

**JASPER
ELECTRONICS**



120 VAC MODELS

- Model TC2070-4A
- Model TC2070-4N(A)

220 VAC MODELS

- Model TC2070-4B
- Model TC2070-4C

POPULAR OPTIONS

- Additional Labeling
- Custom Silkscreening
- Bar Codes



CONTACT

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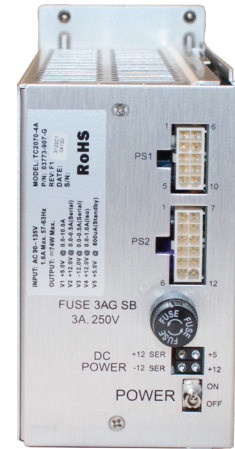
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TC2070-4 Series Power Supplies

AC Input, 70 Watt 4 DC Outputs with Standby



TC2070 FRONT VIEW



TC2070 REAR VIEW

GENERAL OVERVIEW

Jasper Electronics (JE) models TC2070-4A+PFC and TC2070-4N(A)+PFC component power supply modules are **fully compliant** to the State of California Department of Transportation (CalTrans) Transportation Electrical Equipment Specification (TEES) dated November 5, 2020 (designated Caltrans models 2070-4A and 2070-4N(A)) for use in Caltrans TEES 332L, 334L and 336L cabinets. Specific design requirements are detailed in the TEES document. The TC-2070-4 Series units are also **fully compliant** with NYSDOT (New York State Department of Transportation) requirements.

TC2070-4A, TC2070-4N(A), TC2070-4B, TC2070-4C component non-power factor corrected power supply modules are fully compliant to Cal Trans TEES July 2009 (including Errata No. 1 January 2010 and Errata No. 2 July 2014).

TC2070-4 models are chassis mounted, fully enclosed, 4-output (with standby) switching power supplies capable delivering up to 74 Watts DC. They are designed for non-redundant "cold pluggable" installation in the end product. AC input and PE are via a non-detachable power cord at the rear. DC output power, signal, and control connections are through 1 0-circuit and 12-circuit connectors on the front of the supply. Adjacent on the front panel is a line-side operator accessible input fuse, an On/Off switch, and output condition indicator LEDs. These units are convection cooled, with an extended operating temperature range. They are directly interchangeable with all other CalTrans approved 2070-4 type modules with identical AC input ratings.

Models TC2070-4B and TC2070-4C as shown are user-requested optional configurations. The features and specifications listed may be revised as a result of ongoing development testing and/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 herein shall not be permitted without prior notification to and written approval from the user. Please consult the factory for details.



