ABB – ASI15,ASI22,ASM12,ASO05 WELCOME 2-WIRE BUS DOOR ENTRY SYSTEM

PRODUCT ENVIRONMENTAL PROFILE

Environmental Product Declaration

ORGANIZATION	WEBSITE
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STATUS	SECURITY LEVEL	Registration number	REV.	LANG.	PAGE
Approved	Public	PEP ecopassport®ABBG-00042-V01.01-EN	A	en	1/11

ABB Purpose & Embedding Sustainability

ABB is demonstrating their commitment to sustainability by making themselves sustainable. Across their own operations and value chain, aspiring to become a role model for others to follow. With **ABB Purpose** ABB is focusing on reducing harmful emissions, preserving natural resources, and championing ethical and humane behavior to achieve this. Detail info see the website: Sustainability strategy 2030 — ABB Group (global.abb)

General Information

Reference product	One set of door entry system (Welcome 2-wire bus door entry system including ASI15, ASI22, ASM12 and ASO05).
Description of the product	The Welcome 2-wire bus door entry system consists of one video outdoor station (ASO05), one power supply facility (ASM12) and video indoor stations (ASI15 &ASI22). It offers a system with HD video communication that can be used for outdoor, indoor, and remote monitoring of residential and functional buildings which are manufactured in ABB Xiamen Smart Technology 1. **Video outdoor station (ASO05):** for visitors to use, press the button to call the corresponding resident. The outdoor station with 5-inch touch screen, is integrated with transponder and keypad serves as end device for the communication with IP touch panel, guard unit or property management. 2. **Power supply (ASM12):** power supply, system controller, which supplies power to the system and controls the operation of the entire system. Therefore, electricity consumption in use stage happens on this type of product. 3. **Video indoor stations (ASI15 & ASI22):** used by residents. When a visitor comes to visit, you can see the image of the guest on the indoor machine, and you can talk to the visitor and open the lock for the visitor. There are two sizes of video indoor stations which are ASI15 and ASI22. In addition, it can be a centralized screen for other ABB sub-system, like video surveillance, access control and home automation.
Functional unit	According to the PSR-SPECIFIC RULES FOR Electrical switchgear and control gear Solutions (PSR-0005-ed2-EN-2016), the studied product is covered by 3.13-other equipment, category 2: Active products because the Welcome 2-wire bus door entry system consume energy for its operation. **The Functional unit** is to ensure the Welcome 2-wire bus door entry system provides effective communication between visitors (outdoor) and residents (indoor) over a reference service life of 10 years.
Products concerned	The product includes one ASM12, one ASO05, one ASI15 and one ASI22. ASI15 and ASI22 which are used in two rooms, meaning that the residents can reply to the visitor by ASI15 in one room or ASI22 in another room.

Constituent materials

Table 1 lists the mass of sub-components and weight of packaging for the four components of the reference product-Welcome 2-wire bus door entry system (1 set).

Table 1 Information on mass of sub-components and packaging of each component

Components	ASO05	ASI15	ASI22	ASM12	Sum
Electronics parts（g）	97.791	202.683	160.519	490.948	951.941
Structural parts （g）	1024.140	124.879	183.827	218.589	1551.435
Package （g）	469.510	158.411	162.097	198.210	988.228
Total Weight（g）	1591.442	485.973	506.443	907.747	3491.604

Detailed constituent materials of the reference product were shown in Figure 1 and then listed in Table 2.

