

## Model 2116 NiMH

16 W max out • 90-264 VAC input

- Universal input voltage (90-264 VAC)
- Approvals:

Medically certified EN60601 3ed

- Computer Programmable Microprocessor (CPM)

CPM offers the following charge detection options (one or more):

dV, dT/dt, 0 dV, Timer, Safety timer, dV threshold,  
Temperature gradient adjustment

[Link to CPM spec sheet](#)

- 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

2 cells / 1,3A

3-6 cells / 1,3A

4-8 cells / 1A

5-10 cells / 0,8A

6-12 cells / 0,7A

10-20 cells / 0,4A

#### Notes:

Plug-in/Desktop unit

Exchangeable AC and DC plugs available

Standard DC output cord (exch. DC plugs):

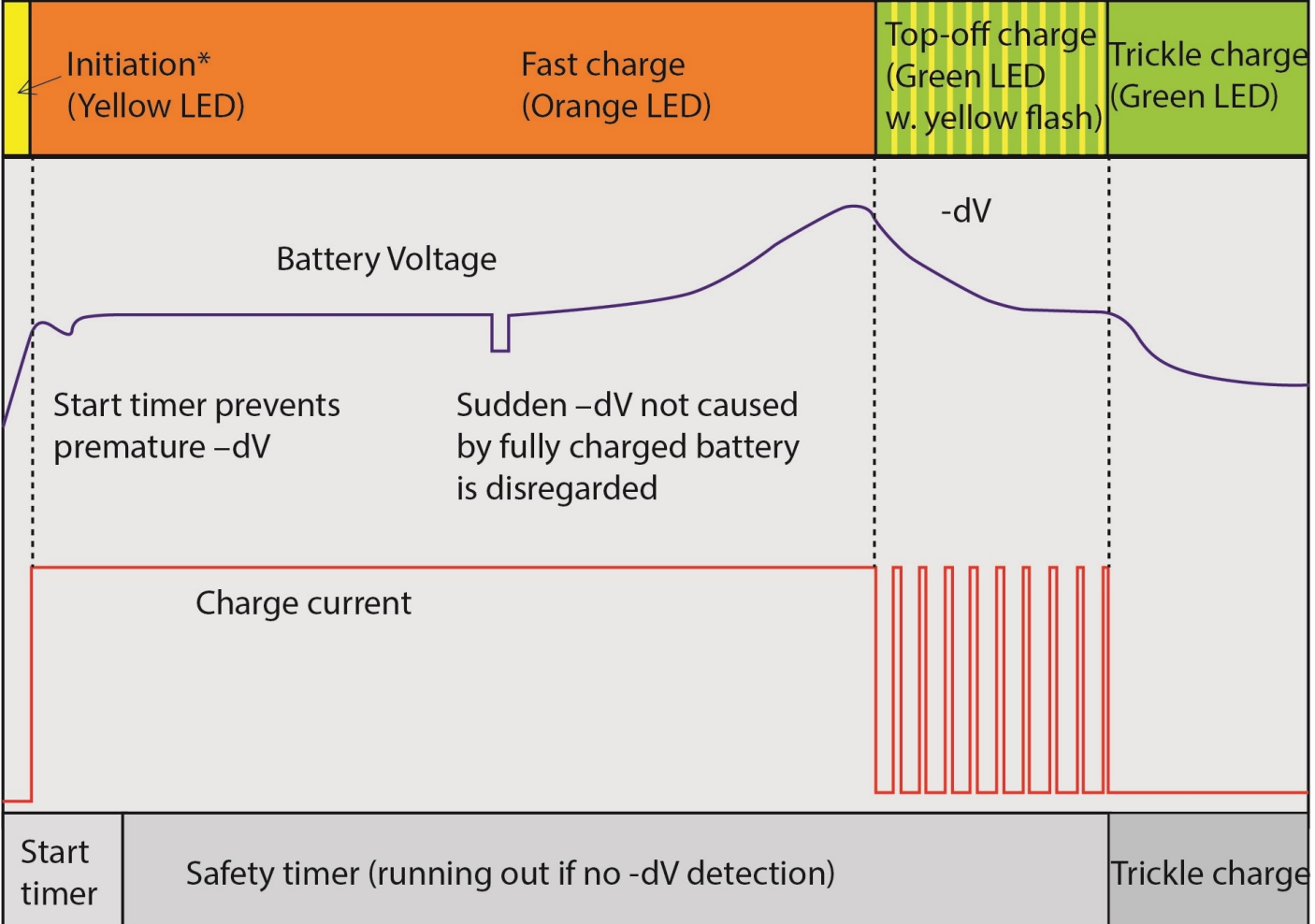
Female conn. L 1.8m, AWG 20, UL 2468

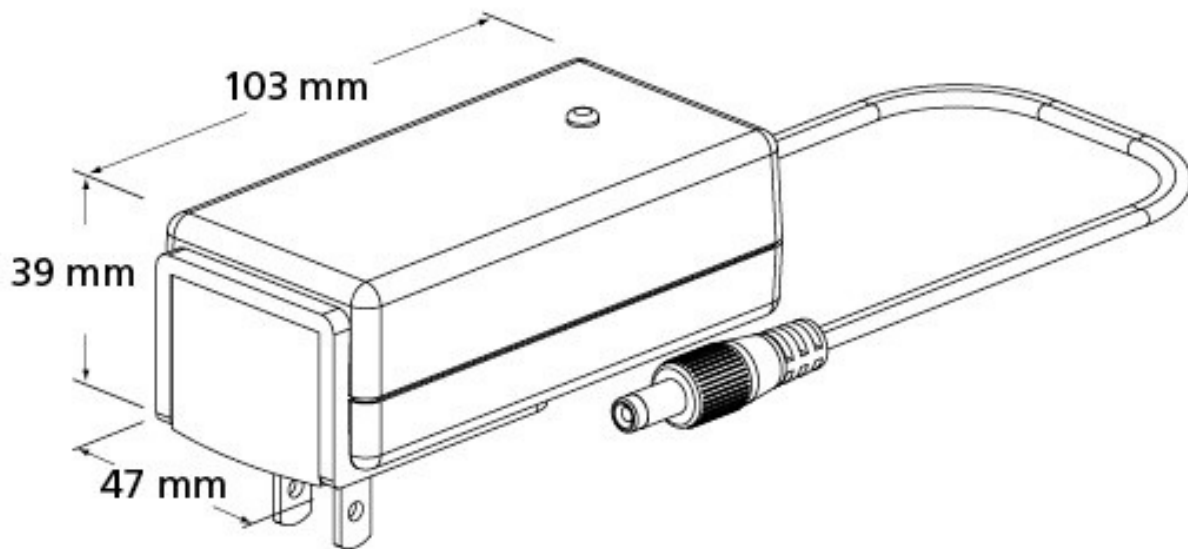
Mounting bracket available

Order plugs and mains cord separately

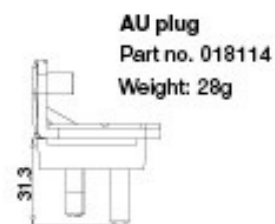
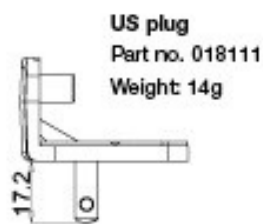
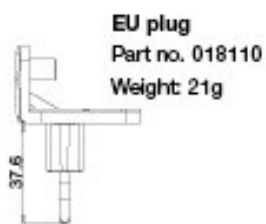
SPECIFICATIONS FOR Mascot TYPE 2115/2116:	2 cells	3-6 cells	4-8 cells	5-10 cells	6-12 cells	10-20 cells
Input voltage	90-265VAC, 50-60Hz	90-265VAC, 50-60Hz	90-265VAC, 50-60Hz	90-265VAC, 50-60Hz	90-265VAC, 50-60Hz	90-265VAC, 50-60Hz
No-load voltage	6.3V ± 0.7V	12.8V ± 0.7V	16.5V ± 1V	21V ± 1.2V	24.7V ± 1.5V	41V ± 2V
Max. output power	8.2W	16W	16W	16W	16W	16W
Min. output voltage for -ΔV detection	2.5V (min 2 cells x min 1.25V pr. cell)	3.7V (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)	12.5V (min 20 cells x min 1.25V pr. cell)
