

OpenPowerNet

Release Notes Version 1.15.0

Institut für Bahntechnik GmbH
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Document No. OPN/RN/1.15.0

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1 Introduction

1.1 Overview

The purpose of this document is to describe the changes and the status of OpenPowerNet version 1.15.0. The document contains:

- List of delivered files on DVD,
- Description of the main functionality,
- Any restrictions known,
- List of corresponding documentation and
- Known issues.



1.2 Configuration

See document Installation Instruction version 1.15.0 for required third-party software versions.

1.3 Acronyms and abbreviations



The following abbreviations are used within this document.

Abbreviation	Description
2AC	2 Phase AC
AC	Alternating Current
ATM	Advance Train Module
DC	Direct Current
DVD	Digital Versatile Disk
EFE	Engine File Editor
GUI	Graphical User Interface
NMMV	Network Model Microscopic Viewer
OCS	Overhead Catenary System
ODBC	Open Database Connectivity
OPN	OpenPowerNet
OT	OpenTrack
PDF	Portable Document Format
PSC	Power Supply Calculation
SoC	State of Charge
VLD	Voltage Limiting Device
XML	Extensible Markup Language

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2 List of files on DVD delivery



OpenTrack/ (all installation files)
openpowernet_app_01.15.00.msi
openpowernet_system_components_01.15.00.exe
OPN_InstallationInstruction_1.15.0.pdf
OPN_ModellingCheckList_1.11.0.pdf
OPN_ReleaseNotes_1.15.0.pdf
OPN_UserManual_1.15.0.pdf

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3 Main functionality



OpenPowerNet version 1.15.0 has the following main functionality:

- Calculation of AC, 2AC and DC power supply system,
- Calculation of magnetic coupling of conductors is done internally,
- Possible electrical network configurations include, but are not limited to:
 - Highspeed railway,
 - Freight railway,
 - Metro systems with OCS or 3rd/4th rail,
 - Monorail systems,
 - Tram networks,
 - Trolleybus networks,
 - Battery buses with charging station.
- AC / 2AC power supply models:
 - Transformer,
 - Static Frequency Converter (SFC),
 - Auto transformer,
 - Booster transformer,
- DC power supply models:
 - Rectifier/Inverter,
 - Stationary energy storage for stabilisation of line voltage and energy saving,
 - Voltage limiting device model to limit the touch voltage,
- Calculation of tractive effort with retroactive effect to the railway operation simulator OpenTrack,
- Consideration of regenerative braking,
- Consideration of tractive and braking current limitation,
- Consideration of power factor at vehicle pantograph,
- Calculation of electrical engines with single or multiple propulsion systems,
- Division of power consumption for multiple train operating companies,
- Evaluation of engine energy storage charging from regenerative braking and/or catenary,
- Evaluation of catenary-free operation,
- Consideration of coasting behaviour of the courses,
- Consideration of changing train mass at station stops,
- Calculation of short circuit currents,
- Quick evaluation of network structure using constant current engine model,
- Visualisation of results using prepared Excel-Files and
- Visualisation of results using the automated analysis of the Analysis Tool generating Excel and PDF files for:
 - Minimum pantograph voltage,
 - Maximum touch voltage,
 - Maximum leakage current,
 - Substation:

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- Feeder current versus time and as TRLPC¹,
- Busbar voltage versus time,
- Power (P,Q,S) versus time and as TRLPC for input, output and total (per substation and total of all substations of a network),
- Power factor versus time,
- Magnetic Field as flux density (B-field) and field strength (H-field),
- Conductor and connector current versus time and as TRLPC¹,
- Voltage versus time and as TRLPC¹,
- Energy overview,
- Vehicle specific charts,
- Vehicle specific overview

¹ The **Time-Rated Load Periods Curve** (TRLPC) shows the maximum or minimum of a set of varying window-size averages where the window time duration is defined by the x-axis value.

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4 Changes

4.1 Version 1.15.0 vs. 1.14.1

4.1.1 New Features


- OPN-13759: Implement DC Converter model
 - The new model of the DC Converter allows to model a controlled converter. This model is super flexible by defining a voltage over current characteristic of the device.
- OPN-15549: ANA Implement new lines chart for maximum time of pantograph voltage below or above limit
 - Add new chart types "t_below_U_threshold = f(s)" and "t_above_U_threshold = f(s)".
- OPN-15461: ANA Implement output of separate curves for consumed and recovered energy at vehicle

