


Motor Operating Devices (MOD)/ Autoreclosing units (AR)

# PEP ecopassport®

## Product Environmental Profile



Registration number:	ABBG-00673-V01.02-EN	Drafting rules:	PCR-ed4-EN-2021 09 06
Contact information:	EPD_ELSB@abb.com	Supplemented by:	PSR-0005-ed3.1-EN-2023 12 08
Verifier accreditation number:	VH51	Information and reference documents:	www.pep-ecopassport.org
Date of issue:	February-25	Validity period:	5 years
<b>Independent verification of the declaration and data in compliance with ISO 14025: 2006</b>			
Internal:	<input type="checkbox"/>	External:	<input checked="" type="checkbox"/>
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (Ddemail)			
PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500 :2022 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"			
			



# ABB Purpose & Embedding Sustainability

ABB is committed to continually promoting and embedding sustainability across its operations and value chain, aspiring to become a role model for others to follow. With its ABB Purpose, ABB is focusing on reducing harmful emissions, preserving natural resources and championing ethical and humane behavior.

The content of this PEP cannot be compared with the content based on another program/database.

Scan QR code for more information

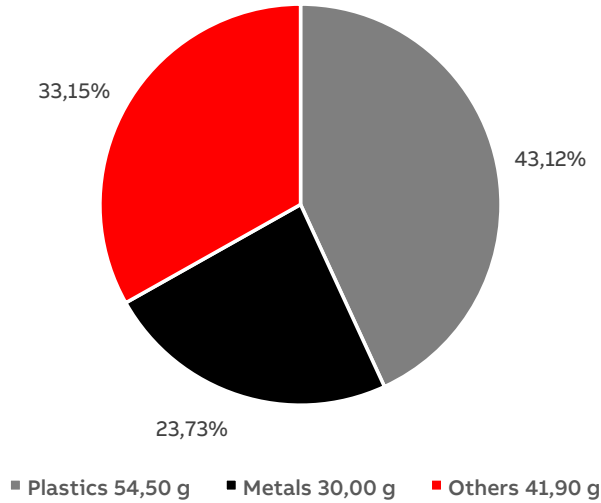


## General information

Reference product	<p>The scope of this LCA study is the evaluation of the environmental impacts of the life cycle of the Motor Operating Devices (MOD)/Autoreclosing units (AR).</p> <p>The MOD allow the remote control of the coupled device. The product analysed in this LCA project is the ABB S3C-MOD230 article code 2CSS202998R0033, rated voltage 240V AC.</p>																		
Description of the product	<p>The MOD allow the remote control of the coupled device. They are especially suitable in centralized systems (either large size or difficult to access) and whenever multiple daily intervention are needed. Auto-reclosing units (AR) are used to automatically operate the reclosing of the associated device in case of unwanted tripping (no remote control is provided).</p>																		
Functional unit	<p>Motor Operating Devices (MODs) allow the remote control of the coupled device. They are particularly suitable in centralized systems (either large size or difficult to access) and whenever multiple daily intervention are needed such as unattended electrical lines, safety lines, unmanned stations.</p> <p>Auto-reclosing units (Ars) are used to automatically operate the reclosing of the associated device in case of unwanted tripping. The PSR category of this product family is "Other Equipment" (PSR @3.15).</p> <p>The Motor Operating Devices (MOD)/ Autoreclosing units (AR) consume energy for its main function therefore- according to PSR @3.15.2.1- they are 'active product' with Category 2 use scenario with RSL of 10 years.</p>																		
