



Environmental Product Declaration

Product: name:

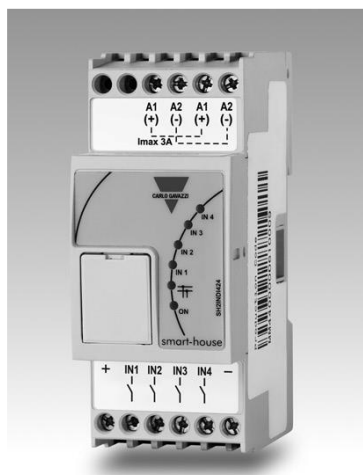
SH2INDI424

Site Plant:

via Safforze, 8
32100 – Belluno (BL)

in compliance with ISO 14025 and EN 50693


Program Operator	EPDItaly
Publisher	EPDItaly
Declaration Number	BL21620.04
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Valid to	2027.03.14



Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

General information

EPD Holder	Gavazzi Controls S.p.A., via Safforze, 8 32100 – Belluno (BL) www.gavazzi-automation.com
Reference production site(s)	Plant in Belluno: via Safforze, 8, 32100 – Belluno (BL)
Field of application	This document refers to a product of family Fieldbus
Programme Operator	EPDItaly - info@epditaly.it
Independent verification	Independent verification of declaration and data carried out according to ISO 14025:2010 <input type="checkbox"/> _Internal <input checked="" type="checkbox"/> _External 3rd party verification conducted by: ICMQ SpA, via De Castillia, 10 20124 – _Milano (www.icmq.it), Accredited by Accredia
CPC code	4621 "Electricity distribution or control apparatus"
Contact	<u>Alberto Mambrini</u> , LCA Process Owner in Carlo Gavazzi Controls SpA
Technical support	 Aequilibria Srl - SB P.le Martiri delle Foibe, 5 30175 – Marghera Venezia (VE) - ITALIA
Comparability	Environmental declarations published within the same product category, but coming from different programmes, may be not comparable. In particular, EPD of similar products may be not comparable if not compliant to the reference norms
Responsibility	Carlo Gavazzi Controls S.p.A. relieves EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence; EPDItaly declines all responsibility for the manufacturer's information, data and results of the life cycle assessment.
Reference documents	This declaration was developed according to the EPDItaly Regulation; the Regulation (Rev.5 of 01/07/2020), available at www.epditaly.it .

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

	The standard EN 50693:2019 represents the reference for the PCR "Electronic and electrical products and systems" (PCR EPDItaly007).
PCR – Product Category Rules	Core-PCR: EPDITALY007 "Electronic and electrical product and systems" Rev. 2 of 21/10/2020
Document date and revision	Dec 20 2021, rev. 0

Table 1. EPD general information

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

Introduction

This document represents the EPD study conducted for the product SH2INDI424, manufactured by Carlo Gavazzi Controls S.p.A., in conformity to the Program EPDIItaly and the relevant Regulation. The Regulation was developed according to ISO 14025 and aims to provide a tool to develop, verify and publish the product EPDs.

This study was done according to the PCR EPDIItaly007 (*PCR for electronic and electrical products and systems*), that identifies and documents:

- The target and field of application of LCA-based info for the product category;
- The rules for productions of additional environmental info;
- The stages of LCA to be included;
- The parameters to be considered and the way to collect and communicate them in a report.

Information on the manufacturer and environmental policy

Carlo Gavazzi Controls SpA develops, produces, sells monitoring relays, timers, energy management systems field bus systems, providing solutions for residential, commercial, industrial automation within the low-voltage installations.

Carlo Gavazzi products are sold in Europe, North-America, Asia-pacific area, through a network of more than 20 own sales companies and approx 60 independent national distributors. Carlo Gavazzi Controls has a production plant in Belluno (via Safforze 8, 32100 – Belluno), involved in this study.

Carlo Gavazzi is certified ISO9001 (from 1997) and ISO14001 (from 2009). Both certifications are issued by accredited Bodies.

