



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 ¹ | 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 ² 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 ² 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 ² 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 μ F ceramic and 47 μ 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 μ 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 |
|------|--|

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

ISOLATION

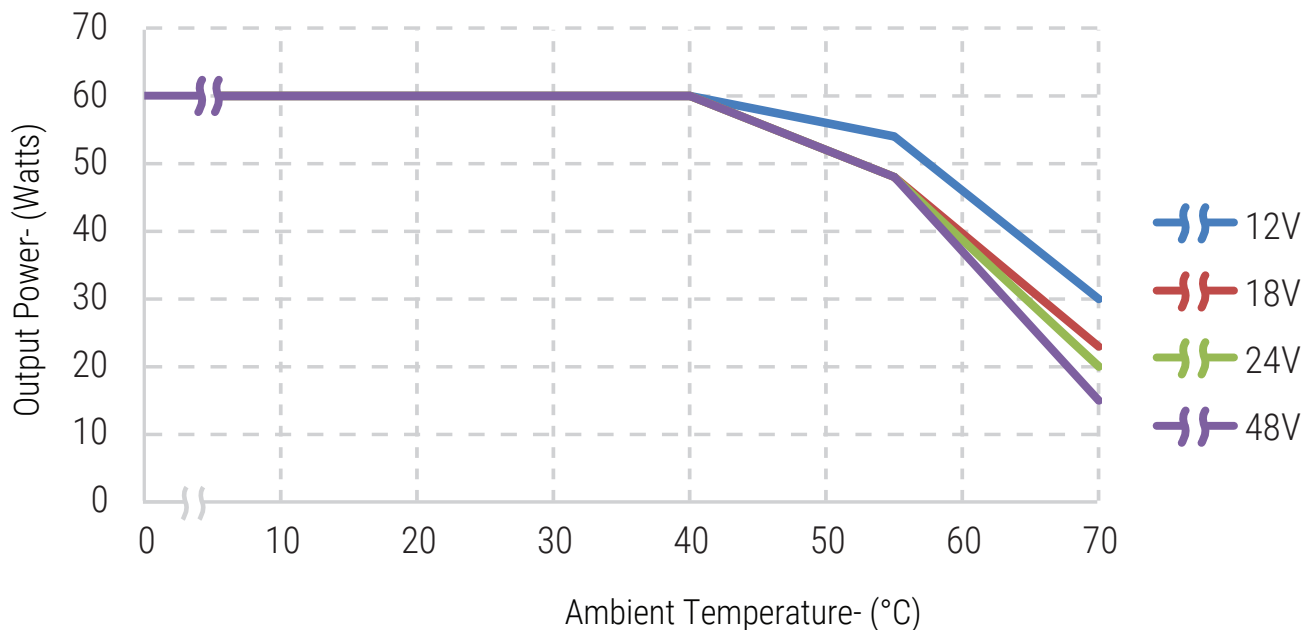
| | |
|-----------|--|
| Isolation | Input-Output: 4000Vac Input-Ground: 1500Vac Output-Ground: 1500Vac |
|-----------|--|

