

- Conduction cooled design approach
- Fanless operation with up to 90% output power
- Operating temperature range  $-30^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$
- I/O reinforced isolation 4250 VAC
- Over voltage category (OVC III)
- High efficiency up to 92%
- Operating up to 5000 m altitude
- Internal EN 55032 conducted class B filter
- Protection class I prepared
- 3-year product warranty



The TCI 500U is a 500 Watt conduction cooled AC/DC enclosed power supply series with a 4250 VAC reinforced isolation system. Traco Power's new TCI line focuses on maximizing the proficiency of conduction cooled systems as it offers superior temperature behavior when mounted on a metal chassis or baseplate. This way the TCI 500U can deliver up to 90% of the maximum output power without the need for a fan. Excellent efficiency of up to 92% allows the TCI series to operate from  $-30$  to  $+50^{\circ}\text{C}$  without derating, while going up to  $+80^{\circ}\text{C}$  with either load derating or forced cooling. They also meet OVC III requirements and can operate at up to 5000 m altitude. Active power factor correction, EMC characteristics dedicated for applications in industrial/automation and test & measurement fields and high reliability make the new TCI line an ideal solution for any demanding industrial application.

### Models

Order Code	Output Power max.	Output Voltage nom. (adjustable)	Output Current max. (Forced air cooling)	Output Current max. (Conduction Cooling)	Efficiency typ.
TCI 500-112U-T	500 W	12 VDC (11.4 - 12.6 VDC)	41'500 mA	37'500 mA	90 %
TCI 500-124U-T		24 VDC (22.8 - 25.2 VDC)	20'800 mA	18'750 mA	91 %
TCI 500-148U-T		48 VDC (45.6 - 50.4 VDC)	10'410 mA	9'375 mA	92 %

### Options

TCI 500-AUX	- Optional Cable: <a href="http://www.tracopower.com/overview/tci500-aux">www.tracopower.com/overview/tci500-aux</a>
TCI-AC1	- Optional Cable: <a href="http://www.tracopower.com/overview/tci-ac1">www.tracopower.com/overview/tci-ac1</a>

## Input Specifications

Input Voltage	- AC Range	Operational Range: <b>90 - 264 VAC</b> (Full Range) Rated Range: <b>100 - 240 VAC</b> (Full Range)
	- DC Range	Operational Range: <b>127 - 370 VDC</b> (Designed for, no certification) Polarity: <b>irrelevant</b>
Input Frequency		Operational Range: <b>47 - 63 Hz</b> Certified: <b>50/60 Hz</b>
Power Consumption	- No load & Vin = 230 VAC	<b>500 mW max.</b> (Ready to meet ErP directive)
	- No load & Vin = 115 VAC	<b>500 mW max.</b>
Input Current	- Full load & Vin = 230 VAC	<b>3'150 mA max.</b>
	- Full load & Vin = 115 VAC	<b>6'300 mA max.</b>
Input Inrush Current	- At 230 VAC	<b>80 A max.</b>
	- At 115 VAC	<b>40 A max.</b>
Power Factor	- At 230 VAC	<b>0.94 min.</b> (Active Power Factor Correction)
	- At 115 VAC	<b>0.94 min.</b> (Active Power Factor Correction)
Input Protection		<b>T 10 A / 250 VAC</b> (Internal Fuse in L & N)
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)

## Output Specifications

Output Voltage Adjustment		<b>±5%</b> (By trim potentiometer) Output power must not exceed rated power!
Voltage Set Accuracy		<b>±2% max.</b>
Regulation	- Input Variation (Vmin - Vmax)	<b>1% max.</b>
	- Load Variation (10 - 100%)	<b>1% max.</b>
Ripple and Noise (20 MHz Bandwidth)	12 VDC model:	<b>160 mVp-p max.</b> (w/ 0.1 µF ceramic    47 µF KY)
	24 VDC model:	<b>240 mVp-p max.</b> (w/ 0.1 µF ceramic    47 µF KY)
	48 VDC model:	<b>480 mVp-p max.</b> (w/ 0.1 µF ceramic    47 µF KY)
Capacitive Load	12 VDC model:	<b>5'000 µF max.</b>
	24 VDC model:	<b>2'500 µF max.</b>
	48 VDC model:	<b>1'250 µF max.</b>
Minimum Load		<b>1 % of Iout max.</b> (Operation at lower load will not damage the converter, but it may not meet all specifications)
Temperature Coefficient		<b>±0.06 %/K max.</b> (-30°C - 0°C)
		<b>±0.03 %/K max.</b> (0°C - 50°C)
Hold-up Time	- At 230 VAC	<b>8 ms min.</b>
	- At 115 VAC	<b>8 ms min.</b>
Start-up Time	- At 230 VAC	<b>350 ms max.</b>
	- At 115 VAC	<b>350 ms max.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b> (Level 1, nom.) <b>Latch</b> (Level 2, instantaneous high current)
Output Current Limitation		<b>113 - 161% of Iout max.</b>
Overvoltage Protection		<b>111 - 130% of Vout nom.</b>
Transient Response	- Response Deviation	<b>3% typ. / 5% max.</b> (25% to 100% Load Step)
	- Response Time	<b>2'000 µs typ. / 3'000 µs max.</b> (25% to 100% Load Step)

