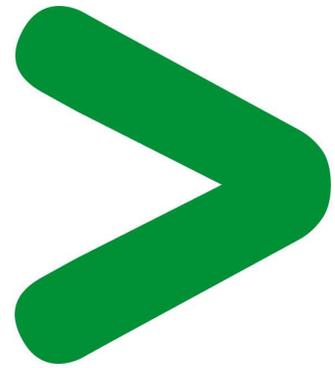


Product Environmental Profile

KNX In- and Output Modules



Product Environmental Profile - PEP

Product overview

The main purpose of the KNX In- and Output Modules is the devices allow, detecting the status of contacts or analogue sensors and sending representative values on the KNX, or allowing adjusting physical analogue values according to received KNX telegrams.

This range consists of KNX In- and Output Modules.

The representative product used for the analysis is KNX Binary input REG-K/8x230, light grey, Ref: MTN644692.

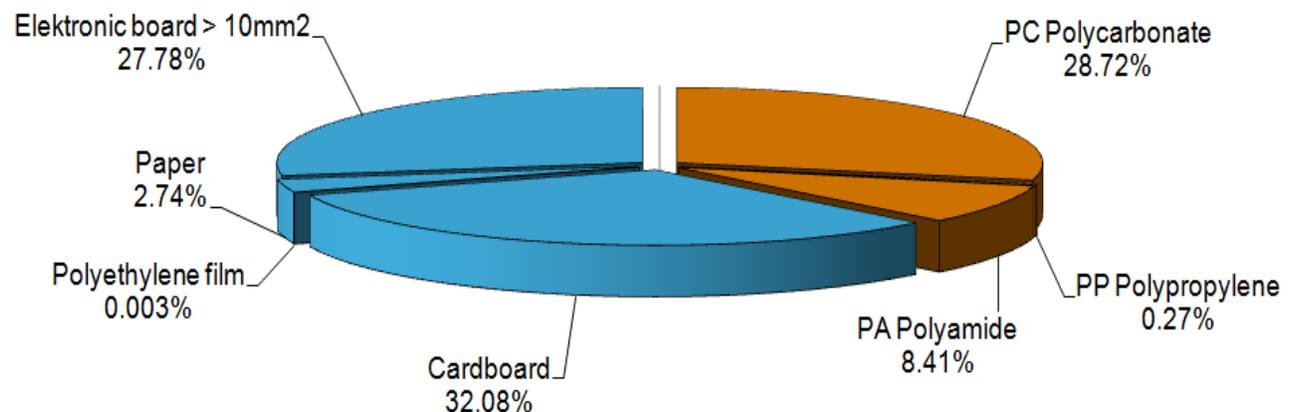
The environmental impacts of this referenced product are representative of the impacts of the other products of the range which are developed with a similar technology.

The environmental analysis was performed in conformity with ISO 14040.

Constituent materials

The mass of the product range is from 245 g to 265 g including packaging. It is 255.61 g for the KNX Binary input REG-K/8x230, light grey, Ref: MTN644692.

The constituent materials are distributed as follows:



Substance assessment

Products of this range are designed in conformity with the requirements of the RoHS directive (European Directive 2002/95/EC of 27 January 2003) and do 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

Manufacturing

KNX In- and Output Modules product range 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. KNX In- and Output Modules packaging weight is 89.01g. It consists of paper (7g), cardboard (82g), polyethylene film (0.008g).

Use

The KNX In- and Output Modules, 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. The electrical power consumed the KNX In- and Output Modules is between 0.3W and 0.5W. It is 0.4W for the referenced KNX Binary input REG-K/8x230 light grey, Ref: MTN644692.

Product Environmental Profile - PEP

End of life

At end of life, the products in the referenced KNX In- and Output Modules have been optimized to decrease the amount of waste and allow recovery of the product components and materials.

This product range doesn't need any special end-of-life treatment. According to countries' practices this product can enter the usual end-of-life treatment process.

The recyclability potential of the products has been evaluated using the "Code- BV 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: 44.32 %.

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).

Modeling hypothesis and method:

- The calculation was performed on The KNX Binary input REG-K/8x230 light grey, Ref: MTN644692
- 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 product**" (assumed service life is 10 years and use scenario is: the consumed power 0.4 W and 100 % service uptime.)
- The geographical representative area for the assessment Is European and the electrical power model used for calculation is 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	For KNX Binary input REG-K/8x230 Ref: MTN644692					
		S = M + D + I + U + E	M	D	I	U	E
Air Acidification (AA for PEP)	kg H+ eq	4.62E-03	2.09E-03	8.00E-06	0.00E+00	2.51E-03	1.19E-05
Air toxicity (AT for PEP)	m³	5.72E+06	2.59E+06	1.19E+04	0.00E+00	3.11E+06	1.76E+04
Energy Depletion (ED for PEP)	MJ	5.43E+02	1.70E+02	5.96E-01	0.00E+00	3.71E+02	9.00E-01
Global Warming Potential (GWP for PEP)	kg CO ₂ eq.	2.94E+01	1.06E+01	4.23E-02	0.00E+00	1.87E+01	6.38E-02
Hazardous Waste Production (HWP for PEP)	kg	4.83E-01	1.72E-01	5.24E-08	0.00E+00	3.11E-01	7.90E-08
Ozone Depletion Potential (ODP for PEP)	kg CFC-11 eq.	2.21E-06	1.20E-06	8.02E-11	0.00E+00	1.02E-06	1.21E-10
Photochemical Ozone Creation Potential (POCP for PEP)	kg C ₂ H ₄ eq.	1.02E-02	3.62E-03	9.77E-06	0.00E+00	6.55E-03	1.42E-05
Raw Material Depletion (RMD for PEP)	Y-1	2.50E-13	2.49E-13	8.65E-19	0.00E+00	4.21E-16	1.30E-18
Water Depletion (WD for PEP)	dm3	1.55E+02	1.01E+02	4.39E-03	0.00E+00	5.36E+01	6.63E-03
Water Eutrophication (WE for PEP)	kg PO ₄ ³⁻ eq.	8.77E-04	8.33E-04	7.86E-08	0.00E+00	4.40E-05	1.19E-07
Water Toxicity (WT for PEP)	m³	7.47E+00	2.05E+00	1.81E-02	0.00E+00	5.38E+00	2.73E-02

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 5.1 and with its database version 2013-02

The Use phase is the life cycle phase which has the greatest impact on the majority of environmental indicators.

Extrapolation rules for product range: Depending on the impact analysis, the environmental indicators (without RMD) of other products in this family may be proportional extrapolated by energy consumption values.

System approach

As the products of the range are designed in accordance with the RoHS Directive (European Directive 2002/95/EC of 27 January 2003), they 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.
Water Eutrophication (WE)	Eutrophication is a natural process defined, as the enrichment in mineral salts of marine or lake waters, or a process accelerated by human intervention, defined as the enrichment in nutritive elements (phosphorous compounds, nitrogen compounds and organic matter). This indicator calculates the water eutrophication of lakes and marine waters by the release of specific substances in the effluents. It is expressed in grams equivalency of PO_4^{3-} (phosphate).
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 V9.3 and TT02 V15 procedures

PEP established according to PCR PEP ecopassport 2010:1.0 rules

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