

Model 3546 NiMH

27 W max out • 90-264 VAC input

- Universal input voltage
- Optimized battery performance and lifetime by:
 - Robust -dV sensitivity detection
 - Low cell temperature at end of fast charge
 - Top-off charge makes sure all cells are fully charged and balanced
 - Safety indication and protection: against reverse polarity, short circuit, charging battery packs with the wrong number of cells
- Approvals:
 - Household safety, EN 60335-1 & -2-29
 - Medically certified
 - Safety: EN 60601-1 ed. 3.1
 - Home healthcare EN 60601-1-11
 - EMC: EN 60601-1-2 ed. 4
 - UL approved
- Custom specifications on request:

Charging parameters, connectors, cords, logo print, housing/open frame/IP rating and certificates. For more information: [custom design info sheet](#)
- Configurable battery charger (CBC)

The CBC module offers a range of custom charge parameter settings, including: dV, dT/dt, 0 dV, Timer, Safety timer, dV threshold, temperature gradient adjustment.

The CBC is also configurable in field. For more information, [see CBC data sheet](#)



Available versions On request

- 2 cells / 2,5A
- 3-6 cells / 2,2A
- 4-8 cells / 2,0A
- 5-10 cells / 1,6A
- 6-12 cells / 1,3A
- 10-20 cells / 0,8A

Notes:

Plug-in/desktop unit

Exchangeable AC and DC plugs available

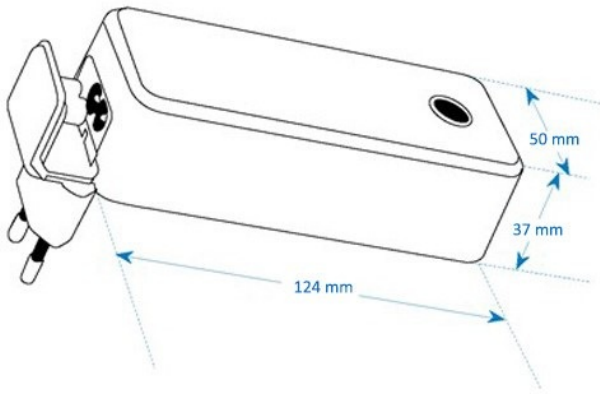
Mounting bracket available

Order plugs and mains cord separately

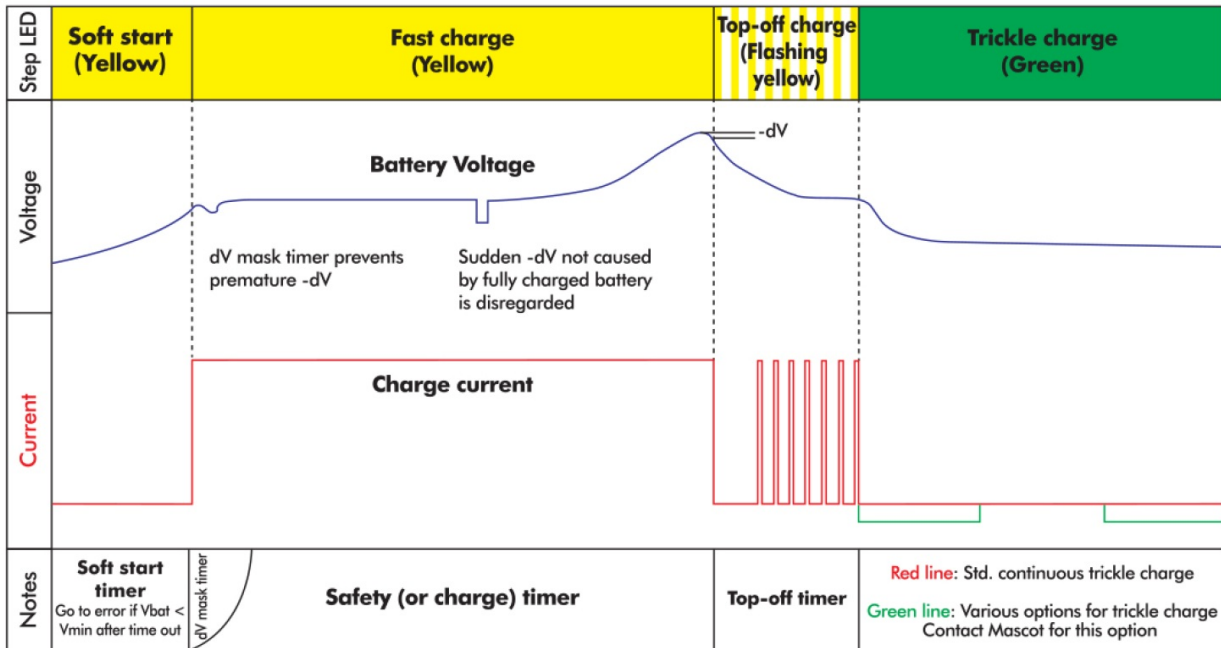
MASCOT type 3546 NiMH/NiCd:	2-cell	3-6 cell	4-8 cell	5-10 cell	6-12 cell	10-20 cell
Input voltage	90 - 264VAC / 47 - 63Hz	90 - 264VAC / 47 - 63Hz	90 - 264VAC / 47 - 63Hz	90 - 264VAC / 47 - 63Hz	90 - 264VAC / 47 - 63Hz	90 - 264VAC / 47 - 63Hz
Max. output power	6.8W	22.5W	27.2W	27.2W	26.5W	27.2W
Min. output voltage for -ΔV detection	2.5V (min 2 cells x min 1.25V pr. cell)	3.75V (min 3 cells x min 1.25V pr. cell)	5.0V (min 4 cells x min 1.25V pr. cell)	6.2V (min 5 cells x min 1.25V pr. cell)	7.5V (min 6 cells x min 1.25V pr. cell)	13V (min 10 cells x min 1.3V pr. cell)
Max. output voltage for -ΔV detection	3.4V (max 2 cells x max 1.7V pr. cell)	10.2V (max 6 cells x max 1.7V pr. cell)	13.6V (max 8 cells x max 1.7V pr. cell)	17V (max 10 cells x max 1.7V pr. cell)	20.4V (max 12 cells x max 1.7V pr. cell)	34V (max 20 cells x max 1.7V pr. cell)
-ΔV sensitivity mV/cell	3mV/cell (approx.)	3mV/cell (approx.)	3mV/cell (approx.)	3mV/cell (approx.)	3mV/cell (approx.)	3mV/cell (approx.)
SoftStart current	100mA ± 25mA @ Vbat < 2V	100mA ± 25mA @ Vbat < 3.75V	100mA ± 25mA @ Vbat < 5.0V	100mA ± 25mA @ Vbat < 6.2V	100mA ± 25mA @ Vbat < 7.5V	50mA ± 15mA @ Vbat < 13V
Fast charge current	2.5A ± 100mA	2.2A ± 100mA	2.0A ± 100mA	1.6A ± 100mA	1.3A ± 100mA	800mA ± 50mA
Top off charge	300mA ± 50mA	310mA ± 50mA	290mA ± 50mA	250mA ± 50mA	220mA ± 30mA	125mA ± 20mA
Trickle charge current	100mA ± 25mA	100mA ± 25mA	100mA ± 25mA	100mA ± 25mA	100mA ± 25mA	50mA ± 15mA
Efficiency at 100% load	70%	78%	80%	82%	83%	84%
Average efficiency	>62%	>72%	>78%	>80%	>80%	>80%
No load consumption	TBD	TBD	TBD	TBD	TBD	TBD
-ΔV mask start timer	3 min, no -ΔV detection in this period	3 min, no -ΔV detection in this period	3 min, no -ΔV detection in this period	3 min, no -ΔV detection in this period	3 min, no -ΔV detection in this period	3 min, no -ΔV detection in this period
SoftStart Timer	10 minutes	10 min	10 min	10 min	10 min	10 min
Top-off timer	1 hour	1 hour	1 hour	1 hour	1 hour	1 hour
Safety timer	5 hours	5 hours	5 hours	5 hours	5 hours	5 hours
The charger switch to trickle charge if no -ΔV is detected before the safety timer has run out.						

MASCOT type 3546 NiMH/NiCd:	2-cell	3-6 cell	4-8 cell	5-10 cell	6-12 cell	10-20 cell
Switch frequency	35kHz.					
Temperature range	-20 to +40°C (these values are only for the charger, not for the batteries).					
Charge control	-ΔV principle. Fast charging stops when the voltage has dropped 3mV/cell below its maximum recorded level.					
Voltage changes during charging	-ΔV detection is disabled if the voltage changes quickly. This to avoid false -ΔV if an external load kicks in during charging.					
Leakage current from battery with mains switch off	< 0.5 mA at nominal battery voltage (< 0.4 Ah/month)					
Fuses	Fuse at input. Mosfet switch at the output protects the unit against wrong polarity.					
Insulation class	Class II.					
Electrical safety	Medical EN 60601-1 / Home Healthcare EN 60601-1-11 / Battery Charger EN 60335-2-29					
EMC-standards	EN 55014-1 and -2, EN 61000-6-3, EN 61000-6-1, EN 60601-1-2					
Insulation voltage (prim-sec)	4000V AC / 5700V DC.					
Input terminals	2-pins IEC 320 connector for exchangeable mains plug (EU, US, UK and AUS).					
Output terminals	Cord with/without plug. Exchangeable plugs available.					
LED-indication	SoftStart / Fast charge: Yellow Top off charge: Flashing yellow Trickle charge: Green Battery not connected: Flashing green (1s/1s)					
Protection:	Protected against reversed polarity. Error indication: Red (2 blinks) Short circuit proof. Error indication: Red (3 blinks) Low battery voltage (SoftStart timer). Error indication: Red (4 blinks) No charge (or charge terminated) if connecting wrong battery pack with higher voltage. Indication: LED is OFF.					
NTC input, on request (std is 10kohm, B-value approx. 4000)	+dT/dt principle. Fast charging stops when the temperature increment is over 0.5°C/min. Battery temperature is too low (<0°C). Wait mode. Indication: Yellow with 1 red blink. Battery temperature is too high (>40°C). Wait mode. Indication: Yellow with 2 red blinks. High temperature (>60°C). Error Indication: Red (5 blinks). NTC missing or shorted. Error Indication: Red (6 blinks).					
Resetting	A new charging cycle starts by reconnecting a battery at the output, or by disconnecting and connecting the mains voltage.					
IP-grade	IP 41.					
Dimensions	123,5 × 49,5 × 37 mm					
Weight	220g.					
Other	Possible options on request: Charger parameters programmable with "Configurator tool". Constant current charge (no battery management). 0dV detection for EoC. DoE compliance.					

Technical drawing



Charging characteristics and LED indication



CHARGE INDICATIONS

- Flashing green: Battery not connected
- Yellow: Fast charge (or soft start)
- Flashing yellow: Top-off
- Green: Trickle


WAIT MODE INDICATIONS

- Yellow with 1 red blink: Battery temperature is too low ($<0^{\circ}\text{C}$)
- Yellow with 2 red blinks: Battery temperature is too high ($>40^{\circ}\text{C}$)

ERROR INDICATIONS

- 2 red blinks: Battery is connected to charger with wrong polarity!
- 3 red blinks: Charger output is shorted. Check output cable connection!
- 4 red blinks: Battery voltage is low. Check battery status or voltage. (ss timer)
- 5 red blinks: Warm error. Temperature $>60^{\circ}\text{C}$
- 6 red blinks: NTC missing or short (if mandatory)
- LED off: Battery voltage is too high. Check battery voltage.

We, the responsible manufacturer;

Company Name:	Mascot Electronics AS
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E-mail:	sales@mascot.com
WEB:	www.mascot.com
declare that this Declaration is issued under our sole responsibility and belongs to the following product(s):	
Product and intended purpose:	Battery Charger for Li-Ion-, LiFePO ₄ -, Li-Titanate, Lead-Acid or NiMH/NiCd Batteries
Brand(s):	 and/or MASCOT (may also carry additional customer name, logo or trade mark)
Type(s)/Model(s)/UDI-DI:	3546 (may also carry additional customer model name or part number)
Batch / Serial No./UDI-PI:	all CE- and/or UKCA- marked products produced from the date indicated below (for production date: see marking on the product)
Description:	<p>Input: max. 0.35 A 100-240 VAC 50-60 Hz, Class II</p> <p>Output: max. 28 W (see product specific technical information)</p> <p>1- to 16-cell for Lithium-Ion Batteries or</p> <p>1- to 16-cell for LiFePO₄ Batteries or</p> <p>1-to 20-cell for Li-Titanate Batteries or</p> <p>12V, 24V, 36V or 48V for Lead Acid Batteries or</p> <p>2- to 20-cell for NiMH/NiCd Batteries.</p> <p>NOTES: - Versions with output voltage >42.4 VDC are not within the scope of standard EN 60335-2-29 Ed.4 (ref. Cl.10.101).</p>