Max. outputvoltage for -ΔV detection	5.4V (max 2 cells x max 1.8V pr. cell)	10.8V (max 6 cells x max 1.8V pr. cell)	14.4V (max 8 cells x max 1.8V pr. cell)	18V (max 10 cells x max 1.8V pr. cell)	21.6V (max 12 cells x max 1.8V pr. cell)	36V (max 20 cells x max 1.8V pr. cell)
-ΔV sensitivity mV/cell or percent	10mV/0.6% at 2 cells.	12mV/0.7% at 3 cells. 10mV/0.6% at 6 cells.	8mV / 0.5% for 4-8 cells	8mV / 0.5% for 5-10 cells	8mV / 0.5% for 6-12 cells	8mV / 0.5% for 10-20 cells
Fast charge current	1.3A ± 100mA	1.3A ± 100mA	1.0A ± 100mA	0.8A ± 100mA	0.7A ± 100mA	400mA ± 50mA
Top off charge	160mA ± 30mA (duration 1h after -dV detection)	160mA ± 30mA (duration 1h after -dV detection)	130mA ± 30mA (duration 1h after -dV detection)	110mA ± 30mA (duration 1h after -dV detection)	100mA ± 30mA (duration 1h after -dV detection)	65mA ± 20mA (duration 1h after -dV detection)
Trickle charge current	30mA ± 15mA (continously)	30mA ± 15mA (continously)	30mA ± 15mA (continously)	30mA ± 15mA (continously)	30mA ± 15mA (continously)	25mA ± 10mA (continously)
Leakage current from battery with mains switch off	< 1mA	< 1mA	< 1mA	< 1mA	< 1mA	< 1mA
Start timer	3 min, no -ΔV de-tection in this period	3 min, no -ΔV de-tection in this period	3 min, no -ΔV de-tection in this period	3 min, no -ΔV de-tection in this period	3 min, no -ΔV de-tection in this period	3 min, no -ΔV de-tection in this period
Top-off timer	1 hour	1 hour	1 hour	1 hour	1 hour	1 hour
Safety timer	2 hours	2 hours	2 hours	2 hours	2 hours	2 hours
The charger switch to trickle charge if no -ΔV is detected before the safety timer has run out.						

