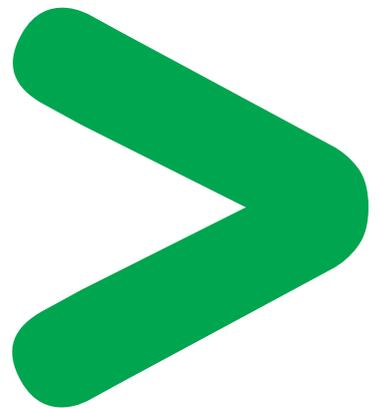


Product Environmental Profile

Measurement and control relays
Zelio Control



Product Environmental Profile - PEP

Product Overview

The main function of the Zelio Control relay range size 35 mm is monitoring and control of electrical (currents, voltages, phases, etc.) and physical (levels, speeds, temperatures, etc.) magnitudes. This range comprises the following relays:

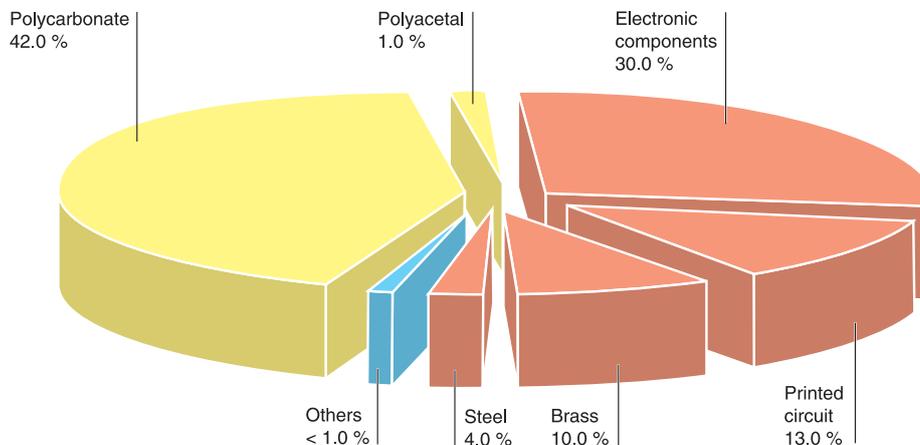
Type	Reference	Functions, characteristics
Lifts 35	RM35ATL, RM35ATR	Temp. lift standard 81
	RM35ATW	Temp. lift standard 81+ phase control
Current/voltage 35 multifunction	RM35JA	Over or undercurrent 0.3 A to 15 A
	RM35UA	Over or undervoltage 0.2 to 600 V
Frequency 35	RM35HZ	Network frequency
Level 35	RM35LV14	Level for discrete sensors
	RM35LM33	Level multisensitivity/multifunction
Phase 35 multifunction	RM35UB3	Over and undervoltage 3-phase
	RM35UB3N	Over and undervoltage 3-phase + neutral
	RM35TF	Order + loss + unbalance + overvoltage + undervoltage
Phase 35 thermal	RM35TM, RM35TM2	Order + loss + motor temperature
Pumps 35	RM35BA	Pumping (overcurrent + phases + level)
Underspeed 35	RM35S0	Underspeed and overspeed

The product selected to produce environmental assessment of the range is current and voltage controller RM35JA/RM35UA. It is considered representative of all 35 mm relays of the Zelio Control range; the other references being manufactured by the same production process. Environmental assessment was carried out conforming to Standard ISO14040 "Environmental management: life cycle assessment, principles and framework".

This assessment takes into account all stages in the product life cycle: raw materials extraction, materials manufacture, product manufacture, use, distribution and end-of-life.

Constituent materials

Weight of the RM35JA relay excluding packaging is 118 g. Constituent materials are broken down 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

The Zelio Control relay range is manufactured on a Schneider Electric production site operating to an ISO 14001 Certified Environmental Management System.

