

NV-100

AC/DC Power Supply Series

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1. INPUT

AC INPUT LINE REQUIREMENTS

See datasheet for specification of input line requirements (including Input voltage range, Input frequency, Input harmonics, Input current and leakage current)

The power supply will automatically recover from AC power loss and shall be capable of start-up under peak loading at 90VAC.

Repetitive ON/OFF cycling of the AC input voltage shall not damage the power supply or cause the input fuse to blow.

- Input Fuse
Not user serviceable. Fast Acting, high breaking capacity, ceramic fuse.
- Input Undervoltage
The power supply is protected against the application of an input voltage below the minimum specified so that it shall not cause damage to the power supply.

2. DC OUTPUT

OUTPUT VOLTAGES

All output channels have a common 0V. Outputs 1-3 are all positive and the polarity of channel 4 is determined when manufactured (FP and TP are positive, F and T are negative). See the datasheet for full specifications of the output, including adjustment range, output current, remote-sensing capability, regulation, ripple & noise and setting accuracy.

REMOTE SENSE

Remote sensing is provided to compensate for voltage drops in the power connections to the load. Remote sense is available for Output 1 and Output 2. Up to 0.5V total line drop can be compensated. The remote sense lines may be connected as follows: -

- If remote sense is not required, simply do not connect either '+sense' or '-sense'
- If remote sense is required, connect '-sense' and '+sense' to the corresponding point at the load (see Figure 1 for details)
- Note – do not connect remote sense across an output fuse.

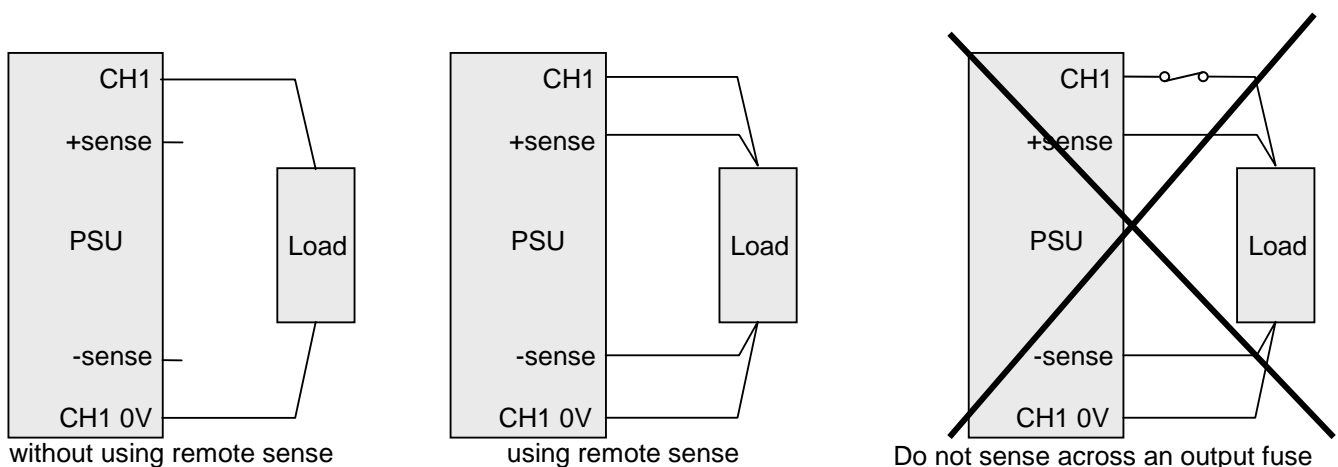


Figure 1: How to connect power supply to load

EFFICIENCY

Note that the following charts show the efficiencies when the power supply is loaded with typical customer loads (multi output). Even better efficiencies are possible if the unit is used as a single output power supply.

