ENGINEERING TOMORROW

Environmental **Product Declaration**

ChangeOver6 Actuator and NovoCon ChangeOver6 Actuator

EPD issued	2024-11-14
EPD expires	2029-11-14
EPD author	Danfoss Climate Solution A/S
EPD type	Cradle-to-grave
Declared unit	One product over its Reference Service Life
Products included	Reference product ChangeOver6 Actuator (003Z3153)
Products covered by EPD	See Annex 1
Manufacturing Location	Maribor, Slovenia
Use Location	European Union
Application	HVAC systems
Mass	1.245 kg without packaging 1.308 kg with packaging
Dimensions (H×W×D)	[84 x 101 x 98] mm without packaging
Verification	[ ] External [X] Internal [ ] None
Produced to	Danfoss Product Category Rules (2022-09)
Internal independent verifier	Danfoss Power Electronics & Drives A/S

DISCLAIMER
This EPD was prepared to the best of knowledge of Danfoss A/S. The life cycle assessment calculations were performed in accordance with ISO 14040 & 14044 and EN15804+A2.
All results were internally reviewed by independent experts. While this declaration has followed the guidance of ISO 14025, it has not been externally verified or registered by an EPD programme and therefore does not fully comply with the ISO 14025 standard.
This EPD has been published by Danfoss A/S on Danfoss Product Store and Danfoss Website. For questions, feedback or requests please contact your Danfoss sales representative.

Product Description

This Environmental Product Declaration (EPD) follows the Danfoss Product Category Rules (PCR) (2022-09-20). These rules provide a consistent framework for calculating and reporting the environmental performance of Danfoss' products and is aligned with relevant international standards, particularly ISO 14025:2006, EN 15804+A2:2019 and EN 50598-3:2015.

This document has been produced by Danfoss A/S following an internal verification process, but it is not a third-party verified document.

What is an EPD?

An EPD is a document used to communicate transparently, the quantified environmental impacts of a product over its lifecycle stages. This quantification is done by performing a Life Cycle Assessment (LCA) in line with a consistent set of rules known as a PCR (Product Category Rules).

An EPD provides:

- A product's carbon footprint together with other relevant environmental indicators, including air pollution, water use, energy consumption and waste, over its own life cycle (Modules A-C), as well as the expected benefits of reuse and recycling in reducing the impact of future products (Module D). See Table 1 for module descriptions.
- Environmental data allowing customers to calculate LCAs and produce EPDs for their own products.

Type of EPD

This EPD is of the type 'cradle-to-grave' and includes all relevant modules: production (A1-A3), shipping (A4) and installation (A5); operational energy use (B6); deconstruction (C1), waste collection and transport (C2), treatment (C3) and disposal (C4). It also includes potential net benefits to future products from recycling or reusing post-consumer waste (D). The codes in brackets are the module labels from EN 15804+A2. Modules concerning use, maintenance, repair, replacement, refurbishment (B1-B5) and operational water use (B7) are excluded, following the cut-off rules from EN 15804.

Table 1: Modules of the product's life cycle included in the EPD

Product stage			Installation		Use stage							End-of-life stage				Benefits
Raw materials	Transport	Manufacture	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-install.	Transport	Waste processing	Disposal	Benefits and loads outside system boundaries
A1	**A2**	**A3**	**A4**	**A5**	B1	B2	B3	B4	B5	**B6**	B7	**C1**	**C2**	**C3**	**C4**	**D**
X	**X**	**X**	**X**	**X**	MNR	MNR	MNR	MNR	MNR	**X**	MNR	**X**	**X**	**X**	**X**	**X**

(X = declared module; MNR = module not relevant)

Product Description

The product covered by this EPD is representative of ChangeOver6 Actuator and NovoCon ChangeOver6 Actuator. The production location is a contract production company from Maribor, Slovenia. See more information on Danfoss Product Store.

The ChangeOver6 Actuator and the NovoCon ChangeOver6 Actuator are an electromechanical device that provides rotary motion with an operating range of 90 degrees and maximum operating torque of 10 Nm. The ChangeOver6 Actuator and NovoCon ChangeOver6 Actuator are used together with the 6-port ball valves ChangeOver6 valves DN15 and DN20 that performs a diverting function between two water circuits in 4-pipe changeover system. This diverting function allows the cooling and heating capacity of a fan coil unit to be increased for the same compact size compared to a double coil model where the heating and cooling water circuits each have their own coil. The electrical supply and control of the ChangeOver6 Actuator and NovoCon ChangeOver6 Actuator is carried out with a connecting cable.

The EPD covers ChangeOver6 Actuators, with 5m (003Z3153) and 1,5m (003Z3152) connecting cable and NovoCon ChangeOver6 Actuators (003Z8520) with 1m connecting cable. These are the main representatives of the product for which the GWPT index was calculated. The first product group include two more product codes (003Z3154 and 003Z8521), which differ from the representative in the length of the connecting cable, the added temperature sensor and the supply voltage for the product. In the second product group one product code (003Z8522) is added. Additional products are allocated in the group according to the largest footprint method. The minus 10% rule is applied. Since the reference product ChangeOver6 Actuator with 5m connecting cable is the biggest and in this range, therefore representing a conservative scenario. The difference between the ChangeOver6 and the NovoCon ChangeOver6 version of the actuator is in the control electronics and the control method. For the ChangeOver6 version, a synchronous motor is built in, and in the NovoCon version, a stepper motor is built in.

The EPD is prepared for the ChangeOver6 Actuator with 5m connecting cable. For the lighter versions of the ChangeOver6 Actuator and NovoConChangeOver6 actuator the scale factor shown in Annex 1 should be used when interpreting the results. The scale factor is calculated as the ratio between the two GWPT values (A1-C4) according to the LCA calculation for all, EPD covered sales codes. The EPD report for the ChangeOver6 valves DN15-DN20 is prepared in a separate document.

Product Description

ChangeOver6 Actuator or NovoCon ChangeOver6 Actuator

ChangeOver6 valve DN15 – DN20

Figure 1: The illustration of the ChangeOver6 Actuator and NovoCon ChangeOver6 Actuator with the 6-port ball valve ChangeOver6 valve DN15-DN20

Reference Service Life

For the purpose of this EPD the reference service life (RSL) of the product is considered to be 10 years.

Intended market

The intended market of this study is EU and the baseline scenario involves the distribution, installation, and end-of-life in EU. With regards to the use stage and the end-of-life stage, this EPD is not representative of regions other than EU.

Product Description

Table 2: Product composition

Material	Mass (kg)	%
Metals	**0,255**	**20,5%**
Steel (excl, stainless steel)	0,255	20,5%
Stainless steel	0,0002	0,02%
Plastics & Rubbers	**0,312**	**25,0%**
Plastic with no GF	0,305	24,5%
Rubbers	0,007	0,5%
Natural materials	**0,0002**	**0,02%**
Paper and cardboard	0,0002	0,02%
Electrical/electronic	**0,667**	**53,6%**
Cables	0,515	41,4%
PCBA	0,026	2,1%
Motor	0,127	10,2%
Other materials	**0,010**	**0,8%**
Other	0,010	0,8%
Product Total	**1,245**	**100,0%**
Packaging - Paper and cardboard	0,064	100,0%
Packaging Total	**0,064**	**100,0%**
Total (Product+Packaging)	**1,308**	

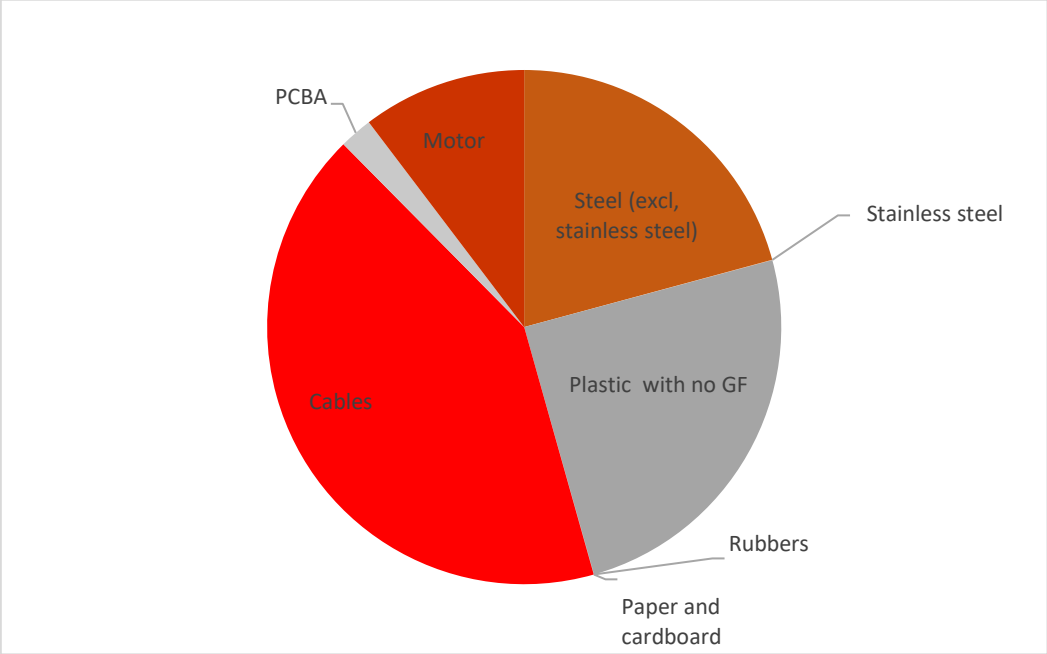

Figure 2: Material Composition Overview

Overview of LCA study

Data quality

Data quality of the selected datasets is generally assessed as good and very good in terms of geographical, time and technology representativeness and applicability. Background data is from *LCA for Experts*© database *version 2024.1*.

Allocation and cut-off criteria

The allocation is made in accordance with the provisions of EN 15804+A2. All major raw materials and all the essential energy are included. All hazardous materials and substances are considered in the inventory. Data sets within the system boundary are complete and fulfil the criteria for the exclusion of inputs and output criteria. A mass allocation method is used to calculate the assembly energy consumption.

Substitutions:

- Due to unavailable data sets for a sinter steel material (Adapter for valves) and a sintering powder steel material (Sinter gears 1,2,3 and 4), it is assumed parts to be produced from Cast steel material.
- Due to unavailable data sets for a PMMA material (LED glass), it is assumed parts to be produced from PC material.
- Due to unavailable data sets for EEE SMT Relay component, it is assumed that the electronic component used is a power transistor in a SOT93/TO218-3 package.
- Due to unavailable data set for filler compound and missing type of material, it is assumed that the oil is used to the lubrication.

Overview of LCA study

System boundaries

The results in this EPD are split into life cycle modules following EN 15804 (Figure 1): production (A1-A3), distribution (A4), use (B6) and the end of the product's life (C1-C4). Module D represents environmental benefits and loads that occur beyond the system boundary (i.e., in future products).

