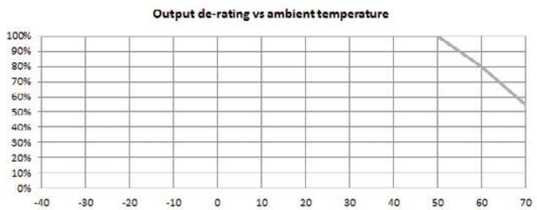
Model	Nominal Voltage (V)	Adjust. Range (V) (4)	Rated Current (A)	Maximum (3) Current (A)	Rated Power (W)	Maximum (3) Power (W)
TPS3000-24	24	19.2 - 28.5	125	133.3	3000	3200
TPS3000-48	48	38.4 - 56.5	66.7	66.7	3200	3200

(3) Rating at nominal output voltage only.
(4) A minimum load of 0.5A is required to maintain regulation and ripple spec throughout the output voltage adjustment range.

Outline Drawing



Derating Curve



Recommended Filter

RTMN-5010



http://us.tdk-lambda.com/lp/products/r-series.htm

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

2000-4080W 3Φ Input Industrial Power Supplies



Features

- 400/440/480 VAC (Nominal) 3 Phase Delta or Wye
- Constant Voltage & Constant Current modes, Fully Regulated
- Wide Range Voltage and Current Programming
- -40°C (start up) to +70°C operation
- Up to 93% Efficiency
- PMBus™ Communication
- Built in ORing FETs & Active I Share for parallel operation
- MIL-STD-461F/G EMC. MIL-STD-810F Vibration / Shock

Key Market Segments & Applications

Industrial COTS Test COMM Broadcast

RoHS

Specifications

Model		TPS4000-12	TPS4000-24	TPS4000-48
Input Voltage (47-63Hz)	VAC	350 - 528VAC, Delta (or Wye) 3 phase		
Input Current	A	8A per phase max, steady state		
Inrush Current	A	<25A per phase (excluding initial spike charging EMI capacitors lasting <2ms)		
Power Factor Correction	-	0.92 typical		
Efficiency (1)	%	TBD	93%	93%
Ripple & Noise (Pk-Pk) (max) (2)	mV	240mV	240mV	480mV
Line Regulation	%	<0.25%		
Load Regulation	%	<0.5%		
Overcurrent Protection	-	Adjustable (70-105% of maximum rated current)		
Overvoltage Protection	V	115% of setpoint (tracking)		
Thermal Protection	-	Internal thermostat. Automatic reset		
Hold Up Time	ms	>10ms at 80% of rated current, nominal input/output voltage		
Remote Sense	-	Compensates for a total of 1V cable drop		
Dropped Phase (2)	-	Open collector signal; off during normal operation, active low during dropped phase state		
Remote On / Off	-	Selectable logic - enable or inhibit		
AC Fail Signal	-	Open Collector, ON when AC input is above 340VAC and unit is enabled		
DC Good Signal	-	Open Collector, ON when output is above 90% of setpoint (tracking)		
Remote Adjust	-	0 - 5V adjusts output from 120% to 80% of nominal		
Parallel Connection (2)	-	Single wire current share, up to 8 units. Built in ORing FETs		
Standby Voltage	-	11.2 - 12.5V, 0.3A		
Operating Temperature	°C	-40 to +70°C, see derating curve (at -40°C, a 10 min. warm up at 80% load required to meet regulation)		
Storage Temperature	°C	-40 to +85°C		
Temperature Coefficient	%/°C	0.02%/°C		
Humidity (non condensing)	%RH	10 - 90%RH		
Cooling	-	Internal variable speed fan		
Withstand Voltage	VAC	Input - Ground 2,000VAC, Input - Output 3,000VAC, Output - Ground 500VDC		
Isolation Resistance	MΩ	Isolation Resistance Input to Output >100MΩ (25deg, 70%RH)		
Vibration	-	Designed to meet MIL-STD-810F, Method 514.5, Proc I, Category 4, 10		
Shock	-	Designed to meet MIL-STD-810F, Method 516.5, Procedure I, IV & VI		
Safety Agency Certifications	-	UL/CSA60950-1, EN60950-1, CE mark for LVD and RoHS2		
Voltage Dips	-	SEMI F47-0706 at 480VAC nominal		
Leakage Current	mA	<2mA		
Conducted & Radiated Emissions	-	EN55032 Class A, FCC part 15 Class A (when inside suitable enclosure) MIL-STD-461F/G RE102 (Navy Ships Below Deck)		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11 MIL-STD-461F/G CS101, CS114 (Army Ground), CS115, CS116		
Altitude	m	4,000m (no additional derating)		
Weight	kg	4.0		
Size (W x H x D)	mm	107 x 85 x 335mm (excluding output busbars)		
Warranty	yrs	Three Years		

(1) Typical, 75-100% at rated current (2) Consult Installation Manual for detailed specifications, test methods and application notes

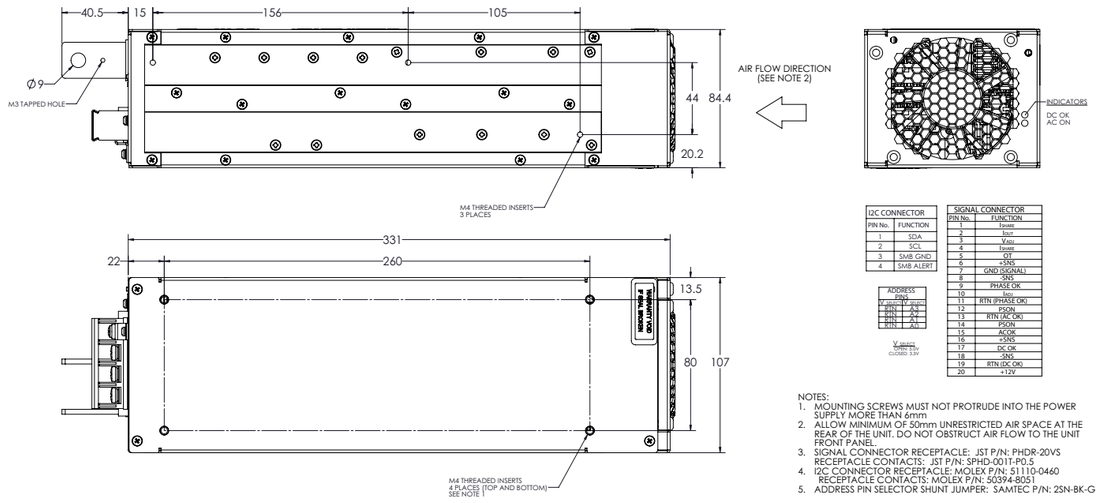
PRELIMINARY

Specifications

Model	Nominal Voltage (V)	Adjust. Range (V) (4)	Rated Current (A)	Maximum (3) Current (A)	Rated (3) Power (W)	Maximum Power (W)
TPS4000-12	12	4.0 - 16	166	170	2000	2720
TPS4000-24	24	4.0 - 29	166	170	4000	4080
TPS4000-48	48	8.0 - 58	83	85	4000	4080

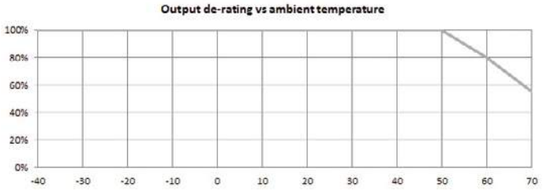
(3) Rating at nominal output only
(4) Minimum 0.5A load required to maintain regulation and ripple specs. Consult manual for <80% output voltage adjustment.

Outline Drawing



NOTES:
1. MOUNTING SCREWS MUST NOT PROTRUDE INTO THE POWER SUPPLY MORE THAN 6mm
2. ALLOW MINIMUM OF 50mm UNRESTRICTED AIR SPACE AT THE REAR OF THE UNIT. DO NOT OBSTRUCT AIR FLOW TO THE UNIT FRONT PANEL.
3. SIGNAL CONNECTOR RECEPTACLE: JST P/N: PHDR-20VS
   RECEPTACLE CONTACTS: JST P/N: SPHD-001T-P0.5
4. I2C CONNECTOR RECEPTACLE: MOLEX P/N: 51110-0460
   RECEPTACLE CONTACTS: MOLEX P/N: 50394-8051
5. ADDRESS PIN SELECTOR SHUNT JUMPER: SAMTEC P/N: 2SN-BK-G

Derating Curve



Special Application Filters, Consult Manual

RTMN-5010

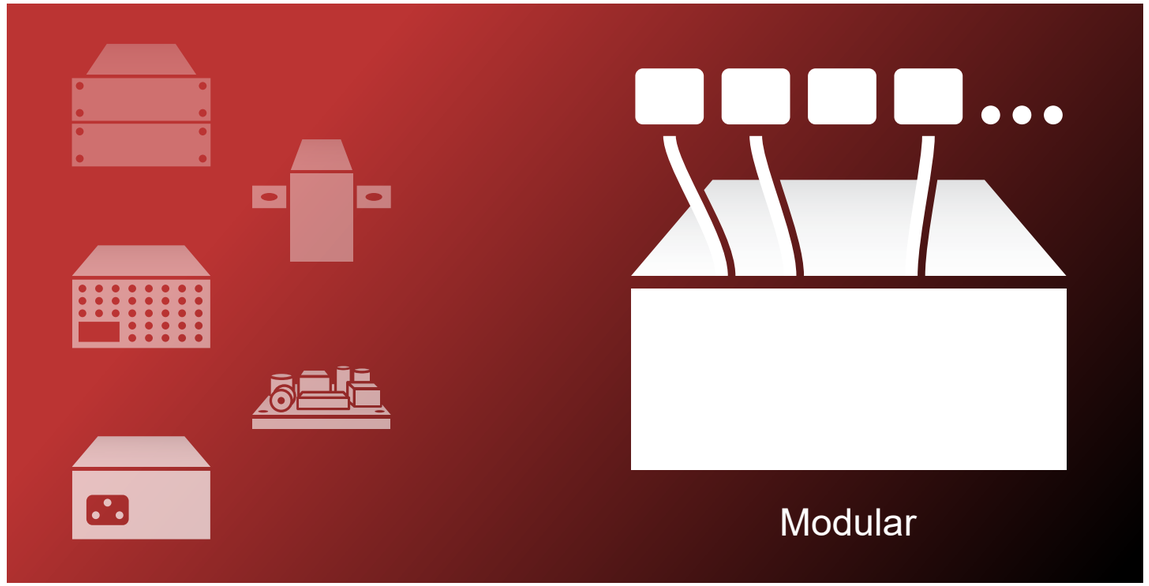


http://us.tdk-lambda.com/lp/products/r-series.htm

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

PRELIMINARY

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
350-1150W	NV350/700	62
450-900W	Vega	64
550-900W	Vega-Lite	66
600W	CM4	68
700-1500W	QM	70

Listed by Wattage

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

Medical Industrial Test COMM Broadcast Renewable

RoHS

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 linearily 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 45C for NV7 when input voltage < 100VAC
(4) See application note for Class B
(5) C, CC, CM modules only
(6) Units with any other module or primary option fitted
(7) Type tested to 4kVAC (equivalent to 5.7VDC), production tested to 4.3 kVDC
(8) CM modules are rated 500VAC output to ground.

1. Configuration Guide

You can create your own NV350 or NV700 configuration online at www.nv-power.com. 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:

			NV3	S	S	S	EN5V
Output Power	NV3 NV7	350W / 660W 250W with reverse air 700W / 1150W					
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 :-
a) Select B as closest match for voltage & current and prefix with voltage eg 5.2B
b) 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: 13.2-15.5V, 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

Medical Industrial Test COMM Broadcast Renewable

RoHS

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

TDK·Lambda Vega Series

Configuring Guide

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

V [A] [B] [C] [D] [E]

Choose the following power supply options.

Primary Options (Leave empty if not required)

F	AC Fail, Global/fan Inhibit, 5V/100mA standby
FV	AC Fail, Global/fan Inhibit, 5V/300mA standby
xFW[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
Single Output			
B1L	1.8-3.8V	20A	1
C1	1.8-4.1V	35A	1
C1Y	1.8-4.1V	40A	1
D1L	1.8-3.8V	50A	1.5
E1	1.8-3.8V	60A	2
F1(6)	1.8-3.8V	80A	2
Z2	1.8-3.8V	95A	3
Z3	1.8-3.8V	114A	4
B1H	3.9-5.5V	20A	1
L1	4.2-5.5V	35A	1
D2	3.8-9V	45A	1.5
D1H	3.9-5.5V	50A	1.5
E2	3.8-8V	60A	2
Z18	4.2-5.5V	66A	2
F2(6)	3.8-8V	75A	2
Z4	3.9-5.5V	95A	3
Z6	3.9-5.5V	104A	3.5
B2	5-9V	25A	1
B3	9.1-16.2V	12A	1
C3	9.1-16.2V	18A	1
D3	8-16.5V	24A	1.5
E3L	8-13.9V	40A	2
Z7	8-16.5V	45A	3
EE2	7.6-16V	45A	4
D4	14-21.5V	18A	1.5
E4	14-19.9V	30A	2
E3H	14-15V	36A	2
C4	16.2-21.5V	14A	1
CC3	18.2-32.4V	18A	2
E5L	20-24V	27A	2
B5	21.6-31V	6A	1
C5	21.6-31V	10A	1
D5	21-28V	15A	1.5
E5H	24-28V	25A	2
Z19(8)	24-28V	36A	3.5
HH5/3	25.3-44.2V	5A	1
DD4	28-43V	18A	3
EE4(8)	28-38	22.5	4
HH5/4	32.5-53V	4.5A	1
BB4	32.6-43V	10A	2
EE5L(8)	40-48	18	4
C5B4	43-48V	10A	2
EE5H(8)	48-56	18	4
CC5	48.1-62V	10A	2
DD5	42-56V	15A	3
Wide Range Programmable*			
W2(6)	1-7.5V	30A	1
W5	0.5-32V	8.5A	1

* Refer to Vega Datasheet

Single Output Module Selection †

Output Options (Leave empty if not required)
Inhibit, module good, and current share: N
Output Connection
Fast on terminals: F
Screw terminals: 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: F
Screw terminals: S
Output Options
Inhibit, module good, and remote sense: N
Remote sense: R
(Leave empty if not required)

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

Full Description Example:
V4FSSFV 5L1S 3.3E1SN 15/15H3/3SR

450W power supply with standard forward air fan, screw terminal input connections, 1.5mA leakage input filter, AC fail with Global/fan inhibit & 5V @ 300mA aux. supply option with the following outputs:
5V @ 35A Screw terminal connections with remote sense standard
3.3V @ 60A Screw terminal connection with output inhibit, module good, and current share options, remote sense standard
15V @ 10A Screw terminal connection with remote sense option (1st half of dual)
15V @ 6A Screw terminal connection with remote sense option (2nd half of dual)
Note the module descriptions are to be used as listed in the module tables.

Model Selector

Module	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

Medical Industrial Test COMM Broadcast Renewable

RoHS

Specifications

Model			VEGA Lite 550	VEGA Lite 750
IInput 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

TDK·Lambda Vega-Lite Series

Configuring Guide

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

V [A] F S [B] [C] Choose the following power supply options.

Primary Options (Leave empty if not required)
- F AC Fail, Global/fan Inhibit, 5V/100mA standby
- E AC Fail, Global/fan Enable, 5V/100mA standby

Input Filter Choice*

	120VAC, 60Hz	240VAC, 60Hz	264VAC, 63Hz (5)
S	564µA	1270µA	1.5mA
L	109µA	246µA	290µA

Output Power
- 5 550W
- 7 750W

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

Vega Output Modules

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				

Vega Output Modules

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

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

Single Output Module Selection †

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

Vout | Module | S | Opt.

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

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

Dual Output Module Selection

V1 / V2 | Module | S | Opt.

Output Options
Inhibit, module good, and remote sense — N

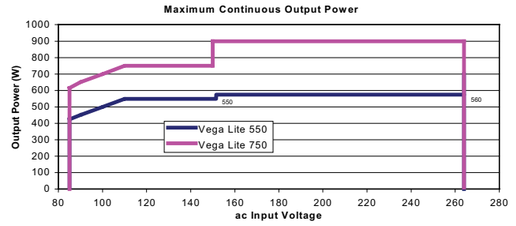
(Leave empty if not required)

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

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

550W power supply with standard forward air fan, screw terminal input connections, 1.5mA leakage input filter, AC fail with Global/fan inhibit & 5V @ 100mA aux. supply option with the following outputs:
5V @ 35A With O/P inhibit, module good & current share options
12V @ 10A
12V @ 6A
24V @ 10A
Note the module descriptions are to be used as listed in the module tables.

