ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 50693 for:

TA85W2 single phase meter

From

Qingdao Comcore Technologies Co., Ltd

Declared product: T85W2 single phase meter

Programme operator:	EPD China
Registration number:	EPD-CN-00027
Issued date:	2025-09-08
Valid until:	2030-09-08

Programme Information

EPD Owner	Qingdao Comcore Technologies Co., Ltd. Contact: Mingfeng Liu (contactus@comcore.com.sg) Address: Unit A3-A4, 8 Floor, Block A, International Innovation Park, No.1 Keyuanweiyi Rd, Laoshan District, Qingdao, China Website: www.comcore.com.sg
Product Name	T85W2 single phase meter
Production Site	No.8, Hemei Rd, Xiaoshan District, Hangzhou, China
Identification of product	UNCPC code: 4621 electricity distributor or control apparatus
Field of Application	Monitoring the consumption of electricity
Programme Operator	EPD China Address of Headquarter: Tianping Road, Xuhui District, Shanghai Website: www.epdchina.cn Email: info@epdchina.cn | secretary@epdchina.cn
LCA Practitioner	Chao WANG, Ecovane environmental, wangchao@1mi1.cn
Responsibility	The EPD owner has the sole ownership, liability, and responsibility for the EPD
Comparability	EPDs within same category of product in different programme operator are not suggested to be compared. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible even applying the same PCR.
Liability	The EPD owner has the sole ownership, liability, and responsibility for the EPD.
Validity	The EPD is published on 2025-09-08 and valid to 2030-09-08
LCA Software (version)	Simapro 10.2
LCI Dataset (version)	Ecoinvent 3.11
Year(s) of Primary Data	05/2024-04/2025
PCR	PCR EPD Italy 007: Electronic and electrical products and systems, REV.3.1 PCR EPD Italy 011: Electronic and electrical products and systems – meters, REV.1
Other Reference Document	EN 50693 (2019): Product category rules for life cycle assessments of electronic and electrical products and systems
Verification statement according EN 50693	
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐ internal ☑ external Third-party institution verification: <Lisa Liang, SGS> is an approved certification body accountable for third-party verification Approved by: EPD China	
Procedure for follow-up of data during EPD validity involves a third-party certification body: ☐ Yes ☑ No	

1 General Information

1.1 Company information

EPD Owner: Qingdao Comcore Technologies Co., Ltd.
Contact: Mingfeng Liu (contactus@comcore.com.sg)
Address: Unit A3-A4, 8 Floor, Block A, International Innovation Park, No.1 Keyuanweiyi Rd, Laoshan District, Qingdao, China
Production site: No8, Hemei Rd, Xiaoshan District, Hangzhou, China
Website: www.comcore.com.sg
Description of the company
Established in 2005, Qingdao Comcore is a global digital energy technology company in the field of digital energy with a complete industrial chain, clean production, environmental protection, and circular economy, that has formed two core business segments which are smart energy and new energy, also providing customers with integrated solutions covering smart energy measurement, energy storage products, and intelligent microgrid with comprehensive energy services.

1.2 Scope and type of EPD

System boundary: Cradle-to-grave
System diagram

Table 1: Process stages and EPD modules.

<table>
<tr><th colspan="2">MANUFACTURING STAGE</th><th>DISTRIBUTION STAGE</th><th>INSTALLATION STAGE</th><th>USE & Maintenance STAGE</th><th>END-OF-LIFE STAGE

De-installation</th></tr>
<tr><th>UPSTREAM MODULE</th><th>CORE MODULE</th><th colspan="4">DOWNSTREAM MODULE</th></tr>
<tr><td>extraction of raw materials, including waste recycling processes and the production of semi-finished and ancillary products</td><td>manufacturing of the product constituents, including all the stages</td><td colspan="4" rowspan="4">IN ACCORDANCE WITH EN 50693</td></tr>
<tr><td>transportation of raw materials to the manufacturing company</td><td>product assembly</td></tr>
<tr><td></td><td>packaging</td></tr>
<tr><td></td><td>waste recycling processes</td></tr>
</table>

2 Detailed Product Description

Description of the product

TA85W2 is a single phase two wire electronic meter, which features in high accuracy, low power consumption and reliable stability.