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

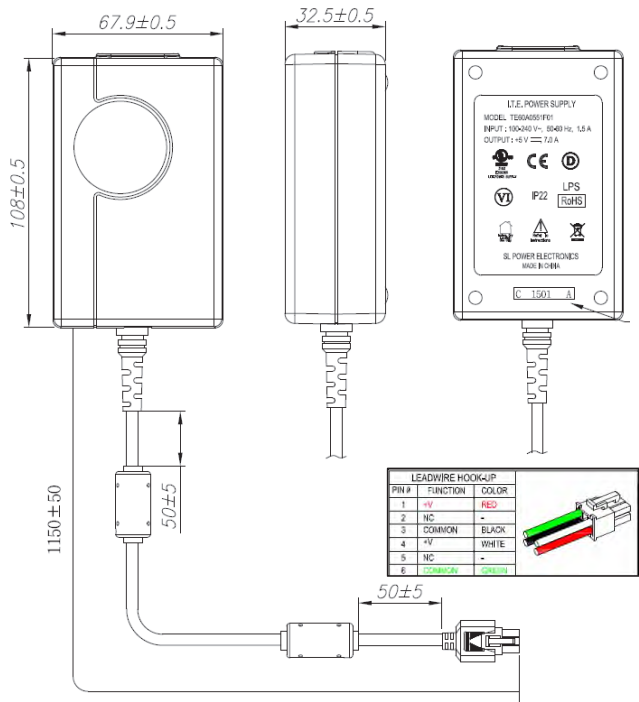
TE60 Family Derating curve



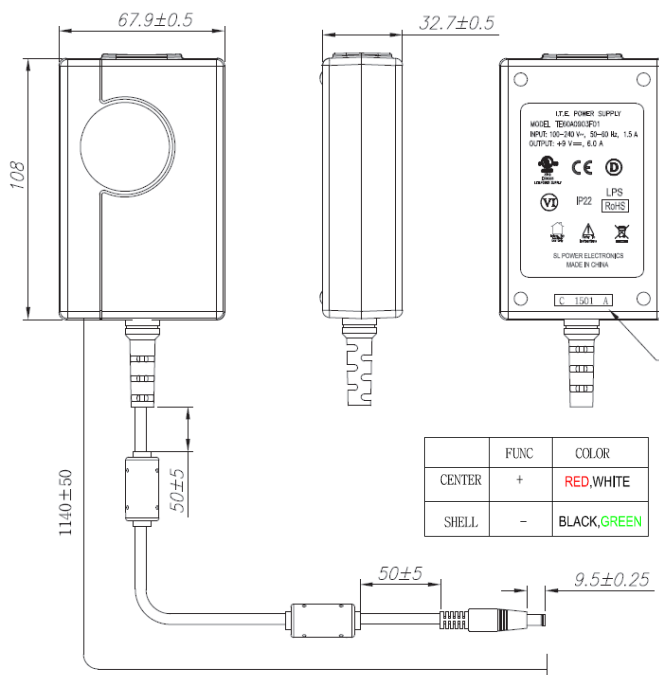


DERATING CHART

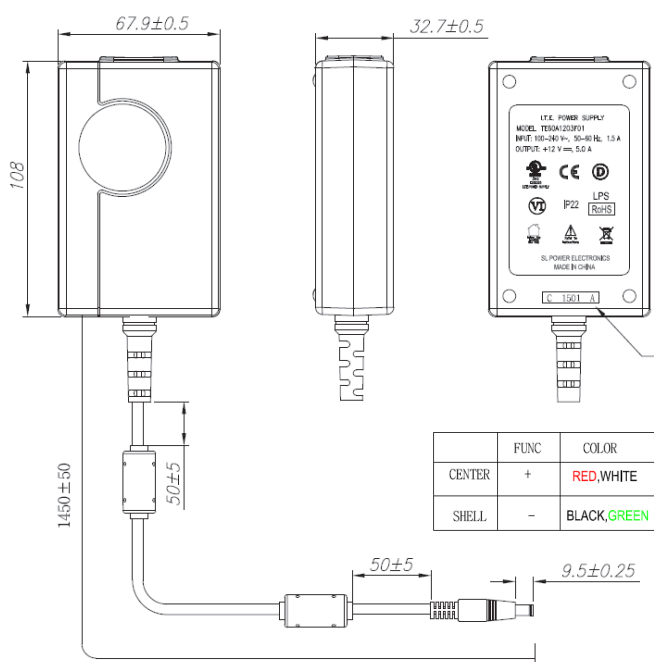
5V model



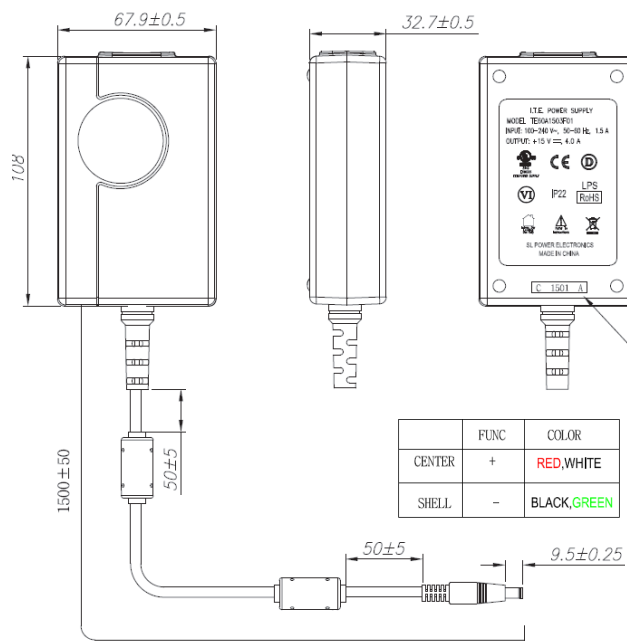
9V model



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 Extrenal 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 | $\geq 0.5 \times P_{out} + 0.16$ | ≤ 0.100 |
| 1 W < $P_{out} \leq 49$ W | $\geq 0.071 \times \ln(P_{out}) \text{ --- } 0.0014 \times P_{out} + 0.67$ | ≤ 0.100 |
| 49 W < $P_{out} \leq 250$ W | ≥ 0.880 | ≤ 0.210 |
| $P_{out} > 250$ W | ≥ 0.875 | ≤ 0.500 |

TE60A12V-48V

Single-Voltage Extrenal 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 | $\geq 0.517 \times P_{out} + 0.087$ | ≤ 0.100 |
| 1 W < $P_{out} \leq 49$ W | $\geq 0.0834 \times \ln(P_{out}) \text{ --- } 0.0014 \times P_{out} + 0.609$ | ≤ 0.100 |
| 49 W < $P_{out} \leq 250$ W | ≥ 0.870 | ≤ 0.210 |
| $P_{out} > 250$ W | ≥ 0.875 | ≤ 0.500 |

TE60A 5V

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