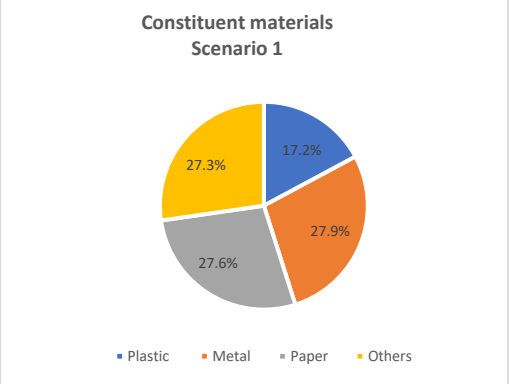

Figure 1 Constituent materials of the reference product

Table 2 Materials distribution of the reference product

Plastics as % of weight		**Metals as % of weight**		**Paper as % of weight**		**Other as % of weight**	
Name and CAS number	Weight-%	Name and CAS number	Weight-%	Name and CAS number	Weight-%	Name and CAS number	Weight-%
PC	8.7%	Stainless steel	20.9	Paper	27.6%	PCBA	27.3%
PA66	5.1%	Al alloy	3.6%			Others	<0.1%
ABS	1.6%	Low carbon steel	3.3.%				
PMMA foam	0.8%	Copper	0.1%				
PE	0.4%						
Rubber	0.3%						
PF foam	0.2%						
PET	<0.1%						
PU foam	<0.1%						
PE foam	<0.1%						

Environmental impacts

Table 3 Environmental Impacts information

Reference lifetime		10 years			
Product category		According to the Specific rules for electrical switchgear and control gear Solutions (PSR-0005-ed2-EN-2016 03 29), the product is covered by other equipment – Category 2: active products			
Installation elements		The product is installed manually. There is no input of materials / accessories and energy during the installation. The main environmental impact was caused by the waste generated in this stage.			
Use scenario		The studied product can be used in multiple scenarios to meet the requirements of clients. One particular configuration was studied. During the whole reference service life of the studied product, there is no maintenance or replacement needed. The only input is electricity which makes the product operate under normal conditions. So, energy consumption in the whole reference service time of the product was calculated and modeled. Assumptions were made to calculate the energy used in the RSL of product. Assume that there are three times of visiting every day. And for each component (ASO05, ASI15, ASI22 and ASM12-PS), the working time is 2 minutes for every visit. Thus, the total amount of working time and standby time are 36.50 work hours and 8,723.50 hours in one year. The total consumption of energy is the sum of energy consumption in the RSL of reference product (10 years).			
Geographical representativeness		The studied product is produced in China, however, used in Germany. In general, specific data (primary data) is preferred. However, when the specific data is not available, generic data is used instead. For the selection of generic data for the production related activities in China, an order of local data, national data, Asian data, global data and European data is followed. E.g., Chinese average grid mix was used in the manufacturing stage. For the selection of generic data for the use and end-of-life activities in Germany, an order of local data, national data, European data, and global data is followed. In this study, Germany average grid mix was used in use stage.			
Technological representativeness		In the manufacturing stage, specific data was collected to calculate the environmental impact caused by the manufacturing process. However, for the production of raw materials and sub-components, datasets from Ecoinvent 3.8 were used. During the dataset selection, the technological representation was considered carefully. Datasets with the same production processes were preferred. If not available, datasets with similar production processes were chosen.			
Software and databases used		Simapro version 9.4.04 & databases ecoinvent 3.8 and WEEE			
Standards applied in ABB		ABB had used many recycling materials, e.g., plastic and metal. The products' standards applied include: EN 62368-1:2014/A11:2017 EN IEC 61000-6-1:2019 EN 61000-6-3:2007/A1:2011			
Energy model used	**Manufacturing**	**Distribution**	**Installation**	**Use**	**End of life**

	The dataset representing the country mix electricity in China “Electricity, middle voltage {CN}| market for	Cut-off, U” from Ecoinvent 3.8 was used.	/	/	The dataset representing the country mix electricity in Germany” Electricity, low voltage {DE}| market for	Cut-off, U”, was used in the model.	Primary data for End-of-life management of the product was not available. According to the PCR, the WEEE LCI was used, meaning that the electricity of France was used.

