ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	dormakaba International Holding GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DOR-20190062-IBA2-EN
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Valid to	30/06/2024

Online Access Control Devices - Compact Readers

dormakaba

Institut Bauen und Umwelt e.V.

www.ibu-epd.com / https://epd-online.com

1. General Information

dormakaba

Online Access Control Devices - Compact Readers

Programme holder
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Germany

Owner of the declaration
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Deutschland

Declaration number
EPD-DOR-20190062-IBA2-EN

Declared product / declared unit
1 Online Access Control Device - Compact Reader (1 piece)

This declaration is based on the product category rules:
Electronic and physical Access Control Systems, 07.2016 (PCR checked and approved by the SVR)

Scope:
This EPD refers to a specific compact reader (online access control device) manufactured by dormakaba EAD GmbH. The production site is located in Villingen-Schwenningen (Germany).

The LCA results declared in the EPD refer to the product model 91 10. To enable the user of the EPD to calculate the results for two other compact reader models 91 04 and 91 12, the factors in chapter 6 can be used for the calculation.

Issue date
01/07/2019

Valid to
30/06/2024

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Verification

The standard /EN 15804/ serves as the core PCR
Independent verification of the declaration and data according to /ISO 14025:2010/
☐ internally ☒ externally

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
(Managing Director IBU)

Dr.-Ing. Wolfram Trinius
(Independent verifier appointed by SVR)

2. Product

2.1 Product description / Product definition

The dormakaba compact readers operate in an electronic access control system.
The compact reader is a device that reads a personalized credential via radio-frequency identification (RFID) or Bluetooth Low Energy technology.
The compact reader reads identity information from the credential and passes it on to an access controller via an RS-485 interface. In an online solution, the access controller then grants or denies access to the credential holder. In a stand-alone solution, the compact reader performs the access decision.

Model 91 04: The compact reader 91 04 is a mullion mount reader for outdoor or indoor use.

Model 91 10: The compact reader 91 10 is a reader for use in indoor or in protected outdoor areas.

Model 91 12: The compact reader 91 12 is a reader for outdoor or indoor use and offers an integrated PIN keypad for an added level of security.

Supported credential / communication technologies:

- LEGIC (advant & prime)
- MIFARE (DESFire & Classic)
- NFC (Near Field Communication)
- Bluetooth Low Energy

For the placing on the market in the European Union/European Free Trade Association (EU/EFTA, with the exception of Switzerland) the following legal provisions apply:

- /EN 301 489-1, EN 301 489-3/,
- /EN 300 330-1, EN 300 330-2/
- /RED 2014/53/EU/
- /REACH 1907/2006/EC/
- /RoHS 2011/65/EU/

The CE-marking takes into account the proof of conformity with the respective harmonized standards based on the legal provisions above. For the application and use the respective national provisions apply.

2.2 Application

The compact readers (91 04, 91 10 and 91 12) are suitable for indoor and outdoor use, where access control is required.
Common applications include: Corporate buildings, industrial sites, government buildings, military installations, education or healthcare buildings.

Possible fields of application are:

• External gates and gateways
• Exterior doors
• Office buildings / Entrances
• Automatic doors
• Lifts
• Garage doors
• Car park barriers
• Motorised locks

2.3 Technical Data

The compact readers have following technical properties:

Name	Value	Unit
Operating temperature	-30 to 60	°C
Operating humidity	5 – 85	%
Power supply DC	10 – 34	VDC
Power supply AC	12 – 27	VAC
Power consumption typ.	1.2	W
Power consumption max.	2.2	W
Transmit frequency	13.56	MHz
Dimensions 91 04	35 x 122 x 16	mm
Dimensions 91 10 / 91 12	88.5 x 88.5 x 19.5	mm

The products are not harmonised in accordance with the Construction Product Regulations (CPR) but in accordance with other provisions for harmonisation of the EU. Compliance with the European Union Directive and technical specifications:

- /EN 62368-1:2014/
- /EN 301489-1 V2.1.1/
- /EN 301489-3 V2.1.1/
- /EN 300330 V2.1.1/
- /EN 50364:2010/
- /EN 60529:2014-09/
- /EN 300328 V2.1.1/
- /EN 301489-17 V3.1.1/

according to the provisions of the /EU directive 2014/53/EU - Radio Equipment Directive (RED)/ is ensured.

