



### FEATURES AND BENEFITS

Meets U.S. DoE efficiency level VI and EU CoC tier 2 requirements

- No load input power
- Average efficiency

Up to 90W of AC-DC power

Universal input 90-264Vac input range

IP22 rated enclosure

Meets "Heavy Industrial" levels of EN61000 EMC requirements

Meets EN55011/CISPR11, FCC Part 15.109 Class B conducted & radiated emissions, with 6db margin

Approved to EN/CSA/IEC/UL62368-1

3 years warranty

E-cap life of >7 years

RoHS/REACH compliant

### MODEL SELECTION

Model Number	Volts	Output Current	Output Power	Ripple & Noise <sup>1</sup>	Line Regulation	Load Regulation	Output Cable & Connector	Input Configuration
TE90A1251F01	12.0V	7.50A	90W	120mV pk-pk	±1%	±5%	6 pin Molex Type <sup>2</sup> 2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	Class I Desktop, IEC60320 C14 Receptacle
TE90A1503F01	15.0V	6.00A	90W	150mV pk-pk	±1%	±5%		
TE90A1803F01	18.0V	5.00A	90W	180mV pk-pk	±1%	±5%		
TE90A2403F01	24.0V	3.75A	90W	240mV pk-pk	±1%	±5%		
TE90A1251N01	12.0V	7.50A	90W	120mV pk-pk	±1%	±5%	6 pin Molex Type <sup>2</sup> 2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	Class II Desktop, IEC60320 C8 Receptacle
TE90A1503N01	15.0V	6.00A	90W	150mV pk-pk	±1%	±5%		
TE90A1803N01	18.0V	5.00A	90W	180mV pk-pk	±1%	±5%		
TE90A2403N01	24.0V	3.75A	90W	240mV pk-pk	±1%	±5%		
TE90A1251Q01	12.0V	7.50A	90W	120mV pk-pk	±1%	±5%	6 pin Molex Type <sup>2</sup> 2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	Class II Desktop, IEC60320 C18 Receptacle
TE90A1503Q01	15.0V	6.00A	90W	150mV pk-pk	±1%	±5%		
TE90A1803Q01	18.0V	5.00A	90W	180mV pk-pk	±1%	±5%		
TE90A2403Q01	24.0V	3.75A	90W	240mV 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.
  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 (TE90B1251F01).
  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 $\emptyset$
Input Current	115Vac: 1.2A, 230Vac: 0.6A
Inrush Current	264Vac, cold start: will not exceed 60A
Input Fuses	F1, F2: 5A, 250Vac fuses (line & neutral lines) provided on all models
Earth Leakage Current	Input-GND: <math>500\mu\text{A}</math>@264Vac, 60Hz, NC Output-GND: <math>4\text{mA}</math>@264Vac, 60Hz, NC
Efficiency	Meets US DoE efficiency level VI and EU CoC tier 2 average efficiency levels
No Load Input Power	<math>0.150\text{W}</math>, meets DoE efficiency level VI and EU CoC tier 2 requirements

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

### PROTECTION

Overtemperature Protection	Will shutdown upon an overtemperature condition, auto-recovery
Overload Protection	130 to 180% of rating, Hiccup mode
Short Circuit Protection	Hiccup mode, auto recovery
Overvoltage Protection	130 to 150% of output voltage (max. 60V on 48V model), hiccup mode
Safety Drop Test	1.4m from table top to wooden platform, 6 faces

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

### SAFETY

Safety Standards	Approved to EN/CSA/IEC/UL62368-1
Shock	Operating: Half-sine, 20gpk, 10mS, 3 axes, 6 shocks total Non-Operating: Half-sine waveform, impact acceleration of 100G, Pulse duration of 6mS, Number of shocks: 3 for each of the three axis

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

### RELIABILITY

MTBF	>500,000 hours, full load, 110 & 220Vac input, 25°C amb., per Telcordia 332 Issue 6
E-Cap Life	>7 year life based on calculations at 115Vac/60Hz & 230Vac/50Hz, ambient 25°C at 24 hrs per day, 365 days/year, 6 power up cycles per day. (80% load on 12V model)

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

### OUTPUT

Hold-Up Time	20mS min., at full load, 100Vac input
Turn On Time	Less than 1 sec @115Vac, full load
Output Power	90W continuous - See models chart for specific voltage model ratings
Output Voltage	See models chart on pg 1
Ripple and Noise	See models chart on pg 1
Transient Response	500 $\mu\text{s}$ response time for return to within 0.5% of final value for any 50% load step over the range of 5% to 100% of rated load, $\Delta i/\Delta t < 0.2\text{A}/\mu\text{s}$ . Max. voltage deviation is $\pm 3.5\%$

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

### ISOLATION SPECIFICATIONS

Isolation	Input - Output: 4000Vac Input - Ground: 1500Vac Output - Ground: 1500Vac
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**Notes:** 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
Temperature Derating	See Derating Chart
Storage Temperature	-40°C to +85°C
Altitude	Operating: to 5000m (derate to TBD temp. above 3000m). 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, 1-500Hz. Non-Operating: 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
Case Temperature	Case Temperatures are within regulatory guidelines. Care should be taken to avoid prolonged contact with skin or other heat sensitive surfaces
Dimensions	W: 2.67" x L: 6.02" x H: 1.36" W: 68mm x L: 153mm x H: 34.5mm
Weight	600g