Table 4 Environmental impact indicators of life cycle Impact assessment

Compulsory Indicators

Impact indicators	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life
Climate change	kg CO2 eq	3.47E+02	9.08E+01	2.70E+01	1.79E+00	2.24E+02	3.09E+00
Climate change - Fossil	kg CO2 eq	3.28E+02	9.13E+01	2.68E+01	2.60E-01	2.07E+02	3.08E+00
Climate change - Biogenic	kg CO2 eq	1.85E+01	-7.26E-01	2.37E-01	1.53E+00	1.74E+01	1.31E-02
Climate change - Land use and LU change	kg CO2 eq	4.85E-01	1.98E-01	1.83E-03	7.96E-05	2.83E-01	1.15E-03
Ozone depletion	kg CFC11 eq	7.11E-05	5.90E-05	6.11E-06	4.29E-08	5.66E-06	3.42E-07
Photochemical ozone formation	kg NMVOC eq	8.14E-01	3.76E-01	1.44E-01	1.04E-03	2.82E-01	1.04E-02
Acidification	mol H+ eq	1.39E+00	6.78E-01	1.39E-01	9.98E-04	5.29E-01	4.06E-02
Eutrophication, freshwater	kg P eq	3.86E-01	7.65E-02	3.70E-04	1.52E-05	3.09E-01	7.97E-05
Eutrophication, marine	kg N eq	3.73E-01	1.44E-01	5.10E-02	3.74E-04	1.54E-01	2.47E-02
Eutrophication, terrestrial	mol N eq	2.93E+00	1.23E+00	5.58E-01	3.65E-03	1.11E+00	3.16E-02
Water use	m3 depriv.	4.14E+01	2.62E+01	2.67E-01	4.61E-02	1.32E+01	1.76E+00
Abiotic resource depletion-fossil	MJ	4.39E+03	1.12E+03	3.76E+02	2.85E+00	2.85E+03	3.84E+01
Abiotic resource depletion-metals and minerals	Sb eq.	2.05E-02	1.86E-02	9.67E-06	6.91E-07	1.83E-03	9.34E-06
Optional Indicators							
Human toxicity, non-cancer	CTUh	7.84E-06	4.90E-06	3.21E-07	5.98E-09	2.34E-06	2.80E-07
Human toxicity, cancer	CTUh	2.69E-07	1.96E-07	2.77E-09	1.61E-10	6.62E-08	3.50E-09
Ecotoxicity, freshwater	CTUe	9.77E+03	6.51E+03	2.04E+02	4.09E+00	2.20E+03	8.47E+02
Land use	Pt	1.24E+03	5.35E+02	5.67E+01	1.91E+00	6.32E+02	1.06E+01
Ecotoxicity, freshwater - organics	CTUe	6.62E+01	3.37E+01	2.39E+01	1.61E-01	7.32E+00	1.10E+00
Ecotoxicity, freshwater - inorganics	CTUe	1.01E+03	7.96E+02	6.40E+01	2.32E+00	1.40E+02	4.18E+00
Ecotoxicity, freshwater - metals	CTUe	8.69E+03	5.68E+03	1.16E+02	1.61E+00	2.05E+03	8.41E+02

