Medical Industrial Test Broadcast Comms Renewable

350W - 1150W Modular power supply.

Features	Benefits
• High efficiency	Minimises heat in system
• Low profile	Fits 1U applications
• High power density	Requires less space
• High peak power rating	Enables use of smaller power supply
• 3 year warranty	Low cost of ownership



Input

Input Voltage	90-264Vac	Input Frequency	47 - 63Hz (440Hz with reduced PFC - consult sales office)	
Input Harmonics	EN61000-3-2 compliant	Inrush Current (cold start)	NV-350 <30A NV-700 <40A	at 25°C and 264Vac at 25°C and 230Vac
Input Fuse	NV-350 = 6.3A, NV-700 = 16A HBC Fast acting (not user accessible)			
Earth Leakage Current	130µA at 120Vac (60Hz), 260µA max at 240Vac (60Hz) Worst case leakage current is less than 300µA at 264Vac, 63Hz (normal condition, 0.5mA Single Fault Condition)			

How To Create A Product Description

The extensive range of output modules and options make it possible to achieve almost any combination of Volts and Amps. You can create your own 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.

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

Converter	**NV3**	350 / 660W
	NV7	700 / 1150W
Cooling	**S**	Standard air - forward
	V	Variable speed fan - forward[6]
	R	Reverse air[4]
	C	Customer air - no fan[1]
Input Connection	**S**	Screw
	I	IEC320[2]
Leakage Current	**S**	Standard: 130µA max at 120Vac (60Hz), 260µA max at 240Vac (60Hz)[5]
Primary Option[3]	**ES5V**	ac good, psu enable, 5V/2A standby
	ES12V	ac good, psu enable, 12V/1A standby
	IS5V	ac good, psu inhibit, 5V/2A standby
	IS12V	ac good, psu inhibit, 12V/1A standby
	EN5V	ac good, psu enable, 5V/2A standby, global module good
	EN12V	ac good, psu enable, 12V/1A standby, global module good
	IN5V	ac good, psu inhibit, 5V/2A standby, global module good
	IN12V	ac good, psu inhibit, 12V/1A standby, global module good

NV3 or NV7	S	S	S	EN5V

1 - Thermocoupled sample recommended to ensure adequate cooling - consult sales
2 - Not with customer air Cooling
3 - The Primary Option uses 1 slot. Leave blank for no primary option.
4 - Not with NV7
5 - Worst case leakage current is less than 300µA at 264Vac, 63Hz Normal Condition (<500µA Single Fault Condition)
6 - Recommended for new designs for NV-350. Not with NV7 (variable speed fan standard on NV7).

2. 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 13V / 20A :-
   a) Select B as closest match for voltage & current and prefix with voltage eg 13BH
   b) Repeat for other outputs.
   This will create a complete product description eg NV3SSSES5V 13BH 12/15DB which represents a three output NV350 with Forward air cooling, Screw input terminals, standard leakage filter, ac good, PSU enable & 5V/2A aux supply
   Output 1 = 13V / 20A. Output 2 = 12V / 13A with screw terminals. Output 3 = 15V / 4A with screw terminals
   Max 350W continuous output power
3. Contact TDK-Lambda to validate configuration and issue a part number.

DUAL OUTPUT MODULES

Module		Output 1		Output 2		
Code	Slots	Voltage Range	Current	Voltage Range	Current	Max Power
DA	1[8]	12 (fixed)	3A	-12 (fixed)	1A	48W[8]
DB	2	3.2 - 3.6	25A	3.3 - 5.5	10A	55W
				7 - 15	5A	60W
				24 - 32	2A	50W
DB	2	4.75 - 5.5	25A	3.3 - 5.5	10A	55W
				7 - 15	5A	60W
				24 - 32	2A	50W
DB	2	5.5 - 6.5	25A	3.3 - 5.5	10A	55W
DB	2	12 - 15	13A[1]	3.3 - 5.5	10A	55W
				7 - 15	5A	60W
				24 - 32	2A	50W
DB	2	24 - 28	7A[2]	3.3 - 5.5	10A	55W
				7 - 15	5A	60W
				24 - 32	2A	50W