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



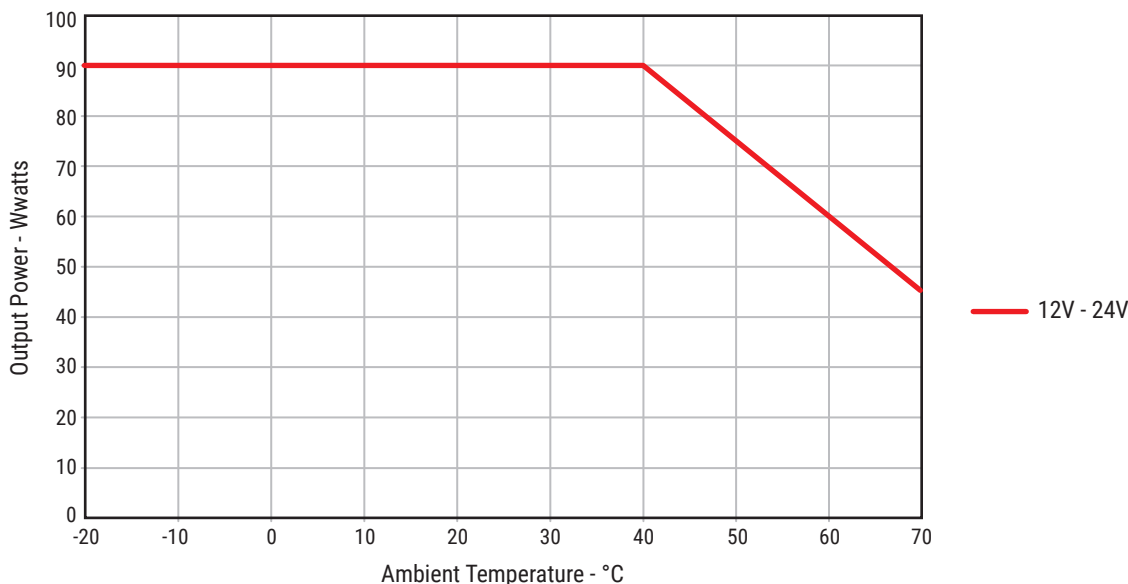
### EMI/EMC COMPLIANCE

Conducted Emissions	EN55011/CISPR22 Class B, FCC Part 15.107, Class B: 6db margin typ, at 115 and 230Vac
Radiated Emissions	EN55022/CISPR22 Class B, FCC Part 15.109, Class B: 3db margin typ, at 115 and 230Vac
Common Mode Noise	High Frequency (100kHz-20MHz): <40mA pk-pk
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 10 mS, at 0, 45, 90, 135, 180, 225, 270 and 315 degrees; 20mS at 0 degrees. 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

**Notes:** Performance criteria are based on EN55024. According to the standards, performance criteria are defined as following:

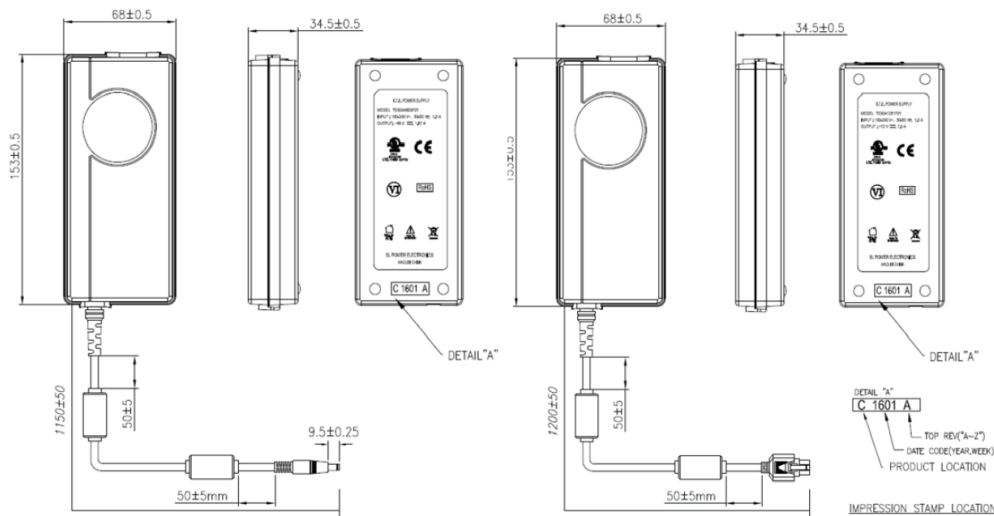
- A – Normal performance during and after the test
- B – Temporary degradation, self-recoverable
- C – Temporary degradation, operator intervention required to recover the operation
- D – Permanent damage

### DERATING CHART





### MECHANICAL DRAWING



15V through 24V Models: 2.5 x 5.5 x 9.5mm Barrel Connector, center positive.

12V Models: Output Connector: 6 pin Molex 39-01-2060 or equiv. Pins 1, 4 = (+), pins 3, 6 = (-), pins 2, 5 = NC

- Notes: 1) All dimensions in mm.  
2) 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. (#51 for the 12V models). 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	2.5 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 = (-))
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	2.5 x 5.5 x 12.5 mm straight barrel plug - Center positive	70	2.1 x 5.5 x 11 mm 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 11 mm 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

TE90 Series

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

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