

Технические характеристики на источники питания AC/DC серии NV-Power Configurable

По вопросам продаж и поддержки обращайтесь:

Архангельск (8182)63-90-72
Брянск (4832)59-03-52
Вологда (8172)26-41-59
Иваново (4932)77-34-06
Калининград (4012)72-03-81
Киров (8332)68-02-04
Курск (4712)77-13-04
Москва (495)268-04-70
Нижегород (831)429-08-12
Орел (4862)44-53-42
Пермь (342)205-81-47
Самара (846)206-03-16
Смоленск (4812)29-41-54
Тверь (4822)63-31-35
Тюмень (3452)66-21-18
Челябинск (351)202-03-61

Астана +7(7172)727-132
Владивосток (423)249-28-31
Воронеж (473)204-51-73
Ижевск (3412)26-03-58
Калуга (4842)92-23-67
Краснодар (861)203-40-90
Липецк (4742)52-20-81
Мурманск (8152)59-64-93
Новокузнецк (3843)20-46-81
Оренбург (3532)37-68-04
Ростов-на-Дону (863)308-18-15
Санкт-Петербург (812)309-46-40
Сочи (862)225-72-31
Томск (3822)98-41-53
Ульяновск (8422)24-23-59
Череповец (8202)49-02-64

Белгород (4722)40-23-64
Волгоград (844)278-03-48
Екатеринбург (343)384-55-89
Казань (843)206-01-48
Кемерово (3842)65-04-62
Красноярск (391)204-63-61
Магнитогорск (3519)55-03-13
Набережные Челны (8552)20-53-41
Новосибирск (383)227-86-73
Пенза (8412)22-31-16
Рязань (4912)46-61-64
Саратов (845)249-38-78
Ставрополь (8652)20-65-13
Тула (4872)74-02-29
Уфа (347)229-48-12
Ярославль (4852)69-52-93

NV-Power NV-100



Industrial



Test



Broadcast



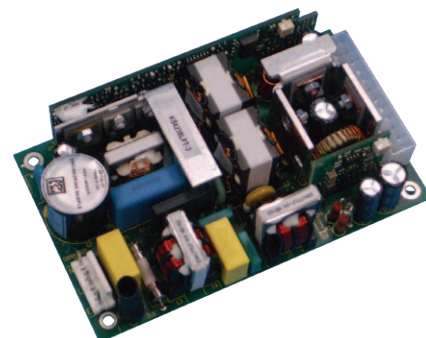
Comms



Renewable

**100W Configurable
ac-dc power supply.**

Features	Benefits
• High Efficiency	Minimises heat in system
• Low Profile	Fits 1U Applications
• Single output connector	Simple and error free connection
• 4 outputs	Eliminates additional power supplies
• 3 Year Warranty	Low cost of ownership



Input			
Input Voltage	90-264Vac	Input Frequency	45 - 63Hz (440Hz with reduced PFC - consult sales office)
Input Harmonics	EN61000-3-2 compliant	Power Factor	0.97 typical
Input Fuse	Time delay (not user accessible)	Inrush Current	<40A at 25°C and 264Vac (cold start)
Earth Leakage Current	123µA at 120Vac (60Hz), 257µA max at 240Vac (60Hz)		

Isolation			
Input to Output	4.3kVdc		
Input to Earth	1.5kVac, 2.3kVdc	Output to Earth	200Vdc

QUICK SELECTOR - example configurations					Additional variants available, see "How to Create a Product Description"
Model	Ch1	Ch2	Ch3	Ch4	
NVA1-453TT	5V / 10A	3.3V / 8A	12V / 3A	-12V / 1A	
NVA1-453FF	5V / 10A	3.3V / 8A	15V / 3A	-15V / 1A	
NVA1-4G5TT	24V / 4A	5V / 5A	12V / 3A	-12V / 1A	
NVA1-4G5FF	24V / 4A	5V / 5A	15V / 3A	-15V / 1A	

How To Create A Product Description							Confirm availability of created product with TDK-Lambda
	NVA1-	#o/p	Ch1	Ch2	Ch3	Ch4 ₁	Case Option
Number of outputs							
Letter / number from 'Available Ch1 - Ch4 Outputs' table to represent output voltage							
							Blank no case -C U chassis + cover -U U chassis
1. For positive output channel 4, follow chosen letter by 'P'. For example, TP channel 4 = +12V / 1A.							

Available Outputs				Other output options are available, please contact sales office with your requirements			
Channel 1	Adjustment Range	Channel 2	Adjustment Range	Channel 3	Adjustment Range	Channel 4 ₂	Adjustment Range
5 5V / 10A ₁	4.75 - 5.25V	3 3.3V / 8A	3.14 - 3.46V	T 12V / 3A F 15V / 3A G 24V / 1.5A	Fixed Fixed Fixed	T -12V / 1A ₃ F -15V / 1A ₃	Fixed Fixed
G 24V / 4A	23 - 25V	5 5V / 5A	3.3 - 5.5V	T 12V / 3A F 15V / 3A	Fixed Fixed	T -12V / 1A F -15V / 1A	Fixed Fixed

1. Total power of 5V ch1 + 3.3V ch2 must not exceed 60W 2. Follow characters in red by 'P' for positive output channel 4. 3. If channel 3 = 24V (G), channel 4 must be 'P'

Output Specification		
Turn on time	1.5s max	at 90Vac and 100% rated output power
Efficiency	up to 90%	configuration dependent
Hold up	16ms min	at 90Vac
Ripple and Noise	<1%	(or 50mV if higher) pk-pk, using EIAJ test method & 20MHz bandwidth 1.5% on channel 4 for 5V channel 1 configs.
Voltage Accuracy	±1%	±5% for Channels 3 & 4 (with Ch1 set to nominal voltage)
Remote Sense	Yes	Channels 1 & 2. Max 0.5V total line drop
Minimum Load	No	on any output. (For models with 12V or 15V ch3, a load ≥1A is required on ch3 to keep it in full regulation when Ch1 + Ch2 power ≥50W)
Total Regulation	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. (5% for channels 3 & 4)
Transient Response	<4%	of set voltage for 50% load change (in 50µs within the range 25-100% load)
Recovery	500µs	for recovery to 1% of set voltage
Over Voltage Protection	Yes	See Application Notes for details
Short Circuit Protection	Yes	
Over Temperature Protection	Yes	
Total Output Power	100W	
Ch1 Good Signal	Optional	Contact sales office for details

Environment	
Temperature	0°C to 50°C operational, -40°C to 85°C storage (max 12 months). Full load, with 2m/s air blown from input to output (approximately 10CFM)
Convection Rating	50W at 50°C. Max 50% output current on any output. See Application Notes for details
Derating	50°C to 70°C derate each output by 2.5% per °C
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30g shocks in each plane, total 18 shocks 30g shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 516.5, Pro I, IV, VI
Vibration	Single axis 10 - 500 Hz at 2g (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 514.4, Pro I, Cat 1,9
Altitude	-200 to 3000 metres operational (-200 to 5000m storage/transportation)
Pollution	Degree 2, Material group IIIb

Immunity EN61000-6-2:2005				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV, Contact discharge 8kV. Not applicable to open frame units	A
Electromagnetic Field	EN61000-4-3	Level 3	12V/m	A
Fast / Burst Transient	EN61000-4-4	Level 3	ac input tested to 2.2kV dc output tested to 1.1kV	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 and dips to 40% for 5 cycles below 220Vac nominal input [criteria A if less than 60% load]	A

Emissions EN61000-6-3:2007		
Radiated Electric Field	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B see application note for details.
Conducted Emissions	EN55011, EN55022	(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

Safety Approvals

IEC/EN 60950-1, UL60950-1 / CSA 22.2 No 60950-1

CE Mark (EN60950-1)

CB certificate and Report available on request

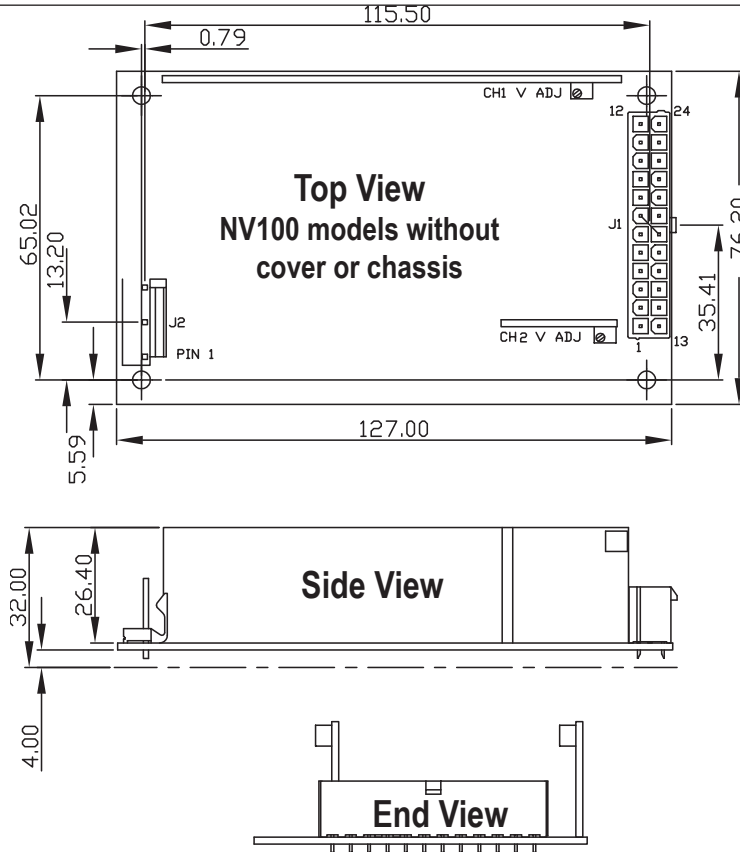
Notes

File E135494

LV Directive 2006/95/EC

Please check with technical sales for status of approvals

Outline & Connection Drawings



J2	
PIN	FUNCTION
1	EARTH
2	NOT CONNECTED
3	LIVE
4	NOT CONNECTED
5	NEUTRAL

Input and output connectors are not included with the product. They are available from TDK-Lambda

