



## Features

- 2" x 4" x 1.4" Package
- Up to 110W Output Power
- 5V @ 1A Standby Output
- Compliant to high levels of EMC per EN61000-4
  - 15kV ESD (Air), 8kV (Contact)
  - 4kV Surge
- Meets Class B Conducted EMI with 6db margin, Class B Radiated EMI with 3db margin
- Up to 90% Efficiency
- >15 years e-cap life
- >1,000,000 hrs. MTBF (50°C)
- Universal Input 90-264Vac Input Range
- DC OK Signal, Inhibit, Power Good Signals
- Class I and II Input Models
- 3 Year Warranty



## Description

A Superior performance 110 Watts AC to DC power supply designed to ensure easy integration into Test and Measurement and Industrial applications. Feature rich and highly efficient TB110S product family can easily fit in 1U chassis and provides up to 110Watts. Greater than 15 years operational life as determined by e-cap life calculations, and a 5V@1A standby output are key features. All models are CE marked to low voltage directive and approved to ITE standards of IEC/UL/EN60950 and CSA C22.2, 2nd edition.

## Model Selection

Model Number <sup>4</sup>	Output Voltage (Nom)	Output Current		Efficiency <sup>1</sup>	Ripple & Noise <sup>2</sup> (pk-pk)	Total Regulation	OVP Threshold	MTBF <sup>3</sup>
		w/Air	Convection					
TB110S12K	12V	8.7A	6.7A	89%	120mV	±2%	15.0 ± 2.0V	500,000
TB110S24K	24V	4.3A	3.3A	89%	240mV	±2%	28.0 ± 2.5V	500,000
TB110S48K	48V	2.1A	1.6A	89%	480mV	±2%	55.0 ± 4.0V	500,000

- Notes:
1. Efficiency values listed are typical and are measured at 115Vac input, full load output current, at an ambient temperature of 25°C.
  2. Measured at 25°C ambient with noise probe directly at end of 6" twisted pair terminated with 0.1µF ceramic and 10µF low ESR capacitors. Values will be higher at ambient temperatures below 0°C.
  3. MTBF values are in hours, per Telcordia SR-332, Issue 3, 25°C, full rated load (w/airflow) at 110Vac input.
  4. Change the "K" suffix to "C" for Input Class II (ungrounded) models.

## General Specifications

<b>AC Input</b>	85-264Vac, single phase. (Safety Approved to 90-264Vac).	<b>Turn On Time</b>	Main Output: <1 Seconds at 115Vac 5Vsb Output: <250mSec at 115Vac
<b>Input Current</b>	1.8A max. at 110Vac, 0.9A max. at 240Vac	<b>Rise Time</b>	Main Output: <70mSec 5Vsb Output: <70mSec
<b>Inrush Current</b>	40Arms max. within 1/2 line cycle, cold start at 25°C. See application note.	<b>Hold-up Time</b>	Main Output: 20mSec min. 5Vsb Output: 100mSec min. from loss of AC input at 115 Vac, full load, 25°C.
<b>Earth Leakage Current</b>	<500mA@264Vac, 60Hz input, NC	<b>Over Load Protection (OCP)</b>	115% - 200% of rated output current value. Hiccup Mode, Auto-recovery