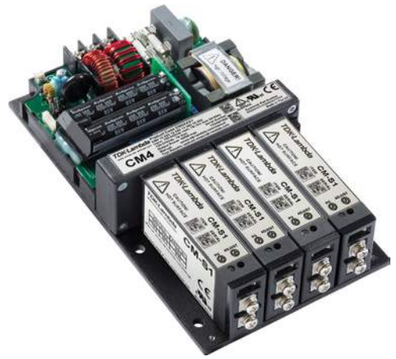
Derating Curve



600W Conduction cooled modular power supplies

Features

- Conduction cooled
- Wide output adjustment
- Compact 4” x 7” Footprint
- 5 year warranty
- MIL-STD-461F, -704F Immunity



Key Market Segments & Applications

Medical Industrial COTS Test COMM Broadcast Renewable

RoHS

Specifications

Model		CM4	
Output power (1)(2)	W	425W	600W (750W for 5s)
Input Voltage Range (1)(2)	VAC	85 - 264VAC	120 - 264VAC
Input Frequency Range	Hz	47 - 63Hz (Contact factory for operation on 400Hz)	
Input Current (Typical)	A	6A at 120VAC input, 600W load	
Inrush Current	A	<20A at 25°C and 264Vac (cold start)	
Leakage Current	µA	200µA maximum at 264Vac 63Hz	
Power Factor Correction	-	Meets EN61000-3-2, PF 0.99 (typ)	
Efficiency	-	Up to 90%, configuration dependent	
Temperature Coefficient	%/ºC	±0.02%/°C	
Output Voltage Setting Accuracy	-	±0.5% of factory set voltage	
Line regulation	-	±0.1% of Vnom for an 85-264Vac input change	
Cross regulation	-	±0.2% of Vnom	
Ripple and Noise	%	1% pk-pk of Vnom, using 20MHz bandwidth	
Overcurrent Protection	-	105 - 125%, hiccup style in short circuit	
Overvoltage Protection	-	Output dependant, see website. Shuts converter down, cycle AC to reset (1)	
Overtemperature Protection	-	All outputs are turned off. After unit cools down, recycle AC or toggle global remote on/off	
Hold up time	ms	Typically 20ms	
Turn on Time	s	2s typical, 3s maximum	
Remote Sense Compensation	-	All modules	
Remote On/Off	-	Module & Converter inhibit (1)	
AC Fail Signal	-	Converter option dependent (1)	
DC Good Signal	-	Individual signal on each output module and a global signal monitoring all outputs	
Minimum load	-	None	
Other signals and programming	-	Over current limit control, remote voltage programming, output current monitor, temperature sense, current share	
Standby Voltage	-	5V 1A	
Operating Temperature (Conduction cooled). See user manual	°C	Ambient: -40°C to +70°C, derate linearly to 50% load from 50 to 70°C Baseplate: -40ºC to +105°C, derate linearly to 50% load from 85 to 105°C	
Storage Temperature	°C	-40 to +70°C	
Humidity (Non condensing)	%RH	5 - 95%RH	
Cooling	-	Conduction, convection or forced air (1)	
Withstand Voltage	-	Input to Output: 4kVAC, (2xMoPP), Input to Ground: 1.5kVAC (1xMoPP), Output to Ground & Output to Output: 500VDC	
Vibration	-	Conforms to EN60068-2-6, IEC60068-2-64, MIL-STD-810G Method 516, Pro 1, Cat 4, 7, 24	
Shock	-	EN 60068-2-27, 30g 18ms operating, MIL-STD-810G: Method 516.6, Procedure IV	
Safety Agency Certifications	-	UL/CSA/EN UL 60950-1, UL/CSA/EN 60601-1, ANSI/AAMI ES60601-1 & CE Mark	
Altitude	m	Operational: 3,000m, storage: 5,000m	
Emissions (1)	-	EN55011/32 Class B radiated and conducted,	
Immunity (1)	-	IEC61000-4-2, -3, -4, -6, 8, -11. MIL-STD-461F, EN60601-1-2 (4th Ed)	
Size (W x D x H)	in mm	4 x 7 x 1.61” 101.6 x 177.8 x 41 mm	
Weight	g	650g + 100g for each slot used	
Warranty	Yrs	Five Years	

Notes

(1) See website for detailed specifications (2) Converter and module power must be de-rated by 2.5% for every 3 volts below 120VAC, down to a minimum of 85VAC

TDK·Lambda CM4 Series

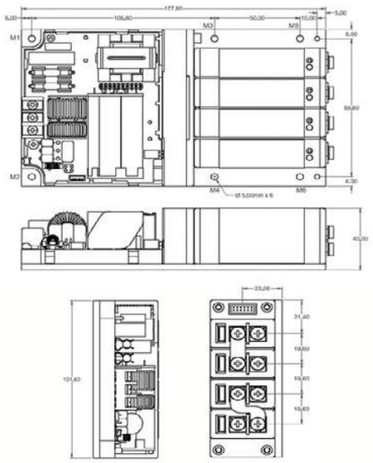
Output Ratings

Module	S1	S2	S3	S4
Vnom	5V	12V	24V	48V
Load regulation (0-100% change)	±50mV	±100mV	±150mV	±300mV
Over voltage protection (typical)	9.5V	18V	36V	66V
Module	**Y1 / HA**	**Y2 / HB**	**Y3**	**Y4**
Vnom	10V	24V	48V	96V
Load regulation (0-100% change)	±100mV	±200mV	±300mV	±600mV
Over voltage protection (typical)	19V	36V	72V	132V
Module	**YA**	**YB**	**YC**	**YD**
Vnom	15V	36V	72V	144V
Load regulation (0-100% change)	±150mV	±300mV	±450mV	±900mV
Over voltage protection (typical)	28.5V	54V	108V	198V
Module	**YN**	**YP**	**YQ**	**YR**
Vnom	20V	48V	96V	192V
Load regulation (0-100% change)	±200mV	±400mV	±600mV	±1200mV
Over voltage protection (typical)	38V	72V	144V	264V
Module	**Z1 / ZA / ZN**	**Z2 / ZB / ZP**	**ZC / ZQ**	**ZD / ZR**
Vnom	5V	12V	24V	48V
Load regulation (0-100% change)	±50mV	±100mV	±150mV	±300mV
Over voltage protection (typical)	9.5V	18V	36V	66V

Output Ratings

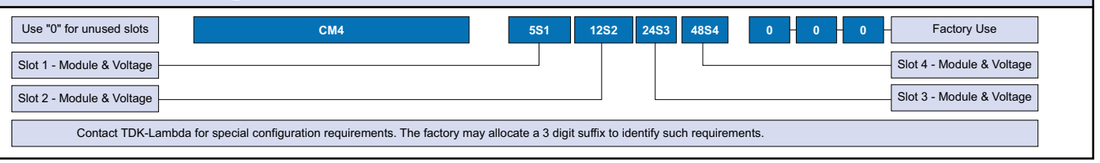
Module Name	Slots Used	Output Voltage Min	Vnominal	Max	Max Output (A)	Max Output Power (W)	Max Peak Power (W) (5s)
S1	1	1.5V	5V	7.5V	25A	125W	187.5W
Z1	2	1.5V	5V	7.5V	50A	250W	375W
ZA	3	1.5V	5V	7.5V	75A	375W	562.5W
ZN	4	1.5V	5V	7.5V	100A	500W	750W
Y1	2	3V	10V	15V	25A	250W	375W
HA	4	3V	10V	15V	50A	500W	750W
S2	1	4.5V	12V	15V	15A	150W	225W
Z2	2	4.5V	12V	15V	30A	300W	450W
YA	3	4.5V	15V	22.5V	25A	375W	562.5W
ZB	3	4.5V	12V	15V	45A	450W	675W
ZP	4	4.5V	12V	15V	60A	600W	750W
YN	4	6V	20V	30V	25A	500W	750W
S3	1	9V	24V	30V	7.5A	150W	225W
Y2	2	9V	24V	30V	15A	300W	450W
ZC	3	9V	24V	30V	22.5A	450W	675W
HB	4	9V	24V	30V	30A	600W	750W
ZQ	4	9V	24V	30V	30A	600W	750W
YB	3	13.5V	36V	45V	15A	450W	675W
S4	1	18V	48V	58V	3.75A	150W	217.5W
Y3	2	18V	48V	60V	7.5A	300W	450W
ZD	3	18V	48V	58V	11.25A	450W	652.5W
ZR	4	18V	48V	58V	15A	600W	750W
YP	4	18V	48V	60V	15A	600W	750W
YC	3	27V	72V	90V	7.5A	450W	675W
Y4	2	36V	96V	116V	3.75A	300W	435W
YQ	4	36V	96V	120V	7.5A	600W	750W
YD	3	54V	144V	174V	3.75A	450W	652.5W
YR	4	72V	192V	232V	3.75A	600W	750W

Outline Drawing



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

Part Number Configuration



700-1500W Multiple Output Modular Power Supplies

Features

- Full Medical Isolation (MOPP)
- Low Speed, Low Audible Noise Fan
- Up to 18 Outputs
- Industry Leading Flexibility
- 7 Year Warranty
- Suitable for B and BF Rated Equipment
- PMBus™ Communication Option



Key Market Segments & Applications

Medical Industrial Test COMM Broadcast Renewable

PMBus RoHS

Specifications

Model		QM5	QM5H	QM7	QM8
Input Voltage Range	VAC	700W output: 90 - 264VAC 800W output: 180 - 264VAC	700W output: 90 - 264VAC 1200W output: 180 - 264VAC	1200W output: 90 - 264VAC 1500W output: 150 - 264VAC	1200W output: 90 - 264VAC 1500W output: 150 - 264VAC
Input Frequency Range	Hz	47 - 63Hz (440Hz with reduced PFC)			
Inrush Current	A	<40A at 25°C and 264Vac (cold start)		<45A at 25°C and 264Vac (cold start)	
Input Current (Max) 90/150VAC	A	9A / 6.2A	9A / 9.25A	15.7A / 11.8A	15.7A / 11.8A
Touch Current	µA	<100µA (with 4 or fewer modules) (1)			
Power Factor Correction	-	> 0.95 (at 100% load), Meets EN61000-3-2			
Efficiency	-	up to 91% , 240VAC & above 50% rated power, configuration dependent			
Overcurrent Protection	-	Hiccup/constant current style - Module dependent (1)			
Overvoltage Protection		Latching. Output shut down, cycle AC to reset (1)			
Overtemperature Protection	-	Converter: auto restart (fan off); Modules: individually protected			
Hold up time	ms	700W output: >16ms; 1200W output: >10ms		1200W output: >20ms; 1500W output: >16ms	
Leakage Current (maximum)	µA	L option: 300µA; R option: 150µA (264VAC, 63Hz)			
Remote Sense Compensation	-	Module dependent (1)			
Remote On/Off	-	Module & Converter option dependent (1)			
AC Fail Signal	-	Available with all Signal Option Types			
DC Good Signal	-	Open collector, standard on all output modules			
Remote on/off	-	Converter: Inhibit or Enable (Signal Option Type dependent). Modules: Inhibit.			
PMBus™ Interface	-	Power supply on/off, fan speed/warning, temperature read back/warning, run time and manufacturing data			
Standby Output	-	5V/250mA / 5V/2A / 12V/1A (Standby Option Type dependent)			
Operating Temperature	°C	-20 to +70°C, derate linearly to 50% load from 50 to 70°C; -40°C start up.			
Storage Temperature	°C	-40°C to +70°C (max 12 months)			
Humidity (Non condensing)	%RH	5 - 95%RH			
Cooling	-	One variable, low speed internal fan		Two variable, low speed internal fans	
Audible Noise	dBA	QM5F: 40.3 dBA @ 25°C / 54.9 dBA @ 50°C QM5I: 36.9 dBA @ 25°C / 51 dBA @ 50°C, per BS ISO 3744:2010		43.6 dBA @ 25°C / 57.3 dBA @ 50°C per BS ISO 3744:2010	
Withstand Voltage	-	Input to Output: 4kVAC (production tested to 4.3kVDC) (2xMoPP), Input to Ground: 1.5kVAC (1xMoPP), Output to Ground: 1.5kVAC (1xMoPP), Output to Output: 200VDC			
Vibration	-	Conforms to EN60068-2-6, IEC68-2-6, MIL-STD-810G, Method 514.6, Pro I			
Shock	-	Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987, MIL-STD-810G, Method 516.6, Pro I, IV			
Safety Agency Certifications	-	IEC/UL/CSA/EN 60950-1, IEC/UL/CSA/EN 60601-1, ANSI/AAMI ES60601-1 & CE Mark. IEC/EN61010 included in 60950 report			
Altitude	m	5,000m			
Emissions	-	EN61000-6-3:2007, EN60601-1-2:2015 4th Edition, EN55011B, EN55032B, Class B radiated & conducted			
Immunity	-	EN61000-6-2:2005, EN60601-1-2:2015			
Size (W x H x D)	in mm	5 x 2.5 x 10.6” 127 x 63.3 x 270mm	5 x 2.5 x 10.6” 127 x 63.3 x 270mm	6.9 x 2.5 x x10.6” 176 x 63.3 x 270mm	7.9 x 2.5 x 10.6” 200 x 63.3 x 270mm
Weight	g	See Application Notes			
Warranty	yrs	Seven Years			

(1) See website for detailed specifications

TDK·Lambda QM Series

Single Output Modules

Module	V1 Voltage Range	Current	Power	Slots Used
DM	2.8 - 3.8V	10A	35W	1
SB	3.3 - 3.63V	37A	122W	1
DM	4.25 - 5.75V	10A	50W	1
SB	5 - 5.5V	30A	150W	1
SC	5 - 5.5V	60A	300W	2
ZD	5 - 5.3V	80A	400W	3
ZF	5 - 5.3V	110A	550W	4
YC	6.6 - 7.48V	37A	276W	2
YC	10 - 11V	30A	300W	2
YF	10 - 11V	60A	600W	4
DM	11.9 - 16.1V	10A	120W	1
SB	12 - 13.2V	25A	300W	1
SC	12 - 13.2V	50A	600W	2
ZD	12 - 12.8V	65A	780W	3
ZF	12 - 12.8V	90A	1080W	4
SB	15 - 16.5V	20A	300W	1
ZC	15 - 16V	36A	510W	2
SB	18 - 19.8V	16.7A	300W	1
ZC	18 - 19.2V	30A	540W	2
YB	20.4 - 27.6V	9.8A	200W	1
DM	20.8 - 28.2V	5A	120W	1
SB	24 - 26.4V	12.5A	300W	1
SC	24 - 26.4V	25A	600W	2
ZD	24 - 25.6V	30A	720W	3
YF	24 - 26.4V	50A	1200W	4
YB	27.6 - 34.5V	7.25A	200W	1
SB	28 - 30.8V	10.7A	300W	1
ZC	28 - 30V	19.3A	504W	2
YC	30 - 33V	20A	600W	2
YC	36 - 39.6V	16.6A	600W	2
YB	40.8 - 55.2V	4.9A	200W	1
YC	48 - 52.8V	12.5A	600W	2
YF	48 - 52.8V	25A	1200W	4
SB	48 - 52.8V	6.25A	300W	1
SC	48 - 52.8V	12.5A	600W	2
ZD	48 - 51.2V	15A	720W	3
YB	55.2 - 62V	3.62A	200W	1
YC	56 - 61.6V	10.7A	600W	2
YF	72 - 79.2V	16.6A	1200W	4
YC	96 - 105.6V	6.25A	600W	2
YF	96 - 105.6V	12.5A	1200W	4

Dual Output Modules (all single slot)

Maximum module power 200W (Total power from channel 1 + Channel 2)

Module	V1 Voltage Range	V1 Current	V1 Power	V2 Voltage Range	V2 Current	V2 Power
DH	10.2 (1) - 13.8V	10A	120W	10.2 - 13.8V	10A	120W
DH	10.2 (1) - 13.8V	10A	120W	12.75 - 17.25V	8A	120W
DH	10.2 (1) - 13.8V	10A	120W	20.4 - 27.6V	5A	120W
DM	11.9 - 16.1V	10A	120W	2.8 - 3.8V	10A	35W
DM	11.9 - 16.1V	10A	120W	4.25 - 5.75V	10A	50W
DM	11.9 - 16.1V	10A	120W	11.9 - 16.1V	8.3A	100W
DM	11.9 - 16.1V	10A	120W	23.5 - 24.5V	4.16A	100W
DH	12.75 (2) - 17.25V	8A	120W	12.75 - 17.25V	8A	120W
DH	12.75 (2) - 17.25V	8A	120W	20.4 - 27.6V	5A	120W
DH	20.4 (3) - 27.6V	5A	120W	20.4 - 27.6V	5A	120W
DM	20.8 - 28.2V	5A	120W	2.8 - 3.8V	10A	35W
DM	20.8 - 28.2V	5A	120W	4.25 - 5.75V	10A	50W
DM	21.6 - 28.2V	5A	120W	23.5 - 24.5V	4.16A	100W
DH	23 (4) - 31V	4.4A	120W	23 - 31V	4.3A	120W

Note: For DH module voltages below 10.8V(1), 13.5V(2), 21.6V(3), and 24.4V(4), a minimum load of 1W must be applied to channel 1. See long form datasheet for max capacitive load ratings.

