# Product Environmental Profile

## Network switch module, Modicon M241, 4 Ethernet switchs

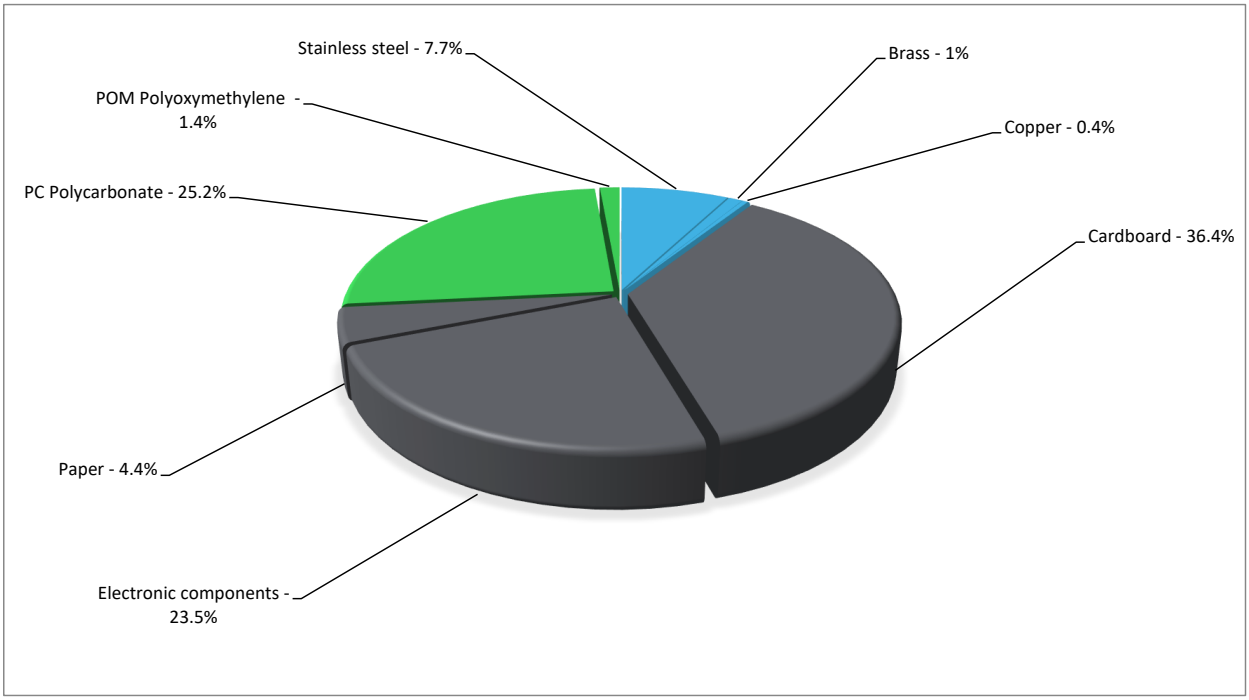
## Modicon M241

## General information

| | |
|---|---|
| **Reference product** | Network switch module, Modicon M241, 4 Ethernet switchs - TM4ES4 |
| **Description of the product** | This communication module is proposed as an option Modicon M241/251 controllers. It also provides a second Ethernet connection with 4 ports on controllers with embedded Ethernet (except on TM241CEC24x). |
| **Description of the range** | The products of the range are: The Modicon TM4 communication module offer is dedicated to Modicon M241 and Modicon M251 logic controllers, increasing the options for connection. Two communication module models are available:<br>- The TM4ES4 Ethernet switch module, offering an Ethernet connection with 4 ports<br>- The TM4PDPS1 Profibus DP slave module<br>The environmental impacts of this reference product are representative of the impacts of the other products of the range which are developed with a similar technology. |
| **Functional unit** | To enhance the capabilities of logic controllers by offering an Ethernet connection with 4 ports (TM4ES4) or configuring a slave connection on the Profibus DP bus (TM4PDPS1) 78,60% of the time for 10 years with these parmeter |
| **Specifications are:** | Technical data:<br>-Current consumption:360 mA at 5 V DC for communication bus<br>-Integrated connection type: Ethernet: 4 RJ45 connector<br>-Transmission rate :10/100 Mbit/s |

## Constituent materials

| | | |
|---|---|---|
| **Reference product mass** | 210 g | including the product, its packaging and additional elements and accessories |




| | | |
|---|---|---|
| | Plastics | 26.60% |
| | Metals | 9.10% |
| | Others | 64.30% |

