



Lane Machine Charger Technical Guide 14-100924-100 & 14-100924-200

Charging method D

STEP 1 - BOOST CHARGE

LED-indicator: YELLOW

The charger is in constant current mode (CC), charging with the maximum current until battery voltage reach Top-Up level.



STEP 2 – TOP-UP CHARGE

The charger is in constant voltage mode. The LED-indication will be FLASHING YELLOW during Top-up charge. The charger stays in this mode until the charge current decreases to charge termination level or the Top-Up Charge Timer runs out. The battery is charged to its full capacity at the end of this step



STEP 3 – FLOAT CHARGE

The LED-indication on the charger is GREEN and the battery is fully charged.

The charger is in float mode. The charge voltage is at float level and the charger may remain connected to the battery.

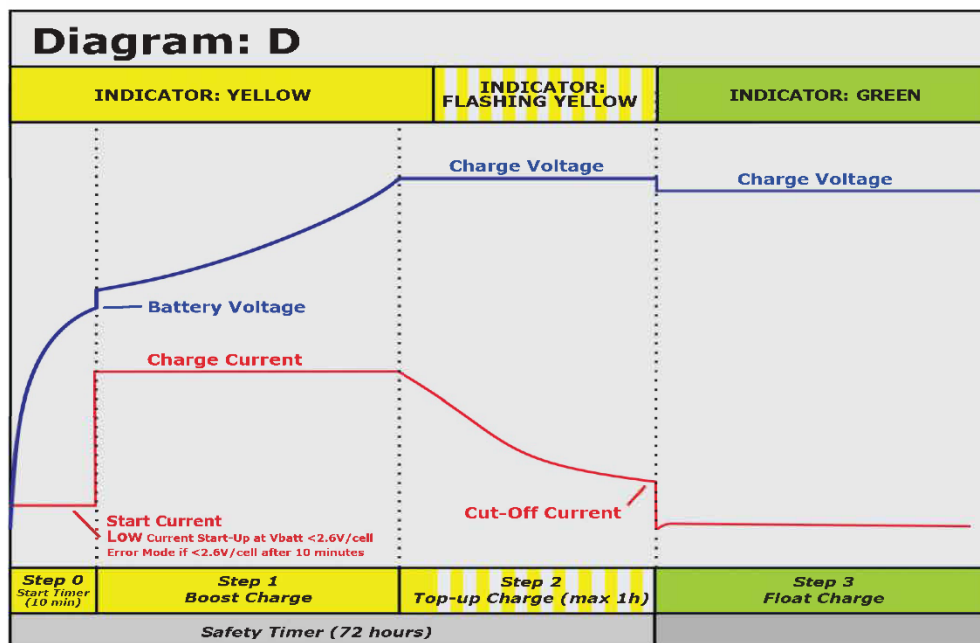
The charger will return to boost charge if the battery is used.

(Model 3540 terminates charge, i.e. no float charge).



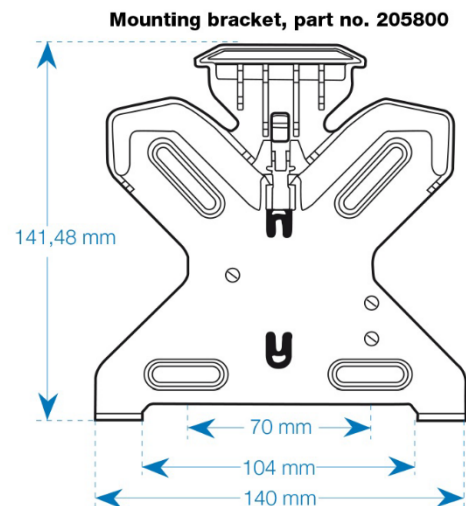
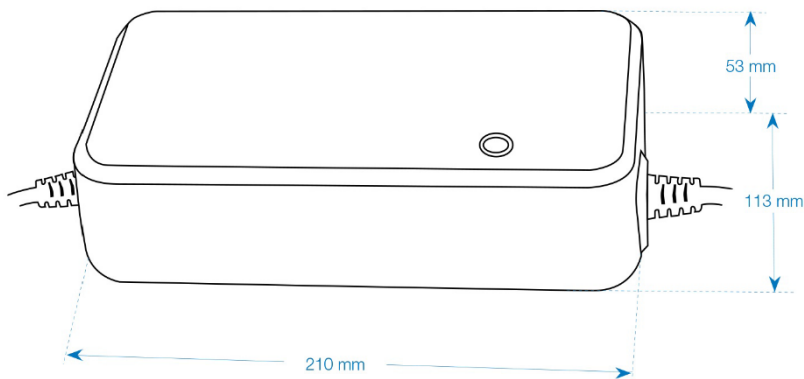
BATTERY NOT CONNECTED INDICATIONS

Battery not connected is indicated by FLASHING GREEN



Additional Specifications

MASCOT type 3540 LiFePO4 Charger		8 Cell
Input Voltage: / Line Frequency:		198-264 VAC/50Hz
Max Output Power:		292W
Charge Control:	Charge Indication:	
Step 0 < 10 Min	Yellow	CC 0.8A +/- 0.2A when battery voltage < 21.0 V
Step 0 > 10 Min	Red (4 blinks)	0A/0V
Step 1 (Constant Current)	Yellow	CC 10A +0.1A/-0.3A, when 21V < Vbat < 29.2V.
Step 2 (Constant Voltage)	Flashing Yellow	CV 29.2V <8.4A until I charge < 0.8A or max 1h.
Charge Timer (step2, CV)		1h
Safety Timer (All Steps)	Red (5 Blinks)	72h
Step 3 (Charge Completed)	Green	0A
Restart Voltage		26.4V
Formation Charge (Step 0)		Low current start-up of deeply discharged battery
Wake-up of deeply discharged battery.		Yes, will apply voltage which deactivates deep discharge in battery pack
Indication when "Battery Not Connected"		Flashing Green (1s/1s)
Leakage current from battery with mains switched off:		< 160 uA @ 29.2V
Efficiency (at 100% load, 115V) approx.:		>92%
Switch frequency approx.:		65 kHz
Ripple:		< 100mVp-p
NTC input, on request (std. is 10 kohm, B-value approx. (4000K)		0-45 degrees C: Normal Charge, Battery Temp. < 0°C (too cold) or > 45°C (too hot): No charge, wait until temp. is OK
		WAIT MODE INDICATIONS
		Yellow with 1 red blink: Battery temperature is too low (<0°C)
		Yellow with 2 red blinks: Battery temperature is too high (>45°C)
Protection		Thermal Protection. Prevents Sparking.
		Short circuit proof. Error Indication: Red (3 Blinks)
		Safety Timer: 72h. Error Indication: Red (5 Blinks)
		Protected against reverse polarity: Error Indication: Red (2 Blinks)
		Safety Timer: Error Indication: Red (5 Blinks)
		No charge (or charge terminated) if connecting wrong battery pack with higher voltage: Indication: LED is OFF
Charging of wrong, lower voltage battery pack limited to (A) and will be terminated after 10 min: Indication: Red (4 Blinks)		0.8A
Temperature range:		Operating: +25 to +40°C. Storage +25 to +65°C
Derating: Charge current automat. reduced to approx.:		7.0A at 40°C
Safety:		EN 60601-1
Insulation class:		Double insulated (Class II)
Insulation voltage: Primary - secondary:		4000VAC/5700VDC
EMC standards:		EN 60601-1-2: 2015 (Edition 4)
Input terminal:		2 pin IEC60320 or mains cable
Output terminals:		Cord with open ends or XLR plug
Protection against ingress (IP-Code):		IP44
Recommended battery capacity:		5 - 400Ah
Dimensions:		210 x 113 x 53 mm
Weight Approx.:		With mains cable 1400g. With IEC60320 1150g



Model 3540 LiFe

20 A max out • 198-264 VAC input

- 3-step charge control with current detection
- Input voltage 198-264 VAC (115V versions available)
- Fixed mains cable, 2-pin IEC 60320 available
- Output terminal: cord w. open ends, XLR output plug for wheelchairs and scooters available
- Wake up and low current start-up of deeply discharged batteries
- Safety indication and protection: against reverse polarity, short circuit, charging battery packs with the wrong number of cells and safety timer run-out
- Approvals:
 - Medically certified
 - Safety: EN 60601-1 ed. 3.1
 - Home healthcare EN 60601-1-11 (fixed cord vers. only)
 - 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](#)

Notes:

Desktop unit

Mounting bracket included

With NTC input on request

2MOOP standard, 2MOPP available (3540P)

Std DC output cord: open ends, L 1.1m, AWG 13, Black PVC, UL 1185



Available versions

4 cell / 20A	7 cell / 10A
8 cell / 10A	9 cell / 9A
12 cell / 7A	16 cell / 5A

EU & UK Declaration of Conformity



We, the responsible manufacturer;

Company Name: **Mascot Electronics AS**
 Postal Address: **P.O.Box 177, N-1601 Fredrikstad, NORWAY**
 Visiting Address: **Mosseveien 109, N-1624 Gressvik, NORWAY**
 Telephone: **(+47) 69 36 43 00** 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-, LiFePO₄-, 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: **3540**
 (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:

Input: max. 2.4 A, 220 - 240 VAC, 50 Hz or max. 4.3 A, 110 - 120 VAC, 60 Hz

Output for Lead-Acid Batteries:

6 V: 7.35 V $\pm 10\%$, max. 20 A, max. 150 W	24 V: 29.4 V $\pm 10\%$, max. 10 A, max. 294 W
12 V: 14.7 V $\pm 10\%$, max. 20 A, max. 294 W	36 V: 44.1 V $\pm 10\%$, max. 6.6 A, max. 294 W
18 V: 22.2 V $\pm 10\%$, max. 13.2 A, max. 294 W	48 V: 58.8 V $\pm 10\%$, max. 5.0 A, max. 294 W

Output for Li-Ion Batteries:

1 cell: 4.2 V $\pm 10\%$, max. 20 A, max. 84 W	8 cell: 33.6 V $\pm 10\%$, max. 8.7 A, max. 294 W
2 cell: 8.4 V $\pm 10\%$, max. 20 A, max. 168 W	9 cell: 37.8 V $\pm 10\%$, max. 7.7 A, max. 294 W
3 cell: 12.6 V $\pm 10\%$, max. 20.0 A, max. 294 W	10 cell: 42.0 V $\pm 10\%$, max. 7.0 A, max. 294 W
4 cell: 16.8 V $\pm 10\%$, max. 17.5 A, max. 294 W	11 cell: 46.2 V $\pm 10\%$, max. 6.3 A, max. 294 W
5 cell: 21.0 V $\pm 10\%$, max. 14 A, max. 294 W	12 cell: 50.4 V $\pm 10\%$, max. 5.8 A, max. 294 W
6 cell: 25.2 V $\pm 10\%$, max. 11.6 A, max. 294 W	13 cell: 54.6 V $\pm 10\%$, max. 5.3 A, max. 294 W
7 cell: 29.4 V $\pm 10\%$, max. 10 A, max. 294 W	14 cell: 58.8 V $\pm 10\%$, max. 5.0 A, max. 294 W

Output for LiFePO₄ Batteries:

1 cell: 3.65 V $\pm 10\%$, max. 20 A, max. 75 W	9 cell: 32.85 V $\pm 10\%$, max. 9.0 A, max. 295 W
2 cell: 7.30 V $\pm 10\%$, max. 20 A, max. 150 W	10 cell: 36.5 V $\pm 10\%$, max. 8.0 A, max. 294 W
3 cell: 10.95 V $\pm 10\%$, max. 20 A, max. 220 W	11 cell: 40.15 V $\pm 10\%$, max. 7.3 A, max. 294 W
4 cell: 14.60 V $\pm 10\%$, max. 20 A, max. 294 W	12 cell: 43.8 V $\pm 10\%$, max. 6.7 A, max. 294 W
5 cell: 18.25 V $\pm 10\%$, max. 16 A, max. 294 W	13 cell: 47.45 V $\pm 10\%$, max. 6.1 A, max. 294 W
6 cell: 21.9 V $\pm 10\%$, max. 13.4 A, max. 294 W	14 cell: 51.1 V $\pm 10\%$, max. 5.5 A, max. 281 W
7 cell: 25.55 V $\pm 10\%$, max. 11.5 A, max. 294 W	15 cell: 54.75 V $\pm 10\%$, max. 5.2 A, max. 284 W
8 cell: 29.20 V $\pm 10\%$, max. 10 A, max. 294 W	16 cell: 58.4 V $\pm 10\%$, max. 5.0 A, max. 294 W

