



### PN1 Switch Disconnecter (IEC) with Box Terminal and Fixed Installation

<b>Representative product</b>	PN1-4-160 (Y7-281253) Product Category: Disconnectors
<b>Description of the product</b>	Eaton Moeller series NZM Switch-disconnector, with two switch positions I-0, are designed to turn off all or part of an installation by disconnecting the installation or part of the installation of all electrical energy, for safety reasons. It is designed for electrical distribution systems and can handle voltages up to 690 V. Eaton's high performance, high quality, robust Switch-disconnectors are a perfect solution for industrial, trade and power distribution applications.
<b>Homogeneous Environmental Families Covered</b>	The PEP concerns following product offerings from Eaton Moeller series NZM Switch Disconnecter as mentioned below: <ul style="list-style-type: none"> <li>• Series: PN1 Switch Disconnectors</li> <li>• Rated Current: 63A, 100A, 125A, 160A</li> <li>• No. of Poles: 3, 4</li> <li>• Type of Terminal: With Box Terminal (BT)</li> </ul>
<b>Functional unit</b>	"Turn off all or part of an installation by separating the installation or part of the installation of all electrical energy or earth, for safety reasons with a rated voltage 690V, and rated current 160A, ensuring isolation characterized by a rated voltage 690V, and IP Rating of IP20, according to the appropriate use scenario, and during the reference service life of the product of 20 years."
<b>Company information</b>	Eaton Electro Productie s.r.l, Independentei 8, Sarbi, Romania, 437157 Email: <a href="mailto:productstewardship-es@eaton.com">productstewardship-es@eaton.com</a>

Constituent Materials			
Reference product mass	1.29E+00 Kg (With packaging)		
Category PEP Material	Material constituent	Mass (kg)	% Contribution
Plastic	Polyamide 66 with 30% Glass Fiber	2.82E-01	21.8%
Metal	Steel	2.28E-01	17.6%
Plastic	Polycarbonate	1.94E-01	15.0%
Plastic	Polyester Resin	1.60E-01	12.4%
Metal	Copper	1.60E-01	12.4%
Metal	Stainless Steel	1.07E-01	8.3%
Others	Cardboard	4.45E-02	3.4%
Plastic	Polyphenylene Sulfide	3.65E-02	2.8%
Others	Wood	2.92E-02	2.3%
Plastic	Polyamide 66	1.91E-02	1.5%
Others	Paper	1.10E-02	0.9%
Metal	Silver	8.02E-03	0.6%
Plastic	Polybutylene Terephthalate	5.00E-03	0.4%
Plastic	Liquid Crystal Polymer	3.20E-03	0.2%
Metal	Brass	3.00E-03	0.2%
Other	Miscellaneous	1.92E-03	0.1%
<b>Total</b>		1.29E+00	100.0%

Substance Assessment
The representative product is compliant with exemption with the EU-RoHS Directive (2011/65/EU), and the product does contain lead, Bisphenol A and 4-tert-butylphenol as substance listed as Substance-of-Very-High-Concern (SVHC) as Duty-to-Declare on the Candidate List of the EU-REACH Regulation (1907/2006/EC).

Additional Environmental Information	
<b>Manufacturing</b>	The reference product is assembled at an Eaton plant Sarbi, Romania holding management system certifications according to ISO 14001 standards.
<b>Distribution</b>	Eaton is committed to minimizing weight and volume of product and packaging with focus to optimize transport efficiency.
<b>Installation</b>	The installation process does not require any energy consumption and there is no waste other than the obsolete product packaging generated during this step.
<b>Use</b>	The product requires energy consumption during operation.
<b>End of life</b>	The recyclability rate of the overall product is 77.27% 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	
<p>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.</p> <p>System modelling was carried out using the commercial LCA software EIME v6.2.2 with database version CODDE-2024-04.</p> <p>Indicators Set: PEF EF 3.1 (Compliance: PEP ed.4, EN15804+A2) v2.0</p>	
<b>Manufacturing Phase</b>	The product is assembled as well as packed at Eaton facility in Romania. Energy model used: Romania
<b>Distribution Phase</b>	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.
<b>Installation Phase</b>	Product is installed in Europe. Installation of product and treatment of packaging waste are considered in this phase. There is no energy consumption for installation for reference product. Energy model used: Europe
<b>Use Phase</b>	Reference lifetime: 20 Years Usage profile: The product has power loss of 29.18 W at full load condition. For Industrial applications considering 50% of the loading rate and 30% of the use time rate, total losses are 383.43 kWh over the 20 years. Product do not require any maintenance/replacement during useful life. Industrial application is considered as per PSR-0005 section 3.2.2. Energy model used: Europe
<b>End of life Phase</b>	Product disposed with WEEE guidelines. Energy model used: Europe
<b>Module-D</b>	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.