<b>SPECIFICATIONS FOR Mascot TYPE 2115/2116 NiMH:</b>	<b>2 cells</b>	<b>3-6 cells</b>	<b>4-8 cells</b>	<b>5-10 cells</b>	<b>6-12 cells</b>	<b>10-20 cells</b>
Switch frequency	40kHz.					
Temperature range	-20 to +40oC (these values are only for the charger, not for the batteries).					
Charge control	-ΔV principle. Fast charging stops when the voltage has dropped 0.5% 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.					
Battery analyzing	Max. 20 sec after mains connection / battery connection (yellow LED).					
Efficiency	Appr. 80%.					
Fuses	Fusible resistor at input. Polyswitch fuse at the output protects the unit against wrong polarity.					
Insulation class	Class II.					
Electrical safety	EN 60601-1, EN 60950, EN 60335-2-29, UL 60601-1.					
EMC-standards	EN 61000-6-3, EN 61000-6-1, EN 60601-1-2.					
Insulation voltage (prim-sec)	4000V AC / 5700V DC.					
Mains connection	2-pins IEC 320 mains connector. 2116: for changeable mains plug (EU, US and UK).					
Output terminals	Secondary cable with exchangeable plugs.					
LED-indication	Initialization/no batt.: Yellow Fast charge: Orange Top off charge: Green with short yellow flashes Trickle charge: Green Battery voltage low: Red-Green flashing (error mode)					
Resetting	A new charging cycle starts by reconnecting a battery at the output, or by disconnecting and connecting the mains voltage.					
IP-grade	IP4X.					
Dimensions	90 x 45 x 32mm (2116: 103.5 x 46.8 x 38.7mm)					
Weight	125g (2116: 150g)					
Other	Possible options on request: +dT/dt, 0dV and timer charge. The charger may be both software and hardware programmable.					