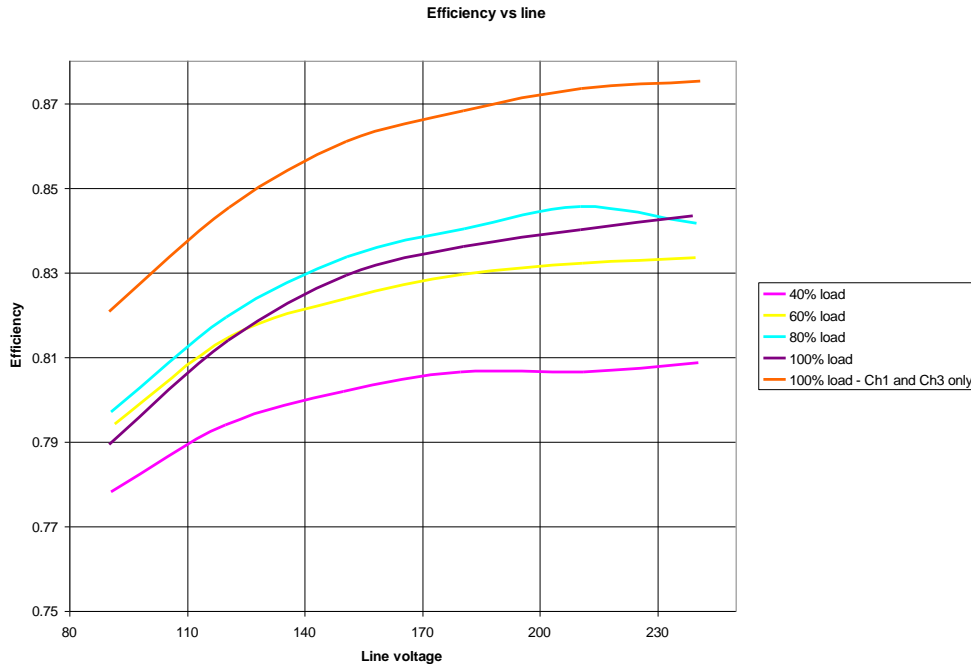


Figure 2. NV-100 Efficiency Chart

NO LOAD OPERATION

No minimum load is required for the power supply to operate within specification.

SERIES/PARALLEL CONNECTION

It is possible to connect multiple NV-100 in series. Do not exceed 160V for the total voltage of outputs connected in series.

The outputs connected in series are non-SELV (Safety Extra Low Voltage) if the total output voltage + 30% of the highest maximum rated output voltage exceeds 60V (the 30% addition allows for a single fault in any one individual channel).

Outputs must not be connected in parallel.

OUTPUT CHARACTERISTICS

Ripple/Noise

Ripple and noise is defined as periodic or random signals over a frequency range of 10Hz to 20MHz. Measurements are to be made with a 20MHz bandwidth oscilloscope. Measurements are taken at the end of a 150mm length of a twisted pair of cables, terminated with a 100nF ceramic capacitor and a 120µF electrolytic capacitor. The earth wire of the oscilloscope probe should be as short as possible, winding a link wire around the earth collar of the probe is the preferred method.

