# TE40

40W Single Output External Power
Test & Measurement/Industrial Series

## Features

- Meets DoE Efficiency Level VI Requirements
  - No load input power
  - Average Efficiency
- Up to 40W of AC-DC Power
- Universal Input 90-264Vac Input Range
- Desktop and Wall-Plug versions
- Meets "Heavy Industrial" Levels of EN61000 EMC Requirements
- Meets EN55011/CISPR11, and FCC Part 15.109 Class B Conducted & Radiated Emissions, with 6db margin
- Approved to EN/IEC/UL60950-1, 2nd Ed., Am. 2
- E-cap life of >8 years
- >1,000,000 hours MTBF
- 3 Year Warranty
- RoHS Compliant

## Description

A high performance AC to DC external power supply family designed for test & measurement and industrial applications. The TE40A Series models are compliant with Efficiency Level VI requirements per U.S. Dept. of Energy, as well as the Heavy Industrial levels of various EN61000-4-x standards for EMC. The TE40A series models also meets Class B conducted and radiated emissions per FCC Part 15, EN55022, and CISPR22, with margin.

## Model Selection

| Model Number | Volts | Output Current | Output Power | Ripple & Noise[1] | Line Regulation | Load Regulation | Overvoltage Trip Range | Output Connector | Input Configuration |
|---|---|---|---|---|---|---|---|---|---|
| TE40A1203F01 | 12.0V | 3.40A | 40W | 120mV pk-pk | ±1% | ±5% | 120%-150% | 2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive | Class I Desktop, IEC60320 C14 Receptacle |
| TE40A1803F01 | 18.0V | 2.20A | 40W | 180mV pk-pk | ±1% | ±5% | 120%-150% | | |
| TE40A2403F01 | 24.0V | 1.70A | 40W | 240mV pk-pk | ±1% | ±5% | 120%-140% | | |
| TE40A1203N01 | 12.0V | 3.40A | 40W | 120mV pk-pk | ±1% | ±5% | 120%-150% | 2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive | Class I Desktop, IEC60320 C8 Receptacle |
| TE40A1803N01 | 18.0V | 2.20A | 40W | 180mV pk-pk | ±1% | ±5% | 120%-150% | | |
| TE40A2403N01 | 24.0V | 1.70A | 40W | 240mV pk-pk | ±1% | ±5% | 120%-140% | | |
| TE40A1203Q01 | 12.0V | 3.40A | 40W | 120mV pk-pk | ±1% | ±5% | 120%-150% | 2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive | Class II Desktop, IEC60320 C18 Receptacle |
| TE40A1803Q01 | 18.0V | 2.20A | 40W | 180mV pk-pk | ±1% | ±5% | 120%-150% | | |
| TE40A2403Q01 | 24.0V | 1.70A | 40W | 240mV pk-pk | ±1% | ±5% | 120%-140% | | |
| TE40A1203B01 | 12.0V | 3.40A | 40W | 120mV pk-pk | ±1% | ±5% | 120%-150% | 2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive | Class II Wall-Plug, Interchangeable Blades[2] |
| TE40A1803B01 | 18.0V | 2.20A | 40W | 180mV pk-pk | ±1% | ±5% | 120%-150% | | |
| TE40A2403B01 | 24.0V | 1.70A | 40W | 240mV pk-pk | ±1% | ±5% | 120%-140% | | |
| TE40A1203C01 | 12.0V | 3.40A | 40W | 120mV pk-pk | ±1% | ±5% | 120%-150% | 2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive | Class II Wall-Plug, Fixed North American Blades[3] |
| TE40A1803C01 | 18.0V | 2.20A | 40W | 180mV pk-pk | ±1% | ±5% | 120%-150% | | |
| TE40A2403C01 | 24.0V | 1.70A | 40W | 240mV pk-pk | ±1% | ±5% | 120%-140% | | |

Notes:
1. Measured at the output connector, with noise probe directly across output and load terminated with 0.1µF ceramic and 10µF low ESR capacitors.
2. Standard models are fitted with North American blades. Order blade kit KT-1027K for other blades (EU. UK, Australia)
3. For EU fixed blades, replace "C" in the model number with "M", for UK blades, replace "C" with "G", for Australia blades, replace "C" with "H".
4. All specifications are typical at nominal input, full load, at 25°C ambient unless noted.
5. For Input Class I models: For AC GND connected to output common (-), insert a "B" in the part number where the "A" is located (TE40B1203F01).