## General Specifications

<b>Turn-On Input Voltage</b>	70-85Vac, Full spec performance at 85Vac.	<b>Short Circuit Protection (SCP)</b>	Short across the output terminals will not cause damage to the unit. Hiccup Mode, Auto-recovery
<b>Turn-Off Input Voltage</b>	<75Vac ± 8Vac	<b>Over Voltage Protection (OVP)</b>	Latches off when output voltage is with range as shown in table. Requires AC Power cycle to reset
<b>Input Fuses</b>	3.15A, 250Vac, line and neutral inputs	<b>Over Temperature Protection (OTP)</b>	Power shuts down at temperature of TBD (typical) at full load. Auto-recovery.
<b>Output Voltage</b>	12V to 48Vdc. See models chart for part numbering.	<b>Output Reverse Voltage Protection</b>	Outputs protected against momentary reverse current less than 20A peak for less than 10mS with 0.5A average. Sustained reverse current at high levels may damage unit.
<b>Voltage Adjustability</b>	+/- 10%	<b>Isolation</b>	Input-Output: 3000Vac Input-Ground: 1800Vac Output-Ground: 500Vac
<b>Efficiency</b>	88% - 90% typical at 115/230Vac, 25°C.	<b>Operating Temperature</b>	-20°C to +70°C. Turn on @ -40°C at >=120Vac
<b>Output Power</b>	110W with 200LFM airflow; 80W convection cooled, -20C to 50°C ambient. 85Vac to 264Vac. See chart for de-rating above 50°C.	<b>Storage Temperature</b>	-40°C to +85°C
<b>Transient Response</b>	500µS typ. response time for return to within 0.5% of final value for a 50% load change, $\Delta i/\Delta t < 0.2A/\mu s$ . Max. volt. deviation is ±3.5%.	<b>Altitude</b>	Operating: -500m to 5000m Non-operating: -500 to 40,000 feet
<b>Minimum Load</b>	Not required.	<b>Relative Humidity</b>	5% to 95%, non-condensing
<b>Total Regulation</b>	±2.0 % for all models.	<b>IPC 610</b>	Class 2
<b>Overshoot</b>	<2% overshoot at turn-on, <1% overshoot at turn-off, under all conditions.	<b>Safety Standards</b>	IEC 60950-1, 2 <sup>nd</sup> Edition CAN/CSA – C22.2 No 60950-1 DEMKO EN60950-1
<b>E-Cap Life</b>	>15 Years in use condition of 40°C ambient, at 12h/day, 261 days/year. Additional information on other use profiles available on request.	<b>MTBF</b>	>1, 000,000 hours @ 110/220Vac, 50°C, GB Telcordia SR-332 issue 3.
<b>Shock (IEC 60068-2-27)</b>	<u>Operating:</u> Half-sine shock waveform. Impact Acceleration: 20g, Pulse duration: 11mS. Cycles: 3 times per axis in X,Y, Z direction <u>Non-Operating:</u> Half-sine shock waveform. Impact Acceleration: 50g, Pulse duration: 6mS Cycles: 3 times per direction on 3 axes (X,Y, Z)	<b>Vibration (IEC 60068-2-6) (IEC 60068-2-64)</b>	<u>Operating:</u> Sinusoidal Frequency: 10-500Hz, Impact Acceleration: 1g, Sweep rate: 1 octave/min Cycles: 10 times per axis in X, Y, Z direction <u>Random Vibration:</u> <u>Operating:</u> 0.003g <sup>2</sup> /Hz, 1.224grms overall, 3 axes, 10 min per axis, 1-500Hz. <u>Non-Operating:</u> 0.02g <sup>2</sup> /Hz, 3.1grms overall, 3 axes, 1 hour per axis, 20-500 Hz
<b>Dimensions</b>	W: 2.0" x L: 4.0" x H: 1.4"	<b>Weight</b>	180g, typical

## Auxiliary Signals

<b>5V Standby Output:</b>	5Vdc @ 1A, +/-5% regulation over all changes in main output load current.	<b>Power Good/Power Fail:</b>	Signal is high after the main output is within regulation band upon AC turn on. Goes low with 4mS min. before the main DC output drops below 90% of nominal value when AC turns off.
<b>Inhibit:</b>	Logic HIGH or open = ON Logic LOW or short to ground = OFF		

## EMI/EMC Compliance

<b>Conducted Emissions</b>	EN55022/CISPR22 Class B, FCC Part 15.107, Class B, 6db margin, typical.
<b>Radiated Emissions</b>	EN55022/CISPR22 Class B, FCC Part 15.109, Class B, 3db margin, typical.
<b>Common Mode Noise: High Frequency (100Khz -20 Mhz)</b>	<90mA pk-pk, 10mA rms, <800mV pk-pk. (Class I input units).
<b>Common Mode Noise: Low Frequency (50-120 Hz)</b>	<40mA pk-pk, 5mA rms (Class I input models).
<b>Static Discharge Immunity</b>	EN55024/IEC61000-4-2, Level 4, 8kV Contact Discharge, 15kV air discharge, Criteria A
<b>Radiated RF Immunity</b>	EN55022/IEC61000-4-3, Level 3, 10V/m, Criteria A
<b>EFT/Burst Immunity</b>	EN55024/IEC61000-4-4, Level 3, 4kV (PS Output), Criteria A; 2kV (signal outputs), Criteria B
<b>Line Surge Immunity</b>	EN55024/IEC61000-4-5, Level 4, 2kV diff., 4kV Common-mode, Criteria A
<b>Conducted RF Immunity</b>	EN55022/IEC61000-4-6, Level 4, 10V/m, Criteria A
<b>Power Frequency Magnetic Field Immunity</b>	EN55024/IEC61000-4-8, Level 4, 30A/m, Criteria A
<b>Voltage Dip Immunity</b>	EN55024/IEC61000-4-11, Dips: 100%, 10ms; 30%, 500ms; 60%, 100ms; Interruptions: 100%, 5000ms; Performance Criteria A, A, B & B
<b>Line Harmonic Emissions</b>	EN55024/IEC61000-3-2, Class A.
<b>Flicker Test</b>	EN55024/IEC61000-3-3

**Notes:** Performance criteria are based on EN55024. According to the standards, performance criteria are defined as following:  
A – Normal performance during and after the test  
B – Temporary degradation, self-recoverable  
C – Temporary degradation, operator intervention required to recover the operation  
D – Permanent damage

