OUMAN

Environmental Product Declaration.

In accordance with ISO 14025 and EN 15804:2012+A2:2019
for H2302 OMA0184 controller with field devices

by Ouman Oy

ECO PLATFORM EPD VERIFIED

THE BUILDING INFORMATION FOUNDATION RTS · EPD

GENERAL ASPECTS

Manufacturer	Ouman Oy
Address	Linnunrata 14 90440 KEMPELE
Website	https://www.ouman.fi

Ouman is an expert of the control of HVAC processes. Ouman's controllers are used in heating and ventilation processes in different kinds of properties. Ouman controllers conserve energy and guarantee pleasant indoor conditions.

PRODUCT IDENTIFICATION

Product name	Controller with field devices
Declared unit	1 piece of product
Specific product names	H2302 OMA0184 controller with field devices
Places of production	Kempele, Finland Kuressaare, Estonia
Geographical scope	A1-A3: Europe/Finland, A4-A5, C1-C4+D: Finland, Nordic countries, Baltic countries

EPD INFORMATION

EPD program operator	The Building Information Foundation RTS, Malminkatu 16 A 00100 Helsinki https://ymparisto.rakennustieto.fi/rakennustiedon-epd
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The EN 15804 standard serves as the core PCR. Additionally RTS PCR (English version, 26.8.2020).
EPD author	Heini Koutonen, Senior consultant, Nordic Impact Oy
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐Internal ☐External EPD verifier: Anni Viitala (Granlund Oy)

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EPD valid until	

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context. This EPD follows additional requirements for construction products considered as Electronic or Electric Equipment.

PRODUCT INFORMATION

PRODUCT DESCRIPTION

This EPD describes the Ouman product H2302 OMA0184 controller with field devices, which is a programmable automation system that enables monitoring and management of a property's building automation. The programming of the Ouflex building automation system takes place with the Ouflex Tool.

Ouman H23 heating controllers are used in district heating substations at private houses. H23 product can control basic functions of two heating circuits and one domestic hot water circuit. H23 is mostly used in ready-made packages for district heating substation manufacturers who sell ready-made packages for end customers with their own brands.

PRODUCTION PROCESSES

The production process commences with the application of solder paste to PCBs, followed by SMD (Surface Mount Device) assembly. Subsequently, PCBs are soldered in a reflow oven and inspected by an Automated Optical Inspection (AOI) machine.

The subsequent step involves the preparation and assembly of the THT (Through Hole Technology) components. These are hand-mounted and soldered to the PCB in a wave-soldering machine. Following wave-soldering, a visual inspection is conducted. This inspection entails checking the assembly for potential errors and short connections, as well as installing the display onto the product.

The production process culminates in the final assembly, during which PCBAs are programmed, tested, and equipped with connectors, plastic covers, and stickers. Upon completion, the products are evaluated by a quality inspector and subsequently packaged.

RAW MATERIAL COMPOSITION AND TECHNICAL INFORMATION

The modelled product and its information is shown in the table below. An accurate LCA modelling was made for one product and the results are declared as conservative (worst-case) results for similar products in the product group. The information of these products is presented in the table in Annex 1.

The mapping of REACH SVHC substances in Ouman products is currently in the process. The most recent information on SVHC's regarding Ouman products can be found at: https://www.oumangroup.com/reach-directory

Additional technical information on the product can be found at https://ouman.fi/en/product/heating-controllers/

