



FEATURES AND BENEFITS

3.3" x 6.2" x 1.62" Package

Up to 425W of Air-cooled Power,
300W Convection

Universal Input 90-264VAC Input Range

5V at 2A Isolated Standby Output

Isolated 12V Fan Output

Inhibit, Power Fail, DC OK Signals,
Remote Sense

Approved to CSA/EN/IEC/UL60950-1, 2nd Edition

Compliant to High Levels of EMC per
EN61000-4

Meets Class B Conducted EMI with 6db Margin
Class A Radiated EMI with 3db Margin

Efficiency 90% Typical

3 Years Warranty

Cover and Fan Cover Options

MODEL SELECTION

Model Number	Volts	Output Current (A)		Ripple Noise (mV pk-pk)	Regulation (% of Vout)	OCP Threshold (% Full load)	OVP Threshold (% Vout)	Construction
		(Convection)	(200LFM air)					
TU425S12E	12V	22.0A	32.2A	120	3%	130%-170%	110%-130%	U channel
TU425S18E	18V	14.6A	21.5A	180	3%	130%-170%	110%-130%	
TU425S24E	24V	11.9A	16.8A	240	3%	130%-170%	110%-130%	
TU425S48E	48V	5.9A	8.4A	480	3%	130%-170%	110%-130%	
TU425S12EF	12V	32.2A	N/A	120	3%	130%-170%	110%-130%	Enclosure with Fan
TU425S18EF	18V	21.4A	N/A	180	3%	130%-170%	110%-130%	
TU425S24EF	24V	16.8A	N/A	240	3%	130%-170%	110%-130%	
TU425S48EF	48V	8.4A	N/A	480	3%	130%-170%	110%-130%	
TU425S12EC	12V	14.2A	26.0A	120	3%	130%-170%	110%-130%	Enclosure
TU425S18EC	18V	9.4A	17.4A	180	3%	130%-170%	110%-130%	
TU425S24EC	24V	7.6A	13.0A	240	3%	130%-170%	110%-130%	
TU425S48EC	48V	3.8A	6.5A	480	3%	130%-170%	110%-130%	
Standby Output	5V	2.0A	2.0A	100	5%	130%-200%	110%-130%	All Models
Fan Output	12V	0.5A	1.0A	360	10%	150%-200%	N/A	

- Notes :**
1. Total power with 200lfm of forced air cooling is 425W (385W for 12V model) including 12V/1A for Fan output and 5V/2A standby.
 2. Maximum convection cooled power is limited to 280W for 12V model and 300W for other models. This includes 12V/0.5A fan output and 5V/2A standby output.
 3. Efficiency values listed are typical and are measured at 115VAC input, full load output current, at an ambient temperature of 25°C.
 4. 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.
 5. Fan Output: If the load on this output is other than a fan, a short circuit condition on this output can only be remedied by removing both the cause of the short circuit and the load. This will allow the output to resume normal operation.
 6. No output adjustment for 56V model.
 7. MTBF values are in hours, per Telcordia 332, Issue 6, 25°C, full rated load (w/airflow) at 110VAC input.



INPUT

AC Input	100-240VAC, $\pm 10\%$, 47-63Hz, 1Ø 120-300 VDC (external fuse required for DC input)
Input Current	115VAC: 5.2A, 230VAC: 2.5A
Inrush Current	264VAC, Cold start: will not exceed 40Arms within $\frac{1}{2}$ cycle. $I^2T = 25A^2/\text{sec}$ maximum
Input Fuses	F1, F2: 6.3A, 250VAC
Leakage Current	<750 μ A @ 264VAC, 60Hz, NC <1.5mA @ 264VAC, 60Hz, SFC
Efficiency	See Model selection chart on page 1
Common Mode Noise	Line Frequency: <2.5Vrms @ 115VAC, <5Vrms @ 230VAC, 50/60Hz. See App note for test set-up and typical graphs. For high frequency noise, consult the factory