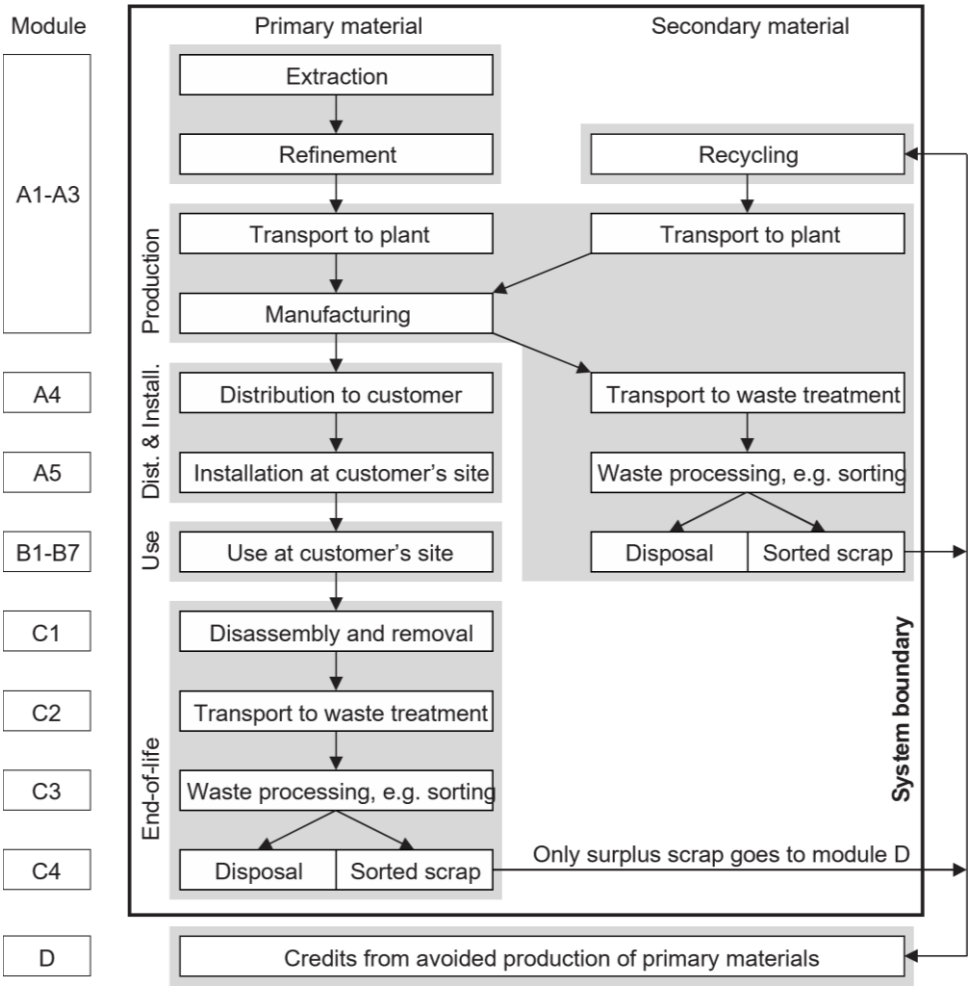

Figure 3: Modular structure used in this EPD (following EN 15804+A2)

Overview of LCA study

Product and packaging manufacture (A1-A3)

Final manufacturing occurs in the contract production company from Maribor, Slovenia, on site production data was gathered for 2024. The facility is certified according to ISO 9001. Where waste generated on-site is recyclable, it is separated and recycled. For further information, see here. The product is shipped in the packaging as described in Table 2. All packaging materials can be safely recycled or incinerated if appropriate local facilities are available.

Table 3: Biogenic carbon content in product and packaging

	Total (excluding recycling)
Biogenic carbon content in product [kg]	8,60E-05
Biogenic carbon content in accompanying packaging [kg]	2,73E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg of CO_2.

Shipping and installation (A4-A5)

Distribution is assumed to occur to customers within EU. The ChangeOver6 Actuator and NovoCon ChangOver6 Actuator are delivered from the contract production company from Maribor, Slovenia, to the Danfoss central warehouse of the finished products in Rodekro, Denmark. From the Danfoss central warehouse location the ChangeOver6 Actuator and NovoCon ChangeOver6 Actuator are delivered to the EU market. Transportation at 3349 km distance by truck is assumed between the factory to Danfoss central warehouse, and to the final customer.

Module A5 includes disposal of packaging materials only, the benefits from e.g., energy recovered after plastic incineration are allocated to module D. The product is assumed to be installed by hand. Energy use in handheld tools during installation is not included as it falls under the cut-off criteria.

Use phase (B1-B6)

The estimated lifetime of the ChangeOver6 Actuator and NovoCon ChangeOver6 Actuator is 10 years. The power used in active and standby modes is measured and is 2,4 W in active mode and 0,46 W in standby mode. The estimated operating time of the product per day is 4,0 hours. The product is in standby mode for 20,0 hours per day.
In the EPD calculation for the use phase, the average carbon footprint of electricity produced in the EU is considered.
In the LCA calculation it is considered that the product consumes 9,6 kWh of electricity in the active mode and 9,20 kWh of electricity in the standby mode during its lifetime.

The scope of this study is targeted for the EU market; therefore, the product under study is sold and used in EU. However, for the purpose of this assessment, an average EU CO2 factor from *LCA for Experts*© database *version 2024.1*. is applied. This factor will differ, depending on the country and share of renewables and fossil energy sources in the corresponding local electricity grid.

The major limitation of the impact calculations for the use phase is that the electricity grid mix in use is assumed to remain at the same carbon intensity over time. Following the plans for the decarbonization of the grid across EU, the environmental impacts are expected to decrease over time within the course of the next 10 years. However, as decarbonization will occur in the future and as the pace of

decarbonization is uncertain, the use of the emission intensity of today's grid should prove to be a "worst-case", conservative assumption.

End-of-life (C1-C4)

The following end-of-life procedure has been applied:

- Manual dismantling is used to separate recyclable bulk materials, e.g. bulk metals and plastics.
- Shredding is used for the remaining parts, such as printed circuit board assemblies.
- Ferrous metals, non-ferrous metals and bulk plastics are recovered through recycling.
- The remaining materials go to either energy recovery or landfill.

