

## Model 2440 LA

4 A max out • 90-264 VAC input

- 3-step charge control with microprocessor
- Low current start up of deeply discharged batteries (step 0)
- Unaffected by fluctuations in mains voltage
- Protected against reverse polarity and short circuit proof
- Waterproof (IP67) version available
- Approvals:

- 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](#)



### Available versions

On request

6V / 4,0A

12V / 4,0A

24V / 2,5A

36V / 1,6A

48V / 1,3A

#### Notes:

Desktop, 2-pin IEC 60320 unit

Battery clips, push-on terminals or exch. DC plugs

Standard DC output cord (exch DC plugs): female conn. L 1,8m,

AWG 18, OD: 2,7 X 5,4 Black w. white line, UL 2468

Mounting bracket available

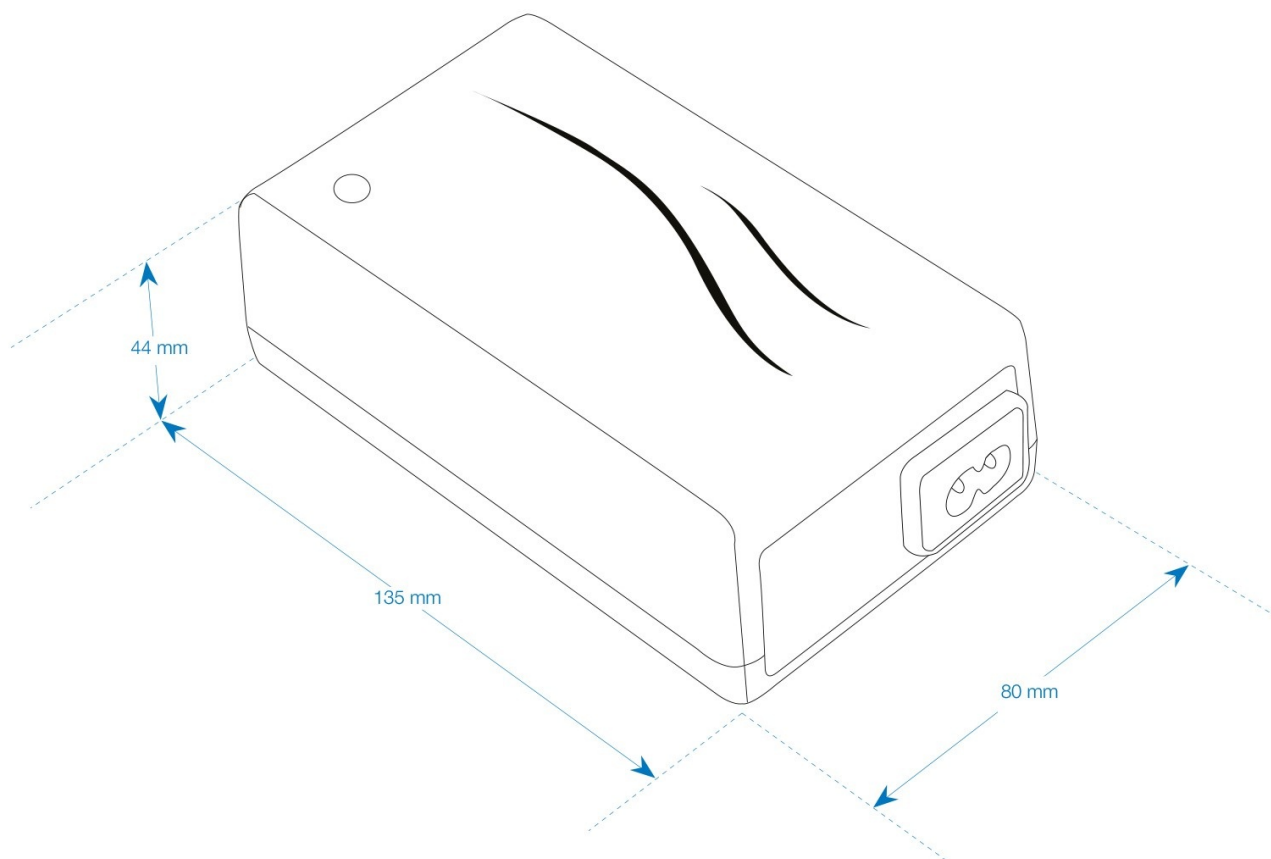
Order plugs and mains cord separately

IP67 version: Fixed cord, Wall mount

MASCOT type 2440 12V LA Charger:	2440 1250 00 w. female connector	2440 0120 00 w. battery clips
Input voltage: / Line frequency:	90 - 264VAC / 47 - 63Hz	
Max output power:	58W	
Charge control:		
Step 0 < 30min	1.2A ± 0.2A, when battery voltage < 10.5V	
Step 0 > 30min	< 0.2A	
Step 1 (until Vbat = 14.7V)	4.0A ± 0.2A, when battery voltage > 10.5V.	
Step 2 (until I charge < 1.2A or > 4h) Flashing Yellow	14.7V ± 0.1V and charge current is tapering.	
Step 3 (until I charge > 4.0A) Green	13.7V ± 0.2V, supply current up to maximum 4.0A for possible parallel load.	
Charge timer (step2):	4h	
Safety timer:	72h	
Restart charge current:	4.0A	
Formation Charge:	Low current start-up of deeply discharged battery.	
Float charge:	4.0A pulses at safe float voltage level for maximum topping of battery capacity.	
Indication when "Battery not connected"	Flashing Green (1s/1s)	
Temperature compensation of charge voltage:	-	-3 to -4mV/C pr. cell
Ripple:	< 100mV p-p	
Efficiency (at 100% load, 90V) approx.:	> 85 %	
Switch frequency approx.:	40kHz	
Leakage current from battery with mains switched off:	< 200 µA at 13V battery voltage (0.15Ah/month)	
Protection:	Protected against reversed polarity and short circuit proof. Safety timer. Charging of wrong lower voltage battery pack (e.g. 6V) will be limited to 1.2A and terminated after 30min.	
