Product Environmental Profile

Photoelectric sensors in plastic housing Telemecanique XUB.A

PEP ecoPASSPORT®

Schneider Electric

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Product Overview

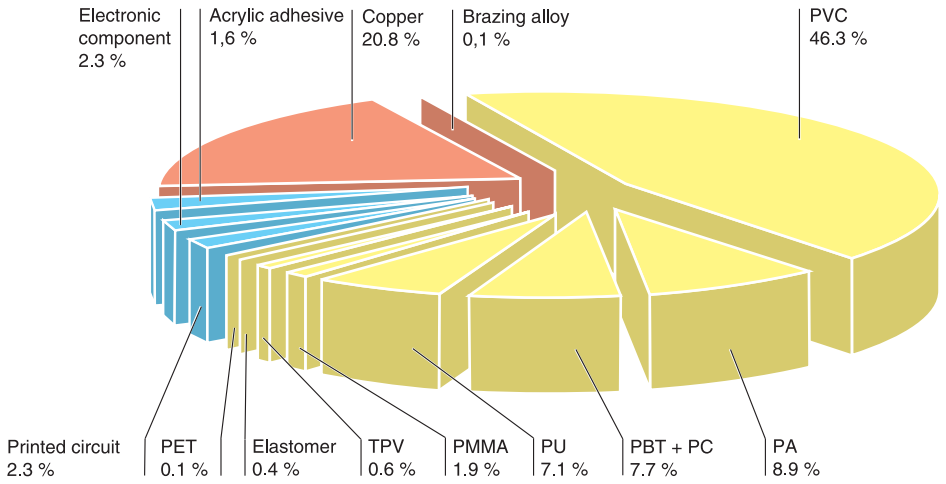
XUB.A photoelectric sensors are used in automated presence detection systems; they are designed to send presence or absence information to the processing system.
The XUB.A product range consists of cylindrical plastic sensors with a diameter of 18 mm. These sensors include a teach mode with three separate detection systems: "proximity", "reflex" and "barrier",

- with programmable output via a cable: XUB.A....L
- with programmable output via M12 connectors: XUB.A....M12.

The product chosen for the environmental analysis of the range is the XUB0 APSN L2 sensor with programmable output via a cable. It is representative of all the products in the XUB.A family; the same manufacturing process is used for the other products in the range.
This analysis takes all the stages in the life cycle of the product into account: extraction of raw materials and manufacture of materials, manufacture of the product, utilisation, distribution (transport and packaging), end of life.

Constituent materials

Without its packaging, the XUB0 APSN L2 sensor weighs 77 g, which is 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 in the authorised proportions, lead, mercury, cadmium, chromium hexavalent, flame retardant (polybromobiphenyles PBB, polybromodiphenylthers PBDE) as mentioned in the Directive.

Manufacturing

XUB photoelectric sensors are manufactured at a Schneider Electric production site operating an ISO 14001 certified environmental management system.

Distribution

The packaging was designed in compliance with the European Union's 94/62/EC packaging directive in order to reduce the weight and volume and consequently the environmental impact of the distribution phase of the life cycle of the product.

The total weight of the packaging of the XUB0 APSN L2 is 28 g, which includes a cardboard box and a paper instruction leaflet, all of which are completely recyclable.

The product distribution flows have been optimised by setting up local distribution centres close to the market areas.

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Utilization

The products in the XUB range do not generate any environmental pollution requiring special precautionary measures (noise, emissions, etc.).
The consumption of the representative product is 0.84 W without load and 2.4 W with load.

End of life

At end of life, the cable should be cut off and sent to a special recycling centre: the copper part of the cable can then be completely recycled, as well as its PVC sheath.
It would also be useful to send the rest of the product, i.e. the body of the sensor, to a recycling centre for used electronic cards to recycle as much of its metal content as possible - especially the copper - and recover the plastic energetically.
The mass recycling potential of the materials of the representative product, XUB0 APSN L2, is therefore greater than 65 % when the copper and PVC from the cable, the copper from the box and brass nuts are included.
As the energy recovery potential is greater than 25 %, the overall recovery potential at end of life is greater than 90 %.

Environmental impacts

The EIME (Environmental Impact and Management Explorer) software, version 1.6, and its database, version 5.4, were used for the Life Cycle Assessment (LCA) of the product chosen as representative of the range.

The analysis focused on the XUB0 APSN L2 photoelectric sensor. For the purposes of the LCA, its estimated service life is 10 years, with an annual rate of operation of 17 % with load and 14 % without load and an annual non-utilisation rate of 69 %, i.e. an electrical consumption of 46 kWh over 10 years. The European electrical power model was chosen for modelling the consumption.

The EIME software was used to model the environmental impacts on the Manufacturing phase (including the extraction of raw materials and processing of basic materials) and on the Distribution and Utilisation phases of the life cycle. The results of the LCA performed with the EIME software are as follows:

Presentation of product environmental impacts

Environmental indicators	Unit	For a XUB0 APSN L2 sensor			
		S = M + D + U	**M**	**D**	**U**
Raw Material Depletion	**Y-1**	**$5.47\ 10^{-15}$**	$5.10\ 10^{-15}$	$2.66\ 10^{-18}$	$3.69\ 10^{-16}$
Water Depletion	**dm^3**	**$1.28\ 10^{2}$**	64.0	$9.99\ 10^{-1}$	63.2
Global Warming	**g≈CO_2**	**$3.69\ 10^{4}$**	$7.23\ 10^{3}$	$1.55\ 10^{2}$	$2.96\ 10^{4}$
Ozone Depletion	**g≈CFC-11**	**$6.73\ 10^{-3}$**	$1.30\ 10^{-3}$	$3.38\ 10^{-5}$	$5.40\ 10^{-3}$
Photochemical Ozone Creation	**g≈C_2H_4**	**27.4**	5.94	$2.57\ 10^{-1}$	21.2
Air Acidification	**g≈H^+**	**7.37**	2.07	$2.30\ 10^{-2}$	5.17
Hazardous Waste Production	**kg**	**$5.63\ 10^{-1}$**	$1.26\ 10^{-1}$	$3.31\ 10^{-5}$	$4.36\ 10^{-1}$

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System approach

As the product 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 within an assembly or an installation submitted to this Directive.

N.B.: please note that the environmental impacts of the product depend on the use and installation conditions of the product.
Impacts values given above are only valid within the context specified and cannot be directly used to draw up the environmental assessment of the 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.

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^+.

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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