Other products covered	<table border="0"> <tr> <td>2CSS201998R0033 S3C-MOD24</td> <td>2CSS202998R0033 S3C-MOD230</td> </tr> <tr> <td>2CSF201998R0034 F3C-AR24</td> <td>2CSF202998R0034 F3C-AR230</td> </tr> <tr> <td>2CSF203998R0034 F3C-AR230 D</td> <td>2CSF201998R0035 F3C-AR230 C 2/30</td> </tr> <tr> <td>2CSF202998R0035 F3C-AR230 C 2/300</td> <td>2CSF203998R0035 F3C-AR230 C 4/30</td> </tr> <tr> <td>2CSF204998R0035 F3C-AR230 C 4/300</td> <td></td> </tr> <tr> <td>2CSF205998R0035 F3C-AR230 C 2/30 H</td> <td></td> </tr> <tr> <td>2CSF206998R0035 F3C-AR230 C 2/300 H</td> <td></td> </tr> <tr> <td>2CSF207998R0035 F3C-AR230 C 4/30 H</td> <td></td> </tr> <tr> <td>2CSF208998R0035 F3C-AR230 C 4/300 H</td> <td></td> </tr> </table>	2CSS201998R0033 S3C-MOD24	2CSS202998R0033 S3C-MOD230	2CSF201998R0034 F3C-AR24	2CSF202998R0034 F3C-AR230	2CSF203998R0034 F3C-AR230 D	2CSF201998R0035 F3C-AR230 C 2/30	2CSF202998R0035 F3C-AR230 C 2/300	2CSF203998R0035 F3C-AR230 C 4/30	2CSF204998R0035 F3C-AR230 C 4/300		2CSF205998R0035 F3C-AR230 C 2/30 H		2CSF206998R0035 F3C-AR230 C 2/300 H		2CSF207998R0035 F3C-AR230 C 4/30 H		2CSF208998R0035 F3C-AR230 C 4/300 H	
2CSS201998R0033 S3C-MOD24	2CSS202998R0033 S3C-MOD230																		
2CSF201998R0034 F3C-AR24	2CSF202998R0034 F3C-AR230																		
2CSF203998R0034 F3C-AR230 D	2CSF201998R0035 F3C-AR230 C 2/30																		
2CSF202998R0035 F3C-AR230 C 2/300	2CSF203998R0035 F3C-AR230 C 4/30																		
2CSF204998R0035 F3C-AR230 C 4/300																			
2CSF205998R0035 F3C-AR230 C 2/30 H																			
2CSF206998R0035 F3C-AR230 C 2/300 H																			
2CSF207998R0035 F3C-AR230 C 4/30 H																			
2CSF208998R0035 F3C-AR230 C 4/300 H																			
Manufacturing address	<p>ABB S.p.A. – ELSB Viale dell'Industria, 18 20009 Vittuone (MI) - Italy www.new.abb.com</p>																		



# Constituent Materials



Total weight of reference product and packaging

126,4

g

Plastics as % of weight		Metals as % of weight		Others as % of weight	
Name and CAS number	Weight%	Name and CAS number	Weight%	Name and CAS number	Weight%
PC	18,7	STEEL	9,3	PCBA	11,6
GF	9,1	FERRITE	4,4	CARDBOARD	15,8
PPS	6,7	COPPER	3,7	PAPER+WOOD	4,8
POM	6,0	ALUMINIUM	3,2	MISCELLANEOUS	0,9
PA+PE	2,6	Brass+Ni+Ag+Mn+FeSi	3,1		

Weight of product 100 g plus packaging 26,4 g



# Additional Information

<b>Manufacturing</b>	The manufacturing stage includes the production and transportation to the manufacturer's last logistic platform of 2CSS202998R0033 and its packaging.
<b>Distribution</b>	The transport from the manufacturing Site to the logistic center was taken into account. For the distribution of the product from the logistic center to the final customer, the real global distribution of the product was adopted.
<b>Installation</b>	Product installation requires only manual activities and consumes no energy. This phase also includes disposal of the product's packaging
<b>Use</b>	<p>During the use phase, the device 2CSS202998R0033 dissipate some electricity due to power losses. The average power loss of the switch has been calculated by ABB following the assumption indicated in the PSR-0005-ed3.1-EN-2023 12 08 :</p> <ul style="list-style-type: none"><li>- Duty Cycle @Stand-by: 99.9857%</li><li>- Duty Cycle @ON: 0.0143%</li><li>- ON state duration: 3 Sec</li><li>- Reference Service Life: 10 Years</li></ul> <p>No maintenance is planned for the product. For disposal, average landfill, incineration, and recycling rates by waste type, data were sourced from Eurostat [17] [18] and OECD database[27]</p>
<b>End of life</b>	The default end-of-life scenario provided by the IEC/TR 62635 [19] document have been adopted, considering the product transport by lorry over 1000 km
<b>Benefits and loads beyond the system boundaries</b>	The potential benefits derives from the impacts prevented by recycling and waste to energy recovery of the packaging in the installation phase