OUTPUT

Hold-Up Time	Main output: >20ms for 300W @ 120VAC/60 Hz, >16ms for 383W (90% of 425W) @ 120VAC/60Hz 5VSB output: >500ms
Turn On Time (Main Output)	Main output: <1 sec max @115VAC, Rise time 30ms max 5VSB turn-on time is 500ms max, Rise time 50ms max. Output voltage rise is monotonic
Switching Frequency	75kHz, Typical
Output Power	425W continuous, with 200 lfm airflow 300W convection cooled – See chart for specific voltage model ratings
Output Voltage	See chart on page 1. Initial setpoint within 0.5% of nominal. Adjustable +/-5% from nominal (except 56V)
Ripple and Noise	0.5%rms, 1% pk-pk, see Model selection chart on page 1
Transient Response	50% load step, $\Delta i/\Delta t$: <0.2A/ μ S. Max voltage deviation = 5%. Recover to within 1% of nominal within 500 μ S
Minimum Load	Not required for main output or 5VSB Fan output: 0.5A min required on the main output in order for the 12V fan output to be within regulation
Power Factor	>0.99 @ 115VAC, Full Load >0.95 @ 230VAC, Full Load
Total Regulation	See Model selection chart on page 1

PROTECTION

Overtemperature Protection	Sensing transformer temperature, 135°C (55°C ambient temperature at full load), Auto-recovery
Overload Protection	130% to 170% of rating, Hiccup mode, Auto-recovery
Short Circuit Protection	Main output & 5VSB: Cycling type, Auto-recovery. Fan output: Recovery only after removal of short and load. See note 5 on page 1
Overvoltage Protection	OVP latch. See chart for trip ranges. 5V standby output (latch). See chart for trip range



ISOLATION SPECIFICATIONS

Isolation	Input-Output: 3,000VAC Input-Ground: 1,500VAC Output-Ground: 500VAC
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SAFETY

Safety Standards	EN/CSA/UL/IEC 60950-1, 2 nd Edition
Shock	Operating: Half-sine, 20gpk, 10ms, 3 axes, 6 shocks total Non-Operating: Half-sine, 40 gpk, 10 ms, 3 axes, 6 shocks total

RELIABILITY

MTBF	See model selection chart on page 1
E-Cap Life	7 years, based on typical operation of 12 hours/day, 261 days/year at 40°C ambient temp

ENVIRONMENT

Operating Temperature	-10 to 70°C. Starts up at -40°C. The unit will meet all published specifications after a warm-up period See Application note for operating conditions during start-up
Temperature Derating	Derate output power linearly above 50°C to 50% at 70°C
Storage Temperature	-40°C to +85°C
Altitude	Operating: Up to 5,000m (derating may be required above 3,000m, consult factory) Non-operating: -500 to 40,000 ft
Relative Humidity	5% to 95%, Non-condensing
Vibration	Operating: 0.003g/Hz, 1.5grms overall, 3 axes, 10 min/axis Non-operating: 0.026g ² /Hz, 5.0grms overall, 3 axes, 1 hr/axis
Dimensions	W: 3.3" x L: 6.2" x H: 1.62" W: 84mm x L: 157.5mm x H: 41mm
Weight	670g

AUXILIARY SIGNALS

DC OK	Goes HIGH when main DC output is above 90% of nominal voltage and goes LOW when the output is below 90% of rated main output DC voltage
Inhibit	Logic HIGH or open = ON Logic LOW or short to ground = OFF
Remote Sense	Compensates for up to 0.5V voltage drop for 48V & 56V models, and 0.16V voltage drop for 12V & 24V models Maximum deviation of 5% (main output) any 50% step above 5% load
5V Standby Output	5V @ 2A, +/-5% regulation over all changes in main output load current
Power Good/ Power Fail	Signal is high within 500ms 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
Fan Output	12V @ 1A (air cooled) or 0.5A (convection), +/-10% regulation for load change of 0.5A to FL on the main output
Current Share ¹	Active single wire, up to 4 supplies in parallel. Paralleled output voltages must be set to within 0.5% of each other Contact Factory for details on the required set-up for proper operation
Current Share Accuracy ¹	5% when the load current is ≥50% of the total available load current, 10% when the load current is between 25% - 49% of the total available load current. Remote sense lines must be connected to ensure accuracy

Notes : 1. Consult Factory for proper set-up for current sharing operation.