Standby / Signals Options

Option Type	Standby 1 Voltage	Max Current	Power	Standby 2 Voltage	Max Current	Power	PSU on/off
E5L	5V	250mA	1.25W	Not available			Enable
E5H	5V	250mA	1.25W	5V	2A	10W	Enable
E12H	5V	250mA	1.25W	12V	1A	12W	Enable
T5L	5V	250mA	1.25W	Not available			Inhibit
T5H	5V	250mA	1.25W	5V	2A	10W	Inhibit
T12H	5V	250mA	1.25W	12V	1A	12W	Inhibit
P5H	Not available			5V	2A	10W	*

*see PMBus™ App Note

Output Module Signals

See Long Form datasheet output module specifications for Module Good, Module Inhibit, Remote Sense availability.

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

The extensive range of output modules and options make it possible to achieve almost any combination of Volts and Amps.
Create your own QM configuration online at https://config.emea.tdk-lambda.com
This method checks your configuration and offers the optimum solution.

Converter / Output Module Configurations

Converter Configurations

QM5	F	S	D	L	T5H

Converter	QM5	5 slots wide 700W low line, 800W high line
	QM5H	5 slots wide 700W low line 1200W high line
	QM7	7 slots wide 1200W low line, 1500W high line
	QM8	8 slots wide 1200W low line, 1500W high line

Cooling	F	Variable speed Forward air - standard
	R	Reverse air (contact sales for details)
	C	Customer air - no fan

Input Connection	S	Screw
	I	IEC320 (QM5/QM5H only)

Input fuse	D	Dual AC fuses
	E	Single AC fuse in Live line (contact sales for details)

Standby/ Signals	blank	none
	E5L	5V / 250mA, Enable
	E5H	5V / 2A, 5V / 250mA, Enable
	E12H	12V / 1A, 5V / 250mA, Enable
	T5L	5V / 250mA, Inhibit
	T5H	5V / 2A, 5V / 250mA, Inhibit
	T12H	12V / 1A, 5V / 250mA, Inhibit
	P5H	5V / 2A, see PMBus™ app note

See Long Form datasheet for Standby / Signals specifications

Leakage Current (max leakage current at 264 VAC, 63Hz)	L	300µA
	R	150µA (contact sales for details)

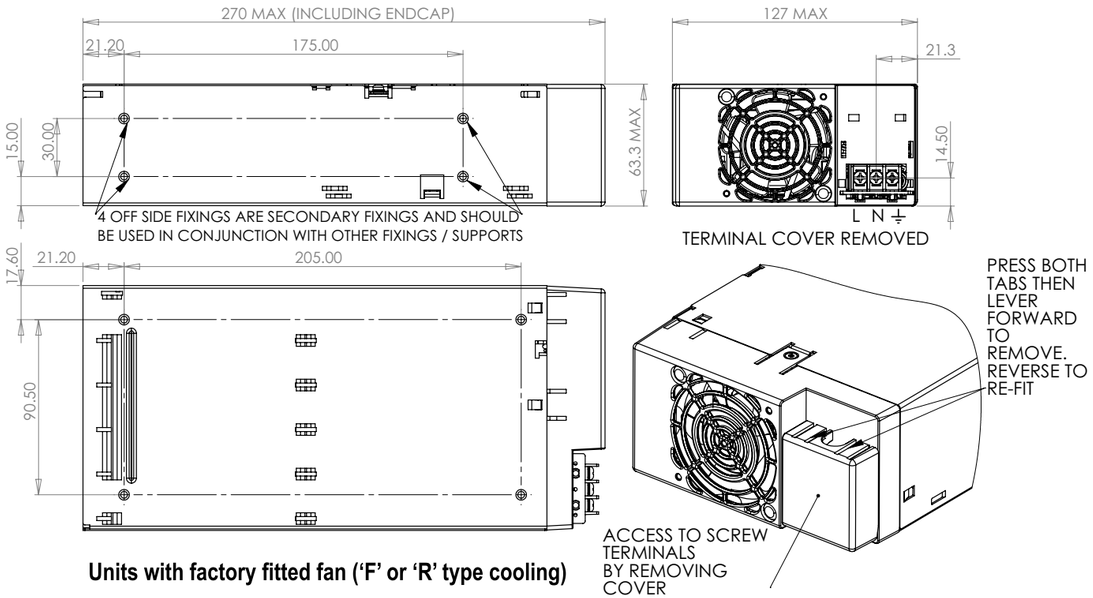
Single Output Module Configurations

Required output voltage	V1	SB	S	Output connection	S	Screw terminal

Dual Output Module Configurations

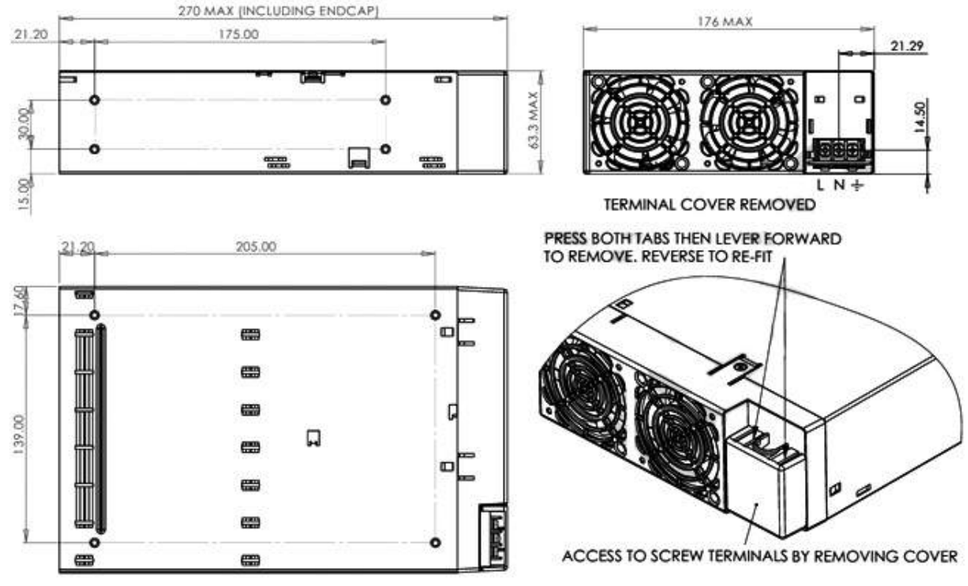
Output 1 required voltage (enter 0 if not required)	V1	/	V2	DM	S	Output connection	S	Screw terminal
Output 2 required voltage (enter 0 if not required)				Module type				

QM5 Outline Drawing with Factory Fitted Fan (‘F’ or ‘R’ type cooling)

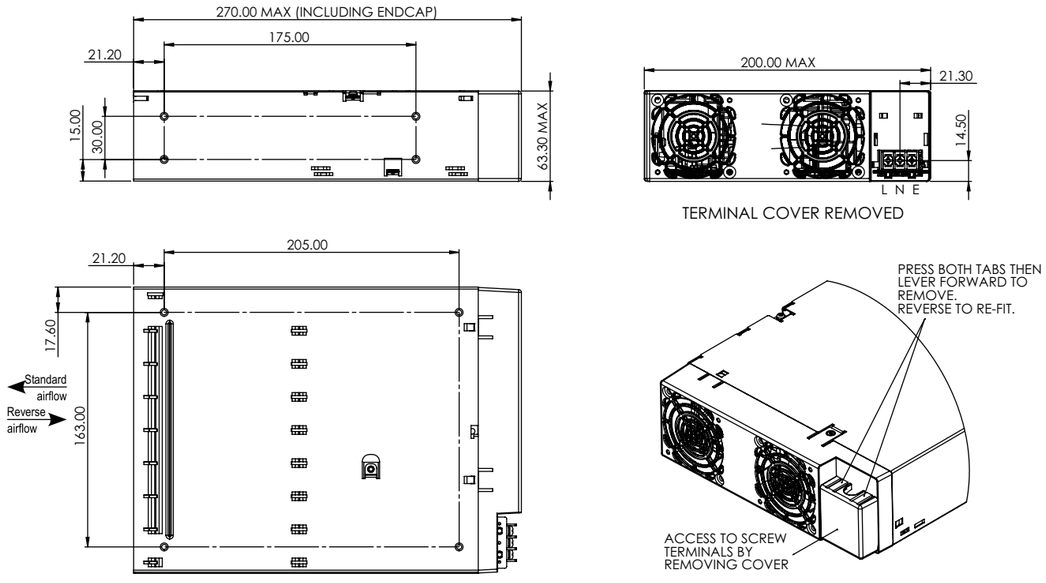


Units with factory fitted fan (‘F’ or ‘R’ type cooling)

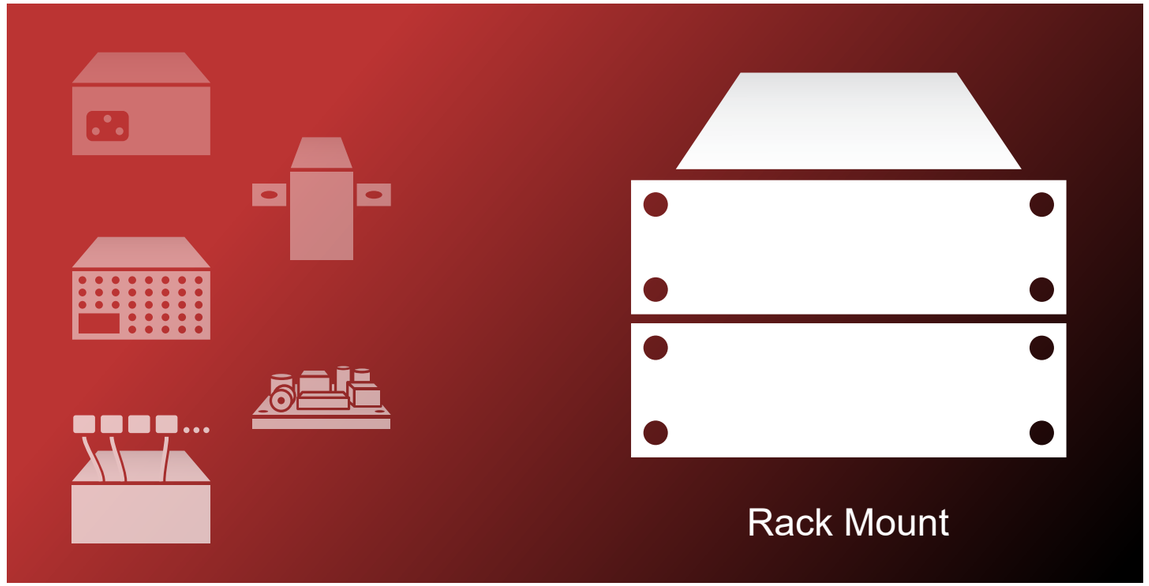
QM7 Outline Drawing with Factory Fitted Fan (‘F’ or ‘R’ type cooling)



QM8 Outline Drawing with Factory Fitted Fan (‘F’ or ‘R’ type cooling)



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
1600W	HFE1600	76
2500W	HFE2500	78

Also see:

200-800W	Z+	220
200-800W	Z+ HV	222

Listed by Wattage

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
- PMBus™(I²C) and LAN options



Key Market Segments & Applications

Industrial COTS Test COMM Broadcast

PMBus RoHS

Specifications

Model			
Input Voltage Range	(2)	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating
Input Current (Max) 115/230VAC		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, 115/230VAC 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, up to 90% accuracy (load dependant), 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
I²C 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 2250VDC 1 min, (POE)
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, EN60950-1, CE Mark
Line Dip		-	Complies with SEMI F47 (200VAC line only)
Conducted and Radiated EMI		-	EN55032 & 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

TDK·Lambda HFE1600 Series

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

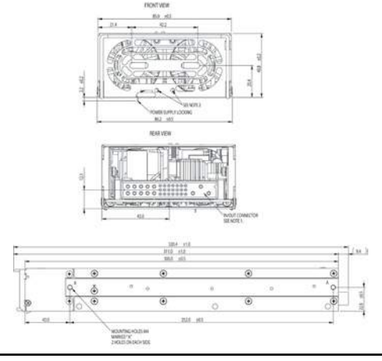
Model	Load Reg	Line Reg	Ripple & Noise(1)	Efficiency (%)(4)	PMBus/ I²C
HFE1600-12	60mV	30mV	240mV	87 / 90%	-
HFE1600-12/S	60mV	30mV	240mV	87 / 90%	Yes
HFE1600-24	120mV	60mV	240mV	88 / 90%	-
HFE1600-24/S	120mV	60mV	240mV	88 / 90%	Yes
HFE1600-32	160mV	80mV	320mV	88 / 90%	-
HFE1600-32/S	160mV	80mV	320mV	88 / 90%	Yes
HFE1600-48	240mV	120mV	480mV	89 / 92%	-
HFE1600-48/S	240mV	120mV	480mV	89 / 92%	Yes

(4) At 75% load, 115 / 230VAC input

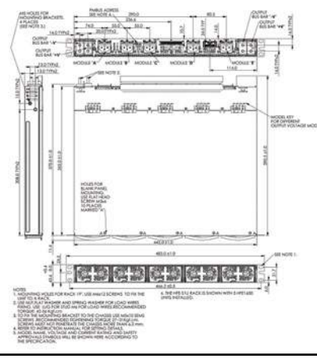
Accessories

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)
HFE1600-LAN	Plug in LAN module. Takes up one rack slot. For use with /S models only.	-

Outline HFE1600



Outline HFE1600S1U



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
- PMBus™(I²C) and LAN options



Key Market Segments & Applications

Industrial COTS Test COMM Broadcast

PMBus 80 PLUS PLATINUM RoHS

(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, up to 95% accuracy (load dependant), 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
I²C 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 2250 VDC 1min, (POE)
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, EN60950-1, CE Mark
Conducted and Radiated EMI		-	EN55032 & 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

TDK·Lambda HFE2500 Series

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

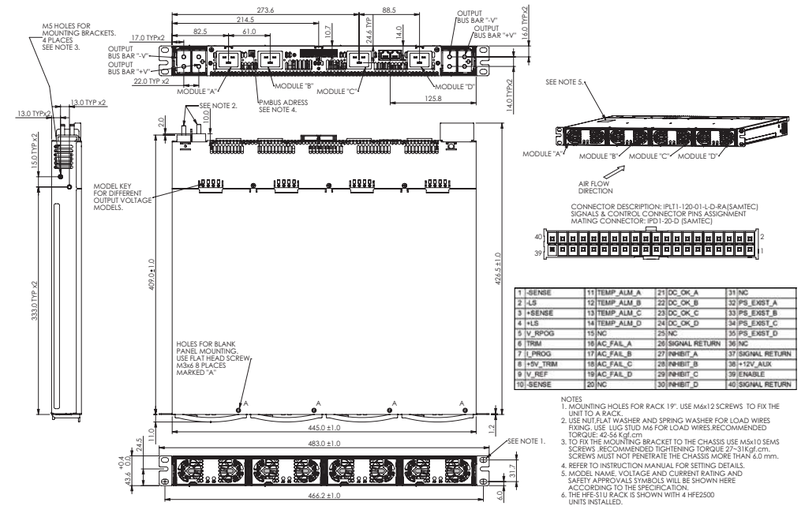
Model	Load Reg	Line Reg	Ripple & Noise(1)	Efficiency (%)(4)	PMBus/ I²C
HFE2500-12	60mV	30mV	240mV	90 / 92%	-
HFE2500-12/S	60mV	30mV	240mV	90 / 92%	Yes
HFE2500-24	120mV	60mV	240mV	90 / 92%	-
HFE2500-24/S	120mV	60mV	240mV	90 / 92%	Yes
HFE2500-48	240mV	120mV	480mV	91 / 93%	-
HFE2500-48/S	240mV	120mV	480mV	91 / 93%	Yes

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

Accessories

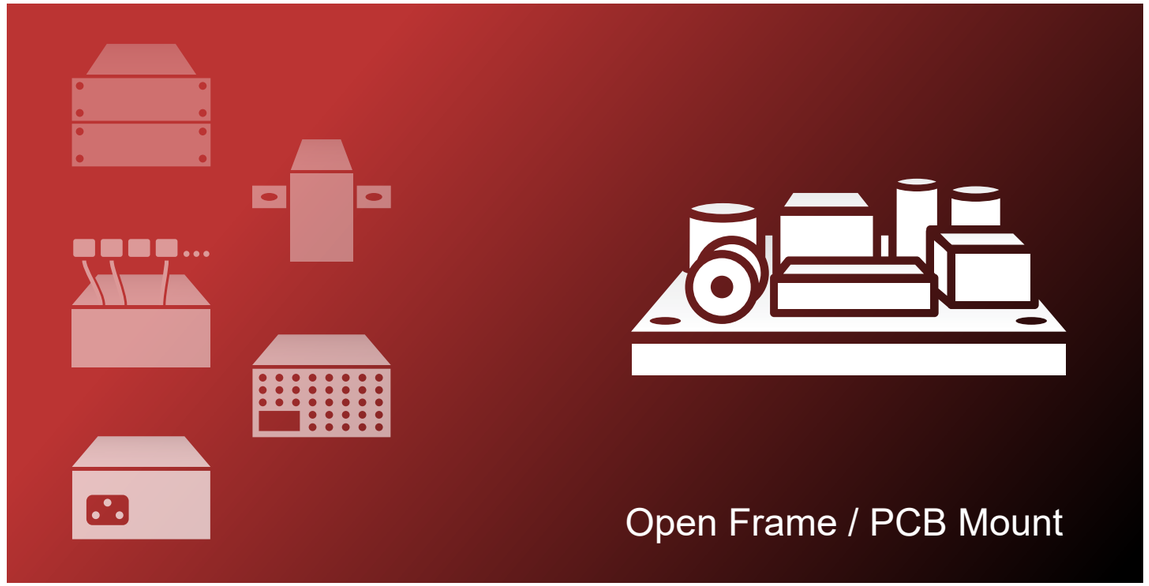
Model	Description	Maximum Rack Current
HFE2500-S1U	Four slot 19” rack, IEC320-C20 input connector	320A each side (640A total)
HFE2500-S1U-TB	Four slot 19” rack, Terminal Block input connector	320A each side (640A total)
HFE2500/BP	One slot blanking panel, two provided with each rack	-
HFE2500-LAN	Plug in LAN module. Takes up one rack slot. For use with /S models only.	-

