



RCBO 3+N Mechanical

Representative product	mRB6-16-3N-C/003-A (RCBO 3+N Mechanical) (Y7-120660) Product Category: Differential circuit-breakers
Description of the product	Eaton's mechanical RCBO - Residual-current circuit breaker with overcurrent protection is designed to provide circuit protection for low-voltage distribution systems. Eaton circuit breakers protect conductors against overloads and conductors and connected apparatus, such as motors and motor starters, against short circuits.
Homogeneous Environmental Families Covered	The PEP concerns following product offerings from Eaton residual-current circuit breaker with overcurrent protection as mentioned below: Series: mRB6, mRB4, FRBM4, FRBM6 Current Range: 6, 10, 13, 16, 20, 25, 32A No of Poles: 3+N Tripping Curves: B, C, D Sensitivity: 30mA, .3mA, .1mA Differential protection type: A, AC
Functional unit	Protect the installation against overloads and short circuits and protect people and premises at risk of fire or explosion against insulation defects in a circuit with rated voltage 400V, rated current 16A, with 3p+N poles, a rated breaking capacity 6kA, the tripping curve C (MCB) / A (RCD), the sensitivity 30mA, and the differential protection type A, in the Household/Commercial areas, according to the appropriate use scenario, and during the reference service life of the product of 20 years.
Company information	Eaton Electro Productie s.r.l, Independentei 8, Sarbi, Romania, 437157 Email: productstewardship-es@eaton.com

Constituent Materials			
Reference product mass	4.98E-01 kg (With packaging)		
Category PEP Material	Materials	Mass (kg)	Percentage (%)
Plastic	Polyamide 66	1.64E-01	32.9%
Metal	Steel cold rolled coil	1.19E-01	23.8%
Metal	Stainless steel	3.76E-02	7.5%
Metal	Steel hot dip galvanized	3.76E-02	7.5%
Metal	Copper wire	3.08E-02	6.2%
Metal	Copper ingot	1.79E-02	3.6%
Metal	Steel wire rod	1.39E-02	2.8%
Other	Electronic components	1.31E-02	2.6%
Other	Cardboard	1.24E-02	2.5%
Other	Wood	1.17E-02	2.3%
Other	Label	1.09E-02	2.2%
Plastic	PTFE	7.98E-03	1.6%
Metal	Ferronickel	4.89E-03	1.0%
Plastic	PMMA	3.22E-03	0.6%
Plastic	Polycarbonate	2.77E-03	0.6%
Other	Miscellaneous	1.15E-02	2.3%
Total		4.98E-01	100.0%

Substance Assessment

The representative product is compliant with the EU-RoHS Directive (2011/65/EU) with exemption and the product does contain Lead as Substance-of-Very-High-Concern (SVHC) on the Candidate List of the EU-REACH Regulation (1907/2006/EC).

Additional Environmental Information

Manufacturing	The reference product is assembled at an Eaton plant Sarbi, Romania holding management system certifications according to ISO 14001 standards.
Distribution	Eaton is committed to minimizing weight and volume of product and packaging with focus to optimize transport efficiency.
Installation	The installation process does not require any energy consumption and there is no waste other than the obsolete product packaging generated during this step.
Use	Product do not need any maintenance during Use phase
End of life	The recyclability rate of the overall product is 86.7% if it is properly dismantled prior to shredding. The rate is calculated based on "ECO'DEEE recyclability and recoverability calculation method" (version V1, 20 Sep. 2008 presented to the French Agency for Environment and Energy Management: ADEME).

Environmental Impacts	
The calculation of the environmental impacts is the result of the Product's Life Cycle Analysis in accordance with ISO 14040/44, covering the entire lifecycle, i.e., "Cradle-to-Grave" including the following life cycle phases: production, distribution, installation, use and end of life. System modelling was carried out using the commercial LCA software EIME v6.1.1 with database version CODDE-2022-01. Indicators Set: PEF EF 3.0 (Compliance: PEP ed.4, EN15804+A2) v2.0	
Manufacturing Phase	The product is assembled as well as packed at Eaton facility Eaton Electro Productie s.r.l, Independentei 8, Sarbi, Romania plant. Energy model used: Europe, Global, France, Singapore, US, China, Romania
Distribution Phase	Distribution of the product in its packaging from the Eaton's last logistics platform to the installation place in Europe is considered as per PCR rules.
Installation Phase	Product is installed in Europe. Installation of product and treatment of packaging waste are considered in this phase. There is no energy consumption for reference product. Energy model used: Europe
Use Phase	Reference lifetime: 20 Years Usage profile: Energy consumption is required by the product during its useful life. But product do not require any maintenance/replacement during useful life. Commercial/ Household application is considered as per PSR-0005 section 3.4.2. Use Rate: 15% In Load Rate: 20% RLT Total Energy consumption in kWh: 12.89034 kWh Energy model used: Europe
End of life Phase	Product disposed with WEEE guidelines. Energy model used: Europe
Module-D	Module D is calculated according to PCR-ed4-EN-2021 09 06 based on the materials recycled and the modelled end-of-life scenario. It expresses the net benefits and loads beyond the boundaries of the system and are not to be included in the life cycle totals. Energy model used: Europe, Global, US, France

