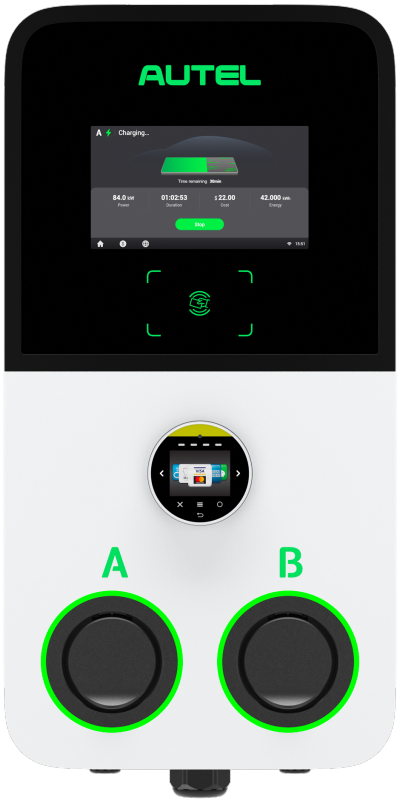
epd-norway
Global Program Operator

Environmental Product Declaration

In accordance with ISO14025:2006 and EN50693

AUTEL MaxiCharger AC Ultra



Owner of the declaration:
Autel Digital Power Co., Ltd.

Product name:
MaxiCharger AC Ultra

Declared unit:
1 pcs (14.8 kg)

Product category /PCR:
[PCR EPDItaly017 – Charging Stations]

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-8693-8341-EN

Registration number:
NEPD-8693-8341-EN

Issue date:

13.01.2025

Valid to:

13.01.2030

The Norwegian
EPD Foundation

General information

Product:
MaxiCharger AC Ultra

This EPD follows additional requirements for construction products considered as Electronic or Electric Equipment.

Program operator:
The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Tlf: +47 23 08 80 00
e-mail: post@epd-norge.no

Declaration number:
NEPD-8693-8341-EN

This declaration is based on Product Category Rules:
PCR EPDItaly017 – Charging Stations

Statement of liability:
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit:
1 pcs MaxiCharger AC Ultra (14.8 kg)

Verification:
Independent verification of the declaration and data, according to ISO14025:2010

internal ☐ external ☑

Lucas Pedro Berman

Independent verifier approved by EPD Norway

Owner of the declaration:
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Contact person: Zhifang Yang
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e-mail: yangzhifang@autel.com

Manufacturer:
Autel Digital Power Co., Ltd. Guangming Branch Rooms 101 and 501, Building 2, Huaxing Optoelectronics Industrial Park, Dongkeng Community, Fenghuang Street, Guangming District, Shenzhen City, Guangdong Province, China

Place of production:
Shenzhen, P.R. China

Management system:
ISO 9001, ISO 14001, ISO 45001

Organisation no:
914403000789968219

Issue date:
13.01.2025

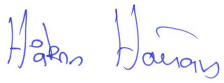
Valid to:
13.01.2030

Year of study:
2023.08-2024.07

Comparability:
EPD of construction products may not be able to compare if they do not comply with EN 15804 and are seen in a building context.

The EPD has been worked out by:
TÜV NORD (Hangzhou) Co., Ltd.

Approved



Manager of EPD Norway

Product

Product description:

Autel's EV charging station is a state-of-the-art solution designed to provide fast, reliable, and eco-friendly charging for electric vehicles. Compatible with all major EV models, it features high-speed charging capabilities, intelligent connectivity for real-time monitoring and remote management, and a durable, weather-resistant design suitable for various environments. Prioritizing user safety, the station incorporates advanced protection against overcurrent, overvoltage, and short circuits. Its energy-efficient design reflects Autel's commitment to sustainability, optimizing energy usage while minimizing environmental impact. Ideal for residential, commercial, and public charging applications, Autel's EV chargers deliver convenience and performance, making them a valuable addition to workplaces, retail spaces, hospitality venues, and homes. With a legacy of innovation and quality, Autel's charging stations are at the forefront of the electric mobility revolution. The MaxiCharger AC Ultra is ideal for businesses looking to provide premium EV charging solutions. Featuring a liquid crystal display (LCD) touchscreen, open charge point protocol (OCPP) compliance, and customization options, it enables revenue generation through Autel's cloud portal, offering flexible pricing, discounts, and advertising opportunities for fleets, schools, apartments, and more.

