

Product Environmental Profile

Modicon M221 Controllers

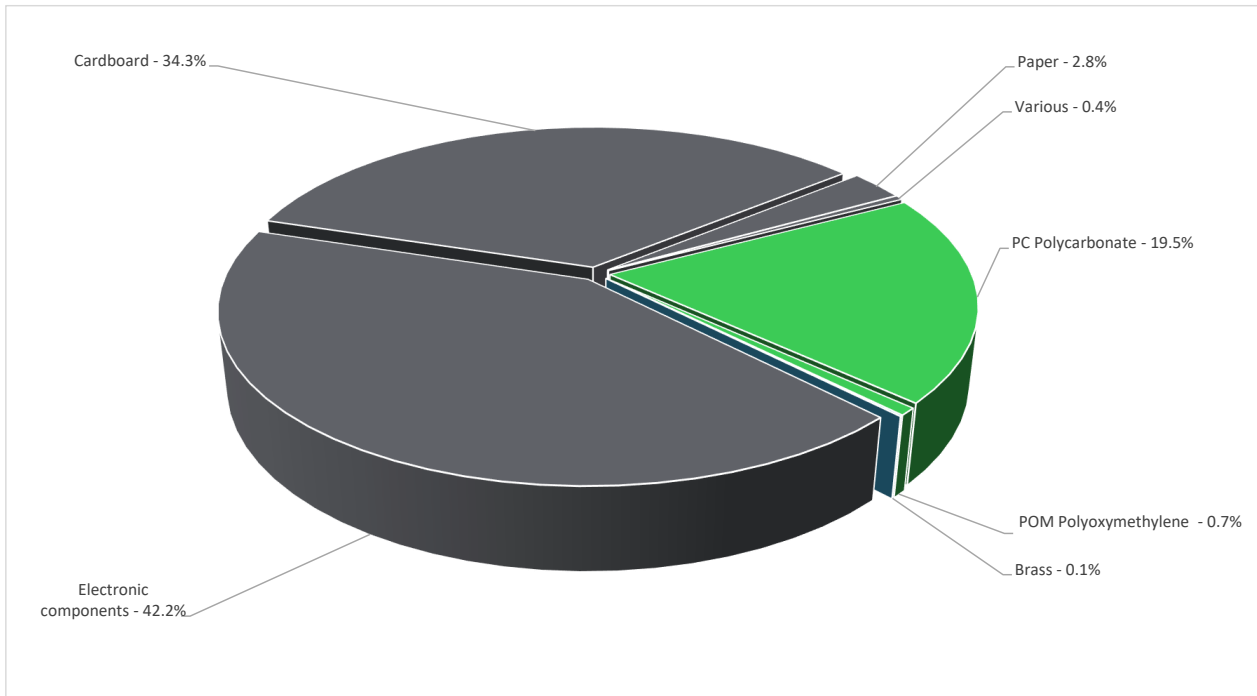


General information

| | |
|----------------------------|--|
| Reference product | Modicon M221 Controllers - TM221CE24T |
| Description of the product | Designed for simple machines, the small dimensions of Modicon M221 logic controllers are ideal for optimizing the size of wall-mounted and floor standing control system enclosures. The Modicon M221 logic controller offers best-in-class performance. Available also in book format, it requires minimal installation and offers tremendous versatility |
| Functional unit | To perform control for applications using I/O communication from 16 to 40 I/Os, Ethernet (RJ45) or Serial Link (RJ45) communication, and optional I/O modules, 57,20% of the time for 10 years. |
| Specifications are: | <p>U = Rated voltage(V) = 24V In = Rated current(A) = 0.58A IP= IP20 with protective cover in place Standards :- IEC 61131-2 UL 508 CAN/CSA C22.2 No. 213 IACS E10 ANSI/ISA 12-12-01</p> |

Constituent materials

Reference product mass 609.3 g including the product, its packaging and additional elements and accessories



| | |
|----------|-------|
| Plastics | 20.2% |
| Metals | 0.1% |
| Others | 79.7% |

Substance assessment

Details of ROHS and REACH substances information are available on the Schneider-Electric Green Premium website
<https://www.se.com/ww/en/work/support/green-premium/>

**Additional environmental information**

| | | | |
|-------------|--------------------------|------|---|
| End Of Life | Recyclability potential: | 0.1% | The recyclability rate was calculated from the recycling rates of each material making up the product with the exception of data using the ESR database. For materials or components using the ESR database or the absence of data the conservative hypothesis "0% recyclability" was used. |
|-------------|--------------------------|------|---|