Environmental Impact Indicators: Mandatory

Mandatory environmental impact indicators	Units	Sum	Manufacturing (A1-A3)	Distribution (A4)	Installation (A5)	Use* (B6)	End of life (C1-C4)	Module-D
Resource use, minerals and metals	kg SB eq.	5.01E-04	4.91E-04	4.70E-09	7.28E-10	3.83E-07	9.67E-06	-2.45E-04
Resource use, fossils	MJ	3.03E+02	1.21E+02	1.67E+00	2.72E-01	1.35E+02	4.59E+01	-5.64E+01
Acidification	mole of H+ eq.	7.35E-02	3.81E-02	7.57E-04	8.35E-05	3.01E-02	4.46E-03	-1.95E-02
Eutrophication, freshwater	kg P eq.	4.67E-04	1.48E-04	4.48E-08	4.20E-07	1.45E-05	3.04E-04	-6.13E-06
Eutrophication marine	kg N eq.	8.86E-03	4.39E-03	3.55E-04	3.98E-05	3.42E-03	6.53E-04	-2.32E-03
Eutrophication, terrestrial	mol N eq.	1.02E-01	3.89E-02	3.89E-03	2.58E-04	5.15E-02	7.28E-03	-1.66E-02
Climate change	kg CO ₂ eq.	1.16E+01	5.34E+00	1.20E-01	3.83E-02	5.28E+00	8.37E-01	-2.40E+00
Climate change-Biogenic	kg CO ₂ eq.	6.63E-02	4.84E-02	0.00E+00	1.27E-03	7.05E-03	9.58E-03	-1.15E-02
Climate change-Fossil	kg CO ₂ eq.	1.16E+01	5.30E+00	1.20E-01	3.71E-02	5.28E+00	8.27E-01	-2.39E+00
Climate change-Land use and land use change	kg CO ₂ eq.	2.52E-07	9.08E-08	0.00E+00	-1.39E-10	0.00E+00	1.61E-07	0.00E+00
Ozone depletion	kg CFC-11 eq.	1.03E-05	1.03E-05	1.83E-10	3.77E-10	2.26E-08	5.37E-08	-1.06E-07

Mandatory environmental impact indicators	Units	Sum	Manufacturing (A1-A3)	Distribution (A4)	Installation (A5)	Use* (B6)	End of life (C1-C4)	Module-D
Photochemical ozone formation - human health	kg NMVOC eq.	2.74E-02	1.30E-02	9.82E-04	6.25E-05	1.10E-02	2.36E-03	-5.73E-03
Water use	m³ eq	4.18E+00	3.17E+00	4.54E-04	2.85E-03	1.87E-01	8.22E-01	-1.84E+00

Inventory Flow Indicators: Mandatory

Inventory flow indicators	Units	Sum	Manufacturing (A1-A3)	Distribution (A4)	Installation (A5)	Use* (B6)	End of life (C1-C4)	Module-D
Use of renewable primary energy excluding renewable primary energy used as raw material	MJ	2.98E+01	3.45E+00	2.22E-03	8.71E-02	2.58E+01	3.98E-01	-5.52E-01
Use of renewable primary energy resources used as raw material	MJ	4.77E-01	4.77E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.76E-01
Total use of renewable primary energy resources	MJ	3.03E+01	3.93E+00	2.22E-03	8.71E-02	2.58E+01	3.98E-01	-8.28E-01
Use of non-renewable primary energy excluding non-renewable primary energy used as raw material	MJ	2.97E+02	1.15E+02	1.67E+00	2.72E-01	1.35E+02	4.59E+01	-5.28E+01
Use of non-renewable primary energy resources used as raw material	MJ	5.71E+00	5.71E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.62E+00
Total use of non-renewable primary energy resources	MJ	3.03E+02	1.21E+02	1.67E+00	2.72E-01	1.35E+02	4.59E+01	-5.64E+01
Use of secondary material	kg	2.53E-06	2.53E-06	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	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	0.00E+00
Net use of freshwater	m³	9.82E-02	7.37E-02	1.06E-05	6.63E-05	4.35E-03	2.01E-02	-4.28E-02
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	5.36E-01	1.24E-01	0.00E+00	3.78E-03	0.00E+00	4.08E-01	-3.05E-08
Materials for energy recovery	kg	9.33E-03	7.93E-04	0.00E+00	6.03E-03	0.00E+00	2.51E-03	0.00E+00
Exported Energy	MJ	3.86E-03	0.00E+00	0.00E+00	3.86E-03	0.00E+00	0.00E+00	0.00E+00
Hazardous waste disposed	kg	1.46E+01	1.41E+01	0.00E+00	6.74E-04	9.87E-02	4.76E-01	-9.03E+00
Non-hazardous waste disposed	kg	4.58E+00	3.31E+00	4.19E-03	2.01E-02	7.60E-01	4.80E-01	-1.08E+00
Radioactive waste disposed	kg	2.84E-03	2.32E-03	2.99E-06	1.56E-06	1.59E-04	3.53E-04	-2.53E-04
Biogenic carbon content of the product	kg C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content of the associated packaging	kg C	1.29E-02	1.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Environmental Impact Indicators: Optional