1. Derate linearly from 13A at 12.5V to 10A at 15.5V
2. Derate linearly from 7A at 25V to 6A at 28V
3. For NV3 - derate linearly from 40A at 5.2V to 36A at 5.5V
   For NV7 - derate linearly from 40A at 5V to 36A at 5.5V
4. Derate linearly from 22.5A at 8V to 20A at 9V
5. For NV3 - derate linearly from 20A at 13.2V to 16.5A at 15.5V
   For NV7 - derate linearly from 20A at 12.5V to 15.5A at 15.5V

SINGLE OUTPUT MODULES

Module		Output 1	Current	
Code	Slots	Voltage Range	Continuous	Peak
B	2	3.2 - 3.6	40A	
		4.75 - 5.5	40A[3]	
		7 - 9	22.5A[4]	
BH	2	12 - 15.5	20A[5]	
		24 - 28	10A[6]	
C	3	12 - 13.2	37.5A[7]	50A[7]
		15 - 16.5	30A[7]	37.5A[7]
		24 - 26.4	18.75A[7]	25A[7]
		27 - 32	16.6A[7]	19.7A[7]
CM	3	24 - 26.4	18.75A[7]	25A[7]
CC	6	48 - 52.8	18.75A[9]	25A[9]
		54 - 64	16.6A[9]	19.7A[9]

Higher output voltages available by connecting output modules in series. Contact technical support for details

6. For NV3 - derate linearly from 10A at 25.7V to 8.5A at 28V
   For NV7 - derate linearly from 10A at 24V to 8.5A at 28V
7. For NV3 - 400W max
   For NV7 - 600W peak for up to 10sec, 450W average
8. Only one per power supply, 48W max total power for module
9. For NV3 - limited by total output power, see below

OUTPUT POWER

		90-115Vac	115-150Vac	150-180Vac	180-264Vac	Comments	
NV-350	Continuous[6]	350W	450W	450W	660W	1. 350W average 2. 450W average 3. 600W average 4. 700W average	5. 1150W average 6. 250W for reverse air 7. Not for reverse air
	Peak (10s)[7]	400W[1]	500W[2]	500W[2]	740W[3]		
NV-700	Continuous	700W	700W	1150W	1150W		
	Peak (10s)		850W[4]	1150W	1450W[5]		

Output Specification

Voltage / Current	See module tables	
Turn on time	1.5s max	at 90Vac and 100% rated output power
Rise time	<50ms	to 90% of voltage, monotonic rise above 10% (27-32V C module < 100ms)
Efficiency	up to 90%	configuration dependent
Hold up	16ms min	at 90Vac and 100% rated power (12ms for NV-700)
Ripple and Noise	<1% or 50mV if greater	pk-pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	<1%	of set voltage (DA module: +5/-1% for channel 1, +2/-3.5% for channel 2)
Remote Sense	Yes	standard on single o/p + ch1 of dual modules, max 0.5V total line drop (DA module: None)
Minimum Load	No	on any output (DA module: 150mA on channel 1)
Temperature Coefficient	<0.02%	of rated voltage per °C
Load Regulation	<1%	for 0-100% load change (<2% for channel 2) (DA module: <3%)
Line Regulation	<0.1%	for 90-264Vac input change
Cross Regulation	<0.1%	for 100% load change on any output (DA module: 0.2% for channel 1, 3% for channel 2)
Transient Response	<4%	of set voltage for 50% load change
Recovery	500µs	for recovery to 1% of set voltage (DA module: 1000µs)
Over Voltage Protection	Yes	

Output Specification		
Over Current Protection (singles)	110-150%	of module current. Hiccup mode. Module primary side protected
Power Limit (duals)	110-150%	of max Power ch1 + ch2. Hiccup mode. Module primary side protected (DA module: 110-220% for channel 1, 110-170% for channel 2)
Short Circuit Protection	Yes	
Over Temperature Protection	Yes	cycle ac off/on to reset Shutdown temperature varies according to ambient, output power and input voltage.

