

S200 MCB 6KA. 0.5 TO 63A, 1 TO 4 POLES, B OR C OR D OR K OR Z CURVE

Product Environmental Profile

Environmental Product Declaration



Document in compliance with ISO 14025: 2010 "Environmental labels and declarations. Type III environmental declarations"

ORGANIZATION		CONTACT INFORMATION	
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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.

This study is related to ABB STOTZ-KONTAKT GmbH, Heidelberg plant that produces MCBs in different ranges. The plant already has the following certifications besides product standard certifications:

DIN EN ISO 9001,
DIN EN ISO 14001,
DIN ISO 45001,
DIN EN ISO 50001 and
ISO/TS 22163



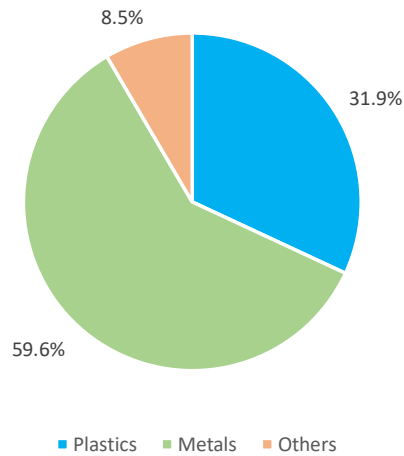
General Information

Reference product	S201-C16 Miniature Circuit Breaker - 1P - C - 16 A
Description of the product	S201-C16 Miniature Circuit Breaker (MCB), 1 Pole, 16A, C Curve, 6kA All MCBs in the product range S200 comply with IEC/EN 60898-1, IEC/EN 60947-2, UL1077 allowing their use in residential, commercial, and industrial applications.
Functional unit	Protect during 20 years the installation against overloads and short circuits in circuit with assigned voltage 230/400 Volt and current 16A. This protection is ensured in accordance with the following parameters; - Number of pole: 1 - Rated Breaking capacity: 6kA - Tripping Curve: C
Other products covered	It is a "Product family declaration" which covers Miniature Circuit Breaker (MCB) S200 Product Series with Standard Product Characteristics Rated current In; 0.5A to 63A, Rated Voltage U; 230/400 V Pole combination Np; 1 to 4 Pole included 1Pole+ N and 3Pole + N, Rated Breaking Capacity: Icn; 6kA Tripping Curve Cd: B,C,D,K & Z

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Constituent materials



Total weight of Reference product

127.57 gram including packaging material

Plastics			Metals			Others		
Name	Weight g	Weight %	Name	Weight g	Weight %	Name	Weight g	Weight g
PA6	35.33	27.7	Steel	64.51	50.6	Corrugated board	10.68	8.4
PA66	2.88	2.3	Copper	8.67	6.8	Miscellaneous Other Material	0.12	0.1
POM	1.71	1.3	Aluminium	2.82	2.2			
Miscellaneous Plastics	0.82	0.6	Miscellaneous Metals	0.30	0.0			

These products comply with actual requirements of EU Directives 2011/65/EU of 8 June 2011 (ROHS) materials and do not contain or only contain in the authorised proportions lead, mercury, cadmium, hexavalent chromium or flame retardants (polybrominated biphenyls -PBB, polybrominated diphenyl ethers - PBDE) as mentioned in the Directive.

Manufacturing, distribution, installation, use, and end-of-life (EOL) stages are taken into account in the environmental impact analysis of this study.

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Additional Environmental Information

Manufacturing	Manufacturing site certified with DIN EN ISO 14001. Packaging is compliant with applicable regulation. At their end of life, its recyclability rate is 99% (in % of packaging weight).
Distribution	Is modelled by considering the average distances from manufacturing site to distance at delivery point.
Installation	Does not required any special process. Packaging waste generated as output in installation phase.
Use	MCB is Maintenance free and does not need any special process while in use.
End of life	The recyclability rate of the Reference Product is estimated at 95%. The calculation of this weight is based on the method IEC/TR 62635,
Benefits and loads beyond the system boundaries	Does not consider since product is beyond control of organization after EOL