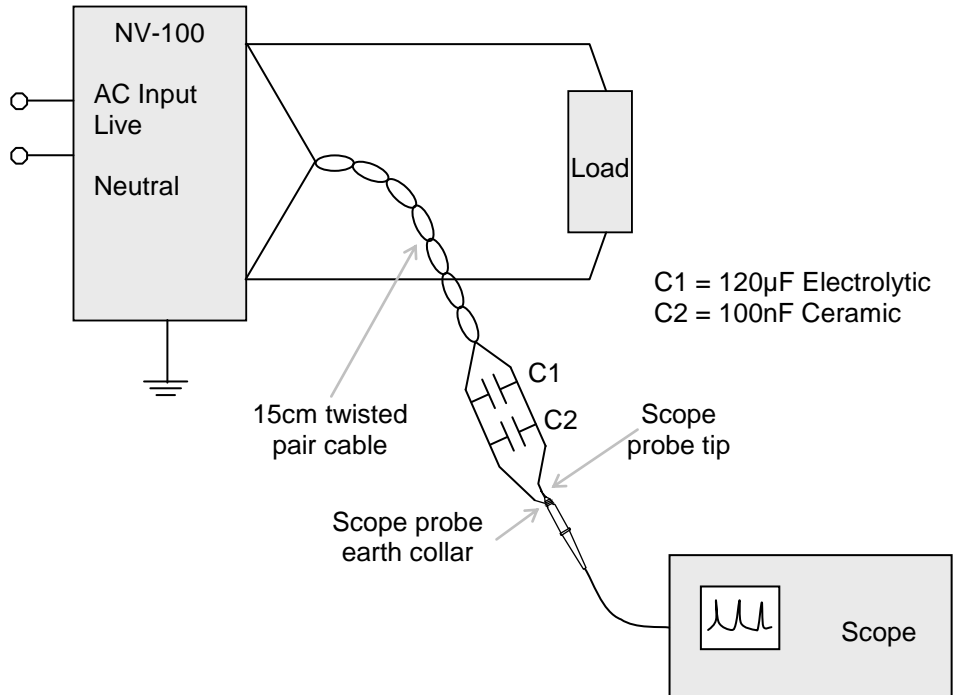
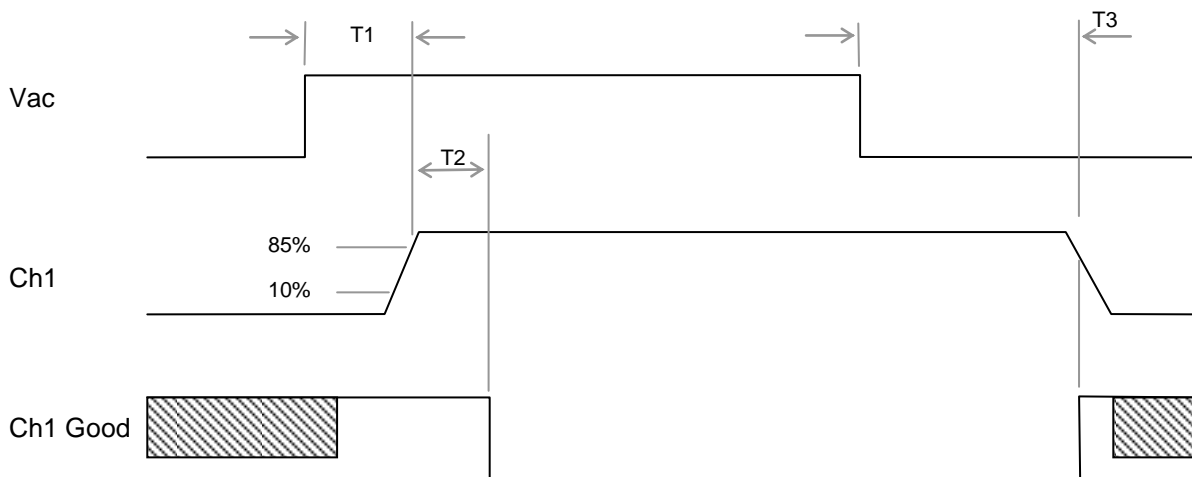


Figure 3: RIPPLE AND NOISE MEASUREMENT METHOD

+5/+3.3V POWER SEQUENCING FOR NV-100

The +5V output level is equal to or greater than the +3.3V output at all times during power up and normal operation.

POWER SUPPLY TIMING



	min	Typical	max	Description
T1			1.5s	Turn on time
T2	200ms		500ms	Output good hold off time
T3	16ms			Hold up time

Figure 4: Output timing diagram

OVERSHOOT AT TURN ON/OFF

The output voltage overshoot upon the application or removal of the input mains voltage shall be less than 10% above the nominal voltage. No voltage of opposite polarity shall be present on any output during turn on or turn off.

OUTPUT PROTECTION

Over temperature protection

If the NV-100 is operated without adequate cooling, it will cause an over temperature condition and the power supply will shut down. To restart the PSU, remove the ac supply for 10 seconds and then reapply.

Over voltage protection

An overvoltage on CH1, 2 or 3 will cause the whole power supply to shutdown (except for standby supply, when fitted). To restart the PSU, remove the ac supply for 10 seconds and then reapply.

Short-Circuit Protection

A short circuit is defined as an impedance of <0.1 Ohms placed between the DC return and any output. A short circuit will cause no damage to the power supply and will cause it to shutdown. The power supply will attempt to restart every 150ms (approximately) until the short-circuit is removed. After removal of the short circuit, the power supply will maintain normal operation.

A short circuit on the CH4 output will not cause the power supply to shut down; however, after the short circuit is removed, the CH4 output will resume normal operation.

Overcurrent Protection

Overload currents applied to each output will cause the output to trip before reaching or exceeding the SELV level of 240VA.

No Load Operation

The power supply will operate with no load on all outputs with no damage, hazardous condition or reduction in performance.

COOLING REQUIREMENTS

Forced Air Cooling

The maximum continuous rating of all DC outputs combined is 100Watts with a minimum of 2m/s of forced-air cooling across the power supply. The recommended air flow direction is from input to output.

Natural Convection

Each output is restricted to 50% of its maximum rating with unrestricted natural convection cooling and an ambient temperature of 50°C or less.