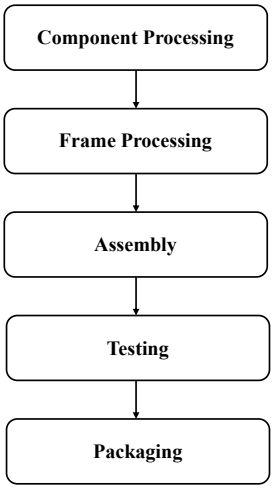
Product specification:

Materials compositions and technical data for the declared product are shown below.

Materials classes	IEC62474 Code	MaxiCharger AC Ultra
Aluminium and its alloys	M-120	0.1%
Other ferrous alloys, non-stainless steels	M-119	24.8%
Copper and its alloys	M-121	6.3%
Plastics and rubber (PC, PA, PE, PET, PVC, PU, Rubber)	M-204, M-208, M-201, M-209, M-200, M-300, M-323	32.8%
Silicone	M-321	6.1%
Glass	M-161	5.4%
Electronics	N/A	12.2%
PCBA	N/A	9.7%
Other inorganic materials	M-199	2.6%

The substances of REACH candidate list Very High Concern concentration are less than 0.1%.

Description of production processes:



Step 1: Component Processing

Component Processing involves the systematic installation of core electrical elements including A and B meters with associated terminal wiring. This stage includes mounting circuit breakers, current transformers, and completing all necessary electrical connections. The process concludes with surface finishing, application of protective films, and installation of support brackets and cooling systems, all subject to rigorous IPQC quality control standards.

Step 2: Frame Pre-processing

Frame Pre-processing focuses on the integration of electronic interfaces and communication systems. This stage begins with display screen installation and testing, followed by precise mounting of light boards and adhesive application. It continues with the systematic installation of AD boards, GPS/4G antennas, NFC components, and WIFI systems. The process includes comprehensive cable routing, terminal connections, and concludes with thorough display testing and quality verification.

Step 3: Assembly

Assembly represents the core construction phase where waterproof elements and major components come together. This stage encompasses the installation of waterproof sockets, seals, and gaskets, followed by heat sink mounting and circuit board integration. It includes the precise installation of fan brackets, power supply units, and control systems, concluding with lock mechanism installation and comprehensive quality inspection.

Step 4: Testing

Testing comprises multiple verification stages to ensure product reliability and functionality. The process begins with initial labeling and marking, followed by product hardening tests and safety regulation compliance checks. It includes multiple rounds of aging tests, wireless communication verification, and lock mechanism testing. Each testing phase must meet strict quality standards before proceeding to the next stage.

Step 5: Packaging

Packaging represents the final stage where the product is prepared for distribution. This process includes accessory preparation, installation of terminal covers, application of PC sheets and edge

frames, and final labeling. The stage concludes with comprehensive inspection, careful boxing with included accessories, weight verification, and final OQC inspection before warehouse storage.

Technical data:

Series (brand name)	MaxiCharger AC Ultra
Product weight	14.8 kg
Output power	up to 2*22kW
Output current	32A
Nominal voltage	400V±15%
Type of operational conditions	Multiphase
Dimensions (H×W×D)	625×320×170 mm
Operating temperature range	-30℃ ~ +50℃

Geographical area:

The products are produced and manufactured in China, and the downstream distribution, use, and end-of-life incorporate a market scenario in Europe.

Reference service life, product:

20 years

Type of EPD

This declaration is a specific EPD.

LCA: Calculation rules

Declared unit:

The declared unit defined in this report is a single charging station (14.8kg), with activities needed for a reference service of life (RSL) of 20 years. It is considered to be installed and operated in Europe in this study, but it can also be installed and operated worldwide.

Cut-off criteria:

This study adheres to the cut-off rules (<2%) specified in the PCR. All available energy and material flow data within the system boundary have been included in the model. In cases where matching life cycle inventories were unavailable for specific flows, proxy data were applied based on conservative assumptions regarding environmental impacts. Material and energy flows associated with the installation and dismantling stages are assumed to be carried out manually, with no associated inputs or outputs. Additionally, what defined in 4.2.3.3 of EN50693 applies.

Allocation:

The allocation is made in accordance with the provisions of EN 50693 and PCR. Allocation refers to the partitioning of input or output flows of a process or a product system between the product systems under study and one or more other product systems.