# Environmental Impacts

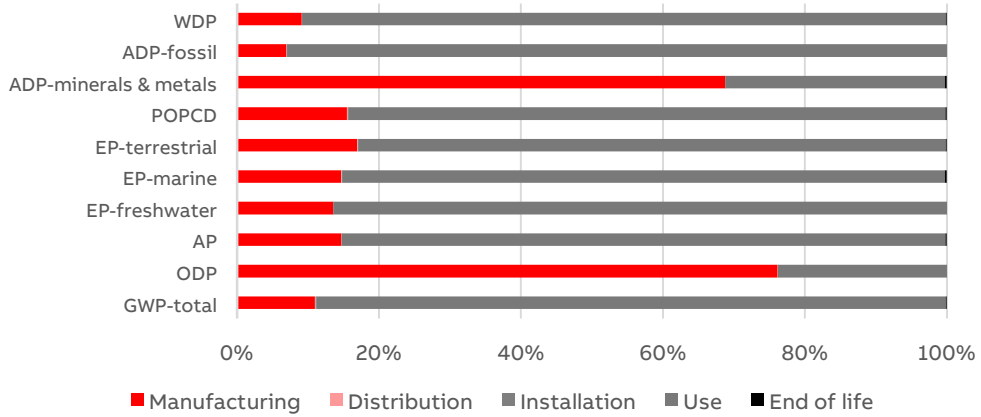
Reference lifetime	10 years
Product category	Motor Operating Devices (MOD) and Auto Reclosing (AR) and other equipments family
Installation elements	No installation materials are required in the life cycle of the product.
Use scenario	The use stage electricity consumption is calculated as follows: $E_{use} [kWh] = (P_{ON} * \%ON + P_{STB} * \%STB * RSL * 8760) / 1000$ No maintenance is planned for the product.
Geographical representativeness	For the use and end-of-life stages of the product, the geographical boundaries of Europe and final destination countries have been considered.
Technological representativeness	Technological representativeness refers to the specific production process for primary data.
Software and database used	SimaPro 9.5.0.0 & Ecoinvent 3.9

## Energy model used

Manufacturing	Electricity, medium voltage {PL}  market for electricity, medium voltage   Cut-off, S The energy-related processes used for the remaining inputs of the manufacturing stage are those included in the ecoinvent 3.9 datasets selected for the analysis
Installation	No energy consumption occur during the installation stage
Use	Electricity, low voltage (Various regionalities according to product distribution data)
End of life	The energy-related processes used for the inputs of the end-of life stage are those included in the ecoinvent datasets selected for the analysis

# Common base of mandatory indicators

% Environmental Impact per Life Cycle Stage of Reference Product



## Environmental impact indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits	
GWP	Total	kg CO2 eq.	6,19E+01	6,81E+00	4,56E-02	4,21E-02	5,49E+01	9,79E-02	-4,24E-01
	Fossil	kg CO2 eq.	6,01E+01	6,78E+00	4,55E-02	2,05E-03	5,32E+01	8,84E-02	-4,47E-01
	Biogenic	kg CO2 eq.	1,66E+00	2,42E-02	3,41E-05	4,01E-02	1,59E+00	9,43E-03	2,37E-02
	Luluc	kg CO2 eq.	1,34E-01	7,88E-03	2,18E-05	8,39E-07	1,26E-01	7,65E-05	-1,02E-03
ODP		kg CFC-11 eq.	3,72E-06	2,83E-06	9,91E-10	4,29E-11	8,83E-07	1,85E-09	-1,22E-08
AP		H+ eq.	3,54E-01	5,21E-02	2,04E-04	1,03E-05	3,01E-01	6,65E-04	-4,52E-03
EP	Freshwater	kg P eq.	5,75E-02	7,82E-03	3,25E-06	2,33E-07	4,96E-02	4,17E-05	-4,29E-04
	Marine	kg N eq.	5,93E-02	8,71E-03	7,50E-05	9,83E-06	5,04E-02	1,62E-04	-5,95E-04
	Terrestrial	mol N eq.	5,57E-01	9,43E-02	8,02E-04	4,17E-05	4,61E-01	9,83E-04	-6,56E-03
POPCD		kg NMVOC eq.	1,71E-01	2,65E-02	2,96E-04	1,63E-05	1,44E-01	3,39E-04	-2,05E-03
ADP	Minerals & metals	kg SB eq.	1,83E-03	1,26E-03	1,23E-07	7,80E-09	5,66E-04	5,47E-06	-7,70E-05
	Fossil	MJ	1,20E+03	8,34E+01	6,68E-01	2,40E-02	1,11E+03	1,04E+00	-5,20E+00
WDP		m³ eq. depr.	1,38E+01	1,26E+00	3,18E-03	1,66E-04	1,25E+01	1,86E-02	-9,86E-02