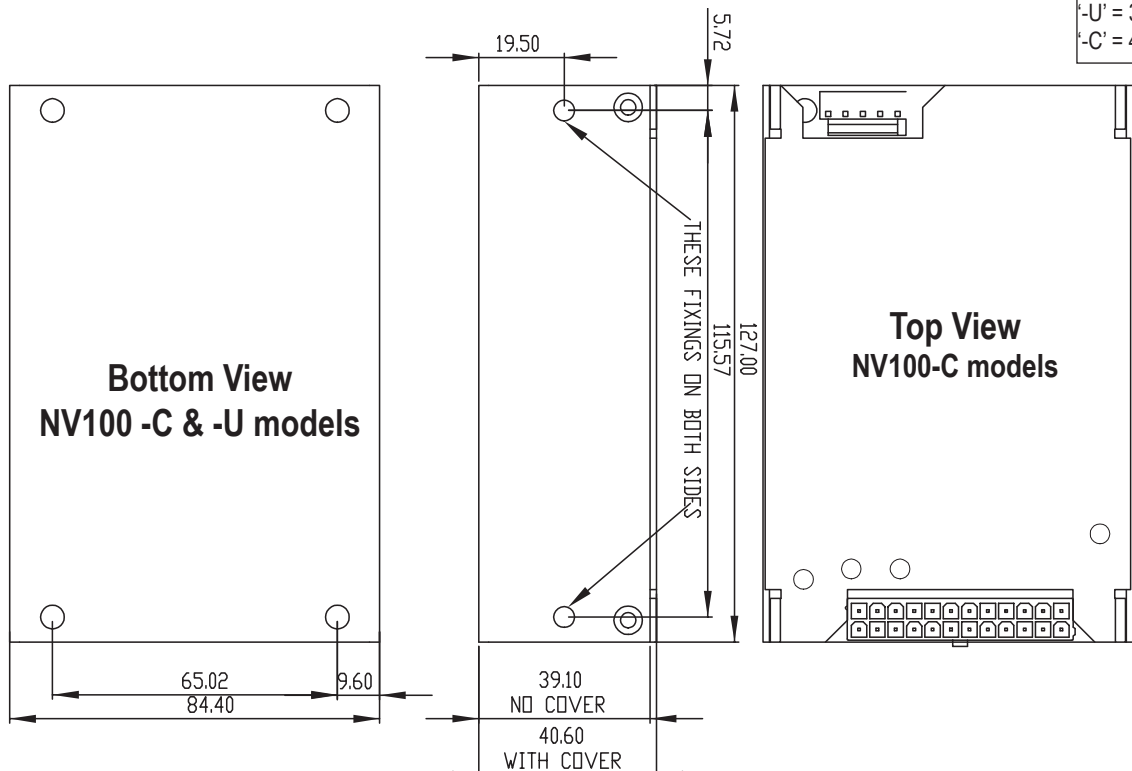
Part No	Contents
94910	1 off input connector and 3 crimps
94911	1 off output connector and 24 crimps

Output Connector J1			
Pin	Function	Pin	Function
12	Not connected	23	Not connected
11	Not connected	24	Not connected
10	Ch1 output	22	Ch1 good
9	Ch1 output	21	Ch1 output
8	Ch1 output	20	Ch1 output
7	+ Sense Ch1	19	- Sense Ch1
6	0V common	18	0V common
5	0V common	17	0V common
4	Ch2 output	16	0V common
3	Ch2 output	15	Ch2 output
2	+ Sense Ch2	14	- Sense Ch2
1	Ch3 output	13	Ch4 output

MATING PARTS (MOLEX OR EQUIVALENT)

CONN	HOUSING	PINS
J1	39-01-2205	45750-3112
J2	09-50-8051	08-52-0113

Weights (±80g)
open frame = 250g
'-U' = 350g
'-C' = 400g



Notes: 1. All customer fixings M3

2. Maximum thread penetration 4.5mm

3. Maximum torque 0.9Nm

4. All tolerances +/-0.5mm

NV-Power NV-175



Medical



Industrial



Test



Broadcast



Comms



Renewable

**175/180/200W Configurable
ac/dc power supply.**

Features	Benefits
• High Efficiency	Minimises heat in system
• Low Profile	Fits 1U Applications
• High power density	Reduces space requirement
• Temperature controlled fan option	Reduces system noise
• 3 Year Warranty	Low cost of ownership



Input			
Input Voltage	90-264Vac	Input Frequency	45 - 63Hz (440Hz with reduced PFC - consult sales office)
Input Harmonics	EN61000-3-2 compliant	Power Factor	0.97 typical
Input Fuse	Timelag (not user accessible)	Inrush Current	<40A at 25°C and 230Vac (cold start)
Earth Leakage Current	123µA at 120Vac (60Hz), 257µA max at 240Vac (60Hz) Worst case leakage current is less than 300µA at 264Vac, 63Hz (normal condition, 500µA Single Fault Condition)		

Available Outputs							
Channel 1	Adjustment Range	Channel 2 ₁	Adjustment Range	Channel 3 ₃	Adjustment Range	Channel 4 ₄	Adjustment Range
5 5V / 25A ₂	5 - 5.5V	1 1.8V / 15A 2 2.7V / 15A 3 3.3V / 15A 0 Omit	0.9 - 2.5V 2.5 - 3.3V 2.5 - 3.3V	T 12V / 5A F 15V / 5A G 24V / 2.5A 0 Omit	12 - 15V 12 - 15V 18 - 24V	T -12V / 1A F -15V / 1A 3H -3.3V / 2A ₉ 5H -5V / 2A ₉ TH -12V / 2A ₉ FH -15V / 2A ₉ 0H Fan supply only 0 Omit	Fixed Fixed Fixed Fixed Fixed Fixed
T 12V / 15A F 15V / 12A	12 - 15V ₅ 12 - 15V ₆	5 5V / 10A ₁₀ 0 Omit	3.3 - 5.5V				
G 24V / 7.5A	24 - 28V ₇	5 5V / 8A ₈ 0 Omit	3.3 - 5.5V				

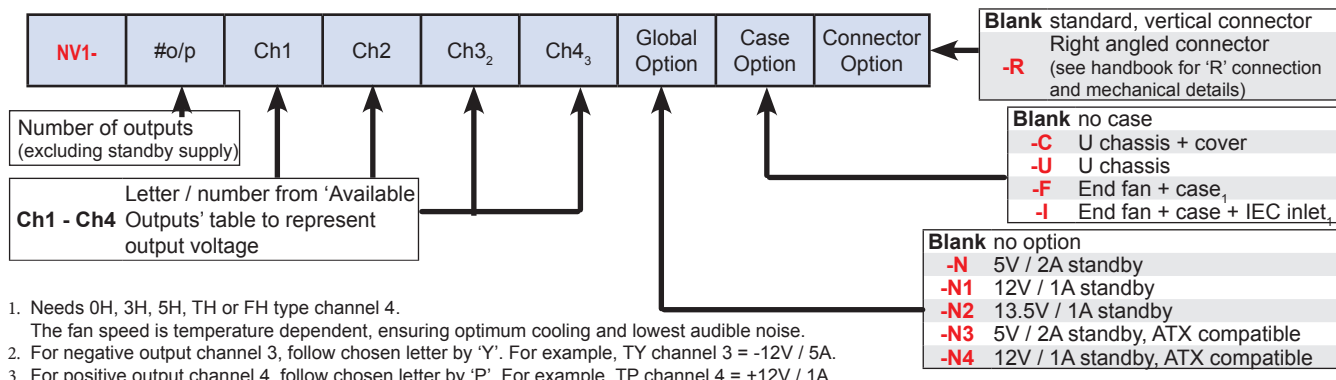
1. 1.8V, 2.7V, 3.3V channel 2 only available with 5V Channel 1
5V/10A channel 2 only available with 12V or 15V Channel 1
5V/8A channel 2 only available with 24V Channel 1.
2. Maximum combined output current from Ch1 & Ch2 = 25A
Models with 5V channel 1 are limited to 175W output power
3. Follow letters in red by 'Y' for negative output channel 3.
4. Follow letters in red by 'P' for positive output channel 4.
5. 12 - 12.5V if 24V channel 3 fitted.
6. 14.5 - 15V if 24V channel 3 fitted
7. 24 - 24.5V if 5V channel 2 fitted
24 - 26V if 24V channel 3 fitted.
8. 7A max with '-F' or '-I' option.
9. 1.5A max with '-F' or '-I' option.
10. 9A max with '-F' or '-I' option.

Other output options are available, please contact sales office with your requirements

Isolation		
Input to Output	2 x MOOPs (3rd edition 60601) 4.3kVdc	Medical reinforced (2 x MOPPs) version available, contact sales office for details.
Input to Earth	1.5kVac, 2.3kVdc	
Output to Earth	200Vdc	

How To Create A Product Description

Confirm availability of created product with TDK-Lambda



Output Specification

Turn on time	1.5s max	at 90Vac and 100% rated output power
Efficiency	up to 90%	configuration dependent
Hold up	16ms min	at 90Vac
Ripple and Noise	<1%	(or 50mV if higher) pk-pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	±1%	±4% for Channel 4 with 'T' or 'F' type outputs, +4/-3% for all other channel 4.
Remote Sense	Yes	Channels 1 & 2. Max 0.5V total line drop
Minimum Load	No	on any output
Total Regulation	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.
Transient Response	<4%	of set voltage for 50% load change (in 50µs within the range 25-100% load)
Recovery	500µs	for recovery to 1% of set voltage
Over Voltage Protection	Yes	See Application Notes for details
Short Circuit Protection	Yes	
Over Temperature Protection	Yes	
Peak Output Power	200W	Single output units with 12V, 15V or 24V (T, F or G). Average output power must not exceed 180W over any 5 minute period
Ch1 Good Signal	Yes	Provides a Logic 'Low' signal after Channel 1 output is within 90% (±5%) of nominal

