



Version
1.0.1

PRODUCT INFORMATION

Sitras Sidytrac Live – Real time prediction

for traction power supply and operational mode
[siemens.com/rail-electrification](https://www.siemens.com/rail-electrification)

SIEMENS

Ensure the efficiency of your traction power supply with Sitras Sidytrac Live

In the daily operation of traction power systems, especially, with their highly dynamic and movable loads it is important to have an overview on the system status, and thus, an optimal basis for decision-making.

Sitras® Sidytrac® Live allows user defined simulations based on current operating states to support operations, reduce potential of error, and increase the efficiency of the system.

All advantages in a nutshell



Transparency by forward simulation

- Continuous simulation of system utilization and energy consumption in an individually adjustable forecast time window
- Early feedback on critical system status such as network failures and load constraints
- Improved anticipation of component failures and train operation disruptions
- Based on actual system configuration and train operation



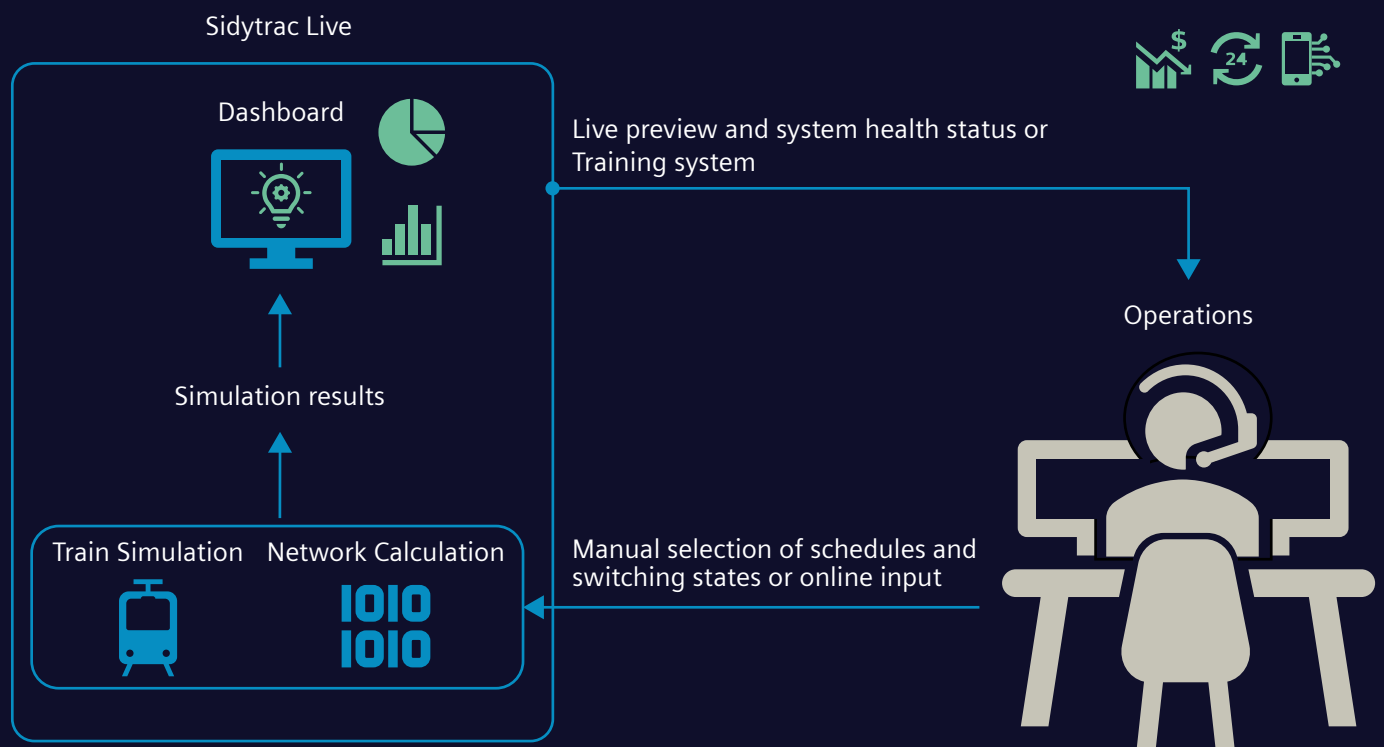
Scenario based decision support

- Analysis of "what-if scenarios" for training purposes and maintenance or for extraordinary emergency situations
- Demonstration of the effectiveness of the actions taken through simulations
- Verification of the protection settings in the event of a change in switching state