Carlo Gavazzi Controls commits to reduce continuously the environmental impact of its products, through the implementing of the ISO14001 certified Environmental Management System and of a design process aware of the environment, based on the principles of norm EN 62430.

The environmental statements have been evaluated by using a qualitative approach on the environment-aware design process.

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

Product information

The product here analyzed is the device **SH2INDI424**, belonging to the family Fieldbus, with rated power consumption 0,6W, weight 157 g, including packaging and instructions.

According to the reference PCR, the functional unit has been defined as a device, **characterized by a power consumption of 0,6W during a RSL (Reference Service Life) of 10 years, including its packaging, working continuously during its whole service life.**

It is a device used for fieldbus applications, compliant to the EMC Directive, RoHS Directive. Assembling, testing and packing is carried out at the production plant of Carlo Gavazzi Controls. During the use stage the product doesn't require any specific maintenance and it is considered turned on for the whole service life estimated in 10 years, with a rated power consumption of 0,6W when supplied at the rated voltage 24Vdc.

The finished product is sent from the production plant to the logistic centers for following distribution.

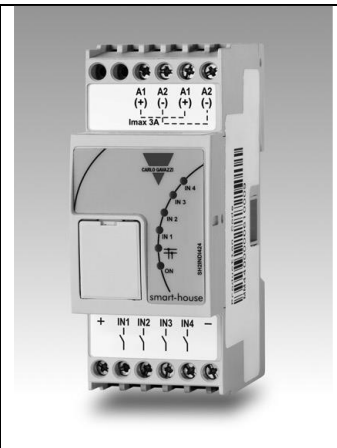
Product family	Fieldbus	
Product name	SH2INDI424, SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT	
Technical data	Power consumption: 0,6W @ 24Vdc Frequency: DC Weight: 98,6g (excluding packaging) Reference Service Life (RLS):10 years	
Packaging	Weight: 58,4g Material: cardboard, paper	

Table 2. Information relevant to the product SH2INDI424

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

➡ Materials and substances contained in the product

The material declaration is done according to EN IEC 62474.

The product complies with the RoHS Directive 2011/65/EU and amendment 2015/863/EU.

The product doesn't contain batteries.

Any percentage of recycled material is unknown.

The percentages of each raw material, as well as the total weight including packaging, are indicated in table 3.

Total weight	157g (including packaging)
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Raw material category	SCLAM	SCLAM description	% SCLAM on total weight	% category on total weight
PCB	PCB-SEM	Printed circuit boards one/two layers	5,58%	16,26%
	PCB-SEM	Printed circuit boards one/two layers	5,24%	
	PCB-SEM	Printed circuit boards one/two layers	5,45%	
Electronic components	CCERS	SMD - Ceramic capacitors	0,037%	6,78%
	CCERS	SMD - Ceramic capacitors	0,006%	
	CCERS	SMD - Ceramic capacitors	0,061%	
	CCERS	SMD - Ceramic capacitors	0,015%	
	CCERS	SMD - Ceramic capacitors	0,017%	
	CCERS	SMD - Ceramic capacitors	0,005%	
	CCERS	SMD - Ceramic capacitors	0,012%	
	CCERS	SMD - Ceramic capacitors	0,058%	
	CCERS	SMD - Ceramic capacitors	0,041%	
	CELEP	PTH - Electrolytic capacitors	0,377%	
	CELEP	PTH - Electrolytic capacitors	1,267%	
	CNTRS	Connectors	0,253%	
	CNTRS	Connectors	0,243%	
	CNTRS	Connectors	0,363%	
	CNTRS	Connectors	0,569%	
	CNTRS	Connectors	0,671%	
	CNTRS	Connectors	0,284%	
	CNTRS	Connectors	0,106%	
	CTANS	SMD - Tantalum capacitors	0,096%	
	DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,002%	
DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,003%		