## EXCHANGEABLE AC PLUG ADAPTERS



**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																								
<b>declare that this Declaration is issued under our sole responsibility and belongs to the following product(s):</b>																											
Product and intended purpose:	Battery Charger for NiCd/NiMH Batteries																										
Brand(s):	and/or <b>MASCOT</b> (may also carry additional customer name, logo or trade mark)																										
Type(s)/Model(s)/UDI-DI:	2115 and 2116 (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:	<b>Input: 0.35A 100-240VAC 50-60 Hz, Class II</b> <b>Output:</b> <table border="0" style="width: 100%;"> <tr> <td>2 cell version:</td> <td>2.5 - 5.4 VDC,</td> <td>max. 1.3 A</td> <td>(6.3 VDC at no load)</td> </tr> <tr> <td>3 - 6 cells version:</td> <td>3.7 - 10.8 VDC</td> <td>max. 1.3 A</td> <td>(12.8 VDC at no load)</td> </tr> <tr> <td>4 - 8 cells version:</td> <td>5.0 - 14.4 VDC</td> <td>max. 1.0 A</td> <td>(16.5 VDC at no load)</td> </tr> <tr> <td>5 - 10 cells version:</td> <td>6.2 - 18.0 VDC</td> <td>max. 0.8 A</td> <td>(21 VDC at no load)</td> </tr> <tr> <td>6 - 12 cells version:</td> <td>7.5 - 21.6 VDC</td> <td>max. 0.7 A</td> <td>(24.7 VDC at no load)</td> </tr> <tr> <td>10 - 20 cells version:</td> <td>12.5 - 36.0 VDC</td> <td>max. 0.4 A</td> <td>(41 VDC at no load)</td> </tr> </table>			2 cell version:	2.5 - 5.4 VDC,	max. 1.3 A	(6.3 VDC at no load)	3 - 6 cells version:	3.7 - 10.8 VDC	max. 1.3 A	(12.8 VDC at no load)	4 - 8 cells version:	5.0 - 14.4 VDC	max. 1.0 A	(16.5 VDC at no load)	5 - 10 cells version:	6.2 - 18.0 VDC	max. 0.8 A	(21 VDC at no load)	6 - 12 cells version:	7.5 - 21.6 VDC	max. 0.7 A	(24.7 VDC at no load)	10 - 20 cells version:	12.5 - 36.0 VDC	max. 0.4 A	(41 VDC at no load)
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**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) <small>recast, repealing Directives 2006/95/EC &amp; 73/23/EEC</small>
2014/30/EU	EU Directive - Electromagnetic Compatibility (EMC) <small>recast, repealing Directives 2004/108/EC &amp; 89/336/EEC</small>
93/42/EEC	EU Directive - General Medical Devices (MDD), Risk Class I Device <small>will from 26.05.2021 be repealed by "MDR" Regulation (EU) 2017/745</small>
2009/125/EC	EU Directive - Energy Related Products, Ecodesign (ERP) <small>recast, repealing Directive 2005/32/EC (EUP)</small>
2015/863/EU	EU Directive - Restriction on use of Hazardous Substances in EEE ("RoHS3") <small>recast, repealing Directives 2002/95/EC, 2008/35/EC &amp; 2011/65/EU</small>

**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 <small>Draft Regulation, awaiting implementation</small>
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 EU LVD- & MDD-Directives and UK Electrical Equipment Regulations 2016):**

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 EU EMC-Directive & UK Electromagnetic Compatibility Regulations 2016):**

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 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

Type 2115 may be delivered with 2-pins IEC 60320 inlet for detachable mains cord or with non-detachable mains cord) and may also be delivered as protected against ingress of objects and water according to IP67 to standard EN/IEC 60529 (fitted with non-detachable mains cord and filled with PUR compound)

Type 2116 is for Direct Plug-In (when used with exchangeable mains plug-adapters) and for detachable mains cord.

The most recent issue of this Declaration is available at [www.mascot.com](http://www.mascot.com).

**Fredrikstad, Norway**

Place of issue

**2021-03-17**

Date of issue

Signed on behalf of Mascot Electronics AS  
  
**Finn-Erik Wailin, Compliance Manager**

Name, function, signature