Powering Business Worldwide	**Product Environmental Profile**	PEP ecopassport®

M22 Potentiometer

Representative product	M22-R100K (Y7-229493) Product Category: Other Equipment-Passive products-non-continuous
Description of the product	Eaton Moeller series M22 contact elements are vital for industrial control and automation. They open or close electrical circuits to control machinery, integrate into safety circuits for emergency stops, and pair with indicator lights to provide status feedback, enhancing system reliability and safety.
Homogeneous Environmental Families Covered	The PEP concerns following product offerings from Eaton Moeller series M22 Potentiometer as mentioned below: Y7-263371 M22-R*-* Y7-288863 M22-R*-*-RH Y7-229491 M22-R10K Y7-229489 M22-R1K Y7-229494 M22-R470K Y7-229492 M22-R47K Y7-229490 M22-R4K7 Y7-263372 M22S-R*-* Y7-288864 M22S-R*-*-RH Y7-232235 M22S-R100K Y7-232233 M22S-R10K Y7-232231 M22S-R1K Y7-232236 M22S-R470K Y7-232234 M22S-R47K Y7-232232 M22S-R4K7 Y7-198591 M22-R100K-BLANK-RH

	Y7-198593 M22-R10K-BLANK Y7-198302 M22-R10K-BLANK-RH Y7-198592 M22-R2K2-BLANK Y7-198595 M22S-R10K-BLANK Y7-198594 M22S-R2K2-BLANK Y7-171157 M22-R2K2
Functional unit	'Potentiometer is used to precise control and adjustment of machines in industrial applications. Potentiometers provide a particularly easy way to control speed or configure general settings such as temperature during the 20-year reference lifespan of the product.'
Company information	EATON INDUSTRIES GMB Kompetenzzentrum Baederstrasse, Holzhausen, Germany, 56357 Email: productstewardship-es@eaton.com

Constituent Materials			
Reference product mass	**4.58E-02 k**g (With packaging)		
Category PEP Material	**Material constituent**	**Mass (kg)**	**% Contribution**
Plastics	Polyamide 66 GF30	1.35E-02	29.4%
Other	Electronics	1.07E-02	23.4%
Other	Cardboard	9.13E-03	19.9%
Plastics	Polyamide 6	7.10E-03	15.5%
Other	Wood	1.75E-03	3.8%
Other	Paper	1.00E-03	2.2%
Metals	Copper wire	6.37E-04	1.4%
Plastics	Acrylonitrile Butadiene Styrene	6.36E-04	1.4%
Plastics	Polycarbonate	6.36E-04	1.4%
Other	Low density Polyethylene	5.02E-04	1.1%
Other	Label	2.70E-04	0.6%
Total		**4.58E-02**	**100.00%**

Substance Assessment
The representative product is compliant with the EU-RoHS Directive (2011/65/EU) and the product doesn't contain any substance listed 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 in Holzhausen, Germany 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	The product requires energy consumption during operation.

End of life	The recyclability rate of the overall product is 21.3% 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 v6.2.5-3 with database version CODDE-2024-04 - updated on 2024-06-04 Indicators Set: PEF EF 3.1 (Compliance: PEP ed.4, EN15804+A2) v2.0	
Manufacturing Phase	The product is assembled as well as packed at EATON INDUSTRIES GMB Kompetenzzentrum Baederstrasse, Holzhausen, Germany plant. Energy model used: Germany
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: The product has power loss of 0.5 W at full load condition. For non-continuous operation considering 30% of the loading rate and 30% of the use time rate, total losses are 2365.2 Wh over the 20 years. Product do not require any maintenance/replacement during useful life. non-continuous operation is considered as per PSR-0005 section 3.15.2.1. 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.

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 CO2 eq.	1.28E+00	3.47E-01	1.22E-02	4.59E-02	8.34E-01	4.36E-02	-1.88E-03
Climate change - fossil fuels (GWP-f)	kg CO2 eq.	1.26E+00	3.58E-01	1.22E-02	1.85E-02	8.32E-01	4.35E-02	-1.44E-02
Climate change – biogenics (GWP-b)	kg CO2 eq.	1.78E-02	-1.12E-02	0.00E+00	2.75E-02	1.53E-03	1.02E-04	1.25E-02
Climate change - land use and land use transformation (GWP-lu)	kg CO2 eq.	8.86E-07	8.85E-07	0.00E+00	0.00E+00	0.00E+00	1.30E-09	0.00E+00
Ozone depletion (ODP)	kg eq. CFC-11	4.14E-08	3.62E-08	1.87E-11	2.02E-10	4.04E-09	9.13E-10	-1.64E-09
Acidification (AP)	mole of H+ eq.	7.32E-03	2.84E-03	7.72E-05	4.45E-05	4.27E-03	9.24E-05	-3.72E-04

