

Carlo Gavazzi Controls S.p.A.



Environmental Product Declaration

Product: name:

DUB02CT23 (SWITCHES)

Site Plant:

via Safforze, 8
32100 – Belluno (BL)

in compliance with ISO 14025 and EN 50693


Program Operator	EPDItaly
Publisher	EPDItaly
Declaration Number	CGC20240916009
EPDItaly Registration Number	EPDITALY0874
Issue Date	05/12/2024
Valid to	05/12/2029



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General information

EPD Owner	Gavazzi Controls S.p.A., Viale Lunigiana, 46 20125 - Milano (MI) Italy www.gavazzi-automation.com
Reference production site(s)	Belluno plant: via Safforze, 8, 32100 – Belluno (BL)
Scope of application	This document refers to the device of the Switches family.
Programme Operator	EPDIItaly - info@epditaly.it
Independent Verification	<p>This declaration was developed according to the EPDIItaly Regulations; further information and the Regulations themselves are available at www.epditaly.it</p> <p>Independent verification of the declaration and data carried out according to ISO 14025:2010 <input type="checkbox"/> _Internal <input checked="" type="checkbox"/> _External</p> <p>Third-party verification performed by: ICMQ SpA, via De Castillia, 10 20124 - _Milan (www.icmq.it) Accredited by Accredia</p>
CPC Code	46212 "Electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits, for a voltage not exceeding 1000 V"
Company contact	<u>Giampaolo Tormen</u> , Certification Manager in Gavazzi Group.
Technical support	 Aequilibria Srl - SB P.le della Stazione, 8 35131 – Padova (PD) - ITALIA
Comparability	Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of similar products may not be comparable if they do not comply with the relevant Technical Standard.
Responsability	Carlo Gavazzi Controls S.p.A. releases EPDIItaly from any non-compliance with environmental legislation.



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	<p>The holder of the declaration will be responsible for the supporting information and evidence; EPDItaly disclaims any responsibility regarding the manufacturer's information, data and results of the life cycle assessment.</p>
Reference documents	<p>This statement was developed following the EPDItaly Program Regulations (Rev.6 of 30/10/2023 available at www.epditaly.it).</p> <p>The EN 50693:2019 standard is the framework reference for PCR "Electronic and electrical products and systems" (PCR EPDItaly007).</p> <p>PCR EPDItaly012 ("Electronic and electrical products and systems – Switches") integrates PCR EPDItaly007 and provides additional technical and regulatory requirements to be applied for the category of products classified as "monitoring relays".</p>
PCR – Product Category Rules	<p>Core-PCR: EPDITALY007 "Electronic and electrical product and systems" Rev. 3 of 13/01/2023</p> <p>Sub-PCR: EPDITALY012 "Electronic and electrical product and systems -Switches" Rev. 0 of 16/03/2020</p>
Date and revision of this document	05/12/2024

Table 1. General information of EPD

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Foreword

This document represents the EPD study conducted for the **DUB02CT23** device manufactured by Carlo Gavazzi Controls S.p.A., in accordance with the EPDIItaly Program and its Regulations, developed in accordance with ISO 14025 and aimed at providing a tool for the development, verification and publication of Environmental Product Declarations.

The study was carried out in accordance with PCR EPDIItaly012 (*PCR for electronic and electrical products and systems – Switches*), which identifies and documents the objective and scope of LCA-based information for the product category, the rules for producing additional environmental information, the life cycle stages to be included, the parameters to be addressed, and the manner in which the parameters are to be collected and communicated in a report.

Producer information and environmental policy

Carlo Gavazzi Controls SpA develops, manufactures and markets monitoring relays, timers, energy management systems, fieldbus systems, providing solutions for the industrial, residential and commercial automation markets, in the field of low voltage installations.

The products are marketed in Europe, North America and Asia-Pacific through a network of 22 own sales companies and about 60 independent national distributors. Carlo Gavazzi Controls has a production plant in Belluno (via Safforze 8, 32100 – Belluno).

The company already holds the following certifications, issued by accredited bodies:

- ISO9001 (since 1997)
- ISO14001 (since 2009)

Carlo Gavazzi Controls is committed to continuously reducing the environmental impact of its products throughout their life cycle, through the implementation of an environmentally conscious design process based on the principles of the EN 62430 standard and an ISO14001 certified environmental management system. The declared environmental claims have been assessed with a qualitative approach on the environmentally conscious design process.