Environmental impacts

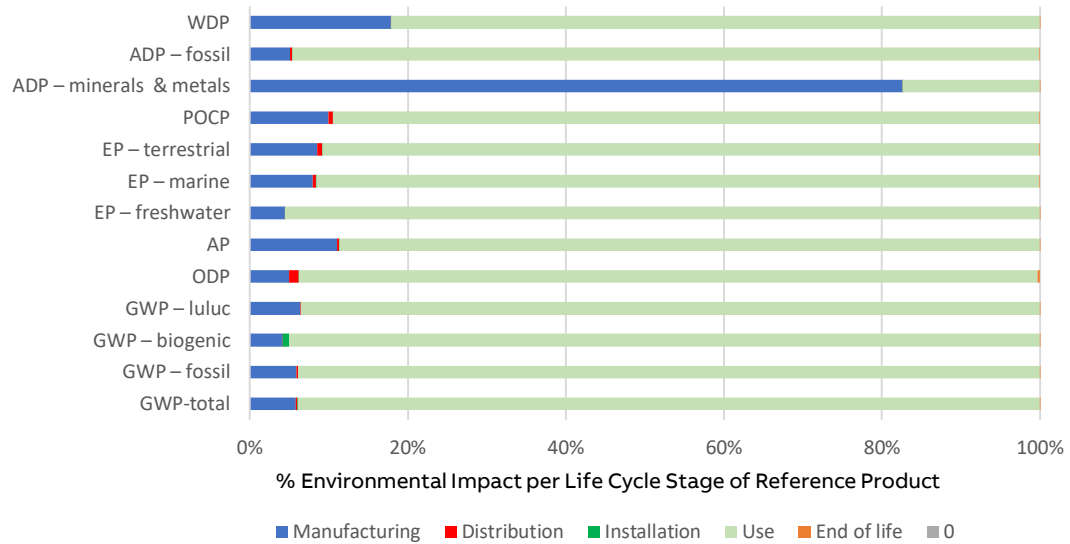
Reference lifetime	20 Years
Product category	Circuit Breakers
Installation elements	End of life of MCB packaging considered in Installation phase.
Use scenario	At loading rate 50% of rated current & use time rate 30% of reference lifetime total energy consumption is 32.9 kWh
Geographical representativeness	Global
Technological representativeness	Technological perpose of MCB to protect the domestic and industrial installation from overload & short circuit
Software and database used	SimaPro 9.4 and Data base Ecoinvent 3.8

Energy model used

Manufacturing	Ecoinvent Electricity Model System Process, Germany
Installation	Ecoinvent Electricity Model System Process, Global
Use	Ecoinvent Electricity Model System Process, Global
End of life	Ecoinvent Electricity Model System Process, global

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Common base of mandatory indicators



Environmental impact indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Instal- lation	Use	End of life
GWP-total	kg CO ₂ eq.	2.103E+01	1.222E+00	4.954E-02	7.628E-03	1.974E+01	1.284E-02
GWP-fossil	kg CO ₂ eq.	2.016E+01	1.185E+00	4.951E-02	1.032E-03	1.891E+01	1.281E-02
GWP-biogenic	kg CO ₂ eq.	8.377E-01	3.473E-02	2.188E-05	6.596E-03	7.963E-01	1.998E-05
GWP-luluc	kg CO ₂ eq.	3.252E-02	2.090E-03	6.964E-06	4.620E-07	3.042E-02	5.820E-06
GWP-fossil = Global Warming Potential fossil fuels GWP-biogenic = Global Warming Potential biogenic GWP-luluc = Global Warming Potential land use and land use change							
OPD	kg CFC-11 eq.	9.240E-07	4.600E-08	1.135E-08	2.383E-10	8.633E-07	3.107E-09
OPD = Depletion potential of the stratospheric ozone layer							
AP	H+ eq.	8.491E-02	9.408E-03	2.381E-04	3.885E-06	7.521E-02	4.872E-05
AP = Acidification potential, Accumulated Exceedance							
EP-freshwater	kg P eq.	2.090E-02	9.384E-04	1.394E-06	8.974E-08	1.996E-02	1.254E-06
EP-marine	kg N eq.	1.693E-02	1.347E-03	8.077E-05	5.873E-06	1.549E-02	1.226E-05
EP-terrestrial	mol N eq.	1.443E-01	1.238E-02	8.842E-04	9.213E-06	1.309E-01	1.337E-04
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment EP-terrestrial = Eutrophication potential, Accumulated Exceedance							
POCP	kg NMVOC eq.	3.982E-02	3.960E-03	2.417E-04	4.935E-06	3.556E-02	4.761E-05
POCP = Formation potential of tropo-spheric ozone							
ADP-minerals & metals	kg Sb eq.	1.915E-04	1.581E-04	3.849E-08	2.524E-09	3.328E-05	3.167E-08
ADP-fossil	MJ	3.024E+02	1.555E+01	7.170E-01	1.653E-02	2.859E+02	2.146E-01
ADP-minerals & metals = Abiotic depletion potential for non-fossil resources ADP-fossil = Abiotic depletion for fossil resources potential							
WDP	m ³ e depr.	3.820E+00	6.821E-01	1.096E-03	9.393E-05	3.135E+00	2.076E-03
WDP = Water Deprivation potential							