QUICK SELECTOR - example configurations

Model	Ch1	Ch2	Ch3	Ch4	Ch5	Global Option
NV1-1T000	12V / 15A	-	-	-	-	No
NV1-1G000	24V / 7.5A	-	-	-	-	No
NV1-453TT	5V / 25A	3.3V / 15A	12V / 5A	-12V / 1A	-	No
NV1-453TT-N3	5V / 25A	3.3V / 15A	12V / 5A	-12V / 1A	5V / 2A	ATX (-N3)
NV1-453FF	5V / 25A	3.3V / 15A	15V / 5A	-15V / 1A	-	No
NV1-453FF-N3	5V / 25A	3.3V / 15A	15V / 5A	-15V / 1A	5V / 2A	ATX (-N3)
NV1-4G5TT	24V / 7.5A	5V / 8A	12V / 5A	-12V / 1A	-	No
NV1-4G5TT-N3	24V / 7.5A	5V / 8A	12V / 5A	-12V / 1A	5V / 2A	ATX (-N3)
NV1-4G5FF	24V / 7.5A	5V / 8A	15V / 5A	-15V / 1A	-	No
NV1-4G5FF-N3	24V / 7.5A	5V / 8A	15V / 5A	-15V / 1A	5V / 2A	ATX (-N3)

Additional variants available 'Built to Order' - see 'How to create a product description'

Global Signals (-N, -N1 and -N2 option models)	
Remote on/off	TTL logic level high inhibits all outputs (except Standby)
Power Good	Open collector output (referenced to PSU 0V). Turns on to indicate ac supply is good and output 1 is within regulation.
Standby Supply	Isolated supply, not affected by remote on/off -N option = 5V / 2A (2.5A peak) -N1 Option = 12V / 1A -N2 Option = 13.5V / 1A

Global Signals (-N3 and -N4 option models)	
ATX Remote on/off	TTL logic level high or open circuit inhibits all outputs (except Standby)
ATX Power Good	Logic high indicates ac supply is good and output 1 is within regulation.
Standby Supply	Common 0V with power supply. Not affected by ATX remote on/off -N3 option = 5V / 2A -N4 Option = 12V / 1A

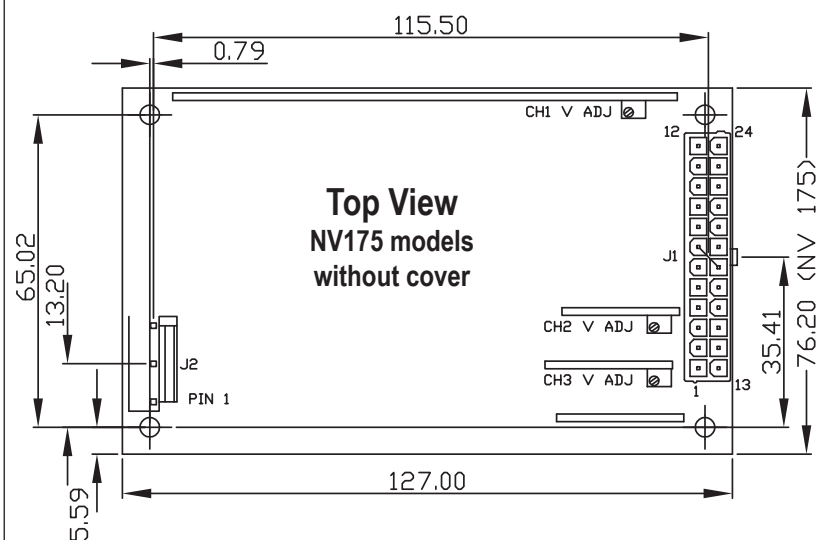
Immunity EN61000-6-2:2005, EN60601-1-2:2007				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV, Contact discharge 8kV. Not applicable to open frame units	A
Electromagnetic Field	EN61000-4-3	Level 3	12V/m	A
Fast / Burst Transient	EN61000-4-4	Level 4	ac input tested to 4.4kV dc 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 and dips to 40% for 5 cycles below 154Vac nominal input	A

Emissions EN61000-6-3:2007, EN60601-1-2:2007			
Radiated Electric Field	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B see application note for details. Additional filtering is required for IEC inlet version	
Conducted Emissions	EN55011, EN55022	(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	

Environment	
Temperature	0°C to 50°C operational, -40°C to 70°C storage (max 12 months). Full load, with either 'F' option fitted or 2m/s air blown from input to output (approximately 10CFM)
Derating	50°C to 70°C derate each output by 2.5% per °C
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30g shocks in each plane, total 18 shocks 30g shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 516.5, Pro I, IV, VI
Vibration	Single axis 10 - 500 Hz at 2g (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 514.4, Pro I, Cat 1,9
Altitude	3000 metres operational
Pollution	Degree 2, Material group IIb

Approvals / Accreditations	
IEC/EN 60950-1, UL60950-1 / CSA 22.2 No 60950-1	File E135494
IEC/EN 60601-1, UL/CSA 60601-1, ANSI/AAMI ES60601-1 CAN/CSA-C22.2 No 60601-1-08	File E349607
IEC/EN61010	File E331788
CE Mark (EN60950-1)	LV Directive 2006/95/EC
CB certificate and Report available on request	<i>Please check with technical sales for status of approvals</i>
Designed and manufactured under the control of ISO9001 and ISO13485 (including risk management).	

Outline & Connection Drawings



J2

PIN	FUNCTION
1	EARTH
2	NOT CONNECTED
3	LIVE
4	NOT CONNECTED
5	NEUTRAL

J1

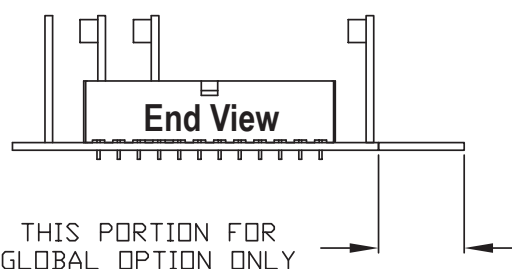
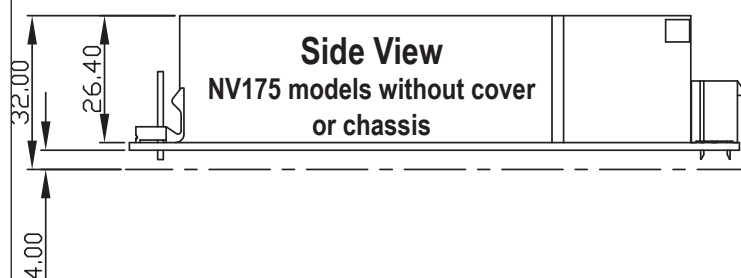
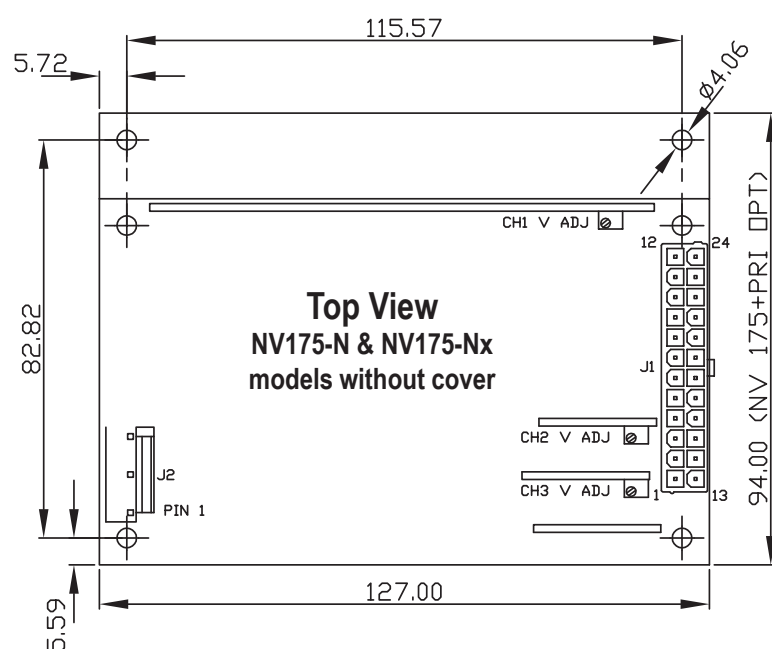
PIN	FUNCTION	PIN	FUNCTION
12	STANDBY +Ve	24	STANDBY RETURN
11	POWER GOOD	23	REMOTE ON/OFF
10	CH1 OUTPUT	22	CH1 GOOD
9	CH1 OUTPUT	21	CH1 OUTPUT
8	CH1 OUTPUT	20	CH1 OUTPUT
7	+SENSE CH1	19	-SENSE CH1
6	0V COMMON	18	0V COMMON
5	0V COMMON	17	0V COMMON
4	CH2 OUTPUT	16	0V COMMON
3	CH2 OUTPUT	15	CH2 OUTPUT
2	+SENSE CH2	14	-SENSE CH2
1	CH3 OUTPUT	13	CH4 OUTPUT

MATING PARTS (MOLEX OR EQUIVALENT)

CONN	HOUSING	PINS
J1	39-01-2245	44476-3112
J2	09-50-8051	08-52-0113

Input and output connectors are not included with the product. They are available from TDK-Lambda

Part Number	Contents
94910	1 off input connector and 3 crimps
94911	1 off output connector and 24 crimps