Main features of TA85W2 meter:

- LCD with 8 digits display format for energy record and meter status.
- Power system quality monitoring (active power, voltage, current and frequency), can be displayed on LCD.
- LCD keeps display even when power supply is not available.
- Super capacitor used as back-up power supply.
- Meter records active energy consumption in security mode.
  i.e. | A | = |+ A | + | -A |
  Notes:
  |+A|: absolute import active energy |-A|: absolute export active energy
- Meter can detect reverse active energy(current). The active tampering event will be indicated on LCD and LED.
- Meter is equipped with non-resettable register.

Table 2: Technical specifications of TA85W2 meter

Technical specification		TA85W2
Meter format		Single phase two wire
Accuracy	Active	Class 1
	Reactive	Class 2
Voltage	Reference voltage	120V
	Operation voltage range	0.8 – 1.2 Un
Current	Basic current	5A
	Maximum current	100A
	Starting current	0.004 Ib
Reference frequency		60Hz
Specification Compliance & Approvals		IEC 62052-11, IEC 62053-21

Figure 1: Picture of the declared product.

Description of the production processes

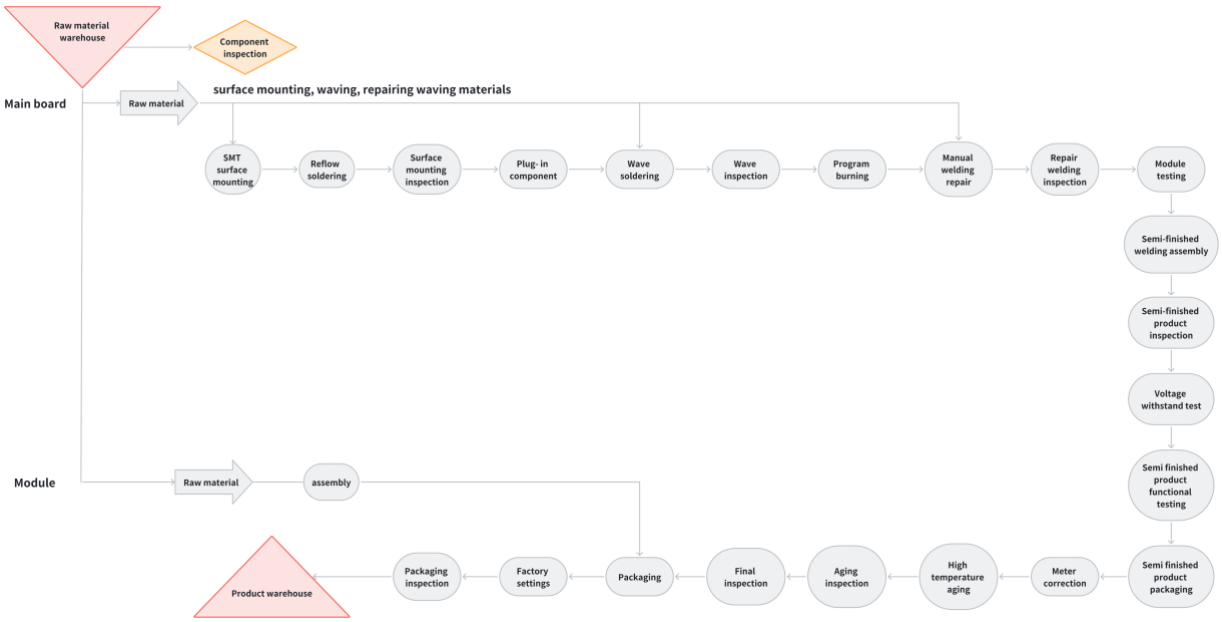

Figure 2: The production process in selected stages.

Product component

Table 3: Main product components and packaging materials per unit.

Product components	Weight, g	Weight-% (versus the product)
Metal	112.7	27.21
Polycarbonate	239.84	57.90
Electronic component	61.67	14.89
TOTAL	414.21	100
Packaging materials	Weight, g	Weight-% (versus the product)
Thin film	3.4	0.82
Wood pallet	238.4	57.56
Carton	69.7	16.83
TOTAL	311.5	75.2

3 LCA results according to EN 15804

3.1 Environmental Impacts

The results of the underlying LCA are provided in this section as environmental impacts, resource use, output flows and additional information on biogenic carbon. All pre-set parameters of EN 15804 are required.

Table 4: Environmental impacts according to EN 15804.