Isolation			
Input to Output	Reinforced	2 x MOPPs (3rd edition 60601) 4kVac, 5.7kVdc type tested to 4kVac (equivalent to 5.7kVdc), production tested to 4.3kVdc.	Outputs from C, CC, CM or CMCM modules only
	Reinforced	2 x MOOPs (3rd edition 60601) 4.3kVdc (Basic for 2nd edition 60601)	Units with any other module or primary option fitted
Input to Earth	Basic	1 x MOOP (3rd edition 60601), 2.3kVdc	
Output to Earth		200Vdc	CM modules are 500Vac (1 x MOPP)

Signals (all signals referenced to 0V of channel)	
Ch1/Ch2 Module Good	Open collector output. 'On' indicates output is within 90% (± 5%) of nominal
Module inhibit	TTL logic high inhibits the output (both outputs for duals) of the module
Ch2 On/Off (duals only)	TTL logic low inhibits output 2 of the module

Global Interface Signals - units fitted with primary option	
AC good collector AC good emitter	Uncommitted optocoupler. See application note for timings.
Global module good collector Global module good emitter	Uncommitted optocoupler. See application note for timings. Do not connect for ES and IS type primary options.
EN/ES and IN/IS Logic 0	TTL low enables (EN or ES) or inhibits (IN or IS) the entire psu including fan (except standby)
EN/ES and IN/IS Logic 1	TTL high enables (EN or ES) or inhibits (IN or IS) the entire psu including fan (except standby)
Standby Supply	5V / 2A (2.5A peak) or 12V / 1A (1.2A peak)

Environment	
Temperature	0°C to 50°C operational, -40°C to 70°C storage.
Derating	50°C_a to 70°C derate total output power and each output current by 2.5% per °C
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30g shocks in each plane, total 18 shocks 30g shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987.
Vibration	Single axis 10 - 500 Hz at 2g (sweep and endurance at resonance) in all 3 planes
Altitude	3000/5000 metres operational (5000 metres non operational). See handbook for limitations of use.
Pollution	Degree 2, Material group IIIb

a - 45°C for NV7 with input voltage below 100Vac

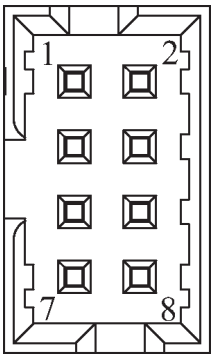
Immunity EN61000-6-2:2005, EN60601-1-2:2007				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV, Contact discharge 8kV	A
Electromagnetic Field	EN61000-4-3	Level 3	12V/m	A
Fast / Burst Transient	EN61000-4-4	Level 4	ac input tested to 4.4kV dc output tested to 2.2kV	A
Surge Immunity	EN61000-4-5	Level 3	Common mode - 2.2kV, Differential - 1.1kV	A
Conducted RF Immunity	EN61000-4-6	Level 3	12V	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	30A/m	A
Voltage Dips, Variations, Interruptions	EN61000-4-11	Class 3	Criteria B for 5 sec interruption Dip to 40% for 5 cycles: NV350 - criteria B below 154Vac input at 350W output, criteria B at 660W output NV700 - criteria B below 198Vac input at 700W output, criteria B at 1150W output	A
Voltage Fluctuations	EN61000-4-14	Class 3	For 100 - 240V Nominal	A

Emissions EN61000-6-3:2007, EN60601-1-2:2007		
Radiated Electric Field	EN55011, EN55032	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B see application note for details. Additional filtering required for IEC inlet version.
Conducted Emissions	EN55011, EN55032	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B
Conducted Harmonics	EN61000-3-2	Class A
Flicker	EN61000-3-3	Compliant - d_{max} only

Approvals / Accreditations	
IEC/EN 62368-1, UL62368-1 / CSA 22.2 No 62368-1	File E135494
IEC/EN 60950-1, UL60950-1 / CSA 22.2 No 60950-1	File E135494
IEC/EN 60601-1, UL/CSA 60601-1, ANSI/AAMI ES60601-1 CAN/CSA-C22.2 No 60601-1-08	File E349607
IEC/EN 61010-1	File E331788
CE Mark (EN62368-1)	Low Voltage Directive (LVD), electromagnetic compatibility (EMC) and Restriction of Hazardous Substances (RoHS)
UKCA (EN62368-1)	Electrical Equipment (Safety) Regulations, electromagnetic compatibility (EMC) and Restriction of Hazardous Substances (RoHS)
CB certificate and Report available on request	*Please check with technical sales for status of approvals*
Designed and manufactured under the control of ISO9001 and ISO13485 (including risk management).	