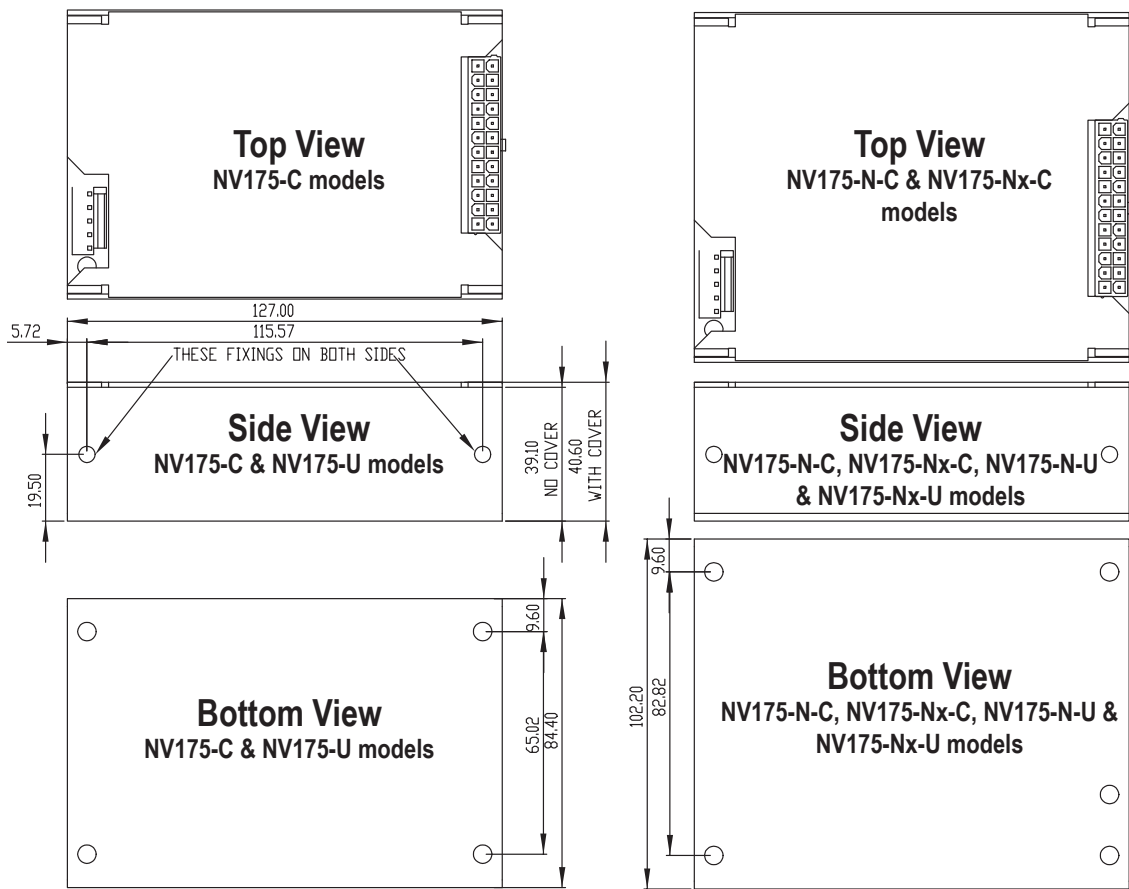
Notes: 1. All customer fixings M3

2. Maximum thread penetration 4.5mm

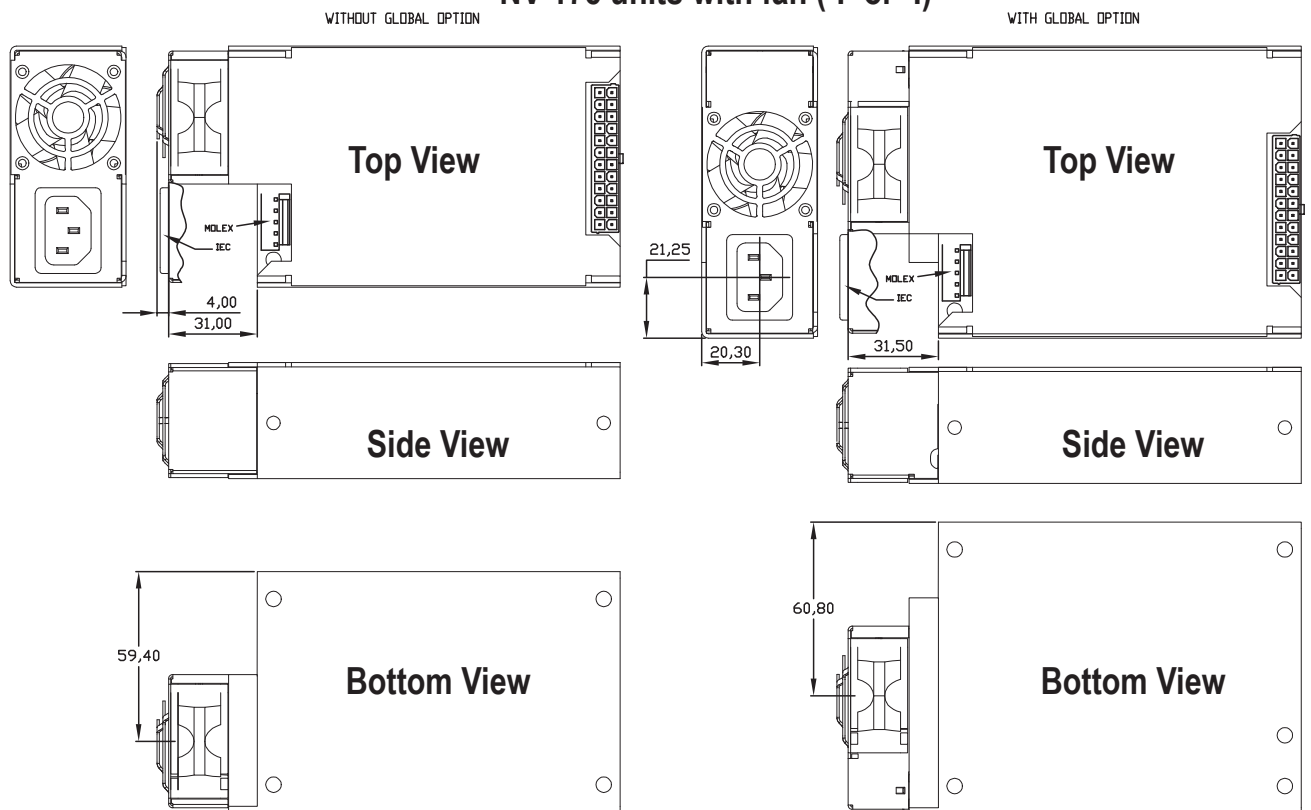
3. Maximum torque 0.9Nm

4. All tolerances +/-0.5mm

Outline & Connection Drawings



NV-175 units with fan (-F or -I)



Other dimensions same as cases without fans (above)

Notes: 1. All customer fixings M3

2. Maximum thread penetration 4.5mm

3. Maximum torque 0.9Nm

4. All tolerances $\pm 0.5\text{mm}$

NV-Power NVM-175



Medical



Industrial



Test



Broadcast



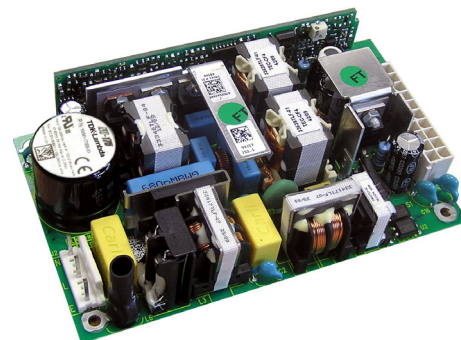
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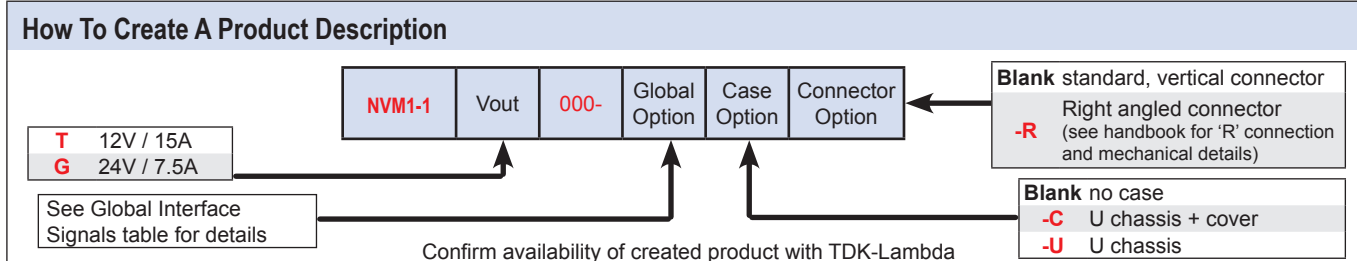
Renewable

**180W Configurable
Medical power supply.**

Features	Benefits
• High Efficiency	Minimises heat in system
• Low Profile	Fits 1U Applications
• Dual Fusing	Simplifies system design, reduces cost
• 2 x MOPPs isolation	Simplifies system design
• 3 Year Warranty	Low cost of ownership



Input			
Input Voltage	90-264Vac (100 - 240Vac nominal)	Input Frequency	45 - 63Hz
Input Harmonics	EN61000-3-2 compliant	Power Factor	0.97 typical
Input Fuse	Dual fused, Fast acting (not user accessible)	Inrush Current	<40A at 25°C and 230Vac (cold start)
Earth Leakage Current	80µA at 120Vac (60Hz), 170µA max at 240Vac (60Hz) Worst case leakage current is less than 200µA at 264Vac, 63Hz (normal condition, 0.33mA Single Fault Condition)		



QUICK SELECTOR - example configurations			
Model	Ch1	Standby	Remote On/Off
NVM1-1T000-S1	12V / 15A	12V / 0.2A	TTL high / OC to inhibit
NVM1-1G000-S1	24V / 7.5A	12V / 0.2A	TTL high / OC to inhibit

Output Specification		
Turn on time	2s max	at 90Vac and 100% rated output power
Efficiency	up to 90%	
Hold up	16ms min	at 90Vac
Ripple and Noise	<1%	(or 50mV if higher) pk-pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	±1%	
Remote Sense	Yes	Channel 1. Max 0.5V total line drop
Minimum Load	No	on any output
Total Regulation	1%	Including Line (for 90-264Vac input change) and Load (for 0-100% load change)
Transient Response	<4%	of set voltage for 50% load change (in 50µs within the range 25-100% load)
Recovery	500µs	for recovery to 1% of set voltage
Over Voltage Protection	Yes	120-135% of Vout. Remove ac for 10 seconds then reapply to restart unit
Short Circuit Protection	Yes	
Over Temperature Protection	Yes	
Output Power	180W	

Isolation			
Input to Output	Reinforced	2 x MOPPs (3rd edition 60601) 4.5kVac	type tested to 4.5kVac (equivalent to 6.3kVdc), production tested to 4.3kVdc
Input to Earth	Basic	1.5kVac, 2.3kVdc	
Output to Earth		1.5kVac	