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT per functional unit							
Core indicator	Unit	Total	Manufacturing	Distribution	Installation	Use & Maintenance	EoL
Global Warming Potential total (GWP-total)	[kg CO2 eq.]	5.29E+01	1.00E+01	6.08E-02	5.64E-01	4.16E+01	6.37E-01
Global Warming Potential fossil fuels (GWP-fossil)	[kg CO2 eq.]	5.28E+01	1.05E+01	6.08E-02	1.46E-02	4.16E+01	6.13E-01
Global Warming Potential biogenic (GWP-biogenic)	[kg CO2 eq.]	8.97E-02	-4.98E-01	1.08E-05	5.49E-01	1.48E-02	2.38E-02
Global Warming Potential land use and land use change (GWP-luluc)	[kg CO2 eq.]	3.82E-02	1.73E-02	3.10E-05	7.29E-06	2.07E-02	6.30E-05
Depletion potential of the stratospheric ozone layer (ODP)	[kg CFC 11 eq.]	4.57E-07	2.61E-07	8.48E-10	1.29E-10	1.95E-07	4.61E-10
Acidification potential, Accumulated Exceedance (AP)	[mol H+ eq.]	3.67E-01	2.31E-01	1.29E-03	6.39E-05	1.35E-01	3.10E-04
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater)	[kg P eq.]	4.39E-02	8.74E-03	3.61E-06	6.66E-06	3.52E-02	2.17E-05
Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine)	[kg N eq.]	4.19E-02	1.61E-02	3.30E-04	7.68E-05	2.53E-02	1.79E-04
Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	[mol N eq.]	3.89E-01	1.77E-01	3.66E-03	2.03E-04	2.06E-01	1.19E-03
Formation potential of tropospheric ozone (POCP)	[kg NMVOC eq.]	1.46E-01	6.14E-02	1.02E-03	7.50E-05	8.27E-02	3.30E-04
Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	[kg Sb eq.]	2.11E-03	1.76E-03	1.06E-07	7.33E-08	3.50E-04	2.33E-07
Abiotic depletion potential for fossil resources (ADP-fossil)	MJ, net calorific value	8.82E+02	1.44E+02	7.77E-01	1.77E-01	7.36E+02	5.36E-01
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	[m3 world eq. Deprived]	9.45E+00	2.36E+00	2.41E-03	-2.23E-02	7.11E+00	5.61E-03

3.2 Resource use and waste categories

Table 5: Resource use and waste categories according to EN 15804.

RESULTS OF THE LCA - Resource use and waste categories per functional unit							
Core indicator	Unit	Total	Manufacturing	Distribution	Installation	Use & Maintenance	EoL
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ	1.22E+02	2.04E+01	7.69E-03	1.13E-02	1.01E+02	4.46E-02
Use of renewable primary energy resources used as raw materials (PERM)	MJ	9.76E-01	9.76E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Total use of renewable primary energy resources (PERT) (primary energy and primary energy resources used as raw materials)	MJ	1.23E+02	2.13E+01	7.69E-03	1.13E-02	1.01E+02	4.46E-02
Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE)	MJ	4.95E+02	7.23E+01	5.69E-02	7.03E-02	4.22E+02	2.20E-01
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ	7.24E+00	7.24E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (PENRT) (primary energy and primary energy resources used as raw materials)	MJ	5.02E+02	7.95E+01	5.69E-02	7.03E-02	4.22E+02	2.20E-01
Use of secondary material (SM)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water (FW)	m3	3.04E-01	7.81E-02	7.43E-05	4.95E-04	2.25E-01	2.83E-04
Hazardous waste disposed (HWD)	kg	3.86E-03	1.24E-03	4.47E-06	1.16E-06	2.62E-03	2.91E-06
Non-hazardous waste disposed (NHWD)	kg	3.12E+00	6.01E-01	1.32E-02	1.57E-01	2.29E+00	6.36E-02
Radioactive waste disposed (RWD)	kg	3.57E-03	2.49E-04	1.07E-07	1.83E-07	3.32E-03	7.96E-07
Components for re-use (CRU)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling (MFR)	kg	1.21E-01	0.00E+00	0.00E+00	1.21E-01	0.00E+00	0.00E+00
Materials for energy recovery (MER)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal (ETE)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity (EEE)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

3.3 Information on biogenic carbon content

Information on biogenic carbon content which shall be included in the EPD as follows:

Table 6: Information describing the biogenic carbon content

Biogenic carbon content	Unit (expressed per functional unit)
Biogenic carbon content in product	0 kg C
Biogenic carbon content in accompanying packaging	0.1439 kg C
NOTE：1 kg biogenic carbon is equivalent to 44/12 kg of CO2.	

