

Model 3546 LI

2,5 A max out • 90-264 VAC input

- 3-step charge control with current detection
- Universal input voltage
- 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:
 - Household safety, EN 60335-1 & -2-29 (6V, 12V, 18V and 24V)
 - 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](#)

Blueline



Available versions

1 cell / 2,5A	2 cell / 2,5A
3 cell / 2,2A	4 cell / 1,6A
5 cell / 1,35A	6 cell / 1,15A
7 cell / 1,0A	8 cell / 0,85A
10 cell / 0,7A	14 cell / 0,5A

Notes:

Plug-in/Desktop unit

Exchangeable AC and DC plugs available

Order plugs & mains cord separately

Standard DC output cord:

Female connector L 0.75m, AWG 18, UL 1185 Coax

With NTC input on request

Animation showing charge error indications:

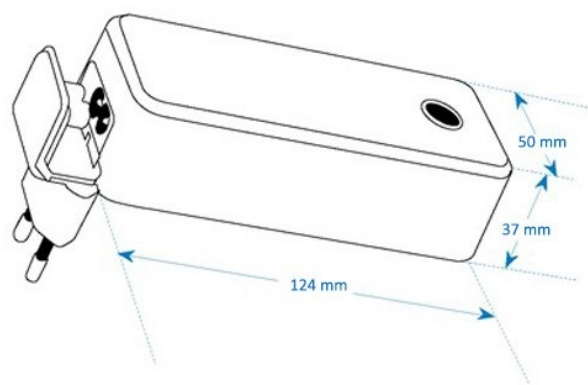
<https://vimeo.com/679995332>

MASCOT type 3546 Li-Ion chargers:	1-cell Li-Ion	2-cell Li-Ion	3-cell Li-Ion
Input voltage: / Line frequency	90-264 Vac/ 47-63 Hz		
Max output power	10.5W	21W	27.7W
Charge control: Charge indication:			
Step 0 < 10min Yellow	CC 100mA ± 25mA, when battery voltage < 3V.	CC 100mA ± 25mA, when battery voltage < 6V.	CC 100mA ± 25mA, when battery voltage < 9V.
Step 0 > 10min Red (4 blinks)	0A / 0V	0A / 0V	0A / 0V
Step 1 (Constant Current) Yellow	CC 2.5A ± 0.3A, when 3V < Vbat < 4.2V.	CC 2.5A ± 0.3A, when 6V < Vbat < 8.4V.	CC 2.2A ± 0.2A, when 9V < Vbat < 12.6V.
Step 2 (Constant Voltage) Flashing Yellow	CV 4.2V ± 0.05V, until I charge < 100mA or max. 1h.	CV 8.4V ± 0.1V, until I charge < 100mA or max. 1h.	CV 12.6V ± 0.1V, until I charge < 100mA or max. 1h.
Charge timer (step2, CV)	1h	1h	1h
Safety timer (all steps) Red (5 blinks)	72h	72h	72h
Step 3 (Charge Completed) Green	0A	0A	0A
Restart voltage	4.1V	8.2V	12.3V
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 protection in battery pack.		
Indication when "Battery not connected"	Flashing Green (1s/1s)		
NTC input, on request (std is 10kohm, B-value approx. 4000)	0 – 45 °C: Normal charge. Battery temperature < 0 °C (too cold) or > 45°C (too hot): No charge, wait until temp. is OK.		
Ripple:	< 100mV p-p		
Efficiency (at 100% load) approx.:	85 % (70% for 1 cell version)		
Switch frequency approx.:	35kHz		
Leakage current from battery with mains switched off:	< 300 µA at nominal battery voltage (< 0.22 Ah/month)		
Protection:	Protected against reversed polarity. Error Indication: Red (2 blinks) Short circuit proof. Error Indication: Red (3 blinks) Charging of wrong lower voltage battery pack will be limited to 100mA and terminated after 10min. Indication: Red (4 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.		
Temperature range:	Operating: -25 to +40°C. Transport and short time storage: -25 to +85°C		
Safety:	Medical EN 60601-1 / Home Health care EN 60601-1-11/ Battery Charger EN 60335-2-29		
Insulation class :	Class II		
Insulation voltage: Primary – secondary:	4000VAC / 5700VDC		
EMC standards:	EN 55014-1 and –2, Emission EN 61000-6-3, Immunity EN 61000-6-1, EN 60601-1-2		
Input terminal:	2-pins IEC 320 connector, C8.		
Output terminals:	DC connector, Battery clips, Push-on terminals or open ends.		
IP-Grade:	4X		
Rec. battery capacity:	2.5 Ah (1C) to 10Ah (<100mA charge current as EoC detection) or up to 100Ah (utilizing the 1h CV timer as EoC detection)	2.5 Ah (1C) to 10Ah (<100mA charge current as EoC detection) or up to 100Ah (utilizing the 1h CV timer as EoC detection)	2.2Ah (1C) to 10Ah (<100mA charge current as EoC detection) or up to 88Ah (utilizing the 1h CV timer as EoC detection)
Dimensions:	123.5 × 49.5 × 37 mm		
Weight:	220g		

