



EPD



Environmental Product Declaration

Retrofit mounting assembly for REX521RRP

Production site: Vaasa, Finland



DOCUMENT KIND Environmental Product Declaration	IN COMPLIANCE WITH ISO 14025 and EN 50693			
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EPD Owner	ABB Switzerland Ltd, Group Technology Management		
Organization No.	CHE-101.538.426		
Manufacturer name and address	ABB Oy Dynamotie 4N, Vaasa, Finland		
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Program operator	The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway phone: +47 23 08 80 00, email: post@epd-norge.no		
Declared product	Retrofit mounting assembly for REX521RRP		
Product description	<p>Previous versions of REX521 relays are in the classic and obsolete stage of the product life cycle. ABB's Relay Retrofit Program for REX 521 offers smooth and controlled replacement of REX 521 relays with REF615, REM615, REX615 from the Relion 615 series. The functionality of the selected 615 series relay corresponds to that of the existing REX521 relay.</p> <p>The main deliverables under this program are Relion 615 series replacement relay and the Retrofit mounting assembly for REX521RRP, which is prewired to the new Relion 615 relay for the customer. Retrofit mounting assembly can be installed in the existing panel door cutout after removal of REX521 relay.</p>		
Functional unit	To retrofit the existing relay and to use the new relay, during a service life of 10 years in Europe.		
Reference flow	A single prewired retrofit mounting assembly and packaging.		
Independent verification	<p>Independent verification of the declaration and data, according to ISO 14025:2010</p> <p><input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL</p> <p>Independent verifier approved by EPD-Norge: Elisabet Amat</p> <p>Signature: </p>		
Approved by	<p>Håkon Hauan, CEO EPD-Norge</p> <p>Signature: </p>		
Reference PCR	<p>EN 50693:2019 – Product Category Rules for Life Cycle Assessments of Electronic and Electrical Products and Systems.</p> <p>EPDItaly007 – Electronic and Electrical Products and Systems, Rev. 3.0, 2023/01/13.</p>		
Program instructions	The Norwegian EPD Foundation/EPD-Norge, General Programme Instructions 2019, Version 3.0, 2019/04/24.		
LCA study	This EPD is based on the LCA study described in the LCA report 2NGA002404_A.		
EPD type	Specific product		
EPD scope	Cradle-to-grave		
Product RSL	10 years		
Geographical representativeness	Manufacturing (suppliers): Finland	Manufacturing (ABB): Finland	Downstream: Global
Reference year	2023		
LCA software	SimaPro 9.5 (2023)		
LCI database	Ecoinvent v3.9.1 (2022)		
Comparability	EPDs published within the same product category, though originating from different programs, may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.		
Liability	The owner of the declaration shall be liable for the underlying information and evidence. EPD-Norge shall not be liable with respect to manufacturer, life cycle assessment data, and evidence.		

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Sustainability at ABB

ABB is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation, and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels.

At ABB, we actively contribute to a more sustainable world, leading by example in our own operations and partnering with customers and suppliers to enable a low-carbon society, preserve resources, and promote social progress.

Learn more on our website global.abb/group/en/sustainability or scan the QR code.



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General Information

This Environmental Product Declaration is a “specific product EPD”, and the declared product is the Retrofit mounting assembly for REX521, including related packaging.

Previous versions of REX521 relays are in the classic and obsolete stage of the product life cycle. ABB’s Relay Retrofit Program for REX 521 offers smooth and controlled replacement of REX 521 relays with REF615, REM615, REX615 from the Relion 615 series. The functionality of the selected 615 series relay corresponds to that of the existing REX521 relay.

The main deliverables under this program are Relion 615 series replacement relay and the Retrofit mounting assembly for REX521RRP, which is prewired to the new Relion 615 relay for the customer. Retrofit mounting assembly can be installed in the existing panel door cutout after removal of REX521 relay.

General technical specifications of the Retrofit mounting assembly for REX521RRP are presented below.

	Description	Device Code 1 (Ref. product)
Size	Width	192 mm
	Height	268 mm
	Depth	183 mm
	Weight	2016 g

ABB only performs assembly of the Retrofit mounting assembly for REX521RRP and a relay and the final testing of this retrofit assembly. ABB does not manufacture or assembly the Retrofit mounting assembly for REX521RRP itself. Instead, it is outsourced and purchased from supplier as a ready product.