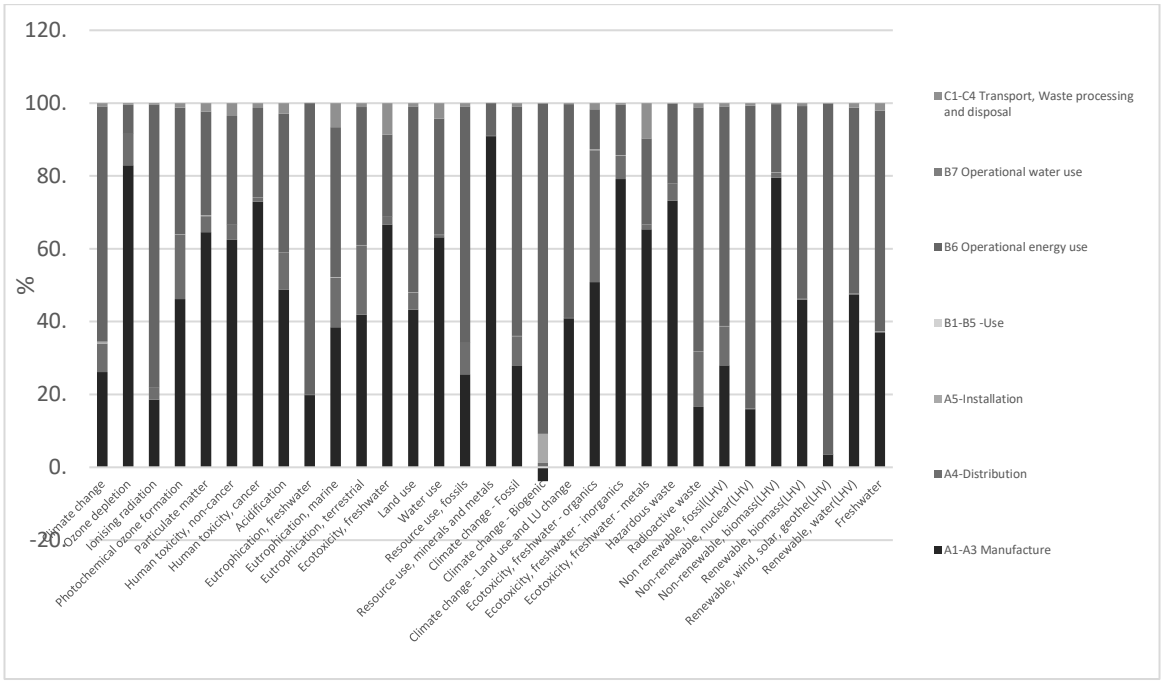

Figure 2 Contributions of life cycle stages to impact indicators (%)

Table 5 Resource use indicators of life cycle Impact assessment

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	8.01E+02	1.30E+02	1.27E+00	4.62E-02	6.67E+02	3.40E+00
Use of renewable primary energy resources as raw materials	MJ	1.99E+01	1.99E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	MJ	8.21E+02	1.50E+02	1.27E+00	4.62E-02	6.67E+02	3.40E+00
Use of non-renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	4.37E+03	1.11E+03	3.76E+02	2.85E+00	2.85E+03	3.84E+01
Use of non-renewable primary energy resources as raw materials	MJ	1.24E+01	1.24E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources	MJ	4.39E+03	1.12E+03	3.76E+02	2.85E+00	2.85E+03	3.84E+01
Use of secondary materials	kg	0.00E+00	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	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	0.00E+00

Freshwater	m3	2.30E+00	8.46E-01	1.16E-02	1.57E-03	1.39E+00	4.62E-02

Table 6 Waste category indicators of life cycle Impact assessment

Waste category indicators	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life
Hazardous waste disposed	kg	2.08E-02	1.53E-02	1.00E-03	7.34E-06	4.55E-03	3.63E-05
Non-hazardous waste disposed	kg	3.86E+01	1.61E+01	1.30E+00	1.15E+00	1.35E+01	6.60E+00
Radioactive waste disposed	kg	1.76E-02	2.92E-03	2.67E-03	1.83E-05	1.18E-02	2.10E-04

Table 7 Output flow indicators

Output flow indicators	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

* Represents less than 0,01% of the total life cycle of the reference flow

Biogenic Carbon of product and packaging

As no biogenic carbon in the product, thus, only the biogenic carbon in the packaging was calculated. Of the product packaging and packaging for transportation, the materials containing biogenic carbon are wood pallet and paper board.