TEHTY SUOMESSA
MADE IN FINLAND

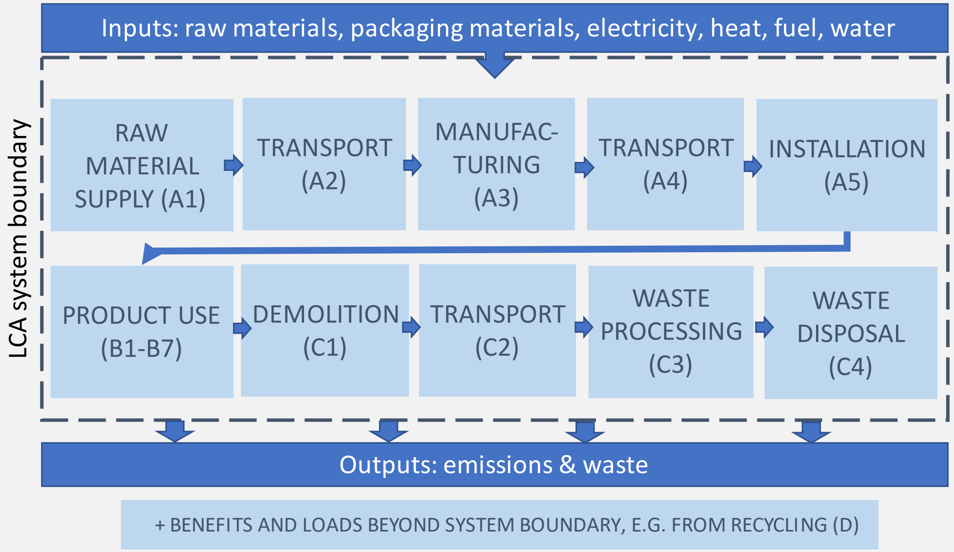
RAW MATERIAL COMPOSITION AND TECHNICAL INFORMATION								
Product group	Modelled reference product	Place of production	Mass	Mass with packaging	Reference service life	Electricity consumption	Raw material composition (% of mass)	Packaging materials
Controller with field devices	H2302 LÄMMÖN-SÄÄDIN, OMA0184	Kuressaare, Estonia & Kempele, Finland	4,64 kg	5,24 kg	15 years	0,023 kWh/tunti (3022 kWh /15 vuotta)	Electronic components 40 % Plastics 25 % Metals 24 % Cables 11 %	Corrugated board + EUR-pallet

RAW MATERIAL CONTENT AND ORIGIN					
Material	% of mass	Renewable	Non-renewable	Recycled	Raw material origin
Electronics	40 %		X		Europe
Plastics	25 %		X		Finland
Metals	24 %		X		Finland
Cables	11 %		X		Europe

LIFE CYCLE ASSESSMENT INFORMATION

System boundary

The EPD type is cradle to gate with options, modules C1–C4, and module D. This system boundary includes all relevant life cycle stages: raw material supply (A1) and transport (A2), manufacturing processes (A3), transport of the product (A4) and packaging waste recycling (A5) were included. In accordance with the ECO platform guidelines for electronic products, all B modules are declared from the product use phase. The end-of-life phase covered product demolition (C1) and transport to a recycling facility (C2), waste processing (C3) and disposal (C4). No relevant life cycle stages were omitted. Manufacturing of the machines and construction of the facilities required for the production are excluded, as is transportation of employees. The system boundary of the assessment is presented the picture. Key assumptions related to life cycle stages are described below.



Raw material supply (A1): The environmental impacts arising from the procurement, processing, and manufacture of all raw materials used in the products, as well as packaging materials.

Raw material transport (A2): Transportation of the raw materials to the production facility in Kempele, Finland. Specific transportation mode (truck, ship, plane) and actual distances are considered.

Manufacturing (A3): Manufacturing and packaging of the products. The assessment covers the electricity and heat consumption needed in the production process and the transport and management of production waste. The electricity is modelled with national residual mixes in the absence of the guarantees of origin. The district heating (production mix) is modelled site-specifically with the information provided by energy companies.

Product transport (A4): Transportation of the finished product over an average distance by truck cargo.

Installation (A5): From the installation phase, packaging waste recycling was included according to product category rules requirements.

Operational energy use (B6): This phase includes the product's own electricity consumption during its operation in the building during its life cycle. The consumption was calculated from the hourly electricity consumption and an estimated 15-year reference service life.