The assembly and testing are done at ABB Electrification service plant in Vaasa, Finland. The plant uses 100 % renewable energy for the electricity (50/50 mix of wind and hydro) and for heating (bioenergy). The plant is also certified according to the following standards:

- ISO 9001:2015 – Quality Management Systems
- ISO 14001:2015 – Environmental Management Systems
- ISO 45001:2018 – Occupational Health and Safety Management Systems
- ISO 50001:2018 – Energy management systems

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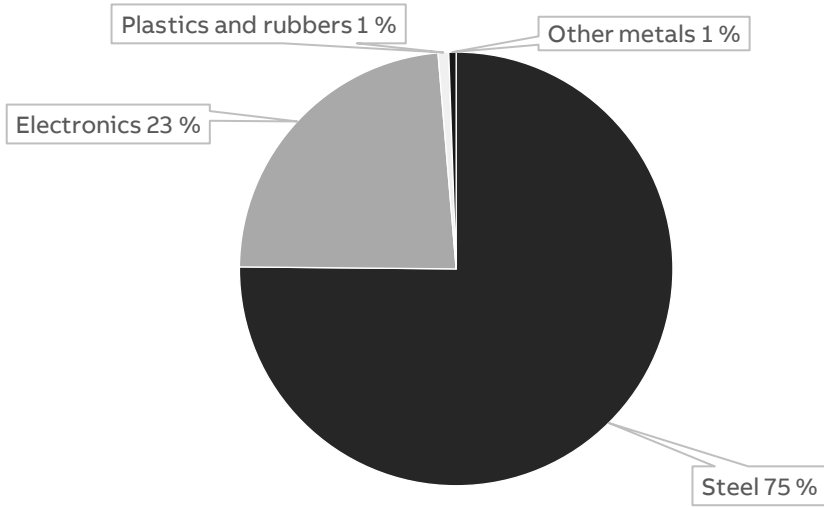


Constituent Materials

The constituent materials of the Retrofit mounting assembly for REX521RRP Reference Product are presented below.

Type	Material	Weight [kg]	Weight %
Metals	Steel, stainless	1.515	75.1
	Other metals	0.011	0.6
Plastics and rubbers	Polyamide	0.006	0.3
	Rubber	0.010	0.5
Others	Electronics	0.474	23.5
Total		2.016	100

Retrofit mounting assembly for REX521RRP



The constituent materials of the packaging are presented below.

	Description	Material	Weight [kg]	Weight %	MS [kg]	MS %
Unit	Packaging box	Cardboard	0.715	83	0.093	13
	Box interior	Plastic	0.150	17		
	Total		0.865	100	0.093	11



