

**Input Parameters**

|                             |               |
|-----------------------------|---------------|
| NOMINAL INPUT VOLTAGE RANGE | 100 - 240V AC |
| MAX. INPUT VOLTAGE RANGE    | 90 - 264V AC  |
| INPUT FREQUENCY             | 47- 440Hz *   |
| MAXIMUM INPUT CURRENT       | 11A AC        |
| INRUSH CURRENT              | <40A          |

\* 47 - 63HZ for IEC/EN/UL/CSA 60601-1

**Output Parameters**

**Adjustment and Derating:**

|        | Airflow                                                 | Input Voltage Range (Vac) | Total Power                                      | Maximum Ambient | Derating                |
|--------|---------------------------------------------------------|---------------------------|--------------------------------------------------|-----------------|-------------------------|
| S      | Foward                                                  | 90-99.9                   | 700W Continuous (850W peak if 700W average #)    | 65°C            | 2.5% per °C above 45°C  |
| S      | Foward                                                  | 100-149.9                 | 700W Continuous (850W peak if 700W average #)    | 65°C            | 2.5% per °C above 50 °C |
| S      | Foward                                                  | 150-264                   | 1150W Continuous (1450W peak if 1150W average #) | 65°C            | 2.5% per °C above 50 °C |
| C, U ‡ | Customer Air , fan not fitted. U=also cover not fitted. | 90-149.9                  | 700W Continuous (850W peak if 700W average #)    | ‡               | ‡                       |
|        |                                                         | 150-264                   | 1150W Continuous (1450W peak if 1150W average #) |                 |                         |

† Both the total output power and the module output currents are derated by the given value.  
 ‡ Refer to Customer Air Cooling section for details.  
 Global Option standby outputs (12V at 1A, 13.5V at 1A or 5-5.5V at 2A) should not be included when calculating total PSU output power, but they are subject to the current deratings for operation above 50°C.  
 Global Options with output voltages between 5.01 and 5.5V have their max. output current linearly derated from 2A at 50°C ambient to 1.4A at 65°C ambient.

**Customer Air Cooling (option C and U):**

The following method must be used for determining the safe operation of PSUs when C or U option (Customer Air) is fitted, ie fan not fitted to PSU. The minimum permitted airflow for customer air cooling is 0.5 m/s

For PSUs cooled by customer supplied airflow the components listed in the following table must not exceed the temperatures given. Additionally ratings specified for units with an internal fan must still be complied with, eg mains input voltage range, maximum output power, module voltage / current ratings and maximum ambient temperature. To determine the component temperatures the heating tests must be conducted in accordance with the requirements of IEC60950-1:2005/ EN60950-1:2006 Clause 4.5. Consideration should also be give to the requirements of other safety standards.

Test requirements include: PSU to be fitted in its end-use equipment and operated under the most adverse conditions permitted in the end-use equipment handbook/specification and which will result in the highest temperatures in the PSU. To determine the most adverse conditions consideration should be given to the end use equipment maximum operating ambient, the PSU loading and input voltage, ventilation, end use equipment orientation, the position of doors & covers, etc. Temperatures should be monitored using type K fine wire thermocouples (secured with cyanoacrylate adhesive, or similar) placed on the hottest part of the component (out of any direct airflow) and the equipment should be run until all temperatures have stabilised.

| CIRCUIT REF. | DESCRIPTION                                  | MAX. TEMP (°C) |
|--------------|----------------------------------------------|----------------|
| L2, L3       | Filter/ PFC assy:Choke winding               | 155            |
| C1,C3, C4    | Filter/ PFC assy:X Capacitors                | 100            |
| L1           | Filter/ PFC assy:Boost choke winding         | 130            |
| C12,C13      | Filter/ PFC assy:Electrolytic Capacitor      | 60(105)        |
| T1           | Filter/ PFC assy:Flyback transformer winding | 130            |
| RL1          | Filter/PFC assy:Relay                        | 100            |
| TX1, TX2     | Modules: Power transformer windings          | 130            |
| L1,XL1       | B, BH & DB Modules:choke                     | 130            |
| L1           | C & CM Modules: choke                        | 140            |
| T2           | Global options :transformer winding          | 130            |
| Various      | All other choke & transformer windings       | 110            |
| Various      | All <=10mm dia Meter Electrolytic Capacitor  | 85(105)        |

See component layout drawings on page 4. Higher temperature limit (in brackets) may be used but product life may be reduced.

**Modules**

**B Module**

| NOMINAL VOLT-AGE (V) | VOLTAGE RANGE (V) # | MAX. CURRENT                                                   |
|----------------------|---------------------|----------------------------------------------------------------|
| 3.3                  | 3.135 - 3.6         | 40A                                                            |
| 5                    | 4.75 - 5.5          | 4.75 - 5.0V: 40A<br>5.0 - 5.5V: Linearly derate from 40 to 36A |
| 8                    | 7-9                 | 7-8V:22.5A<br>8-9V:Linearly derate from 22.5 to 20A            |
| 12                   | 12 - 15.5           | 12-14-8V : 16A<br>14.8 - 15.5V Linearly derate from 16 to 15A  |
| 24                   | 24 - 28             | 8A                                                             |

**BH Module**

| NOMINAL VOLTAGE (V) | VOLTAGE RANGE (V) # | MAX. CURRENT                                                      |
|---------------------|---------------------|-------------------------------------------------------------------|
| 12                  | 12 - 15.5           | 12 - 12.5V: 20A<br>12.5 - 15.5V: Linearly derate from 20 to 15.5A |
| 24                  | 24 - 28             | 24V : 10A<br>24 - 28V: Linearly derate from 10 to 8.5A            |

**C Module**

| NOMINAL VOLTAGE (V) | VOLTAGE RANGE (V)# | MAX. CURRENT                              |
|---------------------|--------------------|-------------------------------------------|
| 12                  | 12-13.2            | 12V:37.5A. Derate to 450W above 12V †     |
| 16                  | 15-16.5            | 15-16V:28.12A. Derate to 450W above 16V † |
| 24                  | 24-26.4            | 24V:18.75A. Dearte to 450W above 24V †    |
| 30                  | 27-32              | 27V: 16.67A Derated to 450W above 27V †   |

**CM Module**

| Nominal Voltage (V) | Voltage Range (V) | Max Current                             |
|---------------------|-------------------|-----------------------------------------|
| 24                  | 24 - 26.4         | 24V: 18.75A Derated to 450W above 24V † |

† C modules may output up to 600W for up to 10 seconds providing that the average power from the module does not exceed 450W

**Dual Output Modules , Output 1:**

| MODULE | NOMINAL VOLTAGE (V) | VOLTAGE RANGE (V) # | MAX. CURRENT                                                |
|--------|---------------------|---------------------|-------------------------------------------------------------|
| DA     | 12                  | 12.25               | 3A                                                          |
| DB     | 3.3                 | 3.135 - 3.6         | 25A                                                         |
|        | 5                   | 4.75 - 5.5          | 25A                                                         |
|        | 6‡                  | 5.5-6.5             | 25A                                                         |
|        | 12                  | 12 - 15.5           | 12-12.5V: 13A<br>12.5-15.5V: Linearly derate from 13 to 10A |
|        | 24                  | 24 - 28             | 24 - 28V: 7A<br>25-28V: Linearly derate from 7 to 6A        |

‡ DB modules with 6V nominal channel 1 derated as follows:

|                 |                         |
|-----------------|-------------------------|
| Ch.1: 5.5-6V    | Ch.1 + Ch.2: 195W total |
| Ch.1: 6.01-6.5V | Ch.1 + Ch.2: 170W total |

**Dual Output Modules , Output 2:**

| MODULE | NOMINAL VOLTAGE (V) | VOLTAGE RANGE (V) # | MAX. CURRENT (A) | MAX. POWER (W) |
|--------|---------------------|---------------------|------------------|----------------|
| DA     | -12                 | -11.9               | 1                | 11.9           |
| DB     | 5                   | 3.3 - 6             | 10               | 60             |
|        | 12                  | 7 - 15.5            | 5                | 60             |
|        | 24                  | 24 - 32             | 2                | 50             |

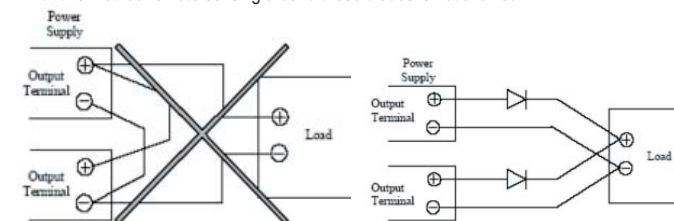
# Voltage measured at the power terminals. This voltage must not be exceeded when remote sense is used.

The DB module may be used with output 1 up to 24V at 8.3A and output 2 up to 16V at 3.13A provided the ambient temperature does not exceed 42 °C.

**Modules Connected in Series or Parallel.**

Module outputs can be connected in series. See section on Module Limitations.

Module outputs cannot be paralleled to other modules in the same power supply or paralleled to other modules in another unit.  
 Paralleling of modules for redundant operation i.e. Output load does not exceed the load current of single module. This can be achieved by isolating the outputs using orring diodes.  
 With this method remote sensing around these diodes is not allowed.



**Module Limitations**

- All outputs are SELV except under the following circumstance: Outputs connected in series are non-SELV if the total output voltage + 30% of the max. rated output voltage of the output with the highest rated voltage exceeds 60Vdc (the 30% addition allows for a single fault in any one individual channel).
- If the total voltage of outputs connected in series exceed the 60Vdc SELV limit then all outputs must be considered non-SELV.
- The total voltage of outputs connected in series must not exceed 160V.
- Non-SELV outputs are hazardous and must not be made user accessible. They must be guarded or a deflector fitted during installation to avoid a service engineer making inadvertent contact with the output terminals, or dropping a tool onto them.
- All outputs have operational spacings to earth, and due consideration must be given to this in the end product design.
- Adjusting output voltage beyond the stated range may cause overvoltage protection (OVP) to operate, whereby the output will turn off. To reset OVP, turn back output voltage adjustment and remove the mains supply for 30 seconds and then switch back on.

### Important safety instructions

#### Servicing

These products are not customer serviceable. Repairs may only be carried out by Lambda UK or their authorised agents.

#### Critical Applications

These products are not authorised for use as critical components in nuclear control systems, life support systems or equipment for use in hazardous environments without the express written approval of the Managing Director of Coutant Lambda Ltd.

#### Energy Hazards

Certain modules are capable of providing hazardous energy (240VA) according to output voltage setting. Final equipment manufacturers must provide protection to service personnel against inadvertent contact with these module output terminals. If set such that hazardous energy can occur then the module terminals or connections must not be user accessible.

#### Approval Limitations: Use in North America (AC units only)

When this product is used on 180VAC-250VAC mains with no neutral, connect the two live wires to L(live) and N (neutral) terminals on the input connector. In this instance double pole fusing is required.

#### High Voltage Warning

Dangerous voltages present within the power supply. Do not remove covers.

#### External Hot Surfaces

Section 6 of the Health and Safety at Work Act requires that manufacturers have an obligation to protect service engineers as well as users. In order to comply with this, a label must be fitted to these products which is clearly visible to service personnel accessing the overall equipment, and which legibly warns that surfaces of these products may be hot and must not be touched when the products are in operation. If the PSU has an IEC inlet fitted and the PSU face with the IEC inlet will be accessible to users then the temperature of this face must be determined in the end-use application

#### Safety Earthing Screw

On products with an enclosure, special safety earthing screws are used which connect the cover to the chassis. They must not be removed. If for any reason they are removed, they must be replaced with new ones.

#### Safety Class of Protection

These products are designed for the following parameters : Material Group IIIb, Pollution Degree 2, Overvoltage Category II, Class 1 (earthed), Indoor use as part of an overall equipment such that the product is accessible to service engineers only.

#### Safety approvals -

UL60950-1 and CSA22.2 No.60950-1 : UL Recognised. C-UL for Canada.

IEC / EN60950-1 : CE mark.

CE marking indicates compliance with the Low Voltage Directive (2006/95/EC) in that it complies with EN60950-1.


IEC/ EN61010-1 and IEC / EN60601-1: CB Report and Certificate

UL/CSA 60601-1: UL and C - UL approvals

### Input markings and symbols

 Alternating Current (a.c.)

 Direct Current (dc)

 Danger, Shock Hazard

 Caution refer to supplementary documents

**L** live

**N** neutral

**E** earth



Protective Earth

### Environmental parameters

#### Operation

Temperature: 0 to 65°C (derating above 45°C or 50°C, see page 1 for details)

Humidity: 5 to 95% RH, non-condensing

Air Pressure 70kPa to 106kPa.

Altitude: -200m to 3000m

#### Storage and Transportation

Temperature: -40°C to +85°C Humidity: 5% to 95% RH, non-condensing

Air Pressure: 54kPa to 106kPa.

Altitude: -200m to 5000m.

#### Shock

+ / - 3 x 30G shocks in each plane, total 18 shocks. 30G shocks are 11ms (±0.5ms), half sine.

Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987.

#### Vibration

Single axis 10 - 500Hz at 2G (sweep and endurance at resonance) in all 3 planes.

#### Cooling

PSUs may be mounted in any of 4 orientations: Horizontal, on either side, or vertical with airflow upwards. For correct airflow, allow 40mm clearance around the ends of the product.

### Level of insulation

Dielectric Strength testing is carried out as follows:

Primary mains circuit to earth - 2.25 - 2.35kVDC; \*\*Primary mains circuits to transformer core - 4.25 - 4.35kVDC; \*\*Primary mains circuits to secondary -4.25 - 4.35kVDC. Outputs to each other and to earth are isolated to 200VDC (except CM Modules 730-760Vdc to earth). (\*\*This test is not possible with modules fitted to the unit as damage to RFI capacitors will occur).

### EMC performance

#### Immunity

| Test                                       | Standard               | Passed  | Comments                                           | Criteria |
|--------------------------------------------|------------------------|---------|----------------------------------------------------|----------|
| Electrostatic discharge                    | EN61000-4-2:1995       | Level 4 | Air discharge 15kV<br>Contact discharge 8kV        | A        |
| Electromagnetic field                      | EN61000-4-3:2002       | Level 3 | Tested to12V/m                                     | A        |
| Fast / burst transient AC Input            | EN61000-4-4:2004       | Level 4 | Tested to 4.4kV                                    | A        |
| Fast / burst transient DC Output           | EN61000-4-4:2004       | Level 4 | Tested to 2.2kV                                    | A        |
| Surge immunity                             | EN61000-4-5:2006       | Level 3 | Common mode to 2.2kV<br>Differential mode to 1.1kV | A        |
| Conducted RF immunity                      | EN61000-4-6:1996       | Level 3 | Tested12V                                          | A        |
| Power frequency magnetic field             | EN61000-4-8:1994       | Level 4 | Tested to 30A/m 50Hz<br>and 60Hz                   | A        |
| Voltage dips, interruptions and variations | EN61000-4-11:2004      | Class 3 |                                                    | A/B      |
| Voltage fluctuations                       | EN61000-4-14:1999 + A1 | Class 3 | For 100-240V Nominal                               | A        |

Criteria B is transient degradation or loss of performance or function, below specification.

#### Emissions

| Test                    | Standard              | Comments                                 |
|-------------------------|-----------------------|------------------------------------------|
| Radiated electric field | EN55011:2007          | Class B See application note for details |
| Conducted emissions     | EN55011:2007          | Class B                                  |
| Conducted harmonics     | EN61000-3-2:2006      | Class A                                  |
| Flicker                 | EN61000-3-3:1995 + A1 | Compliant - d <sub>max</sub> only        |

### General installation instructions

The NV700 family of component power supplies is designed for use within other equipment or enclosures which restrict access to authorised competent personnel only. For safe installation and operation of this product, carefully follow the instructions listed below.

- i) The unit covers/chassis are designed to protect only skilled personnel from hazards and must not be made user accessible Exception : The inlet face of PSU's fitted with an IEC60320 inlet may be user accessible. )(NOT PERMISSIBLE FOR IEC/EN/ULCSA 60601-1)
- iii) These products are Class 1 and must therefore be reliably earthed and professionally installed in accordance with the prevailing electrical wiring regulations and the safety standards covered herein.
- iii) These products are IPX0, and therefore chemicals/solvents, cleaning agents and other liquids must not be used.
- iv) If the earth terminal of the NV700 PSU is connected to the main incoming earth conductor of the end equipment , the installer must cover the NV700 earth symbol with a label bearing the earth symbol of IEC60417-5019
- v) Internal fuses: F1, F16AH, 250V; F2, F1AL, 250V

### Mechanical parameters

**DO NOT USE MOUNTING SCREWS WHICH PENETRATE THE UNIT BY MORE THAN 4.5 MM.**

Weight 1Kg max. dependent upon configuration.

### Special Instructions for IEC/EN/UL/CSA 60601-1

- i) These products are designed for continuous operation within an overall enclosure, and must be mounted such that access to the mains terminals is restricted. See clause 16, IEC60601-1, EN60601-1 and UL/CSA 60601-1.
- ii) These products are NOT suitable for use in the presence of flammable anaesthetic mixtures with air or with oxygen, or with nitrous oxide. These products are not protected against the ingress of water.
- iii) For IEC60601-1, EN60601-1 and UL/CSA 60601-1 the NV700 range provides the following levels of insulation: For PSU's fitted with C and/or CM Modules only there is Reinforced insulation between input and outputs. For all other PSU's there is a basic insulation between input and outputs. For PSU's fitted with CM Modules only there is basic insulation, at the working voltage, between the CM module outputs and earth (provided that a CM module is not fitted in slot 1)
- iv) Connect only apparatus complying with IEC60601- 1, EN60601-1 and UL/CSA 60601-1 to the signal ports.
- v) Except for permanently installed equipment as defined in clause 57.6 of IEC60601-1, EN60601-1 and UL/CSA 60601-1, the overall equipment in which these products are installed must have double pole fusing (rated 16A, 250V fast acting, HBC) on the input mains supply or DC supply as appropriate. The products themselves have single pole fusing ( rated16A, 250V fast acting, HBC) in the live line or positive DC line as appropriate.
- vi) Reference should be made to local regulations concerning the disposal of these products at the end of their useful life.
- vii) These products have not been assessed to IEC/EN60601-1-2 (EMC) but EMC test data is available from Lambda UK.

### Special Instructions for IEC/EN/UL/CSA 61010-1

Whilst all individual module single outputs are classed as SELV outputs in accordance with IEC/ EN/60950 (<60Vdc or 42.4V peak) serried combinations of these modules may exceed these values and become hazardous output voltages. For IEC/EN61010-1 the equivalent limits are 70Vdc, 33Vrms or 46.7V peak. Provided these levels are not exceeded, the outputs are not considered hazardous for IEC/EN61010-1.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

If the earth terminal of the NV700 PSU is connected to the main incoming earth conductor of the end equipment, the installer must cover the NV700 earth symbol with a label bearing the earth symbol of IEC60417-5019.

### Custom Models:

Model: NV700 RSS IN5V 12BH 12BH

Maximum outputs: 12.5V,20A;12.5V,20A (total power 500W max)

Maximum ambient: 65°C with 2.5%/°C derating of total power and module current above 50°C

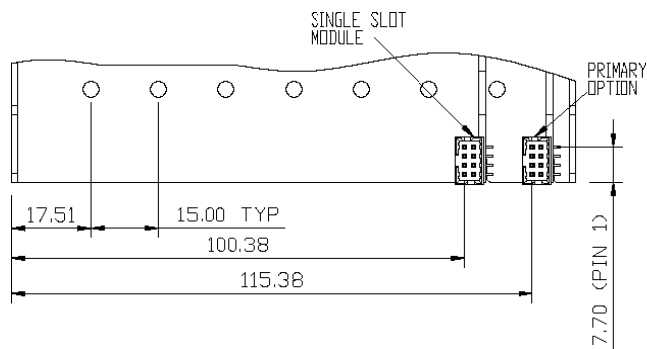
Orientations: Horizontal with chassis lowest, on either side or vertical with the airflow upwards  
Comments: PSU has reverse air

Model: NV700 CSS ES5V 12C

Maximum output: 12V, 37.5A

All ratings as per standard models except maximum operating altitude is 5000m

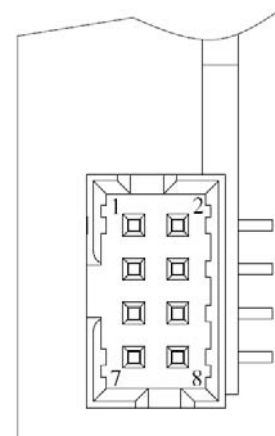
MODULE AND PRIMARY OPTION POSITIONS



Given below are some suitable connection systems - mating parts and crimp tools for the Quasar screw terminals

Ring Tags: Up to 50A. AMP PIDG terminals  
 Red: M3 36151, M4 320551, M5 130660  
 Blue: M3 320561, M4 320560, M5 130663  
 Yellow: M4 320568, M5 130167  
 Crimp tool: 169400 Die set 169404  
 Ring Tags: 50A and over AMP AMPPOWER III  
 M5 (8 AWG) 719538-2 (6 AWG) 719551-1  
 Terminals with crimp tool: 708777-4

PRIMARY OPTION & SINGLE SLOT MODULE ISSUE 4



Primary Option Connector

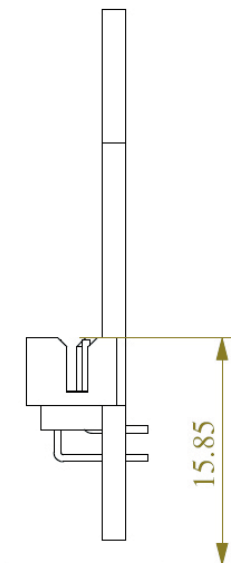
- 1 V Standby
- 2 V Standby Return
- 3 INH Logic 1
- 4 INH Logic 0
- 5 Power Good Collector
- 6 Power Good Emitter
- 7 AC Fail Collector
- 8 AC Fail Emitter

Single Slot Module Connector

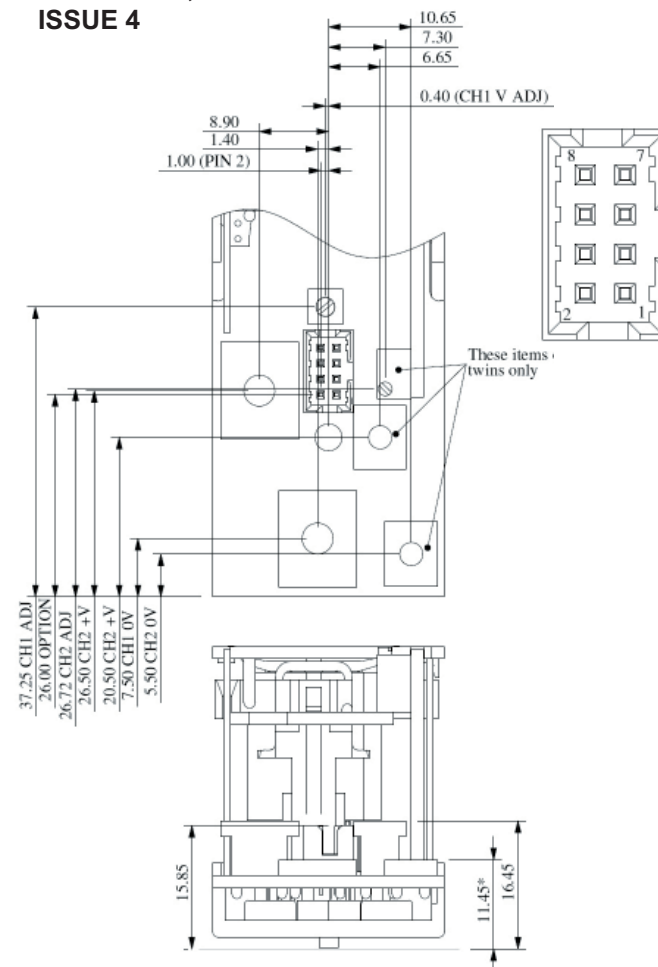
- 1 + 12V
- 2 + 12V
- 3 + 12V
- 4 0V
- 5 0V
- 6 0V
- 7 -12V
- 9 -12V