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

TDK·Lambda Open Frame / PCB Mount

Wattage	Series	Page
2-4W	KAS	82
4-15W	KPSA	84
5-25W	KWSA	86
10-30W	ZWS10-30B	88
15-40W	KM	90
15-60W	KMS-A	92
30-60W	CUS30/60M	94
33-150W	ZWS50-150BAF	96
35W	CUT35	98
75W	CUT75	100
100W	CUS100ME	102
150W	CUS150M	104
175-200W	NV175	106
200-250W	CUS200M	108
240W	ZWS240RC-24	110
300-1000W	PFE300SA-1000F	112
300W	ZWS300BAF	114
500W	PFH500F	116

Listed by Wattage

2-4W Wide AC-DC Input PCB-Mount Power Supplies

Features

- 90 - 305VAC Input Voltage
- Class II (No ground needed)
- Wide Temperature Range (-40 to +80°C)
- Low off-load Power Draw
- High Efficiency



Key Market Segments & Applications

Industrial Test COMM Broadcast

RoHS

Specifications

Model		KAS2	KAS4
Input Voltage Range	-	90-305VAC 47-63Hz or 120-430VDC*	90-305VAC 47-440Hz or 120-430VDC*
Inrush Current Limiting (115 / 230VAC) (1)	A	30 / 50A	15 / 25A
Input Current (115 / 230VAC)	mA	75 / 55mA	110 / 70mA
Off-load Power Draw	W	<0.3W	
Recommended External Fuse	-	3.15 A slow blow type	
Temperature Coefficient	-	±0.02%/°C	
Voltage Set Accuracy	%	±6%	±2%
Minimum Load	-	None	
Overcurrent Protection	-	Hiccup mode, automatic recovery	
Overvoltage Protection	%	No	
Hold-up Time (115 / 230VAC)	ms	>15ms	
Leakage Current (Touch)	mA	<0.25mA at <240VAC	
Operating Temperature	-	-40°C to +80°C, derate linearly to 40% load from 60°C to 80°C	-40°C to +70°C, derate linearly to 40% load from 50°C to 70°C (2)
Storage Temperature	-	-40°C to +85°C	
Humidity	%RH	10% to 95% RH (non-condensing)	
Cooling	-	Convection	
Withstand Voltage	VAC	Input to output: 3kVAC	
Immunity	-	EN55024 (With external varistor L-N rated at 350Vrms maximum, 920V clamp, 0.6W minimum)	
Safety Agency Certification	-	UL/CSA/IEC/EN 60950-1, IEC/EN60335-1 (Designed to meet), CE Mark	
Conducted and Radiated EMI	-	EN55032 Class B	
Weight	g	19.9g	26g
Size (LxWxH)	in (mm)	1.12 x 1.02 x 0.67" 28.5 x 25.8 x 17.0 mm	1.46 x 1.08 x 0.69" 37.0 x 27.5 x 17.5 mm
Mounting & Case	-	PC board mountable. Resin case (UL 94V-0)	
MTBF (MIL-HDBK-217F)	hrs	>450,000 hours	
Warranty	yrs	3 years	

Notes

(1) Cold start, 25ºC ambient. Requires 10Ω 5A external NTC thermistor

(2) Model dependent, see installation manual for details

* Safety certified for AC input, 47-63Hz only

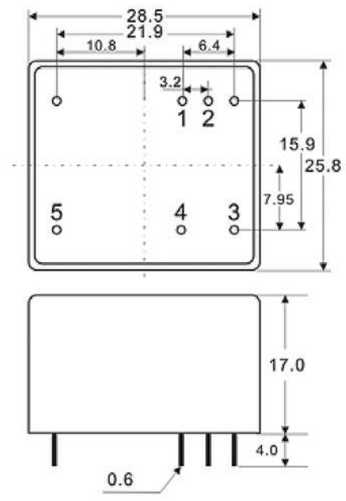
TDK·Lambda KAS Series

Model Selector

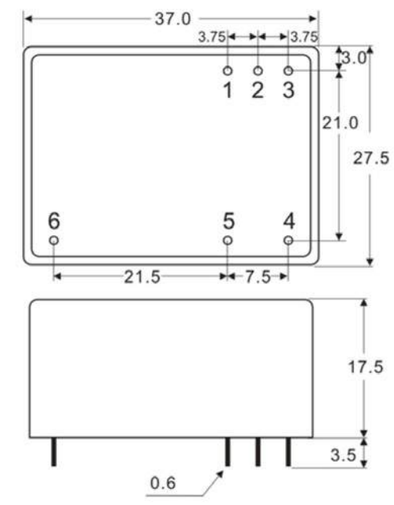
Model		Output Voltage (V)	Maximum Current (A)	Power (W)	Output Ripple & Noise (mV)	Line Regulation (mV)	Load Regulation (typ) (3)	Efficiency (%)	Maximum Capacitive Load (µF)
KAS2-3P3	V1	3.3V	0.6A	2W	300mV	±165mV	±198mV	66%	7000
KAS4-3P3	V1	3.3V	1.2A	4W	250mV	±16.5mV	±49.5mV	68%	5000
KAS2-5	V1	5V	0.4A	2W	300mV	±250mV	±300mV	70%	4000
KAS4-5	V1	5V	0.8A	4W	250mV	±25mV	±75mV	72%	4200
KAS4-8	V1	8V	0.5A	4W	200mV	±40mV	±120mV	74%	1470
KAS2-9	V1	9V	0.22A	2W	300mV	±450mV	±540mV	73%	1200
KAS4-9	V1	9V	0.444A	4W	200mV	±45mV	±135mV	75%	1330
KAS2-12	V1	12V	0.167A	2W	300mV	±600mV	±720mV	73%	500
KAS4-12	V1	12V	0.333A	4W	150mV	±24mV	±60mV	76%	680
KAS4-14	V1	14V	0.286A	4W	150mV	±28mV	±70mV	76%	470
KAS2-15	V1	15V	0.133A	2W	300mV	±750mV	±900mV	73%	350
KAS4-15	V1	15V	0.267A	4W	100mV	±30mV	±75mV	76%	330
KAS2-24	V1	24V	0.083A	2W	300mV	±1200mV	±1440mV	75%	110
KAS4-24	V1	24V	0.167A	4W	100mV	±48mV	±120mV	77%	120

Notes: (3) KAS2 10-100% load change

KAS2



KAS4



Pinout

PIN #	KAS2	KAS4
1	+Vout	+Vout
2	-Vout	-Vout
3	Neutral	Not connected
4	Line	Line
5	Not connected	Neutral
6	-	Not connected

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

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

Industrial Test COMM Broadcast

RoHS

Specifications

Model			KPSA-5	KPSA-10	KPSA-15
Input Voltage range		-	85 - 264VAC (47 - 63Hz) 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		

*Safety certified for AC input only.

Notes:

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

(2) 20CFM forced air ratings:
KPSA5: 0 - 70°C full load
KPSA10: 0 - 70°C full load (3.3V & 5V models derate linearly to 80% load from 50 to 70°C)
KPSA15: 0 - 70°C derate linearly to 80% load from 50 to 70°C

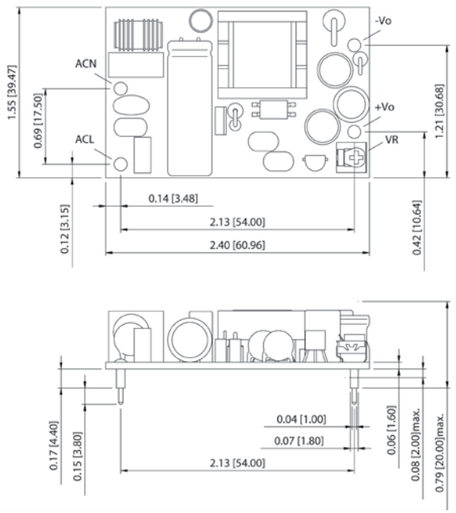
TDK·Lambda KPSA Series

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	4.0	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

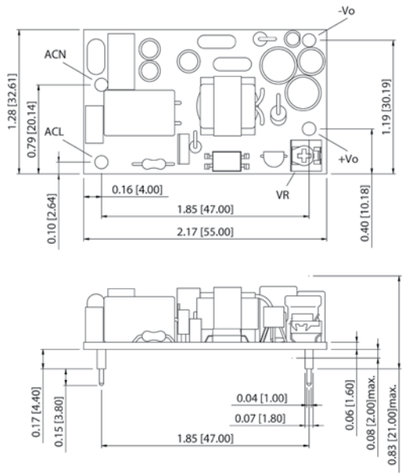


Other Industrial Products

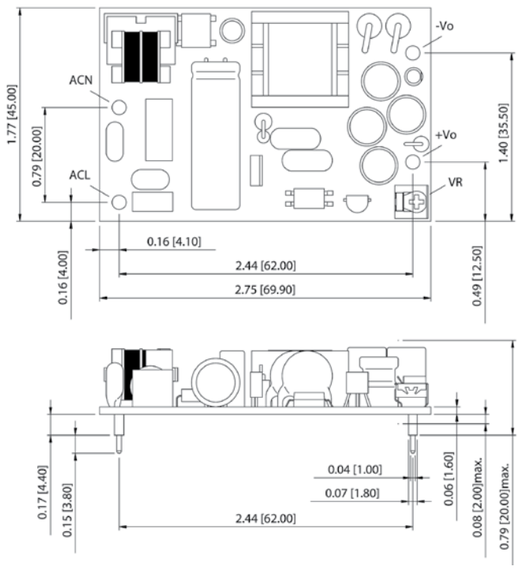
ZPSA	20W to 60W
KM	15 to 40W pcb mount medical
ZWS	5 to 240W, single output

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

KPSA5 Outline Drawing



KPSA15 Outline Drawing



Single Output 5W to 25W AC-DC PCB-Mount Power Supplies

Features

- Wide Temperature Range -40 (start up) to +85°C
- <0.5W Off-Load Power Draw
- Efficiencies up to 88%
- Compact Sizes
- Class II, No Ground Connection



Key Market Segments & Applications

Industrial Test COMM Broadcast

RoHS

Specifications

Model		KWS5A	KWS10A	KWS15A	KWS25A
AC Input Voltage	VAC	85 - 265VAC(1)			
Input Frequency	Hz	47 - 440Hz			
DC Input Voltage	VDC	120 - 370VDC (No safety certification)			
Inrush Current (cold start)	A	15A at 100VAC, 30A at 200VAC			
Power Factor	-	Meets EN61000-3-2			
Input Current (100/200VAC)	A	0.13 / 0.07A	0.25 / 0.13A	0.33 / 0.24A	0.56 / 0.34A
Output Voltage Accuracy	%	±5%			
Off-load Power Draw	W	<0.5W			
Temperature Coefficient	%/°C	<0.02%/°C			
Overcurrent Protection	-	>103% of rated current			
Overvoltage Protection	V	5V: 5.75 - 7V, 12V: 13.8 - 18.3V, 15V: 17.25 - 22.4V, 24V: 27.6 - 34V			
Hold Up Time (100 / 200V input)	ms	15 / 45ms	10 / 30ms		
Leakage Current	mA	<0.25mA at 265VAC, 60Hz			
Operating Temperature (2)	°C	-40°C start-up; -10 to +85°C. Derate linearly to 10% load from +55 to +85°C (2)			
Storage Temperature	°C	-40 to +85°C			
Humidity (non condensing)	%RH	30 - 90%RH Operating, 20 - 95%RH Storage			
Cooling	-	Convection Cooled			
Withstand Voltage	VAC	Input to Output 3kVAC			
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Input to Output 500VDC			
Vibration (non operating)	-	10 - 55Hz: 1.65mm p-p (Max 10G) sweep for 1 min X, Y, Z for 1 hour			
Shock	-	< 50G for 11 ±5ms on (X,Y,Z) each axis 3 times			
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11; IEC61000-6-2			
Safety Agency Certifications	-	EN60950-1, UL/CSA60950-1, CE Mark LVD & RoHS2			
Conducted & Radiated EMI	-	EN55011-A, EN55022-A, FCC Class A (Requires external X capacitor to meet -B)			
Weight (Typ)	g	35	35	60	85
Size (LxWxH)	mm	38.1 x 25.4 x 21.5mm		50.8 x 25.4 x 24mm	63.5 x 25.4 x 29mm
MTBF - Telcordia SR-332 issue 3*	Hours	14,416,059	7,784,121	8,202,502	5,747,627
Warranty	yrs	Three Years			

Notes:

* 24V output model, 25°C ambient, full load, 230VAC input
(1) Derate to 80% load from 100 to 85VAC input (KWS5A 90% load from 90 to 85VAC)
(2) KWS10A-5, KWS15A-5, KWS25A-5: Derate linearly to 10% load from +45 to +85°C

TDK·Lambda KWS-A Series

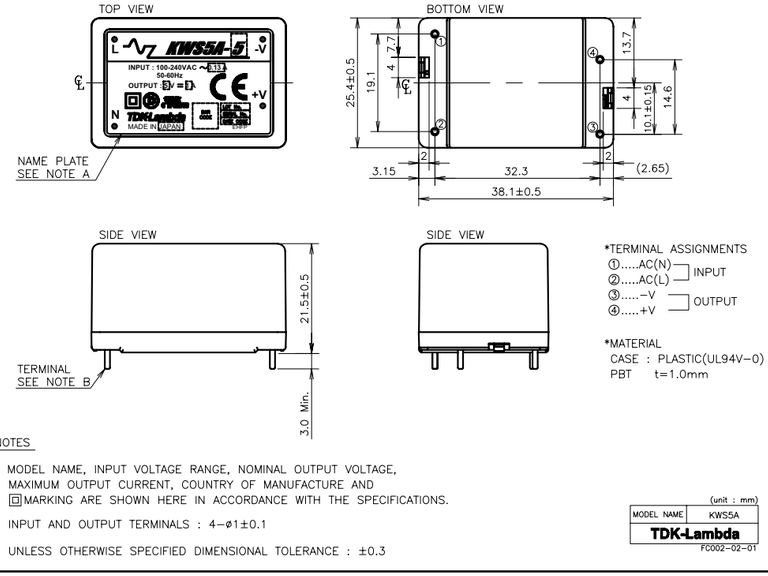
Model Selector

Model	Voltage (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % (3)
KWS5A-5	5	1.0	5.0	40	20	200	76 / 74
KWS10A-5	5	2.0	10.0	40	20	200	76 / 77
KWS15A-5	5	3.0	15.0	40	20	200	77 / 78
KWS25A-5	5	5.0	25.0	40	20	200	81 / 82
KWS5A-12	12	0.45	5.4	96	48	240	78 / 75
KWS10A-12	12	0.9	10.8	96	48	240	80 / 81
KWS15A-12	12	1.3	15.6	96	48	240	81 / 83
KWS25A-12	12	2.2	26.4	96	48	240	84 / 86
KWS5A-15	15	0.35	5.3	120	60	240	79 / 75
KWS10A-15	15	0.7	10.5	120	60	240	81 / 82
KWS15A-15	15	1.0	15.0	120	60	240	82 / 84
KWS25A-15	15	1.7	25.5	120	60	240	85 / 87
KWS5A-24	24	0.22	5.3	150	96	240	80 / 77
KWS10A-24	24	0.5	12.0	150	96	240	82 / 84
KWS15A-24	24	0.7	16.8	150	96	240	82 / 85
KWS25A-24	24	1.1	26.4	150	96	240	86 / 88

Notes:

(3) 115 / 230VAC input. Full load

KWS5A, KWS10A Outline Drawing



Similar Models

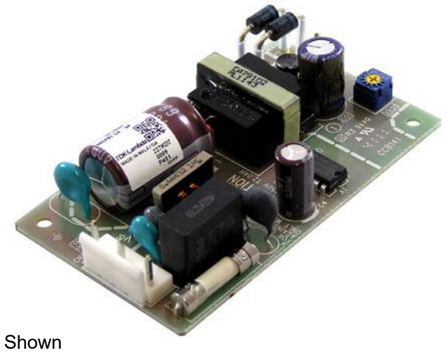
KM	15 & 40W, single, dual and triple outputs, medical & ITE
KPSA	5, 10 & 15W, single output