ISO9001:2015

Rev D-February-19-2025

TECHNICAL SPECIFICATIONS

INPUT		
Voltage/ Current Label Rating		
Model TC2070-4A	AC 90-135V, 60Hz±3Hz, 1.6A max. 1Ø Phase	Designed to TEES, July 2009 Errata 1 January 2010, Errata 2 July 2014
Model TC2070-4N(A)	AC 90-135V, 60Hz±3Hz, 1.6A max. 1Ø Phase	Designed to TEES, July 2009 Errata 1 January 2010, Errata 2 July 2014
Model TC2070-4B	AC 180-264V, 50Hz±3Hz, 0.8A max. 1Ø Phase	Designed to TEES, July 2009 Errata 1 January 2010, Errata 2 July 2014
Model TC2070-4C	AC 180-264V, 60Hz±3Hz, 0.8A max. 1Ø Phase	Designed to TEES, July 2009 Errata 1 January 2010, Errata 2 July 2014
Model TC2070-4A+PFC	AC 90-135V, 60Hz±3Hz, 1.6A max. 1Ø Phase	Designed to TEES, November 5, 2020
Model TC2070-4A+PFC-NYS	Designed to TEES, November 5, 2020 *Standard fuse holder replaced by Shin Chin R3-9C or R3-117B or equivalent	
Power Factor	> 0.96 typical @ 115VAC, full load Only for TC2070-4A + PFC model	
Fusing	AC 3.0A, 250V delayed (slow-blow) action 3AG (glass) 0.25"x1.25" cartridge type external line fuse provided, operator accessible	
Inrush Current	Soft start (~25°C cold start) 25A _{pk} @ AC 115V	
Efficiency	At AC 115V: >70%	
Under Voltage Protection	Auto DC output shutdown when AC input falls below safe operating limits. Automatic recovery when input rises to within normal operating range	
OUTPUT		
Model TC2070-4		
Voltage/Current (V/A)	V1 +5.0V 0.0-10.0A V2 +12.0V 0.0-0.5A (Serial) V3 -12.0V 0.0-0.5A (Serial) V4 +12.0V 0.0-1.0A (ISO) V5 +5.0V 600µA (Standby) <u>Total loading on V1+V2+V3+V4 not to exceed 74 Watts at 74°C.</u> V5 is non-operating until AC input failure.	
Output Voltage Setpoint	Factory preset within ±2.0% of nominal voltage	
Line Regulation	±1.0% at the sense point over full AC input range and 0 – 100% output loading, with sense leads connected	
Load Regulation	<±5.0% at the output connection over the full AC input range and 0 – 100% output loading	
Remote Sense	V1 output compensates for up to 250mV total line drop in the load cables. Output is internally sensed if leads are opened	
Minimum Loading	None required	
Output Turn-on Delay	<1.0 second from AC turn-on	
Over/ Under Shoot	None at turn-on or turn-off	
Stability	<±0.2% output drift after 20 minute warm-up	
Temperature Coefficient	<±0.02%/°C, 0° - 50°C, after 20 minute warm-up	
Dynamic Response	Output recovers to within 1% in less than 500µsec with a 50% load change at a slew rate of 1A/µsec. <±5.0% peak transient deviation	
Ripple and Noise (PARD)	50mV max peak-to-peak 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. Any output exceeding 130%±5% of nominal will cause all outputs to latch off. AC input recycle required to reset	
Over Current/ Short Circuit Protection	Protected against overload and short-circuit faults. Automatic recovery when overload removed	
Over Temperature Protection	Internal temperature sensing. Causes output to shut down. Automatic recovery	
Hold-Up Time	Outputs remain in regulation and capable of supplying 30 watts minimum for 550mSec following AC Fail going LOW. Holds output up for two (2) 500mSec power loss periods occurring within a 1.5 second period	
Standby Output	Provides power at a minimum constant drain of 600µA from +5 to +2 VDC for 10 hours minimum. Monitor circuitry enables (ON) the +5 VDC Standby output immediately on Power Failure and isolates (OFF) at Power Up	

*Specifications subject to change without notice.