### Environmental Impact Indicators: Mandatory

Mandatory environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Climate change - total (GWP)	kg CO <sub>2</sub> eq.	1.47E+02	1.02E+01	3.08E-01	2.25E-01	1.35E+02	1.55E+00	-5.49E+00
Climate change - fossil fuels (GWP-f)	kg CO <sub>2</sub> eq.	1.47E+02	1.02E+01	3.08E-01	8.80E-02	1.35E+02	1.51E+00	-5.51E+00
Climate change - biogenics (GWP-b)	kg CO <sub>2</sub> eq.	3.89E-01	-2.78E-02	0.00E+00	1.37E-01	2.49E-01	3.16E-02	1.99E-02
Climate change - land use and land use transformation (GWP-lu)	kg CO <sub>2</sub> eq.	2.69E-04	2.69E-04	0.00E+00	0.00E+00	0.00E+00	5.31E-07	-2.46E-04
Ozone depletion (ODP)	kg eq. CFC-11	1.44E-06	7.49E-07	4.72E-10	3.24E-09	6.55E-07	3.05E-08	-3.98E-07
Acidification (AP)	mole of H <sup>+</sup> eq.	7.92E-01	8.83E-02	1.95E-03	2.70E-04	6.92E-01	8.74E-03	-4.77E-02
Freshwater eutrophication (Ep-fw)	kg P eq.	1.81E-03	4.53E-04	1.16E-07	8.35E-07	3.56E-04	9.96E-04	-2.76E-05

Mandatory environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Marine aquatic eutrophication (Ep-m)	kg of N eq.	9.63E-02	9.66E-03	9.15E-04	9.45E-05	8.43E-02	1.24E-03	-4.97E-03
Terrestrial eutrophication (Ep-t)	mole of N eq.	1.47E+00	9.34E-02	1.00E-02	7.16E-04	1.35E+00	1.51E-02	-4.03E-02
Photochemical ozone formation (POCP)	kg of NMVOC eq.	3.04E-01	3.12E-02	2.53E-03	1.82E-04	2.65E-01	4.35E-03	-1.43E-02
Depletion of abiotic resources - elements (ADP-e)	kg eq. Sb	1.17E-02	1.16E-02	1.21E-08	6.57E-09	4.78E-05	3.21E-05	-4.49E-03
Depletion of abiotic resources - fossil fuels (ADP-f)	MJ	3.70E+03	2.06E+02	4.30E+00	7.32E-01	3.41E+03	7.79E+01	-9.31E+01
Water scarcity (WDP)	m <sup>3</sup> eq. deprivation worldwide	1.91E+01	7.49E+00	1.17E-03	2.26E-02	1.04E+01	1.21E+00	-4.74E+00

### Inventory Flow Indicators: Mandatory

Inventory flow indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	9.17E+02	1.14E+01	5.74E-03	4.73E-01	9.03E+02	1.86E+00	-3.75E+00
Use of renewable primary energy resources used as raw materials	MJ	2.17E+00	2.17E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-9.72E-01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	9.19E+02	1.36E+01	5.74E-03	4.73E-01	9.03E+02	1.86E+00	-4.72E+00
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	3.68E+03	1.87E+02	4.30E+00	7.32E-01	3.41E+03	7.79E+01	-8.11E+01
Use of non-renewable primary energy resources used as raw materials	MJ	1.87E+01	1.87E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.20E+01
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.70E+03	2.06E+02	4.30E+00	7.32E-01	3.41E+03	7.79E+01	-9.31E+01
Use of secondary materials	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Inventory flow indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
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 fresh water	m <sup>3</sup>	4.47E-01	1.75E-01	2.72E-05	7.63E-04	2.43E-01	2.82E-02	-1.10E-01
Hazardous waste disposed of	kg	6.92E+01	6.21E+01	0.00E+00	6.65E-03	5.92E+00	1.22E+00	-3.40E+01
Non-hazardous waste disposed of	kg	2.86E+01	5.31E+00	1.08E-02	3.48E-02	2.28E+01	4.24E-01	-2.60E+00
Radioactive waste disposed of	kg	7.58E-03	2.24E-03	7.70E-06	4.00E-06	5.24E-03	8.83E-05	-1.38E-03
Components for re-use	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	1.29E+00	2.92E-01	0.00E+00	5.59E-02	0.00E+00	9.42E-01	-1.51E-07
Materials for energy recovery	kg	3.12E-02	1.72E-03	0.00E+00	1.43E-02	0.00E+00	1.52E-02	0.00E+00
Exported energy	MJ by energy vector	1.03E-02	3.47E-05	0.00E+00	1.02E-02	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content of the product	kg of 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 of C.	3.58E-02	3.58E-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	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B6 - Operational energy use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Emission of fine particles	incidence of diseases	6.47E-06	8.32E-07	1.59E-08	1.57E-09	5.57E-06	5.01E-08	-4.50E-07
Ionizing radiation, human health	kBq U <sup>235</sup> eq.	2.70E+02	6.47E+01	7.51E-04	1.05E+01	1.94E+02	3.96E-01	-4.41E+01
Ecotoxicity, fresh water	CTUe	6.73E+02	3.86E+02	2.02E-01	9.01E-01	2.55E+02	3.05E+01	-3.20E+02
Human toxicity, cancer effects	CTUh	1.67E-06	1.65E-06	5.42E-12	5.52E-09	1.70E-08	1.12E-09	-9.22E-07
Human toxicity, non-cancer effects	CTUh	1.23E-06	7.38E-07	1.05E-10	2.12E-10	4.06E-07	8.46E-08	-4.40E-07
Impacts related to land use/soil quality	-	8.65E+00	1.94E+00	0.00E+00	2.29E-04	3.74E+00	2.97E+00	-6.86E-01
Total use of primary energy during the life cycle	MJ	4.62E+03	2.20E+02	4.30E+00	1.20E+00	4.31E+03	7.98E+01	-9.79E+01