In line with EN 15804+A2, only the 'net scrap' (i.e., the leftover recyclable materials remaining after inputs of recycled content required in the manufacturing phase are first satisfied) is used to calculate the benefits and loads beyond the system boundary (Module D).

For this EPD an average scenario with 50% of the product sent to recycling & 50% of the product sent to landfill (C3, C4, D) was used. This scenario is designed to represent an average end-of-life scenario.

For the EPD this average scenario was chosen as it is assumed that it represents the majority of cases on average.

1. Recycling scenario with 100% of the product sent to recycling at the end-of-life, excluding fractions that cannot be recycled or incinerated (e.g., glass reinforcing in glass-filled plastics) and are sent to landfill.

This scenario illustrates best case performance. It assumes a 100% collection rate and best available recycling technologies. Under this scenario electrical cables, and all metals, flat glass and unreinforced plastics found within the body and chassis of the product are recycled. Printed circuit board assemblies are incinerated, and the copper and precious metals (gold, silver, palladium, and platinum) are recycled.

2. Landfill scenario with 100% of the product sent to landfill.

This scenario assumes that the whole product, including its packaging, is landfilled. It is designed to represent a poor end of-life-route where valuable resources are lost.

Benefits and loads beyond the system boundary (D)

Module D considers the net benefit of recycling (including energy recovery) of materials in the product and packaging, taking account of losses in the recycling process and the recycled material used in the production of the product. Module D covers the two end-of-life scenarios, as described above. It does not cover energy recovery from incineration since the process used in LCA for Experts has an efficiency below 60%. Therefore, the impacts of this process are reported in module C4, and no benefits are claimed in module D.

Environmental performance

This section presents the environmental performance of one ChangeOver6 Actuator and NovoCon ChangeOver6 Actuator. Figure 4 presents the environmental impact of the ChangeOver6 Actuator and NovoCon ChangeOver6 Actuator across a number of environmental impact categories (following EN 15804+A2:2019) per life cycle stage, over its full 10-year life cycle, including Global Warming Potential.

