

Measurement and control relays Zelio Control

Product Environmental Profile



Product Environmental Profile - PEP

Product overview

The main function of the Zelio Control relay range size 17.5 mm is **monitoring and control of electrical** (currents, voltages, phases, etc.) **and physical** (levels, speeds, temperatures, etc.) **magnitudes**.

This range comprises the following relays:

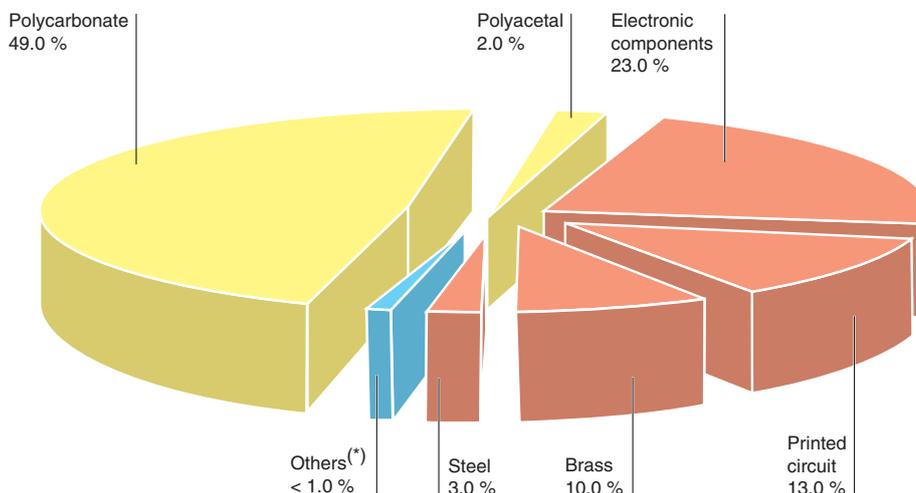
Type	Reference	Functions, characteristics
Toroid current 17.5	RM17JF	Overcurrent, 2 to 20 A, integrated toroid
Phase 17.5 single function	RM17TG00, RM17TG20	Order + loss ($U < 50 V$)
Phase 17.5 multifunction	RM17UB3	Over and undervoltage 3-phase
	RM17TA	Order + loss ($U < 50 V$) + unbalance
	RM17TT	Order + loss ($U < 70 \%$)
	RM17TU	Order + loss ($U < 50 V$) + undervoltage
	RM17TE	Order + loss + unbalance + over/undervoltage window
Threshold 17.5	RM17UAS14	12 V DC
	RM17UAS15, RM17UBE15	65 to 260 V AC/DC
	RM17UAS16, RM17UBE16	20 to 80 V AC/DC

The product selected to produce environmental assessment of the range is phase controller RM17TE. It is considered representative of all 17.5 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 RM17TE relay excluding packaging is 69 g.
Constituent materials are broken down as follows:



(*) Others: solder alloy, PMMA (polymethyl methacrylate).

The RM17TE relay benefits from **weight reduction of approximately 20 %** compared with the equivalent relay of the previous range.

All precautions are taken with our services, suppliers and sub-contractors to ensure that our products contain **no prohibited substances** listed in regulations in force at the time of product introduction to the market (list available on request).

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 17.5 mm width Zelio Control relay such as the RM17TE is 7.5 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.

Product Environmental Profile - PEP

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 RM17TE 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 RM17TE is **around 60 %** in weight, an increase of more than 10% 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 85 %**, an increase of around 10 % 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 RM17TE relay was produced using EIME (Environmental Impact and Management Explorer) software version 1.6 and its database version 5.4.

Analysis scope includes the RM17TE 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 RM17TE relay			
		S = M + D + U	M	D	U
Raw Material Depletion	Y-1	1.24 10 ⁻¹⁴	1.22 10 ⁻¹⁴	1.77 10 ⁻¹⁸	1.69 10 ⁻¹⁶
Energy consumption	MJ				
Water Depletion	dm ³	91.5	62.4	2.36 10 ⁻¹	28.9
Global Warming	g≈CO ₂	2.11 10 ⁴	7.45 10 ³	1.06 10 ²	1.35 10 ⁴
Ozone Depletion	g≈CFC-11	3.79 10 ⁻³	1.30 10 ⁻³	2.11 10 ⁻⁵	2.47 10 ⁻³
Photochemical Ozone Creation	g≈C ₂ H ₄	16.0	6.20	1.78 10 ⁻¹	9.67
Air Acidification	g≈H ⁺	3.81	1.44	1.40 10 ⁻²	2.36
Hazardous Waste Production	kg	3.28 10 ⁻¹	1.29 10 ⁻¹	1.56 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 30 and 40 %**.

Product Environmental Profile - PEP

System approach

It is important to recall that product environmental assessment should be made taking into consideration the application or installation in which it is integrated.

The environmental impact values above are only valid in the specified context.

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 Potential (GWP)

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 methane (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.



We are committed to safeguarding our planet by "Combining innovation and continuous improvement to meet the new environmental challenges".

Schneider Electric Industries SAS

89, boulevard Franklin Roosevelt
F - 92500 Rueil-Malmaison (France)
Tel : +33 (0)1 41 29 85 00

<http://www.schneider-electric.com>

This document is based on ISO 14020 which relates to the general principles of environmental declarations and the ISO TR 14025 technical report relating to type III environmental declarations. It was produced according to the instructions in the PEP drafting guide, version 4.

Published by: Schneider Electric

Produced by: Ameg

Printed by: