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General Product Specifications:

Model TC206L-NY (24V)

Jasper Electronics Internal Part Number: 03703-901-G

AC Input, 120W Single DC Output.

This document outlines the general specifications for Jasper Electronics (JE) model TC206L-NY component power supply module. This is a user specified (custom) design derived from a similar JE model compliant to the State of California Department of Transportation (CalTrans) Transportation Electrical Equipment Specification (TEES) March 12, 2009, and modified per the requirements of New York State standard Group 35800 – Comprehensive Traffic Operation Control & Monitoring Systems, Equipment & Products, Section II, Peripheral Hardware⁽¹⁾, for use in Traffic Control Cabinets.

This document is currently preliminary only and may be incomplete in certain aspects. The features and specifications listed may be revised as a result of development testing or additional user requested changes, but as of the user acceptance date of the first article production sample model (Revision code A), changes affecting the form, fit, function or other features outlined in this document shall not be permitted without prior notification to and written approval from the user.



Generally, JE model TC206L-NY is a switching power supply capable of delivering up to 120 Watts DC power through a single, regulated +24V DC output. Power Factor Correction (Pfc) is provided reducing peak AC Line input current and the associated stress on wiring. The unit is fully enclosed in a grounded sheet metal chassis hinged on one side to allow “swing out” for servicing. AC input, PE, and DC power output connections are made through a 15-circuit connector on the end of a non-detachable flexible cable exiting the rear of the supply. Convection cooled, with an extended operating temperature range. Designed as an initial and long-term lower cost replacement for older linear models.

-INPUT-

Voltage/Current
 Label RatingAC 90-250V, 47-63Hz, 1.6A max, Single Phase;
 TEES MinimumAC 90-132V, 57-63Hz, 1.6A max.

Power Factor>0.98 line PFC typical at AC 115V, full load.

Inrush Current⁽²⁾Soft start (~25°C cold start) 30Apk @ AC 115V.

Fusing⁽³⁾AC 3.0A, 250V delayed action (slow-blow) 3AG (glass) 0.25"x1.25" cartridge type external line side fuse provided, operator accessible.

EfficiencyAt AC 115V: >75% @ 1.0A;
 >84% @ 2.5A;
 >86% @ 5.0A.

-OUTPUTS-

Voltage/Current (V/A) V1
 Model **TC206L-NY** 24.0V⁽⁴⁾, 5.0A

Total loading not to exceed 120 Watts at 74°C.

Output Voltage
 Set PointFactory preset within ±2.0% of nominal voltage.

Line Regulation<±2.0% at the output connection over the full AC input range and 0 – 100% output loading.

Minimum LoadingNone required.

Output Turn-on Delay<200mSec from AC turn-on.

-OUTPUTS (con't)-

Over/Under Shoot	None at turn-on or turn-off.
Stability	<±0.2% output drift after 20 minute warm-up.
Temp. Coefficient	<±0.02%/°C, 0° - 50°C, after 20 minute warm-up.
Dynamic Response	<±5.0% deviation with a 50% load change at a slew rate of 1A/μsec. Output recovers to within 5% in less than 300μsec.
Ripple and Noise (PARD).....	2.0V max peak-to-peak / 500mV RMS nominal at the output terminal with a 20 MHz bandwidth limit. May be measured with a 0.1μF ceramic capacitor in parallel with a 22μF tantalum capacitor connected between the measured output and its return.
Over Voltage Protection (OVP)	Non-crowbar type from 27.6V to 32.4V.
Over Temperature Protection.....	Internal temperature sensing. Causes output to shut down. Automatic recovery.
Over Current/Short Circuit Protection	Protected against overload from 6A to 8A and short-circuit faults. Automatic recovery when overload removed.
Output Transient Protection.....	Minimum 1400W voltage transient suppressor provided.
Output Fusing ⁽²⁾	AC 5.0A, 250V delayed action (slow-blow) 3AG (glass) 0.25"x1.25" cartridge type external fuse provided in the (+) output, operator accessible.

-SIGNALS, INDICATORS and CONTROLS-

AC Power Indicator.....	Front panel mounted, single-color LED. Green indicates AC power ON. Off indicates an input fault.
DC Power Indicator	Front panel mounted, single-color LED. Clear indicates DC power ON. Off indicates an output fault.
Output Test Points.....	Two "banana jack" type test sockets provided on the front panel, color coded red and black. Allows operator to verify output voltage.

-MECHANICAL-

(Refer to JE Outline Configuration Dwg, P/N 03704-000.)

Weight.....	1.59 Kg [3.50 lbs].
Retaining Fastener	2 operator accessible, 8-32 UNC captive panel screws are provided on the right side of the front panel. 2 Ø6.99mm[0.275"] holes (for ¼-20 cap screws) provided on the front panel left side for installation of a user supplied hinge. Allows the power supply to "swing out" for servicing. Refer to the Mechanical Outline detail.
Mounting Orientation	Designed for horizontal insertion into a user provided recess in the end-product.