SIGNALS, INDICATORS AND CONTROLS	
AC On/ Off Switch	Line-side SPST toggle type, vertical throw, rated 5A@120VAC/2A@250VAC on the front panel. Panel silkscreened with function identification and On/Off positions adjacent. "Off" position is "down"
DC Power Indicator	4 front panel mounted, single-color LEDs, one assigned to each output (V1-V4). Green indicates DC power ON and output is within $\pm 5\%$ of V-nom. Off indicates an output fault. Panel silk-screened with function and output identification adjacent
AC Power, -4A	Fail: Line voltage drops below $92V \pm 2V > 50mS$; Restore: Line voltage $\geq 97V \pm 2V > 50mS$
AC Power, -4N(A)	Fail: Line voltage drops below $85V \pm 2V > 50mS$; Restore: Line voltage $\geq 90V \pm 2V > 50mS$
AC Power, -4B, -4C	Fail: Line voltage drops below $180V \pm 4V > 50mS$; Restore: Line voltage $\geq 190V \pm 4V > 50mS$
AC Power Fail/ Power Down	AC Fail and Power Down output lines go LOW (ground true) immediately upon power failure. The lines transition to HIGH within 50ms after both power restoration and supply are fully recovered. Lines driven separately
System Reset/ Power Up	Sysreset and Powerup output lines transition to LOW $525 \pm 25ms$ after AC Fail/Power Down transition to LOW. The Lines transition to HIGH $225 \pm 25ms$ after both Power Restoration and the supply are fully recovered. Lines driven separately
Linesync	60Hz Square Wave Linesync signal is generated by a crystal oscillator which synchronizes to the 60Hz VAC incoming power line at 120 and 300 degrees. A continuous square wave signal is +5 VDC amplitude, and $50 \pm 1\%$ duty cycle. The output has a drive sink capability of 16 mA. A 2K Ohm pull-up resistor is connected between the output and +5 VDC. The monitor circuit compensates for missing pulses and line noise during normal operation. Signal disabled when Sysreset transitions LOW and enables when Sysreset transitions HIGH
MECHANICAL	
(Refer to JE Outline Configuration Dwg, P/N 03774-000.)	
Mounting Orientation	Designed for horizontal insertion into a TEES specified Model 2070 Controller Unit
Weight	1.59 Kg [3.50 lbs]
Retaining Fastener	4 operator accessible M3x0.5 retractable thumb screw captive fasteners on the rear panel. TEES standard TSD No. 3
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	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	
AC Input, All Models	Non-detachable, 3x16 AWG or 1.5mm ² conductor power cord exits the unit through a strain relief bushing from the rear panel. 2 cord wrap brackets provided adjacent
AC Input, -4A	48.0" min. cord length terminated with a NEMA 5-15P grounding type plug. Rated 13A, 125VA
AC Input, -4N(A)	15.0" ± 1.0 " cord length terminated with a NEMA 5-15P grounding type plug. Rated 13A 125VAC
AC Input, -4B, -4C	48.0" min. cord length terminated with an EU1-16P CEE 7/7 Schuko grounding type plug. Rated 16A 250VAC

**Specifications subject to change without notice.*

DC Output/ Signal Connectors	<p>PS1: 10-circuit (2x5) wire-to-board receptacle header with mating locking tab, user accessible through a front panel opening. Rated 9.5A per 0.99"[0.039mm] diameter contact pin, UL 94V-0 rated nylon 66/6 housing material. Tyco/AMP Mini-Universal Mate-N-Lok 2, p/n 1-770971-0. Mates with AMP plug p/n 770580-1 used with user selected AMP socket terminal appropriate for wire gauge and current capacity.</p> <p>PS1 Pin# Function 1 V1 (+5.0VDC) Output. 2 V2 (+12.0VDC) Serial Output. 3 V3 (-12.0VDC) Serial Output. 4 Return, V1,V2,V3 Output (Gnd). 5 V5 (+5.0VDC) Standby Output. 6 (+) V1 Sense. 7 (-) V1 Sense Return. 8 AC Input Power Fail Signal. 9 SYSRESET (System Reset). 10 No Connection.</p> <p>PS2: 12-circuit (2x6) receptacle identical to PS1 above except: Tyco/AMP p/n 1-770972-0. Mates with AMP plug p/n 770581-1.</p> <p>PS2 Pin# Function 1 V1 (+5.0VDC) Output. 2 V2 (+12.0VDC) Serial Output. 3 V3 (-12.0VDC) Serial Output. 4 Return, V1,V2,V3 Output (Gnd). 5 V5 (+5.0VDC) Standby Output. 6 V4 (+12.0VDC) Isolated Output. 7 Return, V4 Output (Gnd). 8 POWERDOWN. 9 POWERUP. 10 EG (Equipment Ground). 11 LINESYNC. 12 No Connection.</p>
SAFETY, REGULATORY AND EMC	
Designed to comply with the relevant industry standards of the authorities having jurisdiction	
Touch Current	1.2mA max @ 50/60Hz, 115V 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