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

	DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,011%	
	DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,037%	
	DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,010%	
	DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,006%	
	DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,007%	
	DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,010%	
	DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,018%	
	DDSMD	SMD - Diodes, zeners, leds, Transils, rectifier bridges	0,130%	
	ICSMD	SMD - Integrated circuits	0,007%	
	ICSMD	SMD - Integrated circuits	0,009%	
	ICSMD	SMD - Integrated circuits	0,013%	
	ICSMD	SMD - Integrated circuits	0,015%	
	ICSMD	SMD - Integrated circuits	0,051%	
	ICSMD	SMD - Integrated circuits	0,286%	
	ICSMD	SMD - Integrated circuits	0,109%	
	INDCS	SMD - Inductors	0,511%	
	INDCS	SMD - Inductors	0,528%	
	MICRO	Microprocessors	0,086%	
	RESMD	SMD Resistors	0,047%	
	RESMD	SMD Resistors	0,034%	
	RESMD	SMD Resistors	0,007%	
	RESMD	SMD Resistors	0,012%	
	RESTD	Resistors	0,132%	
	TRSMO	SMD - Transistors and mosfets	0,005%	
	TRSMO	SMD - Transistors and mosfets	0,004%	
	VARIP	PTH - Varistors	0,209%	
Specific product SCLAM	PTTCP-PO	Potting compounds polyurethane	0,14%	0,14%
Cables	CABLE-PVC	Cables, sleeves and wirings PVC	0,95%	1,91%
	CABLE-PVC	Cables, sleeves and wirings PVC	0,96%	
Small metal parts	MECUS-OT	Custom metal parts brass	2,33%	10,30%
	MESTD-RA	Standard metal parts copper	5,16%	
	MESTD-ST	Standard metal parts steel	0,44%	
	MESTD-ST	Standard metal parts steel	2,36%	

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

Plastic materials	LAFRO-PL	Frontal labels (polyester)	0,17%	27,29%
	LAPAC	Packaging labels	0,97%	
	PLCUS-HO	Custom parts Hostaform	0,54%	
	PLCUS-NO	Custom parts Noryl	0,64%	
	PLCUS-NO	Custom parts Noryl	0,30%	
	PLCUS-NO	Custom parts Noryl	0,31%	
	PLCUS-NO	Custom parts Noryl	0,59%	
	PLCUS-NO	Custom parts Noryl	11,39%	
	PLCUS-NO	Custom parts Noryl	5,82%	
	PLCUS-NO	Custom parts Noryl	6,55%	
Paper packaging	BOXES	Carton boxes	4,53%	37,32%
	BOXES	Carton boxes	24,37%	
	SHEET	Instruction sheets/ manuals	8,42%	

Table 3. Material categories (SCLAM) percentages for product SH2INDI424

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

Information relevant to the study

System boundaries	The system boundaries of this study is considered “ cradle-to-grave ”
Geographic validity	Global
Reference year	2019
Reference tool	This EPD was generated by using data obtained automatically by the certified Excel tool “LCA tool_dati 2019_GAV – rev1” of 23/06/2021

Table 4. Information relevant to the study

The evaluation of all environmental impacts above mentioned is based on the whole life-cycle of the analyzed product: production, distribution, installation, use and end-of-life.

Following is a description of elements and processes taken into consideration, to evaluate the impacts for each stage:

Production	<ul style="list-style-type: none"> raw materials of product and packaging (primary and secondary), auxiliary materials and relevant transportation. production and working processes, that cause energy and water consumption, emissions in air, waste generated during production <ul style="list-style-type: none"> Dataset electricity: <i>Electrical Energy– medium RESIDUAL MIX (Ecoinvent 3.6)</i> 																					
Distribution	<ul style="list-style-type: none"> transportation from the production plant to the logistic centers <table border="1" style="width: 100%; text-align: center;"> <thead> <tr style="background-color: #FFD700;"> <th colspan="3">DISTRIBUTION OF FINISHED PRODUCT (CdD)</th> </tr> <tr style="background-color: #FFF2CC;"> <th>Logistic center</th> <th>% of distribution</th> <th>Further distribution at continental level?</th> </tr> </thead> <tbody> <tr> <td>CGC-CdD Italy</td> <td>62,5%</td> <td>No</td> </tr> <tr> <td>CGC-CdD Spain</td> <td></td> <td></td> </tr> <tr> <td>CGC-CdD USA</td> <td>0,1%</td> <td>No</td> </tr> <tr> <td>CGC-CdD Canada</td> <td></td> <td></td> </tr> <tr> <td>CGC-CdD Singapore</td> <td>37,4%</td> <td>No</td> </tr> </tbody> </table> <ul style="list-style-type: none"> disposal of secondary packaging 	DISTRIBUTION OF FINISHED PRODUCT (CdD)			Logistic center	% of distribution	Further distribution at continental level?	CGC-CdD Italy	62,5%	No	CGC-CdD Spain			CGC-CdD USA	0,1%	No	CGC-CdD Canada			CGC-CdD Singapore	37,4%	No
DISTRIBUTION OF FINISHED PRODUCT (CdD)																						
Logistic center	% of distribution	Further distribution at continental level?																				
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Environmental Product Declaration
 SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

Installation	•disposal of primary packaging.
Use and maintenance	• Product category: Fieldbus • use scenario: 10 years of service life, 100% working at rated conditions, rated power consumption 0,6W.
End of life	•Scenario of end-of-life of the device (WEEE)

Table 5. Processes considered during the various stages of the study

The LCA study has been conducted according to the norms UNI EN ISO 14040/14044, following the guidelines of EN 50693:2019.

Software used for the impact evaluation: SimaPro 9.1.1.1; database Ecoinvent 3.6.

The calculations of impacts refer to refer to the method CML baseline and IPCC, for the impact category relevant to the climate change.

Specific site-data were used for all the following processes:

- production and transportation of raw materials, auxiliary materials, packaging materials;
- manufacturing processes, energy consumption of the plant, air emissions and waste;
- weight and power consumption of the device;
- transportation to the logistic center.

Generic data were used for:

- recycle rates, energy recovery and disposal for the materials of packaging (primary and secondary) and for WEEE (data at global level).

The default scenarios described in the PCR007 were used for:

- transportation to the sales point: scenario of intercontinental and local transportation;
- Life-time (RLS) of the device: 10 years.

➡ Evaluation of the environmental impact

The potential environmental impacts evaluated through the LCA of the device SH2INDI424 are reported in table 6 below. The impacts were calculated by using the software SimaPro Developer 9.1.1.1 and database Ecoinvent 3.6.

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

ENVIRONMENTAL IMPACT								
Impact category	Unit	PRODUCTION		DISTRIBUTION	INSTALLATION	USE AND MAINTAINANCE	END-OF-LIFE	TOTAL
		UPSTREAM module	CORE module	DOWNSTREAM module				
GWP TOT (Global Warming Potential)	kg CO ₂ eq	3,58E+00	8,57E-01	3,59E-01	1,91E-03	2,29E+01	2,72E-02	27,70
GWP - fossil	kg CO ₂ eq	3,56E+00	8,54E-01	3,59E-01	1,91E-03	2,27E+01	2,72E-02	27,49
GWP - biogenic	kg CO ₂ eq	1,03E-02	2,40E-03	5,06E-05	4,13E-07	1,83E-01	1,12E-05	0,20
GWP Luluc (GWP land use and land use change)	kg CO ₂ eq	9,13E-03	2,84E-04	4,82E-05	3,47E-07	3,11E-03	8,63E-06	0,01
ODP (Ozone depletion)	kg CFC ₁₁ eq	3,21E-07	1,54E-07	8,08E-08	2,17E-10	2,37E-06	6,19E-10	2,93E-06
AP (Acidification)	mol H ⁺ eq	3,48E-02	3,80E-03	1,85E-03	6,04E-06	8,66E-02	3,90E-05	0,13
EP (Eutrophication, freshwater)	kg P eq	5,19E-03	2,08E-04	1,13E-05	1,60E-07	4,49E-03	2,56E-06	0,01
POCP (Photochemical ozone formation)	kg NMVOC eq	1,71E-02	2,01E-03	1,92E-03	6,69E-06	4,17E-02	3,00E-05	0,06
ADPE (Resource use, minerals and metals)	kg Sb eq	1,58E-03	4,72E-06	2,49E-06	2,20E-08	1,43E-04	1,72E-07	1,73E-03
ADPF (Resource use, fossils)	MJ	4,88E+01	1,50E+01	5,11E+00	1,49E-02	3,61E+02	8,25E-02	430,21
WDP (Water use)	m ³ depriv.	1,03E+00	2,06E-01	6,60E-03	2,29E-04	8,72E+00	1,13E-03	9,96