The products are subject to CE marking according to the relevant harmonization legislation.

In addition, the product also conforms to the following standards:

- /UL 294:2013/
- /UL62368-1:2014/
- /CAN/CSA-22.2 No. 62368-1:2014/

This device complies with part 15 of the Federal Communications Commission (FCC) Rules (FCC CFR47 Parts 15):

- /FCC ID NVI-KCR9104-L1/
- /FCC ID NVI-KCR9110-L1/

2.4 Delivery status

Each reader unit is delivered individually packaged with mounting plate, sealing pad and paper installation instruction.

Packaged reader dimensions:

- **91 10:** 5 cm x 14,3 cm x 11 cm
- **91 04 / 91 12:** 10 cm x 26 cm x 16,5 cm

2.5 Base materials / Ancillary materials

The composition of the individual compact reader models is listed in the following table:

Material	Unit	91 04	91 10	91 12
Plastics	[%]	19.4	80.4	38.8
Electromechanics	[%]	78.7	19.5	61.1
Stainless steel	[%]	1.6	0.0	0.0
Others (metals)	[%]	0.3	0.1	0.1
Weight	**kg**	**0.25**	**0.31**	**0.49**

The products include partial articles which contain substances listed in the Candidate List of REACH Regulation /1907/2006/EC (date: 15.01.2019)/ exceeding 0.1 percentage by mass in the alloy: no

The Candidate List can be found on the ECHA website address: https:echa.europa.eu/de/home.

2.6 Manufacture

The compact readers are manufactured and assembled at the production facility at Villingen-Schwenningen in Germany. The plastic housing is supplied by an external partner. During assembly the individual parts are assembled into the casing. The assembled compact readers are then packaged with the mounting plate, installation accessories, and installation manual for shipment.

The plant in Villingen-Schwenningen, Germany, is certified to the quality management system /DIN EN ISO 9001:2015-11/, which ensures consistent quality of dormakaba's products.

2.7 Environment and health during manufacturing

The manufacturing plant has an internal environmental, health and safety engineer and an integrated system according to national regulations and good European practices. The system ensures

healthful and safe workplaces and good working conditions for each employee.

2.8 Product processing/Installation
dormakaba deploys its own, specially-trained assembly teams for installation.

2.9 Packaging
The compact readers are packed in cardboard boxes and are fixated in the single package box together with installation accessories and installation instructions. Packaging materials shall be collected separately for recycling.

2.10 Condition of use
No auxiliary or consumable materials are incurred for maintenance and usage of the readers. Repairs or replacement are not usually necessary. No cleaning efforts need to be taken into consideration.

2.11 Environment and health during use
No impacts on human health or the environment are expected during product use.

2.12 Reference service life
The service life of the dormakaba compact readers are estimated to be 30 years. This number is based on conservative MTBF (Mean Time Between Failure) data for the readers at elevated operation temperatures.

2.13 Extraordinary effects

Fire
The external housing of the compact readers consist of a cover and mounting plate, which are constructed from Acrylnitril-Butadien-Styrol-Copolymer (ABS). The housing material has been classified as having a /UL 94 B/ Flame Rating.

Fire protection

Name	Value
Building material class	-
Burning droplets	-
Smoke gas development	-

Water
No substances are used which have a negative impact on ecological water quality on contact by the device with water.

Mechanical destruction
In the case of mechanical destruction, all product components must be disposed of properly. No impacts on human health or the environment are known or expected. No hazardous substance emissions are anticipated in case of mechanical destruction.