Mating Connector

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



DUAL SLOT, SINGLE AND TWIN OUTPUT MODULES ISSUE 4



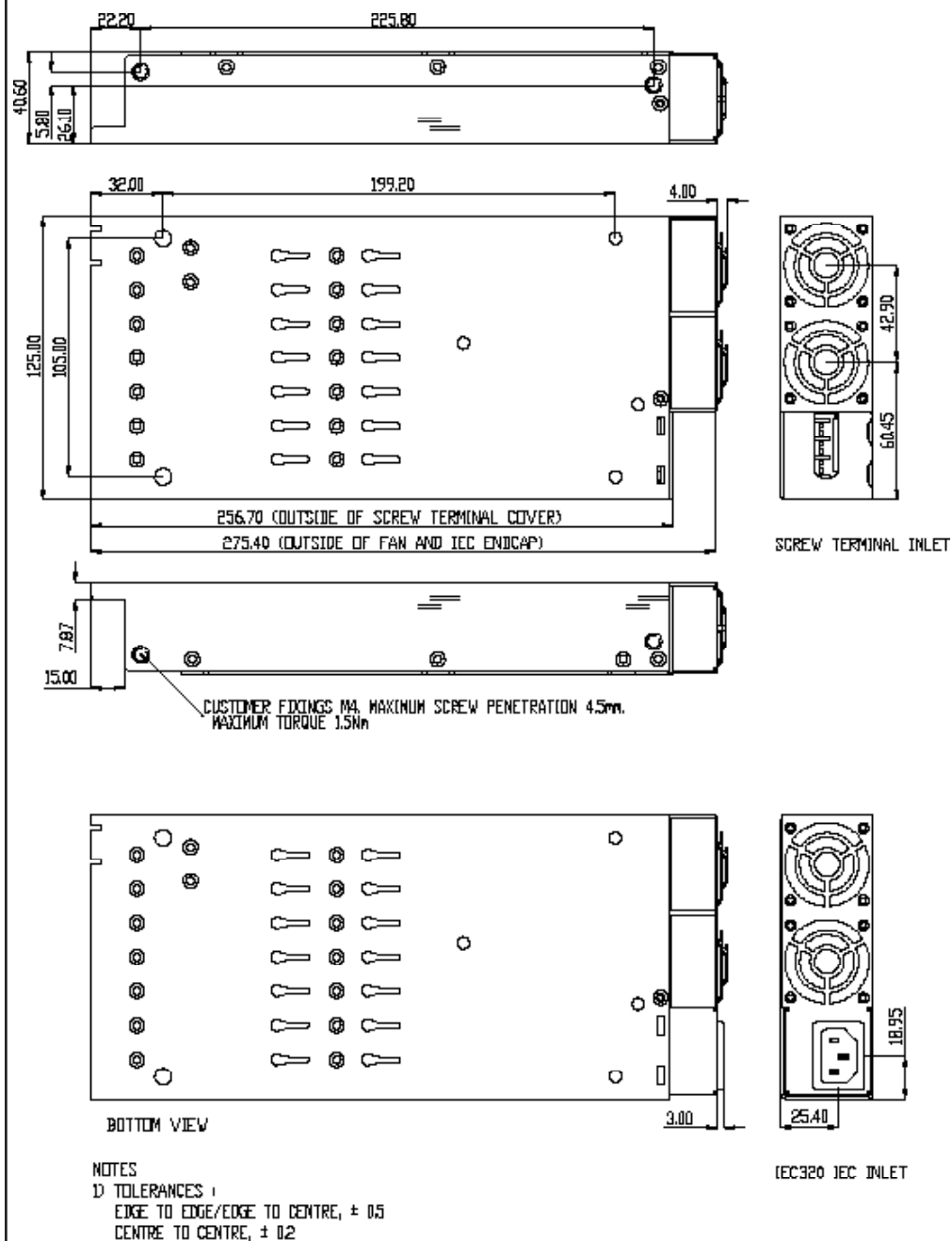
Option Connector

- 1 CH2 0V (Twin)
- CH1 Gate Drive Supply (Single)
- 2 CH2 Module Good (Twin)
- Share Control (Single)
- 3 CH2 On/Off (Twin)
- N/C (Single)
- 4 Module Inhibit
- 5 CH1 0V
- 6 CH1 Module Good
- 7 CH1 Remote Sense-
- 8 CH1 Remote Sense+

