

OpenPowerNet

Release Notes Version 1.14.0

Institut für Bahntechnik GmbH
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Document No. OPN/RN/1.14.0

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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 1.14.0. 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 1.14.0 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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Page 3 of 8	Release Notes Version 1.14.0	Issue 2024-06-07

2 List of files on DVD delivery



OpenTrack/ (all installation files)
MCRInstaller_R2013b_82_win64.exe
Openpowernet_app_01.14.00.msi
openpowernet_system_components_01.13.00.exe
OPN_InstallationInstruction_1.14.0.pdf
OPN_ModellingCheckList_1.11.0.pdf
OPN_ReleaseNotes_1.14.0.pdf
OPN_UserManual_1.14.0.pdf

OPN/RN/	 OpenPowerNet	 Institut für Bahntechnik GmbH
Page 4 of 8	Release Notes Version 1.14.0	Issue 2024-06-07

3 Main functionality



OpenPowerNet version 1.14.0 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:

OPN/RN/	 OpenPowerNet	 <small>Institut für Bahntechnik GmbH</small>
Page 5 of 8	Release Notes Version 1.14.0	Issue 2024-06-07

- 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.

OPN/RN/	 OpenPowerNet	 Institut für Bahntechnik GmbH
Page 6 of 8	Release Notes Version 1.14.0	Issue 2024-06-07

4 Changes

4.1 Version 1.14.0 vs. 1.13.2

4.1.1 New Features

- OPN-12424: ANA Implement possibility to convert metric to US and UK units in Analysis output
 - See User Manual chapter 10.1.13.10.

4.1.2 Improvements

- OPN-15467: OPNCORE Improve performance for simulations with many load flow iterations between ATM and PSC
- OPN-15518: OPNCORE Improve handling of invalid train weight when using OpenTrack delta load feature
 - OpenTrack train weight modification by delta load entry is ignored when the result is below the defined mass of the train. This affects the calculation of the transportation quantity. An error message will be generated in case of a mass misconfiguration now.
- OPN-15095: ANA Improve handling of papersize settings for output creation
 - Support output of magnetic field image and histogram in papersize letter with Java Analysis.
 - Java Analysis will now issue warning PRE-W-505 if the papersize of the default printer used by Excel for PDF export and post processing does not match the preset.
- OPN-15196: GUI Improve handling of invalid ODBC database setup in Analysis Selection Editor and SimS Editor
- OPN-11705: GUI Improve user experience for missing license dongle

4.1.3 Changed Behaviour

- OPN-15741: ANA Remove HDD mode
 - The option in Analysis preferences to configure Analysis for HDD mode was removed. It was strongly advised to use an SSD drive in the past already.

4.1.4 Bugfixes

- OPN-15200: ATM Improve error message for invalid characters in rolling stock file received from OpenTrack
- OPN-15208: ATM Improve detection of engine ID mismatch
- OPN-15413: ATM Fix power calculation for DC engine
 - Fix load flow simulation for some cases were warning message ATM-W-006 "Power calculation failed!" would be displayed.
- OPN-15650: ANA Ensure enabled database keys on start of Analysis to improve performance if simulation did not finish
- OPN-15669: ANA Fix time window repetition (TWR) for timestep length 0.5s
- OPN-15712: ANA Fix exception on empty selection for connectors chart
- OPN-15742: ANA Fix magnetic field output for max and mean H-field
- OPN-15682: SIMS Fix NullPointerException when remaking a scenario

4.1.5 OpenTrack

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

5 Known restrictions

OpenPowerNet 1.14.0 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 1.14.0.

Document	Version
Installation Instruction	1.14.0
User Manual	1.14.0

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

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