## General Specifications

| | | | |
|---|---|---|---|
| **AC Input** | 100-240Vac, ±10%, 47-63Hz, 1∅ | **Turn On Time** | Less than 700mS @115Vac, full load |
| **Input Current** | 115Vac: 1.2A, 230Vac: 0.6A | **Hold-up Time** | 20mS min., at full Load, 100Vac input |
| **Inrush Current** | 264Vac, cold start: will not exceed 40A | **Overtemperature Protection** | Will shutdown upon an overtemperature condition, auto-recovery. |
| **Input Fuses** | 2.0A, 250Vac | **Overload Protection** | 130% - 160%, Hiccup Mode |
| **Earth Leakage Current** | Input-GND: <500µA@264Vac, 60Hz, NC<br>Output-GND: <4mA@264Vac, 60Hz, NC | **Short Circuit Protection** | Hiccup Mode, auto recovery. |
| **Efficiency** | Meets US DoE Efficiency Level VI Average efficiency levels | **Overvoltage Protection** | Hiccup Mode. See models chart for trip ranges. |
| **Output Power** | 40W continuous – See models chart for specific voltage model ratings. | **Isolation** | Input-Output: 4000Vac<br>Input-Ground: 1500Vac<br>Output-Ground: 1500Vac |
| **No Load Input Power** | <0.1W per DoE Efficiency Level VI Requirements | **Safety Standards** | EN/CSA/UL/IEC 60950-1, 2nd Edition, Am 2 |
| **Ripple and Noise** | See models chart on pg 1. | **Operating Temperature** | -20°C to +70°C<br>Start Up at -40°C, full load, (warmup period before all parameters are within published specifications). |
| **Output Voltage** | See models chart on pg 1. | **Temperature Derating** | See derating chart. |
| **Transient Response** | 500µs 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, $\Delta i/\Delta t <$ 0.2A/µs. Max. voltage deviation is +/-3.5%. | **Storage Temperature** | -40°C to +85°C |
| **Regulation** | See models chart on pg 1. | **Altitude** | Operating: to 5000m.<br>Non-operating: -500 to 40,000 ft. |
| **Drop Test** | 1.4m from table top to wooden platform, 6 faces. | **Relative Humidity** | 5% to 95%, non-condensing |
| **Vibration** | Operating: 0.003g/Hz, 1.5grms overall, 3 axes, 10 min/axis, 1-500Hz.<br>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<br>Non-Operating: Half-sine waveform, impact acceleration of 100G, Pulse duration of 6 mS, Number of shocks: 3 for each of the three axis |
| **Dimensions** | See outline drawings | **MTBF** | >250,000 hours, full load, 110 & 220Vac input, 25°C amb., per Telcordia 332 Issue 6. |
| **Weight** | 250g | **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 for the 12V model) |