**Environmental impacts**

| | | | |
|----------------------------------|---|---|---|
| Reference service life time | 10 years | | |
| Product category | Other equipments - Active product | | |
| Installation elements | The product doesn't require special installation procedure and requires little to no energy to install | | |
| Use scenario | The product is in active mode 57.20% of the time with a power use of 4.8W and in off mode 42.80% of the time with a power use of 0 W for 10 years | | |
| Time representativeness | The collected data are representative of the year 2024 | | |
| Technological representativeness | The Modules of Technologies such as material production, manufacturing processes and transport technology used in the PEP analysis (LCA EIME in the case) are Similar and representative of the actual type of technologies used to make the product. | | |
| Geographical representativeness | Europe | | |
| Energy model used | [A1 - A3] | [A5] | [B6] |
| | Electricity Mix; Low voltage; 2018; Taiwan, TW | Electricity Mix; Low voltage; 2018; Europe, EU-27 | Electricity Mix; Low voltage; 2018; Europe, EU-27 |
| | | | [C1 - C4] |
| | | | Electricity Mix; Low voltage; 2018; Europe, EU-27 |

Detailed results of the optional indicators mentioned in PCRd4 are available in the LCA report and on demand in a digital format - Country Customer Care Center - <http://www.schneider-electric.com/contact>

| Mandatory Indicators | | Modicon M221 Controllers - TM221CE24T | | | | | | |
|--|---------------------------|---------------------------------------|---------------------------|---------------------|---------------------|-----------------|-------------------------|--------------------------|
| Impact indicators | Unit | Total (without Module D) | [A1 - A3] - Manufacturing | [A4] - Distribution | [A5] - Installation | [B1 - B7] - Use | [C1 - C4] - End of life | [D] - Benefits and loads |
| Contribution to climate change | kg CO2 eq | 1.20E+02 | 1.96E+01 | 1.21E+00 | 0* | 9.86E+01 | 1.15E+00 | 0.00E+00 |
| Contribution to climate change-fossil | kg CO2 eq | 1.20E+02 | 1.95E+01 | 1.21E+00 | 0* | 9.84E+01 | 1.13E+00 | 0.00E+00 |
| Contribution to climate change-biogenic | kg CO2 eq | 2.32E-01 | 8.22E-02 | 0* | 0* | 1.32E-01 | 1.81E-02 | 0.00E+00 |
| Contribution to climate change-land use and land use change | kg CO2 eq | 1.89E-04 | 1.89E-04 | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to ozone depletion | kg CFC-11 eq | 4.14E-06 | 2.65E-06 | 1.06E-06 | 0* | 4.22E-07 | 9.66E-10 | 0.00E+00 |
| Contribution to acidification | mol H+ eq | 7.14E-01 | 1.46E-01 | 4.97E-03 | 1.21E-04 | 5.63E-01 | 7.57E-04 | 0.00E+00 |
| Contribution to eutrophication, freshwater | kg (PO4) ³⁻ eq | 3.24E-04 | 4.74E-05 | 1.41E-07 | 4.45E-08 | 2.70E-04 | 6.47E-06 | 0.00E+00 |
| Contribution to eutrophication marine | kg N eq | 8.14E-02 | 1.48E-02 | 2.26E-03 | 5.72E-05 | 6.39E-02 | 3.73E-04 | 0.00E+00 |
| Contribution to eutrophication, terrestrial | mol N eq | 1.15E+00 | 1.59E-01 | 2.45E-02 | 5.82E-04 | 9.60E-01 | 3.83E-03 | 0.00E+00 |
| Contribution to photochemical ozone formation - human health | kg COVNM eq | 2.68E-01 | 5.39E-02 | 8.17E-03 | 1.40E-04 | 2.05E-01 | 9.26E-04 | 0.00E+00 |
| Contribution to resource use, minerals and metals | kg Sb eq | 1.58E-03 | 1.57E-03 | 0* | 0* | 7.14E-06 | 0* | 0.00E+00 |
| Contribution to resource use, fossils | MJ | 2.81E+03 | 2.80E+02 | 1.50E+01 | 0* | 2.51E+03 | 1.42E+00 | 0.00E+00 |
| Contribution to water use | m3 eq | 1.10E+01 | 7.41E+00 | 6.11E-02 | 2.13E-02 | 3.49E+00 | 4.07E-02 | 0.00E+00 |