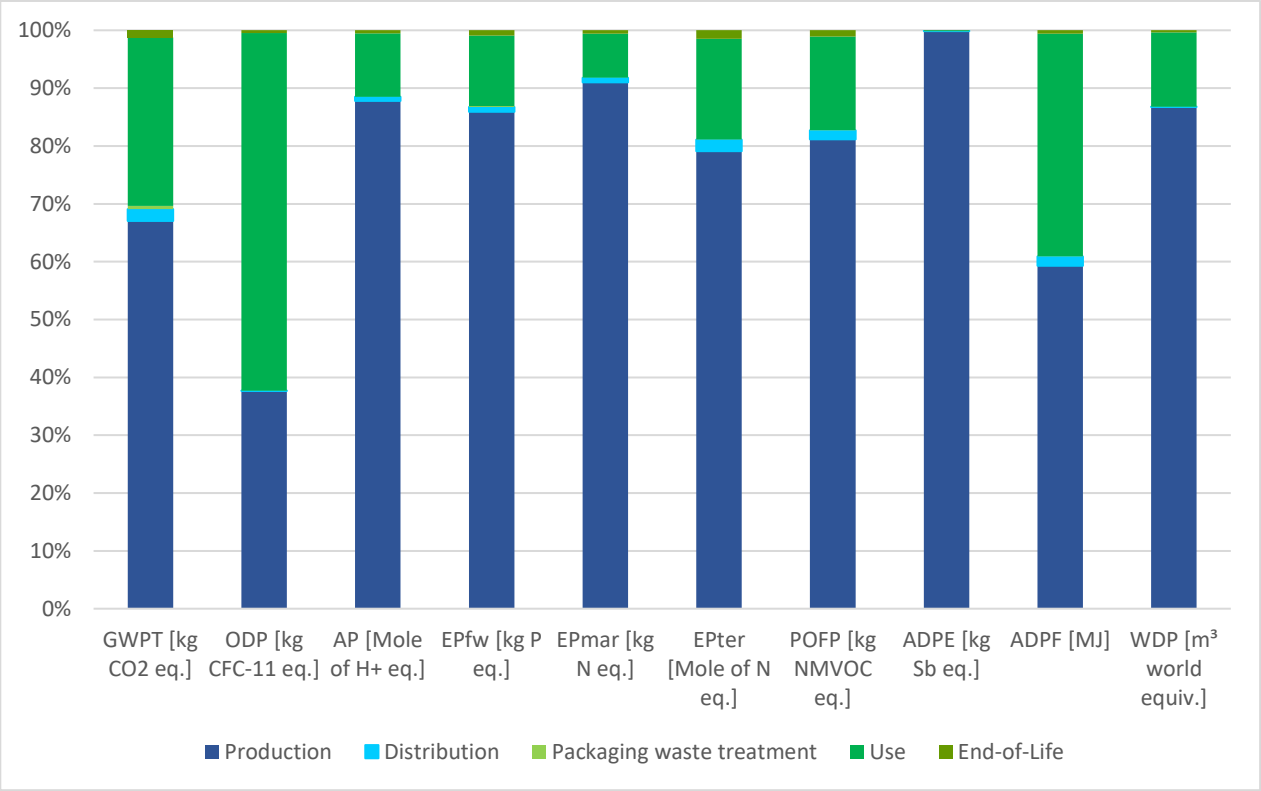

Figure 4: Breakdown of environmental impacts by life cycle stages (Average of Landfill and Recycling End-of-Life scenario/only Landfill scenario) See Table 5 and 6 for descriptions of environmental impact indicators).

Environmental performance

Table 4: Environmental impact indicators

	Production	Distribution	Packaging waste treatment	Use	End-of-Life				(not included in Figure 4)
Life cycle stages based on EN 15804+A2	**A1-A3**	**A4**	**A5**	**B6**	**C1**	**C2**	**C3**	**C4**	**D**
Description / **Environmental Impact Indicators**	Manufacture of the product from 'cradle-to-gate'	Transport of the product to the customer	Installation of the product and disposal of used packaging	Use of the product over its lifetime e.g. 10 years	Deinstallation of the product from the site	Transport of the product to waste treatment	Processing waste for recycling	Disposal of waste that cannot be recycled (through landfill and incineration)	Potential benefits and loads beyond the system boundary due to reuse, recycling, and energy recovery
GWPT [kg CO2 eq.]	1,24E+01	3,78E-01	1,06E-01	5,39E+00	0,00E+00	1,25E-02	6,03E-02	1,54E-01	-8,33E-01
GWPF [kg CO2 eq.]	1,25E+01	3,72E-01	5,84E-03	5,39E+00	0,00E+00	1,25E-02	5,99E-02	1,54E-01	-8,32E-01
GWPB [kg CO2 eq.]	-1,01E-01	0,00E+00	1,01E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWPLULUC [kg CO2 eq.]	1,31E-02	6,15E-03	5,57E-06	8,19E-04	0,00E+00	3,05E-07	4,11E-04	5,29E-05	-1,30E-03
ODP [kg CFC-11 eq.]	7,43E-11	5,39E-14	4,75E-15	1,22E-10	0,00E+00	1,47E-18	8,03E-13	7,71E-14	-2,34E-12
AP [Mole of H+ eq.]	8,33E-02	6,68E-04	3,25E-05	1,04E-02	0,00E+00	1,76E-05	2,22E-04	2,46E-04	-7,60E-03
EPfw [kg P eq.]	1,59E-04	1,56E-06	2,73E-07	2,25E-05	0,00E+00	2,73E-09	2,50E-07	1,46E-06	-1,22E-06
EPmar [kg N eq.]	3,14E-02	2,69E-04	1,75E-05	2,60E-03	0,00E+00	6,85E-06	9,27E-05	1,09E-04	-5,86E-04
EPter [Mole of N eq.]	1,24E-01	3,12E-03	1,59E-04	2,72E-02	0,00E+00	7,72E-05	1,02E-03	1,22E-03	-6,26E-03
POFP [kg NMVOC eq.]	3,45E-02	6,55E-04	4,42E-05	6,86E-03	0,00E+00	1,63E-05	1,92E-04	2,51E-04	-2,23E-03
ADPE [kg Sb eq.]	8,86E-04	3,19E-08	5,88E-10	1,01E-06	0,00E+00	4,49E-10	8,69E-09	1,29E-09	-1,86E-04
ADPF [MJ]	1,74E+02	4,82E+00	8,14E-02	1,13E+02	0,00E+00	1,82E-01	1,06E+00	4,57E-01	-1,44E+01
WDP [m^3 world equiv.]	9,94E+00	5,67E-03	3,85E-04	1,47E+00	0,00E+00	2,13E-05	9,98E-03	3,03E-02	-1,64E-01

