

Power Solutions

# EV Charger for Tricycle



# EV Charger for electrical operated Tricycle (SMPS Based)

A Battery Charger is a device used to put energy into a secondary cell or rechargeable battery by forcing an electric current through it. The charging protocol depends on the size and type of the battery being charged.

SMPS Battery Charger (CVCC type) is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently. In SMPS switching is done at very high frequency of several KHz using Pulse Width Modulation (PWM) technique which is reliable, efficient, noiseless and compact.

## Working Principle:

The design is based on the fly back topology. High switching frequency makes the components sizes to decrease and hence reduction in the size. The efficiency of the unit is greater than 75%. The input voltage is applied to the transformer

primary which is switched at high frequency using opto-isolators. The output of the transformer is rectified using proper rectifier diodes. The output is further smoothed with the use of smoothing inductors to reduce the ripple to the desired level.

The Battery Chargers provide both constant voltage (CV) charging below the rated current and constant current (CC) charging if the battery tries to draw more than the rated current. In CV mode, the output voltage is well regulated against line and load variations. The input voltage range is 160 V to 270 V which is a wide range of effective working of the charger with higher variation in input voltage.



#### Features:

- Due to the wide input range, the charger is suitable to work in regions with high voltage fluctuations.
- Due to compact structure and user friendly functions, carrying and installation of the charger is easy.
- Rugged design of the charger that makes it able to work in harsh environmental conditions.
- Military grade components are used in designing the charger for prolonged life and better tolerance.
- SMF and non SMF both type of batteries can be charged.

The SMPS Battery Charger (CVCC type) is an electronic power supply with a switching regulator for efficient power conversion. The Pulse Width Modulation (PWM) technology, which is dependable, efficient, noiseless, and small, is used in SMPS switching at a very high frequency of several KHz. The device has a high efficiency of more than 75%. The input voltage is applied to the transformer primary, which uses opto-isolators to switch at a high frequency. The transformer's output is rectified using appropriate rectifier diodes.

## TECHNICAL SPECIFICATIONS

<b>Input Specification</b>	
Capacity	24 V / 5 Amp (SMPS based)
Nominal Voltage	230V AC, 1-Ph, 50Hz
Operating Voltage Range	140 to 275 V AC, 1-Ph, 50 Hz & charger shall be able to sustain continuous variation in Input Voltage from 140 V to 275 V AC
Frequency	50±3Hz
Efficiency	>80%
Isolation	I/P to O/P : 1.5 KV DC for 1 minute I/P to earth : 1.5 KV DC for 1 minute
Input Protection	i) Fuse Protection ii) Variation in I/P Voltage below 140 V & above 275 (up to 280 V AC)
Transient Surge Protection	Yes, (Varistor) or any other component
<b>Output Specification</b>	
Purpose	Suitable for charging of 24V 50 AH SMF Batteries (12V 50 AH SMF Batteries - 2 Nos. of Batteries connected in series)
Charging Voltage	28±0.5 V DC
Output Current	5.0 Amp DC (Max)
Ripple	< 3% PK - PK Maximum Output Voltage
Line Regulation	< +/- 1.2%
Load Regulation	< +/- 5%
Protection	(i) O/P Over Voltage (ii) Over Load (120% of Rated 5 Amp) (iii) Short Circuit (iv) Battery Blocking (v) Battery Reverse
Indication	(i) Battery Charging (ii) Battery full charge
<b>Environmental Specifications</b>	
Operating Ambient Temperature range	-10 to 55°C Duration min 6 Hrs. as per following standards: (i) IS:9000 (Part II)-1977 (reaffirmed on 2016) (ii) IS:9000(Part-III)-1977 (reaffirmed on 2016)
Operating Relative Humidity requirement	At Least 90% RH (Non condensing) At 25°C Duration 12 Hrs. As per following standard: IS:9000 (Part IV)-1979 (reaffirmed on 2016)
Cooling	Natural/Forced Air cooling
<b>Mechanical Requirement</b>	
Mechanical Shock & Vibration Test	Upto 2G. as per following standard (I) IS:9000 (Part VIII)-1981 (i) IS:9000(Part 7/Secl): 2006
<b>Cable and Connector Specification</b>	
Input Side	3-Pin Plug Top of 6 Amp rating with 3 core copper cable length of 2 Meter
Output Side	3 Pin, IEC C14 Male connector of 6 Amp current rating with 1 meter length cable (excluding connector) of cross sectional are 1.5 SQ. mm, ISI marked, IS:694
<b>General Requirement</b>	(i) Current & Voltage rating safety factor shall be 1.5 times for Power Semiconductor devices. (ii) Cycle by cycle primary current protection is included to prevent potential damage. (iii) Enclosure shall be non conducting coated of non-breakable material & all the live part shall be covered to provide protection against Electric shock.

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