## Safety Specifications

Standards	- IT / Multimedia Equipment	<b>EN 62368-1</b> <b>IEC 62368-1</b> <b>UL 62368-1</b>
	- Certification Documents	<a href="http://www.tracopower.com/overview/tci500u">www.tracopower.com/overview/tci500u</a>
Protection Class		<b>Class I</b> (Prepared): <b>Connection to PE</b>

All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

Pollution Degree	PD 2
Over Voltage Category	OVC II OVC III

### EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 55032 class B (internal filter)	
	- Radiated Emissions	EN 55032 class A (internal filter)	
	- Harmonic Current Emissions	EN 61000-3-2, class A	
EMS (Immunity)	- Electrostatic Discharge	EN 55035 (Multimedia) Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 4$ kV, perf. criteria A EN 61000-4-3, 3 V/m, perf. criteria A EN 61000-4-4, $\pm 1$ kV, perf. criteria A	
	- RF Electromagnetic Field	L to L: EN 61000-4-5, $\pm 1$ kV, perf. criteria A L to PE: EN 61000-4-5, $\pm 2$ kV, perf. criteria A	
	- EFT (Burst) / Surge	EN 61000-4-6, 3 Vrms, perf. criteria A EN 61000-4-8, 1 A/m, perf. criteria A	
	- Conducted RF Disturbances	Continuous: EN 61000-4-8, 1 A/m, perf. criteria A	
	- PF Magnetic Field	230 VAC / 50 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A >95%, 250 periods, perf. criteria B	
	- Voltage Dips & Interruptions	115 VAC / 60 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A >95%, 250 periods, perf. criteria B	
	EMC / Environmental	- Certification Documents	<a href="http://www.tracopower.com/overview/tci500u">www.tracopower.com/overview/tci500u</a>

### General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-30°C to +80°C
	- Storage Temperature	-30°C to +85°C
Power Derating	- High Temperature	Depending on model
	- Low Input Voltage	3 %/V below 100 VAC
	See application note:	<a href="http://www.tracopower.com/overview/tci500u">www.tracopower.com/overview/tci500u</a>
Over Temperature Protection Switch Off	- Protection Mode	115°C min. / 120°C typ. / 125°C max. (Automatic recovery at 90°C typ.)
	- Measurement Point	Internal IC temperature
Cooling System		Forced air cooling (with external fan, 30 CFM)
		Conduction Cooling (with a 450 x 450 x 3.0 mm aluminum plate)
		Natural Convection (20 LFM)
Fan Power Source	- Output Voltage	12 VDC
	- Output Current	209 mA max. (Fan output voltage: 10.2 - 13.3 VDC when output load > 3% and fan current > 0.1 mA)
Standby Power Source	- Output Voltage	5 VDC
	- Output Current	400 mA max. (1 A max. (with forced air cooling))
Remote Control	- Voltage Controlled Remote (passive = on)	On: 3.3 to 5 VDC or open circuit Off: 0 to 1.0 VDC or short circuit Refers to '+Remote' and '-Remote' Pin
	- Off Idle Input Current	92 mA typ. / 155 mA max.
	- Remote Pin Input Current	8 to 30 mA
Altitude During Operation		4'000 m max. (for OVC III) 5'000 m max. (for OVC II)
Regulator Topology		LCC Converter
Switching Frequency		58 - 76 kHz (PFM)
		67 kHz typ. (PFM)

