TE20

15W-20W Single Output External Power
Test & Measurement/Industrial Series

Features

- Meets DoE Efficiency Level VI Requirements
  - No load input power
  - Average Efficiency
- Up to 20W of AC-DC Power
- Universal Input 90-264Vac Input Range
  - Desktop and Wall-Plug versions
- Meets "Heavy Industrial" Levels of EN61000 EMC Requirements
- Meets EN55022/CISPR22, 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 >10 years
- >1,000,000 Hours MTBF
- 3 Year Warranty
- IP22 Rated Enclosure

Description

A high performance AC to DC external power supply family designed for test & measurement and industrial applications. The TE20A 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 TE20A series models also meet Class B conducted and radiated emissions per FCC Part 15, EN55022, and CISPR22. These superior performance external power supplies are designed to allow easy integration with test and measurement equipment and other industrial applications.

Model Selection

Model Number	Volts	Output Current	Output Power	Ripple & Noise[1]	Line Regulation	Load Regulation	Output Connector	Input Configuration
TE20A0503F01	5.0V	3.00A	15W	75mV pk-pk	±1%	±5%	2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	Class I Desktop, IEC60320 C14 Receptacle
TE20A0603F01	5.9V	2.50A	15W	75mV pk-pk	±1%	±5%		
TE20A0703F01	7.5V	2.00A	15W	75mV pk-pk	±1%	±5%		
TE20A0903F01	9.0V	2.00A	18W	90mV pk-pk	±1%	±5%		
TE20A1203F01	12.0V	1.50A	18W	120mV pk-pk	±1%	±5%		
TE20A1503F01	15.0V	1.20A	18W	150mV pk-pk	±1%	±5%		
TE20A1803F01	18.0V	1.10A	20W	180mV pk-pk	±1%	±5%		
TE20A2403F01	24.0V	0.83A	20W	240mV pk-pk	±1%	±5%		
TE20A4803F01	48.0V	0.42A	20W	480mV pk-pk	±1%	±5%		
TE20A0503N01	5.0V	3.00A	15W	75mV pk-pk	±1%	±5%	2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	Class II Desktop, IEC60320 C8 Receptacle
TE20A0603N01	5.9V	2.50A	15W	75mV pk-pk	±1%	±5%		
TE20A0703N01	7.5V	2.00A	15W	75mV pk-pk	±1%	±5%		
TE20A0903N01	9.0V	2.00A	18W	90mV pk-pk	±1%	±5%		
TE20A1203N01	12.0V	1.50A	18W	120mV pk-pk	±1%	±5%		
TE20A1503N01	15.0V	1.20A	18W	150mV pk-pk	±1%	±5%		
TE20A1803N01	18.0V	1.10A	20W	180mV pk-pk	±1%	±5%		
TE20A2403N01	24.0V	0.83A	20W	240mV pk-pk	±1%	±5%		
TE20A4803N01	48.0V	0.42A	20W	480mV pk-pk	±1%	±5%		
TE20A0503Q01	5.0V	3.00A	15W	75mV pk-pk	±1%	±5%	2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	Class II Desktop, IEC60320 C18 Receptacle
TE20A0603Q01	5.9V	2.50A	15W	75mV pk-pk	±1%	±5%		
TE20A0703Q01	7.5V	2.00A	15W	75mV pk-pk	±1%	±5%		
TE20A0903Q01	9.0V	2.00A	18W	90mV pk-pk	±1%	±5%		
TE20A1203Q01	12.0V	1.50A	18W	120mV pk-pk	±1%	±5%		
TE20A1803Q01	18.0V	1.10A	20W	180mV pk-pk	±1%	±5%		
TE20A1503Q01	15.0V	1.20A	18W	150mV pk-pk	±1%	±5%		
TE20A2403Q01	24.0V	0.83A	20W	240mV pk-pk	±1%	±5%		
TE20A4803Q01	48.0V	0.42A	20W	480mV pk-pk	±1%	±5%		

Model Selection (continued)