The product(s) described above are in conformity with the relevant European Union harmonisation legislation for CE-marking:

2014/35/EU	EU Directive - Safety of electrical equipment ("Low-Voltage Directive") (LVD) recast, repealing Directives 2006/95/EC & 73/23/EEC
2014/30/EU	EU Directive - Electromagnetic Compatibility (EMC) recast, repealing Directives 2004/108/EC & 89/336/EEC
93/42/EEC	EU Directive - General Medical Devices (MDD), Risk Class I Device will from 26.05.2021 be repealed by "MDR" Regulation (EU) 2017/745
2009/125/EC	EU Directive - Energy Related Products, Ecodesign (ERP) recast, repealing Directive 2005/32/EC (EUP)
2015/863/EU	EU Directive - Restriction on use of Hazardous Substances in EEE ("RoHS3") recast, repealing Directives 2002/95/EC, 2008/35/EC & 2011/65/EU

The product(s) described above are in conformity with the relevant U.K. legislation for UKCA-marking:

Electrical Equipment (Safety) Regulations 2016
Electromagnetic Compatibility (EMC) Regulations 2016
The Medical Devices (Amendment etc.) (EU Exit) Regulations 2020, Risk Class I Device
Ecodesign for Energy-Related Products (External Power Supplies) Regulations 2020 Draft Regulation, awaiting implementation
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

The following harmonised standards and technical specifications have been applied:

(International editions and comments indicated in brackets):

Electrical Safety (to LVD- & MDD-Directives):

EN 60950-1	EN 60950-1:2006 + /A1:2010, + /A11:2009, + /AC:2011, + /A12:2011 + /A2:2013 (IEC 60950-1:2005 modified + /A1:2009 modified + /A2:2013 modified, Edition 2.2)	IT-equipment (ITE), Edition 2.2 (OBS! expired for CE-marking !!)
EN 60335-1	EN 60335-1:2012 + /AC:2014 + /A11:2014 (IEC 60335-1:2010 modified, Edition 5.0)(also IEC 60335-1:2010 modified + /A1:2013 + /A2:2016, Edition 5.2)	Household and similar appliances-General requirements, Edition 5.0
EN 60335-2-29	EN 60335-2-29:2004 + /A2:2010 (IEC 60335-2-29:2002 + /A1:2004 + /A2:2009, Edition 4.2) (also IEC 60335-2-29:2016, Edition 5.0)	Household and similar appliances-Requirements for battery chargers, Edition 4.2
EN 60601-1	EN 60601-1:2006 + /AC:2010 + /A1:2013 (IEC 60601-1:2005 + /A1:2012)	Medical electrical equipment, Edition 3.1

Electrical Safety and Electromagnetic Compatibility (to MDR/MDD-Directives):

EN 60601-1	EN 60601-1:2006 + /AC:2010 + /A1:2013 (IEC 60601-1:2005 + /A1:2012)	Medical electrical equipment, Edition 3.1
EN 60601-1-2	EN 60601-1-2:2015 (IEC 60601-1-2:2014, Edition 4.0)	Medical equipment, EMC - Requirements and tests, Edition 4.0

Electromagnetic Compatibility (to EMC-Directive):