How to read scientific numbers:

e.g. 2,05E02 = 2,05 x 10^2 = 205

2,04E-01 = 2,04 x 10^{-1} = 0,204

Environmental performance

Table 5: Environmental impact indicator descriptions

Acronym	Unit	Indicator
GWPT	kg CO_2 eq.	Carbon footprint (Global Warming Potential) – total
GWPF	kg CO_2 eq.	Carbon footprint (Global Warming Potential) – fossil
GWPB	kg CO_2 eq.	Carbon footprint (Global Warming Potential) – biogenic
GWPLULUC	kg CO_2 eq.	Carbon footprint (Global Warming Potential) – land use and land use change
ODP	kg CFC-11 eq.	Depletion potential of the stratospheric ozone layer
AP	Mole H+ eq.	Acidification potential
EPfw	kg P eq.	Eutrophication potential – aquatic freshwater
EPmar	kg N eq.	Eutrophication potential – aquatic marine
EPter	Mole of N eq.	Eutrophication potential – terrestrial
POFP	kg NMVOC eq.	Summer smog (photochemical ozone formation potential)
ADPE*	kg Sb eq.	Depletion of abiotic resources – minerals and metals
ADPF*	MJ	Depletion of abiotic resources – fossil fuels
WDP*	m^3 world eq.	Water deprivation potential (deprivation-weighted water consumption)

Results for module A1-A3 are specific to the product. All results from module A4 onwards should be considered as scenarios that represent one possible outcome. The true environmental performance of the product will depend on actual use.

The results in this section are relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks. EPDs from others may not be comparable.

Carbon footprint

The total carbon footprint, cradle-to-grave, of the product is **1,85E+01 kg CO2-eq** (A1-C4), based on the baseline use phase scenario. The carbon footprint of production of this product, cradle-to-gate, is **1,24E+01 kg CO2-eq** (A1-A3).

Environmental performance

Table 6: Resource use

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE [MJ]	4.93E+01	4.15E-01	5.45E-03	8.16E+01	0,00E+00	6.00E-04	5.61E-01	4.88E-02	-1.41E+00
PERM [MJ]	3.00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT [MJ]	4.93E+01	4.15E-01	5.45E-03	8.16E+01	0,00E+00	6.00E-04	5.61E-01	4.88E-02	-1.41E+00
PENRE [MJ]	1.65E+02	4.82E+00	8.14E-02	1.13E+02	0,00E+00	1.82E-01	1.06E+00	4.57E-01	-1.44E+01
PENRM [MJ]	8.78E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT [MJ]	1.74E+02	4.82E+00	8.14E-02	1.13E+02	0,00E+00	1.82E-01	1.06E+00	4.57E-01	-1.44E+01
SM [kg]	9.31E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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	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	0,00E+00	0,00E+00
FW [m3]	2.44E-01	4.63E-04	1.21E-05	6.22E-02	0,00E+00	9.63E-07	4.38E-04	7.18E-04	-4.09E-03

Table 7: Resource use indicator descriptions

Acronym	Unit	Indicator
PERE	MJ	Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM	MJ	Use of renewable primary energy resources used as raw materials
PERT	MJ	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)
PENRE	MJ	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials
PENRM	MJ	Use of non-renewable primary energy resources used as raw materials
PENRT	MJ	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)
SM	kg	Use of secondary material
RSF	MJ	Use of renewable secondary fuels
NRSF	MJ	Use of non-renewable secondary fuels
FW	m^3	Net use of fresh water

Environmental performance

Table 8: Waste categories and output flows

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD [kg]	1.99E-06	1.85E-10	1.23E-11	1.63E-07	0,00E+00	1.25E-12	1.08E-09	9.55E-11	-3.71E-08
NHWD [kg]	3.75E+00	7.88E-04	2.34E-02	9.32E-02	0,00E+00	1.82E-05	6.62E-04	3.89E-01	-8.09E-02
RWD [kg]	4.80E-03	8.79E-06	5.26E-07	1.80E-02	0,00E+00	1.95E-07	1.18E-04	6.37E-06	-2.22E-05
CRU [kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR [kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2.17E-01	0,00E+00
MER [kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE [MJ]	4.57E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET [MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Table 9: Waste category and output flow descriptions

