



Test & Measurement



Audio Visual



Automation



Broadcast



Industrial



Display & Signage



Renewable



ITE & Comms



Lighting



Military COTS



### FEATURES AND BENEFITS

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

EN/IEC/UL60950-1, 2<sup>nd</sup> Edition, Am. 2

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%	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
TE60A0551N01	5.0V	7.00A	35W	75mV pk-pk	±1%	±5%			
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%	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
TE60A4803N01	48.0V	1.35A	60W	480mV pk-pk	±1%	±5%			
TE60A0551Q01	5.0V	7.00A	60W	75mV pk-pk	±1%	±5%			
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%	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
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 0.1µF ceramic and 47µF 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, ±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: <500µA@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	>250,000 hours, full load, 110 & 220Vac input, 25°C amb., 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

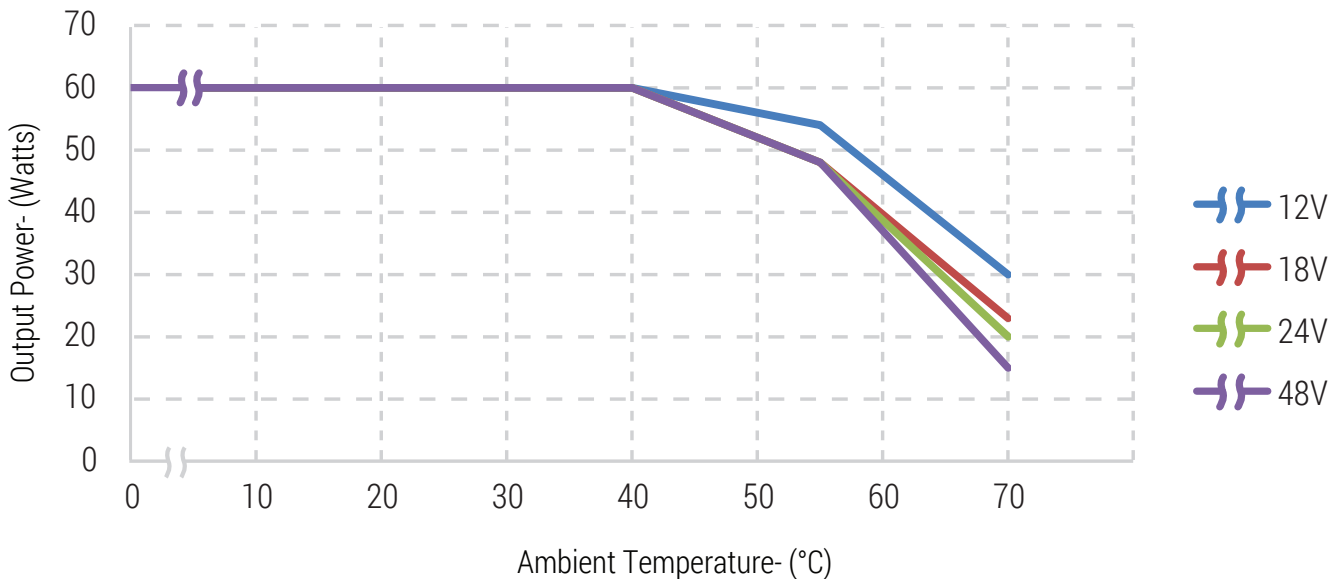
Isolation	Input-Output: 4000Vac Input-Ground: 1500Vac Output-Ground: 1500Vac
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### SAFETY

Safety Standards	EN/CSA/UL/IEC 60950-1, 2nd Edition, Am 2
Drop Test	1.4m from table top to wooden platform, 6 faces