Temperature range:	Operating: +25 to +40°C. Storage: +25 to +85°C	
Safety:	Medical EN 60601-1 / Home Healthcare 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	
Output terminals:	Battery clips, Push-on terminals or DC connector	
IP-Grade:	41	
Rec. battery capacity:	20 - 200Ah	
Dimensions:	135 x 80 x 44 mm	
Weight:	390g	610g

MASCOT type 2440 24V LA Charger:		2440 2450 00 w. female connector	2440 0240 00 w. battery clips
Input voltage: / Line frequency:		90 - 264VAC / 47 - 63Hz	
Max output power:		74W	
Charge control:	Charge indication:	0.6A ± 0.2A, when battery voltage < 21V < 0.2A 2.5A - 0.2A + 0.05A, when battery voltage > 21V. 29.4V ± 0.1V and charge current is tapering. 27.4V ± 0.2V, supply current up to maximum 2.5A for possible parallel load. 4h 72h 2.5A	
Step 0 < 30min	Yellow		
Step 0 > 30min	Red (Error-mode)		
Step 1 (until Vbat = 29.4V)	Yellow		
Step 2 (until I charge < 0.6A or > 4h)	Flashing Yellow		
Step 3 (until I charge > 2.5A)	Green		
Charge timer (step2):			
Safety timer:			
Restart charge current:			
Formation Charge:		Low current start-up of deeply discharged battery.	
Float charge:		2.5A pulses at safe float voltage level for maximum topping of battery capacity.	
Indication when "Battery not connected"		Flashing Green (1s/1s)	
Temperature compensation of charge voltage:		-	-3 to -4mV/°C pr. cell
Ripple:		< 100mV p-p	
Efficiency (at 100% load, 90V) approx.:		> 83%	
Switch frequency approx.:		40kHz	
Leakage current from battery with mains switched off:		< 200 µA at 26V battery voltage (0.15Ah/month)	
Protection:		Protected against reversed polarity and short circuit proof. Safety timer. Charging of wrong lower voltage battery pack (e.g. 12V) will be limited to 0.6A and terminated after 30min.	
Temperature range:		Operating: +25 to +40°C. Storage: +25 to +85°C	
Safety:		Medical EN 60601-1 / Home Healthcare 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	
Output terminals:		Battery clips, Push-on terminals or DC connector	
IP-Grade:		41	
Rec. battery capacity:		12 - 125Ah	
Dimensions:		135 × 80 × 44 mm	
Weight:		390g	610g