CONNECTOR INFORMATION

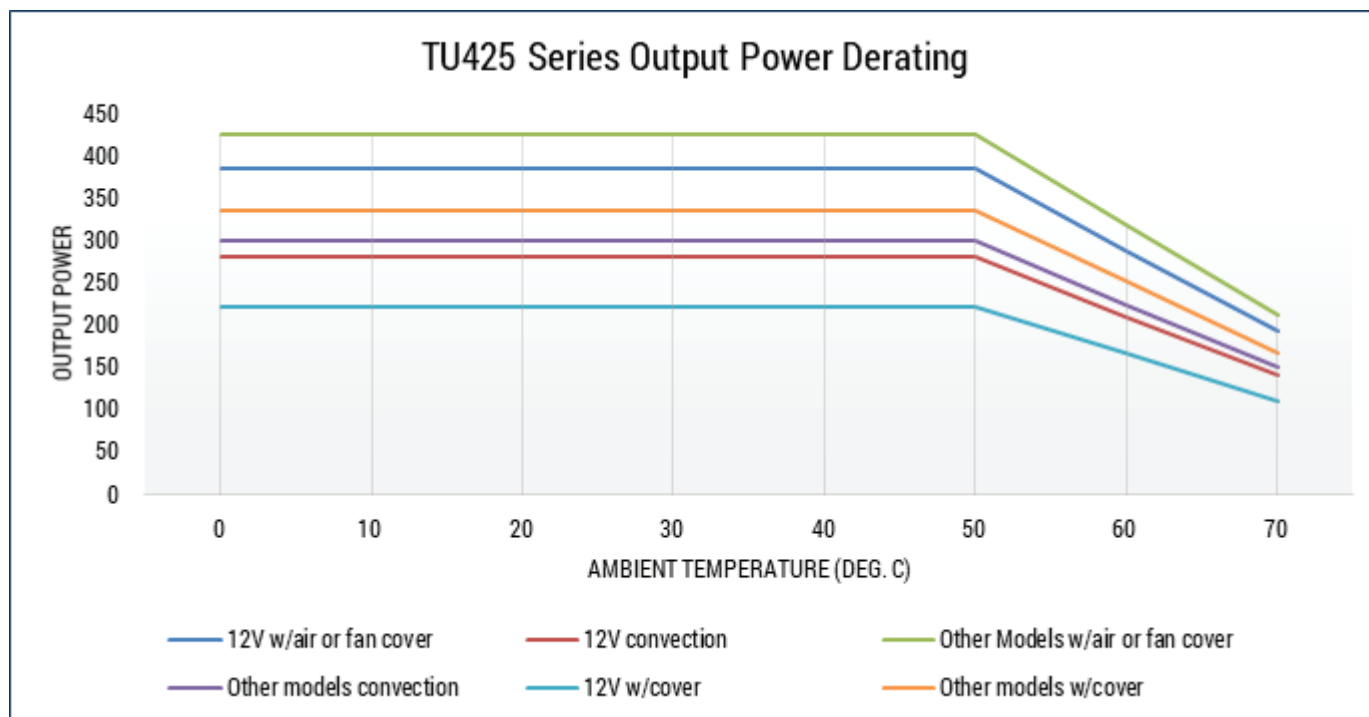
Input Connector J101	Main DC Output J302, J303	Fan Output J301	Signal Connector J401
PIN 1) FG PIN 2) NC PIN 3) AC Neutral PIN 4) NC PIN 5) AC Line	Term 1 – J302: (+V) Term 2 – J303: (-V)	PIN 1) 12V Fan (+) PIN 2) 12V Fan (-)	PIN 1) Remote Sense (+) Pin 6) Power Good PIN 2) Common Pin 7) +5VSB Output PIN 3) Remote Sense (-) Pin 8) +5VSB Output PIN 4) Current Sharing Pin 9) DC OK PIN 5) Remote Inhibit Pin 10) Common
Mating Connector: Tyco/AMP 640250-5 Pins: 3-770476-1	Mating Connector: Molex 19141-0058 19141-0063 19141-0083	Mating Connector: Tyco AMP 1375820-2 Pins: 1375819-1	Mating Connector: Molex 90142-0010 Pins: 90119-2110