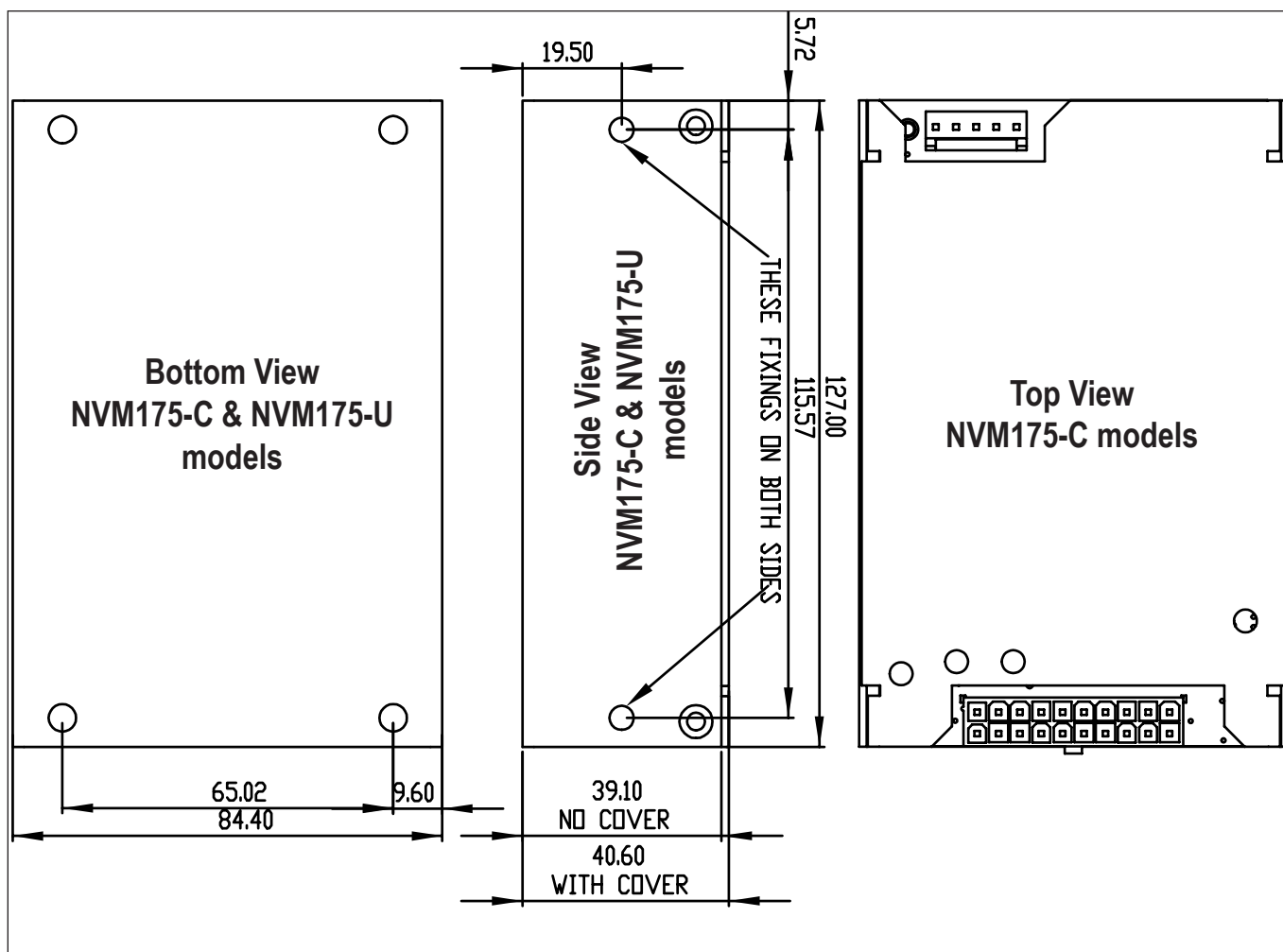
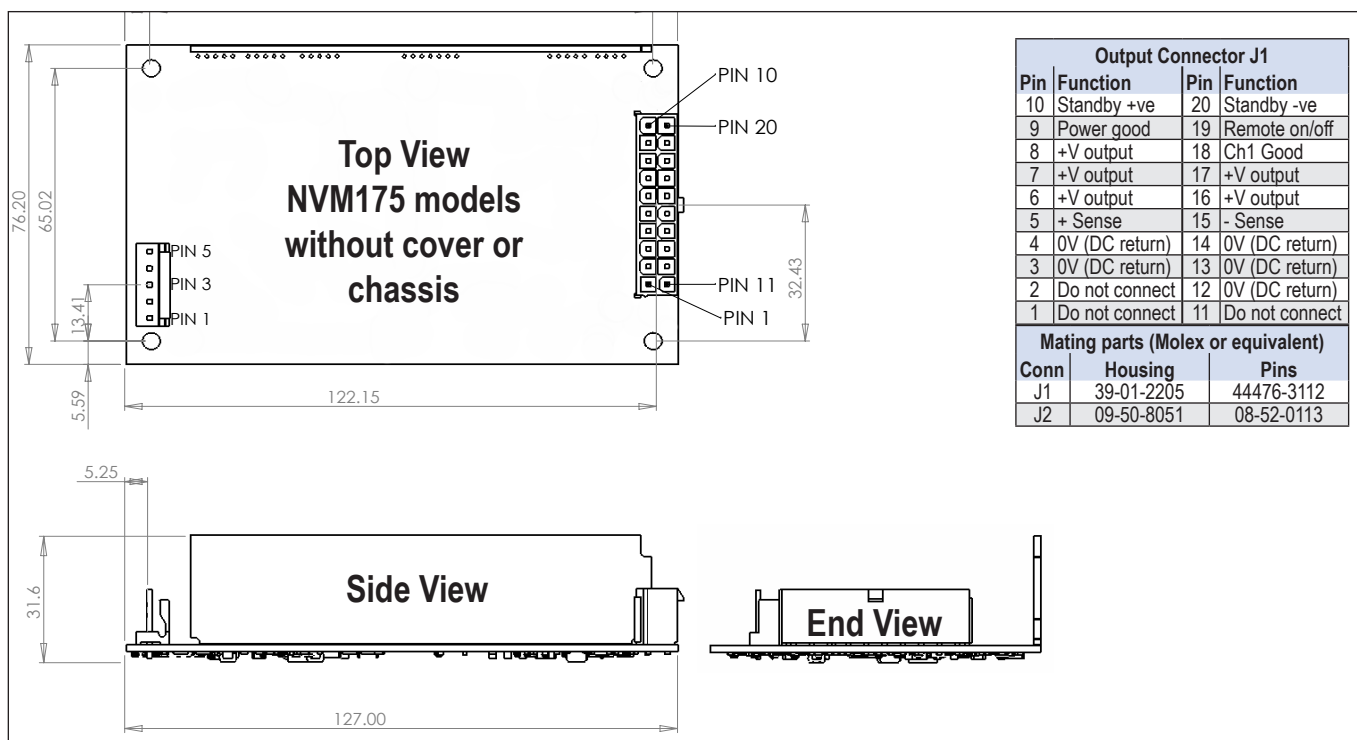
Environment	
Temperature	0°C to 50°C operational, -40°C to 85°C storage (max 12 months). Full load, with 2m/s air blown from input to output (approximately 10CFM)
Derating	50°C to 70°C derate each output by 2.5% per °C with 2m/s air blown from input to output
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30g shocks in each plane, total 18 shocks 30g shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 516.5, Pro I, IV, VI
Vibration	Single axis 10 - 500 Hz at 2g (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 514.4, Pro I, Cat 1,9
Altitude	5000 metres operational (3000 metres for medical approval)
Pollution	Degree 2, Material group IIIb

Global Interface Signals				
	Standby	PSU good signal	Logic level to enable main output	
S	12V / 0.2A	Power good	High	Power good = logic low signal to indicate when ac supply is good and output 1 is within regulation
S1	12V / 0.2A	Power good	Low	
S2	12V / 0.2A	Channel 1 good	High	Channel 1 good = logic low signal to indicate when output 1 is within regulation
S3	12V / 0.2A	Channel 1 good	Low	
S5	5V / 0.5A	Power good	Low	

Approvals / Accreditations	
IEC/EN 60950-1, UL60950-1 / CSA 22.2 No 60950-1	File E135494
IEC/EN 60601-1, UL/CSA 60601-1, ANSI/AAMI ES60601-1 CAN/CSA-C22.2 No 60601-1-08	File E349607
CE Mark (EN60950-1)	LV Directive 2006/95/EC
CB certificate and Report available on request	<i>Please check with technical sales for status of approvals</i>
Designed and manufactured under the control of ISO9001 and ISO13485 (including risk management).	

Immunity EN61000-6-2:2005, EN60601-1-2:2007				Criteria
Electrostatic Discharge	EN61000-4-2	Level 3	Air discharge 8kV, Contact discharge 6kV. Not applicable to open frame units	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 and dips to 40% for 5 cycles below 154Vac nominal input	A

Emissions EN61000-6-3:2007, EN60601-1-2:2007			
Radiated Electric Field	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B see application note for details.	
Conducted Emissions	EN55011, EN55022	(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	



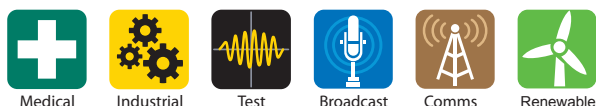
Notes:

1. All customer fixings M3
2. Maximum thread penetration 4.5mm
3. Maximum torque 0.9Nm
4. All tolerances +/-0.5mm

Input and output connectors are not included with the product.
They are available from TDK-Lambda

1 off input connector and 3 crimps part number is 94910.
1 off output connector and 20 crimps part number is 94668

NV-Power NV-175M



**180-200W Configurable
Medical power supply.**

Features	Benefits
• High Efficiency	Minimises heat in system
• Low Profile	Fits 1U Applications
• Low Earth Leakage and Class B EMC	Simplifies system design, reduces cost
• 2 x MOPPs isolation	Simplifies system design
• 3 Year Warranty	Low cost of ownership