Table 6. Results of various environmental impact categories for device SH2INDI424

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

USE OF RESOURCES								
Impact category	Unit	PRODUCTION		DISTRIBUTION	INSTALLATION	USE AND MAINTAINANCE	END OF LIFE	TOTAL
		UPSTREAM module	CORE module	DOWNSTREAM module				
PENRE	MJ	5,09E+01	1,62E+01	5,43E+00	1,59E-02	3,94E+02	8,78E-02	466,42
PENRM	MJ	1,12E+00	7,45E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,20
PENRT	MJ	5,06E+01	1,63E+01	5,43E+00	1,59E-02	3,94E+02	8,78E-02	466,32
PERE	MJ	4,73E+00	1,91E+00	3,04E-02	1,88E-04	6,47E+01	6,76E-03	71,34
PERM	MJ	3,42E+00	5,74E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,99
PERT	MJ	5,69E+00	2,48E+00	3,04E-02	1,88E-04	6,47E+01	6,76E-03	72,87
FW (Net use of fresh water)	m ³	3,53E-02	7,15E-03	2,58E-04	6,39E-06	2,34E-01	4,49E-05	0,28
MS (use of secondary materials)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00
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	0,00
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	0,00

Table 7. Environmental impacts referred to use of resources for device SH2INDI424

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

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

WASTE PRODUCTION								
Impact category	Unit	PRODUCTION		DISTRIBUTION	INSTALLATION	USE AND MAINTAINANCE	END OF LIFE	TOTAL
		UPSTREAM module	CORE module	DOWNSTREAM module				
Hazardous waste disposal (HWD)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,14E-02	8,14E-02
Non-hazardous waste disposal (NHWD)	kg	0,00E+00	0,00E+00	1,82E-02	1,66E-02	0,00E+00	0,00E+00	3,49E-02
Radioactive waste disposal (RWD)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	3,08E-03	2,02E-03	0,00E+00	0,00E+00	5,10E-03
Materials for recycling (MFR)	kg	0,00E+00	1,30E-02	1,90E-02	3,78E-02	0,00E+00	1,72E-02	8,70E-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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE (exported electricity energy)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Table 8. Environmental impacts referred to waste, for product SH2INDI424

Environmental Product Declaration

SH2INDI424 SMART-DUPLINE® CABINET MODULE FOR DIGITAL INPUT

References

- ❖ ISO 14040:2006 Environmental management - Life cycle assessment - Principles and framework
- ❖ ISO 14044:2018 Environmental management - Life cycle assessment - Requirements and guidelines
- ❖ ISO 14020:2000 Environmental labels and declarations - General principles
- ❖ UNI EN ISO 14025:2010, Etichette e dichiarazioni ambientali - Dichiarazioni ambientali di Tipo III - Principi e procedure
- ❖ EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems
- ❖ EPDItaly Regulation, Rev. 5 of 01/07/2020
- ❖ Core-PCR: EPDITALY007 " Electronic and electrical product and systems" Rev. 2 del 21/10/2020