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Product Information

The product under analysis is device **DUB02CT23**, belonging to the Monitoring Relays family, nominal consumption 5 W (0.005 kW), weight 140.2 g (0.1402 kg) including packaging and manual.

The adopted functional unit was defined, based on the reference PCR, as **a device, characterized by its own operating power at 0.005 kW for a life time (RSL - Reference Service Life") of 20 years, including its packaging, and operating throughout its useful life.**

These are devices that establish or interrupt the electrical continuity of the circuit where they are applied, with a number of poles equal to 1 and the nominal short circuit breaking capacity equal to n.a.

The assembly and testing of the product are carried out at the Carlo Gavazzi Controls production site.

Regarding the use phase, the product does not require periodic maintenance, it is considered active 30% of the time throughout its estimated useful life of **20 years**, with a nominal consumption of **5 W** at a voltage of 24/115/230 Vac 50-60Hz.

The finished device is then sent to the various Gavazzi distribution centers or, in some cases, directly to a specific customer.


Product family	Monitoring Relays	
Product identification number	DUB02CT23	
Technical Data	Power: 5 W (0.005 kW) Frequency: 50-60 Hz Weight: 0.11654 kg (packaging excluded) Service Life Time (RLS): 20 years Current Intensity: $I_n = 8A$	
Packaging	Weight: 0.02366 kg (23.66 g) Material: Paper and Cardboard	

Table 2. Product related information DUB02CT23

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➡ Materials and constituents of the product

The declaration of materials is made in accordance with EN IEC 62474.

The products comply with substance restrictions in the EU RoHS directive (2011/65/EU).

Any recycled material content in the device is unknown.

Below is the total mass of the product (including packaging) and the weight percentages of each individual raw material to the total product.

Total mass of the device	0.1402 kg (including packaging)
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Raw Material Category SCLAM	SCLAM	SCLAM description	% of total weight	% of category to total weight
PCB	PCB-SEM	Printed circuit boards semplici (fino a due strati)	18.49%	18.49%
Electronic Components	SWPTH	PTH - Switches and tact switches	1.213%	15.707%
	VARIP	PTH - Varistors	0.870%	
	RELAY	Relays and reed contacts	6.583%	
	CELEP	PTH - Electrolytic capacitors	1.812%	
	CFLMP	PTH - Film capacitors	0.942%	
	CNTRS	Connectors	0.174%	
	TMPH	PTH - Trimmers and potentiometers	1.541%	
	INDCP	PTH - Inductors	0.300%	
	RESMD	SMD Resistors	0.001%	
	RESMD	SMD Resistors	0.001%	
	RESMD	SMD Resistors	0.004%	
	RESMD	SMD Resistors	0.008%	
	RESMD	SMD Resistors	0.001%	
	RESMD	SMD Resistors	0.004%	
	RESMD	SMD Resistors	0.001%	
	RESMD	SMD Resistors	0.006%	
	RESMD	SMD Resistors	0.012%	
	RESMD	SMD Resistors	0.012%	
	RESMD	SMD Resistors	0.012%	
	RESMD	SMD Resistors	0.039%	



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	CCERS	SMD - Ceramic capacitors	0.013%	
	CCERS	SMD - Ceramic capacitors	0.003%	
	CCERS	SMD - Ceramic capacitors	0.003%	
	CCERS	SMD - Ceramic capacitors	0.007%	
	CCERS	SMD - Ceramic capacitors	0.014%	
	CCERS	SMD - Ceramic capacitors	0.004%	
	CCERS	SMD - Ceramic capacitors	0.013%	
	CTANS	SMD - Tantalum capacitors	0.478%	
	CELES	SMD - Electrolytic capacitors	0.928%	
	DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0.005%	
	DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0.005%	
	DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0.006%	
	DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0.088%	
	DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0.106%	
	DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0.068%	
	DDSMD	SMD - Diodes, zeners, leds, transils, rectifier bridges	0.003%	
	TRPTH	PTH - Transistors and mosfets	0.086%	
	TRSMO	SMD - Transistors and mosfets	0.011%	
	ICSMO	SMD - Integrated circuits	0.040%	
	ICSMO	SMD - Integrated circuits	0.011%	
	MICRO	Microprocessors	0.031%	
	CCERS	SMD - Ceramic capacitors	0.248%	
Sclam product specific	TBCUS	Custom terminal blocks	8.10%	26.42%
	TBCUS	Custom terminal blocks	8.06%	
	TBCUS	Custom terminal blocks	8.10%	
	TRAFO	Transformers	2.15%	
	LEDXX	Leds - no infrared	0.00%	
	LEDXX	Leds - no infrared	0.00%	
	LEDXX	Leds - no infrared	0.00%	
Cables				0%
Small metallic parts				0.00%
Plastics	PLCUS-NY	Custom plastic parts nylon	11.03%	27.55%
	PLCUS-NY	Custom plastic parts nylon	10.95%	
	PLCUS-NY	Custom plastic parts nylon	1.90%	