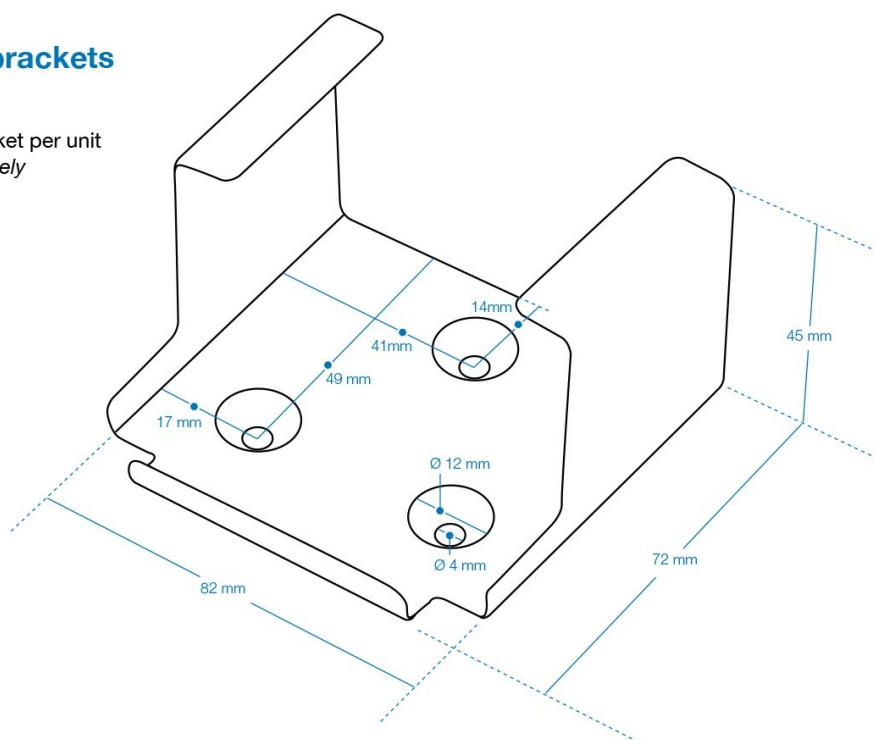
MASCOT type 2440 Lead Acid Charger:		2440 4850 00 w. female connector	2440 0480 00 w. battery clips
Input voltage: / Line frequency:		90 - 264VAC / 47 - 63Hz	
Max output power:		76.5W	
Charge control: Step 0 < 30min Step 0 > 30min Step 1 (until Vbat = 58.8V) Step 2 (until I charge < 0.3A or > 4h) Step 3 (until I charge > 1.3A) Charge timer (step2): Safety timer: Restart charge current:	Charge indication: Yellow Red (Error-mode) Yellow Flashing Yellow Green	0.3A ± 0.1A, when battery voltage < 42.0V < 0.2A 1.3A ± 0.1A, when battery voltage > 42.0V. 58.8V ± 0.2V and charge current is tapering. 54.8V ± 0.2V, supply current up to maximum 1.3A for possible parallel load. 4h 72h 1.3A	
Formation Charge:		Low current start-up of deeply discharged battery.	
Float charge:		1.3A pulses at safe float voltage level for maximum topping of battery capacity.	
Indication when "Battery not connected"		Flashing Green (1s/1s)	
Temperature compensation of charge voltage:		-	-3 to -4mV/°C pr. cell
Ripple:		< 100mV p-p	
Efficiency (at 100% load, 90V) approx.:		> 85%	
Switch frequency approx.:		40kHz	
Leakage current from battery with mains switched off:		< 200 µA at 52V battery voltage (0.15Ah/month)	
Protection:		Protected against reversed polarity and short circuit proof. Safety timer. Charging of wrong lower voltage battery pack (e.g. 6V) will be limited to 0.3A and terminated after 30min.	
Temperature range:		Operating: +25 to +40°C. Storage: +25 to +85°C	
Safety:		Medical EN 60601-1 / Home Healthcare 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	
Output terminals:		Battery clips, Push-on terminals or DC connector	
IP-Grade:		41	
Rec. battery capacity:		7 - 70Ah	
Dimensions:		135 x 80 x 44 mm	
Weight:		390g	610g



## Mounting brackets

### TYPE 201970

1 mounting bracket per unit  
*Available separately*



Charging method A

STEP 1 - BOOST CHARGE

To start a charge cycle, connect the charger to the mains.  
The charger is in constant current mode, charging with the maximum current indicated on the charger, the LED-indication on the charger is ORANGE. This step allows rapid charging of your battery until the battery reaches typically 80 - 95% of its capacity.