-MARKING and LABELING-

A 4.00"x1.75" (or smaller) adhesive label is permanently applied to the rear panel. Imprinted with JE model identification data, including JE name, input/output ratings, model name, JE part number, a 4-digit (week/year) manufacturing date code and manufacturing facility identification code, and space to apply any future authorized product safety certification marks.

Space is available on labels for modified or custom models for a user specified part number or model description.

Use of non-standard JE labels, or user required marking, such as bar codes, user revision codes, user name or logo, etc, is possible but may incur additional costs. Consult the factory.

-OPERATING ENVIRONMENT-

Operating Temperature ...	-34.6° – +165.2°F (-37.0° – +74.0°C) ambient at full load.
Cooling	Convection only.
Relative Humidity.....	Up to 95% RH, non-condensing.
Operational Vibration	0.75G peak, 5 – 500Hz along three orthogonal axis.
Storage Temperature.....	-40° to +185°F (-40° to +85°C).
Altitude	Operating to 10,000 ft. Storage to 30,000 ft.
MTBF	Designed for 150,000 hrs at 25°C.
Maintenance.....	No routine maintenance is specified or required.

-INTERCONNECT-

Input/Output Connector (PS-1).....	Non-detachable I/O cable secured in the rear panel, terminated with a 15-circuit (3x5) pin and socket plug housing, with 2.36mm[0.093"] pins rated 9.5A/pin. UL94V-2 6/6 nylon insulator material -40°C - +105°C. Molex plug 03-09-2151 and pin 02-09-2101. Mates with Molex receptacle 03-09-1151 or 03-09-1152 and socket 02-09-1102.
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Note: Use of the specified mating connector is recommended to insure proper current carrying capacity is maintained.

<u>Pin#</u>	<u>Function</u>
1	L – Line (+AC) Input.
2	Earth Ground.
3	N – Neutral (ACC) Input.
4-13	No Connection.
14	+24 VDC Output.
15	DC Ground.

-SAFETY, REGULATORY and EMC-

Designed to comply with the relevant industry standards of the authorities having jurisdiction, typically UL 60950-1, CSA 22.2 and IEC 60950.	
EMI Filtering	Meets CISPR22B Level B, EN55022 Level B, and FCC Part 15, Level B, for conducted emissions.
Harmonics	Meets EN 61000-3 (harmonics and voltage fluctuations).
Touch Current.....	1.2mA max @ 50/60Hz, 264V AC per UL 60950 test procedures (Sec. 5.0).
Routine Factory Tests.....	Di-electric strength (hi-pot) to 2121V DC input-to-chassis and input-to-outputs; MegOhm to 500V output-to-chassis.

-ENVIRONMENTAL CONSIDERATIONS-

The model TC206L-NY is fully compliant with the requirements of Directive 2002/95/EC Restrictions of Hazardous Substances (RoHS). RoHS compliant models are identified with the letter code "G" suffix added to the part number on the unit labels and related documents (sales orders, etc). All materials, processes and packaging used in the assembly and shipping of RoHS versions comply.

A Certificate of Compliance is available on request. Contact the factory.

-Limited Warranty Policy-

All Jasper Electronics (JE) standard model power supplies and products are guaranteed to be free of defects in workmanship and materials for a minimum of two (2) years from the date of original shipment, when operated within specification. This warranty applies only to defects that result in a failure to comply or perform to published specifications. Non-standard (custom) power supplies and products may be warranted on an individual basis. The unused portion of this warranty is fully transferable with the original equipment in which the power supply is installed.

-PACKAGING and SHIPPING-

Every reasonable precaution is taken to ensure that the customer receives Jasper Electronics products in good condition. Each item was new when it left the factory and was packed in a container approved by the carrier.