Input			
Input Voltage	90-264Vac (100 - 240Vac nominal)	Input Frequency	45 - 63Hz
Input Harmonics	EN61000-3-2 compliant	Power Factor	0.97 typical
Input Fuse	Fast acting (not user accessible)	Inrush Current	<40A at 25°C and 230Vac (cold start)
Earth Leakage Current	123µA at 120Vac (60Hz), 257µA max at 240Vac (60Hz) Worst case leakage current is less than 300µA at 264Vac, 63Hz (normal condition, 0.5mA Single Fault Condition) Lower leakage versions available, contact sales office for details		

Isolation			
Input to Output	2 x MOPPs (3rd edition 60601) 4kVac	type tested to 4kVac (equivalent to 5.7kVdc), production tested to 4.3kVdc	
Input to Earth	1.5kVac, 2.3kVdc	Output to Earth	200Vdc

QUICK SELECTOR - example configurations				Additional variants available, see "How to Create a Product Description"
Model	Ch1	Ch3	Ch4	
NV1-1T000-M	12V / 15A	-	-	
NV1-1G000-M	24V / 7.5A	-	-	
NV1-3G0TT-M	24V / 7.5A	12V / 5A	-12V / 1A	
NV1-3G0FF-M	24V / 7.5A	15V / 5A	-15V / 1A	

How To Create A Product Description

Confirm availability of created product with TDK-Lambda

NV1-

#o/p

Ch1

0

Ch3₂

Ch4₃

Case Option

-M

Connector Option

Blank standard, vertical connector
R Right angled connector (see handbook for 'R' connection and mechanical details)

Medical with 4kVac (2 x MOPPs) input to output isolation

Blank no case
-C U chassis + cover
-U U chassis
-F End fan + case₁
-I End fan + case + IEC inlet₁

Number of outputs

Ch1, Ch3, Ch4 Letter / number from 'Available Outputs' table to represent output voltage

- Needs 0H, 3H, 5H, TH or FH type channel 4.
The fan speed is temperature dependent, ensuring optimum cooling and lowest audible noise.
- For negative output channel 3, follow chosen letter by 'Y'. For example, TY channel 3 = -12V / 5A.
- For positive output channel 4, follow chosen letter by 'P'. For example, TP channel 4 = +12V / 1A.

Available Outputs							Other output options are available, please contact sales office with your requirements	
Channel 1	Adjustment Range	Channel 2	Channel 3 ₁	Adjustment Range	Channel 4 ₂	Adjustment Range		
T 12V / 15A F 15V / 12A	12 - 15V ₃ 12 - 15V ₄	Not available	T 12V / 5A F 15V / 5A G 24V / 2.5A O Omit	12 - 15V 12 - 15V 18 - 24V	T -12V / 1A F -15V / 1A 3HP +3.3V / 2A ₆ 5HP +5V / 2A ₆ TH -12V / 2A ₆ FH -15V / 2A ₆ OH Fan supply only O Omit	Fixed Fixed Fixed Fixed Fixed Fixed		
G 24V / 7.5A	24 - 28V ₅							

1. Follow letters in red by 'Y' for negative output channel 3.

2. Follow letters in red by 'P' for positive output channel 4.

3. 12 - 12.5V if 24V channel 3 fitted.

4. 14.5 - 15V if 24V channel 3 fitted

5. 24 - 26V if 24V channel 3 fitted.

6. 1.5A max with '-F' or '-I' option.

Output Specification		
Turn on time	1.5s max	at 90Vac and 100% rated output power
Efficiency	up to 90%	configuration dependent
Hold up	16ms min	at 90Vac
Ripple and Noise	<1%	(or 50mV if higher) pk-pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	±1%	±4% for Channel 4 with 'T' or 'F' type outputs, +4/-3% for all other channel 4.
Remote Sense	Yes	Channel 1. Max 0.5V total line drop
Minimum Load	No	on any output
Total Regulation	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.
Transient Response	<4%	of set voltage for 50% load change (in 50µs within the range 25-100% load)
Recovery	500µs	for recovery to 1% of set voltage
Over Voltage Protection	Yes	See Application Notes for details
Short Circuit Protection	Yes	
Over Temperature Protection	Yes	
Peak Output Power	200W	Single output units with 12V, 15V or 24V (T, F or G). Average output power must not exceed 180W over any 5 minute period
Ch1 Good Signal	Yes	Provides a Logic 'Low' signal after Channel 1 output is within 90% (±5%) of nominal

Environment	
Temperature	0°C to 50°C operational, -40°C to 70°C storage (max 12 months). Full load, with either '-F' option fitted or 2m/s air blown from input to output (approximately 10CFM)
Derating	50°C to 65°C derate each output by 2.5% per °C
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30g shocks in each plane, total 18 shocks 30g shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 516.5, Pro I, IV, VI
Vibration	Single axis 10 - 500 Hz at 2g (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 514.4, Pro I, Cat 1,9
Altitude	3000 metres operational (4000m for NV1-1G000-M for 60601-1 3rd edition)
Pollution	Degree 2, Material group IIIb

Immunity EN61000-6-2:2005, EN60601-1-2:2007				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV, Contact discharge 8kV. Not applicable to open frame units	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 and dips to 40% for 5 cycles below 154Vac nominal input	A

Emissions EN61000-6-3:2007, EN60601-1-2:2007		
Radiated Electric Field	EN55011, EN55022	(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, EN55022	(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 60950-1, UL60950-1 / CSA 22.2 No 60950-1

IEC/EN 60601-1, UL/CSA 60601-1, ANSI/AAMI ES60601-1

CAN/CSA-C22.2 No 60601-1-08

IEC/EN61010

CE Mark (EN60950-1)

CB certificate and Report available on request

Designed and manufactured under the control of ISO9001 and ISO13485 (including risk management).

Notes

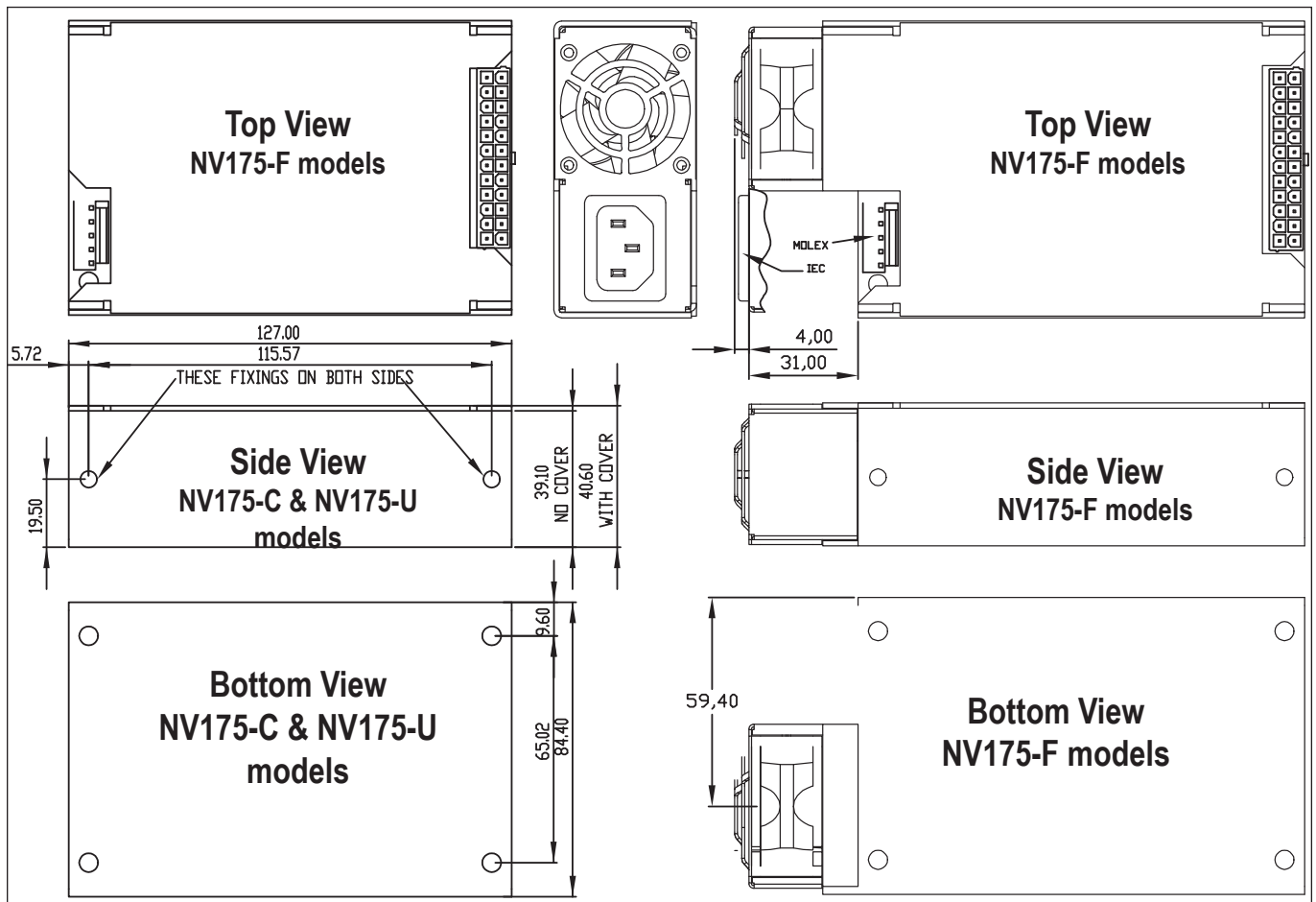
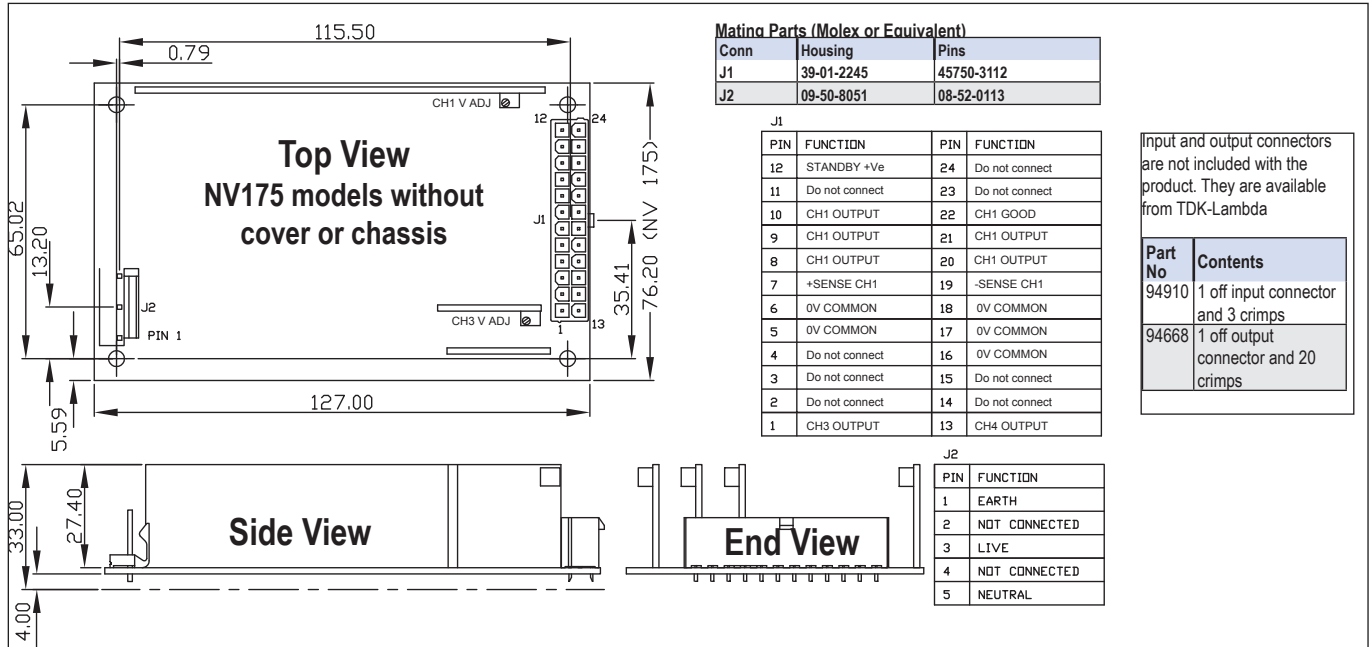
File E135494