## Resource use indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
PERE	MJ	2,40E+02	8,42E+00	9,70E-03	8,37E-04	2,31E+02	1,11E-01	-7,83E-01
PERM	MJ	4,28E-01	4,28E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,40E+02	8,85E+00	9,70E-03	8,37E-04	2,31E+02	1,11E-01	-7,83E-01
PENRE	MJ	1,19E+03	8,22E+01	6,68E-01	2,40E-02	1,11E+03	1,04E+00	-5,20E+00
PENRM	MJ	1,20E+00	1,20E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,20E+03	8,34E+01	6,68E-01	2,40E-02	1,11E+03	1,04E+00	-5,20E+00

# Common base of mandatory indicators

## Use of secondary materials, water, and energy resources

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
SM	kg	0,00E+00	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	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m <sup>3</sup>	9,52E-01	1,10E-01	1,04E-04	7,90E-06	8,41E-01	6,83E-04	-3,40E-03

## Waste category indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
HWD	kg	2,29E-03	3,95E-04	4,15E-06	1,47E-07	1,86E-03	3,17E-05	7,68E-05
N-HWD	kg	5,36E+00	6,38E-01	5,80E-02	3,83E-03	4,59E+00	6,70E-02	-6,03E-02
RWD	kg	7,53E-03	1,26E-04	2,01E-07	1,95E-08	7,40E-03	2,96E-06	-5,08E-06

## Output flow indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
CfRu	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MfR	kg	1,16E-01	3,73E-02	0,00E+00	2,07E-02	0,00E+00	5,77E-02	0,00E+00
MfER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	8,16E-02	0,00E+00	0,00E+00	1,38E-02	0,00E+00	6,78E-02	0,00E+00

## Other indicators

Indicator	Unit	Total
Biogenic Carbon	kg of C	0,00E+00
Product Packaging	kg of C	1,27E-02

## Optional indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
Tot PE	MJ	1,44E+03	9,23E+01	6,78E-01	2,48E-02	1,34E+03	1,15E+00	-5,99E+00
Efp	Dise inc	1,41E-06	2,95E-07	4,66E-09	1,96E-10	1,11E-06	5,25E-09	-3,38E-08
IrHH	kBq U-235 eq	2,94E+01	5,13E-01	8,32E-04	7,81E-05	2,88E+01	1,16E-02	-2,06E-02
ETX FW	CTUe	3,18E+02	1,23E+02	3,22E-01	2,90E-02	1,94E+02	8,93E-01	-8,14E+00
HTX CE	CTUh	3,09E-08	7,06E-09	1,98E-11	2,16E-12	2,31E-08	7,20E-10	-5,83E-10
HTX N-CE	CTUh	1,21E-06	2,46E-07	4,77E-10	3,04E-11	9,42E-07	1,60E-08	-3,23E-08
IrLS	Pt	2,48E+02	2,87E+01	6,73E-01	1,14E-02	2,18E+02	5,89E-01	-2,94E+00

# Extrapolation Factors

For other products than the Reference product covered by this PEP, the environmental impacts for each phase of the lifecycle are obtained by multiplying the values of the Reference product by the following coefficients:

For the manufacturing stage, distribution stage and end-of-life stage:  $y = a_n x_1 + b_n$  where  $x_1$  is the weight of the product;

For use stage:  $y = a_n x_2 + b_n$  where  $x_2$  is the average Power loss of the product.