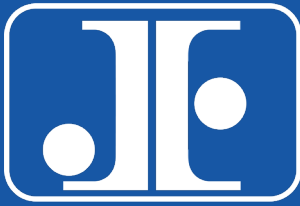
**Specifications subject to change without notice.*

STANDARD MARKING AND LABELING

A 2"x1" [50.8x25.4mm] adhesive label is applied to the front panel (ref. TEES 1.4.3). As a minimum, this label is imprinted with JE model identification data including JE name, JE model designation, JE part number, the input/output ratings, a 4-digit (week/year) manufacturing date code, and manufacturing facility identification code. Application of any future authorized product safety certification marks, user specified part number or model description, or user required markings such as bar codes, revision codes, name, or logo is optional, but may require an enlarged or additional label. Please consult the factory for details.

CUSTOM CONFIGURATION CODE

-MXXXX: Indicates a Modified model, where XXXX is a factory assigned 4-digit number to identify a unique, user specified configuration. Such models may include special or non-standard features and/ or options, or be in a configuration differing sufficiently from the design of the approved similar standard model to require reevaluation of all or part of the design to ensure continuing compliance with all safety requirements. Please consult the factory for details.



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STANDARD DOCUMENTATION

A Certificate of Conformance and a Test Certificate shall be included with each lot shipped. Unit serial numbers within the lot shall be listed on the certificates.

Following user acceptance of the production released configuration (Revision A), changes that affect the final (end) assembly revision shall not be incorporated unless and until the user has been notified and has submitted written approval for the change to JE engineering. This requirement applies to both JE and user requested design changes

RoHS COMPLIANT

The TC2070-4 Series 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 JE internal 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. Please contact the factory for more information.

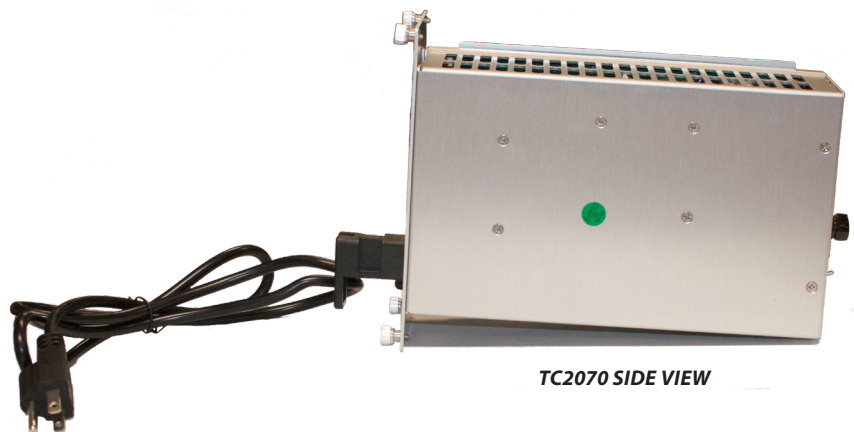
PACKAGING AND SHIPPING

JE ships FOB Origin from the Anaheim, CA factory or our other subsidiary facilities.

Unless otherwise requested, the TC2070-4 assembly is typically boxed and shipped with up to five (5) units per container. Shipping Weight is ~ 8.90g [~19.5 lbs] for a single container with 5 assemblies.

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. 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. Please see our website for full warranty statement.