File E349607

Designed to meet

LV Directive 2006/95/EC

Please check with technical sales for status of approvals



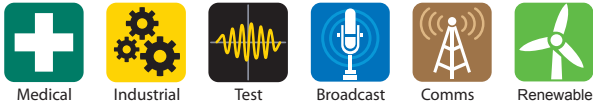
Notes: 1. All customer fixings M3

2. Maximum thread penetration 4.5mm

3. Maximum torque 0.9Nm

4. All tolerances +/-0.5mm

NV-300



300W Configurable power supply.

Features	Benefits
• High Efficiency	Minimises heat in system
• Low Profile	Fits 1U Applications
• High Power Density	Requires less space
• Up To 5 Outputs	Eliminates need for additional supplies
• 3 Year Warranty	Low cost of ownership



Input			
Input Voltage	90-264Vac (below 100Vac input, derate by 3W / V)	Input Frequency	45 - 63Hz (440Hz with reduced PFC - consult sales office)
Input Harmonics	EN61000-3-2 compliant	Power Factor	0.97 typical
Input Fuse	6.3A Fast acting (not user accessible)	Inrush Current	15A typical at 25°C and 230Vac (cold start)
Earth Leakage Current	123µA at 120Vac (60Hz), 257µA 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

Number of outputs
(excluding standby and fan supplies)

Ch1 - Ch4 Letter/number from 'Available Outputs' table to represent output voltage

1 - Needs '0H', '3H', '5H', 'TH' or 'FH' type channel 4. The fan speed is temperature dependent, ensuring optimum cooling and lowest audible noise

NVA3-

#o/p

Ch1

Ch2

Ch3

Ch4

Global Option

Case Option

Blank no case
-C U chassis + cover
-U U chassis
-F End fan + case₁
-I IEC input, end fan + case₁

Blank no option
-N3 5V/2A ATX compatible
-N4 12V/1A ATX compatible

Confirm availability of created product with TDK-Lambda

QUICK SELECTOR - example configurations						
Model	Ch1	Ch2	Ch3	Ch4	Ch5	Global Option
NVA3-453TTH	5V / 40A	3.3V / 15A	12V / 5A	-12V / 2A	-	No
NVA3-453TTH-N3	5V / 40A	3.3V / 15A	12V / 5A	-12V / 2A	5V / 2A	ATX (-N3)
NVA3-350TTH	5V / 40A	-	12V / 5A	-12V / 2A	-	No
NVA3-350TTH-N3	5V / 40A	-	12V / 5A	-12V / 2A	5V / 2A	ATX (-N3)
NVA3-453FFH	5V / 40A	3.3V / 15A	15V / 5A	-15V / 2A	-	No
NVA3-453FFH-N3	5V / 40A	3.3V / 15A	15V / 5A	-15V / 2A	5V / 2A	ATX (-N3)
NVA3-350FFH	5V / 40A	-	15V / 5A	-15V / 2A	-	No
NVA3-350FFH-N3	5V / 40A	-	15V / 5A	-15V / 2A	5V / 2A	ATX (-N3)

AVAILABLE OUTPUTS							
Channel 1	Adjustment Range ₅	Channel 2 ₁	Adjustment Range ₅	Channel 3	Adjustment Range ₅	Channel 4 ₃	Adjustment Range
5	5V / 40A ₂ 5 - 5.5V	1	1.8V / 15A 0.9 - 2.5V	T 12V / 5A ₄ 12 - 15V TH 12V / 8A ₆ 12 - 15V F 15V / 4A ₄ 12 - 15V FH 15V / 6.4A ₆ 12 - 15V G 24V / 2.5A 18 - 24V 0 Omit		3H -3.3V / 2A ₈ Fixed 5H -5V / 2A ₈ Fixed TH -12V / 2A ₈ Fixed FH -15V / 2A ₈ Fixed 0H Fan supply only 0 Omit	
		2	2.7V / 15A 2.5 - 3.8V				
		3	3.3V / 15A 2.5 - 3.8V				
		2H	2.7V / 24A 2.5 - 3.8V				
		3H	3.3V / 24A 2.5 - 3.8V				
		0	Omit				
T	12V / 25A 12 - 13V	5	5V / 10A 3.3 - 5.5V				
		5H	5V / 16A 3.3 - 5.5V				
		0	Omit				
G	24V / 12.5A 24 - 28V ₇	5	5V / 8A 5 - 5.5V				
		5H	5V / 12.5A 5 - 5.5V				
		T	12V / 10A 12 - 15.5V				
		F	15V / 10A 12 - 15.5V				
		0	Omit				

1. 1, 2, 3, 2H & 3H channel 2 only available with 5V channel 1.
5V / 10A channel 2 only available with 12 or 15V channel 1.
5V / 8A channel 2 only available with 24V channel 1
2. Maximum combined output current from Ch1 + Ch2 = 40A
3. Follow output letters by 'P' for positive output channel 4.
60W max output power
4. 60W max output power
5. Max voltage at the output (includes remote sense)
6. 96W max output power
7. 24-24.5V if any channel 2 fitted
24 - 26V is 24V channel 3 fitted
8. 1.5A max if fitted with '-F' option.

Other output options are available, please consult TDK-Lambda with your requirements

Output Specification		
Voltage / Current	See available outputs	
Turn on time	1.5s max	at 90Vac and 100% rated output power
Efficiency	up to 90%	configuration dependent
Hold up	16ms min	at 90Vac
Ripple and Noise	<1%	(or 50mV if higher) pk-pk, using EIAJ test method & 20MHz bandwidth 1.5% for units with 5V channel 1
Voltage Accuracy	±1%	±5% for Channel 4
Remote Sense	Yes	Channels 1 & 2. Max 0.5V total line drop
Minimum Load	No	on any output
Total Regulation	1.5%	For channels 1, 2 and 3 (2.5% for channel 4) 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
Transient Response	<5%	of set voltage for 40% load change (in 50µs within the range 25-100% load)
Recovery	500µs	for recovery to 1% of set voltage
Over Voltage Protection	Yes	See Application Notes for details
Short Circuit Protection	Yes	
Over Temperature Protection	Yes	
Ch1 Good Signal	Yes	Provides a Logic 'Low' signal after Channel 1 output is within 90% (±5%) of nominal.
Output Power	300W	Total output power from all outputs for Vin above 180Vac, max output power = 300W + standby supply

Isolation		
Input to Output	Reinforced	2 x MOOPs (3rd edition 60601) 4.3kVdc
Input to Earth	Basic	2.3kVdc
Output to Earth		200Vdc

Global Interface Signals - units fitted with N3 or N4 options	
ATX Remote on/off	TTL high or open circuit will inhibit all outputs (except Standby)
ATX Power Good	Logic high indicates ac supply is good and output 1 is within regulation
Standby Supply	Common 0V with power supply. Not affected by ATX remote on/off -N3 Option = 5V / 2A -N4 Option = 12V / 1A

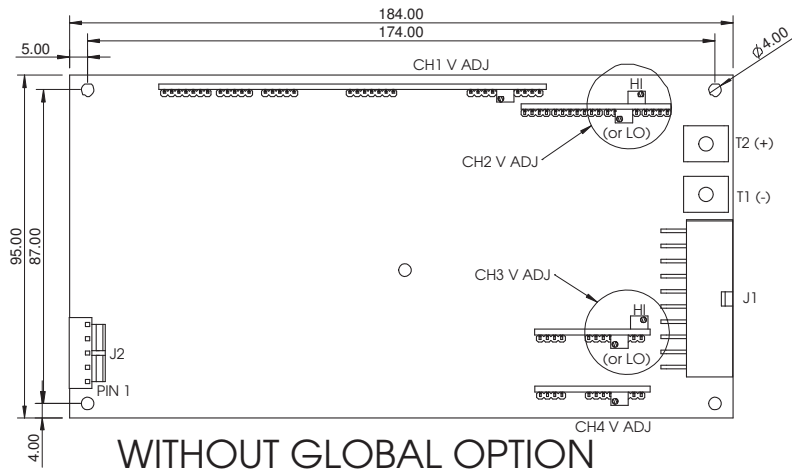
Environment	
Temperature	0°C to 50°C operational, -40°C to 70°C storage (max 12 months). Full load, with either 'F' option fitted or 1.5m/s air blown from input to output (approximately 10CFM)
Derating	50°C to 65°C derate each output by 2.5% per °C
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30g shocks in each plane, total 18 shocks 30g shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 516.5, Pro I, IV, VI
Vibration	Single axis 10 - 500 Hz at 2g (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 514.4, Pro I, Cat 1,9
Altitude	3000 metres operational
Pollution	Degree 2, Material group IIIb

Immunity EN61000-6-2:2005, EN60601-1-2:2007				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV, Contact discharge 8kV. Not applicable to open frame units	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 and dips to 40% for 5 cycles below 198Vac nominal input	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, EN55022	(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, EN55022	(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 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	Designed to meet
CE Mark (EN60950-1)	LV Directive 2006/95/EC
CB certificate and Report available on request	<i>Please check with technical sales for status of approvals</i>
Designed and manufactured under the control of ISO9001 and ISO13485 (including risk management).	