2.14 Re-use phase
The following possibilities arise with reference to the material composition of the readers.

Re-use
During the reference service life the readers can be disconnected and dismounted then remounted and attached elsewhere.

Material Recycling
The dormakaba factories provide arrangements for the collection, treatment, recycling and recovery of the compact readers sold.

2.15 Disposal
The products and packaging should be recycled.
The classification is according to /EWC/: 16 02 14 Discarded equipment other than those mentioned in 16 02 09 to 16 02 13
No disposal is foreseen for the product nor for the corresponding packaging.

2.16 Further information
Please refer to the last page of this declaration for contact details to obtain further information.

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3. LCA: Calculation rules

3.1 Declared Unit
The declared unit is 1 piece of compact reader with the technical specifications given in chapter 2.3.

Declared unit

Name	Value	Unit
Declared unit	1	pce.
Mass for model 91 10	0.3102	kg
Conversion factor to 1 kg	3.22	-

3.2 System boundary
Type of EPD: cradle to gate - with options.
The Environmental Product Declaration refers to the production stage (A1-A3), the use stage (B6), the end of life stage (C3) and recycling potential which is declared in the module "benefits and loads beyond the product system boundary" (D).

Modules A1 to A3 include the provision and processing of raw materials as well as the processing of input materials, the transport to manufacturer and production. Module A5 includes the incineration of the product packaging after installation. Module B6 includes the operational energy consumption of the compact reader during its use. Module C3 includes the incineration of plastics for energy recovery. Module D comprises the recycling of metals and gives the recycling potentials.

3.3 Estimates and assumptions
Electronic components have been modelled based on variant 9112 (highest weight of electronic parts) and then estimated for the other variants using the area ratio of the included printed wiring boards.

3.4 Cut-off criteria
No cut-off criteria are applied in this study. All reported data were incorporated and modelled using best available Life Cycle Inventory (LCI) data.

Production of capital equipment, facilities and infrastructure required for manufacture are outside the scope of this assessment.
Transport processes of pre-products to the manufacturing facility in Villingen-Schwenningen are considered.

3.5 Background data

All background data used was taken from the /GaBi ts software/ data bases. The consistent data sets contained in the /GaBi/ data base are documented in the online /GaBi ts documentation/. The last update of the database was in February 2018.
In order to guarantee comparability of the results, exclusively the consistent background data from the /GaBi/ data base was used in the LCA (e.g. data sets on energy, transport, auxiliaries and consumables).

3.6 Data quality

Primary data was collected by dormakaba EAD GmbH using a specifically prepared questionnaire for the three compact readers models. The foreground data collected by the manufacturer are based on yearly production amounts and extrapolations of measurements on specific machines and plants. The production data refer to an average of the year 2017.

Cross-checks concerning the plausibility of mass and energy flows were carried out on the data received. Similar checks were made on the software model developed during the study.
Overall the data quality can be described as good. The primary data collection has been done thoroughly, all relevant flows are considered.

3.7 Period under review

The data in this LCA is based on data records from 2017. The period under review was 12 months.

3.8 Allocation

The production process does not deliver any co-products. The applied software model does not contain any allocation.

Production waste (plastics) is sent to a waste incineration plant. Resulting electrical and thermal energy is looped inside module A1-A3 as the quality of the recovered energy is assumed to be comparable to the input energy.

Environmental burden of the incineration of packaging and the product in the end of life scenario are assigned to the system (A5 or C3); resulting credits for thermal and electrical energy are declared in module D.

The credits for thermal and electrical energy are calculated with European average data.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

The /GaBi ts software/ and databases were used to create the EPD.

4. LCA: Scenarios and additional technical information

The following technical information forms the basis for the declared modules or can be used for developing specific scenarios within the context of a building assessment.