Use (B1), maintenance (B2), repair (B3), replacement (B4), refurbishment (B5), operational water use (B7): there are no identified processes related to the use phase of the reference product that can be expected within these modules, so in accordance with the ECO platform guidelines, they are declared with parameter results of value 0, as no mass flows take place.

Demolition (C1): The potential environmental impacts from deconstruction of the product from the building in module C1 emissions are assumed to be insignificant.

Transport to waste management (C2): Transportation of the discarded product over an assumed 121 km distance to a waste management facility.

Waste processing (C3): In the end-of-life scenario, it was assumed that 46,2 % of the product is recycled as waste from electrical and electronic equipment (WEEE collection rate according to Eurostat). In WEEE recycling, the device is assumed to be crushed and after that its materials are separated by using different technologies (SER-kierrätys.fi). Non-recyclable materials (plastic and glass fiber) are sent to energy recovery and recyclable materials (copper from the PCB) are sent to material recovery.

Waste disposal (C4): Following the Eurostat recycling rate, it was assumed that 53,8 % of the products end up in final disposal.

Benefits and loads beyond the system boundary (D): Materials delivered to material recycling can be used to make secondary material, thus avoiding the use of virgin raw material. Secondary metal content should be deducted from the materials sent to material recovery to avoid double-counting of benefits as it has already been recovered from a previous system. In this case, no information on the secondary material content of the materials was available in A1 phase, so all materials were considered as virgin materials.

Materials sent to energy recovery are used for energy production that is assumed to replace conventional electricity and heat production. By assumption this energy recovery replaces the use of average electricity grid mix in electricity production and the use of thermal energy from coal in heat production.

LIFE CYCLE INVENTORY ANALYSIS

DECLARED UNIT

The declared unit is set to 1 piece of finished product.

REFERENCE SERVICE LIFE (RSL)

Reference service life for the controller with field devices is assumed 15 years. The reference in-use conditions are 24 hours a day in indoor use installed in the wall of the building, in stable room temperature, standard indoor moisture, and with no chemical exposure. The average service life of the devices is the same regardless of the property, because regardless of the property type, they control the same HVAC processes in the building.

The 15-year service life is an assumption in the absence of accurate information. It can be considered a conservative assumption in the sense that 15 years is a shorter lifespan compared to that defined in the EPDs of some other building technology products.

TIME REPRESENTATIVENESS

The data represents the year 2022, which was the newest full year data. The data from generic databases are from 2013 – 2022.

DATA COLLECTION

Primary data concerning the production was collected directly from Ouman by using an Excel form. The data represents the actual production of the studied products in Kuressaare, Estonia and Kempele, Finland from the materials transported to and from the facilities (phases A1-A3 + A4). Also for the operational energy use (B6) the information was obtained directly from Ouman. Scenarios for phases A5, C1-C4 and D were planned and agreed together by Ouman and the LCA practitioner. The scenarios included are currently in use and are representative for one of the most likely scenario alternatives.

Generic data used for modelling the upstream and downstream processes was collected from the Sphera and Ecoinvent 3.9.1 databases. The generic datasets were chosen to represent the studied system as closely as possible. When supplier specific information was not available the information sources were chosen based on their technical and geographical representativeness. Only when country specific or European data has not been available, global level data been used.

CALCULATION PROCEDURES

The modelling was made by using LCA for Experts software (former GaBi software) and the life cycle inventory datasets provided by Sphera and Ecoinvent. All gathered data was used without excluding categories in advance following the system boundaries set in the beginning of the assessment.

Product stage			Construction stage		Use stage							End-of-life stage				Beyond system boundary		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Raw materials	Transport	Manufacturing	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Energy use	Water use	Demolition	Transport	Waste processing	Waste disposal	Reuse	Recovery	Recycling

ND = Not declared

(dark grey)	Mandatory according to EN15804+A2
(light grey)	Mandatory in accordance with section 6.2.1 of the RTS EPD protocol
(yellow)	Optional modules based on scenarios

CUT-OFF CRITERIA

This study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. Data was available for all inputs and outputs, and thus no flows had to be excluded from this assessment due to lack of detailed data.