LCA Background Information

Functional Unit

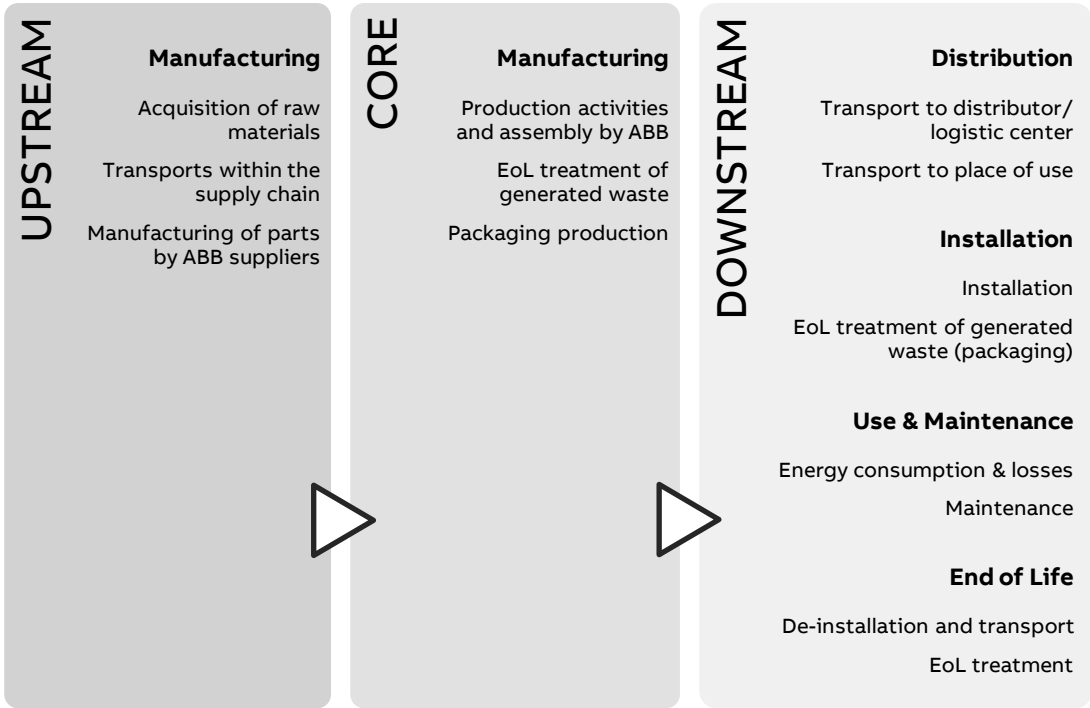
The functional unit quantifies the performance of the service delivered by a product. This provides a reference to which inputs and outputs are related in the LCA. As a result, the reference flow can be determined, which refers to the measure of outputs required to fulfil the function.

The functional unit of this study is to retrofit the existing relay with new, during a service life of 10 years in Europe. The reference flow is a single prewired retrofit mounting assembly and packaging.

Note, the reference service life (RSL) of 10 years is a theoretical period selected for calculation purposes only – this is not representative for the minimum, average, nor actual service life of the product.

System Boundaries

The life cycle assessment is a “cradle-to-grave” analysis, and the system boundaries are defined according to EN 50693, as required by the PCR. For transparency reasons, the manufacturing stage is further divided into an upstream and core stage.



Data quality

Both primary and secondary data are used. The main sources for primary data are the bill of materials (BOM) and technical drawings site-specific foreground data provided by ABB.

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For all processes for which primary data are not available, generic background data originating from the ecoinvent v3.9.1 database, with system model “allocation, cut-off by classification”, are used. The LCA software used for the calculations is SimaPro 9.5.

Allocation rules

The utility consumption by ABB, in the core manufacturing stage, is allocated to the production of one reference product according to applicable rules. For the end-of-life allocation, the “Polluter Pays” principle is adopted according to what is defined in the CEN/TR 16970 standard, as required by EPDIItaly007. However, the potential benefits and avoided loads from recovery and recycling processes are not considered because it is not required by the PCR.

Cut-off criteria

The PCR EPDIItaly007 does not provide any details about cut-off criteria; it refers to chapter 4.2.3.3 in the standard EN 50693. According to EN 50693, the cut-off criteria can be set to a maximum of 5 % of the overall environmental impacts. In this LCA, labels as well as the tape and staples used in the packaging have been excluded as their weights are negligible.

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Inventory Analysis

Manufacturing Stage (upstream)

The life cycle inventory in the upstream manufacturing stage is based on the primary data available from ABB and background data from ecoinvent. Datasets are applied accordingly, to the best of our knowledge, to represent each material, manufacturing process, and surface treatment. Modelling decisions and assumptions that are highly relevant to the results are as following:

- The amount of gold used in each connector is considered, due to its high impact.

Additionally, supply chain transports are added as far as data is available between ABB, the suppliers, and sub-suppliers. Only primary suppliers are considered. The rest of the transports are assumed to already be included in ecoinvent's "market for"-processes.

Manufacturing Stage (core)

In the core manufacturing stage, utility consumption and waste generation at the ABB manufacturing site are accounted for. The packaging materials are also considered. Modelling decisions and assumptions that are highly relevant to the results are as following:

- 100% renewable electricity and district heating is considered, which is procured by the ABB manufacturing site through Guarantees of Origins (GO's). In the use stage electricity is not calculated according to residual mix, but according to location-based approach.