Increase of availability and efficiency

- Increase of reliability, availability, and utilization rate of the system.
- Training with Sidytrac Live leads to better decision making in operations
- Better demand planning through energy forecast and optimized operation costs



Sidytrac Live Basic Architecture – As a training system and decision support

New challenges in rail operations due to increasing traffic push existing solutions to their limits

Railway networks are constantly growing due to extended lines, higher capacity, and shorter headways. In addition, changing configurations of new electrical rolling stock there are retroactive effects on the network – electrically and to the schedule.

For the operator it is becoming increasingly difficult to predict the power supply performance of the network.

Digitalization with connectivity and transparency can support operators day by day. Sidytrac Live offers the operator a real-time simulation tool, which shows the capacity and load of all traction power-supply components. It can simulate any event, including switching sequences or component outages to assess the upcoming operation scenarios.

A digital twin as a reproduction of the real system including vehicles

With Sidytrac Live a forecast of the operational mode is made from train operation data on the one hand and from the switching state of the network on the other. This makes it possible to analyze the electrical load on the network and its effects on train operation and connected systems. Technically, Sidytrac Live is a simulation program

that combines train operation and network calculation algorithms. This allows the highly volatile power demand of locally and temporally variable consumers in a defined time range to be simulated exactly and in real time by means of a forecast simulation.

With Sidytrac Live, the operator can obtain an overview of the effects on the timetable, voltage stability, component load, guarantee of protection stability and other important aspects even before the switching action is carried out.

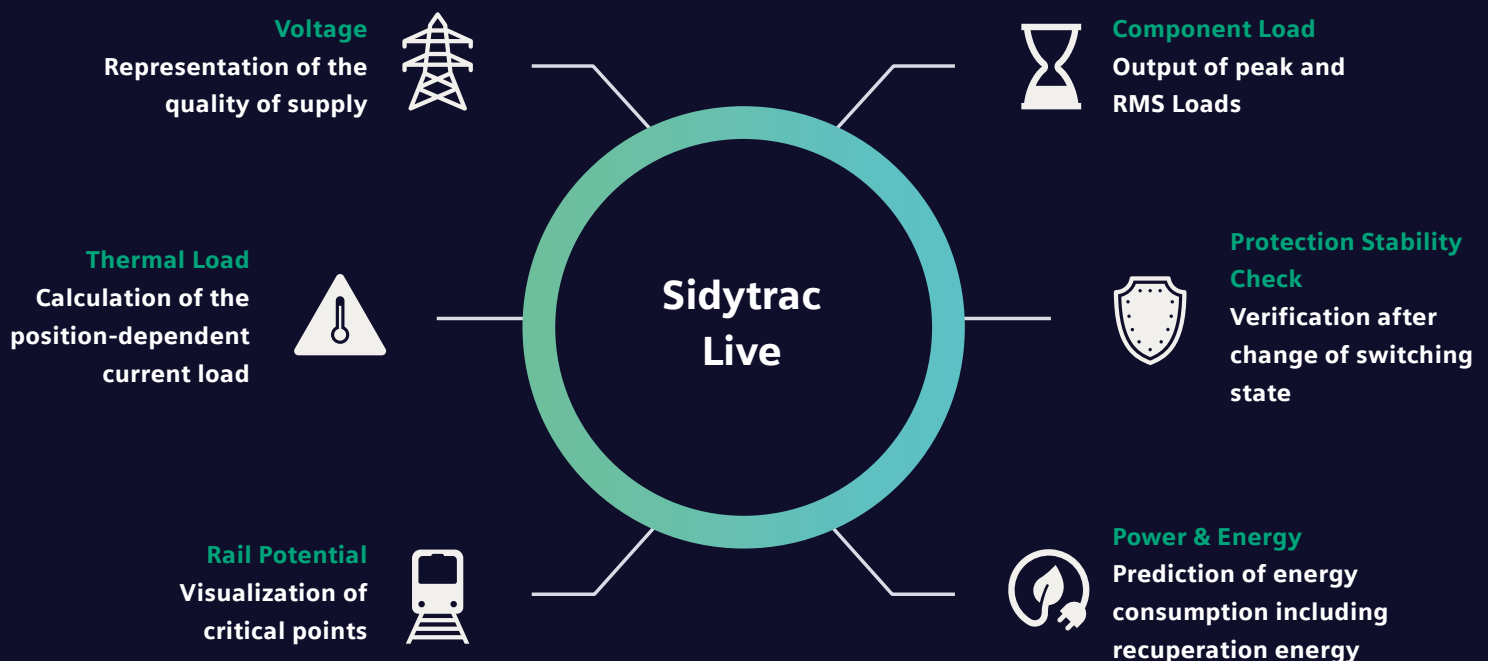
Easy monitoring and system transparency provided on a dashboard