Table below reports the linear coefficients  $a_n$  and  $b_n$  for each life cycle stage. The calculation of the coefficient for the Installation Stage was not performed because the selected parameters do not affect the values for this stage

\* if the coefficient is !1, the impacts of the phase of the life cycle are assimilated to the Reference product, meaning that the impacts are unchanged in comparison to the Reference product

Impact Category	Manufacturing		Distribution		Installation		Use		End of Life	
	a1	b1	a2	b2	a3	b3	a4	b4	a5	b5
GWP-total	4,41E-02	2,62E+00	3,80E-04	9,51E-03	0,00E+00	4,21E-02	3,65E+01	5,21E-02	1,03E-03	1,40E-08
GWP-fossil	4,39E-02	2,61E+00	3,79E-04	9,50E-03	0,00E+00	2,05E-03	3,53E+01	5,05E-02	9,30E-04	1,26E-08
GWP-biogenic	2,01E-04	5,03E-03	2,84E-07	7,12E-06	0,00E+00	4,01E-02	1,06E+00	1,51E-03	9,93E-05	1,35E-09
GWP-luluc	7,22E-05	1,02E-03	1,81E-07	4,54E-06	0,00E+00	8,39E-07	8,37E-02	1,19E-04	8,05E-07	1,09E-11
ODP	2,96E-08	1,45E-08	8,25E-12	2,07E-10	0,00E+00	4,29E-11	5,87E-07	8,38E-10	1,95E-11	2,64E-16
AP	3,45E-04	1,93E-02	1,70E-06	4,25E-05	0,00E+00	1,03E-05	2,00E-01	2,85E-04	7,00E-06	9,50E-11
EP-freshwater	4,97E-05	3,10E-03	2,71E-08	6,79E-07	0,00E+00	2,33E-07	3,30E-02	4,71E-05	4,39E-07	5,96E-12
EP-marine	6,27E-05	2,75E-03	6,25E-07	1,57E-05	0,00E+00	9,83E-06	3,35E-02	4,78E-05	1,70E-06	2,31E-11
EP-terrestrial	7,40E-04	2,40E-02	6,68E-06	1,67E-04	0,00E+00	4,17E-05	3,06E-01	4,37E-04	1,03E-05	1,40E-10
POCP	2,06E-04	7,00E-03	2,46E-06	6,17E-05	0,00E+00	1,63E-05	9,55E-02	1,36E-04	3,57E-06	4,85E-11
ADPE	1,31E-05	1,26E-05	1,02E-09	2,56E-08	0,00E+00	7,80E-09	3,76E-04	5,37E-07	5,76E-08	7,81E-13
ADPF	5,69E-01	2,94E+01	5,57E-03	1,39E-01	0,00E+00	2,40E-02	7,39E+02	1,05E+00	1,09E-02	1,48E-07
WDP	8,93E-03	4,10E-01	2,65E-05	6,63E-04	0,00E+00	1,66E-04	8,32E+00	1,19E-02	1,96E-04	2,66E-09
CRU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	1,81E-04	2,01E-02	0,00E+00	0,00E+00	0,00E+00	2,07E-02	0,00E+00	0,00E+00	6,07E-04	8,24E-09
MER	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,38E-02	0,00E+00	0,00E+00	7,14E-04	9,69E-09
PM	2,72E-09	3,68E-08	3,88E-11	9,73E-10	0,00E+00	1,96E-10	7,36E-07	1,05E-09	5,53E-11	7,51E-16
IRP	4,43E-03	9,23E-02	6,93E-06	1,74E-04	0,00E+00	7,81E-05	1,92E+01	2,74E-02	1,22E-04	1,65E-09
PENRE	5,56E-01	2,93E+01	5,57E-03	1,39E-01	0,00E+00	2,40E-02	7,38E+02	1,05E+00	1,09E-02	1,48E-07
PENRM	1,24E-02	3,05E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	5,69E-01	2,94E+01	5,57E-03	1,39E-01	0,00E+00	2,40E-02	7,38E+02	1,05E+00	1,09E-02	1,48E-07
PERE	5,60E-02	3,10E+00	8,08E-05	2,02E-03	0,00E+00	8,37E-04	1,54E+02	2,19E-01	1,17E-03	1,59E-08
PERM	0,00E+00	4,28E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	5,60E-02	3,53E+00	8,08E-05	2,02E-03	0,00E+00	8,37E-04	1,54E+02	2,19E-01	1,17E-03	1,59E-08
PE	6,25E-01	3,29E+01	5,65E-03	1,41E-01	0,00E+00	2,48E-02	8,92E+02	1,27E+00	1,21E-02	1,64E-07
SM	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	3,41E-04	7,77E-02	8,70E-07	2,18E-05	0,00E+00	7,90E-06	5,59E-01	7,98E-04	7,19E-06	9,76E-11
HWD	3,87E-06	2,72E-05	3,45E-08	8,65E-07	0,00E+00	1,47E-07	1,24E-03	1,77E-06	3,34E-07	4,53E-12
NHWD	4,84E-03	1,78E-01	4,83E-04	1,21E-02	0,00E+00	3,83E-03	3,05E+00	4,36E-03	7,06E-04	9,58E-09
RWD	1,09E-06	2,27E-05	1,67E-09	4,19E-08	0,00E+00	1,95E-08	4,92E-03	7,03E-06	3,12E-08	4,23E-13
ETP-fw	1,20E+00	8,86E+00	2,69E-03	6,73E-02	0,00E+00	2,90E-02	1,29E+02	1,84E-01	9,40E-03	1,28E-07
HTP-c	6,10E-11	1,27E-09	1,65E-13	4,14E-12	0,00E+00	2,16E-12	1,54E-08	2,20E-11	7,58E-12	1,03E-16
HTP-nc	2,07E-09	4,96E-08	3,98E-12	9,96E-11	0,00E+00	3,04E-11	6,26E-07	8,94E-10	1,69E-10	2,29E-15
SQP	1,93E-01	1,04E+01	5,60E-03	1,40E-01	0,00E+00	1,14E-02	1,45E+02	2,07E-01	6,20E-03	8,41E-08
BCProd	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
BCPack	0,00E+00	1,27E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