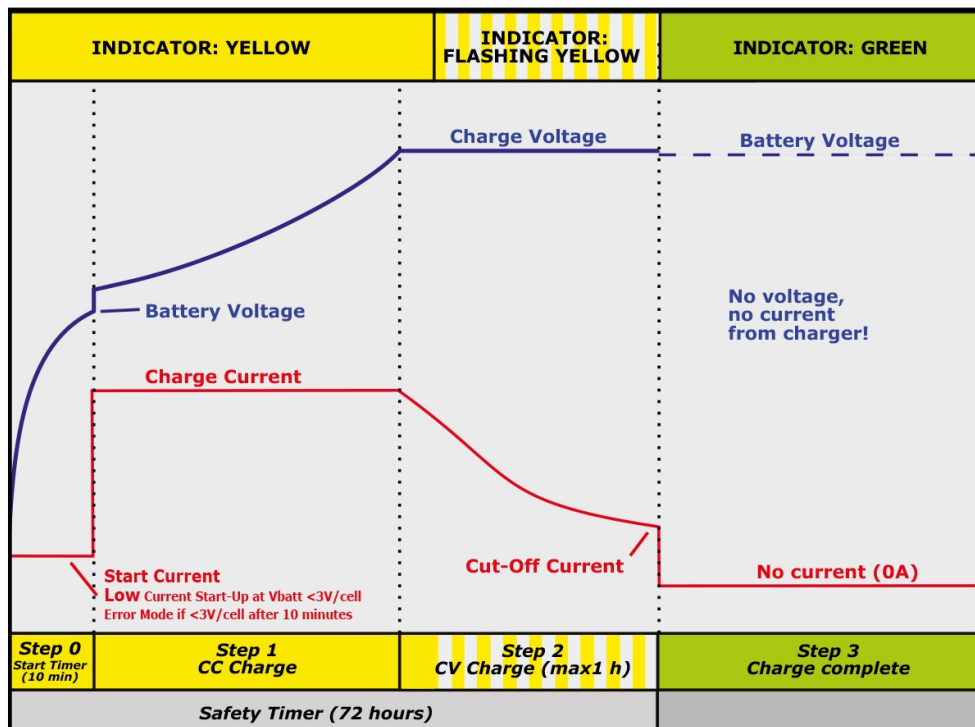
MASCOT type 3546 Li-Ion chargers:	4-cell Li-Ion	5-cell Li-Ion	6-cell Li-Ion
Input voltage: / Line frequency	90 - 264VAC / 47 - 63Hz		
Max output power	26.9W	28.4W	29W
Charge control: Charge indication:			
Step 0 < 10min Yellow	CC 100mA ± 25mA, when batt voltage < 12V.	CC 100mA ± 25mA, when battery voltage < 15V.	CC 100mA ± 25mA, when batt voltage < 18V.
Step 0 > 10min Red (4 blinks)	0A / 0V	0A / 0V	0A / 0V
Step 1 (Constant Current) Yellow	CC 1.6A ± 0.15A, when 12V < Vbat < 16.8V.	CC 1.35A ± 0.2A, when 15V < Vbat < 21.0V.	CC 1.15A ± 0.1A, when 18V < Vbat < 25.2V.
Step 2 (Constant Voltage) Flashing Yellow	CV 16.8V ± 0.1V, until I charge < 100mA or max. 1h.	CV 21.0V ± 0.1V, until I charge < 100mA or max. 1h.	CV 25.2V ± 0.2V, until I charge < 100mA or max. 1h.
Charge timer (step2, CV)	1h	1h	1h
Safety timer (all steps) Red (5 blinks)	72h	72h	72h
Step 3 (Charge Completed) Green	0A	0A	0A
Restart voltage	16.4V	20.5V	24.6V
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 protection in battery pack.		
Indication when "Battery not connected"	Flashing Green (1s/1s)		
NTC input, on request (std is 10kohm, B-value approx. 4000)	0 - 45 °C: Normal charge. Battery temperature < 0 °C (too cold) or > 45°C (too hot): No charge, wait until temp. is OK.		
Ripple:	< 100mV p-p		
Efficiency (at 100% load) approx.:	85 %		
Switch frequency approx.:	35kHz		
Leakage current from battery with mains switched off:	< 300 µA at nominal battery voltage (< 0.22 Ah/month)		
Protection:	Protected against reversed polarity. Error Indication: Red (2 blinks) Short circuit proof. Error Indication: Red (3 blinks) Charging of wrong lower voltage battery pack will be limited to 100mA and terminated after 10min. Indication: Red (4 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.		
Temperature range:	Operating: -25 to +40°C. Transport and short time storage: -25 to +85°C		
Safety:	Medical EN 60601-1 / Home Health care EN 60601-1-11/ Battery Charger EN 60335-2-29		
Insulation class :	Class II		
Insulation voltage: Primary – secondary:	4000VAC / 5700VDC		
EMC standards:	EN 55014-1 and -2, Emission EN 61000-6-3, Immunity EN 61000-6-1, EN 60601-1-2		
Input terminal:	2-pins IEC 320 connector, C8.		
Output terminals:	DC connector, Battery clips, Push-on terminals or open ends.		
IP-Grade:	4X		
Rec. battery capacity:	1.6 Ah (1C) to 10Ah (<100mA charge current as EoC detection) or up to 64Ah (utilizing the 1h CV timer as EoC detection)	1.35 Ah (1C) to 10Ah (<100mA charge current as EoC detection) or up to 54Ah (utilizing the 1h CV timer as EoC detection)	1.15 Ah (1C) to 10Ah (<100mA charge current as EoC detection) or up to 46Ah (utilizing the 1h CV timer as EoC detection)
Dimensions:	123.5 × 49.5 × 37 mm		
Weight:	220g		