Distribution

Product packaging has been designed respecting European Union packaging directive 94/62/EC, with the objective of minimising packaging weight and volume to enable reduction in environmental impact of the product life cycle distribution phase. The weight of packaging materials of a 35 mm width Zelio control relay such as the RM35JA is 9 g. This packaging is entirely in cardboard, a material 100 % recyclable. Product distribution flows are optimised by location of local distribution centres in close proximity to main market areas.

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Utilization

Products of the Zelio Control range present no environmental stress requiring special use precautions (noise, emissions...).

Electrical energy consumed by relays depends on installation conditions and the specific use of each product. Power dissipated by representative relay RM35JA is estimated at 0.6 W (joule effect loss).

Energy consumption has been reduced by 40 % compared with the previous range.

End of life

Measures have been taken to simplify relay dismantling at end-of-life and for direction of the various sub-assemblies to the appropriate processing chains to recover maximum value of the various constituent materials:

- electronic cards are easily extracted; they are directed towards a specific card processing chain
- plastics parts of enclosures are all snap-on and easily removed; they enable particularly simple removal of cards, and can be directed towards appropriate recovery chains identified by their marking.

The proportion of recycled material in representative product RM35JA is around 50 % in weight, an increase of more than 15 % compared with the previous range. This percentage includes:

- plastics parts, essentially polycarbonate (PC). These parts contain neither loading nor bromated flame retardants and are all marked and easy to dismantle
- certain metals in electronic cards (notably copper and precious metals).

The proportion of material from which energy is recoverable is around 25 % in weight. This percentage includes in particular the epoxy resin and glass fibre of the printed circuits.

The potential global value recovery at end-of-life is therefore close to 75 %, an increase of around 15 % compared with the previous range. Choices made in design of plastics parts – recyclable materials, easily removable and marked parts – have enabled a reduction in the environmental impact of Zelio Control relays at their end-of-life phase by optimising the materials and energy value recovery potential of these parts.

Environmental impacts

Life Cycle Assessment (LCA) of the RM35JA relay was produced using EIME (Environmental Impact and Management Explorer) software version 1.6 and its database version 5.4.

Analysis scope includes the RM35JA relay. For the purposes of the LCA, its life is estimated at 8 years, with use rate of 50 %. The electrical energy model selected for consumption modelling is the European model.

Environmental impacts have been modelled on EIME software on the life cycle phases of Manufacture (including raw materials extraction and production of basic materials) Distribution and Use.

Presentation of product environmental impacts

Environmental indicators	Unit	For RM35JA (or RM35UA) relay			
		S = M + D + U	M	D	U
Raw Material Depletion	Y-1	1,43 10 ⁻¹⁴	1,42 10 ⁻¹⁴	2,83 10 ⁻¹⁸	1,69 10 ⁻¹⁶
Energy Depletion	MJ				
Water Depletion	dm ³	94,5	65,3	2,95 10 ⁻¹	28,9
Global Warming Potential	g≈CO ₂	2,15 10 ⁴	7,77 10 ³	1,70 10 ²	1,35 10 ⁴
Ozone Depletion	g≈CFC-11	3,88 10 ⁻³	1,38 10 ⁻³	3,33 10 ⁻⁵	2,47 10 ⁻³
Photochemical Ozone Creation	g≈C ₂ H ₄	16,5	6,56	2,90 10 ⁻¹	9,67
Air Acidification	g≈H ⁺	4,03	1,64	2,25 10 ⁻²	2,36
Hazardous Waste Production	kg	3,30 10 ⁻¹	1,31 10 ⁻¹	2,18 10 ⁻⁵	1,99 10 ⁻¹

In addition, total energy consumed by the product during its use phase is 21 kWh in 8 years of use.

Impacts of the manufacture and use phases have been significantly reduced by respective reductions in weight and energy consumption of 10 and 40 %.

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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 dm³.

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 CO₂.

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 (C₂H₄).

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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Schneider Electric Industries SAS

35, rue Joseph Monier
CS30323
F - 92506 Rueil Malmaison Cedex

RCS Nanterre 954 503 439
Capital social 896 313 776 €
www.schneider-electric.com



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