Distribution

The transport distance from the ABB manufacturing site to the site of installation is assumed to be 300 km by lorry, as the actual distance is unknown. The environmental impacts can be multiplied accordingly if the actual distance is known.

	Dataset	Amount	Unit	Represent.
Transport	Transport, freight, lorry 16-32 metric ton, EURO4 {RER}	300	km	Assumption

Installation

The installation phase only implies manual activities, and the energy consumed is negligible. Therefore, this phase only considers the end-of-life of the packaging materials used.

	Scenario	Transport	Representation
Packaging End-of-Life	Packaging waste by waste management operations (Eurostat, 2021)	100 km by lorry (assumption)	Europe

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Use

No material and energy consumption regarding the Retrofit mounting assembly for REX521RRP occur during the use stage, and no maintenance is required.

End of life

Decommissioning of the product only implies manual activities, and the energy consumed is negligible. Therefore, this phase only considers the end-of-life of the product.

	Scenario	Transport	Representation
Product End-of-Life	IEC/TR 62635 (Annex D.3) *	100 km by lorry (assumption)	Europe

*A conservative approach is adopted by considering all parts as either: requiring selective treatment, difficult to process, or going through a separation process; no individual part is considered as a single recyclable material.



Environmental Indicators

In accordance with the PCR EPDItaly007, the environmental impact indicators are determined by using the characterization factors and impact assessment methods specified in EN 15804:2012+A2:2019.

Impact category	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
GWP – total	kg CO ₂ eq.	2,23E+01	1,11E+01	1,00E+01	2,40E-01	3,91E-01	0,00E+00	5,04E-01
GWP – fossil	kg CO ₂ eq.	2,09E+01	1,13E+01	8,71E+00	2,40E-01	1,69E-01	0,00E+00	4,55E-01
GWP – biogenic	kg CO ₂ eq.	1,94E-01	-1,90E-01	1,14E-01	2,19E-04	2,22E-01	0,00E+00	4,87E-02
GWP – luluc	kg CO ₂ eq.	1,23E+00	2,55E-02	1,21E+00	1,17E-04	2,63E-05	0,00E+00	2,75E-04
ODP	kg CFC-11 eq.	2,95E-06	2,48E-06	4,62E-07	5,26E-09	8,11E-10	0,00E+00	2,43E-09
AP	mol H+ eq.	3,51E-01	2,40E-01	1,08E-01	9,94E-04	1,90E-04	0,00E+00	1,08E-03
EP – freshwater	kg P eq.	2,22E-02	1,78E-02	4,26E-03	1,69E-05	5,09E-06	0,00E+00	6,97E-05
EP – marine	kg N eq.	5,08E-02	2,22E-02	2,76E-02	3,79E-04	2,57E-04	0,00E+00	3,61E-04
EP – terrestrial	mol N eq.	8,70E-01	4,87E-01	3,75E-01	4,05E-03	7,19E-04	0,00E+00	3,06E-03
POCP	kg NMVOC eq.	1,52E-01	6,77E-02	8,14E-02	1,46E-03	2,71E-04	0,00E+00	9,09E-04
ADP – minerals and metals	kg Sb eq.	3,87E-03	3,52E-03	3,52E-04	7,76E-07	1,47E-07	0,00E+00	1,73E-06
ADP – fossil	MJ, net calorific value	2,58E+02	1,52E+02	1,00E+02	3,43E+00	5,22E-01	0,00E+00	2,48E+00
WDP	m ³ eq.	8,47E+00	5,50E+00	2,91E+00	1,39E-02	1,26E-02	0,00E+00	3,25E-02

GWP-fossil: Global Warming Potential fossil; GWP-biogenic: Global Warming Potential biogenic; GWP-luluc: Global Warming Potential land use and land use change; ODP: Depletion potential of the stratospheric ozone layer; AP: Acidification potential; EP-freshwater: Eutrophication potential-freshwater compartment; EP-marine: Eutrophication potential-marine compartment; EP-terrestrial: Eutrophication potential-accumulated exceedance; POCP: Formation potential of tropospheric ozone; ADP-minerals & metals: Abiotic Depletion for non-fossil resources potential; ADP-fossil: Abiotic Depletion for fossil resources potential; WDP: Water deprivation potential.