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Common base of mandatory indicators

Inventory flows indicator – Resource use indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Instal- lation	Use	End of life
PERE	MJ	3.957E+01	2.099E+00	3.807E-03	2.272E-04	3.747E+01	2.564E-03
PERM	MJ	1.586E-01	1.586E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PERT	MJ	3.973E+01	2.258E+00	3.807E-03	2.272E-04	3.747E+01	2.564E-03
PENRE	MJ	3.008E+02	1.404E+01	7.170E-01	1.654E-02	2.858E+02	2.146E-01
PENRM	MJ	1.508E+00	1.508E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PENRT	MJ	3.023E+02	1.555E+01	7.170E-01	1.654E-02	2.858E+02	2.146E-01

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials
 PERM = Use of renewable primary energy resources used as raw materials
 PERT = Total Use of renewable primary energy resources
 PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials
 PENRM = Use of non-renewable primary energy resources used as raw materials
 PENRT = Total Use of non-renewable primary energy resources

Inventory flows indicator – Indicators describing the use of secondary materials, water, and energy re-sources

Indicator	Unit	Total	Manu- facturing	Distri- bution	Instal- lation	Use	End of life
SM	kg	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RSF	MJ	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NRSF	MJ	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
FW	m ³	2.272E-01	1.913E-02	3.940E-05	2.877E-06	2.080E-01	5.631E-05

SM = Use of secondary material
 RSF = Use of renewable secondary fuels
 NRSF = Use of non-renewable secondary fuels
 FW = Use of net fresh water

Inventory flows indicator – Waste category indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Instal- lation	Use	End of life
Hazardous waste disposed	kg	4.291E-04	2.766E-04	1.867E-06	3.933E-08	1.501E-04	4.988E-07
Non- hazardous waste disposed	kg	1.489E+00	2.097E-01	1.804E-02	4.248E-03	1.112E+00	1.448E-01
Radioactive waste disposed	kg	1.207E-03	4.136E-05	4.995E-06	1.077E-07	1.159E-03	1.399E-06

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Common base of mandatory indicators

Inventory flows indicator – Output flow indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Instal- lation	Use	End of life
Components for re-use	kg	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Materials for recycling	kg	1.789E-02	9.998E-03	0.000E+00	7.893E-03	0.000E+00	0.000E+00
Materials for energy recovery	kg	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Exported energy	MJ	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Inventory flow indicator – other indicators

Indicator	Unit	Total
Biogenic carbon content of the product	kg of C	0.000E+00
Biogenic carbon content of the associated packaging	kg of C	5.399E-03

Optional indicators

Environmental indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Instal- lation	Use	End of life
Total use of primary energy during the life cycle	MJ	3.420E+02	1.780E+01	7.208E-01	1.676E-02	3.232E+02	2.172E-01
Emissions of fine particles	incidence of diseases	3.201E-07	7.038E-08	1.741E-09	1.171E-10	2.463E-07	1.532E-09
Ionizing radiation, human health	kBq U235 eq.	4.477E+00	1.164E-01	3.254E-03	7.984E-05	4.357E+00	1.009E-03
Ecotoxicity (fresh water)	CTUe	2.338E+02	5.638E+01	4.411E-01	2.618E-02	1.768E+02	1.758E-01
Human toxicity, carcinogenic effects	CTUh	7.522E-09	3.516E-09	7.640E-12	3.878E-13	3.993E-09	4.901E-12
Human toxicity, non-carcinogenic effects	CTUh	2.309E-07	8.302E-08	6.196E-10	2.305E-11	1.471E-07	1.675E-10
Impact related to land use/soil quality	kg	1.182E+01	1.437E+00	1.511E-01	5.283E-03	1.015E+01	7.724E-02