TE20A0503B01	5.0V	3.00A	15W	75mV pk-pk	±1%	±5%	2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	Class II Wall-Plug, Interchangeable Blades (North American Blade included)[2]
TE20A0603B01	5.9V	2.50A	15W	75mV pk-pk	±1%	±5%		
TE20A0703B01	7.5V	2.00A	15W	75mV pk-pk	±1%	±5%		
TE20A0903B01	9.0V	2.00A	18W	90mV pk-pk	±1%	±5%		
TE20A1203B01	12.0V	1.50A	18W	120mV pk-pk	±1%	±5%		
TE20A1503B01	15.0V	1.20A	18W	150mV pk-pk	±1%	±5%		
TE20A1803B01	18.0V	1.10A	20W	180mV pk-pk	±1%	±5%		
TE20A2403B01	24.0V	0.83A	20W	240mV pk-pk	±1%	±5%		
TE20A4803B01	48.0V	0.42A	20W	480mV pk-pk	±1%	±5%		
TE20A0503C01	5.0V	3.00A	15W	75mV pk-pk	±1%	±5%	2.5 x 5.5 x 9.5mm Straight Barrel Type, center positive	Class II Wall-Plug, Fixed North American Blades
TE20A0603C01	5.9V	2.50A	15W	75mV pk-pk	±1%	±5%		
TE20A0703C01	7.5V	2.00A	15W	75mV pk-pk	±1%	±5%		
TE20A0903C01	9.0V	2.00A	18W	90mV pk-pk	±1%	±5%		
TE20A1203C01	12.0V	1.50A	18W	120mV pk-pk	±1%	±5%		
TE20A1503C01	15.0V	1.20A	18W	150mV pk-pk	±1%	±5%		
TE20A2403C01	24.0V	0.83A	20W	240mV pk-pk	±1%	±5%		
TE20A2403C01	24.0V	0.83A	20W	240mV pk-pk	±1%	±5%		
TE20A4803C01	48.0V	0.42A	20W	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 10µF low ESR capacitors. For 5V and 6V models, values listed are typical, 100mV pk-pk maximum with 0.1µF ceramic and 47µF low ESR capacitors used at measurement point.
2. 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. For Input Class I models: For AC GND connected to output common (-), insert a "B" in the part number where the "A" is located (TE20B0503F01).
5. All specifications are typical at nominal input, full load, at 25°C ambient unless noted.

General Specifications

AC Input	100-240Vac, ±10%, 47-63Hz, 1∅	**Turn On Time**	Less than 700mS @115Vac, full load
Input Current	115Vac: 0.5A, 230Vac: 0.25A	**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	F1, F2: 3.15A, 250Vac fuses (line & neutral lines) provided on all models	**Overload Protection**	130 to 180% of rating, Hiccup Mode
Earth Leakage Current	Input-GND: <500µA@264Vac, 60Hz, NC 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**	130 to 150% of output voltage, hiccup mode
Output Power	15 to 20W continuous – See models chart for specific voltage model ratings.	**Isolation**	Input-Output: 4000Vac Input-Ground: 1500Vac 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 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, return to within 0.5% of final value for any 50% load step over 5% to 100% of rated load, Δi/Δt< 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. 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

General Specifications (continued)

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; Sine waveform, Vib. frequency/ acceleration: 10-500Hz/1g, sweep rate of 1 octave/min., 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
E-Cap Life	>10 year life, based on calculations at 115Vac/60Hz & 230Vac/50Hz, 25°C at 24 hrs per day, 365 days/year, 6 power up cycles per day. (@80% load for the 12V model)	**MTBF**	>1,000,000 hours, full load, 110 & 220Vac input, 25°C amb., per Telcordia 332 Issue 6, Stress Method.

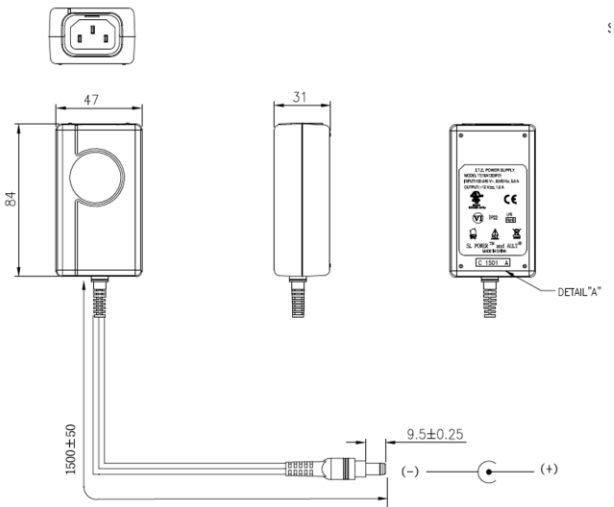
All specifications are typical at nominal input, full load, at 25°C ambient unless noted.

EMI/EMC Compliance

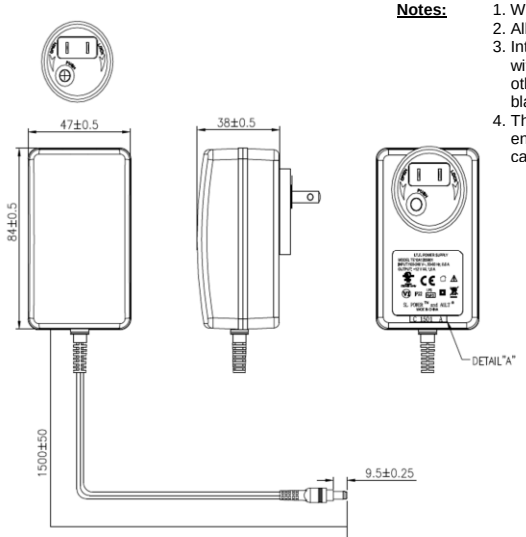
Conducted Emissions:	EN55011/CISPR22 Class B, FCC Part 15.107, Class B: 6db margin typ, at 115 and 230Vac
Radiated Emissions:	EN55022/CISPR22 Class B, FCC Part 15.109, Class B: 3db margin typ, at 115 and 230Vac
Common Mode Noise:	High Frequency (100kHz-20MHz): <40mA pk-pk
Electro-Static Discharge (ESD) 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, +/- 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: --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.