Data quality:

Primary data (such as materials or energy flows that enter and leave the production system) is from Autel manufacturing facilities for the period spanning from Aug. 2023 to Jul. 2024 (annual average). Generic data related to the life cycle impacts of the material or energy flows that enter and leave the production system is sourced from Ecoinvent 3.10 "allocation, cut-off by classification - unit" database.

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Manufacturing stage			Distribution stage	Installation stage	Use and Maintenance stage							End of life stage			
Upstream module		Core module	Downstream module												
Raw materials	Transport	Manufacturing	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

System boundary:

The system boundary for this LCA study of charging station encompasses manufacturing stage, distribution stage, installation stage, use stage, and end-of-life stage, from cradle to grave.

LCA: Scenarios and additional technical information

The following information describes the scenarios in the different modules of the EPD.

Transport from production place to assembly/user (A4)

Transport from production place to assembly/user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy consumption	Unit	Value
Truck (Within China)	36.7	1000	Diesel	kg/tkm	0.0366
Ship (to Europe)	70	18000	Heavy fuel oil	kg/tkm	0.0025
Truck (Within Europe)	36.7	300	Diesel	kg/tkm	0.0366

Assembly (A5)

	Unit	Value
Water consumption	m^3/DU	-
Electricity consumption	kWh/DU	-
Other energy carriers	MJ/DU	-
Material loss	kg/DU	-
Output materials from waste treatment	kg/DU	0.675

In the installation stage, the energy use is negligible since the installation process is mainly done manually. According to the product category rules (PCR), only waste generation and treatment of packaging materials are considered in this stage. The treatment of the waste wood pallets is modeled as 75% recycling and 25% incineration. Other packaging materials, including paper and plastic film, are modeled as 100% incineration.

Use (B1)

There are no material or energy inputs, nor emissions during the use phase (B1).

Maintenance (B2)/Repair (B3)

No maintenance and repair are required during the service life of the product.

Replacement (B4)/Refurbishment (B5)

It is assumed that the charging station itself does not require replacement and refurbishment during its RSL.

Operational energy (B6) and water consumption (B7)

The following formula is to be used to calculate the electricity consumed during the product's service life:

$$E_{use} = \frac{P_{use} \times 8760 \times RSL}{1000}$$

Where P_{use} is the power consumed by the charging station, RSL is the service life of the product, assumed to be 20 years; 8760 is the number of hours in a year; 1000 is the conversion factor that allows the energy consumed in kWh over the product's service life to be expressed.

Product	Operating hours per day (h)	Power consumed by the charging station (P_{use}, W)	Electricity consumption (kWh)
MaxiCharger AC Ultra	24	18.1	3171.1

End of Life (C1, C3, C4)

Categories	Unit	MaxiCharger AC Ultra
Hazardous waste disposed	kg/DU	-
Collected as mixed construction waste	kg/DU	14.8
Reuse	kg/DU	-
Recycling	kg/DU	9.76
Energy recovery	kg/DU	3.08
To landfill	kg/DU	1.96

Assumptions are made for C1, C3 and C4 stage. Decommissioning stage (C1) of charging stations is assumed to be taken manually. For waste processing (C3), charging station is shredded and post-processed. The charging station disposal and recycling stage involves removing valuable materials, metal scraps. The most recyclable materials constitute the metal components, printed circuit boards (PCBs) and cables. In this study, 90% of metals (steel, aluminium, copper) can be recycled and 10% will be disposed by landfill. 60% of plastics can be recycled and 40% will be disposed with incineration. 65% of electronic components (PCBA and electronic devices) can be recycled and the rest of 35% will be disposed with incineration.

Transport to waste processing (C2)

Transport from installation place to waste treatment (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy consumption	Unit	Value
Truck	36.7	100	Diesel	kg/tkm	0.036

100km transportation distance from the installation site to waste treatment site (C2) is assumed according to PCR.

LCA: Results

The LCA results show the environmental impacts and resource input and output flows calculated according to EN 15804:2012+A2. The results are shown per declared unit (1 single unit of charging station). The LCA results have been calculated using the LCA software SimaPro 9.6.