TEMPERATURE DERATING

NV-100 achieves full power output up to 50°C. Above this temperature, the total output power (and individual output currents) must be derated by 2.5%/°C up to 70°C. See diagram.

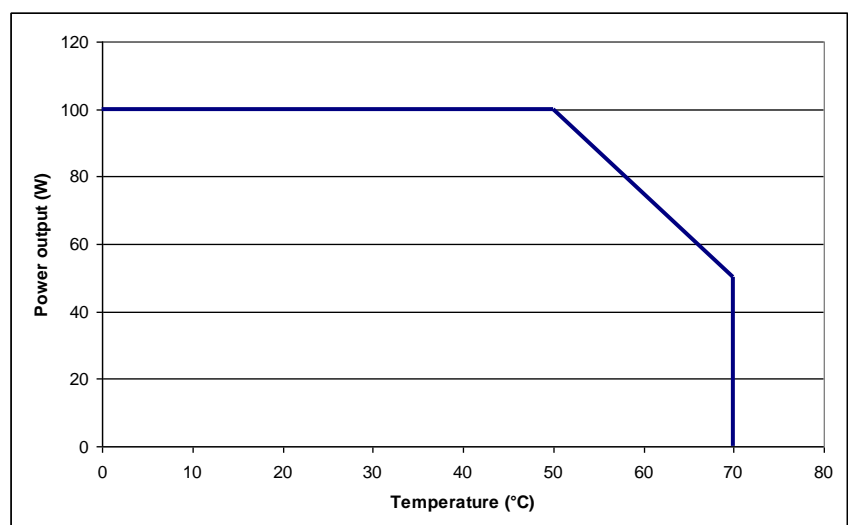


Figure 5: NV-100 Thermal Derating curve

ELECTROMAGNETIC COMPATIBILITY

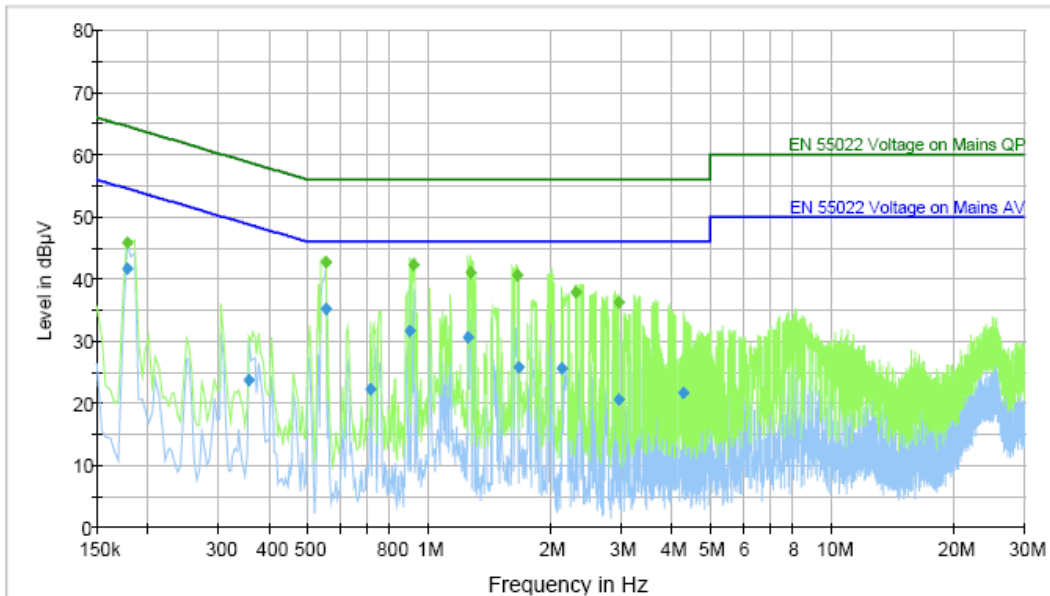


Figure 6: Sample plot of NV100
Measured at 230V input

Installation for optimum EMC performance

Mounting

All equipment should be mounted inside an earthed metal box.

If this is not possible then use an earthed metal plane to mount the power supply and load.

All 4 corners (of the uncased unit) should be connected to earth.

Cables

All cables (both ac input and dc output) should be run as close as possible to the earthed metal box/plane.

AC input cable should be twisted group laid as flat to the earthed metal box/plane as possible.

All output cables should be routed as far away from input cables as possible.