## 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: | **2%** | 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 does not require any installation operations |
| **Use scenario** | The product is in active mode 57,20% of the time with a power use of 2W and in stand-by mode 21,40% of the time with a power use of 1,5W, and off 21,40% of the time, for 10 year |
| **Time representativeness** | The collected data are representative of the year 2023 |
| **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 représentaive of the actual type of technologies used to make the product. |
| **Geographical representativeness** | Rest of the World |

| **Energy model used** | [A1 - A3] | [A5] | [B6] | [C1 - C4] |
|---|---|---|---|---|
| | Electricity Mix; Low voltage; 2018; Indonesia, ID | Electricity Mix; Low voltage; 2018; China, CN | Electricity Mix; Low voltage; 2018; China, CN | Electricity Mix; Low voltage; 2018; China, CN |
| | | Electricity Mix; Low voltage; 2018; France, FR | Electricity Mix; Low voltage; 2018; France, FR | Electricity Mix; Low voltage; 2018; France, FR |
| | | Electricity Mix; Low voltage; 2018; Germany, DE | Electricity Mix; Low voltage; 2018; Germany, DE | Electricity Mix; Low voltage; 2018; Germany, DE |
| | | Electricity Mix; Low voltage; 2018; Italy, IT | Electricity Mix; Low voltage; 2018; Italy, IT | Electricity Mix; Low voltage; 2018; Italy, IT |
| | | Electricity Mix; Low voltage; 2018; Spain, ES | Electricity Mix; Low voltage; 2018; Spain, ES | Electricity Mix; Low voltage; 2018; Spain, ES |
| | | Electricity Mix; Low voltage; 2018; United States, US | Electricity Mix; Low voltage; 2018; United States, US | Electricity Mix; Low voltage; 2018; United States, US |

Detailed results of the optional indicators mentioned in PCRed4 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** | | **Network switch module, Modicon M241, 4 Ethernet switchs - TM4ES4** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **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 | 9.60E+01 | 2.45E+01 | 0* | 0* | 7.11E+01 | 3.33E-01 | -6.52E-03 |
| Contribution to climate change-fossil | kg CO2 eq | 9.59E+01 | 2.45E+01 | 0* | 0* | 7.11E+01 | 3.32E-01 | -5.97E-03 |
| Contribution to climate change-biogenic | kg CO2 eq | 6.24E-02 | 3.33E-02 | 0* | 0* | 2.85E-02 | 5.71E-04 | -5.44E-04 |
| Contribution to climate change-land use and land use change | kg CO2 eq | 6.14E-05 | 6.14E-05 | 0* | 0* | 0* | 9.64E-09 | 0.00E+00 |
| Contribution to ozone depletion | kg CFC-11 eq | 2.88E-06 | 2.51E-06 | 0* | 0* | 3.73E-07 | 5.90E-10 | -1.86E-09 |
| Contribution to acidification | mol H+ eq | 6.40E-01 | 1.52E-01 | 0* | 0* | 4.87E-01 | 3.04E-04 | -4.69E-04 |
| Contribution to eutrophication, freshwater | kg $(PO4)^{3-}$eq | 1.77E-04 | 5.04E-05 | 0* | 0* | 1.05E-04 | 2.10E-05 | -8.45E-09 |
| Contribution to eutrophication marine | kg N eq | 7.61E-02 | 2.29E-02 | 2.39E-05 | 2.09E-05 | 5.31E-02 | 1.23E-04 | -6.97E-06 |
| Contribution to eutrophication, terrestrial | mol N eq | 9.03E-01 | 2.45E-01 | 2.62E-04 | 2.13E-04 | 6.56E-01 | 1.28E-03 | -8.19E-05 |
| Contribution to photochemical ozone formation - human health | kg NMVOC eq | 2.49E-01 | 7.29E-02 | 6.61E-05 | 5.12E-05 | 1.76E-01 | 3.12E-04 | -5.26E-05 |
| Contribution to resource use, minerals and metals | kg Sb eq | 3.64E-03 | 3.64E-03 | 0* | 0* | 2.64E-06 | 5.76E-07 | -3.72E-06 |
| Contribution to resource use, fossils | MJ | 1.78E+03 | 2.99E+02 | 0* | 0* | 1.48E+03 | 5.17E-01 | -1.03E-01 |
| Contribution to water use | m3 eq | 9.52E+00 | 6.54E+00 | 0* | 7.79E-03 | 2.94E+00 | 2.97E-02 | -2.21E-02 |

| Inventory flows Indicators | | Network switch module, Modicon M241, 4 Ethernet switchs - TM4ES4 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 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 | 2.28E+02 | 7.59E+00 | 0* | 0* | 2.20E+02 | 0* | -1.17E-02 |
| Contribution to use of renewable primary energy resources used as raw material | MJ | 1.74E+00 | 1.74E+00 | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to total use of renewable primary energy resources | MJ | 2.30E+02 | 9.33E+00 | 0* | 0* | 2.20E+02 | 0* | -1.17E-02 |
| Contribution to use of non renewable primary energy excluding non renewable primary energy used as raw material | MJ | 1.78E+03 | 2.97E+02 | 0* | 0* | 1.48E+03 | 5.17E-01 | -1.03E-01 |
| Contribution to use of non renewable primary energy resources used as raw material | MJ | 2.63E+00 | 2.63E+00 | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to total use of non-renewable primary energy resources | MJ | 1.78E+03 | 2.99E+02 | 0* | 0* | 1.48E+03 | 5.17E-01 | -1.03E-01 |
| Contribution to use of secondary material | kg | 2.04E-05 | 2.04E-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 | $m^3$ | 2.22E-01 | 1.53E-01 | 0* | 1.81E-04 | 6.85E-02 | 6.91E-04 | -5.15E-04 |
| Contribution to hazardous waste disposed | kg | 6.98E+01 | 6.79E+01 | 0* | 0* | 1.88E+00 | 5.00E-02 | -3.42E-01 |
| Contribution to non hazardous waste disposed | kg | 1.79E+01 | 6.61E+00 | 0* | 8.52E-02 | 1.11E+01 | 7.76E-02 | -4.69E-04 |
| Contribution to radioactive waste disposed | kg | 2.75E-03 | 2.06E-03 | 0* | 0* | 6.92E-04 | 3.08E-06 | -4.96E-07 |
| Contribution to components for reuse | kg | 0.00E+00 | 0* | 0* | 0* | 0* | 0* | 0.00E+00 |
| Contribution to materials for recycling | kg | 5.56E-03 | 2.78E-03 | 0* | 0* | 0* | 2.78E-03 | 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 | 7.83E-03 | 3.11E-05 | 0* | 0* | 0* | 7.80E-03 | 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 de C | 0.00E+00 |
| Contribution to biogenic carbon content of the associated packaging | kg de C | 2.47E-02 |