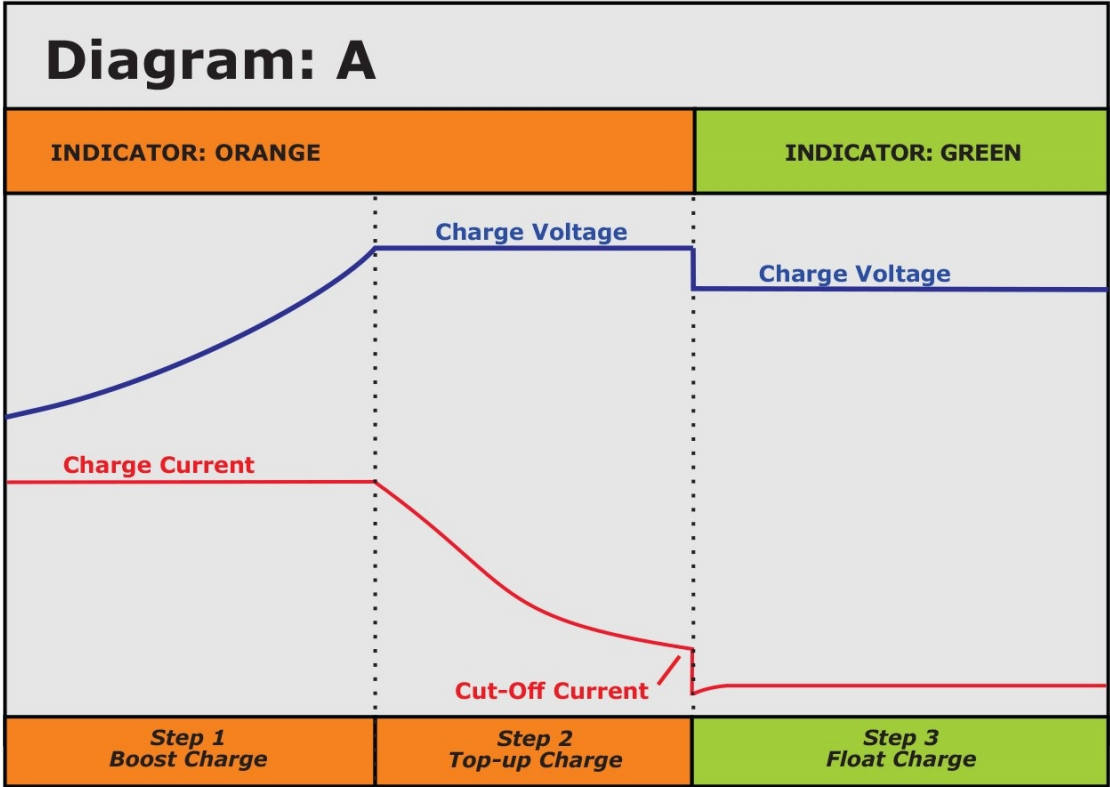
STEP 2 – TOP-UP CHARGE

The charger is in constant voltage mode, charging with a decreasing current until the current is below the charger's charge termination level (indicated on the charger).  
The LED-indication on the charger is ORANGE. 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 standby mode. The charge voltage is at standby level and the charger may remain connected to the battery.  
The charger will return to boost charging if the battery is used.  
A load larger than the cut-off current will initiate a new charge cycle.



# 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-, LiFePO <sub>4</sub> - or Lead-Acid Batteries		
Brand(s):	and/or <b>MASCOT</b> (may also carry additional customer name, logo or trade mark)		
Type(s)/Model(s)/	2440 (may also carry additional customer model name)		
UDI-DI:	(model 2440 apply 2MOOP protection to IEC 60601-1, model 2440P apply 2MOPP)		
Batch / Serial No./	all CE- and/or UKCA- marked products produced from the date indicated below		
UDI-PI:	(for production date: see marking on the product)		
Description:	<p><b>Input:</b> max.1.6A 100-240VAC 50-60Hz, Class I or II</p> <p><b>Output:</b> for Lead-Acid Batteries 6V to 48V: 4.5A - 1.0A</p> <p>for Li-Ion Batteries 1 to 16 cell: 4.5A - 1.0A</p> <p>for LiFePO<sub>4</sub> Batteries 1 to 16 cell: 4.5A - 1.2A</p> <p><b>Power Supply Unit with fixed output within range 4 - 67VDC:</b> 4.5A - 1.1A</p> <p><b>NOTES:</b></p> <ul style="list-style-type: none"> <li>- Versions with output voltage &gt;42.4VDC are not within the scope of standard EN 60335-2-29 Cl.10.101.</li> <li>- For compliance with EN 60601-1 output terminals &gt;60VDC must be inaccessible to the operator.</li> <li>- For EN 60950-1 output voltages &gt;60VDC are regarded ELV and may not be accessible/interconnected.</li> <li>- Versions with output voltage &gt;42.4 VDC are not within the scope of standard EN 60335-2-29 Ed.4 (ref. Cl.10.101).</li> </ul>		

## 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
(EU) 2017/745	EU Regulation - Medical Devices Regulation (MDR), Risk Class I Device amending Directive 2001/83/EC, Regulations (EC) 178/2002 & (EC) 1223/2009 and repealing Directives 90/385/EEC & 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 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.
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

## 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
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# 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 Device Regulation (MDR) 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: Metroser, 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](http://www.mascot.com).

Fredrikstad, Norway

Place of issue

2021-08-16

Date of issue

Signed on behalf of Mascot Electronics AS

  
Finn-Erik Wailin, Compliance Manager  
Name, function, signature