If the input and output cables must be run close to each other then screen one or other (or ideally both).

The positive and negative supply cables should be twisted together.

The remote sense wires (if used) should be twisted together and run alongside their related supply cables.

All cable run loops should be kept as small as possible (this should be implemented in PCB design also).

Connecting between boxes

If cables must be connected between equipment boxes then at the closest possible point to the port where the cables exit the 1st enclosure connect 100nF decoupling Y caps (between the output and earth). Note that these capacitors must be rated at the working voltage. Ideally these capacitors should be between all signal cables which have to connect between boxes although this may not be practical if fast switching [digital] signals are involved (if this is the case then smaller value Y capacitors should be used).

Earth star point

Where the ac supply enters the equipment, this should be taken to a 'star point' chassis mounted earth point (Note compliance with EN609050 practices which require own star point washer and nut) as close as possible to the IEC inlet. All other earth points should be taken back to this point only.

RELIABILITY

Calculated using Telcordia Issue 1, Case 3

FPMH (Failures per million hours)

Temperature	0°C	30°C	40°C	50°C	60°C	70°C
Main Assembly	0.548	1.267	1.703	2.319	3.205	4.498
Channel 2	0.102	0.256	0.356	0.496	0.695	0.975
Channel 3	0.066	0.152	0.208	0.287	0.401	0.567
Channel 4 (Linear)	0.001	0.020	0.039	0.074	0.136	0.240

To calculate MTBF, sum the FPMH for all component parts at the required temperature. This gives total failures per million hours (FPMH). Convert this to MTBF by dividing 1000000 by the FPMH.

For example: -

Require the MTBF for NVA1-453TT at 30°C

Main Assembly	1.267
Channel 2	0.256
Channel 3	0.152
Channel 4	0.020

Total FPMH 1.695

Therefore MTBF = $1000000 / 1.695 = 589970$ hours (590k hours)

3. CONNECTION

Input

Input housing is Molex part number 09-50-8051 (or equivalent part from alternative manufacturer)
 The Molex part number for the crimps is 08-52-0113 (or equivalent part from alternative manufacturer)
 1 housing and 3 crimps are available as a single part number from TDK-Lambda. The part number is 94910.

Output

Output housing is Molex part number 39-01-2245 (or equivalent part from alternative manufacturer)
 The Molex part number for the crimps is 44476-3112 (or equivalent part from alternative manufacturer)
 1 housing and 24 crimps are available as a single part number from TDK-Lambda. The part number is 94911.

Pin Definition (standard [vertical] output connector)

Pin	Channel	Function
J1-1	3	Output
J1-2	2	Positive sense
J1-3	2	Output
J1-4	2	Output
J1-5	Common	0V (DC Return)
J1-6	Common	0V (DC Return)
J1-7	1	Positive sense
J1-8	1	Output
J1-9	1	Output
J1-10	1	Output
J1-11		Do not connect
J1-12		Do not connect
J1-13	4	Output
J1-14	2	Negative sense
J1-15	2	Output
J1-16	Common	0V (DC Return)
J1-17	Common	0V (DC Return)
J1-18	Common	0V (DC Return)
J1-19	1	Negative sense
J1-20	1	+ Output
J1-21	1	+ Output
J1-22		Do not connect (used for Ch1 good, if fitted, consult factory for details)
J1-23		Do not connect
J1-24		Do not connect

Pin	Function	Molex
J2-1	Earth – chassis/safety ground	J2-1
J2-2	Do not connect	J2-2
J2-3	Live	J2-3
J2-4	Do not connect	J2-4
J2-5	Neutral	J2-5

4. MOUNTING

The NV-100 can be mounted in any orientation but must be mounted on all four corners.
 '-C' (covered) and '-U' (U chassis) versions to be mounted using all four fixings on the bottom of the unit or the fixing holes on the side of the unit.
 Uncovered versions should be mounted on stand-offs that are at least 6.35mm tall.

5. WEIGHTS

NV-100 (quad output, open frame)	0.30 kg
NV-100 (with cover + chassis)	0.40 kg

6. TEST RESULTS

Detailed test results are available online from: -

<http://testcert.emea.tdk-lambda.com/>

You will need the serial number and product code of the unit to retrieve the test results for the unit. Test results are not packaged with the unit. This ensures that the test results will be available for the NV-Power unit for the whole life of the power supply (not just when the unit is unpacked as with the more traditional printed test results).