ALLOCATIONS

Allocation is required if the production process produces more than one product and the flows of materials, energy and waste cannot be separately measured for the studied product. Avoiding allocation could not be avoided for electricity and heating consumption, and waste generation, as the information was only measured on factory level. The inputs were allocated to each studied product based on their production volume (mass in kilograms).

LIFE CYCLE IMPACT ASSESSMENT

The life cycle impact assessment was made based on the data collection described in the previous chapter. A life cycle model was built for the product in the LCA for Experts software. Quantitative data on input and output flows, transport modes and distances collected for the environmental impact assessment of the products were entered into the model. The software automatically calculates the environmental impact category results based on the entered data.

The impact categories, category indicators and characterization factors included in this study correspond to the EN 15804 standard. Note that the LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

In the following tables the potential environmental impacts are reported per declared unit (1 piece of final product) and per life cycle stage. The results are presented in scientific form. Data interpretation example: 1.31E-2 = 1.31*10-2 = 0.0131

Note that the comparison of these LCIA results to different products may not be valid if the life cycle assessments have not been prepared in accordance with same standards or if a different declared unit has been used.

H2302 OMA0184 controller with field devices

ENVIRONMENTAL INDICATORS

Impact category	unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7
Climate change - Total	kg CO2 eq	9,33E+01	7,55E-01	2,03E+00	9,61E+01	2,20E-01	1,81E-02	0	0	0	0	0	3,87E+02	0
Climate change - Fossil	kg CO2 eq	9,28E+01	7,43E-01	2,02E+00	9,56E+01	2,17E-01	1,80E-02	0	0	0	0	0	3,85E+02	0
Climate change - Biogenic	kg CO2 eq	3,58E-01	0,00E+00	1,06E-03	3,59E-01	0,00E+00	7,02E-05	0	0	0	0	0	1,81E+00	0
Climate change - Land use and LU change	kg CO2 eq	1,49E-01	1,22E-02	3,21E-03	1,64E-01	3,56E-03	1,11E-05	0	0	0	0	0	1,47E-01	0
Ozone depletion	kg CFC11 eq	9,30E-07	1,07E-13	1,49E-12	9,30E-07	3,12E-14	1,12E-13	0	0	0	0	0	1,56E-09	0
Acidification	mol H+ eq	4,03E-01	4,82E-03	5,30E-03	4,13E-01	1,10E-03	1,95E-04	0	0	0	0	0	1,08E+00	0
Eutrophication, freshwater	kg P eq	1,30E-03	3,09E-06	1,40E-06	1,31E-03	9,04E-07	3,01E-08	0	0	0	0	0	6,24E-04	0
Eutrophication, marine	kg N eq	7,94E-02	2,36E-03	1,47E-03	8,33E-02	5,31E-04	6,50E-05	0	0	0	0	0	2,67E-01	0
Eutrophication, terrestrial	mol N eq	8,32E-01	2,63E-02	1,63E-02	8,74E-01	5,92E-03	8,59E-04	0	0	0	0	0	2,89E+00	0
Photochemical ozone formation	kg NMVOC eq	2,32E-01	4,67E-03	3,96E-03	2,41E-01	1,08E-03	1,75E-04	0	0	0	0	0	8,47E-01	0
Resource use, minerals and metals	kg Sb eq	1,45E-02	6,31E-08	3,40E-08	1,45E-02	1,84E-08	1,18E-09	0	0	0	0	0	5,55E-05	0
Resource use, fossil fuels	MJ	1,18E+03	9,54E+00	2,22E+01	1,22E+03	2,79E+00	2,49E-01	0	0	0	0	0	1,51E+04	0
Water use	m3 depriv.	3,06E+01	1,12E-02	8,39E-02	3,07E+01	3,28E-03	1,06E-01	0	0	0	0	0	3,57E+01	0

