



Industrial

### FEATURES AND BENEFITS

Meets DoE Efficiency Level VI And EU CoC Tier 2 Requirements  
No Load Input Power  
Average Efficiency

Approved to EN/CSA/IEC/UL62368-1

E-Cap Life Of >8 Years

Up To 60W Of AC-DC Power

>900,000 Hours MTBF

Universal Input 90-264Vac Input Range

3 Year Warranty

Meets "Heavy Industrial" Levels Of EN61000 EMC Requirements

IP22 Rated Enclosure

Meets EN55011/CISPR11, FCC Part 15.109 Class B Conducted & Radiated Emissions, With 6Db Margin



### MODEL SELECTION

Model Number	Volts	Output Current	Output Power	Ripple & Noise <sup>1</sup>	Line Regulation	Load Regulation	Output Connector	Output Cable	Input Configuration
TE60A0551F01	5.0V	7.00A	35W	75mV pk-pk	±1%	±5%	6 pin Molex Type <sup>2</sup>  2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	#18AWG, See mechanical drawings for cable length	Class I Desktop, IEC60320 C14 Receptacle
TE60A0903F01	9.0V	6.00A	54W	90mV pk-pk	±1%	±5%			
TE60A1203F01	12.0V	5.00A	60W	120mV pk-pk	±1%	±5%			
TE60A1503F01	15.0V	4.00A	60W	150mV pk-pk	±1%	±5%			
TE60A1803F01	18.0V	3.40A	60W	180mV pk-pk	±1%	±5%			
TE60A2403F01	24.0V	2.70A	60W	240mV pk-pk	±1%	±5%			
TE60A4803F01	48.0V	1.35A	60W	480mV pk-pk	±1%	±5%			
TE60A0551N01	5.0V	7.00A	35W	75mV pk-pk	±1%	±5%	6 pin Molex Type <sup>2</sup>  2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	#18AWG, See mechanical drawings for cable length	Class II Desktop, IEC60320 C8 Receptacle
TE60A0903N01	9.0V	6.00A	54W	90mV pk-pk	±1%	±5%			
TE60A1203N01	12.0V	5.00A	60W	120mV pk-pk	±1%	±5%			
TE60A1503N01	15.0V	4.00A	60W	150mV pk-pk	±1%	±5%			
TE60A1803N01	18.0V	3.40A	60W	180mV pk-pk	±1%	±5%			
TE60A2403N01	24.0V	2.70A	60W	240mV pk-pk	±1%	±5%			
TE60A4803N01	48.0V	1.35A	60W	480mV pk-pk	±1%	±5%			
TE60A0551Q01	5.0V	7.00A	60W	75mV pk-pk	±1%	±5%	6 pin Molex Type <sup>2</sup>  2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	#18AWG, See mechanical drawings for cable length	Class II Desktop, IEC60320 C18 Receptacle
TE60A0903Q01	9.0V	6.00A	54W	90mV pk-pk	±1%	±5%			
TE60A1203Q01	12.0V	5.00A	60W	120mV pk-pk	±1%	±5%			
TE60A1503Q01	15.0V	4.00A	60W	150mV pk-pk	±1%	±5%			
TE60A1803Q01	18.0V	3.40A	60W	180mV pk-pk	±1%	±5%			
TE60A2403Q01	24.0V	2.70A	60W	240mV pk-pk	±1%	±5%			
TE60A4803Q01	48.0V	1.35A	60W	480mV pk-pk	±1%	±5%			



### Notes:

1. Measured at the output connector, with noise probe directly across output and load, terminated with 0.1 $\mu$ F ceramic and 47 $\mu$ F low ESR capacitors. For 5V and 6V models, values listed are typical, 100V pk-pk maximum
2. Molex p/n 39-01-2060 or equivalent. See outline drawing for pinout information
3. For Input Class I models: For AC GND connected to output common (-), insert a "B" in the part number where the "A" is located (TE60B1203F01)
4. All specifications are typical at nominal input, full load, at 25°C ambient unless noted