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ENVIRONMENTAL PRODUCT DECLARATION

Resource use parameters	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
PENRE	MJ, low cal. value	2,41E+02	1,41E+02	9,36E+01	3,43E+00	5,22E-01	0,00E+00	2,48E+00
PERE	MJ, low cal. value	1,23E+03	1,28E+01	1,22E+03	5,32E-02	1,78E-02	0,00E+00	2,49E-01
PENRM	MJ, low cal. value	1,75E+01	1,11E+01	6,37E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERM	MJ, low cal. value	1,84E+01	9,19E+00	9,19E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ, low cal. value	2,59E+02	1,52E+02	1,00E+02	3,43E+00	5,22E-01	0,00E+00	2,48E+00
PERT	MJ, low cal. value	1,25E+03	2,20E+01	1,23E+03	5,32E-02	1,78E-02	0,00E+00	2,49E-01
FW	m ³	1,08E+00	1,54E-01	9,25E-01	4,88E-04	3,99E-04	0,00E+00	1,24E-03
MS	kg	1,65E+00	1,56E+00	9,30E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

PENRE: Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material; PERE: Use of renewable primary energy excluding renewable primary energy resources used as raw material; PENRM: Use of non-renewable primary energy resources used as raw material; PERM: Use of renewable primary energy resources used as raw material; PENRT: Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); PERT: Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); FW: Net use of fresh water; MS: Use of secondary materials; RFS: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels.

System output indicators	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
HWD	kg	5,66E-03	4,73E-03	8,97E-04	2,18E-05	2,60E-06	0,00E+00	9,65E-06
NHWD	kg	1,10E+01	3,05E+00	7,17E+00	1,67E-01	1,21E-01	0,00E+00	4,84E-01
RWD	kg	3,36E-04	2,14E-04	1,15E-04	1,11E-06	3,29E-07	0,00E+00	4,80E-06
MER	kg	2,71E-01	0,00E+00	6,75E-02	0,00E+00	1,19E-01	0,00E+00	8,43E-02
MFR	kg	2,99E+00	8,10E-03	8,01E-01	0,00E+00	6,49E-01	0,00E+00	1,53E+00
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	1,01E+00	0,00E+00	0,00E+00	0,00E+00	7,76E-01	0,00E+00	2,37E-01
EEE	MJ	5,63E-01	0,00E+00	0,00E+00	0,00E+00	4,31E-01	0,00E+00	1,32E-01

HWD: hazardous waste disposed; NHWD: non-hazardous waste disposed; RWD: radioactive waste disposed; MER: materials for energy recovery; MFR: material for recycling; CRU: components for reuse; ETE: exported thermal energy; EEE: exported electricity energy.

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Additional Environmental Information

Circularity Values

The recyclability potential of the product (excluding packaging) is calculated by dividing “MFR: material for recycling” in the end-of-life stage by the total weight of the product. As a result, the recyclability potential of the product is 76 %. The result is representative for Europe according to IEC/TR 62635.

Recyclability potential	
Retrofit mounting assembly for REX521RRP	76%

The recycled content and recyclability potential of the packaging is calculated by dividing “MS: Use of secondary materials” in the core manufacturing stage and “MFR: material for recycling” in the installation stage by the total weight of the packaging. The recycled content is based on primary data, and the recyclability potential is representative for Europe according to Eurostat (2021). The results are presented below.

	Recycled content	Recyclability potential
Packaging materials	11 %	75 %

Greenhouse gas emissions from the use of electricity in the manufacturing phase

Production mix from import, medium voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process.

Energy mix	Source	Amount	Unit
ABB FI custom energy mix; 50 % wind + 50 % hydro	Ecoinvent v3.9.1	0.028	kg CO ₂ -eq/kWh

Dangerous substances

The product complies with REACH and RoHS directive requirements and does not contain any of the listed materials in excess of the authorized proportions. For further information about REACH and RoHS, please visit the ABB webpage:

<https://new.abb.com/contact/form>.

Indoor environment

The product meets the requirements for low emissions.

Carbon footprint

Carbon footprint has not been worked out for the product.

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