MASCOT type 3546 Li-Ion chargers:	7-cell Li-Ion	8-cell Li-Ion	10-cell Li-Ion
Input voltage: / Line frequency	90 - 264VAC / 47 - 63Hz		
Max output power	29.4W	28.6W	29.4W
Charge control: Charge indication:			
Step 0 < 10min Yellow	CC 100mA ± 25mA, when batt voltage < 21V.	CC 100mA ± 25mA, when batt voltage < 24V.	CC 100mA ± 25mA, when batt voltage < 30V.
Step 0 > 10min Red (4 blinks)	0A / 0V	0A / 0V	0A / 0V
Step 1 (Constant Current) Yellow	CC 1.0A ± 0.1A, when 21V < Vbat < 29.4V.	CC 0.85A ± 0.1A, when 24V < Vbat < 33.6V.	CC 0.7A ± 0.07A, when 30V < Vbat < 42V.
Step 2 (Constant Voltage) Flashing Yellow	CV 29.4V ± 0.2V, until I charge < 100mA or max. 1h.	CV 33.6V ± 0.2V, until I charge < 100mA or max. 1h.	CV 42V ± 0.3V, until I charge < 100mA or max. 1h.
Charge timer (step2, CV)	1h	1h	1h
Safety timer (all steps) Red (5 blinks)	72h	72h	72h
Step 3 (Charge Completed) Green	0A	0A	0A
Restart voltage	28.7V	32.8V	41V
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 protection in battery pack.		
Indication when "Battery not connected"	Flashing Green (1s/1s)		
NTC input, on request (std is 10kohm, B-value approx. 4000)	0 – 45 °C: Normal charge. Battery temperature < 0 °C (too cold) or > 45°C (too hot): No charge, wait until temp. is OK.		
Ripple:	< 100mV p-p		
Efficiency (at 100% load) approx.:	85 %		
Switch frequency approx.:	35kHz		
Leakage current from battery with mains switched off:	< 300 µA at nominal battery voltage (< 0.22 Ah/month)		
Protection:	Protected against reversed polarity. Error Indication: Red (2 blinks) Short circuit proof. Error Indication: Red (3 blinks) Charging of wrong lower voltage battery pack will be limited to 100mA (75mA) and terminated after 10min. Indication: Red (4 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.		
Temperature range:	Operating: -25 to +40°C. Transport and short time storage: -25 to +85°C		
Safety:	Medical EN 60601-1 / Home Health care EN 60601-1-11/ Battery Charger EN 60335-2-29		
Insulation class :	Class II		
Insulation voltage: Primary – secondary:	4000VAC / 5700VDC		
EMC standards:	EN 55014-1 and -2, Emission EN 61000-6-3, Immunity EN 61000-6-1, EN 60601-1-2		
Input terminal:	2-pins IEC 320 connector, C8.		
Output terminals:	DC connector, Battery clips, Push-on terminals or open ends.		
IP-Grade:	4X		
Rec. battery capacity:	1Ah (1C) to 10Ah (<100mA charge current as EoC detection) or up to 40Ah (utilizing the 1h CV timer as EoC detection)	0.85Ah (1C) to 10Ah (<100mA charge current as EoC detection) or up to 34Ah (utilizing the 1h CV timer as EoC detection)	0.7Ah (1C) to 10Ah (<100mA charge current as EoC detection) or up to 28Ah (utilizing the 1h CV timer as EoC detection)
Dimensions:	123.5 × 49.5 × 37 mm		
Weight:	220g		