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
Freshwater eutrophication (EP-fw)	kg P eq.	9.60E-06	4.32E-06	4.57E-09	2.01E-07	2.19E-06	2.88E-06	-1.53E-07
Marine aquatic eutrophication (EP-m)	kg of N eq.	9.87E-04	3.88E-04	3.62E-05	1.76E-05	5.20E-04	2.51E-05	-2.07E-05
Terrestrial eutrophication (EP-t)	mole of N eq.	1.30E-02	3.85E-03	3.97E-04	1.40E-04	8.36E-03	2.97E-04	-1.90E-04
Photochemical ozone formation (POCP)	kg of NMVOC eq.	3.03E-03	1.19E-03	1.00E-04	3.38E-05	1.64E-03	6.81E-05	-7.11E-05
Depletion of abiotic resources – elements (ADPe)	kg eq. Sb	3.28E-05	3.24E-05	4.80E-10	6.41E-10	2.95E-07	8.02E-08	-2.61E-06
Depletion of abiotic resources - fossil fuels (ADP-f)	MJ	2.90E+01	7.44E+00	1.70E-01	1.41E-01	2.10E+01	2.24E-01	-2.22E-01
Water scarcity (WDP)	m3 of eq. deprivation worldwide	2.09E-01	1.40E-01	4.63E-05	1.07E-03	6.39E-02	3.41E-03	-1.83E-02

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	5.74E+00	1.06E-01	2.27E-04	4.89E-02	5.57E+00	1.39E-02	2.00E-02
Use of renewable primary energy resources used as raw materials	MJ	3.44E-01	3.44E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.45E-01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	6.08E+00	4.50E-01	2.27E-04	4.89E-02	5.57E+00	1.39E-02	-1.25E-01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	2.83E+01	6.69E+00	1.70E-01	1.41E-01	2.10E+01	2.24E-01	-2.04E-01
Use of non-renewable primary energy resources used as raw materials	MJ	7.50E-01	7.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.82E-02
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	2.90E+01	7.44E+00	1.70E-01	1.41E-01	2.10E+01	2.24E-01	-2.22E-01
Use of secondary materials	kg	1.00E-06	1.00E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.20E-04
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	m3	4.97E-03	3.31E-03	1.08E-06	7.85E-05	1.50E-03	8.33E-05	-4.27E-04
Hazardous waste disposed of	kg	2.35E-01	1.46E-01	0.00E+00	1.53E-03	3.65E-02	5.05E-02	-2.40E-01
Non-hazardous waste disposed of	kg	1.99E-01	4.27E-02	4.28E-04	7.59E-03	1.41E-01	7.63E-03	-6.16E-03
Radioactive waste disposed of	kg	6.44E-05	2.99E-05	3.05E-07	9.52E-07	3.23E-05	9.58E-07	-3.05E-06
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	1.86E-02	7.22E-03	0.00E+00	1.09E-02	0.00E+00	5.09E-04	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
Materials for energy recovery	kg	5.30E-04	3.40E-04	0.00E+00	1.90E-04	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ by energy vector	3.27E-03	4.18E-04	0.00E+00	2.85E-03	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.	8.15E-03	0.00E+00	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	5.19E-08	1.60E-08	6.28E-10	2.68E-10	3.44E-08	5.89E-10	-2.23E-09
Ionizing radiation, human health	kBq of U235 eq.	4.43E+00	3.22E+00	2.97E-05	2.10E-03	1.20E+00	4.30E-03	-8.43E-01
Ecotoxicity, fresh water	CTUe	2.03E+02	2.00E+02	7.99E-03	1.79E-01	1.57E+00	1.22E+00	-2.87E-01
Human toxicity, cancer effects	CTUh	3.94E-04	3.94E-04	2.14E-13	1.25E-09	1.05E-10	8.44E-09	-1.32E-09
Human toxicity, non-cancer effects	CTUh	1.77E-08	1.38E-08	4.14E-12	4.19E-11	2.50E-09	1.37E-09	-4.32E-09
Impacts related to land use/soil quality	-	3.72E-02	6.46E-03	0.00E+00	5.23E-05	2.31E-02	7.63E-03	0.00E+00
Total use of primary energy during the life cycle	MJ	3.51E+01	7.89E+00	1.70E-01	1.90E-01	2.66E+01	2.38E-01	-3.47E-01

Other sub modules in the use stage (B1-B5, B7) are equal to 0, hence not listed in the table.