EMI/EMC COMPLIANCE

Conducted Emissions	EN55011/CISPR22 Class B, FCC Part 15.107, Class B, 6db margin, Typical
Radiated Emissions	EN55011/CISPR22 Class A, FCC Part 15.109, Class A, 3db margin, Typical
Static Discharge Immunity	EN55024/IEC61000-4-2, Level 4, 8kV contact discharge, 15kV air discharge, Criteria A
Radiated RF Immunity	EN55022/IEC61000-4-3, Level 2, 3V/m, Criteria A
EFT/Burst Immunity	EN55024/IEC61000-4-4, Level 3, 2kV (PS output), 1kV (signal outputs), Criteria A
Line Surge Immunity	EN55024/IEC61000-4-5, Level 3, 1kV diff, 2kV common-mode, Criteria A Level 4, 2kV diff, 4kV common-mode, Criteria C
Conducted RF Immunity	EN55022/IEC61000-4-6, Level 3, 10V/m, Criteria A
Power Frequency Magnetic Field Immunity	EN55024/IEC61000-4-8, Level 3, 10A/m, Criteria A
Voltage Dip Immunity	EN55024/IEC61000-4-11, Dips: 100%, 10ms; 30%, 500ms; 60%, 100ms Interruptions: 100%, 5,000ms; Performance Criteria A, A, B & B
Line Harmonic Emissions	EN55024/IEC61000-3-2, Class A, C & D at full load (425W output)
Flicker Test	EN55024/IEC61000-3-3, Section 5