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

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



ZWS15B Shown

Key Market Segments & Applications

Industrial Test COMM Broadcast

RoHS

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 (lv 4), -3 (lvl 3), -4 (lvl 4), -5 (lvl 4), -6 (lvl 3), -8 (lvl 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

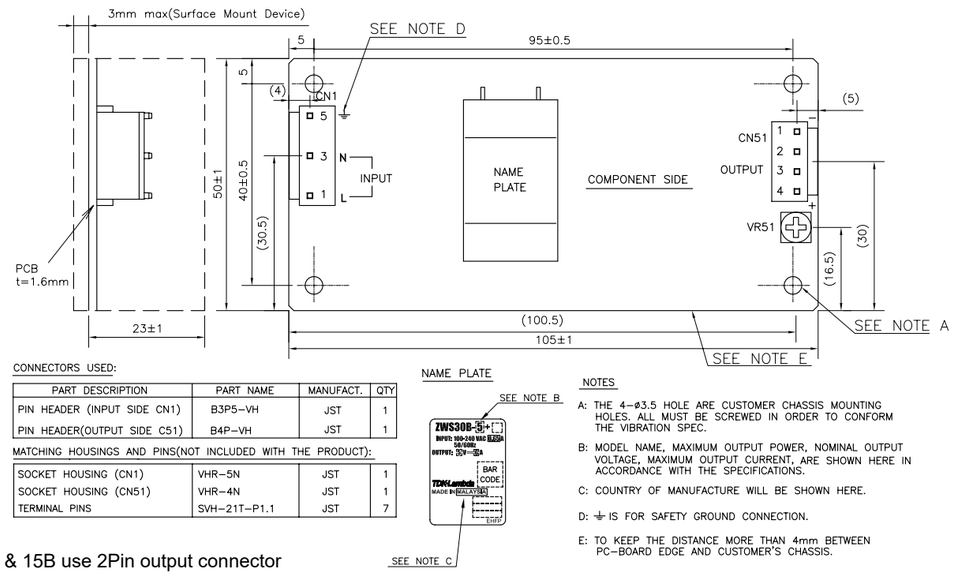
*Safety certified for AC input only

TDK·Lambda ZWS10-30B Series

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

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

Medical Industrial Test COMM Broadcast

RoHS

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	292 / 188mA			860 / 460mA		
Recommended External Fuse	-	2A slow blow type			3.15A slow blow type		
Temperature Coefficient	-	±0.01%/°C					
Ripple and Noise (pk-pk)	mV	50mV or 1%, whichever is greater					
Overcurrent Protection	-	> 105%, hiccup mode, automatic recovery					
Overvoltage Protection	%	Yes, Zener diode clamp					
Hold-up Time (typical)	ms	20ms			18ms		
Enclosure Leakage (240VAC 63Hz) (264VAC 63Hz)	mA	0.055 max 0.06 max			0.08 max 0.085 max		
Operating Temperature	°C	-25°C to 70°C, derate linearly to 50%(1) load from 50°C to 70°C. Max case temperature 95°C					
Storage Temperature	°C	-40°C to 100°C					
Humidity	%RH	20% to 95% RH (non-condensing)					
Cooling	-	Convection, over temperature protected ~100°C case temperature					
Withstand Voltage	VAC	Input to output: 4kVAC (Reinforced) (2 x MOPPS 3rd Edition)					
Immunity	-	EN60601-1-2					
Safety Agency Certification	-	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

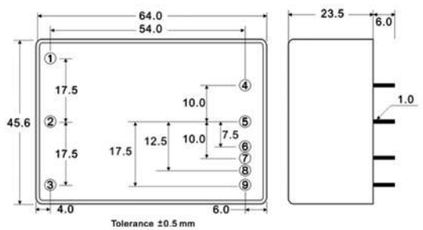
*Safety certified for AC input only

TDK·Lambda KM Series

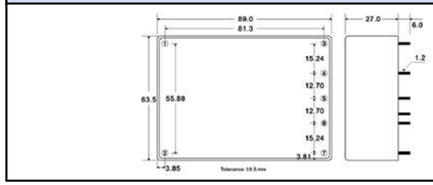
Output Ratings

Model		Output Voltage (V)	Minimum Current (A)	Maximum Current (A)	Power (W)	Output Set Accuracy (%)	Line Regulation (%)	Load Regulation (1) (%)	Cross Regulation	Efficiency (%)
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



KM40 Outline Drawings



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

(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

15-60W Medical AC-DC PCB-Mount Power Supplies

Features

- Medical Safety Certifications (4kVAC Input - Output)
- Class II (No ground needed)
- Wide Temperature Range (-40 to +80°C)
- Low off-load Power Draw
- Smaller size than KMS
- High Efficiency

Key Market Segments & Applications

Medical Industrial Test COMM Broadcast



Photo (KMS60A shown)

RoHS

Specifications

Model		KMS15A	KMS30A	KMS60A
Input Voltage Range (1)	-	90-264VAC 47-440Hz* or 120-370VDC*		
Inrush Current Limiting (115 / 230VAC) (2)	A	20 / 40A	30 / 60A	55 / 95A
Input Current (115 / 230VAC)	mA	385 / 250mA	650 / 400mA	1500 / 1000mA
Off-load Power Draw	W	<0.1W	<0.15W	<0.3W
Recommended External Fuse	-	3.15 A slow blow type		
Temperature Coefficient	-	±0.05%/°C		
Voltage Set Accuracy	%	±2%		
Minimum Load	-	None		
Overcurrent Protection	-	Hiccup mode, automatic recovery		
Overvoltage Protection	%	Yes, Zener diode clamp		
Hold-up Time (115 / 230VAC)	ms	15 / 56ms (typ)	>10ms	
Leakage Current (Touch)	mA	<0.1mA at 264VAC		
Series Operation	-	Yes. Use diodes connected across each output		
Operating Temperature (3)	-	-40°C to +80°C, derate linearly to 30% load from 50°C to 80°C		
Maximum Case Temperature	°C	90°C (83°C <115VAC)	85°C (78°C <115VAC)	80°C (73°C <115VAC)
Storage Temperature	-	-40°C to +90°C		
Humidity	%RH	10% to 95% RH (non-condensing)		
Cooling	-	Convection		
Withstand Voltage	VAC	Input to output: 4kVAC, 2 x MOPPs		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11		
Altitude	m	5000m		
Safety Agency Certification	-	UL/CSA/IEC/EN 60950-1, ANSI/AAMI ES60601-1, IEC/EN 60601-1 (2xMOPPs)		
Conducted and Radiated EMI	-	EN55011 Class B		
Weight	g	59g	130g	280g
Size (LxWxH)	in (mm)	2.07 x 1.08 x 0.93” 52.5 x 27.5 x 23.5 mm	2.52 x 1.77 x 0.93” 64.0 x 45.0 x 23.5 mm	3.5 x 2.5 x 1.06” 89.0 x 63.5 x 27.0 mm
Mounting & Case	-	PC board mountable. Resin case (UL 94V-0)		
MTBF	hrs	200,000 to 400,000 hours, model dependant		
Warranty	yrs	3 years		

(1) Derate linearly to 80% load below 110VAC (100VAC for KMS15A)
(2) Cold start, 25°C ambient
(3) Derate linearly to 80% load below -30°C

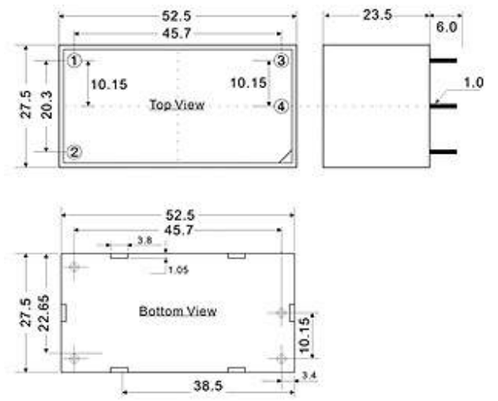
* Safety certified for AC input, 47-63Hz only

TDK·Lambda KMS-A Series

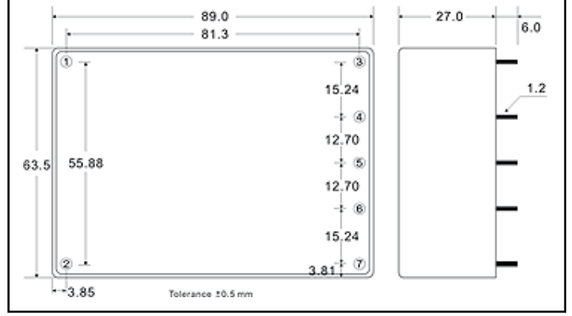
Model Selector

Model	Output Voltage (V)	Maximum Current (A)	Power (W)	Output Ripple & Noise (mV)	Line Regulation (mV)	Load Regulation (mV)	Efficiency (%)	Maximum Capacitive Load (µF)
KMS15A-5	5V	3A	15W	120mV	±25mV	±50mV	79%	7000
KMS30A-5	5V	5A	25W	100mV	±25mV	±50mV	84%	6800
KMS60A-5	5.1V	10A	51W	100mV	±25mV	±75mV	86%	10000
KMS15A-9	9V	1.666A	15W	120mV	±45mV	±90mV	80%	5000
KMS60A-9	9V	6.666A	60W	100mV	±45mV	±135mV	87%	5000
KMS15A-12	12V	1.25	15W	120mV	±60mV	±120mV	84%	1500
KMS30A-12	12V	2.5A	30W	150mV	±60mV	±120mV	89%	1600
KMS60A-12	12V	5A	60W	120mV	±60mV	±120mV	88%	5000
KMS15A-15	15V	1A	15W	150mV	±75mV	±150mV	84%	1000
KMS30A-15	15V	2A	30W	150mV	±75mV	±150mV	86%	1200
KMS60A-15	15V	4A	60W	150mV	±75mV	±150mV	86%	4000
KMS15A-24	24V	0.625	15W	240mV	±120mV	±240mV	85%	470
KMS30A-24	24V	1.25A	30W	240mV	±120mV	±240mV	86%	470
KMS60A-24	24V	2.5A	60W	240mV	±120mV	±240mV	87%	2000

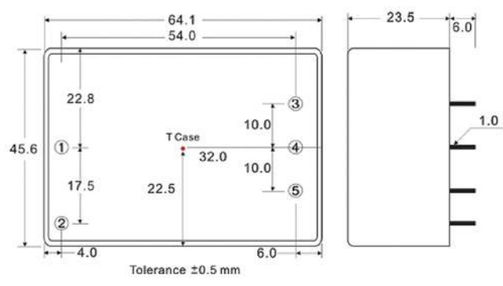
KMSA15



KMSA60



KMSA30



Pinout

PIN #	KMS15A	KMS30A	KMS60A
1	AC (L)	AC (N)	AC (L)
2	AC (N)	AC (L)	AC (N)
3	+Vout	-Vout	+Vout
4	-Vout	No pin	No pin
5		+Vout	-Vout
6			No pin
7			No pin

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

TDK·Lambda CUS30M & CUS60M Series

Single Output 30 to 60W Medical & ITE Power Supplies

Features

- High Efficiency, up to 90%
- Industry Standard 2” x 3” Footprint
- Convection Cooled
- Class I and II Operation
- Suitable for B and BF rated equipment



Key Market Segments & Applications

Medical Industrial Test COMM Broadcast

RoHS

Specifications

Model		CUS30M	CUS60M
AC Input Voltage	VAC	85 - 265VAC(1)	
Input Frequency	Hz	47 - 63Hz	
Inrush Current (cold start)	A	30A at 115VAC, 60A at 230VAC	
Power Factor	-	Meets EN61000-3-2	
Input Current (115/230VAC)	A	0.6 / 0.4	5V: 0.7 / 0.5, 12-48V: 1.2 / 0.8
Off-load Power Draw	W	<0.3W at 265VAC	<0.5W at 265VAC
Temperature Coefficient	%/°C	<0.02%/°C	
Output Voltage Adjustment	-	Fixed as standard. Use /ADJ suffix for potentiometer ±10% adustment	
Overcurrent Protection	-	>105% of rated current. Class 2 Limited Power Source (2)	
Overvoltage Protection (3)	V	> 115% of nominal output	> 120% of nominal output
Hold Up Time (Typical) (115/230VAC)	ms	20 / 100	
Leakage Current	mA	<0.25mA at 265VAC, 60Hz	<0.2mA at 265VAC, 60Hz
Touch Current (Maximum)	µA	100µA at 265VAC, 60Hz	60µA at 265VAC, 60Hz
Remote Sense	-	No	
Operating Temperature	°C	-20 to +70°C. (-30°C start up) Derate linearly to 50% load from +50 to +70°C (4)	
Storage Temperature	°C	-40 to +85°C	
Humidity (non condensing)	%RH	10 - 95%RH (Operating & Storage)	
Cooling	-	Convection Cooled	
Withstand Voltage		Input to Ground 2kVAC (1xMOPP), Input to Output 4kVAC (2xMOPPs), Output to Ground 1.5kVAC (1xMOPP) suitable for B & BF rated equipment	
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s² constant sweep 1 min X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s², MIL-STD-810F	
Immunity	-	IEC61000-4-2 (lv 4), -3 (lv3), -4 (lv 3), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11, Criteria A. IEC60601-1-2 Ed4	
Line Voltage Dips	-	SEMIF47 (200-240VAC), IEC61000-4-11 (Class 3) Criteria A: Vin >120VAC or <70% load, Criteria B: Vin <120VAC and >70% load	
Safety Agency Certifications	-	EN/IEC/UL/ES/CSA60601-1, EN/IEC/UL/CSA60950-1, IEC60335-1, CE Mark	
Altitude	m	5,000m, derate operating ambient by 5°C/1000m above 3,000m	
Conducted & Radiated EMI	-	EN55011-B, EN55032-B, FCC Class B	
Weight (Typ)	g	62	120
Size (LxWxH)	mm(in)	76.2 x 50.8 x 24.2mm (3 x 2 x 0.95”)	76.2 x 50.8 x 26.7mm (3 x 2 x 1.05”)
Connectors (JST)*	-	Input (CN1): B2P3-VH(LF)(SN) (Mates with VHR-3N housing). Output (CN-51): B4P-VH(LF)(SN) (Mates with VHR-4N)	
Warranty	yrs	Three Years	

Notes:
* See installation manual for terminal pin and hand tool information
(1) CUS30M: Derate linearly to 80% load from 115VAC to 85VAC. CUS60M: Derate linearly to 80% load from 100VAC to 85VAC
(2) All models except CUS60M-5
(3) Cycle AC to reset
(4) CUS30M-18, -48 and CUS60M-5, -12: Derate linearly to 50% load from +45 to +70°C

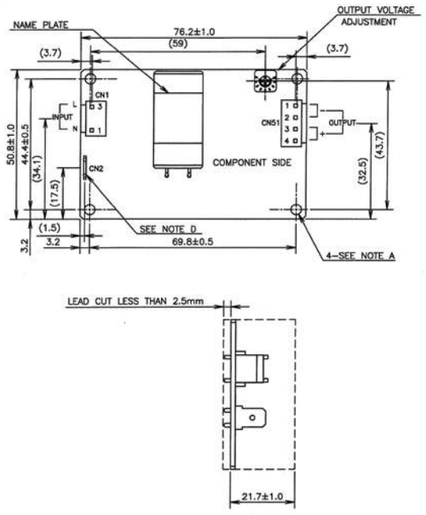
TDK·Lambda CUS30M & CUS60M Series

Model Selector

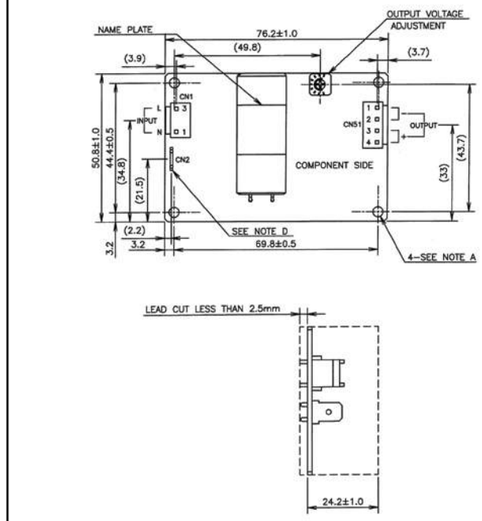
Model	Voltage	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV) (5)	Efficiency (typ) % (6)	Average Active Efficiency (typ) % (6)
CUS60M-5	5V	6.0	30.0	100	20	120	81 / 81	81 / 80
CUS30M-12	12V	2.5	30.0	120	48	120	87 / 88	87 / 87
CUS60M-12	12V	5.0	60.0	120	48	120	87 / 88	87 / 86
CUS60M-15	15V	4.0	60	120	60	150	88 / 89	87 / 87
CUS60M-18	18V	3.25	60.3	144	72	150	88 / 89	87 / 87
CUS30M-24	24V	1.25	30.0	192	96	150	88 / 90	87 / 87
CUS60M-24	24V	2.5	60.0	192	96	150	89 / 90	88 / 87
CUS30M-48	48V	0.63	30.24	384	192	200	88 / 90	88 / 89
CUS60M-48	48V	1.25	60.0	384	192	200	89 / 90	89 / 88