## Extrapolation Factors

Product Code	Product Name	Weight [g]	Average power loss [W]
2CSS201998R0033	S3C-MOD24	95,00	1,003
2CSS202998R0033	S3C-MOD230	95,00	1,503
2CSF201998R0034	F3C-AR24	95,00	1,002
2CSF202998R0034	F3C-AR230	95,00	1,503
2CSF203998R0034	F3C-AR230 D	95,00	1,503
2CSF201998R0035	F3C-AR230 C 2/30	130,00	1,503
2CSF202998R0035	F3C-AR230 C 2/300	130,00	1,503
2CSF203998R0035	F3C-AR230 C 4/30	130,00	1,503
2CSF204998R0035	F3C-AR230 C 4/300	130,00	1,503
2CSF205998R0035	F3C-AR230 C 2/30 H	130,00	1,503
2CSF206998R0035	F3C-AR230 C 2/300 H	130,00	1,503
2CSF207998R0035	F3C-AR230 C 4/30 H	130,00	1,503
2CSF208998R0035	F3C-AR230 C 4/300 H	130,00	1,503

# Glossary

---

## Environmental impact Indicators

---

GWP-total	Global Warming Potential total (Climate change)
GWP-fossil	Global Warming Potential fossil
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
EP-freshwater	Eutrophication potential - freshwater compartment
EP-marine	Eutrophication potential - fraction of nutrients reaching marine end compartment
EP-terrestrial	Eutrophication potential - Accumulated Exceedance
POPCD	Formation potential of tropospheric ozone
ADP-m&m	Abiotic Depletion for non-fossil resources potential
ADP-fossil	Abiotic Depletion for fossil resources potential, WDP
WDP	Water deprivation potential

---

## Resource indicators

---

PENRE	Use of non-renewable primary energy excluding renewable primary energy resources used as raw material
PENRM	Use of non-renewable primary energy resources used as raw material
PENRT	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)
PERE	Use of renewable primary energy excluding non-renewable primary energy resources used as raw material.
PERM	Use of renewable primary energy resources used as raw material
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)