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

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

Product Number	Description	Phases	GWP	GWP-f	GWP-b	GWP-lu	ODP	AP	Ep-fw	Ep-m	Ep-t	POCP	ADP-e	ADP-f	WDP
Y7-229493 (Reference)	M22-R100K (Reference)	All Phase	1.00												
Y7-263371	M22-R*-*	All Phase	1.00												
Y7-288863	M22-R*-*-RH	All Phase	1.00												
Y7-229491	M22-R10K	All Phase	1.00												
Y7-229489	M22-R1K	All Phase	1.00												

Product Number	Description	Phases	GWP	GWP-f	GWP-b	GWP-lu	ODP	AP	Ep-fw	Ep-m	Ep-t	POCP	ADP-e	ADP-f	WDP
Y7-229494	M22-R470K	All Phase							1.00						
Y7-229492	M22-R47K	All Phase							1.00						
Y7-229490	M22-R4K7	All Phase							1.00						
Y7-263372	M22S-R*-*	All Phase							1.00						
Y7-288864	M22S-R*-*-RH	All Phase							1.00						
Y7-232235	M22S-R100K	All Phase							1.00						
Y7-232233	M22S-R10K	All Phase							1.00						
Y7-232231	M22S-R1K	All Phase							1.00						
Y7-232236	M22S-R470K	All Phase							1.00						
Y7-232234	M22S-R47K	All Phase							1.00						
Y7-232232	M22S-R4K7	All Phase							1.00						
Y7-198591	M22-R100K-BLANK-RH	All Phase							1.00						
Y7-198593	M22-R10K-BLANK	All Phase							1.00						
Y7-198302	M22-R10K-BLANK-RH	All Phase							1.00						
Y7-198592	M22-R2K2-BLANK	All Phase							1.00						
Y7-198595	M22S-R10K-BLANK	All Phase							1.00						
Y7-198594	M22S-R2K2-BLANK	Manufacturing	0.85	0.86	1.03	1.00	0.84	0.86	0.69	0.87	0.85	0.85	0.85	0.81	0.86
		Distribution							0.88						
		Installation							1.00						
		End of Life	0.83	0.83	0.96	1.00	0.82	0.84	0.97	0.83	0.83	0.83	1.00	0.84	0.93
		Module- D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Y7-171157	M22-R2K2	Manufacturing	0.85	0.86	1.03	1.00	0.84	0.86	0.69	0.87	0.85	0.85	0.85	0.81	0.86
		Distribution							0.88						
		Installation							1.00						
		End of Life	0.83	0.83	0.96	1.00	0.82	0.84	0.97	0.83	0.83	0.83	1.00	0.84	0.93
		Module- D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Multiplying Factors for Use Phase for homogenous products:

Part Number	Product Description	Equipment heat dissipation, current-dependent (W)	Use Phase Extrapolation Factors
Y7-229493 (Reference)	M22-R100K (Reference)	0.5	1
Y7-263371	M22-R*-*	0.5	1
Y7-288863	M22-R*-*-RH	0.5	1
Y7-229491	M22-R10K	0.5	1
Y7-229489	M22-R1K	0.5	1
Y7-171157	M22-R2K2	0.5	1
Y7-229494	M22-R470K	0.5	1
Y7-229492	M22-R47K	0.5	1
Y7-229490	M22-R4K7	0.5	1
Y7-263372	M22S-R*-*	0.5	1
Y7-288864	M22S-R*-*-RH	0.5	1
Y7-232235	M22S-R100K	0.5	1
Y7-232233	M22S-R10K	0.5	1
Y7-232231	M22S-R1K	0.5	1
Y7-232236	M22S-R470K	0.5	1
Y7-232234	M22S-R47K	0.5	1
Y7-232232	M22S-R4K7	0.5	1
Y7-198591	M22-R100K-BLANK-RH	0.5	1
Y7-198593	M22-R10K-BLANK	0.5	1
Y7-198302	M22-R10K-BLANK-RH	0.5	1
Y7-198592	M22-R2K2-BLANK	0.5	1
Y7-198595	M22S-R10K-BLANK	0.5	1
Y7-198594	M22S-R2K2-BLANK	0.5	1

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.

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Verifier accreditation Number	VH56	Supplemented by	PSR-0005-ed3.1-EN-2023 12 08
Date of issue	04-2025	*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 »			