Impact category	unit	C1	C2	C3	C4	D
Climate change - Total	kg CO2 eq	0,00E+00	6,29E-02	2,68E+00	5,57E-02	-3,60E+00
Climate change - Fossil	kg CO2 eq	0,00E+00	6,19E-02	2,68E+00	5,53E-02	-3,60E+00
Climate change - Biogenic	kg CO2 eq	0,00E+00	0,00E+00	4,46E-04	1,19E-04	-2,70E-03
Climate change - Land use and LU change	kg CO2 eq	0,00E+00	1,01E-03	1,40E-04	2,24E-04	-7,71E-04
Ozone depletion	kg CFC11 eq	0,00E+00	8,87E-15	9,91E-10	7,30E-10	-5,33E-11
Acidification	mol H+ eq	0,00E+00	3,79E-04	5,84E-04	3,33E-04	-1,86E-02
Eutrophication, freshwater	kg P eq	0,00E+00	2,57E-07	5,08E-05	8,78E-08	-1,07E-05
Eutrophication, marine	kg N eq	0,00E+00	1,85E-04	1,17E-04	1,02E-04	-2,87E-03
Eutrophication, terrestrial	mol N eq	0,00E+00	2,06E-03	1,73E-03	1,12E-03	-3,14E-02
Photochemical ozone formation	kg NMVOC eq	0,00E+00	3,69E-04	3,41E-04	2,98E-04	-8,95E-03
Resource use, minerals and metals	kg Sb eq	0,00E+00	5,24E-09	9,06E-07	-1,24E-07	-7,75E-04
Resource use, fossil fuels	MJ	0,00E+00	7,93E-01	1,67E+00	7,02E-01	-4,06E+01
Water use	m3 depriv.	0,00E+00	9,32E-04	2,61E-01	4,45E-02	-1,22E+00

NATURAL RESOURCE USE INDICATORS

Impact category	unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	3,40E+02	8,22E-01	1,30E+01	3,54E+02	2,40E-01	6,92E-02	0	0	0	0	0	1,14E+04	0
Use of renewable primary energy resources used as raw materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0
Total use of renewable primary energy resources	MJ	3,40E+02	8,22E-01	1,30E+01	3,54E+02	2,40E-01	6,92E-02	0	0	0	0	0	1,14E+04	0
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	1,18E+03	9,54E+00	2,22E+01	1,22E+03	2,79E+00	2,49E-01	0	0	0	0	0	1,51E+04	0
Use of non-renewable primary energy resources used as raw materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0
Total use of non-renewable primary energy resources	MJ	1,18E+03	9,54E+00	2,22E+01	1,22E+03	2,79E+00	2,49E-01	0	0	0	0	0	1,51E+04	0
Use of secondary material	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0
Use of renewable secondary fuels	MJ	8,10E-23	0,00E+00	0,00E+00	8,10E-23	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0
Use of non-renewable secondary fuels	MJ	9,52E-22	0,00E+00	0,00E+00	9,52E-22	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0
Net use of fresh water	m3	9,58E-01	9,15E-04	4,71E-03	9,63E-01	2,68E-04	2,50E-03	0	0	0	0	0	1,17E+01	0

Impact category	unit	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	0,00E+00	6,83E-02	3,33E-01	7,76E-02	-7,68E+00
Use of renewable primary energy resources used as raw materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources	MJ	0,00E+00	6,83E-02	3,33E-01	7,76E-02	-7,68E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	0,00E+00	7,93E-01	1,67E+00	7,02E-01	-4,06E+01
Use of non-renewable primary energy resources used as raw materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources	MJ	0,00E+00	7,93E-01	1,67E+00	7,02E-01	-4,06E+01