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	PLCUS-HO	Custom parts Hostaform	0.66%	
	PLCUS-NY	Custom plastic parts nylon	0.28%	
	PLCUS-NY	Custom plastic parts nylon	1.24%	
	LAFRO-PC	Frontal labels	0.11%	
	LAPAC	Packaging labels	1.37%	
Paper primary packaging	BOXES	Carton boxes	12.73%	16.88%
	SHEET	Instruction sheets/ manuals	4.14%	

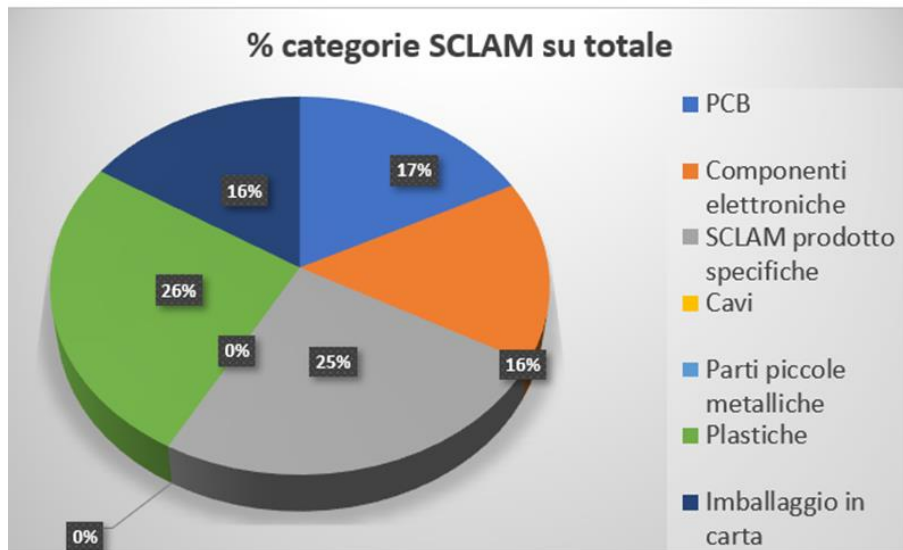


Figure 1. Material breakdown of the DUB02CT23 device

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Information related to the study

System boundaries	The boundaries of the study system are “ cradle-to-grave ”.
Geographical validity	Global
Reference year data	2023
Reference tool	This EPD was generated using the results automatically generated by the Excel tool “LCA tool_dati 2023_GAV – rev4” of 15/11/2024

Table 4. Information related to the study

The assessment of all potential environmental impacts above is based on the entire life cycle of the product under analysis: production, distribution, installation, use and end of life.

The elements and processes considered for the assessment of impacts related to each phase are described below:

Production	<ul style="list-style-type: none"> • Product and packaging raw materials (primary and secondary), auxiliary materials and related transportation • production and processing processes (involving energy and water consumption, air emissions, waste generated by production) • The energy sources behind the electricity grid used in manufacturing is the Italian residual mix 0,649 kg CO₂ eq./kWh (Ecoinvent 3.10) 																					
Distribution	<ul style="list-style-type: none"> • transportation from the Gavazzi plant to the latest distribution logistics platforms <table border="1" style="width: 100%; text-align: center;"> <thead> <tr style="background-color: #FFD700;"> <th colspan="3">FINISHED PRODUCT DISTRIBUTION (CoD)</th> </tr> <tr style="background-color: #FFF2CC;"> <th>Distribution center finished product</th> <th>% distributed to the CoD</th> <th>Further distribution at the continental level?</th> </tr> </thead> <tbody> <tr> <td>CGC-CdD Italy</td> <td>71.79%</td> <td>Sì</td> </tr> <tr> <td>CGC-CdD Spain</td> <td>0.00%</td> <td>Sì</td> </tr> <tr> <td>CGC-CdD USA</td> <td>18.33%</td> <td>Sì</td> </tr> <tr> <td>CGC-CdD Canada</td> <td>0.38%</td> <td>Sì</td> </tr> <tr> <td>CGC-CdD Singapore</td> <td>9.49%</td> <td>Sì</td> </tr> </tbody> </table>	FINISHED PRODUCT DISTRIBUTION (CoD)			Distribution center finished product	% distributed to the CoD	Further distribution at the continental level?	CGC-CdD Italy	71.79%	Sì	CGC-CdD Spain	0.00%	Sì	CGC-CdD USA	18.33%	Sì	CGC-CdD Canada	0.38%	Sì	CGC-CdD Singapore	9.49%	Sì
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	<ul style="list-style-type: none"> • transportation from Gavazzi's CdD to the specific customer (Company Name, Country) • disposal of secondary packaging
Installation	<ul style="list-style-type: none"> • End of life of primary packaging.
Use and maintenance phase	<ul style="list-style-type: none"> • Product Category: Switch (Monitoring Relays) • usage scenario: 20-year service life, continuous operation at 30% rated load, rated power 5 W.
End of life	<ul style="list-style-type: none"> • Device End of Life Scenario (WEEE).