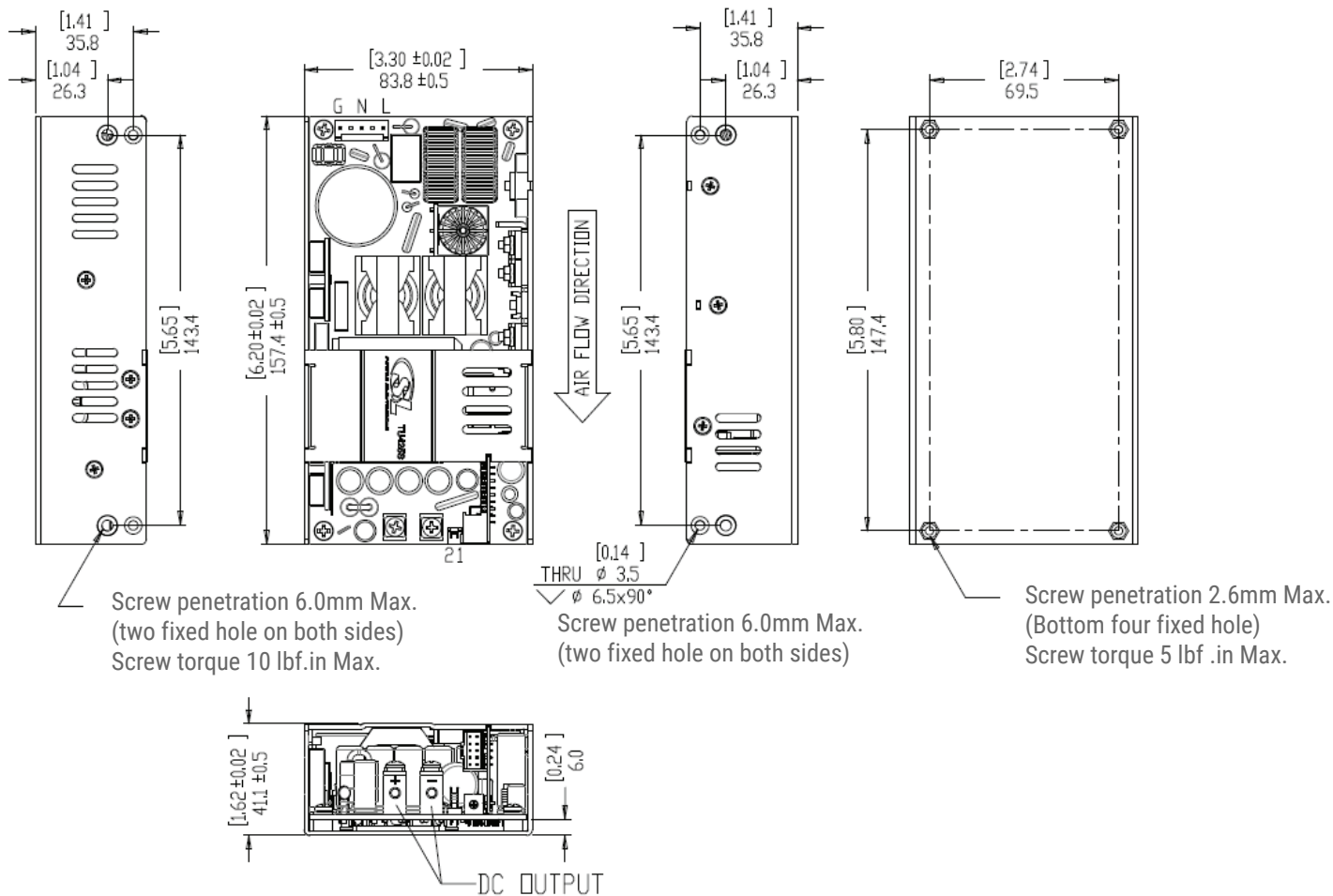
DERATING CURVES





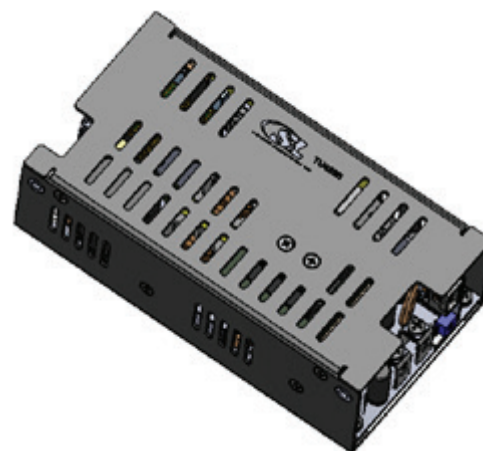
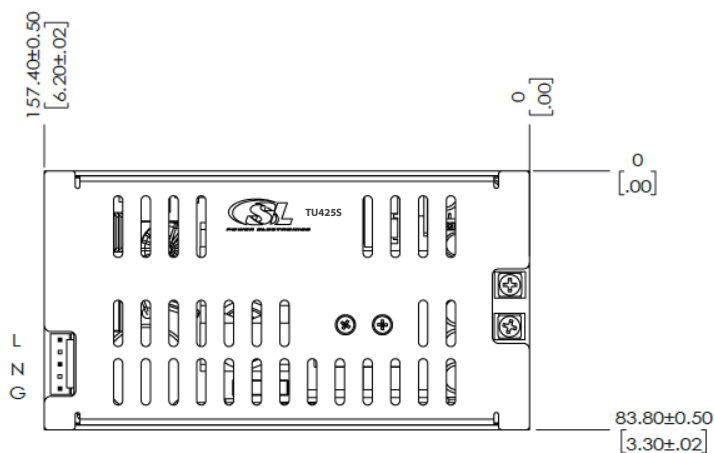
MECHANICAL DRAWING