Notes:
(5) Ripple level increases at light loading to meet new efficiency standards
(6) 115/230VAC

Outline Drawing CUS30M



Outline Drawing CUS60M

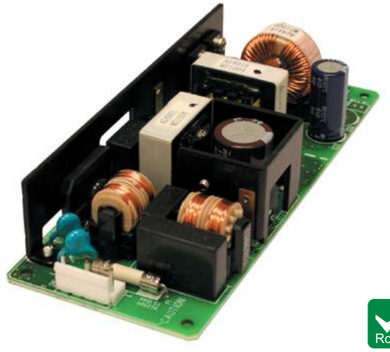


For Additional Information, please visit
us.tdk-lambda.com/lp/products/cus-m-series

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

Industrial Test COMM LED Broadcast

RoHS

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 operartion in overload
(2) 100 / 200VAC Input
(3) 60°C: 70% load

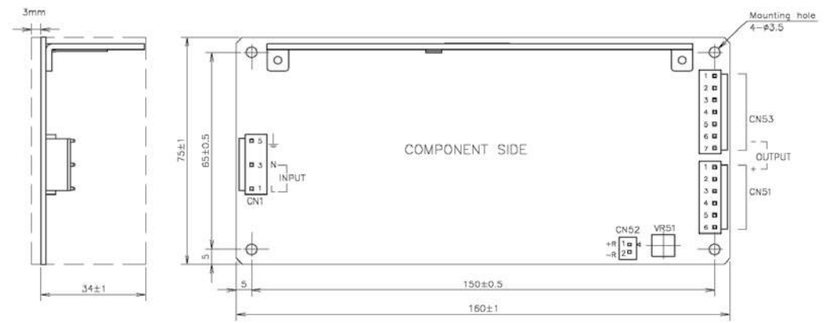
*Safety certified for AC input only

TDK·Lambda ZWS50-150BAF Series

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	-

Dual or Triple Output 35W Low Profile Power Supplies

Features

- 2 x 4 x 1.06” footprint
- Output 1 isolated from outputs 2 & 3
- No minimum loading
- Medical & ITE Certifications
- Three year warranty



Key Market Segments & Applications

Medical Industrial Test Broadcast

RoHS

Specifications

Model		CUT35-522	CUT35-5FF
AC Input Voltage (1)	VAC	85 - 265VAC	
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage	VDC	88 - 370VDC (No safety certification)	
Inrush Current (cold start)	A	13A at 100VAC, 32A at 230VAC	
Power Factor	-	Meets EN61000-3-2	
Input Current (100 / 200VAC)	A	1 / 0.5	
Temperature 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 - 16.8V	V1: 5.7-7.0, V2: 17.2 - 21.0V
Efficiency (Typical at 200VAC Input)	%	81%	82%
Hold Up Time (115 / 230V input)	ms	20ms	
Leakage Current (265VAC 50Hz)	mA	<0.3mA	
Operating Temperature (3)	-	Open Frame & /B:-20 to +70°C. Derate linearly to 70% load from +55 to +70°C Cover:-20 to +60°C. Derate linearly to 70% load from +45 to +60°C	
Storage Temperature	-	-30 to +85°C	
Operating 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 25C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s² constant sweep 1 min X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s² (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 ANSI/AAMI ES60601-1, CSA 60601-1 (cTUVus), IEC/EN60601-1 (2 x MOOP)	
Conducted & Radiated EMI		EN55011-B, FCC-B	
Weight (Typ)	g	Open frame: 90, Baseplate: 136, Cover: 175	
Size (WxLxH)	in (mm)	Open Frame: 2 x 4 x 1.06”” (50.8 x 101.6 x 27) Baseplate: 2.22 x 4.8 x 1.1”” (56.5 x 122 x 28) Cover: 2.48 x 4.92 x 1.42”” (63.1 x 125 x 36)	
Warranty	yrs	Three Years	

(1) Derate linearly to 60% load from 100VAC to 85VAC input when ambient is <-10°C

(2) Cycle AC to reset

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

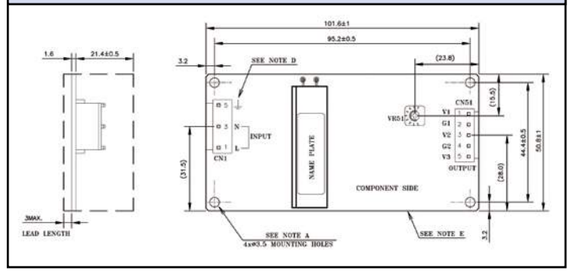
TDK·Lambda CUT35 Series

Model Selector

Model		Voltage (V)	Adjust Range (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)
CUT35-522	V 1	5V	5 - 5.25	3	15	100	50	120
	V2	+12V	Fixed	1.2	20.4	600	240	150
	V3	-12V	Fixed	0.85		600	240	150
CUT35-522	V1	5V	5 - 5.25	3	15	100	50	120
	V2	24V	Fixed	0.85	20.4	750	300	150
	(Leave common terminal unconnected)							
CUT35-5FF	V1	5V	5 - 5.25	3	15	100	50	120
	V2	+15V	Fixed	1	19.5	750	300	150
	V3	-15V	Fixed	0.65		750	300	150
CUT35-5FF	V1	5V	5 - 5.25	3	15	100	50	120
	V2	30V	Fixed	0.65	19.5	750	300	150
	(Leave common terminal unconnected)							

Note CUT35 can be configured as a dual or single output.

Outline Drawing



Options

Suffix	Description
Blank	Open frame with JST connectors
/A	Cover with JST connectors
/B	Baseplate with JST connectors

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

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

Industrial Test Broadcast

RoHS

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 orientatons

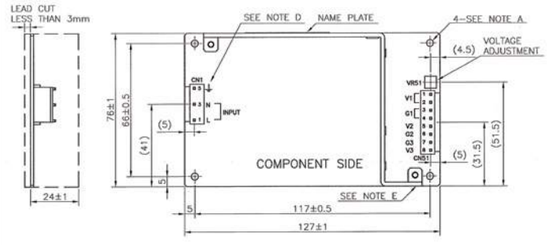
TDK·Lambda CUT75 Series

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.

Outline Drawing



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

2 x 4” 100W AC-DC Power Supplies

Features

- Convection, conduction or forced air cooling
- 100W Rating at 50°C Ambient
- 50W Conduction Cooling Rating at 80°C Ambient
- 75W With 1m/s Airflow at 85°C Ambient
- ITE & Medical Certifications (2 x MOPP)
- Suitable for Class I and Class II installations
- Class B Conducted and Radiated EMI

Key Market Segments & Applications

Medical Industrial Test LED Broadcast



RoHS

Specifications

Model		CUS100ME
Input Voltage range		85 - 264VAC (47 - 440Hz (1)). Derate linearly to 90% load from 90 to 85VAC input
Inrush Current (Cold start at 230VAC input)	A	<65A
Input Current (100W load)	A	1.4A at 100VAC input
Hold Up Time (Typ)	ms	>24ms
Harmonic Compliance	-	EN/IEC61000-3-2 Class A. Minimum PF 0.97/0.89 (115/230Vac, 100% load)
Leakage Current	uA	<250uA at 230VAC 63Hz
Touch Current (enclosure leakage)	uA	<100uA
Temperature Coefficient	%/°C	±0.02%/°C
No Load Power Draw at 230VAC input	W	<0.5W
Output Adjustment	-	No adjustment
Ripple & Noise	mV (pk-pk)	≤1%
Load Regulation	mV	≤1% (0 - 100% load)
Line Regulation	mV	≤0.5% (85 - 264VAC)
Short Circuit Protection	%	110 - 190%. Hiccup mode, automatic recovery
Overvoltage Protection	V	Latching (unit shutdown), cycle AC input to reset
Efficiency	%	Up to 94%
Active Average Efficiency	%	>87%
Operating Temperature	-	-20°C to +85°C, see derating curves for operation above +50°C (2)
Storage Temperature	°C	-40 to +85°C
Operational Altitude	m	5000m
Humidity (non condensing)	%RH	5 - 95%RH
Cooling	-	Convection, conduction (coldplate) or forced air cooling (2)
Withstand Voltage	VAC	Input to Ground 1.5kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP)
Isolation Resistance	MΩ	>100MΩ at 25C & 70%RH, Output to Ground 500VDC
Insulation Class	-	Construction suitable for Class I or Class II installation
Vibration (non operating)	-	2G, 10-500Hz for 1 hour
Shock	-	30G, 11ms half sine
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1. ES60601-1. Designed to meet IEC61010-1. EN60335-1 (3)
Conducted & Radiated EMI	-	EN55011 / EN55032-B (See application notes for conditions)
Immunity	-	EN61000-4-2 (Lvl 4), -3 (Lvl 3), -4 (Lvl 4), -5 (Lvl 3), -6 (Lvl 3), -8 (Lvl 4) -11 (class 3), EN60601-1-2:2015 (Ed4)
Weight (Typ)	g	Open Frame: 180g; /U: 240g; /A: 255g; /B: 220g
Size (WxLxH)	In (mm)	Open frame version: 2 x 4 x 1.24” (50.8 x 101.6 x 31.5mm)
Warranty	yrs	Five years
Connectors	-	Input: JST B2P3-VH, Output: JST B6P-VH

Note 1: For operation at 400-440Hz and/or DC input please contact Technical Sales
Note 2: See website for full derating curves
Note 3: EN60335-1 Compliant versions available (subject to MOQ). Please contact Technical Sales

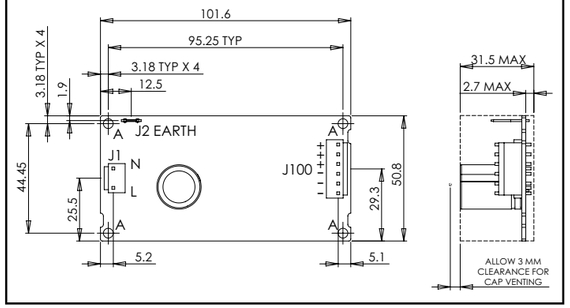
TDK·Lambda CUS100ME Series

Model Selector

Model	Nominal Output Voltage (V)	Maximum (2) Current Convection (A)	Maximum (2) Power (W)
CUS100ME-12	12	8.33	100
CUS100ME-12/U	12	8.33	100
CUS100ME-12/A	12	8.33	100
CUS100ME-12/B	12	8.33	100
CUS100ME-15	15	6.66	100
CUS100ME-15/U	15	6.66	100
CUS100ME-15/A	15	6.66	100
CUS100ME-15/B	15	6.66	100
CUS100ME-18	18	5.55	100
CUS100ME-18/U	18	5.55	100
CUS100ME-18/A	18	5.55	100
CUS100ME-18/B	18	5.55	100
CUS100ME-24	24	4.16	100
CUS100ME-24/U	24	4.16	100
CUS100ME-24/A	24	4.16	100
CUS100ME-24/B	24	4.16	100
CUS100ME-28	28	3.57	100
CUS100ME-28/U	28	3.57	100
CUS100ME-28/A	28	3.57	100
CUS100ME-28/B	28	3.57	100
CUS100ME-36	36	2.77	100
CUS100ME-36/U	36	2.77	100
CUS100ME-36/A	36	2.77	100
CUS100ME-36/B	36	2.77	100
CUS100ME-48	48	2.08	100
CUS100ME-48/U	48	2.08	100
CUS100ME-48/A	48	2.08	100
CUS100ME-48/B	48	2.08	100

Note 2: See website for full derating curves

Outline drawing (Open Frame). See website for /U, /A and /B versions



Style	Cooling	Output Power / Ambient Temperature			
		-20 to 50°C	70°C	80°C	85°C
Open frame	Convection	100W	60W	20W	-
/U or /B	Conduction	100W	100W	50W	-
All versions	1m/s air	100W	100W	83.3W	75W

Options

Suffix	Description
Blank	Open frame construction, dual input fuses, JST connetors
/U	U channel construction
/A	U channel with cover
/B	Baseplate
/M*	Molex connectors
/E*	Single input fuse in Live line

Examples
CUS100ME-24/UEM, CUS100ME-12V5/A (example of model set at 12.5V)

Non-standard outputs can be requested within the following ranges * Subject to MOQ, please consult sales

Model:	CUS100ME-12	CUS100ME-15	CUS100ME-18	CUS100ME-24	CUS100ME-28	CUS100ME-36	CUS100ME-48
Voltage range:	12 - 13.2	15 - 16.5	18 - 19.8	24 - 26.4	28 - 30.8	36 - 39.6	48 - 50

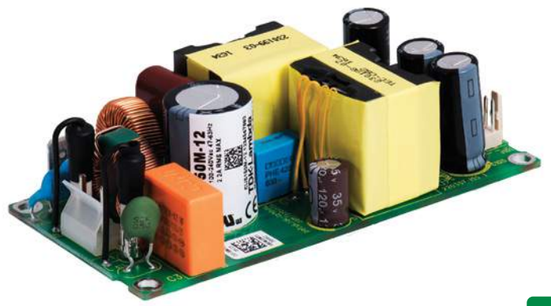
Non-standard output versions may be subject to minimum order quantities and variations to specification.
For all non-standard output voltage settings please consult Sales.

For Additional Information, please visit
http://www.us.tdk-lambda.com/lp/products/cus-m-series

2 x 4” 150W AC-DC Power Supplies

Features

- 150W Convection Rating (/U version)
- ITE & Medical Certifications (2 x MOPP)
- Class B Conducted and Radiated EMI
- Suitable for Class I and Class II installations
- Compact 2 x 4 x 1.24” Footprint
- Suitable for BF Rated Equipment
- Operation up to 85°C Ambient



Key Market Segments & Applications

Medical Industrial Test LED COMM Broadcast

RoHS

Specifications

Model		CUS150M
Input Voltage Range (1)	-	85 - 264VAC (47 - 440Hz (2)). Derate linearly to 90% load from 90 to 85VAC input
Inrush Current (Cold start at 230VAC input)	A	<65A
Input Current (150W load)	A	2.2A at 100VAC input
Hold Up Time (Typ)	ms	>18ms
Harmonic Compliance	-	EN/IEC61000-3-2 Class A, Class C >120W. Minimum PF 0.98/0.92 (115/230Vac, 100% load)
Leakage Current	uA	<250uA at 230VAC 63Hz
Touch Current (enclosure leakage)	uA	<100uA
Temperature Coefficient	%/°C	±0.02%/°C
No Load Power Draw at 230VAC input	W	<0.5W
Output Adjustment	-	No adjustment
Fan Supply	-	10 - 12V (see model selector), 0.5A, +14%/-6% regulation
Ripple & Noise	mV (pk-pk)	<1%
Load Regulation	mV	≤1% (0 - 100% load)
Line Regulation	mV	≤0.5% (90 - 264VAC)
Short Circuit Protection	%	110 - 170%. Hiccup mode, automatic recovery
Overvoltage Protection	V	Latching (unit shutdown), cycle AC input to reset
Efficiency	%	Up to 94%
Active Average Efficiency	%	>91%
Operating Temperature	-	-20 (1) to +85°C, see derating curves on website (70°C maximum for fan version /F)
Storage Temperature	°C	-40 to +85°C (70°C maximum for fan version /F)
Operational Altitude	m	5000m
Humidity (non condensing)	%RH	5 - 95%RH (15 - 90%RH for /F fan version)
Cooling	-	Convection, conduction or forced air cooling (see derating curves on website)
Withstand Voltage	VAC	Input to Ground 1.5kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP)
Isolation Resistance	MΩ	>100MΩ at 25C & 70%RH, Output to Ground 500VDC
Insulation Class	-	Construction suitable for Class I or Class II installation
Vibration (non operating)	-	2G, 10-500Hz for 1 hour
Shock	-	30G, 11ms half sine
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1. ES60601-1. Designed to meet IEC61010-1. EN60335-1 compliant models available (1)
Conducted & Radiated EMI	-	EN55011 / EN55032-B (See application notes for conditions)
Immunity	-	EN60601-1-2:2015 (Edition 4), EN61000-4-2 (Lvl 4), -3 (Lvl 3), -4 (Lvl 4), -5 (Lvl 3), -6 (Lvl 3), -8 (Lvl 4) -11 (class 3)
Weight (Typ)	g	Open Frame: 185g; /U: 245g; /A: 255g; /B: 220g, /F: 265g
Size (WxLxH)	In (mm)	Open frame version: 2 x 4 x 1.24” (50.8 x 101.6 x 31.5mm)
Warranty	yrs	Five years
Connectors	-	Input: JST B2P3-VH, Output: JST B6P-VH, Fan: Molex 22-04-1021

Note 1: Contact factory regarding option models for -40°C start up, DC input and models compliant to EN60335-1. MOQs may apply.
Note 2: For operation at 400-440Hz, please contact Technical Support.