Reference service life

Name	Value	Unit
Reference service life	30	a

Operational energy use (B6)

Name	Value	Unit
Electricity consumption over reference service life	326,3	kWh

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste	0.31	kg
Recycling	0.06	kg
Energy recovery	0.25	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Collection rate	100	%
Plastics	0,25	kg
Electronic-Mechanics	0,06	kg

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	X	MND	MND	MNR	MNR	MNR	X	MND	MND	MND	X	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 piece of compact reader 91 10

Parameter	Unit	A1-A3	A5	B6	C3	D
Global warming potential	[kg CO_2-Eq.]	1.14E+1	1.39E-1	1.35E+2	5.38E-1	-1.20E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	7.00E-10	1.36E-16	6.02E-10	1.01E-14	-6.86E-13
Acidification potential of land and water	[kg SO_2-Eq.]	5.85E-2	1.21E-6	3.84E-1	2.66E-4	-2.18E-2
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	3.86E-3	2.71E-7	3.60E-2	6.80E-5	-6.72E-4
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	3.77E-3	-1.20E-7	2.41E-2	1.66E-5	-9.93E-4
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	4.47E-4	7.29E-11	7.19E-5	8.01E-9	-5.49E-4
Abiotic depletion potential for fossil resources	[MJ]	1.42E+2	4.36E-3	1.44E+3	1.49E-1	-1.38E+1

RESULTS OF THE LCA - RESOURCE USE: 1 piece of compact reader 91 10

Parameter	Unit	A1-A3	A5	B6	C3	D
Renewable primary energy as energy carrier	[MJ]	2.66E+1	1.29E+0	9.29E+2	1.99E-2	-1.35E+0
Renewable primary energy resources as material utilization	[MJ]	1.29E+0	-1.29E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	2.79E+1	2.32E-4	9.29E+2	1.99E-2	-1.35E+0
Non-renewable primary energy as energy carrier	[MJ]	1.48E+2	1.61E-1	2.47E+3	1.19E+1	-1.50E+1
Non-renewable primary energy as material utilization	[MJ]	1.19E+1	-1.57E-1	0.00E+0	-1.18E+1	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	1.60E+2	4.60E-3	2.47E+3	1.67E-1	-1.50E+1
Use of secondary material	[kg]	6.51E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m^3]	8.44E-2	2.44E-5	1.27E+0	1.27E-3	-2.55E-2

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 piece of compact reader 91 10

Parameter	Unit	A1-A3	A5	B6	C3	D
Hazardous waste disposed	[kg]	4.20E-6	1.22E-12	1.16E-6	3.48E-10	-1.78E-8
Non-hazardous waste disposed	[kg]	3.47E-1	1.30E-5	1.74E+0	1.88E-2	-6.50E-2
Radioactive waste disposed	[kg]	6.82E-3	9.41E-8	4.10E-1	7.23E-6	-4.64E-4
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	7.56E-2	0.00E+0	2.00E-4	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	3.60E-3	0.00E+0	2.50E-1	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	4.28E-2	0.00E+0	1.68E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	2.41E-2	0.00E+0	9.33E-1	0.00E+0

6. LCA: Interpretation

The use phase B6 clearly dominates almost all environmental impact categories with a contribution between 50% and 90% to the environmental impacts (within product system A1-C3). Modules A1-A3 show only a low influence for most of the indicators but dominate abiotic depletion potential for non-fossil resources (ADPE) with a share of around 90% and depletion potential of the stratospheric ozone layer (ODP) with a share of around 50%. The influence of modules A5 and C3 are negligible for all impact categories.

The modules A1-A3 are mainly characterized by the supply of raw materials. The printed wiring board (PWB) is the main contributor of the environmental impacts for all impact categories in the modules A1-A3. This is because the highly complex manufacturing process of the PWB involves a variety of different process steps that are requiring a lot of energy and auxiliary materials, which leads to a high environmental burden of the PWB. Therefore, even if the PWB is used in a rather small share in the card readers, its contribution to the overall environmental impact is significant.

To obtain the environmental impact results for the other two compact reader models 91 04 and 91 12, the results for compact reader model 91 10 have to be multiplied with the factors given in the tables below. The results are given for the individual life cycle stages of the product.