All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

Insulation System		Reinforced Insulation
Working Voltage (rated)		277 VAC
Isolation Test Voltage	- Input to Output, 60 s	4'250 VAC (6'000 VDC)
	- Input to Case or PE, 60 s	2'830 VAC (4'000 VDC)
	- Output to Case or PE, 60 s	1'500 VAC (2'121 VDC)
Isolation Resistance	- Input to Output, 500 VDC	100 MΩ min.
Leakage Current (at 264 VAC / 63 Hz)	- Earth Leakage Current	1500 μA max.
Distance Through Isolation		7.1 mm
Reliability	- Calculated MTBF	160'000 h (MIL-HDBK-217F, ground benign)
Washing Process		Not allowed
Environment	- Vibration	IEC 60068-2-6 2 g, 3 axis, 60 min, 10-500 Hz, 10 min/cycle
	- Mechanical Shock	IEC 60068-2-27 50 g, 3 axis, half sine, 11 ms
Housing Material		Aluminum
Potting Material		Silicone (UL 94 V-0 rated) (the converter is partly potted on the bottom)
Housing Type		Metal Case
Mounting Type		Chassis Mount
Connection Type		Screw Terminal, Pin Connector
Weight		710 g
Power OK Signal	- Power OK	Voltage source output
	- Power Off	High level Low level (Refers to 'PG' and 'GND' Pin)
Status Indicator		Indicated by green LED
Sense Function		3% max. of Vout nom.
Environmental Compliance	- REACH Declaration	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	<a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	47ec4091-32e0-4625-9fc8-8d2dcbfddbcd

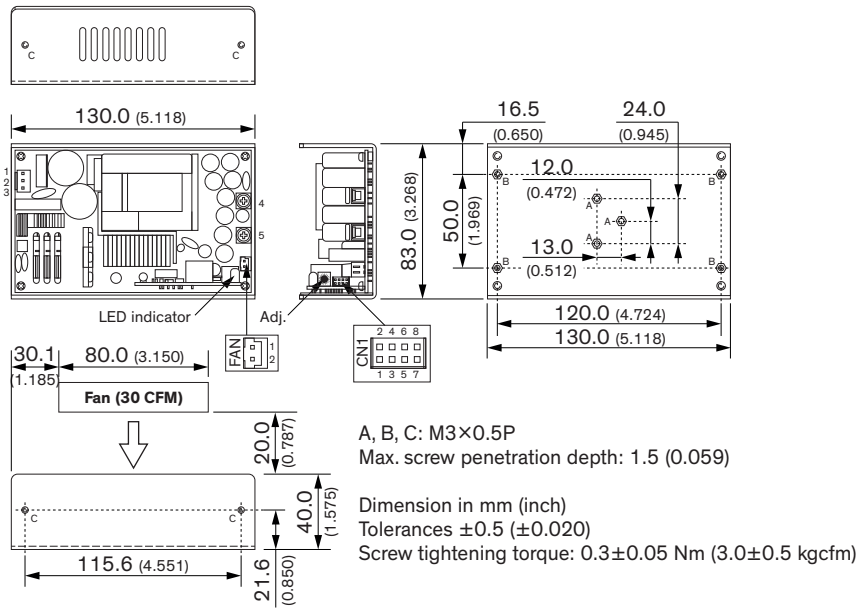
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tci500u](http://www.tracopower.com/overview/tci500u)

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### Outline Dimensions



Input	
Pin	Function
1	AC (N)
2	No Pin
3	AC (L)

Output	
Pin	Function
4	+Vout
5	-Vout**

Auxiliary	
CN1	
Pin	Function
1	-Standby**
2	+Standby
3	GND
4	Power Good
5	-Remote**
6	+Remote
7	-Sense**
8	+Sense

FAN	
Pin	Function
1	+12V
2	GND

Case	
(no dedicated connector)	
Pos	Function
A	For mounting on chassis only
B	For mounting on PCB or chassis, and connecting PE
C	For connecting PE only

**Input:** JST series  
mates with JST crimp terminal: SVH-41T-P1.1 or Equivalent  
and terminal housing: VHR-3N or Equivalent

**Output:** Screw Terminal  
M3.5 Pozzi Pan Head Screw  
max. torque: 0.9 Nm (9.1 kgcm)

**Auxiliary:** JST series  
mates with JST crimp terminal: SPHD-001T-P0.5 or Equivalent  
and terminal housing: PHDR-08VS or Equivalent

**FAN:** JST series  
mates with JST crimp terminal: SXH-002T-P0.6 or Equivalent  
and terminal housing: XHP-2 or Equivalent

\*\*Internally connected with GND