| Inventory flows Indicators | | Modicon M221 Controllers - TM221CE24T | | | | | | |
|---|------|---------------------------------------|---------------------------|---------------------|---------------------|-----------------|-------------------------|--------------------------|
| Inventory flows | Unit | Total (without Module D) | [A1 - A3] - Manufacturing | [A4] - Distribution | [A5] - Installation | [B1 - B7] - Use | [C1 - C4] - End of life | [D] - Benefits and loads |
| Contribution to use of renewable primary energy excluding renewable primary energy used as raw material | MJ | 4.91E+02 | 8.65E+00 | 0* | 0* | 4.82E+02 | 0* | 0.00E+00 |
| Contribution to use of renewable primary energy resources used as raw material | MJ | 4.76E+00 | 4.76E+00 | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to total use of renewable primary energy resources | MJ | 4.96E+02 | 1.34E+01 | 0* | 0* | 4.82E+02 | 0* | 0.00E+00 |
| Contribution to use of non renewable primary energy excluding non renewable primary energy used as raw material | MJ | 2.80E+03 | 2.72E+02 | 1.50E+01 | 0* | 2.51E+03 | 1.42E+00 | 0.00E+00 |
| Contribution to use of non renewable primary energy resources used as raw material | MJ | 7.30E+00 | 7.30E+00 | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to total use of non-renewable primary energy resources | MJ | 2.81E+03 | 2.80E+02 | 1.50E+01 | 0* | 2.51E+03 | 1.42E+00 | 0.00E+00 |
| Contribution to use of secondary material | kg | 5.24E-05 | 5.24E-05 | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to use of renewable secondary fuels | MJ | 0.00E+00 | 0* | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to use of non renewable secondary fuels | MJ | 0.00E+00 | 0* | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to net use of freshwater | m³ | 2.59E-01 | 1.75E-01 | 1.42E-03 | 4.95E-04 | 8.12E-02 | 9.47E-04 | 0.00E+00 |
| Contribution to hazardous waste disposed | kg | 2.26E+01 | 2.05E+01 | 0* | 0* | 1.84E+00 | 2.39E-01 | 0.00E+00 |
| Contribution to non hazardous waste disposed | kg | 1.93E+01 | 4.72E+00 | 0* | 2.33E-01 | 1.42E+01 | 1.66E-01 | 0.00E+00 |
| Contribution to radioactive waste disposed | kg | 5.71E-03 | 2.49E-03 | 2.39E-04 | 0* | 2.97E-03 | 6.64E-06 | 0.00E+00 |
| Contribution to components for reuse | kg | 0.00E+00 | 0* | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to materials for recycling | kg | 4.55E-04 | 6.20E-05 | 0* | 0* | 0* | 3.93E-04 | 0.00E+00 |
| Contribution to materials for energy recovery | kg | 0.00E+00 | 0* | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to exported energy | MJ | 1.61E-05 | 1.22E-05 | 0* | 0* | 0* | 3.89E-06 | 0.00E+00 |

* represents less than 0.01% of the total life cycle of the reference flow

| | | |
|---|---------|----------|
| Contribution to biogenic carbon content of the product | kg of C | 0.00E+00 |
| Contribution to biogenic carbon content of the associated packaging | kg of C | 6.68E-02 |

| Mandatory Indicators | | Modicon M221 Controllers - TM221CE24T | | | | | | | |
|--|---------------------------|---------------------------------------|------|------|------|------|------|----------|------|
| Impact indicators | Unit | [B1 - B7] - Use | [B1] | [B2] | [B3] | [B4] | [B5] | [B6] | [B7] |
| Contribution to climate change | kg CO2 eq | 9.86E+01 | 0* | 0* | 0* | 0* | 0* | 9.86E+01 | 0* |
| Contribution to climate change-fossil | kg CO2 eq | 9.84E+01 | 0* | 0* | 0* | 0* | 0* | 9.84E+01 | 0* |
| Contribution to climate change-biogenic | kg CO2 eq | 1.32E-01 | 0* | 0* | 0* | 0* | 0* | 1.32E-01 | 0* |
| Contribution to climate change-land use and land use change | kg CO2 eq | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |
| Contribution to ozone depletion | kg CFC-11 eq | 4.22E-07 | 0* | 0* | 0* | 0* | 0* | 4.22E-07 | 0* |
| Contribution to acidification | mol H+ eq | 5.63E-01 | 0* | 0* | 0* | 0* | 0* | 5.63E-01 | 0* |
| Contribution to eutrophication, freshwater | kg (PO4) ³⁻ eq | 2.70E-04 | 0* | 0* | 0* | 0* | 0* | 2.70E-04 | 0* |
| Contribution to eutrophication marine | kg N eq | 6.39E-02 | 0* | 0* | 0* | 0* | 0* | 6.39E-02 | 0* |
| Contribution to eutrophication, terrestrial | mol N eq | 9.60E-01 | 0* | 0* | 0* | 0* | 0* | 9.60E-01 | 0* |
| Contribution to photochemical ozone formation - human health | kg COVNM eq | 2.05E-01 | 0* | 0* | 0* | 0* | 0* | 2.05E-01 | 0* |
| Contribution to resource use, minerals and metals | kg Sb eq | 7.14E-06 | 0* | 0* | 0* | 0* | 0* | 7.14E-06 | 0* |
| Contribution to resource use, fossils | MJ | 2.51E+03 | 0* | 0* | 0* | 0* | 0* | 2.51E+03 | 0* |
| Contribution to water use | m3 eq | 3.49E+00 | 0* | 0* | 0* | 0* | 0* | 3.49E+00 | 0* |