Factors for the compact reader model 91 04

	A1-A3	A5	B6	C3	D
GWP	0.66	2.42	1.00	0.24	0.63
ODP	0.68	0.07	1.00	0.18	0.37
AP	0.71	1.03	1.00	0.07	0.71
EP	0.72	1.10	1.00	0.06	0.69
POCP	0.69	4.02	1.00	0.08	0.71
ADPE	0.72	0.29	1.00	0.11	0.72
ADPF	0.64	1.87	1.00	0.12	0.61

Factors for the compact reader model 91 12

	A1-A3	A5	B6	C3	D
GWP	0.68	2.25	1.00	0.70	0.65
ODP	0.60	1.04	1.00	0.79	0.70
AP	0.65	1.54	1.00	1.00	0.63
EP	0.68	1.57	1.00	1.01	0.63
POCP	0.66	3.08	1.00	0.98	0.63
ADPE	0.63	1.15	1.00	0.87	0.62
ADPF	0.69	1.97	1.00	0.90	0.65

7. Requisite evidence

This Environmental Product Declaration does not require any evidence relating to the material composition of the product and its area of applicability.

8. References

/GaBi ts software/
GaBi version 8.7: software and database for life cycle assessment, 1992-2018, thinkstep AG, Leinfelden-Echterdingen, with recognition by LBP University of Stuttgart

/GaBi ts documentation/
GaBi ts dataset documentation for the software-system and databases, LBP,University of Stuttgart and thinkstep, Leinfelden-Echterdingen, 2018 (http://www.gabi-software.com/international/support/gabi/gabi-database-2018-lci-documentation/)

/PCR Part A/
PCR – Part A: Calculation rules for the Life Cycle Assessment and Requirements on the Project Report, version 1.7, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2018

/PCR Part B/
PCR – Part B: Requirements on the EPD for Electronic Access Control Systems, version 1.2, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2016

/IBU 2016/
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e.V., Version 1.1 Institut Bauen und Umwelt e.V., Berlin.
www.ibu-epd.de

/ISO 14025/
DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

/EN 15804/
/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

/EN 301489-1/
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Part 1: Common technical requirements - Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

/EN 301489-3/
Electromagnetic compatibility and Radio spectrum Matters (ERM) - ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz

/EN 300330-1/
ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 1: Technical characteristics and test methods

/EN 300330-2/
Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive

/RED 2014/53/EU/
Radio Equipment Directive, 2014/53/EU

/EN 62368-1:2014/
Audio/video, information and communication technology equipment - Part 1: Safety requirements

/EN 50364:2010/
Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 300 GHz, used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications

/EN 60529:2014-09/
Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989 + A1:1999 + A2:2013)

/EN 300328 V2.1.1/
Wideband transmission systems - Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques - Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

/EN 301489-17 V3.1.1/
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Part 17: Specific conditions for Broadband Data Transmission Systems - Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

/UL 294:2013/
Standard for Access Control System Units

/REACH 1907/2006/EC/
Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Regulation (EC) No 1907/2006

/RoHS 2011/65/EU/
Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), Directive (EU) No 2011/65

/UL62368-1:2014/
Audio/video, information and communication technology equipment - Part 1: Safety requirements

/CAN/CSA-22.2 No. 62368-1:2014/
Audio/video, information and communication technology equipment - Part 1: Safety requirements

/FCC CFR47 Parts 15/
Code of Federal Regulations, Title 47, Part 15, 47 CFR 15: Radio Frequency Devices

- **/FCC ID NVI-KCR9104-L1/**
  The listed FCC ID for the Compact reader 91 04 shows that this specific device complies with part 15 of the FCC rules.
- **/FCC ID NVI-KCR9110-L1/**
  The listed FCC ID for the Compact reader 91 10 shows that this specific device complies with part 15 of the FCC rules.

/DIN EN ISO 9001:2015-11/
Quality management systems - Requirements (ISO 9001:2015)

/EWC/
COMMISSION DECISION of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council

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