### INPUT

AC Input	100-240Vac, $\pm$ 10%, 47-63Hz, 1
Input Current	115Vac: 1.5A, 230Vac: 0.75A
Inrush Current	264Vac, cold start: will not exceed 40A
Input Fuses	F1, F2: 2A, 250Vac fuses (line & neutral lines) provided on all models
Earth Leakage Current	Input-GND: <500 $\mu$ A@264Vac, 60Hz, NC Output-GND: <4mA@264Vac, 60Hz, NC
Efficiency	Meets US DoE Efficiency Level VI and EU CoC Tier 2 average efficiency levels
Common Mode Noise	High Frequency (100kHz-20MHz): <40mA pk-pk
No Load Input Power	<0.150W. Meets DoE Efficiency Level VI and EU CoC Tier 2 Requirements

### PROTECTION

Overvoltage Protection	130 to 150% of output voltage (max. 60V on 48V model), hiccup mode
Short Circuit Protection	Hiccup Mode, auto recovery
Overtemperature Protection	Will shutdown upon an over-temperature condition, auto-recovery
Overload Protection	130 to 180% of rating, Hiccup Mode

### OUTPUT

Output Voltage	See models chart on pg 1
Output Power	60W continuous – See models chart for specific voltage model ratings
Turn On Time	Less than 1 sec @115Vac, full load
Hold-up Time	20mS min., at full Load, 100Vac input
Ripple and Noise	See models chart on pg 1

### EMI/EMC COMPLIANCE

Conducted Emissions	EN55032//EN55022/CISPR22 Class B, FCC Part 15.107, Class B: 6db margin typ, 115/230Vac
Radiated Emissions	EN55032/EN55022/CISPR22 Class B, FCC Part 15.109, Class B: 3db margin typ, 115/230Vac
Electro-Static Discharge (ESD) Immunity on Power ports	EN55024/IEC61000-4-2, Level 4: +/- 8kV contact, +/- 15kV air, Criteria A
Radiated RF EM Fields Susceptibility	EN55022/EN61000-4-3, 10V/m, 80MHz-2.7GHz, 80% AM at 1kHz
Electrical Fast Transients (EFT) /Bursts	EN55024/IEC61000-4-4, Level 4, +/- 4kV, 100Khz rep rate, 40A, Criteria A
Surges, Line to Line (Diff Mode) and Line to GND (CMN Mode)	EN55024/IEC61000-4-5, Level 4, +/-2kV DM, +/-4kV CM, Criteria A
Conducted Disturbances induced by RF Fields	EN55022/IEC61000-4-6, 10Vrms – Level 4, in ISM and amateur radio bands between 0.15Mhz and 80Mhz, 80% AM at 1KHz
Rated Power frequency magnetic fields	EN55024/IEC1000-4-8, Level 4: 30 A/m, 50/60 Hz
Voltage Interruptions, Dips, Sags & Surges	EN55024/IECEN61000-4-11: --100% dip for 20mS, Criteria A --100% dip for 5000mS (250/300 cycles), Criteria B --60% dip for 100mS, Criteria B --30% dip for 500mS, Criteria A
Harmonic Current Emissions	EN55011/EN61000-3-2, Class A
Flicker Test	EN61000-3-3

All specifications are typical at nominal input, full load, at 25°C ambient unless noted



### ENVIRONMENT

Operating Temperature	-20°C to +70°C. Derate above 40°C. Start Up at -40°C, full load, (warmup period before all parameters are within published specifications)
Relative Humidity	5% to 95%, non-condensing
Weight	400g
Dimensions	See mechanical drawings below
Temperature Derating	See derating curve below
Altitude	Operating: to 5000m Non-operating: -500 to 40,000 ft
Storage Temperature	-40°C to +85°C
Vibration	Operating: 0.003g/Hz, 1.5grms overall, 3 axes, 10 min/axis, 1-500Hz Non-Oper.: random waveform, 3 minutes per axis, 3 axes and Sine waveform, Vib. frequency/acceleration: 10-500Hz/1g, sweep rate of 1 octave / minutes, Vibration time of 10 sweeps / axes, 3 axes
Shock	Operating: Half-sine, 20gpk, 10mS, 3 axes, 6 shocks total Non-Operating: Half-sine waveform, impact acceleration of 100G, Pulse duration of 6 mS, Number of shocks: 3 for each of the three axis

### RELIABILITY

MTBF	>900,000 hours, full load, 115Vac input, 25°C ambient, per Telcordia 332 Issue 6
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All specifications are typical at nominal input, full load, at 25°C ambient unless noted