Mechanical Drawing



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

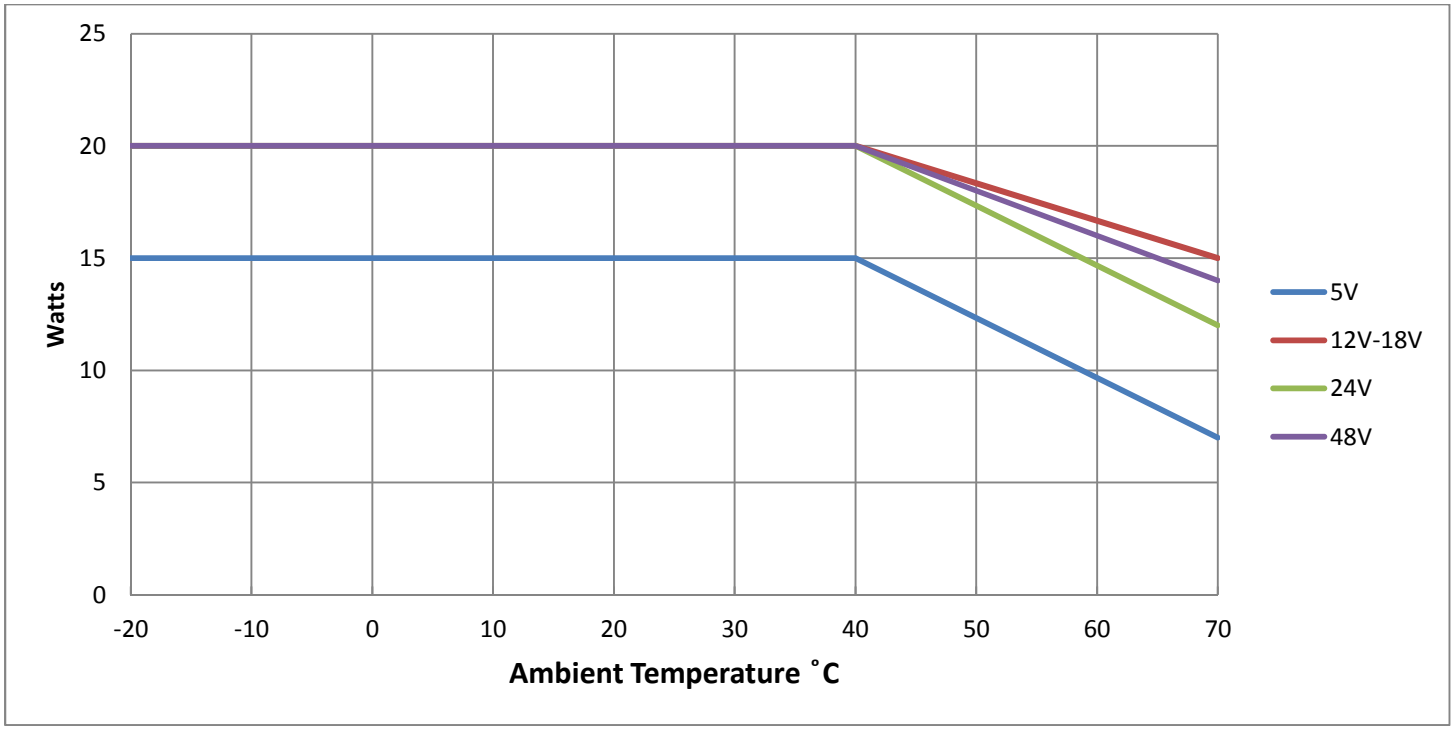


Interchangeable N.A. Blade, 2.5 x 5.5 x 9.5mm barrel connector

Notes:

1. Weight: 110g.
2. All dimensions in mm.
3. Interchangeable blade models come with North American blade fitted. For other blades (EU, UK, Aust.) order blade kit KT1027K.
4. The unit should not be covered or enclosed to protect against excessive case temperature rise.

Derating Chart:



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	$\geq 0.5 \times P_{out} + 0.16$	≤ 0.100
1 W < $P_{out} \leq 49$ W	$\geq 0.071 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.67$	≤ 0.100
49 W < $P_{out} \leq 250$ W	≥ 0.880	≤ 0.210
$P_{out} > 250$ W	≥ 0.875	≤ 0.500
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	$\geq 0.517 \times P_{out} + 0.087$	≤ 0.100
1 W < $P_{out} \leq 49$ W	$\geq 0.0834 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.609$	≤ 0.100
49 W < $P_{out} \leq 250$ W	≥ 0.870	≤ 0.210
$P_{out} > 250$ W	≥ 0.875	≤ 0.500

TE20A Series

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