Table 5. Processes considered at various stages of the study

The LCA study was carried out according to ISO 14040/14044 standards, following the guidelines of IS EN 50693:2019.

The software used for impact assessment is SimaPro 9.6.0.1; Ecoinvent 3.10 database.

The methods used to calculate impacts refer to the CML baseline and IPCC method for the climate change impact category.

Site-specific data were used for all of the following processes:

- production and transportation of device raw materials, auxiliary materials and packaging materials;
- manufacturing processes, plant energy consumption, air emissions and waste;
- weight, power of the device;
- transportation to the distribution center (last logistics platform).

Generic data were used for:

- recycling, energy recovery and disposal rates for primary and secondary packaging materials and WEEE (global data).

Default scenarios described in PCR 007 and PCR 012 were used for:

- transportation to the point of sale: intercontinental and local transportation scenario;
- Lifetime (RLS) of the device: 20 years.

Environmental impact assessment

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The potential environmental impacts assessed through an LCA of the **DUB02CT23** device are given in Table 6 below.

Impacts were calculated using SimaPro Developer 9.6.0.1 software and the Ecoinvent 3.10 database.

ENVIRONMENTAL IMPACT								
Impact category	Unit of measurement	PRODUCTION phase		DISTRIBUTION phase	INSTALLATION Phase	Use and Maintenance Phase	END OF LIFE phase	TOTAL
		UPSTREAM module	CORE module	DOWNSTREAM module				
GWP (TOT)	kg CO2 eq	9.01E+00	7.23E-01	3.58E-01	1.65E-03	1.41E+02	3.09E-02	1.51E+02
GWP - Fossil	kg CO2 eq	8.99E+00	7.37E-01	3.56E-01	9.33E-04	1.41E+02	3.09E-02	1.51E+02
GWP - Biogenic	kg CO2 eq	3.38E-03	-1.45E-02	1.91E-03	7.13E-04	4.59E-01	-1.12E-05	4.51E-01
GWP - Luluc Land use and Land use change	kg CO2 eq	1.32E-02	2.73E-04	4.53E-05	1.31E-06	4.43E-02	1.43E-05	5.78E-02
ODP (Ozone depletion)	kg CFC11 eq	4.37E-07	1.75E-08	5.65E-09	8.45E-12	2.30E-06	7.91E-11	2.76E-06
AP (Acidification)	mol H+ eq	6.76E-02	2.15E-03	1.46E-03	2.41E-06	5.51E-01	4.23E-05	6.22E-01
EP (Eutrophication, freshwater)	kg P eq	1.01E-02	1.04E-04	9.41E-06	7.97E-08	6.06E-02	2.50E-06	7.07E-02
EP (Eutrophication, marine)	kg N eq	1.24E-02	4.48E-04	5.76E-04	9.65E-07	9.88E-02	1.31E-05	1.12E-01
EP (Eutrophication, terrestrial)	mol N eq	1.28E-01	4.64E-03	6.29E-03	1.01E-05	9.72E-01	1.29E-04	1.11E+00
POCP (Photochemical ozone formation)	kg NMVOC eq	3.93E-02	2.26E-03	2.08E-03	3.39E-06	3.44E-01	3.84E-05	3.87E-01
ADPE (Resource use, minerals and metals)	kg Sb eq	2.55E-03	1.17E-06	3.04E-07	1.30E-09	1.10E-03	4.85E-08	3.65E-03
ADPF (Resource use, fossils)	MJ	1.16E+02	1.24E+01	4.76E+00	7.07E-03	2.72E+03	9.71E-02	2.86E+03
WDP (Water use)	m3 depriv.	2.42E+00	1.83E-01	9.74E-03	1.35E-04	2.37E+01	1.32E-03	2.63E+01