TDK·Lambda CUS150M Series

Model Selector

Model	Nominal Output Voltage (V)	Fan Supply Voltage (V)	Maximum (3) Current Convection (A)	Maximum Current Forced Air (A)	Maximum (3) Power Convection (W)	Maximum Power Forced Air (W)
CUS150M-12 or /B	12	11.6	10	12.5	120	150
CUS150M-12/A or U	12	11.6	12.5	12.5	150	150
CUS150M-12/F	12	11.6	12.5	-	150	-
CUS150M-15 or /B	15	9.8	8	10	120	150
CUS150M-15/A or U	15	9.8	10	10	150	150
CUS150M-15/F	15	9.8	10	-	150	n/a
CUS150M-18 or /B	18	11.6	6.66	8.33	120	150
CUS150M-18/A or U	18	11.6	8.33	8.33	150	150
CUS150M-18/F	18	11.6	8.33	n/a	150	n/a
CUS150M-24 or /B	24	11.6	5	6.25	120	150
CUS150M-24/A or U	24	11.6	6.25	6.25	150	150
CUS150M-24/F	24	11.6	6.25	-	150	-
CUS150M-28 or /B	28	10.8	4.3	5.4	120	150
CUS150M-28/A or U	28	10.8	5.4	5.4	150	150
CUS150M-28/F	28	10.8	5.4	-	150	-
CUS150M-36 or /B	36	11.6	3.33	4.2	120	150
CUS150M-36/A or U	36	11.6	4.2	4.2	150	150
CUS150M-36/F	36	11.6	4.2	-	150	-
CUS150M-48 or /B	48	11.6	2.5	3.12	120	150
CUS150M-48/A or U	48	11.6	3.12	3.12	150	150
CUS150M-48/F	48	11.6	3.12	-	150	-

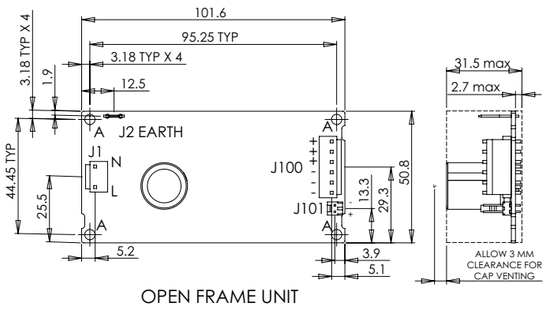
Note 3: See derating curves on website

Non-standard outputs can be requested within the following ranges (excluding the /F version);

Model:	CUS150M-12	CUS150M-15	CUS150M-18	CUS150M-24	CUS150M-28	CUS150M-36	CUS150M-48
Voltage range:	12 - 13.2	15 - 16.5	18 - 19.8	24 - 26.4	28 - 30.8	36 - 39.6	48 - 50

Non-standard output versions may be subject to minimum order quantities and variations to specification.
For all non-standard output voltage settings please consult Sales.

Outline drawing (Open Frame). See website for /U, /A and /F versions



OPEN FRAME UNIT

Options

Suffix	Description
Blank	Open frame construction, dual input fuses, JST connectors
/B	Base plate
/U	U channel construction
/A	U channel with cover
/F	U channel with cover construction, top mounted fan
/E*	Single input fuse in Live line
/M*	Molex connectors
Example:	
CUS150M-15/UE	U channel with cover construction, single input fuse

* Subject to MOQ, please consult sales

For Additional Information, please visit
http://www.us.tdk-lambda.com/lp/products/cus-m-series

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

Medical Industrial Test COMM Broadcast

RoHS

Specifications

Model		NV175
Input Voltage range	-	90 - 264VAC (47 - 63Hz, 440Hz with reduced PFC)
Inrush Current	A	<40A at 25C and 230VAC input, Cold Start
Power Factor Harmonics	-	EN61000-3-2 Compliant (0.97 typical)
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 linearily 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 514.4, Pro I, Cat 1,9; EN60068-2-6, IEC68-2-6
Shock	-	Conforms to MIL-STD-810E/F, Method 516.5, Pro I, IV, VI; 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

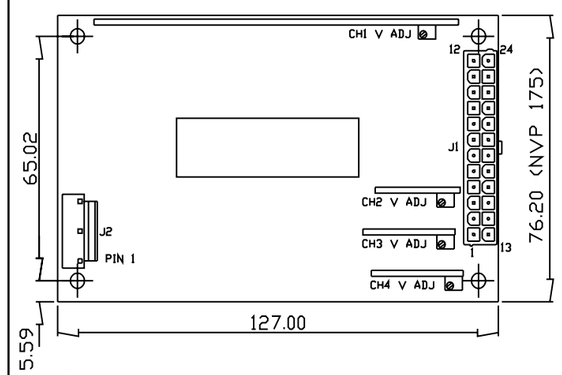
TDK·Lambda NV175 Series

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 inhbit 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) Code	Adjust. Range	CH2(5)	CH2 Code	Adjust. Range	CH3	CH3 Code	Adjust. Range	CH4	CH4 Code	Adjust. 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
						+24V / 2.5A	G	18 - 24V	Fan Supply only	0H	Fixed
+12V / 15A	T	12 - 15V (8)	+5V / 10A	5	3.3 - 5.5V	No output	0	-	No output	0	
+15V / 12A	F	12 - 15V (9)	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	Blank	Blank	No Case
AC Fail, Remote On/Off, 5V/2A Standby, CH1 DC Good	N	U	U Chassis
AC Fail, Remote On/Off, 12V/1A Standby, CH1 DC Good	N1	C	U Chassis with Cover
AC Fail, Remote On/Off, 13.5V/1A Standby, CH1 DC Good	N2	F	U Chassis, Cover and Fan*
ATX AC Fail+Remote On/Off, 5V/2A Standby, CH1 DC Good	N3	I	U Chassis, Cover and Fan* and IEC inlet
ATX AC Fail+Remote On/Off, 12V/1A Standby, CH1 DC Good	N4		

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

Example **NV1 3 G 5 0 3HP N C**

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

Mating Parts (Molex)

CONN	Housing	Pins
J1	39-01-2245	45750-3112
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

Single Output 200 to 250W Medical & ITE Power Supplies

Features

- ◆ High Efficiency, up to 94%
- ◆ Industry Standard 3” x 5” Footprint
- ◆ 200W Convection Cooled Rating
- ◆ Suitable for B and BF rated equipment
- ◆ 5V Standby Output



Key Market Segments & Applications

Medical Industrial Test COMM Broadcast

RoHS

Specifications

Model		CUS200M
AC Input Voltage	VAC	85 - 265VAC (1)
Input Frequency	Hz	47 - 63Hz
Inrush Current (cold start)	A	35A at 115VAC, 70A at 230VAC
Power Factor	-	Meets EN61000-3-2 Class A (Typical PF 0.99/0.95) (2)
Input Current (115/230VAC)	A	200W output: 2.2 / 1.1A; 250W output: 3.0 / 1.5A
Off-load Power Draw	W	<0.5W at 230VAC (In standby mode using remote on/off)
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	-	12V: >17.2A, 18V: > 14.7A, 24V: > 11A, 36V: > 7.4A, 48V: > 5.5A
Overvoltage Protection (3)	V	12V: 13.2 - 16.2V, 18V: 19.8 - 24.3V, 24V: 26.4 - 32.4V, 36V: 39.6 - 48.6V, 48V: 52.8 - 64.8V
Hold Up Time (115 / 230V input)	ms	16ms at 200W output, 12ms at 250W
Leakage Current	mA	<0.3mA at 265VAC, 60Hz
Remote Sense	-	No
Remote On/Off	-	Apply voltage to isolated terminals to shut unit down
Power Good	-	Isolated transistor, On = Good. Gives >5ms warning of AC power loss
Standby Voltage	-	5V 0.6A (convection), 1A (forced air)
Operating Temperature	°C	-20 to +70°C. (-40°C start up) Derate linearly to 50% load from +50 to +70°C (4)
Storage Temperature	°C	-40 to +85°C
Humidity (non condensing)	%RH	10 - 95%RH (Operating & Storage)
Cooling	-	Convection or Forced Air Cooled (1.5m/s across terminals)
Withstand Voltage	-	Input to Ground 2kVAC (1xMOPP), Input to Output 4kVAC (2xMOPPs), Output to Ground 1.5kVAC (1xMOPP) suitable for B & BF rated equipment
Isolation Resistance	-	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s² constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s² (20G)
Immunity	-	IEC61000-4-2 (lv 2, 3), -3 (lv3), -4 (lv 3), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11, EN60601-1-2:2015 (Ed4)
Safety Agency Certifications	-	EN/IEC/UL/ES/CSA 60601-1, EN/IEC/UL/CSA60950-1, CE Mark
Conducted & Radiated EMI	-	EN55011-B, EN55032-B, FCC Class B
Weight (Typ)	g	350
Size (LxWxH)	mm (in)	127 x 76.2 x 34mm (5 x 3 x 1.34”)
Warranty	yrs	Three Years

Notes:

(1) Derate linearly to 80% load from 115 to 85VAC input

(2) 115 / 230VAC input

(3) Cycle AC to reset

(4) /A suffix (cover): -20 to +60°C. (-40°C start up) Derate linearly to 50% load from +35 to +60°C

TDK·Lambda CUS200M Series

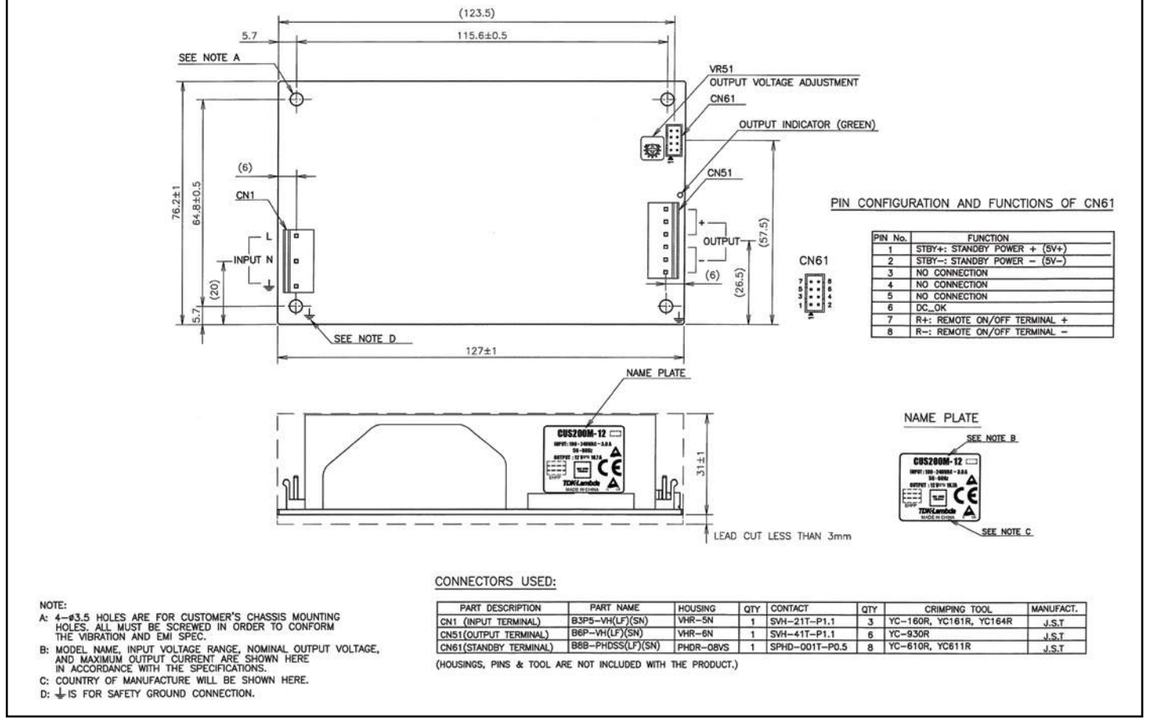
Model Selector

Model	Voltage	Adjust Range (V)	Max Current Conv (A)	Max Current Forced Air (A)	Max Power Forced Air (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % (4)
CUS200M-12	12V	11.7 - 12.6	16.7	16.7	200.4	120	60	180	92 / 93
CUS200M-18	18V	17.6 - 18.9	11.2	14.0	252.0	180	90	180	92 / 94
CUS200M-24	24V	23.5 - 25.2	8.4	10.5	252.0	240	120	240	92 / 94
CUS200M-36	36V	35.2 - 37.8	5.5	7.0	252.0	360	180	360	92 / 94
CUS200M-48	48V	47 - 50.4	4.2	5.3	254.4	480	240	480	92 / 94

Notes:

(5) 115 / 230VAC input with convection cooling

Outline Drawing



Options

Suffix	Description
Blank	Open frame construction
/A	Fitted with a cover

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

240W 24V Output Power Supply with EN62477-1 OVC III

Features

- ◆ Certified to IEC/EN62477-1 OVC III
- ◆ 12 Year e-cap Lifetime
- ◆ 5 Year Warranty
- ◆ Convection Cooling



Key Market Segments & Applications

Industrial

RoHS

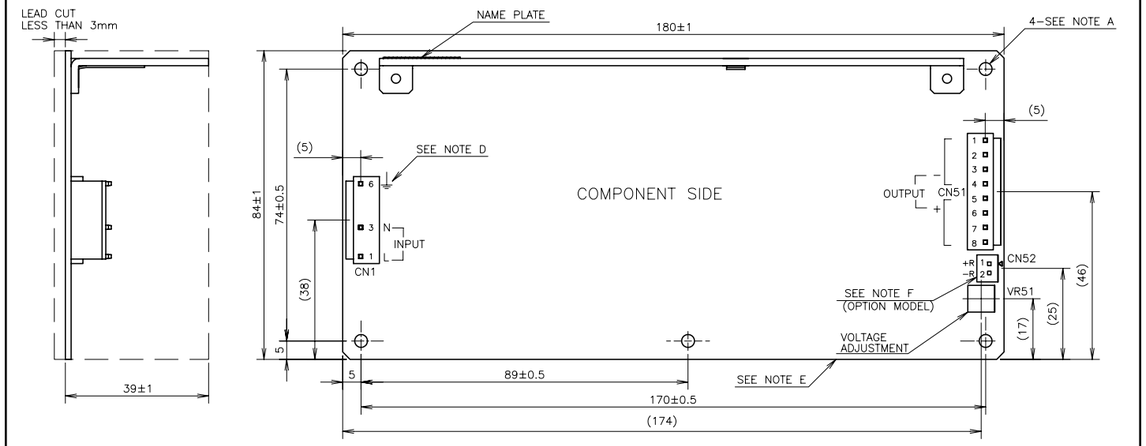
Specifications

Model		ZWS240RC-24
Nominal Output Voltage	V	24V
Maximum Output Current	A	10A
Maximum Output Power	W	240W
Efficiency (typ)	%	87 / 90% (100 / 200VAC)
AC Input Voltage range (1)	-	85 - 265VAC (47 - 63Hz)
Input Current (typical) (2)	A	2.8 / 1.5A
Inrush Current - cold start (2)	A	15 / 30A
PFHC	-	Active Power Factor Correction - Designed to meet EN/IEC61000-3-2
Power Factor (2)	-	0.93 / 0.9
Output Voltage Accuracy	%	±2%
Output Voltage Range	VDC	21.6 - 26.4V
Ripple and Noise (pk-pk)	mV	200mV (0 to +70°C) (Maximum)
Line Regulation	mV	96mV (Maximum)
Load Regulation	mV	150mV (Maximum)
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	-	>10.5A
Overvoltage Protection	V	27.6 - 32.4V (Cycle AC to reset)
Hold Up time (Typ) (2)	ms	31ms
Leakage Current (Typ) (3)	mA	0.2 / 0.4mA
Cooling	-	Convection
Operating Temperature (4)	°C	-10°C to +70°C, derate linearly to 30% load from 50°C to 70°C
E-cap lifetime (5)	Years	Up to 12 years; 50°C ambient, 100% full load, 24 hours a day operation
Storage Temperature	°C	-30°C to +75°C
Humidity (non condensing)	%RH	Operating: 30 - 90%RH, Storage: 10 - 90%RH
Withstand Voltage	VAC	I/P to Gnd 2kVAC (10mA), I/P to O/P: 3kVAC (10mA), O/P to Gnd: 500VAC (20mA) for 1min
Isolation Resistance	Ω	>100MΩ at 25°C & 70%RH, Output to Gnd: 500VDC
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6 m/s² constant X, Y, Z 1 hour each
Shock	-	<196.1m/s²
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN62477-1 (OVC III), CE Mark
Conducted Emission	-	EN55011 / EN55032-B, FCC-B, VCCI-B
Radiated Emission	-	EN55011 / EN55032-A, FCC-A, VCCI-A
Immunity	-	IEC61000-6-2 ; IEC61000-4-2, -3, -4, -5, -6, -8, -11
Weight (Typ)	g	520g
Size (W x H x D)	mm	84 x 42 x 180mm
Warranty	Years	Five Years

Notes:
(1) Derate linearly to 80% load from 90 to 85VAC input
(2) 100/200VAC, full load
(3) 100/230VAC
(4) Refer to Application Notes
(5) Refer to Reliability Data

TDK·Lambda ZWS240RC-24 Series

Outline Drawing



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

Industrial COTS Test COMM LED Broadcast

RoHS

Specifications

Model		PFE300SA PFE500SA	PFE700SA	PFE500F	PFE1000FA
AC Input	VAC	85 to 265VAC, 47-63Hz (up to 440Hz) (4)			
Input Current (115 / 230VAC)	A	3.2 / 1.6		6.8 / 3.4	
Model dependant	A	5.2 / 2.5	7.0 / 3.4	100/200VAC	10.8 / 5.3
Inrush Current (115 / 230VAC) (1)	A	23 / 46A 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		300	420
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	5 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
   PFE1000FA, PFE1000F48 & PFE1000FA48: -40 to 85°C below 170VAC input voltage.
   See instruction manuals for derating curves
3) PFE500F, PFE1000FA: 500VDC Output to baseplate
4) Reduced PFC above 63Hz. Contact technical support for 440Hz operation.