### ISOLATION

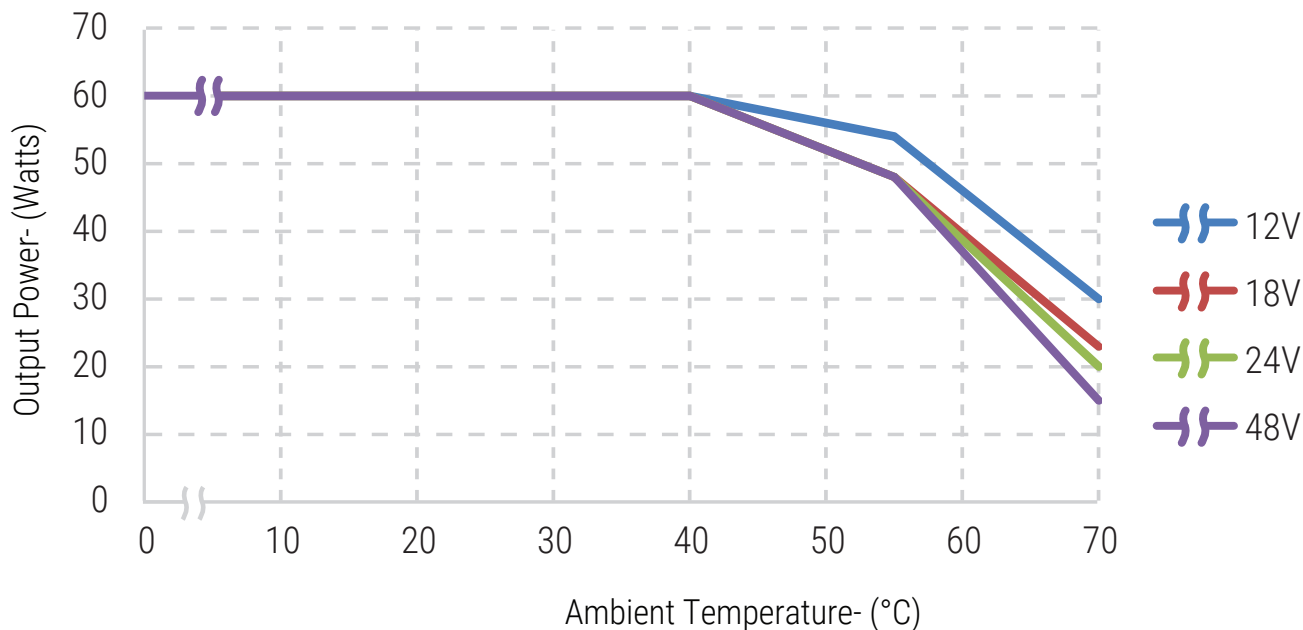
Isolation	Input-Output: 4000Vac Input-Ground: 1500Vac Output-Ground: 1500Vac
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### SAFETY

Safety Standards	EN/CSA/IEC/UL62368-1
Drop Test	1.4m from table top to wooden platform, 6 faces