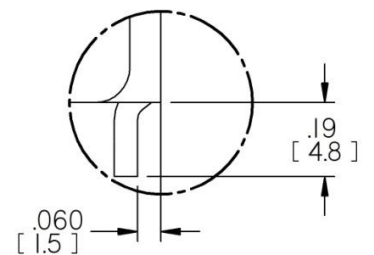
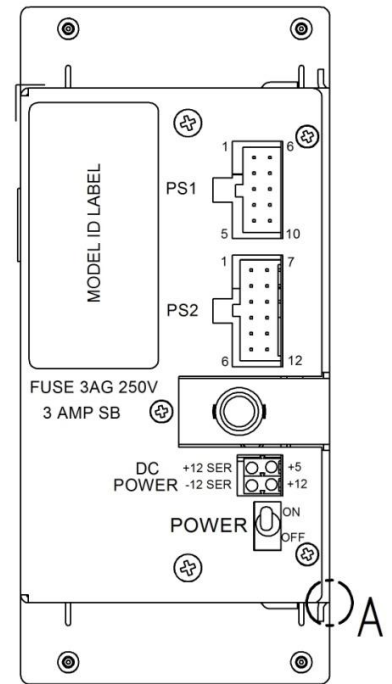
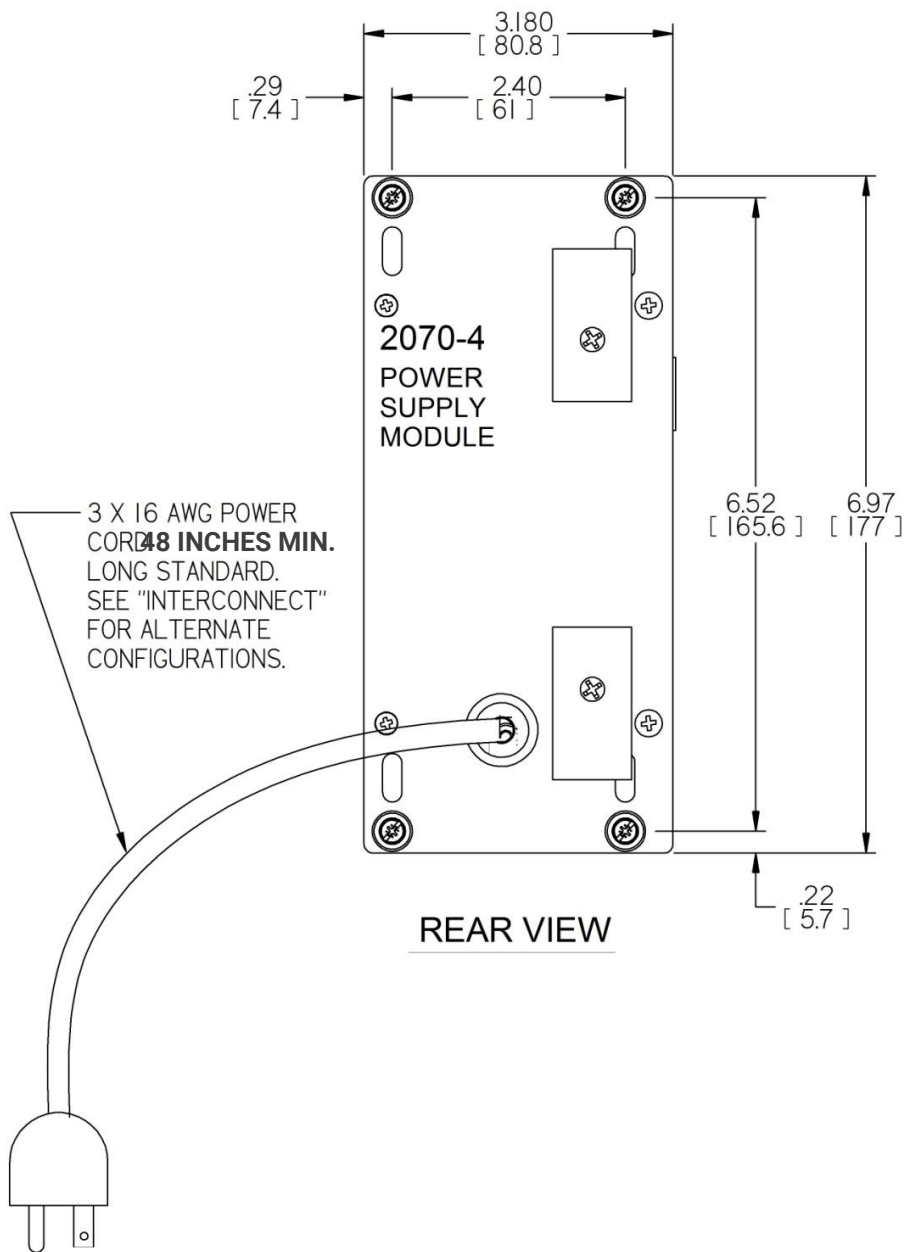
TC2070 SIDE VIEW