Table 8 Amount of biogenic carbon of product and packaging

Item	Unit (kg of C)	Total
Biogenic carbon content of the product	0.00E+00	0.00E+00
Biogenic carbon content of the associated packaging	4.47E-01	4.47E-01

The results of module D

Table 9 Environmental impact indicators of module D

Impact indicators	Unit	Module D
Climate change	kg CO2 eq	-6.35E+00
Climate change - Fossil	kg CO2 eq	-7.21E+00
Climate change - Biogenic	kg CO2 eq	8.65E-01
Climate change - Land use and LU change	kg CO2 eq	-6.18E-03
Ozone depletion	kg CFC11 eq	-4.11E-07
Photochemical ozone formation	kg NMVOC eq	-5.61E-02
Acidification	mol H+ eq	-1.71E-01
Eutrophication, freshwater	kg P eq	-3.97E-02
Eutrophication, marine	kg N eq	-8.74E-03
Eutrophication, terrestrial	mol N eq	-2.09E-01
Ecotoxicity, freshwater	CTUe	-1.37E+03
Abiotic resource depletion-fossil	MJ	-6.70E+01

Abiotic resource depletion-metals and minerals	kg Sb eq	-9.36E-03
Water use	m3 depriv.	-4.68E+00
Optional Indicators		
Human toxicity, non-cancer	CTUh	-1.68E-06
Human toxicity, cancer	CTUh	-3.15E-08
Ecotoxicity, freshwater	CTUe	-1.37E+03
Ecotoxicity, freshwater - organics	CTUe	-1.41E+00
Ecotoxicity, freshwater - inorganics	CTUe	-1.67E+01
Ecotoxicity, freshwater - metals	CTUe	-1.35E+03
Land use	Pt	-1.02E+02

Table 10 Resource use indicators of module D

Resource use indicators	Unit	Module D
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	-6.70E+01
Use of renewable primary energy resources as raw materials	MJ	0.00E+00
Total use of renewable primary energy resources	MJ	-6.70E+01
Use of non-renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	-1.93E+01
Use of non-renewable primary energy resources as raw materials	MJ	0.00E+00
Total use of non-renewable primary energy resources	MJ	-1.93E+01
Use of secondary materials	kg	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00
Freshwater	m3	-1.18E-01

Table 11 Waste category indicators of Module D

Waste category indicators	Unit	Module D
Hazardous waste disposed	kg	-1.90E-04
Non-hazardous waste disposed	kg	1.55E+00
Radioactive waste disposed	kg	-1.83E-04

Additional Environmental Information

Table 12 The Additional Environmental Information

Manufacturing	*The plant has passed the **ISO** 14001, ISO9001 certification*
Distribution	Packaging weight (product packaging and transportation packaging) is 1146.9 g, consisting of 964.6 g paper, 156.8 g wood and 25.4 g plastic. It indicates that more than 97% of the packaging materials are paper and wood. The paper is from the product packaging which can be recovered as material or energy. Wood is from the packaging for transportation and can be reused several times in practice. After that, it can also be recovered as material or energy.
Installation	The product is installed manually. There is no input of materials / accessories and energy during the installation. So, no extra actions to reduce the environmental impact need to be taken.
Use	Greener electricity (e.g., electricity from PV) can reduce the environmental impact in use stage.
End of life	The recycling of material and recovery of energy can reduce the end-of-life impact. However, as no specific data was provided, in this study, WEEE LCI datasets were used to calculate the load and benefit beyond the studied system boundary.

Additional Product information

Table13 Detailed information of the sales numbers of components

Project No.	Article No.	Description
ASM12-PS	83300 83300-500	System controller
ASO05	A21381P1-S-03 A21381P1-S-04	Outdoor audio station, 1gang
ASI15	83222 U-611 83222 U-625 83222 U-611-500 83222 U-625-500	Indoor video station
ASI22	M22401-W-03	Indoor video station 4.3, WiFi