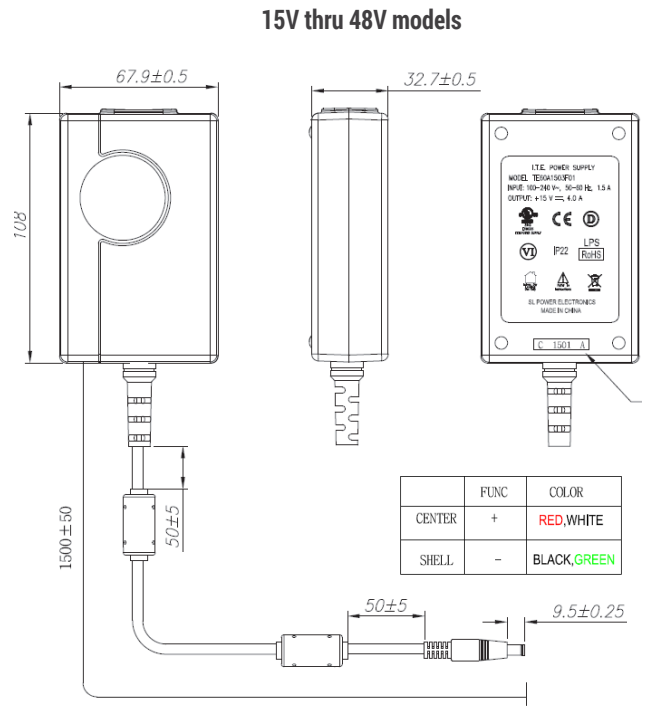
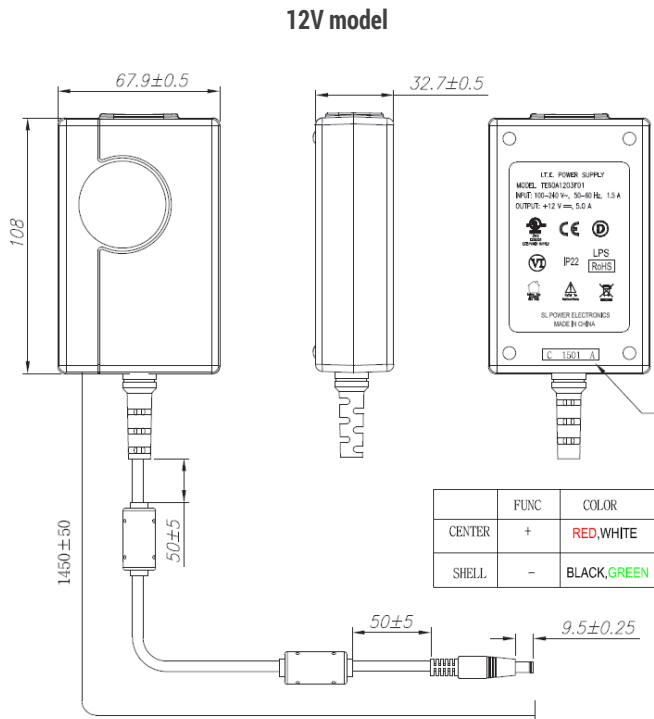
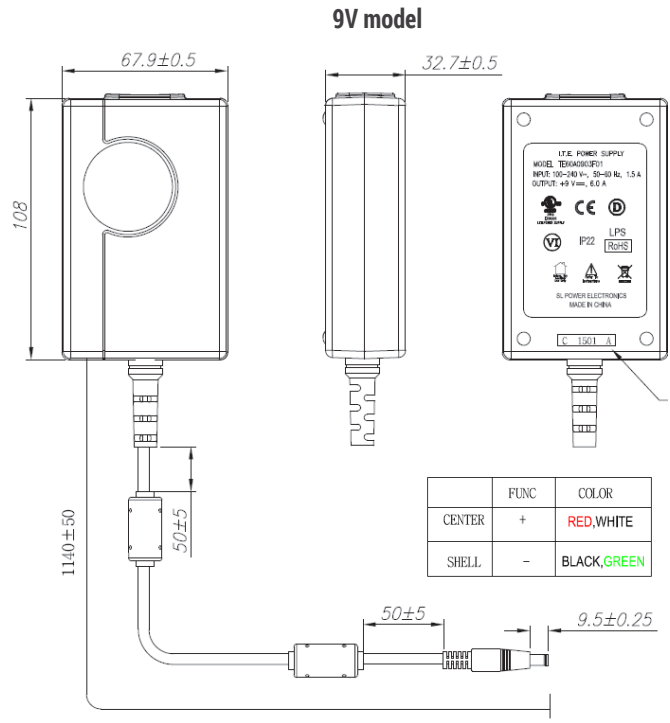
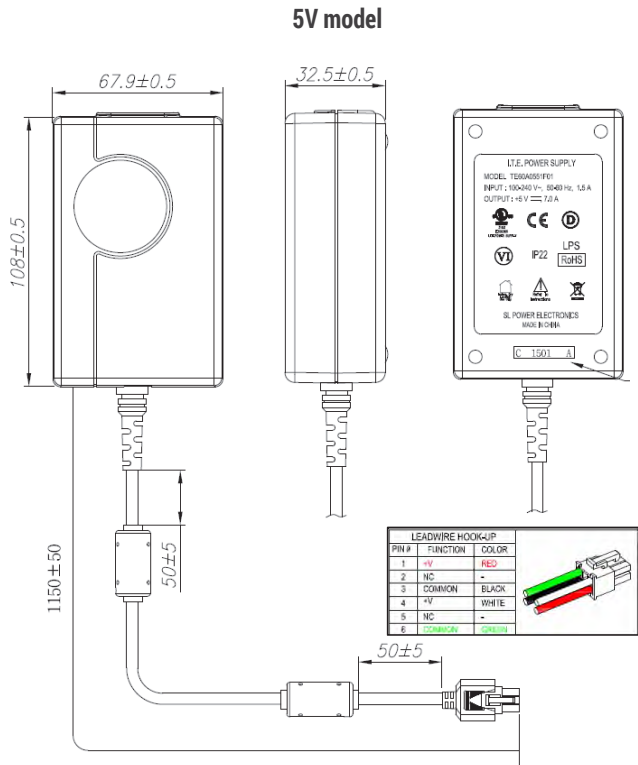
### TE60 SERIES OUTPUT POWER DERATING CURVE