| Inventory flows Indicators | | Modicon M221 Controllers - TM221CE24T | | | | | | | |
|---|------|---------------------------------------|------|------|------|------|------|----------|------|
| Inventory flows | Unit | [B1 - B7] - Use | [B1] | [B2] | [B3] | [B4] | [B5] | [B6] | [B7] |
| Contribution to use of renewable primary energy excluding renewable primary energy used as raw material | MJ | 4.82E+02 | 0* | 0* | 0* | 0* | 0* | 4.82E+02 | 0* |
| Contribution to use of renewable primary energy resources used as raw material | MJ | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |
| Contribution to total use of renewable primary energy resources | MJ | 4.82E+02 | 0* | 0* | 0* | 0* | 0* | 4.82E+02 | 0* |
| Contribution to use of non renewable primary energy excluding non renewable primary energy used as raw material | MJ | 2.51E+03 | 0* | 0* | 0* | 0* | 0* | 2.51E+03 | 0* |
| Contribution to use of non renewable primary energy resources used as raw material | MJ | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |
| Contribution to total use of non-renewable primary energy resources | MJ | 2.51E+03 | 0* | 0* | 0* | 0* | 0* | 2.51E+03 | 0* |
| Contribution to use of secondary material | kg | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |
| Contribution to use of renewable secondary fuels | MJ | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |
| Contribution to use of non renewable secondary fuels | MJ | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |
| Contribution to net use of freshwater | m³ | 8.12E-02 | 0* | 0* | 0* | 0* | 0* | 8.12E-02 | 0* |
| Contribution to hazardous waste disposed | kg | 1.84E+00 | 0* | 0* | 0* | 0* | 0* | 1.84E+00 | 0* |
| Contribution to non hazardous waste disposed | kg | 1.42E+01 | 0* | 0* | 0* | 0* | 0* | 1.42E+01 | 0* |
| Contribution to radioactive waste disposed | kg | 2.97E-03 | 0* | 0* | 0* | 0* | 0* | 2.97E-03 | 0* |
| Contribution to components for reuse | kg | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |
| Contribution to materials for recycling | kg | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |
| Contribution to materials for energy recovery | kg | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |
| Contribution to exported energy | MJ | 0* | 0* | 0* | 0* | 0* | 0* | 0* | 0* |

* represents less than 0.01% of the total life cycle of the reference flow

Life cycle assessment performed with EIME version v6.2.2, database version 2023-02 in compliance with ISO14044, EF 3.0 method is applied, for biogenic carbon storage, assessment methodology 0/0 is used

Please note that the values given above are only valid within the context specified and cannot be used directly to draw up the environmental assessment of an installation.

| | | | |
|---|------------------|-------------------------------------|--|
| Registration number : | ENVPEP1403012_V4 | Drafting rules | PCR-4-ed4-EN-2021 09 06 |
| Date of issue | 11-2024 | Supplemented by | PSR-0005-ed3.1-EN-2023 12 08 |
| | | Information and reference documents | www.pep-ecopassport.org |
| | | Validity period | 5 years |
| Independent verification of the declaration and data, in compliance with ISO 14021 : 2016 | | | |
| Internal | X | External | |
| The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain) | | | |
| PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500 :2022 | | | |
| The components of the present PEP may not be compared with components from any other program. | | | |
| Document complies with ISO 14021:2016 "Environmental labels and declarations. Type II environmental declarations" | | | |

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