Optional Environmental impact indicators	Units	Sum	Manufacturing (A1-A3)	Distribution (A4)	Installation (A5)	Use* (B6)	End of life (C1-C4)	Module-D
Ecotoxicity, freshwater	CTUe	1.31E+02	4.57E+01	8.05E-02	3.50E-01	5.69E+01	2.81E+01	-1.21E+01
Human toxicity, cancer	CTUh	1.74E-06	1.52E-06	2.10E-12	3.06E-09	6.16E-10	2.16E-07	-9.12E-07
Human toxicity, non-cancer	CTUh	3.76E-07	3.14E-07	2.27E-10	1.38E-10	2.44E-08	3.77E-08	-1.55E-07
Ionising radiation, human health	kBq U235 eq.	4.41E+01	3.62E+01	2.91E-04	4.18E-03	7.86E+00	5.73E-02	-2.61E+01
Land use	No dimension	1.57E+00	5.61E-01	0.00E+00	1.88E-03	1.05E-01	9.00E-01	0.00E+00
EF-particulate Matter	Disease occurrence	6.11E-07	3.43E-07	6.15E-09	5.00E-10	2.34E-07	2.74E-08	-1.81E-07

Optional Environmental impact indicators	Units	Sum	Manufacturing (A1-A3)	Distribution (A4)	Installation (A5)	Use* (B6)	End of life (C1-C4)	Module-D
Total Primary Energy	MJ	3.33E+02	1.25E+02	1.67E+00	3.60E-01	1.60E+02	4.63E+01	-5.73E+01

*B6 is energy requirements during the use stage. Other sub modules in the use stage (B1-B5, B7) are equal to zero. So, it is not listed in the table.

To evaluate the environmental impact of other product covered by this PEP, multiply the impact figures by-

Multiplying Factors for Manufacturing, Distribution, Installation, End-of-Life, Module-D and Use Phase:

Part Number	Product Description	Multiplying Factors	
		Manufacturing, Distribution, Installation, EoL and Module-D Phase	Use Phase (Commercial Application) (Only B6)
Y7-120660	mRB6-16/3N/C/003-A (Reference)	1.00	1.00
Y7-120651	mRB6-13/3N/B/003-A		0.94
Y7-120652	mRB6-16/3N/B/003-A		1.06
Y7-120657	mRB6-6/3N/C/003-A		0.44
Y7-120658	mRB6-10/3N/C/003-A		0.75
Y7-120659	mRB6-13/3N/C/003-A		0.86
Y7-120670	mRB6-10/3N/D/003-A		0.72
Y7-120671	mRB6-13/3N/D/003-A		0.71
Y7-120672	mRB6-16/3N/D/003-A		1.03
Y7-120677	mRB4-20/3N/C/003-A		1.08
Y7-120678	mRB4-25/3N/C/003-A		1.06
Y7-120683	mRB4-20/3N/D/003-A		1.10
Y7-167508	mRB4-32/3N/C/003-A		1.43
Y7-170894	FRBM6-D16/3N/003-A		1.03
Y7-170986	FRBM6-B16/3N/003		1.06
Y7-170987	FRBM6-B13/3N/003-A		0.94
Y7-170988	FRBM6-B16/3N/003-A		1.06
Y7-170989	FRBM6-C6/3N/003		0.44
Y7-170990	FRBM6-C10/3N/003		0.75
Y7-170992	FRBM6-C16/3N/003		1.00
Y7-170993	FRBM4-C20/3N/003		1.08
Y7-170994	FRBM4-C25/3N/003		1.06
Y7-170995	FRBM4-C32/3N/003		1.43
Y7-170997	FRBM6-C10/3N/003-A		0.75
Y7-170998	FRBM6-C13/3N/003-A		0.86
Y7-170999	FRBM6-C16/3N/003-A		1.00
Y7-171000	FRBM4-C20/3N/003-A		1.08
Y7-171001	FRBM4-C25/3N/003-A		1.06
Y7-171002	FRBM4-C32/3N/003-A		1.43
Y7-171004	FRBM6-D10/3N/003		0.72
Y7-171006	FRBM6-D16/3N/003		1.03
Y7-171007	FRBM4-D20/3N/003		1.10