### TE60 SERIES OUTPUT POWER DERATING CURVE

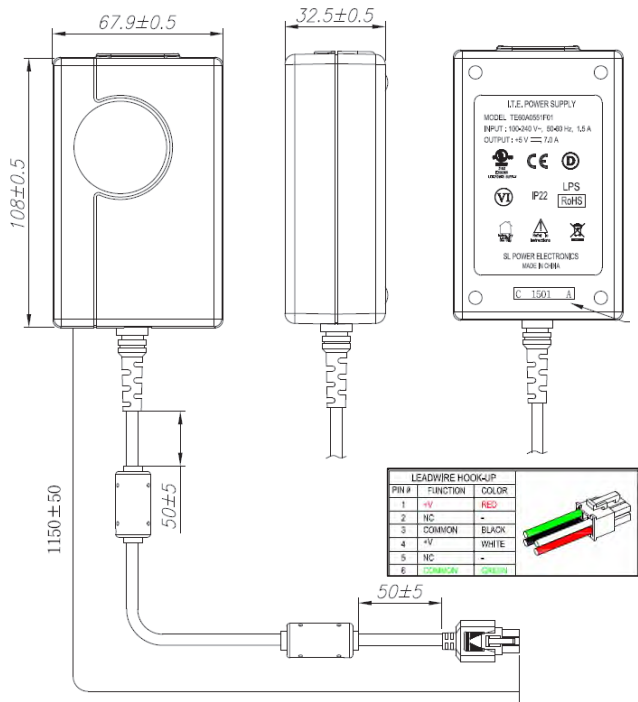
## TE60 Family Derating curve



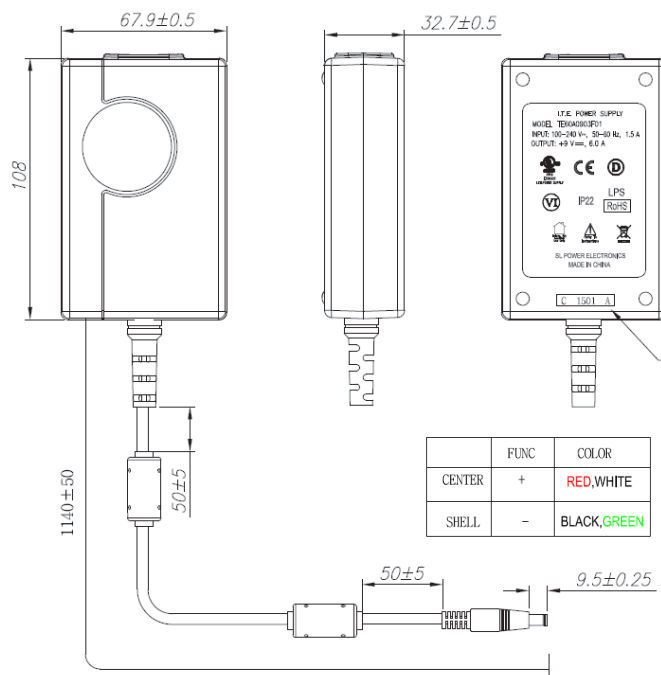


### DERATING CHART

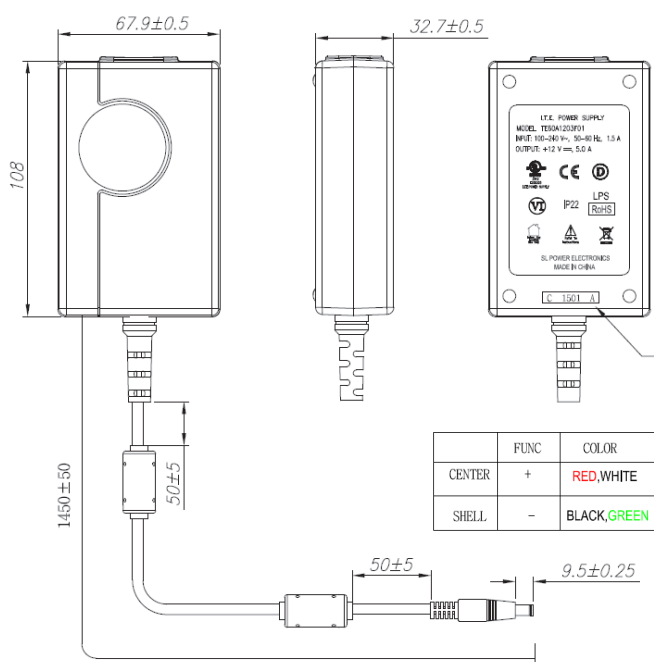
#### 5V model



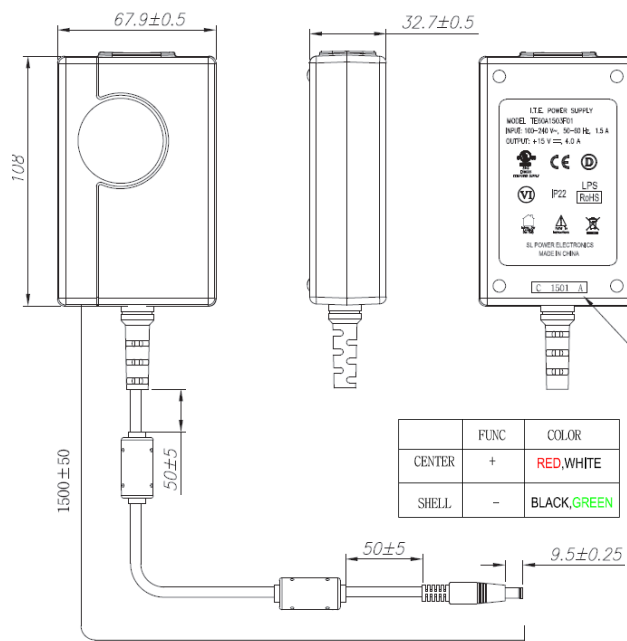
#### 9V model



#### 12V model



#### 15V thru 48V models



#### Notes:

- All dimensions in (mm)
- The unit should not be covered or enclosed to protect against excessive case temperature rise



### CONNECTOR INFORMATION

Standard models include a 2.5 x 5.5 x 9.5mm straight barrel type connector (Ault #3), center positive. Other standard options are listed below. The "03" in the standard model number is replaced by the applicable digits below.