EN 61000-6-1	EN 61000-6-1:2007 (IEC 61000-6-1:2005, Edition 2.0) (also IEC 61000-6-1:2016, Edition 3.0, not yet an EN-norm)	Immunity-residential, comm. & light-industrial environment, Edition 2.0
EN 61000-6-3	EN 61000-6-3:2007 + /A1:2011 & /AC:2012 (IEC 61000-6-3:2007 + /A1:2010)	Emission-residential, comm. & light-industrial environment, Edition 2.1
EN 55014-1	EN 55014-1:2006 + /A1:2009 & /A2:2011 (CISPR 14-1:2005 + /A1:2008 & /A2:2011, Edition 5.2) (also CISPR 14-1:2016, Edition 6.0, but not yet an EN-norm)	Emission-household appliances, Edition 5.2
EN 55014-2	EN 55014-2:1997 + /AC:1997, /A1:2001, /A2:2008 (CISPR 14-2:1997 + /A1:2001 & /A2:2008, Edition 1.2) (also CISPR 14-2:2015, Edition 2.0, but not yet an EN-norm)	Immunity-household appliances, Edition 1.2
EN 55024	EN 55024:2010 (CISPR 24:2010, Edition 2.0) (also CISPR 24:2010 + /Corr.1:2011 + /A1:2015, Edition 2.1, but not yet an EN-norm)	Immunity-IT-Equipment, Edition 2.0
EN 55032	EN 55032:2012 + /AC:2013 (CISPR 32:2012 + /Corr.1:2012 + /Corr 2:2012, Edition 1.0) (also CISPR 32:2015, Edition 2.0, but not yet an EN-norm)	Emission-Multimedia Equipment, Edition 1.0

Ecodesign to EU ERP-Directive:

Commission Regulation (EC) No 2019/1782	implementing Directive 2005/32/EC with regard to ecodesign requirements for no-load condition electric power consumption and average active efficiency of external power supplies (Repealing Commission Regulation (EC) No 2019/1782 from 2020-04-01) (Note: not applicable to Battery Chargers, ref. Article 1.2 item c)
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Ecodesign for U.K.:

Draft Regulation only (awaiting implementation)	Draft "Ecodesign for Energy-Related Products (External Power Supplies) Regulations 2020" (Note: not applicable to Battery Chargers)
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Ecodesign for U.S.A. (Note: depends on battery used !):

US Code of Federal Regulations (CFR) Also called "DoE compliance"	10 CFR Part 430 - Energy Conservation Program for Consumer Products, 10 CFR Part 430, Subpart B - Test Procedures, 10 CFR Appendix Y to Subpart B of Part 430, Uniform Test Method for Measuring the Energy Consumption of Battery Chargers or 10 CFR Appendix Z to Subpart B of Part 430, Uniform Test Method for Measuring the Energy Consumption of External Power Supplies, whichever applicable.
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California Code of Regulations (CCR) Also called "CEC-400 compliance" referring to CEC-400-2017-002 "2016 Appliance Efficiency Regulations" issued by California Energy Commission	CCR Title 20 - Public Utilities and Energy, Division 2 - State Energy Resources Conservation and Development Commission, Chapter 4 - Energy Conservation, Article 4 - Appliance Efficiency Regulations, Sections 1601 to 1609
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Restriction of the Use of certain Hazardous Substances (RoHS) for EU:

2015/863/EU "RoHS3"	EU Directive - Restriction on use of Hazardous Substances in EEE Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment
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Restriction of the Use of certain Hazardous Substances for UK:

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

EU & UK Declaration of Conformity



Additional Information:

Compliance with harmonised standards and technical specifications may have been verified by the manufacturer, by third party testing or by a Certification Body (NCB).

The products are considered Risk Class I devices according to EU Medical Devices Directive, EU Medical Devices Regulation and the U.K. Medical Devices (Amendment etc.) (EU Exit) Regulations 2020.

The product(s) may be produced at production sites (for specific product: see "Made in"-marking on the product):

- Mascot Baltic OÜ, Taevakivi 15, EE-13619 Tallinn, ESTONIA
- Mascot Power Supplies (Ningbo) Co.,Ltd, No.128 Jinchuan Road, Zhenhai, Ningbo 315221, CHINA

The production sites are certified to standard EN 29001:2015 (ISO 9001:2015) by:

- Mascot Baltic OÜ: Metrosert, certificate ref. K-144
- Mascot Power Supplies (Ningbo) Co.,Ltd: DNV-GL, certificate ref. 179027-2015

The most recent issue of this Declaration is available at www.mascot.com.

Fredrikstad, Norway

Place of issue

2021-01-28

Date of issue

Signed on behalf of Mascot Electronics AS


Finn-Erik Wailin, Compliance Manager

Name, function, signature