OUTLINE & CONNECTION DRAWINGS



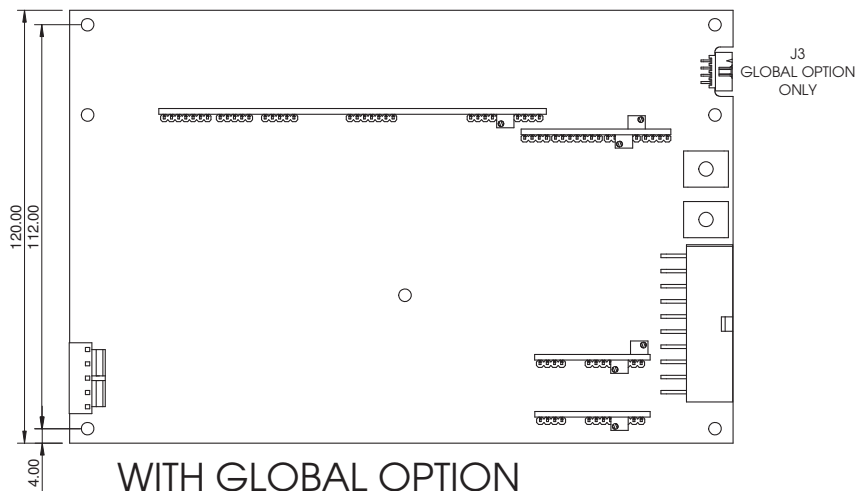
WITHOUT GLOBAL OPTION

J2

PIN	CONNECTION
1	EARTH
2	NOT CONNECTED
3	LIVE
4	NOT CONNECTED
5	NEUTRAL

J1

PIN	CONNECTION	PIN	CONNECTION
11	0V COMMON	1	0V COMMON
12	0V COMMON	2	0V COMMON
13	CH2 +Ve	3	CH2 +Ve
14	CH2 +Ve	4	CH2 +Ve
15	+SENSE CH1	5	-SENSE CH1
16	+SENSE CH2	6	-SENSE CH2
17	CH1 GOOD	7	N/C
18	CH3 +Ve	8	CH3 +Ve
19	0V COMMON	9	0V COMMON
20	CH4 O/P	10	CH4 O/P



WITH GLOBAL OPTION

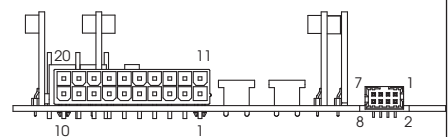
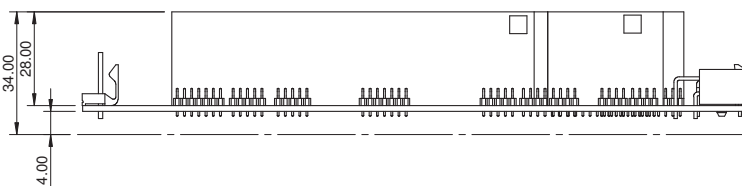
T1 & T2 (SEE TOP LEFT)

J3 (GLOBAL OPTION ONLY)

PIN	CONNECTION	PIN	CONNECTION
1	STANDBY -Ve	5	N/C
2	STANDBY +Ve	6	N/C
3	STANDBY -Ve	7	POWER GOOD
4	STANDBY +Ve	8	REM ON/OFF

MATING PARTS (MOLEX OR EQUIVALENT)

CONNECTOR	HOUSING	CRIMP PIN
J1	39-01-2205	45750-3112
J2	09-50-8051	08-52-0113
J3	51110-0860	50394
T1 & T2	N/A	TAG 19073-0165



Notes

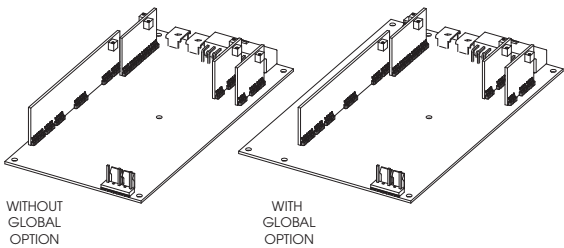
1. All customer fixings are M3
2. Maximum thread penetration 4.5mm
3. Maximum torque 0.9Nm
4. All tolerances +/-0.5mm

Input and output connectors are not included with the product. They are available from TDK-Lambda

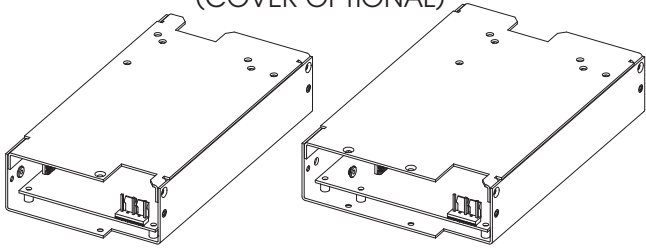
1 off input connector and 3 crimps part number is 94910.
1 off output connector and 20 crimps part number is 94912.

OUTLINE & CONNECTION DRAWINGS

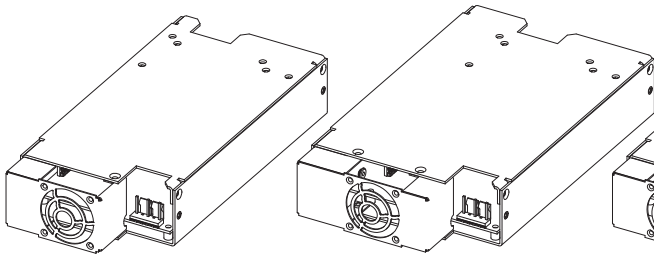
OPEN FRAME



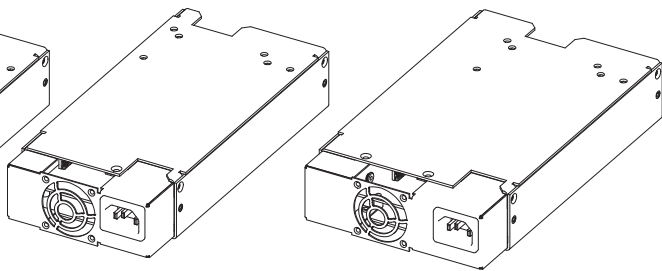
'U' CHASSIS
(COVER OPTIONAL)



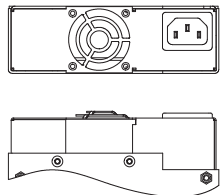
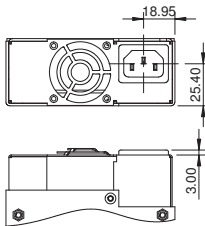
FAN OPTION



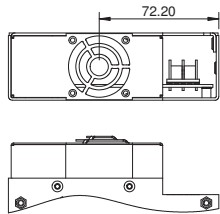
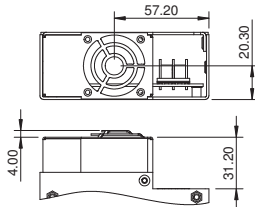
FAN+IEC OPTION



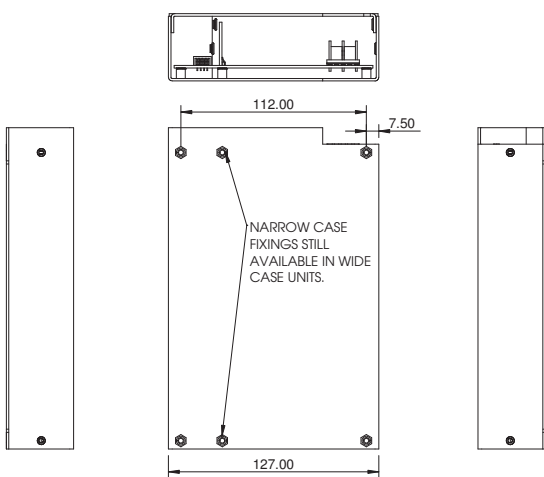
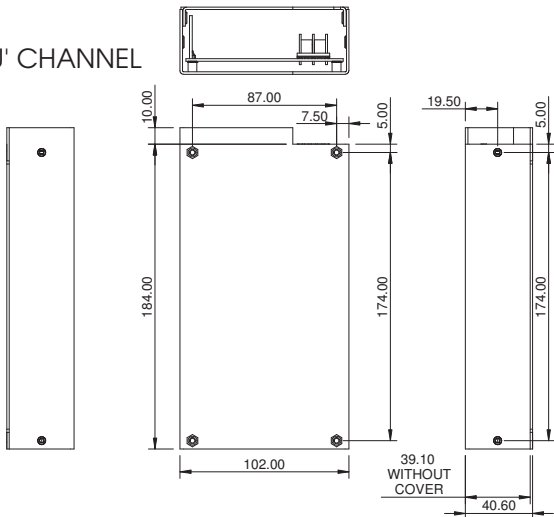
FAN+IEC OPTION



FAN OPTION



'U' CHANNEL



Notes

1. All customer fixings are M3 2. Maximum thread penetration 4.5mm 3. Maximum torque 0.9Nm 4. All tolerances +/-0.5mm

По вопросам продаж и поддержки обращайтесь:

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