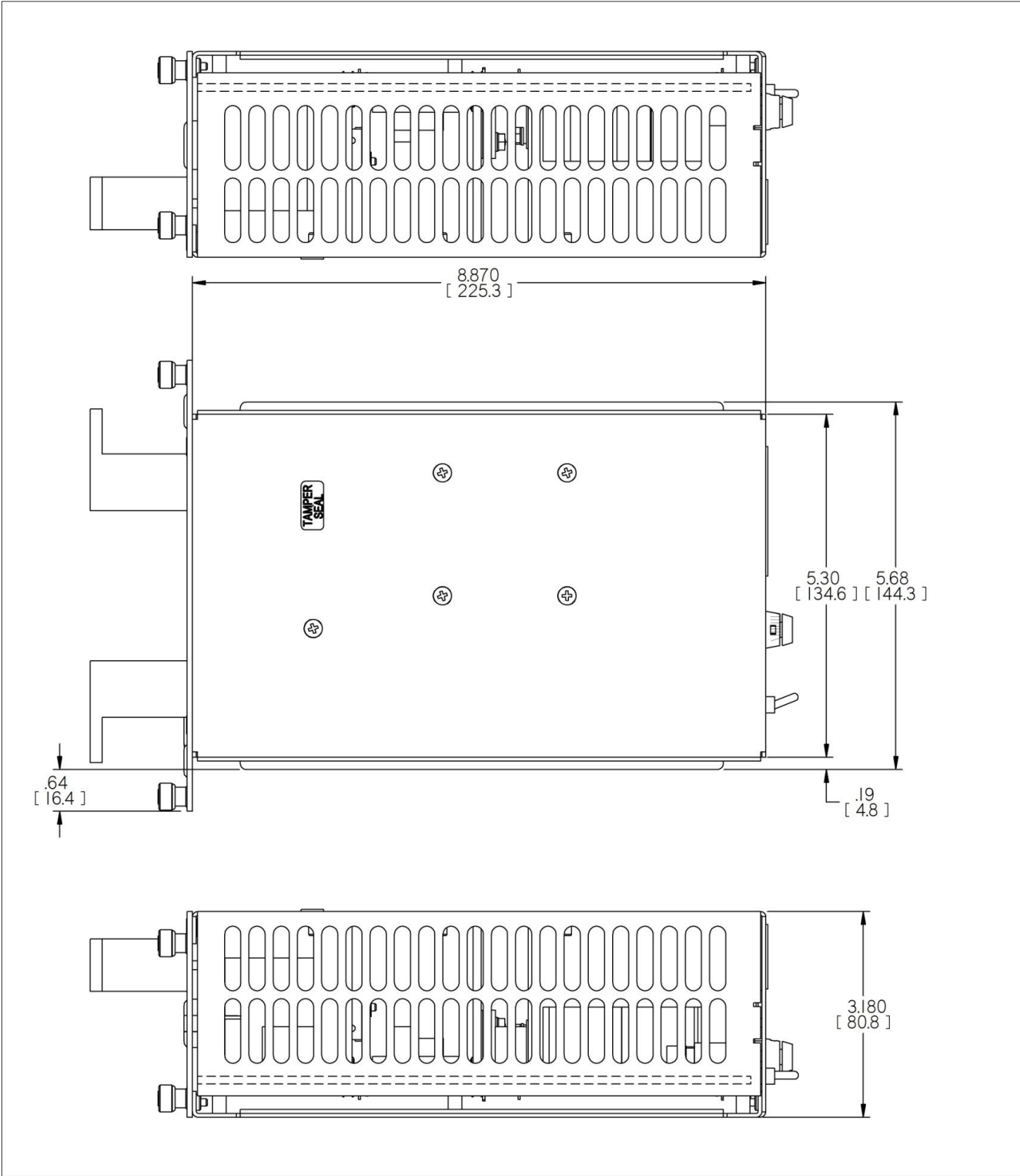
TC2070-4 OUTLINE DRAWING

Mechanical Outline

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



TC2070-4 OUTLINE DRAWING



INNOVATIVE SPECIALTY DC POWER SYSTEMS

Standard and Custom Power Supplies from 5W to 10KW

TRAFFIC CONTROL POWER SUPPLIES



- 70-400+ Watts / 120 and 220 VAC Models Available
- CALTRANS TEES, NYSDOT, CDOT, GDOT Compliant for 332, 334, 336, 342, 344, and 346 Series cabinets
- RoHS and NEMA Compliant
- Custom labeling and barcoding available
- Ruggedization against shock / vibration / humidity available

CUSTOM POWER DISTRIBUTION ASSEMBLIES (PDAs)



- Compliant with TEES 2020
- 1U smaller than the PDA2-LX and PDA3-LX
- User accessible slots as specified
- Custom labeling and barcoding available
- Ruggedization against shock / vibration / humidity available

COMPACT PCI



- AC or DC input, 175W - 500W DC output, active PFC
- 3U x 8HP, 6U x 8HP sizes
- PICMG 2.11 compliant, UL/CSA, NEMKO/TUV/CE certified, ROHS compliant
- Ruggedization against shock/ vibration/ humidity optional

Primary Applications: Industrial Computing, Military, Satellite Comm, Test, Transportation, Telecom, Aerospace

SPECIALTY HOT-SWAPPABLE POWER SUPPLIES



- 200-1500W, Universal Input, 5-54VDC Output
- Hot Swap. N+1, 90+% Efficiency
- 1U Form Factors
- 30+ Variations for Various Applications Including Nuclear
- Ruggedization against shock/ vibration/ humidity optional

Primary Applications: Medical Equipment, Military, Test, Automotive, Computing, Audio, Sensitive Electronics