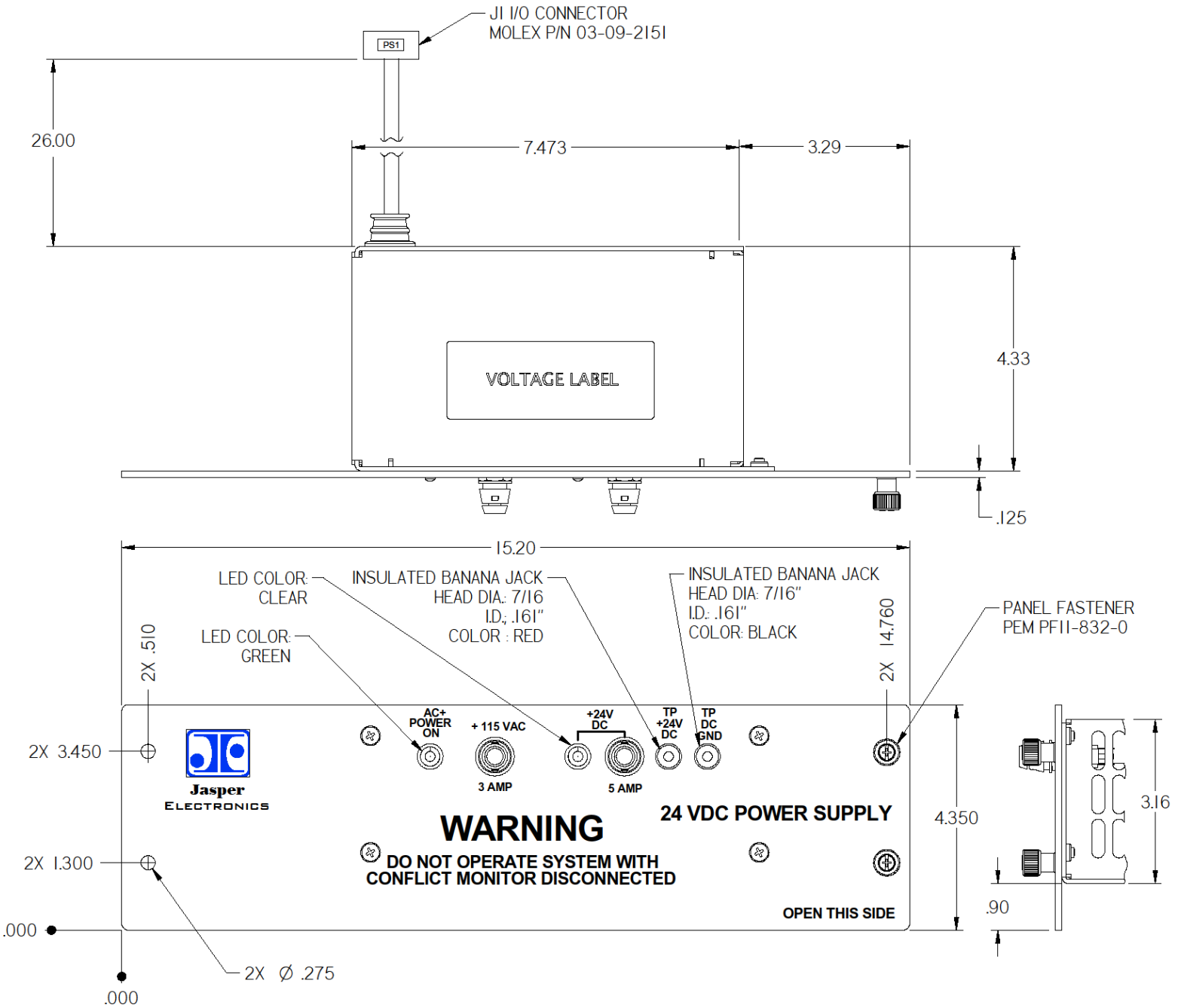
JE makes shipments FOB from the Anaheim, CA, factory or other subsidiary facilities. When placed on board the carrier's vehicle, the equipment becomes the customer's property. The customer is responsible for examining each container when it arrives at the customer's facility, and for immediately reporting any damage to the delivering carrier. The customer shall make any and all subsequent claims for redress of in-transit damage directly to the carrier that delivered the shipment to the customer's facility and not to JE.

-Notes-

- (1) The power supply described in the NY Group 35800 specification is a linear type. The power supply described within this specification is a switching type and in all differences between these specifications has performance capabilities equal to significantly improved over the linear type it is intended to replace.
- (2) Inrush current is limited by a thermistor in parallel with a resistor, bypassed when the bulk capacitor is charged. This differs from the dual 10W resistor method described in both the TEES and Grp 35800 specs in that it offers significantly lower inrush current levels and allows peak efficiency during normal operation. This design is typical for switch mode power supplies widely used in the industry.
- (3) The original 206L switch mode power supply this model is derived from uses 3.15A input and 8.0A output 5x20mm fuses due to the requirement that fuses comply with IEC 60127-2-3 (TEES Sec. 3.4.2.3). This new model retains the 3.0A input and 5.0A output 3AG fuses from the linear design.
- (4) The NYS Group 35800 spec, Sec. 2.4.1.2, states "Design Voltage: +24.6VDC." JE's customer for this model has overridden this requirement and defined the Vnom output voltage as "+24.0VDC."

Mechanical Outline

(Dimensions in inches[millimeters]. Not to scale.)



All statements and technical information contained herein are believed by JE to be reliable as of the publication date of this document, but the accuracy or completeness is not guaranteed, and JE reserves the right to change specifications without prior notification. However, every reasonable effort will be made by JE to inform users of JE products of changes to design form, fit or function that may affect the user's applications. JE manufactures a quality product, equal to any available in the marketplace; however, these products are intended to be used in accordance with the specifications described in these instructions. Any use or application that deviates from the stated operating specifications is not recommended and may be unsafe.