MASCOT type 3546 Li-Ion chargers:		14-cell Li-Ion	
Input voltage: / Line frequency			
Max output power		29.4W	
Charge control: Charge indication:			
Step 0 < 10min	Yellow	CC 60mA ± 15mA, when batt voltage < 42V.	
Step 0 > 10min	Red (4 blinks)	0A / 0V	
Step 1 (Constant Current)	Yellow	CC 0.5A ± 0.05A, when 42V < Vbat < 58.8V.	
Step 2 (Constant Voltage)	Flashing Yellow	CV 58.8V ± 0.5V, until I charge < 75mA or max. 1h.	
Charge timer (step2, CV)		1h	
Safety timer (all steps)	Red (5 blinks)	72h	
Step 3 (Charge Completed)	Green	0A	
Restart voltage		57.4V	
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 protection in battery pack.	
Indication when "Battery not connected"		Flashing Green (1s/1s)	
NTC input, on request (std is 10kohm, B-value approx. 4000)		0 – 45 °C: Normal charge. Battery temperature < 0 °C (too cold) or > 45°C (too hot): No charge, wait until temp. is OK.	
Ripple:		< 100mV p-p	
Efficiency (at 100% load) approx.:		85 %	
Switch frequency approx.:		35kHz	
Leakage current from battery with mains switched off:		< 300 µA at nominal battery voltage (< 0.22 Ah/month)	
Protection:		Protected against reversed polarity. Error Indication: Red (2 blinks) Short circuit proof. Error Indication: Red (3 blinks) Charging of wrong lower voltage battery pack will be limited to 100mA (75mA) and terminated after 10min. Indication: Red (4 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.	
Temperature range:		Operating: -25 to +40°C. Transport and short time storage: -25 to +85°C	
Safety:		Medical EN 60601-1 / Home Health care EN 60601-1-11/ Battery Charger EN 60335-2-29	
Insulation class :		Class II	
Insulation voltage: Primary – secondary:		4000VAC / 5700VDC	
EMC standards:		EN 55014-1 and -2, Emission EN 61000-6-3, Immunity EN 61000-6-1, EN 60601-1-2	
Input terminal:		2-pins IEC 320 connector, C8.	
Output terminals:		DC connector, Battery clips, Push-on terminals or open ends.	
IP-Grade:		4X	
Rec. battery capacity:		0.5 Ah (1C) to 7.5Ah (<75mA charge current as EoC detection) or up to 20Ah (utilizing the 1h CV timer as EoC detection)	
Dimensions:		123.5 × 49.5 × 37 mm	
Weight:		220g	