Part Number	Product Description	Multiplying Factors	
		Manufacturing, Distribution, Installation, EoL and Module-D Phase	Use Phase (Commercial Application) (Only B6)
Y7-120653	mRB6-13/3N/B/01-A		0.94
Y7-120654	mRB6-16/3N/B/01-A		1.06
Y7-120661	mRB6-6/3N/C/01-A		0.44
Y7-120662	mRB6-10/3N/C/01-A		0.75
Y7-120663	mRB6-13/3N/C/01-A		0.86
Y7-120664	mRB6-16/3N/C/01-A		1.00
Y7-120676	mRB6-16/3N/D/01-A		1.03
Y7-120679	mRB4-20/3N/C/01-A		1.08
Y7-120680	mRB4-25/3N/C/01-A		1.06
Y7-120684	mRB4-20/3N/D/01-A		1.10
Y7-167509	mRB4-32/3N/C/01-A		1.43
Y7-170899	FRBM6-B16/3N/01-A		1.06
Y7-170929	FRBM6-C16/3N/01-A		1.00
Y7-170930	FRBM4-C20/3N/01-A		1.08
Y7-170931	FRBM4-C25/3N/01-A		1.06
Y7-170932	FRBM4-C32/3N/01-A		1.43
Y7-120655	mRB6-13/3N/B/03-A		0.94
Y7-120656	mRB6-16/3N/B/03-A		1.06
Y7-120665	mRB6-6/3N/C/03-A		0.44
Y7-120666	mRB6-10/3N/C/03-A		0.75
Y7-120667	mRB6-13/3N/C/03-A		0.86
Y7-120668	mRB6-16/3N/C/03-A		1.00
Y7-120681	mRB4-20/3N/C/03-A		1.08
Y7-120682	mRB4-25/3N/C/03-A		1.06
Y7-167510	mRB4-32/3N/C/03-A		1.43
Y7-170946	FRBM6-B16/3N/03-A		1.06
Y7-170948	FRBM6-C10/3N/03		0.75
Y7-170950	FRBM6-C16/3N/03		1.00
Y7-170951	FRBM4-C20/3N/03		1.08
Y7-170952	FRBM4-C25/3N/03		1.06
Y7-170953	FRBM4-C32/3N/03		1.43
Y7-170955	FRBM6-C10/3N/03-A		0.75
Y7-170957	FRBM6-C16/3N/03-A		1.00
Y7-170958	FRBM4-C20/3N/03-A		1.08
Y7-170959	FRBM4-C25/3N/03-A		1.06
Y7-170960	FRBM4-C32/3N/03-A		1.43
Y7-170962	FRBM6-D10/3N/03		0.72
Y7-170964	FRBM6-D16/3N/03		1.03
Y7-170965	FRBM4-D20/3N/03		1.10

Part Number	Product Description	Multiplying Factors	
		Manufacturing, Distribution, Installation, EoL and Module-D Phase	Use Phase (Commercial Application) (Only B6)
Y7-170966	FRBM6-D6/3N/03-A		0.44
Y7-170969	FRBM6-D16/3N/03-A		1.03
Y7-170970	FRBM4-D20/3N/03-A		1.10

For part numbers intended for industrial application as well, the Use Phase (B6) impacts of commercial/residential application of specific part number should be multiplied by 11.11 to calculate impacts for Industrial application of that specific part number. The impact for other phases remains the same for all applications.

Disclaimer
This Product Environmental Profile and its content is based on information available to us. It refers to the product at the date of issue. We make no express or implied representations or warranties with respect to the information contained herein.

Registration Number	EATO-00113-V01.01-EN	Drafting rules	PCR-ed4-EN-2021 09 06
Verifier accreditation Number	VH54	Supplemented by	PSR-0005-ed3-EN-2023 06 06
Date of issue	03-2024	Information and reference documents	www.pep-ecopassport.org
		Validity period	5 years
Independent verification of the declaration and data, in compliance with ISO 14025: 2006			
Internal	X	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 and 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 »			