Product Environmental Profile

Discrete Input/Output expansion Module
TM2DMM24DRF

PEP ecopassport SCHN-2013-011-V1

Product Environmental Profile - PEP

Product overview

The TM2DMM24DRF is a discrete Input/Output module expansion for Modicon M238, Magelis XBTGC and Twido, included in active product category.

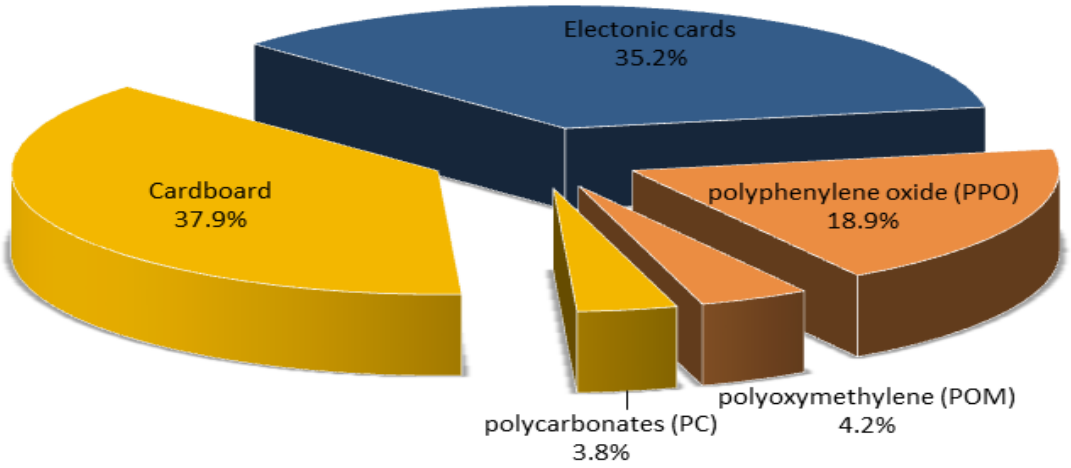
The main purpose of the TM2DMM24DRF is to communicate (give and receive information) and process data for automated management systems during 10 years.

The product used for the analysis is the TM2DMM24DRF (16 channel input/ 8 channel relay output module with non-removable spring terminal block).

The environmental analysis was performed in conformity with ISO 14040.

Constituent materials

The mass of the product is 264g including packaging. The constituent materials are distributed as follows:



Substance assessment

Product is designed in conformity with the requirements of the RoHS directive (European Directive 2011/65/EU of 8 June 2011) and does 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

Details of ROHS and REACH substances information are available on the Schneider-Electric Green Premium website . (http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page)

Manufacturing

The TM2DMM24DRF product is manufactured at a production site which complies with the regulations governing industrial sites.

Distribution

The weight and volume of the packaging have been optimized, based on the European Union's packaging directive.
The TM2DMM24DRF packaging weight is *100 g*. It consists of 100g of cardboard.
The weight of recycled materials used is 80% of total packaging mass.
The product distribution flows have been optimised by setting up local distribution centres close to the market areas.

Use

The product TM2DMM24DRF does not generate environmental pollution (noise, emissions) requiring special precautionary measures in standard use.
The dissipated power depends on the conditions under which the product is implemented and used. This dissipated power is 1.08 W for the TM2DMM24DRF product. The thermal dissipation represents less than 1% of the power which passes through the product.
The product range does not require special maintenance operations.

End of life

At end of life, the TM2DMM24DRF product has been optimized to decrease the amount of waste and allow recovery of the product components and materials.
This product contains electronic cards (0.093 Kg) that should be separated from the stream of waste so as to optimize end-of-life treatment by special treatments. The location of these components and other recommendations are given in the End of Life Instruction document which is available for this product range on the Schneider-Electric Green Premium website Green Premium website
(http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page).

The recyclability potential of the product has been evaluated using the “ECO DEEE recyclability and recoverability calculation method” (version V1, 20 Sep. 2008 presented to the French Agency for Environment and Energy Management: ADEME).
According to this method, the potential recyclability ratio is: 21.1%.
As described in the recyclability calculation method this ratio includes only metals and plastics which have proven industrial recycling processes.

Environmental impacts

Life cycle assessment has been performed on the following life cycle phases: Materials and Manufacturing (M), Distribution (D), Installation (I) Use (U), and End of life (E).
Modelling hypothesis and method:
- The calculation was performed on the TM2DMM24DRF product
- Product packaging is included
- Installation components: No flows taken into consideration.
- Scenario for the Use phase: this product is included in the active category (category 2). Its assumed service life is 10 years and use scenario is product dissipation is 1.08 W in active mode and service uptime percentage is 100%. Average use scenario of the product is 12h / day but some application requires full time running (source: Schneider Electric). We take the worst case scenario to build the use phase scenario of the product.
- The geographical representative area for the use phase is Europe and the electrical power model used for calculation is European model.