4 Supplementary information

4.1 Calculation rules

Functional unit

1 single TA85W2 meter designed for the monitoring of electric energy consumption using for 20 years

Mass reference

414.2g

Assumption

Assumptions and substitutions were used widely in this project. The main assumption includes:

- Transportation for the distribution of the TA85W2 meter uses assumed distance and transportation vehicles for simplification purpose. A sensitivity analysis was conducted in LCA report.
- The input and output data during the installation of TA85W2 meter is based on experience, which represents the average installation according to Comcore. It is assumed that the same amount of structural, electronic and mechanical equipment will be used on the installation of each TA85W2 meter.
- During the end-of-life stage, the transportation of the waste TA85W2 meter from the operation site to treatment facilities such as dismantling site and disposal facilities such as recycling, landfill or incineration centre is assumed to be 50 km for simplification; A sensitivity analysis was conducted in LCA report.
- Waste to energy is not considered in this modelling.

Assumptions about generic data for this study:

- Transport model is based on the average regional data.
- Energy models are based on average national data, and in case possible, provincial or regional data is used to the best potential.
- Raw material uses generic data from database with adaptation of supplier data to the best possible potential.

Cut-off rules

The following procedure was followed for the exclusion of inputs and outputs:

- All inputs and outputs to a (unit) process will be included in the calculation for which data is available. Data gaps may be filled by conservative assumptions with average or generic data. Any assumptions for such choices will be documented.
- In case of insufficient input data or data gaps for a unit process, according to the PCR requirement, the cut-off criteria chosen is 2% of the total mass and energy of that unit process. (respectively, of the meter's unit weight and the energy needed to produce and assemble it)
- The total neglected input flows of the cradle to grave stage, e.g. per module shall be a maximum of 2% of energy usage and mass, in this study, the neglected flow is demonstrated in table below.

Table 7: Cut off flows

Flow name	Process stage	Reason cut off
Production, use and disposal of the packaging of raw materials	Upstream	Used repeatedly by the suppliers or recycled (cut off from system boundary)
Raw materials: trace elements	Upstream	All materials from the BOM is included in the model
Transportation and storage within the plant	Core	Energy<0.1%
Equipment maintenance	Core	The meter is designed not to be tampered with or modified in any way during its service life.
Inspection travel during maintenance of meter	Downstream	Not routine operation

Data quality

The data quality requirements for this study were as follows:

- Precision
- Completeness
- Representativeness
  - Time - related coverage
  - Geographic coverage
  - Technology coverage
- Consistency

All the above data quality requirements are met.

Allocations

Allocation refers to 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.

- Multi-input processes: For data sets in this study, the allocation of the inputs from coupled processes is generally carried out via the mass. The consumption of raw materials is allocated by mass ratio. The transportation of raw materials is allocated by mass. For TA85W2 meter production, the total consumption of energy during product assembly is equally allocated by dividing the total input (besides raw material, which is decided using BOM of each model) by the volume of production of TA85W2 meter.
- Multi-output processes: Multi-Output allocation is based on a quantitative calculation of the resource consumption and the emissions for example in relation to the distribution of functions, physical properties or economic aspects. Physical properties, such as mass, net calorific values, etc., shall be preferred, otherwise economic aspects, such as man-hours, operating hours or product assembly cost may be used. In this study, there is no other by products other than TA85W2 meter, within this study, the output such as the environmental emissions of wastewater pollutants, off gas pollutants and etc are allocated similarly as multi-input process.