Base Model: TU425SxxE



Cover Option: TU425SxxEC

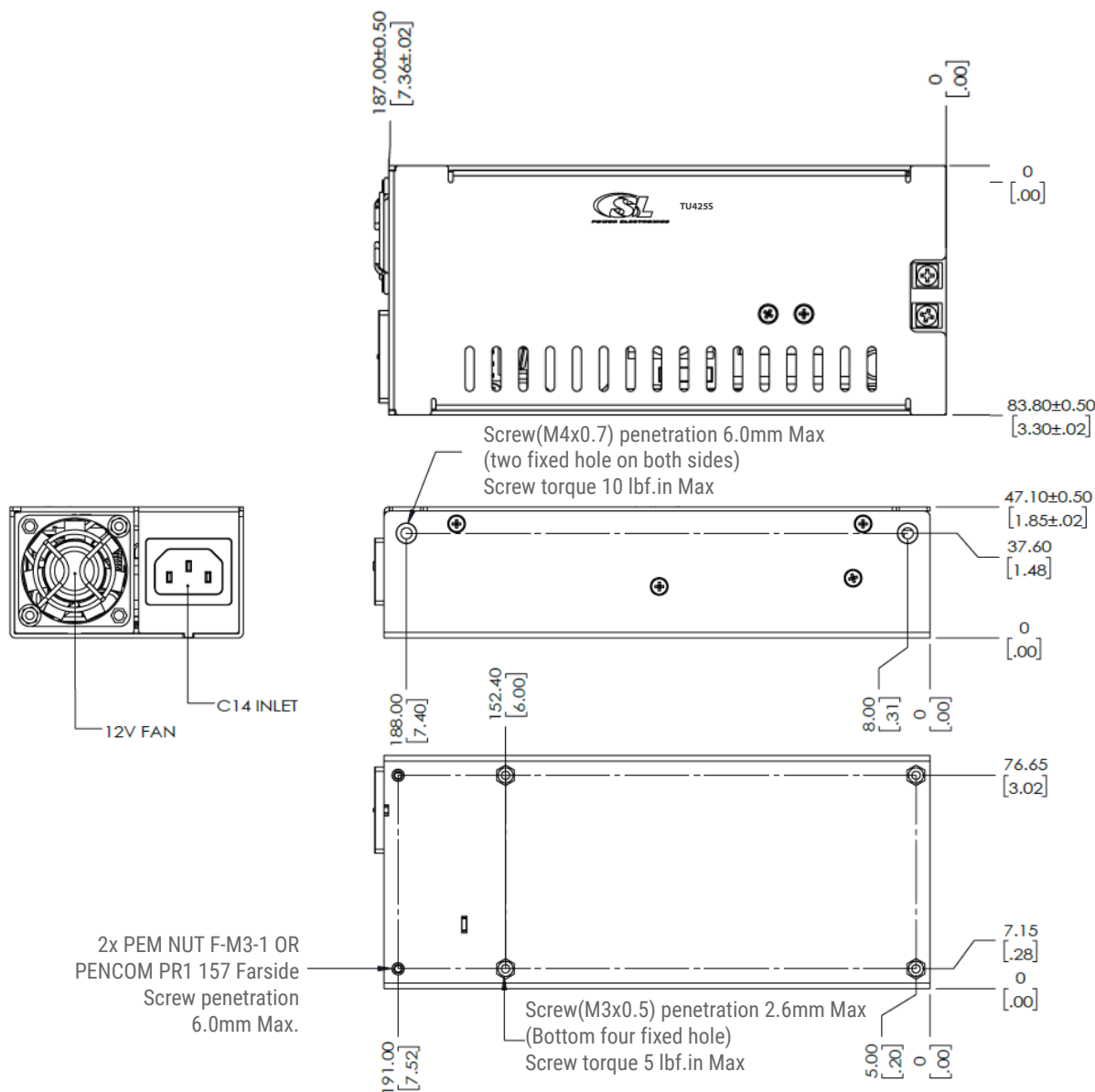
(Top view shown only, other views same as base model above)





MECHANICAL DRAWING

Fan Cover Option: TU425SxxEF



- Notes :**
1. Specifications subject to change without notice.
 2. All dimensions in inches (mm), Tolerance is ±0.02" (±0.5).
 3. FG is safety ground connection.
 4. Specifications are for convection rating at factory settings at 115VAC input 25°C unless otherwise stated.
 5. Warranty: 3 years.