Output for Lithium Titanate Batteries:

1 cell: 2.85 V $\pm 10\%$, max. 20 A, max. 60 W	11 cell: 31.35 V $\pm 10\%$, max. 9.3 A, max. 294 W
2 cell: 5.7 V $\pm 10\%$, max. 20 A, max. 115 W	12 cell: 34.2 V $\pm 10\%$, max. 8.5 A, max. 294 W
3 cell: 8.55 V $\pm 10\%$, max. 20 A, max. 171 W	13 cell: 37.05 V $\pm 10\%$, max. 7.9 A, max. 294 W
4 cell: 11.4 V $\pm 10\%$, max. 20 A, max. 230 W	14 cell: 39.9 V $\pm 10\%$, max. 7.3 A, max. 294 W
5 cell: 14.25 V $\pm 10\%$, max. 20 A, max. 285 W	15 cell: 42.75 V $\pm 10\%$, max. 6.8 A, max. 294 W
6 cell: 17.1 V $\pm 10\%$, max. 17 A, max. 294 W	16 cell: 45.6 V $\pm 10\%$, max. 6.4 A, max. 292 W
7 cell: 19.95 V $\pm 10\%$, max. 14.7 A, max. 294 W	17 cell: 48.45 V $\pm 10\%$, max. 5.5 A, max. 268 W
8 cell: 22.8 V $\pm 10\%$, max. 12.8 A, max. 294 W	18 cell: 51.3 V $\pm 10\%$, max. 5.5 A, max. 282 W
9 cell: 25.65 V $\pm 10\%$, max. 11.4 A, max. 294 W	19 cell: 54.15 V $\pm 10\%$, max. 5.2 A, max. 282 W
10 cell: 28.5 V $\pm 10\%$, max. 10.3 A, max. 294 W	20 cell: 57.0 V $\pm 10\%$, max. 5.0 A, max. 285 W

Output for NiMH/NiCd Batteries:

2 cell: max. 20 A, max. 3.60 V $\pm 10\%$, max. 294 W
3-6 cell: max. 20 A, max. 10.8 V $\pm 10\%$, max. 294 W
4-8 cell: max. 20 A, max. 14.4 V $\pm 10\%$, max. 294 W
5-10 cell: max. 16.3 A, max. 18.0 V $\pm 10\%$, max. 294 W
6-12 cell: max. 13.6 A, max. 21.6 V $\pm 10\%$, max. 294 W
10-20 cell: max. 8.1 A, max. 36.0 V $\pm 10\%$, max. 294 W
10-22 cell: max. 7.4 A, max. 39.6 V $\pm 10\%$, max. 294 W

NOTE: " $\pm 10\%$ " do not indicate the tolerance of the output voltage. " $\pm 10\%$ " indicate that the product version is certified having an output voltage within this range.

EU & UK Declaration of Conformity



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 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 60601-1-11	EN 60601-1-11:2010 Medical electrical equipment and systems used in the home healthcare environment, Edition 1.0 (IEC 60601-1-11:2010 + /COR1:2011, Ed.1.0) (also IEC 60601-1-11:2015 + /A1:2020, Ed.2.1, but not yet an EN-norm) NOTE: for products rated IPx1 or higher to standard EN 60529 only	

Electromagnetic Compatibility (to MDR/MDD-Directives):

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
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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

Ecodesign to EU ERP-Directive:

Commission Regulation (EC) No 2019/1782	implementing Directive 2005/32/EC with regard to eco-design 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.
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

EU & UK Declaration of Conformity



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

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

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: Metrocert, 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

2021-03-02

Date of issue

Signed on behalf of Mascot Electronics AS


Finn-Erik Wailin, Compliance Manager

Name, function, signature