4.1.2 Improvements

- OPN-15144: Update to OpenJDK 21 and Eclipse 2024-03
- OPN-15580: INST Implement upgrade of system components
- OPN-15028: SimS Reduce Idle CPU Load On RunControlPage
- OPN-15219: SEL Check SEL-File for invalid selections from obsolete model elements
- OPN-15833: GUI Unify user experience for new file wizards
 - Show new file wizards in Simulation and XML perspectives in menu File -> New.
 - Show shortcut to perspective in Simulation perspective at menu Window -> Perspective -> Open Perspective.
- OPN-15849: GUI Update EGit update site for version 7.0
- OPN-15745: OPNCORE Improve error message for old license

4.1.3 Changed Behaviour

- OPN-15679: GUI Remove old PSC Viewer from product
- OPN-15757: Remove opncore debug binary from product
- OPN-15686: ANA Remove Matlab implementation from product
- OPN-15847: ANA Prevent parallel execution of Analysis
- OPN-15645: ANA Prevent analysis execution with invalid selections
- OPN-15670: ANA Y-axis scaling in position subplot of magnetic field images now depends on the selected time window
- OPN-15690: ANA Improve support of different line and marker styles in preset
 - Improve handling of different line and marker styles that may be defined in the presets file for each item.
 - Markers for a chart line will only be drawn if the defined line style is "marker" or contains the "Markers" keyword. This requires a change to custom preset files created by the user, otherwise the legend entries in magnetic field image output will look slightly different: In the presets XML file under OpenPowerNet/Analysis/ImageTypes/MagneticField/ImageType/Chart2/Item

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the attribute "style" has to be changed from "line" to "lineMarkers" for the items "Consuming engine" and "Recovering engine".

- OPN-15857: SimS Prevent usage of forbidden hash character (#) in PID and VID as it would lead to problems during scenario run

4.1.4 Bugfixes

- OPN-15460: SEL Fix possible invalid input value from pulldown menu of selection tables
- OPN-15476: SEL Fix handling of unselected items in selection table
- OPN-15796: ANA Fix invalid parameter exception for vehicles with only 1 timestep
- OPN-15729: ANA Fix unspecific error on insufficient simulation time in database
- OPN-15733: ANA Fix creation of inline current chart fails at positions with only one conductor
- OPN-15875: ANA Fix creation of inline current chart throws an exception when conductor data is missing
- OPN-15882: ANA Fix time window checkboxes on General page were ignored for creation of energy overview
- OPN-15883: ANA Fix creation of line chart fails if stations are not assigned to a line in OT model

4.1.5 OpenTrack

- The OpenTrack version tested with OpenPowerNet is 1.10.6 (2023-12-27).

5 Known restrictions

OpenPowerNet 1.15.0 is tested with OpenTrack version 1.10.6 (2023-12-27) and should only be used with this version.

OpenPowerNet is a single user application. It is not tested to use the same database for multiple users at the same time.

6 Version of corresponding documentation

The following table lists the version of the documents related to OpenPowerNet 1.15.0.

Document	Version
Installation Instruction	1.15.0
User Manual	1.15.0

7 Known issues

The following table contains all known but unsolved issues.

ID	Summary	Status
371	<p>When using larger time steps other than 1s or 0.5s, OpenTrack sends the requests not for all courses in the same time raster but OpenPowerNet is designed to calculate always in the same time raster.</p> <p>Workaround 1: Always use 1s or 0.5s simulation time steps, which is recommended for best performance and accuracy anyways.</p> <p>Workaround 2: Set all times within OpenTrack in the raster according to the selected simulation time step, e.g. for 3s time step only time hh:mm:00, hh:mm:03, hh:mm:06</p> <p>The simulation will be terminated by OpenPowerNet in case of OpenTrack requests outside of the time raster.</p>	Can't be solved.
n/a	Due to a limitation of the Excel VB interface, sheet names must not use international character sets. Therefore all sheet names will be created in English.	Can't be solved.
n/a	Warning message PRE-W-506 might be displayed on localised systems. This happens due to a limitation of the Excel VB interface, if the printer can not be set correctly. Technical background: As Excel sets the page size of new sheets according to the current printer, a printer with proper setup has to be selected before creating output. This is normally achieved using "Microsoft XPS" printer. If it fails, the user has to take care, that the system default printer is configured as desired. The warning message may be ignored in this case.	Can't be solved.
n/a	Vehicles, charts for all courses with multiple time windows: As data is written to the sheet sorted by engine first and timestep second, the chart series in a subchart can not be limited as easy as if sorted by timestep and therefore will contain time data from other subcharts. The axis scaling will be set correctly though.	Can't be solved.
OPN-13883	While merging with attribute mergeNetwork="false" the model parsing might fail with error message INT-E-353 as the network is still evaluated and checking references to master network.	Open

END OF DOCUMENT