Core environmental impact indicators

Indicator	Unit	Upstream	Core	Downstream			
		Manufacturing		Distribution	Installation	Use & Maintenance	End-of-life
GWP - total	kg CO2 eq	2.79E+02	4.94E+00	8.15E+00	6.93E+00	1.98E+03	1.08E+01
GWP - fossil	kg CO2 eq	2.79E+02	9.51E+00	8.14E+00	2.35E+00	1.98E+03	1.08E+01
GWP - biogenic	kg CO2 eq	0.00E+00	-4.58E+00	0.00E+00	4.58E+00	0.00E+00	0.00E+00
GWP - luluc	kg CO2 eq	3.23E-01	1.56E-02	3.63E-03	3.01E-05	2.31E-01	1.35E-03
ODP	kg CFC11 eq	8.99E-06	3.52E-07	1.25E-07	1.66E-09	2.14E-05	2.90E-08
AP	molc H+ eq	4.78E+00	4.48E-02	1.14E-01	1.03E-03	7.27E+00	1.23E-02
EP- freshwater	kg P eq	4.00E-02	9.55E-04	5.51E-05	1.33E-06	7.55E-02	1.02E-04
EP -marine	kg N eq	4.14E-01	1.73E-02	2.88E-02	4.67E-04	1.30E+00	2.91E-03
EP - terrestrial	molc N eq	5.09E+00	1.01E-01	3.20E-01	4.83E-03	1.49E+01	3.21E-02
POCP	kg NMVOC eq	1.69E+00	3.59E-02	9.43E-02	1.22E-03	4.36E+00	9.35E-03
ADP-M&M[2]	kg Sb-Eq	2.00E+03	4.73E+01	8.14E+00	2.05E-01	1.78E+04	2.19E+01
ADP-fossil[2]	MJ	6.93E-02	3.35E-05	1.86E-05	2.27E-07	1.39E-02	1.01E-05
WDP[2]	m3	8.85E+01	3.89E+00	3.90E-01	1.33E-01	2.53E+02	3.03E-01

GWP-total: *Global Warming Potential;* ***GWP-fossil:*** *Global Warming Potential fossil fuels;* ***GWP-biogenic:*** *Global Warming Potential biogenic;* ***GWP-LULUC:*** *Global Warming Potential land use and land use change;* ***ODP:*** *Depletion potential of the stratospheric ozone layer;* ***AP:*** *Acidification potential, Accumulated Exceedance;* ***EP-freshwater:*** *Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional Norwegian requirements" for indicator given as PO4 eq.* ***EP-marine:*** *Eutrophication potential, fraction of nutrients reaching freshwater end compartment;* ***EP-terrestrial:*** *Eutrophication potential, Accumulated Exceedance;* ***POCP****: Formation potential of tropospheric ozone;* ***ADP-M&M****: Abiotic depletion potential for non-fossil resources (minerals and metals);* ***ADP-fossil:*** *Abiotic depletion potential for fossil resources;* ***WDP:*** *Water deprivation potential, deprivation weighted water consumption*

Reading example: 9.0 E-03 = $9.0*10^{-3}$ = 0.009

Additional environmental impact indicators

Indicator	Unit	Upstream	Core	Downstream			
		Manufacturing		Distribution	Installation	Use & Maintenance	End-of-life
PM	Disease incidence	1.96E-05	6.52E-07	4.56E-07	7.03E-09	6.03E-05	1.18E-07
IRP[1]	kBq U235 eq.	1.01E+01	1.59E-01	3.10E-02	6.21E-04	8.82E+01	1.12E-01
ETP-fw[2]	CTUe	7.72E+03	7.35E+01	2.49E+01	7.71E+00	4.04E+04	8.12E+01
HTP-c[2]	CTUh	2.24E-06	1.14E-07	4.11E-08	1.20E-09	1.10E-04	9.68E-08
HTP-nc[2]	CTUh	1.02E-05	1.18E-07	5.15E-08	1.28E-08	1.85E-05	1.40E-07
SQP[2]	Dimensionless	1.43E+03	3.43E+02	4.30E+01	2.69E-01	4.48E+03	1.04E+01

PM: Particulate matter emissions; IRP: Ionising radiation, human health; ETP-fw: Ecotoxicity (freshwater); ETP-c: Human toxicity, cancer effects; HTP-nc: Human toxicity, non-cancer effects; SQP: Land use related impacts / soil quality