Other indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Instal- lation	Use	End of life
No Other indicators used							

Extrapolation of Coefficients

Extrapolation rules are established according to EN 50693. Results of LCA performed for a reference product extrapolated to other products, these products are belonged to a same homogeneous product family as the reference product. The group of products have the following same characteristics:

- Same main function, Same product standards,
 - Similar manufacturing technology: same type of materials and manufacturing processes
- Coefficients factors has been extrapolated with division of environment indicators value of homogeneous product by reference product environment indicator value.

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:

Note: 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.

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Manufacturing phase: To calculate environmental impact of covered product nominal value of reference product environment category to be multiplied with corresponding rating Impact category's coefficient, then value to be multiplied by the number of poles.

i.e. $y=ax*n$

Where a= Coefficient of corresponding rating impact category

y= Homogeneous product environmental category

x=Nominal value of reference product environmental category

n=Number of poles

Impact category	Manufacturing Phase Coefficient				
	0.5A, 1A, 1.6A, 2A, 3A,4A & 5A	6A, 8A & 10A	13A, 15A & 16A	20A, 25A, 30A, 32A & 40A	50A, 60A & 63A
GWP-total	0.989	1.005	1.000	1.043	1.308
GWP-fossil	0.989	1.005	1.000	1.042	1.312
GWP-biogenic	0.991	1.001	1.000	1.054	1.156
GWP-luluc	0.967	1.009	1.000	1.130	1.430
OPD	0.975	1.005	1.000	1.132	1.728
AP	0.933	1.002	1.000	1.584	2.293
EP-freshwater	0.958	1.002	1.000	1.358	2.402
EP-marine	0.977	1.004	1.000	1.239	2.045
EP-terrestrial	0.969	1.004	1.000	1.203	2.306
POCP	0.973	1.003	1.000	1.170	1.983
ADP-minerals & metals	0.903	0.997	1.000	2.053	5.639
ADP-fossil	0.986	1.005	1.000	1.077	1.353
WDP	0.952	0.999	1.000	1.661	2.052
Inventory flows indicator – Resource use indicators					
PERE	0.944	1.003	1.000	1.452	1.889
PERM	1.067	1.000	1.000	1.000	1.000
PERT	0.953	1.003	1.000	1.420	1.827
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Impact category	0.5A, 1A, 1.6A, 2A, 3A,4A & 5A	6A, 8A & 10A	13A, 15A & 16A	20A, 25A, 30A, 32A & 40A	50A, 60A & 63A
PENRE	0.984	1.006	1.000	1.084	1.393
PENRM	1.010	0.997	1.000	1.010	0.982
PENRT	0.986	1.005	1.000	1.077	1.353
Inventory flows indicator – Indicators describing the use of secondary materials, water, and energy re-sources					
FW	0.958	1.000	1.000	1.550	1.921
Inventory flows indicator – Waste category indicators					
Hazardous waste disposed	0.938	0.999	1.000	1.585	2.297
Non- hazardous waste disposed	0.938	1.002	1.000	1.260	1.547
Radioactive waste disposed	0.965	1.007	1.000	1.171	1.642
Inventory flows indicator – Output flow indicators					
Materials for recycling	1.009	0.997	1.000	0.999	0.972
Inventory flows indicator – Other indicators					
Biogenic carbon content of the associated packaging	1.000	1.000	1.000	1.000	1.000

Note:

In above table coefficients are excluded when impact indicators value is zero for reference products. And for Optional Environmental indicators.