Use of secondary material	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m3	0,00E+00	7,61E-05	6,12E-03	1,07E-03	-2,92E-02

WASTE AND OUTPUT FLOWS

Waste flow	unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7
Hazardous waste	kg	2,87E-03	3,65E-10	1,29E-05	2,88E-03	1,07E-10	1,44E-10	0	0	0	0	0	1,55E-05	0
Non-hazardous waste	kg	4,63E+00	1,56E-03	1,98E-02	4,65E+00	4,55E-04	2,25E-02	0	0	0	0	0	1,33E+01	0
Radioactive waste	kg	2,66E-02	1,74E-05	2,44E-03	2,91E-02	5,08E-06	1,30E-05	0	0	0	0	0	4,09E+00	0

Waste flow	unit	C1	C2	C3	C4	D
Hazardous waste	kg	0,00E+00	3,04E-11	2,06E-10	1,23E-10	1,54E-07
Non-hazardous waste	kg	0,00E+00	1,29E-04	1,08E-02	2,50E+00	-8,73E-02
Radioactive waste	kg	0,00E+00	1,44E-06	1,97E-05	1,70E-05	-1,81E-03

Output flow	unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0
Material for recycling	kg	0,00E+00	0,00E+00	1,34E+00	1,34E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0
Material for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,00E-01	0	0	0	0	0	0,00E+00	0
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0

Output flow	unit	C1	C2	C3	C4	D
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	8,56E-01	0,00E+00	0,00E+00
Material for energy recovery	kg	0,00E+00	0,00E+00	9,49E-01	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Biogenic carbon content	unit	
Biogenic carbon in product	kg	0
Biogenic carbon in packaging	kg	0,147

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO2.

EPD RESULTS BY RTS PCR REQUIREMENTS

Results of environmental information reported per kilogram.

Impact category	unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7
Climate change - Total	kg CO2 eq	1,76E+01	1,44E-01	3,87E-01	1,81E+01	4,20E-02	1,83E-01	0	0	0	0	0	7,40E+01	0
Abiotic repletion potential, minerals and metals	kg Sb eq	2,77E-03	1,20E-08	6,49E-09	2,77E-03	3,52E-09	2,26E-10	0	0	0	0	0	1,06E-05	0
Abiotic depletion potential, fossil resources	MJ	2,26E+02	1,82E+00	4,23E+00	2,32E+02	5,32E-01	4,74E-02	0	0	0	0	0	2,89E+03	0
Water use	m3 depriv.	5,85E+00	2,14E-03	1,60E-02	5,86E+00	6,25E-04	2,03E-02	0	0	0	0	0	6,81E+00	0
Use of secondary material	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0,00E+00	0
Biogenic carbon content in product	kg C	0												

Impact category	unit	C1	C2	C3	C4	D
Climate change - Total	kg CO2 eq	0,00E+00	1,20E-02	5,09E-01	1,06E-02	-6,87E-01
Abiotic repletion potential, minerals and metals	kg Sb eq	0,00E+00	1,00E-09	1,73E-07	-2,36E-08	-1,48E-04
Abiotic depletion potential, fossil resources	MJ	0,00E+00	1,51E-01	3,19E-01	1,34E-01	-7,74E+00
Water use	m3 depriv.	0,00E+00	1,78E-04	4,99E-02	8,48E-03	-2,32E-01
Use of secondary material	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Biogenic carbon content in product	kg C					

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Energy use in manufacturing (A3)

Parameter	Quantity		Data quality
	Kuressaare	Kempele	
A3 Electricity information and CO_2e emission	0,454 kg CO_2e /kWh	0,682 kg CO_2e /kWh	Kuressaare: Residual mix, EE 2021 (76,37 % fossil fuels and peat, 7,55 % renewable sources, 16,08 % nuclear power) Kempele: Residual mix, FI 2023 (80,62 % fossil fuels and peat, 5,34 % renewable sources, 14,04 % nuclear power)
A3 Heat information and CO_2e emission	0,137 kg CO_2e /kWh	0,125 kg CO_2e /kWh	Kuressaare district heating: 60 % wood chips, 40 % heavy fuel oil Kempele district heating: 43 % biomass, 23 % peat, 2 % heavy fuel oil, 1 % light fuel oil