Environmental Impact Indicator Glossary

Table 14 Environmental Impact Indicator Glossary

Environmental Impact Indicators	Description	Indicators	Unit
Global warming (GW)	Indicator of potential global warming caused by emissions to air contributing to the greenhouse effect. Includes fossil and biogenic	Climate change	kg CO_2 eq.
		Climate change - Fossil	kg CO_2 eq.
		Climate change - Biogenic	kg CO_2 eq.
		Climate change - Land use and LU change	kg CO_2 eq.
Ozone depletion (OD)	Indicator of emissions to air that contribute to the destruction of the ozone layer	Ozone depletion	kg CFC-11 eq.
Acidification (AP)	Indicator of the potential acidification of soils and water caused by the release of certain gases to the atmosphere	Acidification	mol H+ eq.
Eutrophication (E)	Indicator of the contribution to eutrophication of water by the enrichment of the aquatic ecosystem with nutritional elements, e.g. industrial or domestic effluents, agriculture, etc.	Eutrophication, freshwater	kg P eq.
		Eutrophication, marine	kg N eq
		Eutrophication, terrestrial	mol N eq

Photochemical ozone creation (POCP)	Indicator of emissions of gases that affect the creation of photochemical ozone in the lower atmosphere (smog) because of the rays of the sun.	Photochemical ozone formation	kg NMVOC eq.
Water requirement	Indicator of use of water including water use requirement	Water use	m3 of eq.
Depletion of abiotic resources – elements (ADPe)	Indicator of the depletion of natural non-fossil resources	Resource use, minerals and metals	kg Sb eq.
Depletion of abiotic resources – fossil fuels (ADPf)	Indicator of the depletion of natural fossil resources	Resource use, fossils	MJ (lower heating value)
Optional indicators	Indicator of optional environmental impact indicators	Total use of primary energy during the life cycle	MJ
		Ecotoxicity (fresh water), expressed in,	CTUe
		Human toxicity, carcinogenic effects	CTUh
		Human toxicity, non-carcinogenic effects	CTUh
		Impacts related to land use/soil quality	without dimension
Inventory Flow Indicators	**Description**		**Unit**
Resource use indicators	Use of renewable primary energy	Use of renewable primary energy	MJ (lower heating value)
		Use of renewable primary energy resources used as raw materials	MJ
		Total use of renewable primary energy resource	MJ
	Use of non-renewable primary energy	Use of non-renewable primary energy	MJ (lower heating value)
		Use of non-renewable primary energy resources used as raw materials	MJ
		Total use of non-renewable primary energy resources	MJ
Waste category indicators	Indicator of waste	Hazardous waste	Kg
		Non-hazardous Waste	kg
		Radioactive waste	kg
Secondary use	Indicators of describing the use of secondary materials, water and energy resources (e.g., waste combustion)	Use of secondary materials	Kg
		Use of renewable secondary fuels	MJ
		Use of non-renewable secondary fuels	MJ
		Net use of fresh water	m3
Output flow	Indicators of components for reuse, materials for recycling and energy recovery	Components for reuse	Kg
		Materials for recycling	Kg
		Materials for energy recovery,	kg
Other	Indicators of biogenic carbon content	Biogenic carbon content of the product	kg of C
		Biogenic carbon content of the product	kg of C

The check-list box: For a PEP compliant with PCR ed4-EN-2021 09 06:

Registration number: ABBG-00042-V01.01-EN	Drafting Rules : "PCR-ed4-EN-2021 09 06" Supplemented by *PSR* -0005-ed2-EN-2016
Verifier accreditation number: VH42	Information and reference documents:www.pep-ecopassport.org
Date of issue: *12-2022*	Validity period: 5 years
Independent verification of the declaration and data in compliance with ISO 14025: 2006	
Internal: ☐	External: ☒
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain)	
PEPs are compliant with XP C08-100-1:2016 or EN 50693:2019 The components of the present PEP may not be compared with components from any other program.	
Document complies with ISO 14025:2006 "Environmental labels and declarations. Type III environmental declarations"	