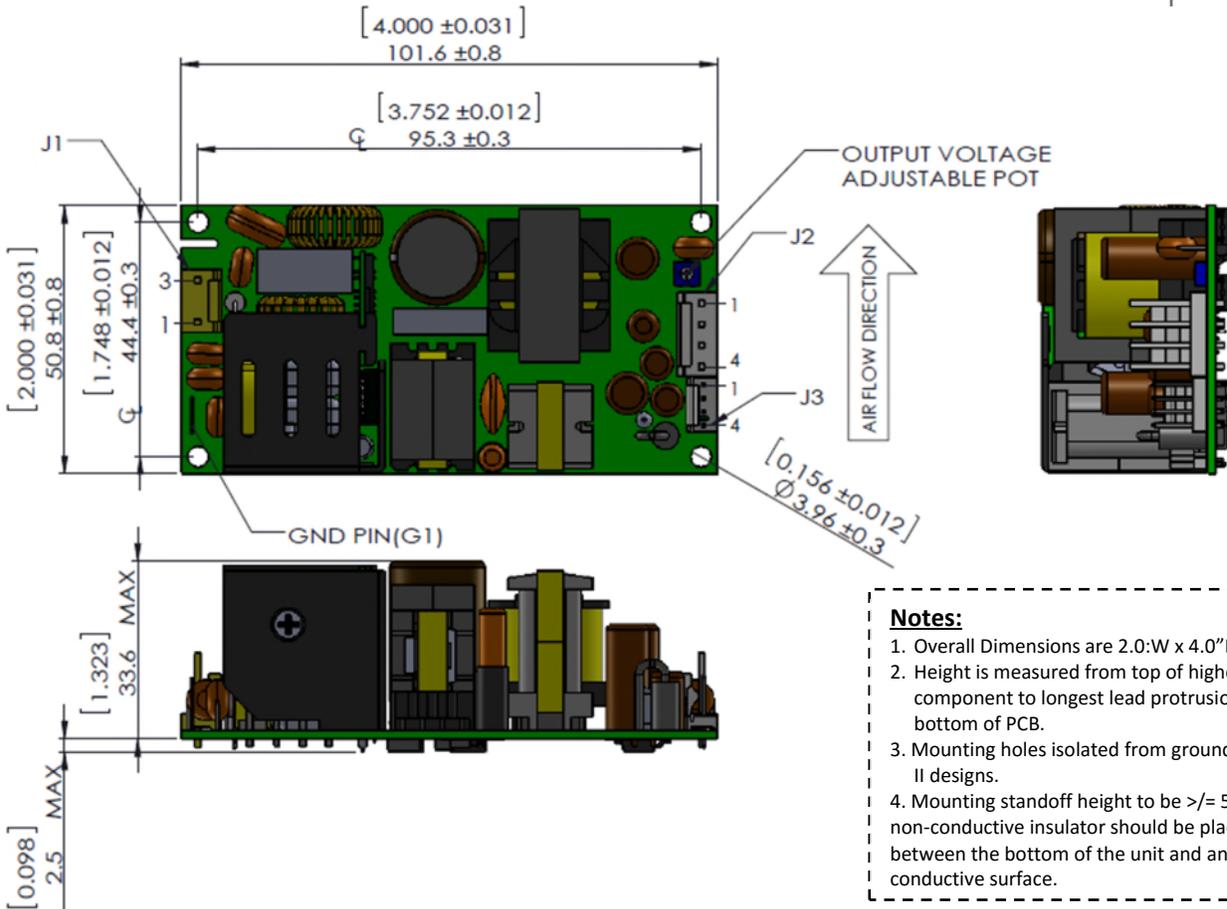
## Isolation Specifications

Parameter	Conditions/Description	Min	Nom	Max	Units
Insulation Safety Rating	Input/Ground		1800Vac		
	Input/Output		3000Vac		
	Output/Ground		500Vac		
Electric Strength Test Voltage	Input/Ground	1800	-	-	Vac
	Input/Output	3000	-	-	Vac
	Output/Ground	500	-	-	Vac

## Connector Information

Input Connector J1	DC Output Connector J2	Ground Connector G1	Signal Connector J3
PIN 1) AC Line PIN 2) Empty (removed) PIN 3) AC Neutral	Pin 1) (+V) Pin 3) (-V) Pin 2) (+V) Pin 4) (-V)	FG 0.187" Quick-connect tab	PIN 1) RTN Pin 3) Power Good/Power Fail PIN 2) 5Vsb Output Pin 4) Inhibit
<b>Mating Connector:</b> Tyco/AMP 640250-3 Pins: 640252-2	<b>Mating Connector:</b> Tyco/AMP 640250-4 Pins: 640252-2	<b>Mating Connector:</b> Molex 01-90020005	<b>Mating Connector:</b> Tyco/AMP 1375820-4 Pins: 1375819

## Mechanical Drawing



## Output Derating:

110W w/air, 80W convection cooled at -20°C to 50°C operating ambient temperature and across the entire operating AC input range of 85 to 264Vac. Derate as indicated below for temperatures above 50°C.