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

**Factors for Manufacturing, Installation, End-of-Life, and Module-D Phase:**

Product Number	Product Number	Phases	GWP	GWP-f	GWP-b	GWP-lu	ODP	AP	Ep-fw	Ep-m	Ep-t	POCP	ADP-e	ADP-f	WDP
Y7-281253	PN1-4-160 (Reference)	All Phases Except Distribution and Use Phase	1.00												
Y7-265999	PN1-4-63	All Phases Except Distribution and Use Phase	1.00												
Y7-266000	PN1-4-100	All Phases Except Distribution and Use Phase	1.00												
Y7-266001	PN1-4-125	All Phases Except Distribution and Use Phase	1.00												
Y7-281235	PN1-160	Manufacturing	0.78	0.78	1.45	0.77	0.78	0.77	0.76	0.78	0.78	0.78	0.75	0.78	0.78
		Installation	0.93	0.93	0.92	1.00	0.99	0.97	0.96	0.96	0.96	0.95	0.98	0.96	0.99
		End of Life	0.78	0.78	0.75	0.76	0.76	0.77	0.75	0.78	0.77	0.78	0.75	0.79	0.77
		Module-D	0.78	0.78	1.54	0.77	0.78	0.77	0.77	0.77	0.78	0.78	0.75	0.77	0.78
Y7-259140	PN1-63	Manufacturing	0.78	0.78	1.45	0.77	0.78	0.77	0.76	0.78	0.78	0.78	0.75	0.78	0.78
		Installation	0.93	0.93	0.92	1.00	0.99	0.97	0.96	0.96	0.96	0.95	0.98	0.96	0.99
		End of Life	0.78	0.78	0.75	0.76	0.76	0.77	0.75	0.78	0.77	0.78	0.75	0.79	0.77
		Module-D	0.78	0.78	1.54	0.77	0.78	0.77	0.77	0.77	0.78	0.78	0.75	0.77	0.78
Y7-259141	PN1-100	Manufacturing	0.78	0.78	1.45	0.77	0.78	0.77	0.76	0.78	0.78	0.78	0.75	0.78	0.78
		Installation	0.93	0.93	0.92	1.00	0.99	0.97	0.96	0.96	0.96	0.95	0.98	0.96	0.99
		End of Life	0.78	0.78	0.75	0.76	0.76	0.77	0.75	0.78	0.77	0.78	0.75	0.79	0.77
		Module-D	0.78	0.78	1.54	0.77	0.78	0.77	0.77	0.77	0.78	0.78	0.75	0.77	0.78
Y7-259142	PN1-125	Manufacturing	0.78	0.78	1.45	0.77	0.78	0.77	0.76	0.78	0.78	0.78	0.75	0.78	0.78
		Installation	0.93	0.93	0.92	1.00	0.99	0.97	0.96	0.96	0.96	0.95	0.98	0.96	0.99
		End of Life	0.78	0.78	0.75	0.76	0.76	0.77	0.75	0.78	0.77	0.78	0.75	0.79	0.77
		Module-D	0.78	0.78	1.54	0.77	0.78	0.77	0.77	0.77	0.78	0.78	0.75	0.77	0.78


**Multiplying Factors for Use Phase and Distribution phase for homogenous products:**

Part Number	Product Description	Use Phase Extrapolation Factors	Distribution Phase Extrapolation Factors
Y7-281253 (Reference)	PN1-4-160	1.00	1.00
Y7-281235	PN1-160	1.00	0.78
Y7-259140	PN1-63	0.15	0.78
Y7-259141	PN1-100	0.39	0.78
Y7-259142	PN1-125	0.61	0.78
Y7-265999	PN1-4-63	0.15	1.00

Part Number	Product Description	Use Phase Extrapolation Factors	Distribution Phase Extrapolation Factors
Y7-266000	PN1-4-100	0.39	1.00
Y7-266001	PN1-4-125	0.61	1.00

#### 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-00224-V01.01-EN	Drafting rules	PCR-ed4-EN-2021 09 06
Verifier accreditation Number	VH53	Supplemented by	PSR-0005-ed3.1-EN-2023 12 08
Date of issue	10-2024	Information and reference documents	<a href="http://www.pep-ecopassport.org">www.pep-ecopassport.org</a>
		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 »			