Connector No.	Description		Connector No.	Description	
02	2.1mm x 5.5mm x 9.5mm straight barrel plug - Center positive		44	2.1mm x 5.5mm x 9.5mm straight barrel plug, locking - Center positive	
03	2.5 x 5.5 x 9.5 mm straight barrel plug - Center positive (Standard models)		45	2.5mm x 5.5mm x 9.5mm straight barrel plug, locking - Center positive	
12	5 pin DIN - 180 male connector (Pins 3, 5 = (+); pins 1, 2, 4 = (-))		48	3 pin Snap n Lock, Kycon Kpp - 3P or equivalent (Pin 1 = (+); pin 2 = (-))	
22	6 pin DIN male connector (Pins 1, 2 = (+); pins 4, 5 = (-))		49	4 pin Snap n Lock, Kycon Kpp - 4P or equivalent (Pins 1, 3 = (+); pins 2, 4 = (-))	
23	8 pin DIN male connector (Pins 3, 7 = (+); pins 1, 4, 6, 8 = (-); shell = FG)		51	6 pin Minifit - Molex 39-01-2060 or equivalent (Pins 1, 4 = (+); pins 3, 6 = (-))	
32	9 pin "D" type, female (Pins 8 = (+); pins 5=(-); all others = NC)		65	Stripped and Tinned Leads	
33	2.5mm x 5.5mm x 12.5mm straight barrel plug - Center positive		70	2.1mm x 5.5mm x 11mm right angle barrel plug (high retention) - Center positive	
40	2.1mm x 5.5mm x 9.5mm right angle barrel plug (High retention) - Center positive		71	2.5mm x 5.5mm x 11mm right angle barrel plug (high retention) - Center positive	
41	2.5mm x 5.5mm x 9.5mm right angle barrel plug (High retention) - Center positive		72	2.1mm x 5.5mm x 9.5mm straight barrel plug (High retention, no spark) - Center positive	
42	2.1mm x 5.5mm x 11mm straight barrel plug (High retention) - Center positive		73	2.5mm x 5.5mm x 9.5mm straight barrel plug (High retention, no spark) - Center positive	
43	2.5mm x 5.5mm x 11mm straight barrel plug (High retention) - Center positive		74	EIAJ#5 style connector - Central positive	



### EFFICIENCY LEVEL VI INFORMATION

#### Single-Voltage External AC-DC Power Supply, Basic-Voltage

Nameplate Output Power ( $P_{out}$ )	Minimum Average Efficiency in Active Mode (expressed as a decimal)	Maximum Power in No-Load Mode [W]
$P_{out} \leq 1$ W	$\geq 0.5 \times P_{out} + 0.16$	$\leq 0.100$
$1$ W < $P_{out} \leq 49$ W	$\geq 0.071 \times \ln(P_{out}) \text{ --- } 0.0014 \times P_{out} + 0.67$	$\leq 0.100$
$49$ W < $P_{out} \leq 250$ W	$\geq 0.880$	$\leq 0.210$
$P_{out} > 250$ W	$\geq 0.875$	$\leq 0.500$

TE60A12V-48V

#### Single-Voltage External AC-DC Power Supply, Low-Voltage

Nameplate Output Power ( $P_{out}$ )	Minimum Average Efficiency in Active Mode (expressed as a decimal)	Maximum Power in No-Load Mode [W]
$P_{out} \leq 1$ W	$\geq 0.517 \times P_{out} + 0.087$	$\leq 0.100$
$1$ W < $P_{out} \leq 49$ W	$\geq 0.0834 \times \ln(P_{out}) \text{ --- } 0.0014 \times P_{out} + 0.609$	$\leq 0.100$
$49$ W < $P_{out} \leq 250$ W	$\geq 0.870$	$\leq 0.210$
$P_{out} > 250$ W	$\geq 0.875$	$\leq 0.500$

TE60A 5V