

Modicon Quantum Automation platform

Product Environmental Profile



Product Environmental Profile - PEP

Product overview

A modular, flexible architecture and an extensive range of networks and fieldbus communication devices combine to make Modicon Quantum an ideal automation platform for continuous or semi-continuous industrial processes, as well as for large infrastructures.

The product of more than 25 years experience in the field of redundancy systems, Modicon Quantum is the perfect solution for applications that require high control system availability. This offer is therefore inherently suited to critical applications, such as petrochemicals, metals, cements, energy, tunnels, airports and water treatment. It can be used in many fields from Food & Beverage to the pharmaceutical industry. Certified by TÜV Rheinland Group and IEC61508 compliant, some modules of the Modicon Quantum can be used in applications where functional safety is necessary. A configuration which combines functional safety and redundancy is also available.

This automation platform provides unrivalled treatment capacity together with an expandable memory size. It can receive the complete project, deal with very complex data structures, time and date stamping of diagnostics information as well as storage of recipes and traceability of information.

A Modicon Quantum automation platform configuration uses the following product families: Rack, Power supply, Central processing unit, Communication, Input/Output, Analogue, and Metering.

The representative configuration selected consists of the following 15 modules mounted on a 16 slots rack 140XBP01600: 140CPU67160, 140CPS11420, 140ACI04000, 140ACO02000, 140ACO13000, 140ATI03000, 140CRP93200, 140DAI54000, 140DDI35300, 140DDI84100, 140DDO35300, 140DRA84000, 140ERT85410, 140NOE77101, 140XBE10000.

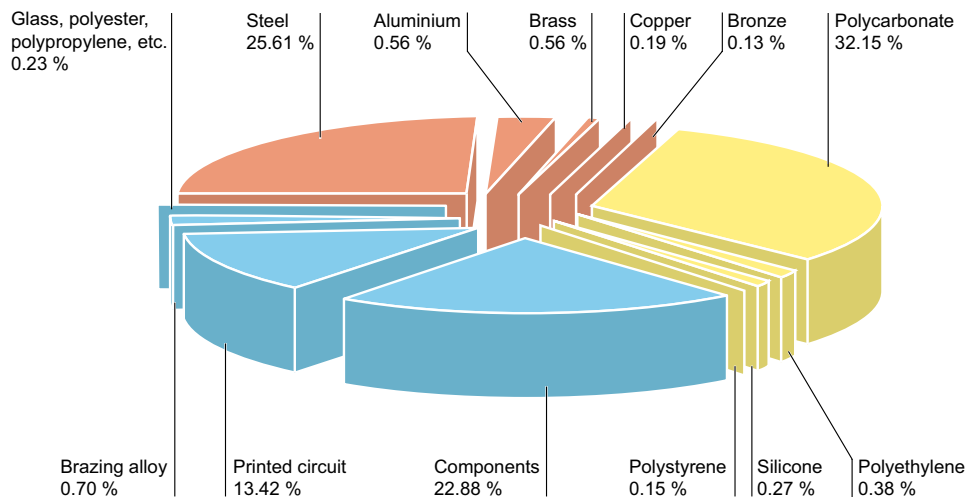
The environmental impacts of this referenced configuration are representative of the impacts of the other possible configurations for which the same technology is used.

The environmental analysis was performed in conformity with ISO 14040 "Environmental management: Life cycle assessment - Principle and framework".

This analysis takes the stages in the life cycle of the product into account.

Constituent materials

The mass of the configuration analysed for the Modicon Quantum automation platform is 7 kg, not including the packaging. The constituent materials are distributed as follows:



All necessary steps have been taken with our services, suppliers and subcontractors to ensure that the materials used in the composition of the Modicon Quantum automation platform do not contain any substances prohibited by the legislation that was in force⁽¹⁾ when it was put on the market. The products in the range are designed in compliance with the requirements of the RoHS directive (2002/95/EC of 27 January 2003) and do not contain levels of lead, mercury, cadmium, hexavalent chromium or flame retardants (polybrominated biphenyls PBB, polybrominated diphenyl ethers PBDE) above the permissible thresholds mentioned in the directive.

(1) according to the list available on request.

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Manufacturing

The Modicon Quantum automation platform product range is manufactured at a Schneider Electric production site on which an ISO 14001 certified environmental management system has been established.

Distribution

The weight and volume of the packaging have been reduced in compliance with the European Union's packaging directive. The weight of the packaging of the Modicon Quantum automation platform product configuration analysed is 2.6 kg. This packaging consists mainly of cardboard and paper, which are 100 % recyclable. The product distribution flows have been optimised by setting up local distribution centres close to the market areas.

Utilization

The products in the Modicon Quantum automation platform range do not generate any environmental pollution requiring special precautionary measures (noise, emissions, etc.). The dissipated power depends on the conditions under which the product is implemented and used. The power consumption of the Modicon Quantum automation platform referenced is 54 W maximum.

End-of-life

At end of life, the products in the Modicon Quantum automation platform range can either be crushed or dismantled to facilitate the recovery of the various constituent materials. The recycling potential is more than 80 %. This percentage mainly includes the steel used for the rack, the non-filled plastic material of the housings, as well as the aluminium used for the heat sink of the CPU. The end of life data appears on the product end-of-life sheet.

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. The assumed service life of the product is 10 years, the utilisation rate of the installation is 34 % and the European electrical power model is used. The analysis focused on the reference Modicon Quantum automation platform.

The environmental impacts were analysed for the Manufacturing (M) phase, including the processing of raw materials, and for the Distribution (D) and Utilisation (U) phases.

Presentation of product environmental impacts:

Environmental indicators	Unit	For the configuration of the selected Quantum			
		S = M + D + U	M	D	U
Raw Material Depletion	Y-1	1.7909 10 ⁻¹²	99.3 %	0.0 %	0.7 %
Water Depletion	dm ³	3.6475 10 ⁺³	93.7 %	0.3 %	6.0 %
Global Warming	g _≈ CO ₂	5.059 10 ⁺⁶	79.2 %	0.4 %	20.4 %
Ozone Depletion	g _≈ CFC-11	0.90	78.8 %	0.3 %	20.9 %
Photochemical Ozone Creation	g _≈ C ₂ H ₄	4.056 10 ⁺³	81.1 %	0.7 %	18.2 %
Air Acidification	g _≈ H ⁺	9.27 10 ⁺²	80.2 %	0.3 %	19.5 %
Hazardous Waste Production	kg	87.15	82.5 %	0.0 %	17.5 %

The life cycle analysis showed that the Manufacturing phase (phase M) has the greatest impact on most of the environmental indicators and the environmental parameters of this phase were optimised at the design stage.

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System approach

As the products in the range were designed in conformity with the RoHS directive (2002/95/EC of 27 January 2003), they can be integrated unrestrictedly in a device or installation directly governed by these regulations.

N.B.: the environmental impacts of the product depend on the conditions under which it is installed and used.

The environmental impact values listed in the above table are only valid within the specified context and cannot be used directly in the environmental report on 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 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".

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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.

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