Product Environmental Profile

MiCOM P849

Input & Output Extension Device

Schneider Electric

Product Environmental Profile - PEP

Product overview

The main purpose of the MiCOM P849 Input / Output box is to gather digital values from many digital sensors and communicate them to Protection or Control schemes. It is also to process control commands coming from Protection or Control schemes up to primary actuators.

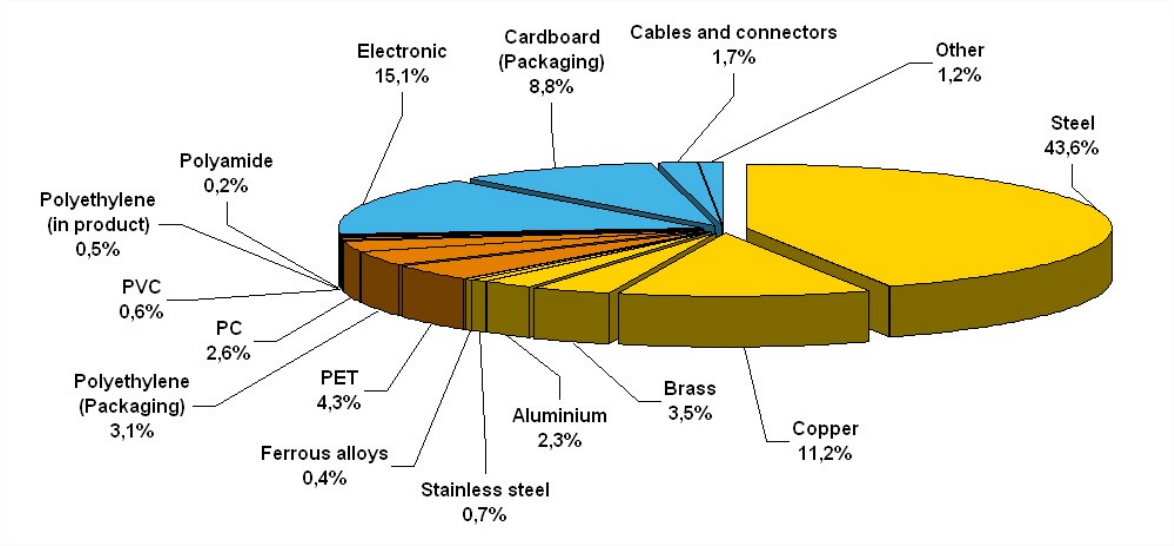
The representative product used for the analysis is the 110-220Vac version, with Ethernet communication capabilities.

The environmental impacts of this referenced product are representative of the impacts of the other products of the range, which are developed with a similar technology.

The environmental analysis was performed in conformity with ISO 14040.

Constituent materials

The mass of the MiCOM P849 variants is around 11.5kg, including packaging. The product under study weighs 12kg.
The constituent materials are distributed as follows:



Substance assessment

This product contains lead (0.01%). This percentage is relative to the total mass of the product, not including packaging.

Manufacturing

MiCOM P849 is manufactured at a Schneider Electric production site on which an ISO14001 certified environmental management system has been established.

Distribution

Weight and volume of packaging have been optimized, based on the European Union's packaging directive.
The packaging weighs 1.4kg, consisting in cardboard and polyethylene foam.

Use

Products from the MiCOM range do not generate environmental pollution (noise, emissions) requiring special precautionary measures in standard use.
The electrical power consumption depends on the conditions under which the product is implemented and used. For a MiCOM P849, it ranges from 12W and 24W, depending on the number of inputs and outputs activated.

The Li-ion battery will have to be changed 3 times during the product's 20 years service-life

End of life

This product contains PCB assemblies, electrolytic capacitors and a battery, 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.

The recyclability potential of the products 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: 62%.
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), Use (U), and End of life (E).
Modelling hypothesis and method:
- The calculation was performed on a MiCOM P849 with an Ethernet communication board.
- Product packaging: is included
- Installation components: no special components included.
- Scenario for the Use phase: This product range is included in the category "Energy consuming products". A MiCOM P849 is designed for a 20 years service-life, and is considered to run 100% of the time at it's nominal consumption of 19W (corresponding to half of inputs & outputs activated)

The electrical power model used for calculation is the European model.
End of life impacts are based on a worst case transport distance to the recycling plant (1000km)

Presentation of the product environmental impacts

Environmental indicators	Unit	MiCOM P849				
		S=M+D+U+E	M	D	U	E
Raw Material Depletion	Y-1	2,53E-12	2,49E-12	2,29E-17	4,38E-14	2,37E-17
Energy Depletion	MJ	4,18E+04	3,42E+03	1,68E+01	3,83E+04	1,74E+01
Water depletion	dm^3	7,23E+03	1,69E+03	1,59E+00	5,54E+03	1,65E+00
Global Warming	g≈CO_2	2,17E+06	2,31E+05	1,33E+03	1,93E+06	1,38E+03
Ozone Depletion	g≈CFC-11	1,99E-01	9,15E-02	9,40E-04	1,05E-01	9,72E-04
Air Toxicity	m^3	3,89E+08	6,75E+07	2,51E+05	3,21E+08	2,59E+05
Photochemical Ozone Creation	g≈C_2H_4	7,90E+02	1,33E+02	1,14E+00	6,55E+02	1,18E+00
Air acidification	g≈H^+	3,03E+02	4,09E+01	1,70E-01	2,61E+02	1,75E-01
Water Toxicity	dm^3	5,88E+05	3,65E+04	1,66E+02	5,51E+05	1,72E+02
Water Eutrophication	g≈PO_4	1,27E+01	8,09E+00	2,21E-02	4,55E+00	2,29E-02
Hazardous waste production	kg	3,78E+01	5,77E+00	4,95E-04	3,21E+01	5,11E-04

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 4, and with its database version 11.
The Use phase is the life cycle phase which has the greatest impact on the majority of environmental indicators.

System approach

When used in a remote configuration (i.e. placed in a marshalling kiosk instead of the Protection & Control room), MiCOM P849 can be used as a concentrator of digital information, allowing to decrease the number of physical inputs/outputs per protection device, and thus decreasing copper wiring between the primary plant equipment and related protections, and the related electric losses.

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.

PEP in compliance with Schneider-Electric TT01 v5 and TT02 V15 procedures

PEP established according to PCR PEPecopassport PEP- PCR-ed 2-EN-2011 12 09

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