Table 6. Results for various environmental impact categories for device DUB02CT23

USE OF RESOURCES

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Impact category	Unit of measurement	PRODUCTION phase		DISTRIBUTION phase	INSTALLATION Phase	Use and Maintenance Phase	END OF LIFE phase	Total
		UPSTREAM module	CORE module	DOWNSTREAM module				
PENRE	MJ	1.16E+02	1.23E+01	4.76E+00	7.07E-03	2.72E+03	9.71E-02	2.86E+03
PENRM	MJ	2.51E-04	9.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.41E-02
PENRT	MJ	1.16E+02	1.25E+01	4.76E+00	7.07E-03	2.72E+03	9.71E-02	2.86E+03
PERE	MJ	1.21E+01	-2.47E-01	3.08E-02	1.03E-04	1.80E+02	7.92E-03	1.92E+02
PERM	MJ	3.68E-01	6.76E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E+00
PERT	MJ	1.24E+01	4.29E-01	3.08E-02	1.03E-04	1.80E+02	7.92E-03	1.93E+02
FW (Net use of fresh water)	m3	8.25E-02	5.48E-03	3.25E-04	3.55E-06	1.70E+00	4.69E-05	1.79E+00
MS (use of secondary materials)	kg	2.14E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.14E-03
RSF (use of renewable secondary fuels)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF (Use of non-renewable secondary fuels)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Legend: **PENRE** = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as raw materials; **PENRM** = Use of non-renewable primary energy resources as raw materials; **PENRT** = Total use of non-renewable primary energy resources; **PERE** = Use of renewable primary energy resources excluding renewable primary energy resources used as raw materials; **PERM** = Use of renewable primary energy resources as raw materials; **PERT** = Total use of renewable primary energy resources.

Table 7. Environmental impacts related to resource consumption for the DUB02CT23 device.

WASTE PRODUCTION

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Impact category	Unit of measurement	PRODUCTION phase		DISTRIBUTION phase	INSTALLATION Phase	Use and Maintenance Phase	END OF LIFE phase	TOTAL
		UPSTREAM module	CORE module					
Hazardous waste disposal (HWD)	kg	5.90E-03	3.73E-04	6.50E-04	2.27E-04	9.31E-02	1.91E-03	1.02E-01
Non-hazardous waste disposal (NHWD)	kg	3.13E-01	2.82E-02	7.00E-02	1.10E-02	1.10E-02	2.83E-03	4.36E-01
Radioactive waste disposal (RWD)	kg	2.38E-04	7.22E-06	6.03E-07	1.53E-09	1.53E-09	1.50E-07	2.46E-04
Materials for energy recovery (MER)	kg	0.00E+00	0.00E+00	2.54E-03	9.80E-04	0.00E+00	0.00E+00	3.52E-03
Materials for recycling (MFR)	kg	0.00E+00	2.53E-02	1.28E-02	1.10E-02	0.00E+00	2.60E-02	7.51E-02
Components for reuse (CRU)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE (exported thermal energy)	MJ	0.00E+00	0.00E+00	7.23E-03	2.79E-03	0.00E+00	0.00E+00	1.00E-02
EEE (exported electricity energy)	MJ	0.00E+00	0.00E+00	3.53E-03	1.36E-03	0.00E+00	0.00E+00	4.89E-03

Table 8. Waste-related environmental impacts for the DUB02CT23 device.



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- ❖ ISO 14040:2021 Environmental management - Life cycle assessment - Principles and framework
- ❖ ISO 14044:2021 Environmental management - Life cycle assessment - Requirements and guidelines
- ❖ ISO 14020:2000 Environmental labels and declarations - General principles
- ❖ ISO 14025:2010, Environmental labels and declarations - Type III environmental statements - Principles and procedures
- ❖ EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems
- ❖ EPDItaly Program Regulations Rev. 6 of 30/10/2023
- ❖ Core-PCR: EPDITALY007 " Electronic and electrical product and systems" Rev. 3 of 13/01/2023
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