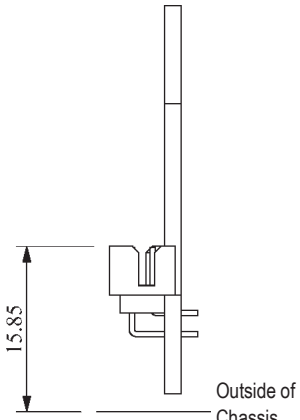
PRIMARY OPTION / DA MODULE

DA Module
1 +12V (channel 1)
2 +12V (channel 1)
3 +12V (channel 1)
4 0V (common ch1 / ch2)
5 0V (common ch1 / ch2)
6 0V (common ch1 / ch2)
7 -12V (channel 2)
8 -12V (channel 2)



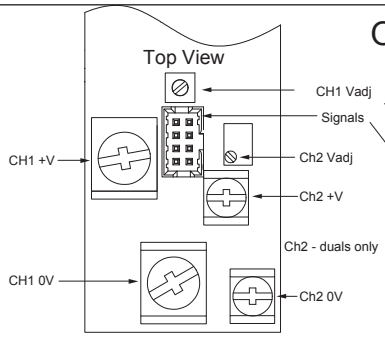
Primary Option
1 +V Standby
2 0V Standby
3 EN/ES & IN/IS Logic 1
4 EN/ES & IN/IS Logic 0
5 Global Module Good Collector
6 Global Module Good Emitter
7 AC good Collector
8 AC good Emitter

Housing: Molex 51110-0860
Crimp pin: 50394
Hand crimp tool: 69008-0959

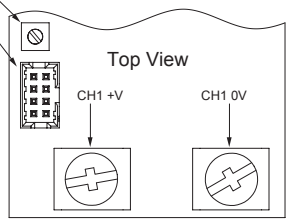


Option End View

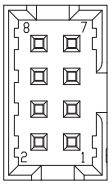
OUTPUT CONNECTIONS



DB / B / BH Module

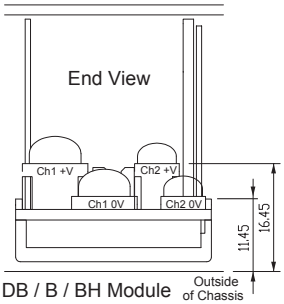


C Module

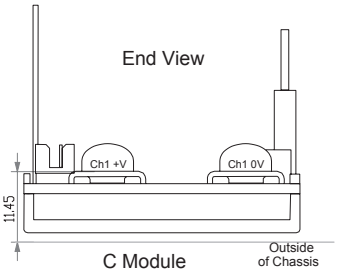


Signals
1 Ch2 0V
2 Ch2 Output Good
3 Ch2 On/Off
4 Module Inhibit
5 Ch1 0V
6 Ch1 Output Good
7 Ch1 Remote Sense -
8 Ch1 Remote Sense +

Housing: Molex 51110-0860
Crimp pin: 50394 Hand crimp tool: 69008-0959
Note: Do not connect pins 1-3 on single output modules



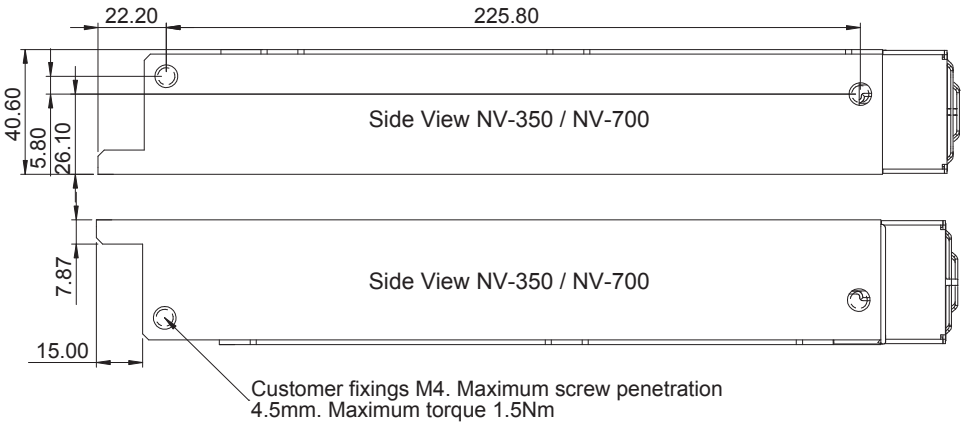
DB / B / BH Module Outside of Chassis



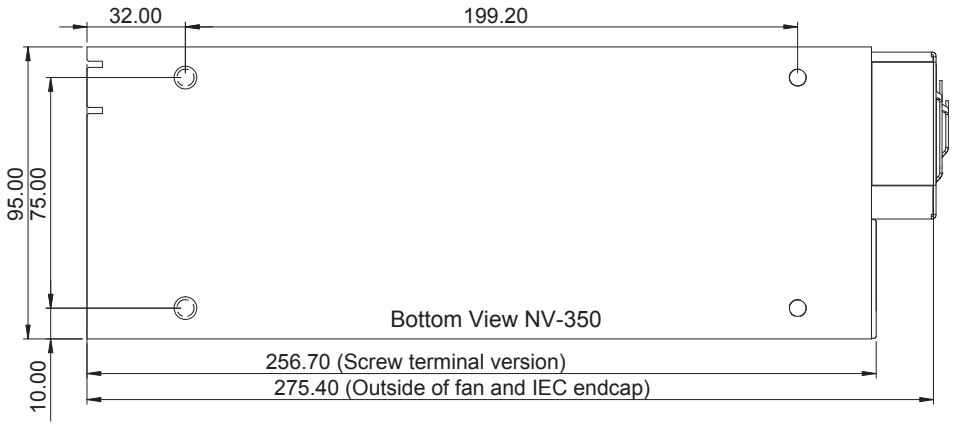
C Module Outside of Chassis

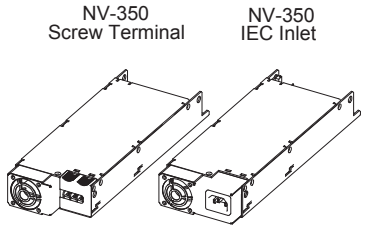
Connection Guidelines

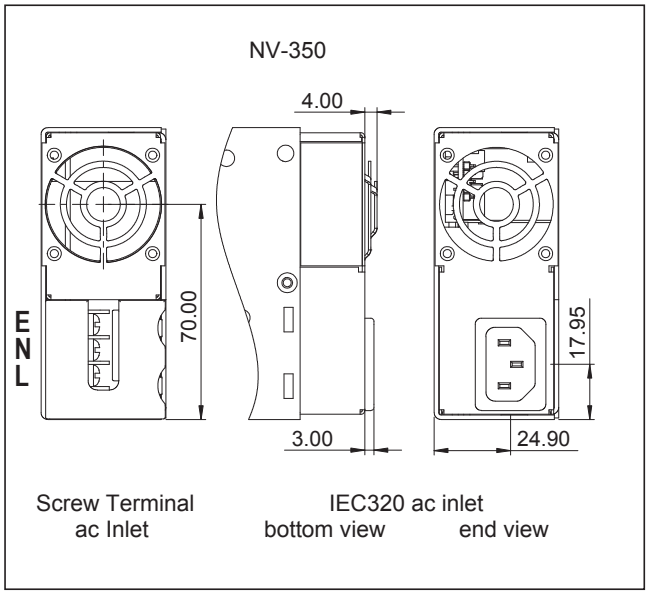
Ring Tags: Up to 50A, AMP PIDG terminals
Red: M3 36151, M4 320551, M5 130660
Blue: M3 320561, M4 320560, M5 130663
Yellow: M3 M4 320568, M5 130167
Crimp tool: 16900 Die set 169404