Transport to customers (A4)

Parameter	Quantity	Data quality
Transport, distance	373 km	Primary data
Specific emissions, type of vehicle used for transport	Truck: 0,10 kg CO2e /tkm	Truck-trailer, Euro 5, 26 - 28t gross weight / 18.4t payload capacity, Global 2022, Sphera.
Capacity utilization	Truck average capacity utilisation default 61 %	

Use phase energy consumption (B6)

Parameter	Quantity per declared unit	Unit
Energy quality	Electricity grid mix ((Finland, 2023)	
Power consumption	0,023	kWh/hour
Operation time	15	years
Total energy consumption	3022,2	kWh
Unit emission factor	0,131	kg CO2e/kWh

End-of-life scenario (C1-C4)

Process flow	Quantity per declared unit	Unit
Collection process specified by type	4,64	kg collected separately
	0	kg collected with mixed construction waste
Recovery system specified by type	0	kg for re-use
	0,86	kg for recycling
	0,95	kg for energy recovery
Disposal of waste	2,84	kg product or material for final deposition
Assumptions for scenario development, e.g., transportation	Assumed recycling rate for WEEE is 46,2 %, the rest end up in final disposal. Assumed transport distance 121 km to a recycling facility, where the recycled device is assumed to be crushed and after that its materials are separated and sent to material recycling or energy recovery.	

REFERENCES

ECO Platform, 2023. Audit and Verification Guidelines for ECO EPD Programme Operators Version 6 (March 2023)

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ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

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LCA background report, Nordic Offset Oy 2023.

SER-kierrätys.fi, 2023. Mitä kerätyille laitteille tapahtuu? https://serkierratys.fi/fi/kuluttajille/mitae-keraetyille-laitteille-tapahtuu

RTS PCR (26.8.2020): Protocol for drawing up Environmental Product Declarations of building products (RTS EPD). PT 18 RTS EPD Committee.

ANNEX 1

Other Ouman products covered by this EPD

An accurate LCA modelling was made for one product (H2302 LÄMMÖNSÄÄDIN, OMA0184) and in this EPD the results are declared as conservative (worst-case) results for similar but smaller products in the product group. The information of these products is also presented in the table below. Ouman also makes customer versions of all products listed below (in customer products only the software and stickers are different).

The scaling is based on product mass, and it is based on the modelled reference product, which has the largest mass and therefore the highest GWP values, i.e. the worst-case values. The varying proportions of different materials in A1 have been taken into account with their weights and material-specific emission factors. You can obtain the results for other products in the table by multiplying the A1 emissions or A1-A3 emissions of the reference product by the scaling factors given below.

Product group	Product name and product ID	Mass	Mass with packaging	Plastics (% of mass)	Metals (% of mass)	Electronics (% of mass)	Other (% of mass)	Scaling factor A1	Scaling factor A1-A3
Controller with field devices	Reference product: H2302 LÄMMÖNSÄÄDIN, OMA0184 Different software and language version: H2303 LÄMMÖNSÄÄDIN, OMA0185	4,64 kg	5,24 kg	39 %	18 %	35 %	7 %	1,00	1,00
	H23 FIN LÄMMÖNSÄÄDIN, OMA0181 H23 ENG LÄMMÖNSÄÄDIN, OMA0180 H23 SWE LÄMMÖNSÄÄDIN, OMA0183 H23 EE LÄMMÖNSÄÄDIN, OMA0660 H21 HEATING CONTROLLER, OMA0692	1,49 kg	1,76 kg	12 %	2 %	57 %	3 %	0,65	0,66