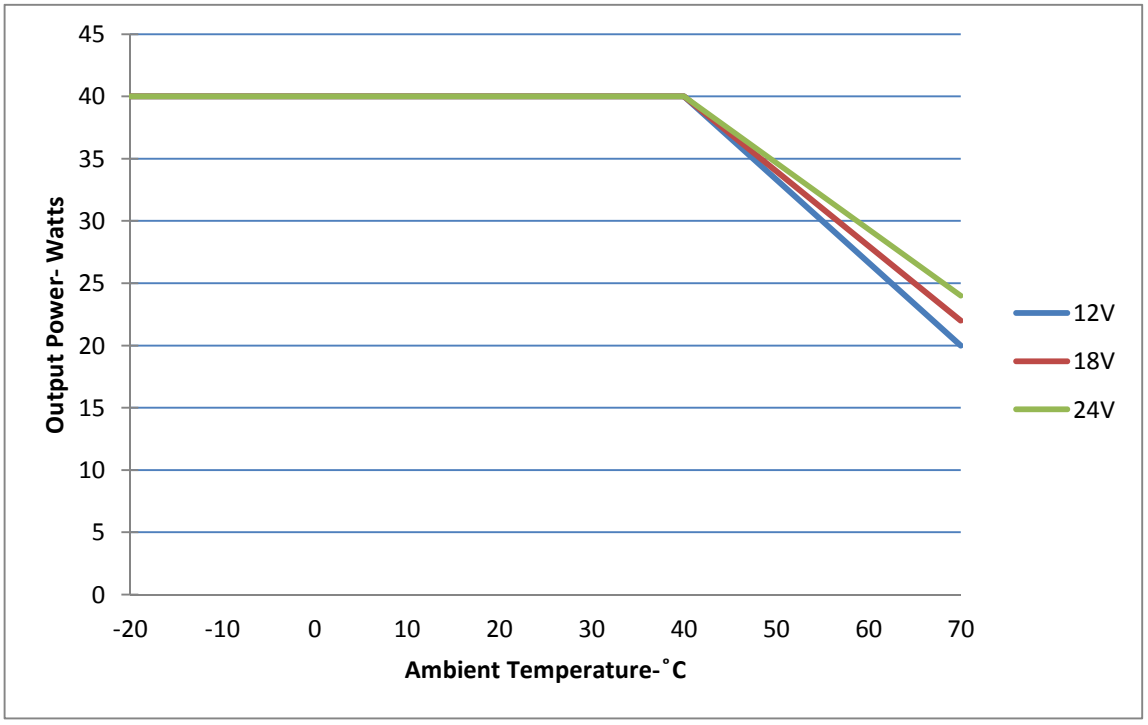
All specifications are typical at nominal input, full load, at 25°C ambient unless noted.

## EMI/EMC Compliance

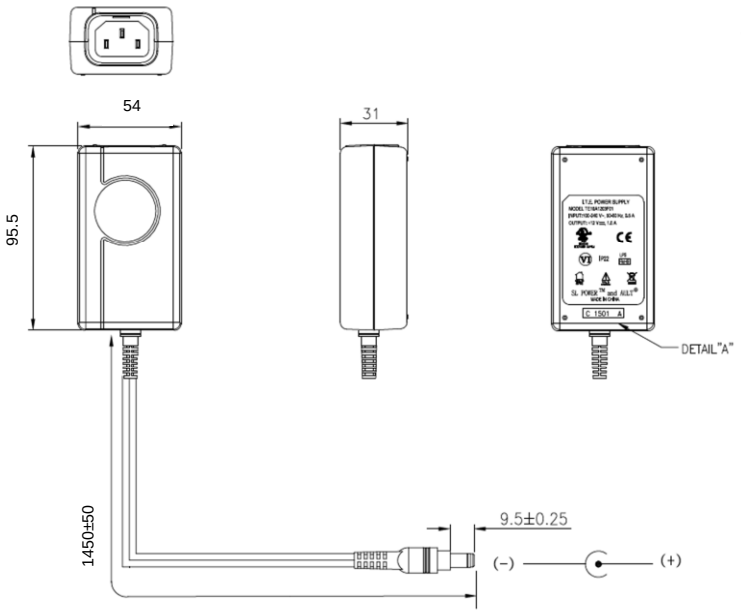
| | |
|---|---|
| **Conducted Emissions:** | EN55011/CISPR22 Class B, FCC Part 15.107, Class B: 6db margin typ, at 115 and 230Vac |
| **Radiated Emissions:** | EN55022/CISPR22 Class B, FCC Part 15.109, Class B: 3db margin typ, at 115 and 230Vac |
| **Common Mode Noise:** | High Frequency (100kHz-20MHz): <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, 3V/m – Level 4, 0.15 to 80Mhz; and 12V/m) 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: 30A/m, 50/60 Hz |
| **Voltage Interruptions, Dips, Sags & Surges** | EN55024/IECEN61000-4-11:<br>--100% dip for 20mS, Criteria A<br>--100% dip for 5000mS (250/300 cycles), Criteria B<br>--60% dip for 100mS, Criteria B<br>--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.