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Distribution, Installation & EOL Phase: To calculate the environmental impact of covered product nominal value of reference product environment category to be multiplied with corresponding rating's coefficient, and then value to be multiplied by the number of poles. i.e. $y=ax*n$

Where a= Coefficient of corresponding rating

y= Homogeneous product environmental category

x=Nominal value of reference product environmental category, and n=Number of poles

Coefficient of Distribution, Installation & EOL Phase

Rated Current	0.5A, 1A, 1.6A, 2A,3A,4A & 5A	6A, 8A & 10A	13A,15A & 16A	20A, 25A, 30A, 32A & 40A	40A,60A & 63A
Distribution Phase	1.001	0.999	1.000	1.029	1.073
Installation Phase	1.000	1.000	1.000	1.000	1.000
EOL Phase	1.001	0.999	1.000	1.029	1.073

Use phase: To calculate the environmental impact of covered product nominal value of reference product environment category to be multiplied with corresponding rating w.r.t tripping curve's coefficient, and then value to be multiplied by the number of poles. i.e. $y=ax*n$

Where a= Coefficient of corresponding rating w.r.t tripping curve

y= Homogeneous product environmental category

x=Nominal value of reference product environmental category. and n=Number of poles

Use Phase Coefficient

Tripping curve	Rated Current										
	0.5A	1A	1.6A	2A	3A	4A	5A	6A	8A	10A	13A
B	0.560	0.560	0.640	0.720	0.520	0.720	-	0.800	0.600	0.840	0.920
C	0.560	0.560	0.640	0.720	0.520	0.720	-	0.800	0.600	0.840	0.920
D	0.560	0.560	0.640	0.720	0.520	0.720	-	0.800	0.600	0.840	0.920
K	0.440	0.500	0.600	0.660	0.480	0.680	0.520	0.760	0.600	0.560	0.560
Z	0.960	0.920	1.120	1.000	0.960	0.960	-	1.280	0.800	1.080	-

Use Phase Coefficient

Tripping curve	Rated Current									
	15A	16A	20A	25A	30A	32A	40A	50A	60A	63A
B	1.000	1.000	1.000	1.280	-	1.480	1.920	1.300	-	1.920
C	1.000	1.000	1.000	1.280	-	1.480	1.920	1.300	-	1.920
D	1.000	1.000	1.000	1.280	-	1.480	1.920	1.300	-	1.920
K	0.693	0.800	1.080	1.160	1.260	1.440	1.800	1.240	1.440	1.760
Z	-	1.120	0.960	1.320	-	1.440	1.640	1.640	-	2.080

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Environmental Impact Indicator Glossary

Impact indicators

Indicator	Description	Unit
Global warming potential (GWP) - total	Indicator of potential global warming caused by emissions to air contributing to the greenhouse effect. The total global warming potential (GWP-total) is the sum of three sub-categories of climate change. GWP-total = GWP-fossil + GWP-biogenic + GWP- land use and land use change	kg CO ₂ eq.
Ozone depletion (OD)	Emissions to air that contribute to the destruction of the stratospheric ozone layer	kg CFC-11 eq.
Acidification of soil and water (A)	Acidification of soils and water caused by the release of certain gases to the atmosphere, such as nitrogen oxides and sulphur oxides	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. This indicator is divided to three: freshwater, marine and terrestrial.	kg P eq., kg N eq., mole 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.	kg NMVOC eq.
Depletion of abiotic resources – elements (ADPe)	Indicator of the depletion of natural non-fossil resources	kg Sb eq.
Depletion of abiotic resources – fossil fuels (ADPf)	The use of non-renewable fossil resources in an unsustainable way (e.g. from material to waste)	MJ (lower heating value)
Water Deprivation potential (WDP)	Deprivation-weighted water consumption. Assesses the potential of water deprivation, to either humans or ecosystems, building on the assumption that the less water remaining available per area, the more likely another user will be deprived.	m ³ e depr.

Resource use indicators

Indicator	Description	Unit
Total use of primary energy	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) + Total use of renewable primary energy re-sources (primary energy and primary energy resources used as raw materials)	MJ (lower heating value)

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Date of issue:	12.2022	Information and reference documents:	www.pep-ecopassport.org
		Validity period:	5 years


Independent verification of the declaration and data, in compliance with ISO 14025: 2010

Internal External

The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain)

PEP are compliant with XP C08-100-1: 2016
The elements of the present PEP cannot be compared with elements from another program

Document in compliance with ISO 14025: 2010 "Environmental labels and declarations. Type III environmental declarations"



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