4.2 Scenarios and additional technical information

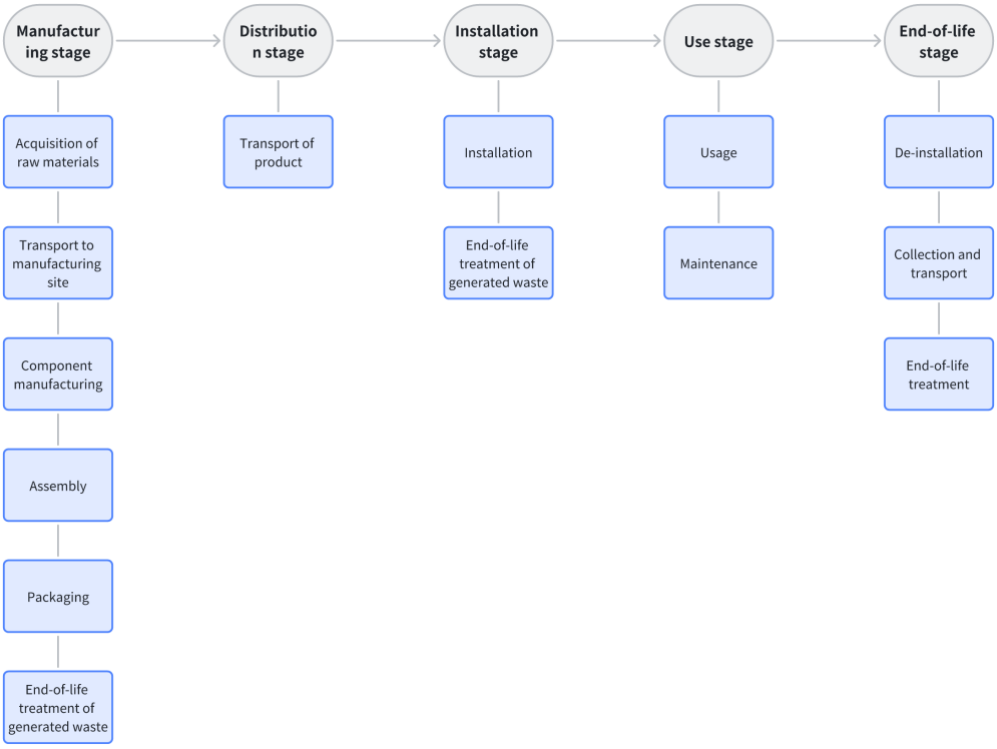

Figure 3: Life cycle stages flow chart of TA85W2 meter

Upstream stage

The LCI data from upstream stage includes extraction and processing of raw materials of PCB, PC, metal and electronic components, and the transportation of the raw material to the factory. Most of data regarding the raw materials, energy and transportation is adopted and adapted from background database, by adjusting input and output data from manufacturers directly from upstream.

Core stage

For product assembly, TA85W2 meter product included in this LCA report are assembled in Hangzhou city, Zhejiang province in China.

Downstream stage

The product transport follows a simplified weight-distance aggregated average approach, by aggregating the market into different regions and using estimation, scenario for product transportation is developed. see section 5.3 for more detail.

The TA85W2 meter's operation stage includes installation, use, maintenance, repair, replacement, refurbishment and the operational energy use and water use during the RSL (20 years) period of the TA85W2 meter's operation. LCI data regarding the electricity consumption (installation and use) is collected from historical experience and expert calculation with test results by Comcore and extrapolated to represent TA85W2 meter.

End-of-life stage includes de-installation and demolition of TA85W2 meter, transport to waste processing, waste processing and final disposal of the waste. Scenarios are developed for this stage based on the reasonable justification and situation in the region of disposal.

4.3 Dangerous substances

There are no dangerous substances into indoor air, oil and water during the use stage.

References

1. EN 50693: 2019 Product category rules for life cycle assessments of electronic and electrical products and systems
2. EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
3. PCR EPD Italy 007, Product category rules for electronic and electrical products and systems, REV.3.1
4. PCR EPD Italy 011, Product category rules for electronic and electrical products and systems – meters, REV.1
5. Advancing Sustainable Materials Management: 2018 Fact Sheet. (Released December 2020)
6. WEEE report, NO. CANEC1608131202, date: May 19, 2016
7. ISO 14025 (2021): Environmental labels and declarations -Type III Environmental labels – Principles and procedures
8. ISO 14040 (2019): Environmental Management - Life Cycle Assessment - Principles and Framework
9. ISO 14044 (2019): Environmental Management - Life Cycle Assessment - Requirements and Guidelines
10. ISO 14001(2015): Environmental management systems - Requirements with guidance for use.
11. ISO 9001(2015): Quality management systems – Requirements.
12. ISO 45001(2018): Occupational health and safety management systems — Requirements with guidance for use.

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