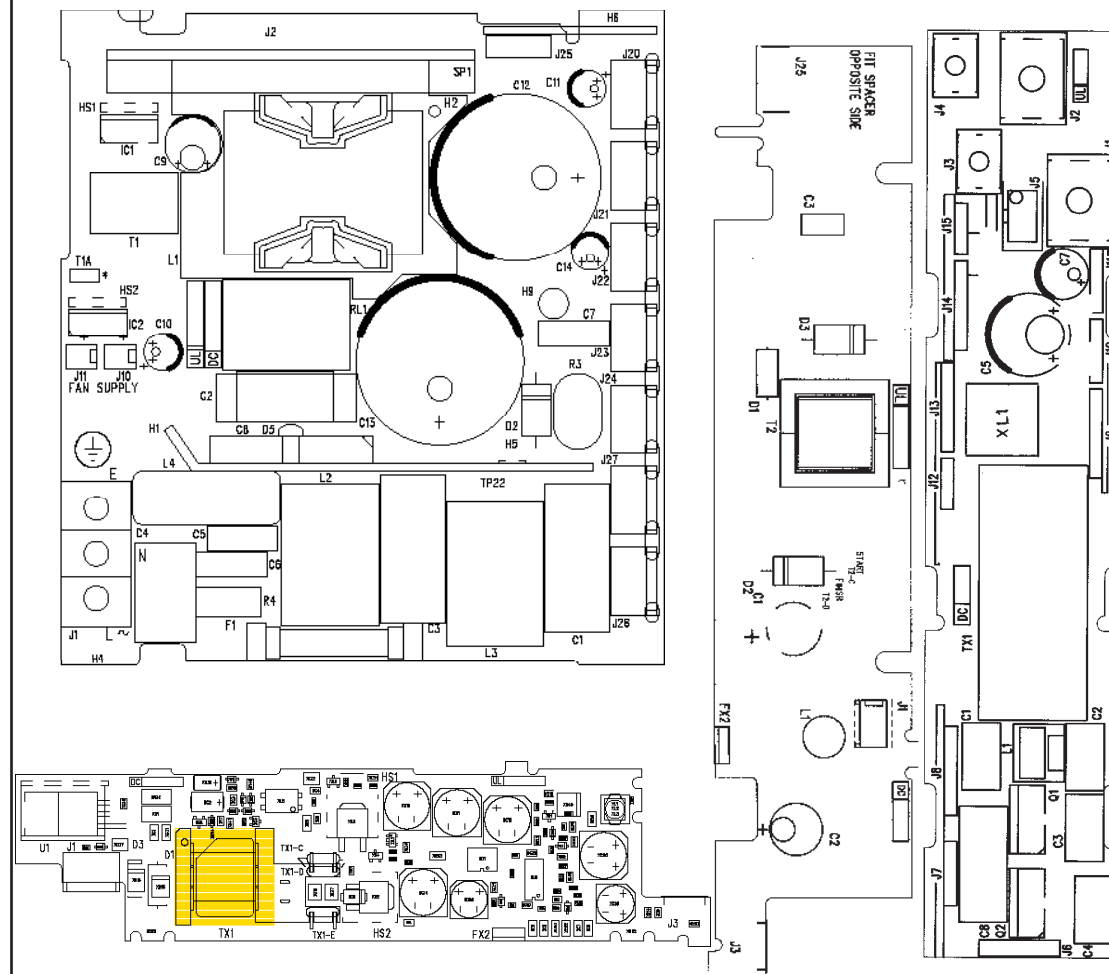
Secondary Option Connection

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

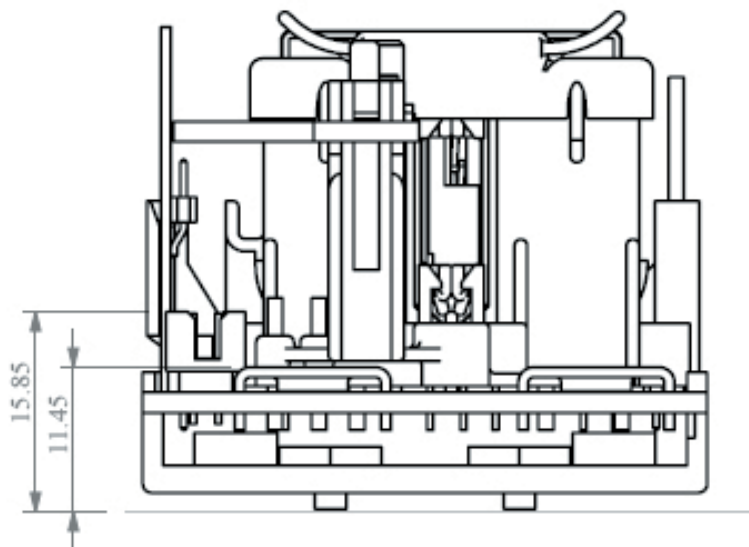
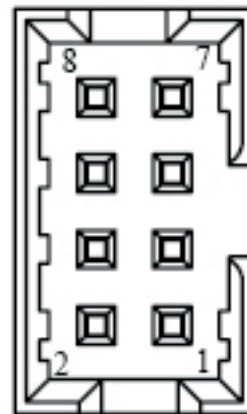
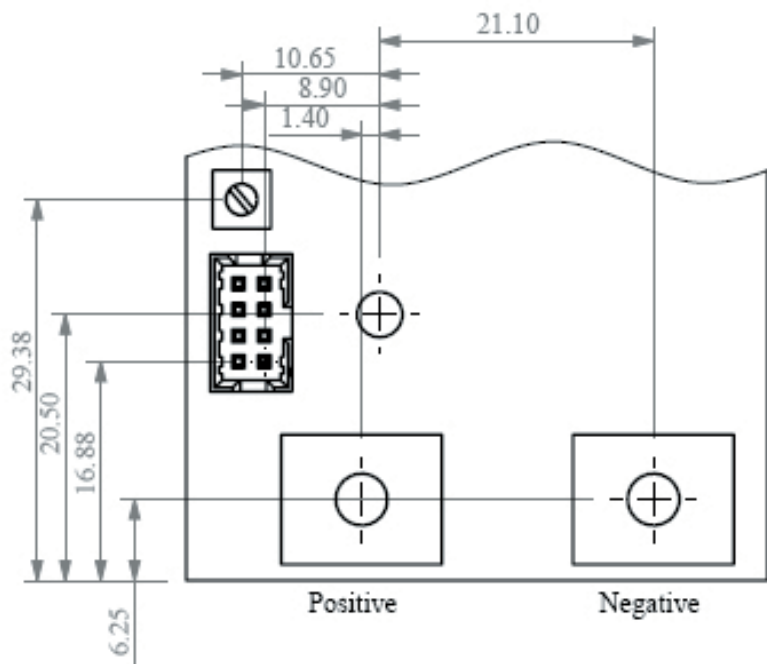
NV700 Outline Drawing



Component Layout Drawings



C Module Outline Drawing



Option Connector

- 1 Gate drive supply.
- 2 Share Control.
- 3 N/C
- 4 Module Inhibit
- 5 0V
- 6 Module Good
- 7 Remote Sense-
- 8 Remote Sense+

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