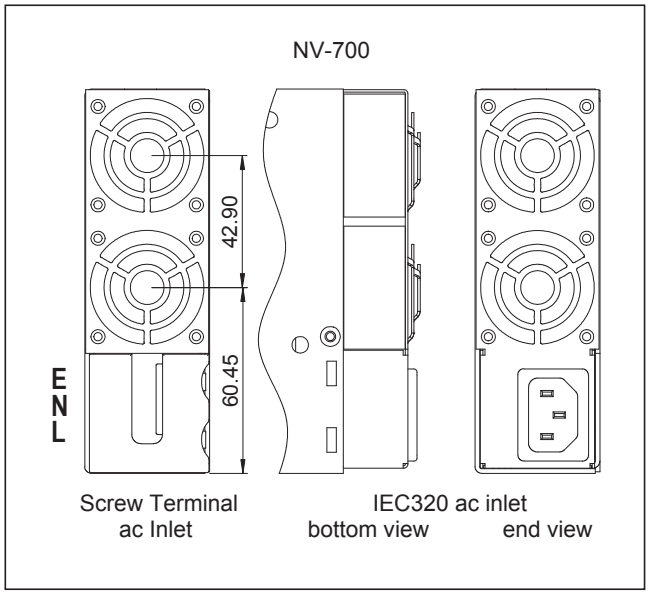


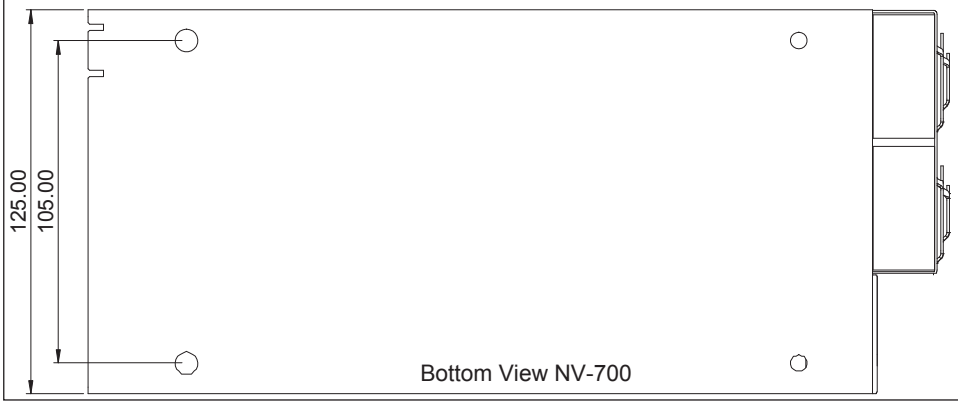
NOTES
1) Dimensions in mm
2) Tolerances:
Edge to edge/Edge to centre, +/-0.5
Centre to centre +/-0.2

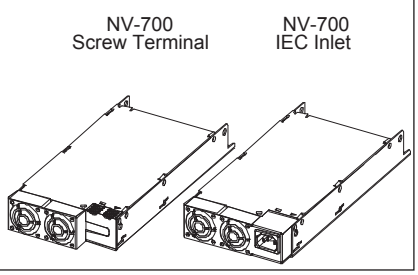














TDK-Lambda France SAS
Tel: +33 1 60 12 71 65
tlf.fr-powersolutions@tdk.com
www.emea.lambda.tdk.com/fr



Italy Sales Office
Tel: +39 02 61 29 38 63
tlf.it-powersolutions@tdk.com
www.emea.lambda.tdk.com/it



Netherlands
tlf.nl-powersolutions@tdk.com
www.emea.lambda.tdk.com/nl



TDK-Lambda Germany GmbH
Tel: +49 7841 666 0
tlg.powersolutions@tdk.com
www.emea.lambda.tdk.com/de



Austria Sales Office
Tel: +43 2256 655 84
tlg.at-powersolutions@tdk.com
www.emea.lambda.tdk.com/at



Switzerland Sales Office
Tel: +41 44 850 53 53
tlg.ch-powersolutions@tdk.com
www.emea.lambda.tdk.com/ch



Nordic Sales Office
Tel: +45 8853 8086
tlg.dk-powersolutions@tdk.com
www.emea.lambda.tdk.com/dk



TDK-Lambda UK Ltd.
Tel: +44 (0) 12 71 85 66 66
tlu.powersolutions@tdk.com
www.emea.lambda.tdk.com/uk



TDK-Lambda Ltd.
Tel: +9 723 902 4333
tli.powersolutions@tdk.com
www.emea.lambda.tdk.com/il-en



TDK-Lambda Americas
Tel: +1 800-LAMBDA-4 or 1-800-526-2324
tla.powersolutions@tdk.com
www.us.lambda.tdk.com



TDK Electronics do Brasil Ltda
Tel: +55 11 3289-9599
sales.br@tdk-electronics.tdk.com
www.tdk-electronics.tdk.com/en



TDK-Lambda Corporation
Tel: +81-3-6778-1113
www.jp.lambda.tdk.com



TDK-Lambda (China) Electronics Co. Ltd.
Tel: +86 21 6485-0777
tlc.powersolutions@tdk.com
www.lambda.tdk.com.cn



TDK-Lambda Singapore Pte Ltd.
Tel: +65 6251 7211
tls.marketing@tdk.com
www.sg.lambda.tdk.com



TDK India Private Limited, Power Supply Division
Tel: +91 80 4039-0660
mathew.philip@tdk.com
www.sg.lambda.tdk.com

For Additional Information, please visit
https://product.tdk.com/en/power/