Secondary materials, water and energy resources		Waste category indicators	
SM	Use of secondary materials	HWD	Hazardous waste disposed
RSF	Use of renewable secondary fuels	N-HWD	Non-hazardous waste disposed
NRSF	Use of non-renewable secondary fuels	RWD	Radioactive waste disposed
FW	Net use of fresh water		

Output flow indicators		Optional indicators	
CfRu	Components for re-use	Tot PE	Total use of primary energy during the life cycle
MfR	Materials for recycling	Efp	Emissions of Fine particles
MfER	Materials for energy recovery	IrHH	Ionizing radiation, human health
EE	Exported Energy	ETX FW	Ecotoxicity, freshwater
		HTX CE	Human toxicity, carcinogenic effects
		HTX N-CE	Human toxicity, non-carcinogenic
		IrLS	Impact related to Land use / soil quality

## References

---

- [1] PEP ecopassport® PROGRAM. PCR-ed4-EN-2021 09 06. Product Category Rules for Electrical, Electronic and HVAC-R Products.
- [2] PEP ecopassport® PROGRAMME. PSR-0005-ed3.1-EN-2023 12 08. Specific rules for Electrical switchgear and control gear Solutions.
- [3] PRé Consultants. Software Simapro v. 9.5.0.0 ([www.simapro.com](http://www.simapro.com)).
- [4] ISO 14040:2006/Amd 1:2020. Life cycle assessment. Environmental management. Principles and Framework. International Organization for Standardization. 2020.
- [5] ISO 14044:2006/Amd 1:2017/Amd 2:2020. Life cycle assessment. Environmental management. Requirements and guidelines. International Organization for Standardization. 2020.
- [6] ABB website. (<https://global.abb/group/en/about>) [accessed 12-01-2023].
- [7] ABB website. (<https://global.abb/group/en/sustainability/sustainability-strategy-2030>) [accessed 12-01-2023].
- [8] ABB website. (<https://new.abb.com/low-voltage/products/system-pro-m/residual-current-devices/dda200>) [accessed 15-12-2023].
- [9] Ecoinvent. 2022. Swiss Centre for Life Cycle Assessment. v3.9.1 ([www.ecoinvent.ch](http://www.ecoinvent.ch)).
- [10] EN 15804:2012+A2:2019: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
- [11] Google Maps. (<https://www.google.it/maps/preview>).
- [12] Sea Rates. (<https://www.searates.com/>).
- [13] VAC – Advanced Magnetic Solutions, VITROPERM® 800 / 500 (VITROPERM 500 - 800.pdf ([vacuumschmelze.com](http://vacuumschmelze.com))).
- [14] Wikipedia, Alnico (Alnico - Wikipedia).
- [15] Kruzhanov, Vladislav & Arnhold, Volker. (2012). Energy consumption in powder metallurgical manufacturing. Powder Metallurgy. 55. 14-21. 10.1179/174329012X13318077875722 ((PDF) Energy consumption in powder metallurgical manufacturing ([researchgate.net](http://researchgate.net))).
- [16] GO CERTIFICATES ABB SPA 2022.
- [17] Eurostat. ([https://ec.europa.eu/eurostat/web/products-datasets/-/ENV\\_WASPAC](https://ec.europa.eu/eurostat/web/products-datasets/-/ENV_WASPAC)). Accessed november 2024
- [18] Eurostat. ([https://ec.europa.eu/eurostat/web/products-datasets/-/ENV\\_WASTRT](https://ec.europa.eu/eurostat/web/products-datasets/-/ENV_WASTRT)). Accessed november 2024
- [24] EEA (European Environment Agency), Technical report No 3/2012. Annual European Union greenhouse gas inventory 1990–2010 and inventory report 2012
- [25] EN 50693:2019. Product category rules for life cycle assessments of electronic and electrical products and systems
- [26] Ecoinvent. 2021. Documentation for the “Allocation, cut-off, EN15804” system model 2021.10.01
- [27] OECD (Organisation for Economic Co-operation and Development), 2020. Environment statistic database - Municipal waste - MetadataMUNW\_2021.
- 28] ITSB-00673-V01.01-EN S3C-MOD230 LCA Report to support PEP Ecopassport for S3C-MOD230 Motor Operating Device