End of life impacts are based on end of life scenario including collection, dismantling element, special treatment for element under WEEE specification, shredding and sorting out other material flows. Depending on the recycled rate of the product, some flows are going to be recycled, some incinerated and some are going to be landfilled. The impact of these 3 stages has been taken into consideration.

Presentation of the product environmental impacts

Environmental indicators	Unit	For give the name and commercial reference or description of the representative product					
		S = M + D + I + U + E	M	D	I	U	E
Raw Material Depletion	Y-1	8.64E-14	8.40E-14	8.43E-19	0	2.46E-15	7.49E-19
Energy Depletion	MJ	2.24E+03	7.18E+01	6.19E-01	0	2.17E+03	5.63E-01
Water depletion	dm^3	3.63E+02	4.95E+01	5.87E-02	0	3.13E+02	9.26E-02
Global Warming	g≈CO_2	1.14E+05	4.23E+03	4.90E+01	0	1.09E+05	1.34E+02
Ozone Depletion	g≈CFC-11	6.86E-03	8.61E-04	3.46E-05	0	5.94E-03	2.27E-05
Air Toxicity	m^3	1.91E+07	9.37E+05	9.26E+03	0	1.81E+07	8.77E+03
Photochemical Ozone Creation	g≈C_2H_4	3.95E+01	1.23E+00	4.25E-02	0	3.82E+01	3.01E-02
Air acidification	g≈H^+	1.54E+01	7.01E-01	6.26E-03	0	1.47E+01	5.83E-03
Water Toxicity	m^3	3.29E+01	1.32E+00	6.70E-03	0	3.13E+01	2.39E-01
Water Eutrophication	g≈PO_4^{3-}	7.04E-01	4.27E-01	8.14E-04	0	2.57E-01	1.89E-02
Hazardous waste production	kg	1.88E+00	7.05E-02	1.82E-05	0	1.81E+00	1.36E-04

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 5.0.7, and with its database version July 2012.
The Use phase is the life cycle phase which has the greatest impact on the majority of environmental indicators.

System approach

As the product is designed in accordance with the RoHS Directive (European Directive 2011/65/EU of 8 June 2011), it can be incorporated without any restriction in an assembly or an installation subject to this Directive.
Please note that the values given above are only valid within the context specified and cannot be used directly to draw up the environmental assessment of an installation.

Glossary

Raw Material Depletion (RMD)	This indicator quantifies the consumption of raw materials during the life cycle of the product. It is expressed as the fraction of natural resources that disappear each year, with respect to all the annual reserves of the material.
Energy Depletion (ED)	This indicator gives the quantity of energy consumed, whether it be from fossil, hydroelectric, nuclear or other sources. This indicator takes into account the energy from the material produced during combustion. It is expressed in MJ.
Water Depletion (WD)	This indicator calculates the volume of water consumed, including drinking water and water from industrial sources. It is expressed in dm^3.
Global Warming (GW)	The global warming of the planet is the result of the increase in the greenhouse effect due to the sunlight reflected by the earth's surface being absorbed by certain gases known as "greenhouse-effect" gases. The effect is quantified in gram equivalent of CO_2.
Ozone Depletion (OD)	This indicator defines the contribution to the phenomenon of the disappearance of the stratospheric ozone layer due to the emission of certain specific gases. The effect is expressed in gram equivalent of CFC-11.
Air Toxicity (AT)	This indicator represents the air toxicity in a human environment. It takes into account the usually accepted concentrations for several gases in the air and the quantity of gas released over the life cycle. The indication given corresponds to the air volume needed to dilute these gases down to acceptable concentrations.
Photochemical Ozone Creation (POC)	This indicator quantifies the contribution to the "smog" phenomenon (the photochemical oxidation of certain gases which generates ozone) and is expressed in gram equivalent of ethylene (C_2H_4).
Air Acidification (AA)	The acid substances present in the atmosphere are carried by rain. A high level of acidity in the rain can cause damage to forests. The contribution of acidification is calculated using the acidification potentials of the substances concerned and is expressed in mode equivalent of H^+.
Water Toxicity (WT)	This indicator represents the water toxicity. It takes into account the usually accepted concentrations for several substances in water and the quantity of substances released over the life cycle. The indication given corresponds to the water volume needed to dilute these substances down to acceptable concentrations.
Hazardous Waste Production (HWP)	This indicator calculates the quantity of specially treated waste created during all the life cycle phases (manufacturing, distribution and utilization). For example, special industrial waste in the manufacturing phase, waste associated with the production of electrical power, etc. It is expressed in kg.

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Independent verification of the declaration and data, according to ISO 14025:2006				
Internal		External	X	
In compliance with ISO 14025:2006 type III environmental declarations				
PCR review was conducted by an expert panel chaired by J. Chevalier (CSTB)				
The elements of the actual PEP cannot be compared with elements from another program				

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