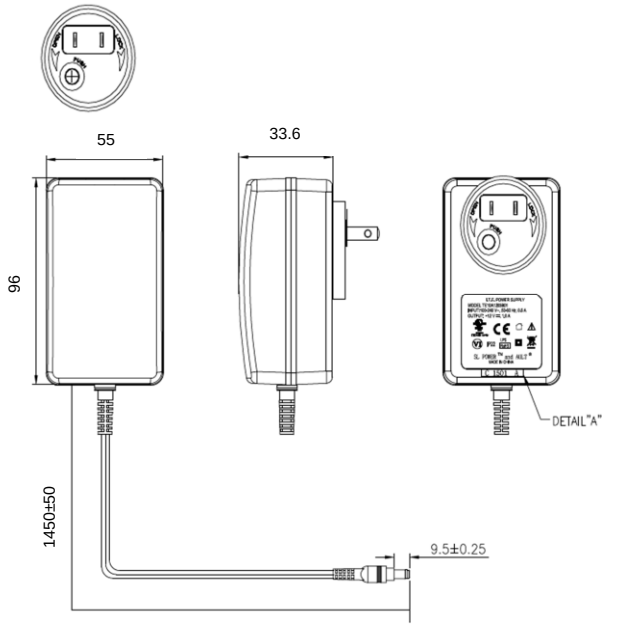
## Derating Chart



## Mechanical Drawing




*IEC60320 C14 Receptacle, 2.5 x 5.5 x 9.5mm Barrel Connector*




*Interchangeable N.A. Blade, 2.5 x 5.5 x 9.5mm barrel connector*

**Notes:**
1. All dimensions in mm.
2. Interchangeable blade models come with North American blade fitted. For other blades (EU, UK, Aust.) order blade kit KT1027K.

## 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 9.5mm straight barrel plug - Center Positive | 44 | 2.1 x 5.5 x 9.5mm straight barrel plug, locking - Center Positive |
| 03 | 2.5 x 5.5 x 9.5mm straight barrel plug - Center Positive (Standard Models) | 45 | 2.5 x 5.5 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 (Pin 8 = (+), pin 5 = (-), all others = NC) | 65 | Stripped and Tinned Leads |
| 33 | 2.5 x 5.5 x 12.5mm 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 9.5mm 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 9.5mm right angle barrel plug (high retention) - Center Positive | 72 | 2.1 x 5.5 x 9.5mm straight barrel plug (high retention, no spark) - Center Positive |
| 42 | 2.1 x 5.5 x 11mm straight barrel plug (high retention) - Center Positive | 73 | 2.5 x 5.5 x 9.5mm straight barrel plug (high retention, no spark) - Center Positive |
| 43 | 2.5 x 5.5 x 11mm straight barrel plug (high retention) - Center Positive | 74 | EIAJ#5 style connector - Center 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 | $\geq 0.071 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.67$ | $\leq 0.100$ |
| 49 W < $P_{out} \leq 250$ W | $\geq 0.880$ | $\leq 0.210$ |
| $P_{out} > 250$ W | $\geq 0.875$ | $\leq 0.500$ |
| **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 | $\geq 0.0834 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.609$ | $\leq 0.100$ |
| 49 W < $P_{out} \leq 250$ W | $\geq 0.870$ | $\leq 0.210$ |
| $P_{out} > 250$ W | $\geq 0.875$ | $\leq 0.500$ |

TE40A Series

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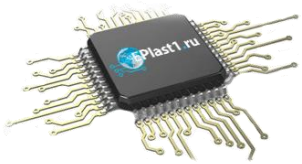


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