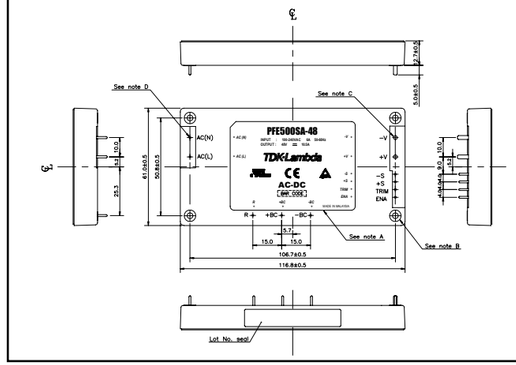
TDK·Lambda **PFE-SA, PFE500-F & PFE1000-FA**

Specifications

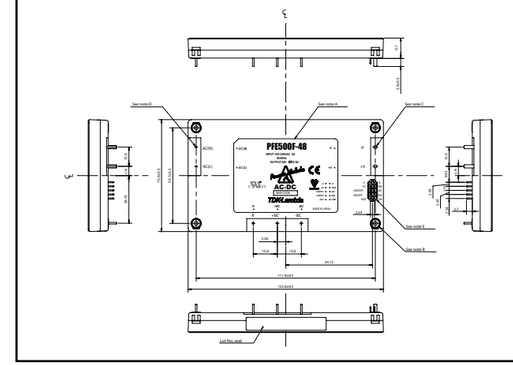
Model	Output Voltage (V)	Adjust. Range (V)	Maximum Current (A)	Maximum Wattage (W)	Load Reg. (mV)	Line Reg. (mV)	Efficiency typ (5)
PFE300SA-12	12	9.6 - 14.4	25	300	48	48	84 / 86
PFE500SA-12	12	9.6 - 14.4	33	396	48	48	84 / 86
PFE500F-12	12	9.6 - 14.4	42	504	48	48	81 / 83
PFE1000FA-12	12	9.6 - 14.4	60	720	48	48	84.5 / 87
PFE300SA-28	28	22.4 - 33.6	10.8	302	56	56	87.5 / 89.5
PFE500SA-28	28	22.4 - 33.6	18	504	56	56	88 / 90
PFE500F-28	28	22.4 - 33.6	18	504	56	56	84 / 86
PFE1000FA-28	28	22.4 - 33.6	36	1008	56	56	87 / 89.5
PFE300SA-48	48	38.4 - 57.6	6.3	302	96	96	88 / 90.5
PFE500SA-48	48	38.4 - 57.6	10.5	504	96	96	90 / 91
PFE500F-48	48	38.4 - 57.6	10.5	504	96	96	84 / 86
PFE1000FA-48	48	38.4 - 57.6	21	1008	96	96	88 / 90.5
PFE700SA-48	51	None	14	714	50 - 57V (6)		90 / 92

(5) 115 / 230VAC (100/230VAC for PFE500F)
(6) Total regulation range

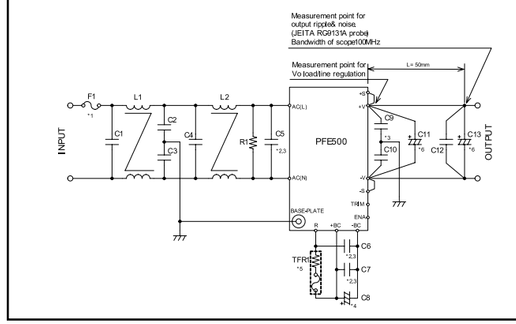
PFE500SA Outline Drawing



PFE500F Outline Drawing



PFE500SA Basic connection



Heatsink Table

Heatsink	Size (mm)	PFE Module
HAF-10L	116.8 x 25.4 x 61	PFE300/500SA
HAF-15L	116.8 x 38.1 x 61	PFE300/500SA
HAF-15T	116.8 x 38.1 x 61	PFE300/500SA
HAL-F12T	122 x 35 x 69.9	PFE500F
HAM-F10T	160 x 33.4 x 100	PFE1000FA

Options

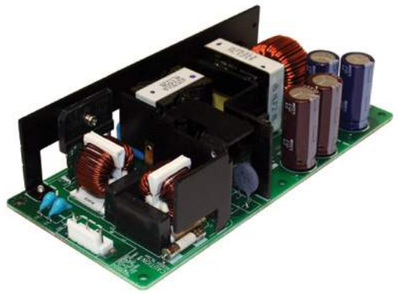
Suffix	Description
Blank	M3 tapped mounting inserts (4)
/T	3.3mm non-threaded inserts (4)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/pfea-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

Industrial Test COMM

RoHS

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 (lvl2, 3), -3 (lvl 3), -4 (lvl 3), -5 (lvl 3, 4), -6 (lvl 3), -8 (lvl 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

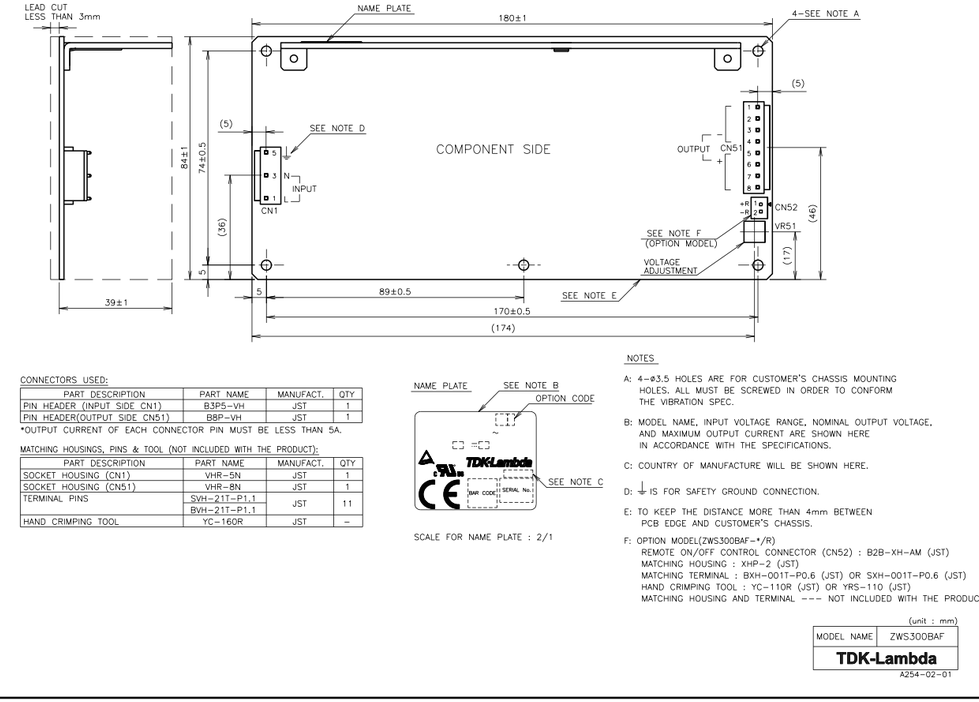
Notes:
(1) 100 / 200VAC Input
(2) 25°C ambient (cold start)
(3) Avoid prolonged operartion in overload
(4) Forced air rating: Class A radiated
(5) Safety certified for AC input only

TDK·Lambda ZWS300BAF Series

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



Options

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

* please contact factory for other combinations of option codes

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

500 Watt AC-DC Power Module

Features

- 4” x 2.4” Brick Foot-print with Metal Case
- High Power Density; High Efficiency
- Suitable for Conduction Cooling
- Power Factor Corrected
- PMBus™
- Droop Load Share (optional)
- No Minimum Load Requirement

Key Market Segments & Applications

Industrial COTS Test COMM LED Broadcast



PMBus RoHS

Specifications

Model		PFH500F-12	PFH500F-28
AC Input Voltage (1)	VAC	85 to 265VAC, 47-63Hz	
AC Input Current (typ) (4)	A	5 / 2.5A	
Power Factor	-	0.95 minimum (Vin=230VAC, Io > 80%, Tc=25°C, meets EN61000-3-2	
Inrush Current (typ) (4)	A	9A / 18A (peak) (20A max)	
Input Turn -on Voltage	VAC	83V (typ)	
Input Turn - off Voltage	VAC	79V (typ)	
Hold -up (Typ.) (1) (2)	ms	40ms	20ms
Output Voltage Set-point	VDC	11.76 - 12.24VDC (Vin=115Vac, Io=0%)	27.5 - 28.5 VDC (Vin=115Vac, Io=0%)
AC Start-Up Delay (115/230 VAC)(2)	s	2.8/1.2 typ	2.7/1.2 typ
		with Remote ON/OFF = LOW from AC application to 10% of Vo	
Remote ON/OFF Start-Up Delay (2)	s	2.5/1.0 typ (115/230VAC) with AC applied from Remote ON/OFF assertion to 10% of Vo	
Output Voltage Rise Time (typ)	ms	45ms	65ms
Line Regulation (typ)	mV	35mV (0.3%) (Io=50% of Io,max, Vin=Vin,min to Vin, max)	42mV (0.15%) (Io=50% of Io,max, Vin=Vin,min to Vin, max)
Load Regulation (typ)	mV	15 mV (0.125%) (Vin=115/230 Vac, Io= 10% to Io,max, excluding Droop)	28 mV (0.1%) (Vin=115/230 Vac, Io=0 to Io,max, excluding Droop)
Output Ripple (Pk to Pk) (3)	mV	150mV Typ. (250mV max.)	400mV Typ. (500mV max.)
Over Voltage Protection (max)	VDC	15.7V	35.5V
Over Current Protection (Hiccup) (typ) (5)	A	47.5A	21.5A
Output Capacitance Range	uF	1,000 - 8,000uF	470 - 3,000uF
Power Good Signal	mA	Open collector 200mA max. (Active low)	
Auxiliary Supply	-	10-14V; 200mA	
Remote On/Off	VDC	Low = On, < 0.8VDC (3.3V max input)	
Over Temperature Protection	°C	Input line voltage dependent (see derating curves)	
Series Operation	-	Yes (maximum of two units)	
Parallel Operation (optional)	-	Droop Share	
Operating Baseplate Temperature	°C	-40 to 100°C (with derating)	
Storage Temperature	°C	-55 to 125°C	
Humidity (non condensing)	%	Operating: 20 - 95%RH, Non Operating: 10 - 95%RH	
Cooling	-	Conduction	
Withstand Voltage (1 min)	VAC	Input to Output 3,000VAC: Input to Case 2,500VAC: Output to Case 1,500VDC	
Isolation Resistance	Ω	Output to Case: 100MΩ at 500Vdc, 25C ambient, 70%RH	
Vibration (Non Operating)	-	MIL-STD-810G: 514.6 Cat 4, Cat 21; Sine Vibration 23.52 m/s² Constant (XYZ Axis)	
Shock	-	MIL-STD-810G: 516.6 Procedure I (XYZ Axis)	
Safety Certifications	-	UL/cUL60950-1, IEC/EN60950-1, CE Mark	
Size (typ)	in.(mm)	4.00 x 2.40 x 0.53 (101.6 x 61.0 x 13.3)	
Weight (max)	g	225	
Warranty	Years	3	

Notes: External components are required. Consult the Instruction Manual for more detailed information.
1) Maximum Power will be de-rated at Vin < 100V with 6.7 W/V (400W@85Vin).
2) With 2 x 470uF bulk cap, 100% Load, Tc = 25°C.
3) Vin=115/230Vac, Io=100%, Tc=25°C. Measured across one 0.1uF, four 10uF ceramic capacitors and recommended minimum output capacitance located 2 inches away. BW = 20MHz.
4) Vin = 115/230Vac, Io = 100%, Tc = 25°C.
5) When Vo > Vo_nominal, OCP trip point will be lower to limit Po_max allowed.

TDK·Lambda PFH500F Series

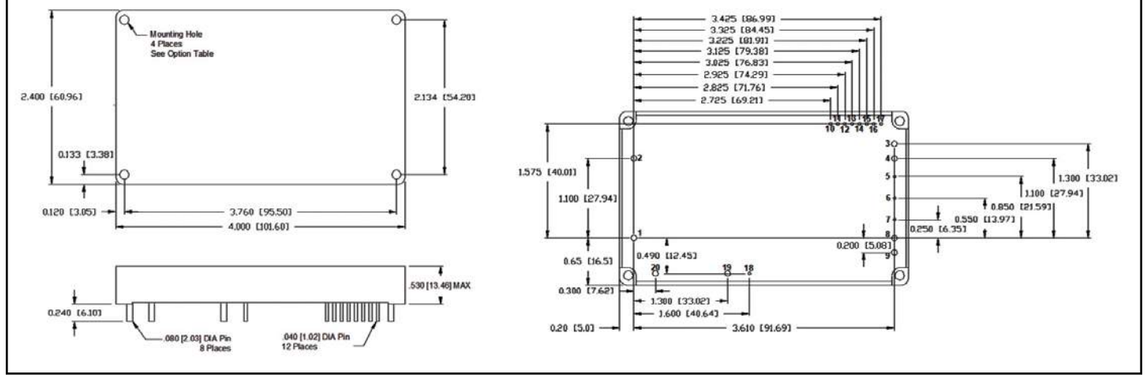
Specifications

Model	Output Voltage (V)	Adjust. Range (V)	Maximum Current (A)	Maximum Wattage (W)	Efficiency (typ) (%) (4)
PFH500F-28-XXX-R	28	22.4 - 33.6	18	504	90 / 92
PFH500F-12-XXX-R	12	9.6 - 14.4	42	504	90 / 92

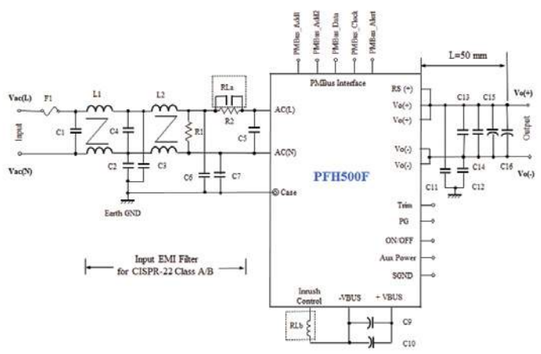
Model Suffix (“XXX”) Selector

Suffix	Mounting Inserts	Overvoltage Protection	Overcurrent Protection	Overtemperature Protection	Pin Length	Droop Mode Current Share
0D0	3.3mm Ø Non-threaded	Latching	Non-Latching	Non-Latching	0.24” (6.1mm)	Yes
1D0	3mm (M3) Threaded	Latching	Non-Latching	Non-Latching	0.24” (6.1mm)	Yes
000	3.3mm Ø Non-threaded	Latching	Non-Latching	Non-Latching	0.24” (6.1mm)	No
100	3mm (M3) Threaded	Latching	Non-Latching	Non-Latching	0.24” (6.1mm)	No

PFH500F Outline Drawing



PFH500F Basic Connection Diagram



Heatsink Accessory

Part #	Description
HS00110	2.4” x 4” x 1.5” Al with cylindrical pin fins and integrated thermal pad

Pinout

PIN	Function	PIN	Function
1	AC Input (Line) or AC (L)	11	Secondary Signal GND or SGND
2	AC Input (Neutral) or AC (N)	12	Aux Power Supply or Aux Power
3	Vout (-)	13	PMBus Clock
4	Vout (-)	14	PMBus Data
5	Remote ON/OFF	15	PMBus Alert
6	Trim	16	PMBus Address 2
7	Remote Sense (+) or RS (+)	17	PMBus Address 1
8	Vout (+)	18	Inrush Control or Inrush CTL
9	Vout (+)	19	- Boost Voltage Bus or - VBUS
10	Power Good or PG	20	+ Boost Voltage Bus or + VBUS

Evaluation Board

Evaluation Kit Part #	Content
PFH05W-001-EVK-S0	Evaluation kit assembly with no module
PFH05W##-100-EVK-S1	Evaluation kit assembly with PFH500F-##-100-R module
PFH05W##-1D0-EVK-S1	Evaluation kit assembly with PFH500F-##-1D0-R module
PFH05W-S01-EVK-S0	Evaluation kit assembly with I/P Surge Filter; no module

- Designates Output Voltage (e.g. 12 = 12V; 28 = 28V; 48 = 48V)

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