| Mandatory Indicators | | Network switch module, Modicon M241, 4 Ethernet switchs - TM4ES4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Impact indicators | Unit | [B1 - B7] - Use | [B1] | [B2] | [B3] | [B4] | [B5] | [B6] | [B7] |
| Contribution to climate change | kg CO2 eq | 7.11E+01 | 0* | 0* | 0* | 0* | 0* | 7.11E+01 | 0* |
| Contribution to climate change-fossil | kg CO2 eq | 7.11E+01 | 0* | 0* | 0* | 0* | 0* | 7.11E+01 | 0* |
| Contribution to climate change-biogenic | kg CO2 eq | 2.85E-02 | 0* | 0* | 0* | 0* | 0* | 2.85E-02 | 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 | 3.73E-07 | 0* | 0* | 0* | 0* | 0* | 3.73E-07 | 0* |
| Contribution to acidification | mol H+ eq | 4.87E-01 | 0* | 0* | 0* | 0* | 0* | 4.87E-01 | 0* |
| Contribution to eutrophication, freshwater | kg $(PO4)^{3-}$ eq | 1.05E-04 | 0* | 0* | 0* | 0* | 0* | 1.05E-04 | 0* |
| Contribution to eutrophication marine | kg N eq | 5.31E-02 | 0* | 0* | 0* | 0* | 0* | 5.31E-02 | 0* |
| Contribution to eutrophication, terrestrial | mol N eq | 6.56E-01 | 0* | 0* | 0* | 0* | 0* | 6.56E-01 | 0* |
| Contribution to photochemical ozone formation - human health | kg NMVOC eq | 1.76E-01 | 0* | 0* | 0* | 0* | 0* | 1.76E-01 | 0* |
| Contribution to resource use, minerals and metals | kg Sb eq | 2.64E-06 | 0* | 0* | 0* | 0* | 0* | 2.64E-06 | 0* |
| Contribution to resource use, fossils | MJ | 1.48E+03 | 0* | 0* | 0* | 0* | 0* | 1.48E+03 | 0* |
| Contribution to water use | m3 eq | 2.94E+00 | 0* | 0* | 0* | 0* | 0* | 2.94E+00 | 0* |

| Inventory flows Indicators | | Network switch module, Modicon M241, 4 Ethernet switchs - TM4ES4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 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 | 2.20E+02 | 0* | 0* | 0* | 0* | 0* | 2.20E+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 | 2.20E+02 | 0* | 0* | 0* | 0* | 0* | 2.20E+02 | 0* |
| Contribution to use of non renewable primary energy excluding non renewable primary energy used as raw material | MJ | 1.48E+03 | 0* | 0* | 0* | 0* | 0* | 1.48E+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 | 1.48E+03 | 0* | 0* | 0* | 0* | 0* | 1.48E+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 | $m^3$ | 6.85E-02 | 0* | 0* | 0* | 0* | 0* | 6.85E-02 | 0* |
| Contribution to hazardous waste disposed | kg | 1.88E+00 | 0* | 0* | 0* | 0* | 0* | 1.88E+00 | 0* |
| Contribution to non hazardous waste disposed | kg | 1.11E+01 | 0* | 0* | 0* | 0* | 0* | 1.11E+01 | 0* |
| Contribution to radioactive waste disposed | kg | 6.92E-04 | 0* | 0* | 0* | 0* | 0* | 6.92E-04 | 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 v6.1, database version 2023-02 in compliance with ISO14044, EF 3.0 method is applied, for biogenic carbon storage, assessment methodology 0/0 is used*

According to this environmental analysis, proportionality rules may be used to evaluate the impacts of other products of this range, ratios to apply can be provided upon request

*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 :* | ENVPEP1403009_V4 | *Drafting rules* | PCR-4-ed4-EN-2021 09 06 |
| | | *Supplemented by* | PSR-0005-ed3-EN-2023 06 06 |
| *Date of issue* | 09-2024 | *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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Published by Schneider Electric

ENVPEP1403009_V4



09-2024