[1] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

[2] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Resource use

Indicator	Unit	Upstream	Core	Downstream			
		Manufacturing		Distribution	Installation	Use & Maintenance	End-of-life
RPEE	MJ	8.63E+02	5.91E+01	1.25E+00	3.28E+01	1.72E+03	2.02E+00
RPEM	MJ	3.27E+01	0.00E+00	0.00E+00	-3.27E+01	0.00E+00	0.00E+00
TPE	MJ	8.96E+02	5.91E+01	1.25E+00	3.50E-02	1.72E+03	2.02E+00
NRPE	MJ	2.21E+03	5.82E+01	1.07E+01	2.92E+01	2.27E+04	1.73E+02
NRPM	MJ	1.75E+02	0.00E+00	0.00E+00	-2.88E+01	0.00E+00	-1.46E+02
TRPE	MJ	2.38E+03	5.82E+01	1.07E+01	4.18E-01	2.27E+04	2.69E+01
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m3	2.76E+00	1.00E-01	1.21E-02	6.79E-03	1.77E+01	2.10E-02

RPEE *Renewable primary energy resources used as energy carrier;* ***RPEM*** *Renewable primary energy resources used as raw materials;* ***TPE*** *Total use of renewable primary energy resources;* ***NRPE*** *Nonrenewable primary energy resources used as energy carrier;* ***NRPM*** *Nonrenewable primary energy resources used as materials;* ***TRPE*** *Total use of non-renewable primary energy resources;* ***SM*** *Use of secondary materials;* ***RSF*** *Use of renewable secondary fuels;* ***NRSF*** *Use of non-renewable secondary fuels;* ***W*** *Use of net fresh water.*

End of life – Waste

Indicator	Unit	Upstream	Core	Downstream			
		Manufacturing		Distribution	Installation	Use & Maintenance	End-of-life
HW	kg	4.51E-02	3.97E-04	6.70E-04	1.51E-05	5.05E-02	9.86E-05
NHW	kg	1.71E+01	7.72E-01	3.21E+00	8.36E-02	6.82E+01	1.50E+01
RW	kg	6.47E-03	1.09E-04	1.99E-05	6.15E-07	6.19E-02	7.66E-05

HW *Hazardous waste disposed;* ***NHW*** *Non-hazardous waste disposed;* ***RW*** *Radioactive waste disposed.*

End of life – output flow

Indicator	Unit	Upstream	Core	Downstream			
		Manufacturing		Distribution	Installation	Use & Maintenance	End-of-life
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	0.00E+00	6.75E-01	0.00E+00	9.76E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	2.88E+00	0.00E+00	3.08E+00
ETE	MJ	0.00E+00	0.00E+00	0.00E+00	1.50E+01	0.00E+00	1.66E+01
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	8.31E+00	0.00E+00	9.23E+00

CR *Components for reuse;* ***MR*** *Materials for recycling;* ***MER*** *Materials for energy recovery;* ***EEE*** *Exported electric energy;* ***ETE*** *Exported thermal energy.*

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	MaxiCharger AC Ultra
Biogenic carbon content in product	kg C/DU	0
Biogenic carbon content in the accompanying packaging	kg C/DU	1.25

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2

Additional requirements

Greenhous gas emission from the use of electricity in the manufacturing phase

In the context of China, a market-based approach is not applicable due to the absence of a Guarantee of Origin system. Therefore, a location-based approach is employed to assess the environmental impact of electricity in this EPD. The following table presents the applied electricity for the manufacturing process (A3).

Regional electricity grid	Data source	GWP_{total} [kg CO_2 -eq/kWh]
Electricity, medium voltage {CN-CSG}| market for electricity, medium voltage | Cut-off, U	ecoinvent 3.10	0.681

Additional environmental impact indicators required for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Indicator	Unit	Upstream	Core	Downstream			
		Manufacturing		Distribution	Installation	Use & Maintenance	End-of-life
GWP-IOBC	kg CO2 eq	2.79E+02	9.53E+00	8.15E+00	2.35E+00	1.98E+03	1.08E+01

GWP-IOBC *Global warming potential calculated according to the principle of instantaneous oxidation.*

Indoor environment

This is not relevant in this study.

Carbon footprint (A1-C4)

The carbon footprint (per DU) for is 2.29×10^{3} kg CO_2 eq.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN15804:2012+A2:2019/ AC:2021	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
EN 50693:2019	Product category rules for life cycle assessments of electronic and electric products and systems
Ecoinvent: 2024	Swiss Centre for Life Cycle Assessment, v3.10 (www.ecoinvent.ch).
ISO 21930:2017	Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.
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LCA Report, 2024	LCA report of Charging Station for Environmental Product Declaration (EPD)
PCR EPDItaly 007	Electronic and Electric Products and Systems (rev.3), 2023/01/13
PCR EPDItaly 017	Electronic and electrical products and systems – Charging Stations, 2020/12/14.

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