#### TE60 Family Derating curve





### DERATING CHART



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	2.1 x 5.5 x 9.5 mm straight barrel plug - Center positive		44	2.1 x 5.5 x 9.5 mm straight barrel plug, locking - Center positive	
03	2.1 x 5.5 x 9.5 mm straight barrel plug - Center positive (Standard models)		45	2.5 x 5.5 x 9.5 mm 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 = (-); pins 5, 6 = NC)	
23	8 pin DIN male connector (Pins 3, 7 = (+); pins 1, 4, 6, 8 = (-); shell = FG)		51	6 pin Minit - 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	2.5 x 5.5 x 12.5 mm straight barrel plug - Center positive		70	2.1 x 5.5 x 11mm right angle barrel plug (high retention) - Center positive	
40	2.1 x 5.5 x 9.5 mm right angle barrel plug (High retention) - Center positive		71	2.5 x 5.5 x 11mm right angle barrel plug (high retention) - Center positive	
41	2.5 x 5.5 x 9.5 mm right angle barrel plug (High retention) - Center positive		72	2.1 x 5.5 x 9.5 mm straight barrel plug (High retention, no spark) - Center positive	
42	2.1 x 5.5 x 11 mm straight barrel plug (High retention) - Center positive		73	2.5 x 5.5 x 9.5 mm straight barrel plug (High retention, no spark) - Center positive	
43	2.5 x 5.5 x 11 mm 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]
$P_{out} \leq 1\text{ W}$	$\geq 0.5 \times P_{out} + 0.16$	$\leq 0.100$
$1\text{ W} < P_{out} \leq 49\text{ W}$	$\geq 0.071 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.67$	$\leq 0.100$
$49\text{ W} < P_{out} \leq 250\text{ W}$	$\geq 0.880$	$\leq 0.210$
$P_{out} > 250\text{ W}$	$\geq 0.875$	$\leq 0.500$
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]
$P_{out} \leq 1\text{ W}$	$\geq 0.517 \times P_{out} + 0.087$	$\leq 0.100$
$1\text{ W} < P_{out} \leq 49\text{ W}$	$\geq 0.0834 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.609$	$\leq 0.100$
$49\text{ W} < P_{out} \leq 250\text{ W}$	$\geq 0.870$	$\leq 0.210$
$P_{out} > 250\text{ W}$	$\geq 0.875$	$\leq 0.500$

..... TE60A 12V-48V

..... TE60A 5V