Charging characteristics and LED indication *



** an animated video of this charging progress is available on our website*

BATTERY NOT CONNECTED INDICATIONS

Battery not connected is indicated by FLASHING GREEN. In this mode charger will apply short pulses attempting to wake up deeply discharged batteries.

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.
- 5 red blinks: Safety timer has run out. Check battery status or capacity.
- LED off: Battery voltage is too high. Check battery voltage.

WAIT MODE INDICATIONS

Yellow with 1 red blink: Battery temperature is too low ($<0^{\circ}\text{C}$)
Yellow with 2 red blink: Battery temperature is too high ($>45^{\circ}\text{C}$)

EU 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-, 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-marked products produced from the date indicated below (for production date: see marking on the product)
Description:	Input: max. 0.35 A 100-240 VAC 50-60 Hz, Class II Output: max. 28 W (see product specific technical information) 1- to 16-cell for Lithium-Ion Batteries or 1- to 16-cell for LiFePO ₄ Batteries or 1-to 20-cell for Li-Titanate Batteries or 12V, 24V, 36V or 48V for Lead Acid Batteries or 2- to 20-cell for NiMH/NiCd Batteries.

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

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
(EU) 2017/745	EU Regulation - Medical Device Regulation (MDR), Risk Class I Device repealing Directive 93/42/EEC
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 following harmonised standards and technical specifications have been applied:

(International editions and comments indicated in brackets)

Electrical Safety (to LVD- Directive):

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) (OBS Expired from CE-marking!)	IT-equipment (ITE), Edition 2.2
EN 60335-1	EN 60335-1:2012 + /A1:2013 + /A2:2016 (IEC 60335-1:2010 + /A1:2013 + /A2:2016, Edition 5.2)	Household and similar appliances-General requirements, Edition 5.2
EN 60335-2-29	EN 60335-2-29:2021 (IEC 60335-2-29:2016, Edition 5.0)	Household and similar appliances-Requirements for battery chargers, Edition 5.0

Electrical Safety and Electromagnetic Compatibility (to MDR-Directive):

EN 60601-1	EN 60601-1:2006 + /AC:2010 + /A1:2013 + /A2:2021 (IEC 60601-1:2005 + /A1:2012 + /A2:2020)	Medical electrical equipment, Edition 3.2
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

EU Declaration of Conformity



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 55014-1:2017 (CISPR 14-1:2016, Edition 6.0)	Emission-household appliances, Edition 6.0
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 55032:2015 + /A1:2020 (CISPR 32:2015, Edition 2.0)	Emission-Multimedia Equipment, Edition 2.0

Ecodesign (to ERP-Directive):

Commission Regulation (EC) No 278/2009	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 (Note: not applicable to Battery Chargers, ref. Article 1.2 item c))
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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 the General Medical Devices Directive.

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

Mascot Electronics AS P.O.Box 177, N-1601 Fredrikstad, NORWAY	Mascot Baltic OÜ Taevakivi 15 EE-13619 Tallinn ESTONIA	Mascot Power Supplies (Ningbo) Co.,Ltd No.128 Jinchuan Road, Zhenhai Ningbo 315221 CHINA
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The production sites are certified to standard EN 29001:2015 (ISO 9001:2015):

Mascot Electronics AS: Kiwa Teknologisk Institutt certificate ref. 044	Mascot Baltic OÜ: Metrosert certificate ref. K-144	Mascot Power Supplies (Ningbo) Co.,Ltd: DNV-GL certificate ref. 179027-2015
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The most recent issue of this Declaration is available at www.mascot.com.

Fredrikstad, Norway

Place of issue

2023-08-24

Date of issue

Signed on behalf of Mascot Electronics AS

Fredrik Johansen, Compliance Manager

Name, function, signature