Acronym	Unit	Indicator
HWD	kg	Hazardous waste disposed
NHWD	kg	Non-hazardous waste disposed
RWD	kg	Radioactive waste disposed
CRU	kg	Components for reuse
MFR	kg	Materials for recycling
MER	kg	Materials for energy recovery
EEE	kg	Exported energy (electrical)
EET	kg	Exported energy (thermal)

Environmental performance

Table 10: Additional indicators*

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PM [Disease incidences]	9.72E-07	5.99E-09	2.38E-10	8.68E-08	0,00E+00	1.05E-10	1.59E-09	2.31E-09	-6.63E-08
IRP [kBq U235 eq.]	5.32E-01	1.27E-03	7.03E-05	2.96E+00	0,00E+00	2.76E-05	1.95E-02	9.23E-04	1.74E-03
ETPfw [CTUe]	2.14E+02	3.55E+00	6.87E-02	5.16E+01	0,00E+00	1.32E-01	5.71E-01	4.06E-01	-1.49E+01
HTPc [CTUh]	1.07E-08	7.23E-11	1.20E-12	1.84E-09	0,00E+00	2.45E-12	1.68E-11	1.33E-11	-6.29E-10
HTPnc [CTUh]	2.36E-07	4.05E-09	9.82E-11	4.24E-08	0,00E+00	1.07E-10	5.78E-10	7.63E-10	-2.35E-08
SQP [Pt]	5.34E+01	2.37E+00	1.27E-02	4.78E+01	0,00E+00	4.65E-04	4.69E-01	5.86E-02	-3.20E+00

Table 11: Optional indicator descriptions

Acronym	Unit	Indicator
PM	Disease incidence	Potential incidence of disease due to particulate matter emissions
IRP**	kBq U235 eq.	Potential human exposure efficiency relative to U235
ETPfw*	CTUe	Potential Comparative Toxic Unit for ecosystems (fresh water)
HTPc*	CTUh	Potential Comparative Toxic Unit for humans (cancer)
HTPnc*	CTUh	Potential Comparative Toxic Unit for humans (non-cancer)
SQP*	Dimensionless	Potential soil quality index

**Disclaimer for ADPE, ADPF, WDP, ETPfw, HTPc, HTPnc, SQP:* The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

***Disclaimer for ionizing radiation:* This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Environmental performance

Annex 1: The sales codes of all products covered in this EPD

To calculate the actual GWPT of purchased product, just multiply the GWPT from this EPD with the factor of the purchased product sales code. You can use this factor to calculate other indicators as well.

Example:
Sales code: 003Z3152

Factor: 0,914
GWPT: 1,85E+01 kgCO2-eq (A1-C4)
Greenhouse gases 0,914 x 1,85E+01 kgCO2eq = 1,69E+01 kgCO2eq

Table 12: ChangeOver6 Actuators and NovoCon ChangeOver6 Actuators covered by this EPD

Sales code	Product description	Factor
003Z3153	ChangeOver6 Actuator, 24V AC, 5m	1,000
003Z3154	ChangeOver6 Actuator, 230V AC, 1,5m	1,000
003Z3521	Change Over6 Novocon Energy,24V AC/DC, 1,5m	1,000
003Z3152	ChangeOver6 Actuator, 24V AC, 1,5 m	0,914
003Z8522	Change Over6 Novocon Flexible, 24V AC/DC, 1,5m	0,914
003Z8520	ChangeOver6 Actuator for NovoCon S	0,817

Additional environmental information

CEN (2015). *EN 50598-3:2015: Ecodesign for power drive systems, motor starters, power electronics and their driven applications – Part 3: Quantitative eco design approach through life cycle assessment including product category rules and the content of environmental declarations.* Brussels, Belgium: European Committee for Standardization.

CEN (2019). *EN 15804:2012+A2:2019: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.* Brussels, Belgium: European Committee for Standardization.

Danfoss (2022). *Danfoss Product Category Rules: Environmental Product Declarations for Danfoss Products.* Nordborg, Denmark: Danfoss A/S.

ISO (2006a). *ISO 14025:2006: Environmental labels and declarations – Type III environmental declarations – Principles and procedures.* Geneva, Switzerland: International Organization for Standardization.

ISO (2006b). *ISO 14040:2006: Environmental management – Life cycle assessment – Principles and framework.* Geneva, Switzerland: International Organization for Standardization.

ISO (2006c). *ISO 14044:2006: Environmental management – Life cycle assessment – Requirements and guidelines.* Geneva, Switzerland: International Organization for Standardization.