RACK POWER SYSTEMS



- 200W-1500W, 2-8 slots, single or mixed output voltages, up to 10KW total
- Single, dual, or individual unit AC or DC input
- Internally or externally redundant DC outputs
- Standard 19" and 23" size or user-specified configurations also available
- Ruggedization against shock/ vibration/ humidity optional

Primary Applications: Medical Equipment, Military, Test, Automotive, Computing, Audio, Sensitive Electronics

CUSTOMS & MODIFIED STANDARDS



- 75W-2KW
- Single to 7 outputs
- Designed and built to custom or semi-custom specifications
- Ruggedization against shock/ vibration/ humidity optional
- Custom electrical specs, chassis, paint, labeling, connectors, interface all available

Primary Applications: Medical Equipment, Military, Test, Automotive, Computing, Audio, Sensitive Electronics

LOW NOISE CONVECTION / CONDUCTION COOLED POWER SUPPLIES



- 200W-500W, 90—264VAC full range input with 12-54 VDC Output
- Wide operating temperature range / high efficiency
- Small form factors
- Ruggedization against shock/ vibration/ humidity optional

Primary Applications: Medical Equipment, Military, IT, Sensitive Electronics

MEDICAL ADAPTERS



- 6W-250W, Efficiency levels V & VI
- Desktop, Wall-mount, and Interchangeable AC plug types
- Large selection of output connectors – additional cable lengths available
- UL60601 (medical) approved adapters available
- Ruggedization against shock/ vibration/ humidity optional