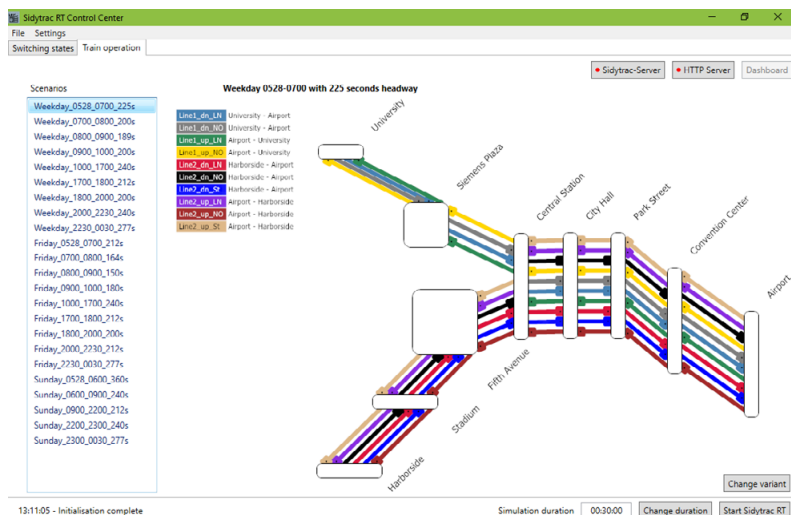
A dashboard is available for this purpose, which provides a clear overview of all relevant KPIs directly from the running simulation. Sidytrac Live gives a decision-making aid for the operator, thus achieving additional safety in the long term and increasing asset utilization and reliability. In operational emergency situations Sidytrac Live can help to quickly bring about a sensible decision through what-if simulations. Archived traffic management system and SCADA data can also be used to analyze later on real-life scenarios. In this way, an evaluation of measures taken, and the representation of their effects is conceivable, whereby unfavorable operating scenarios can be avoided in the future.

Offline Option: Simple handling via the Control Center and display various of informative results to understand the system behavior

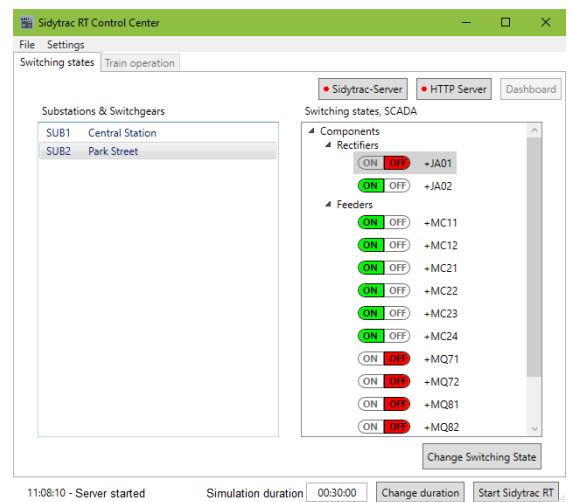
Easy monitoring and transparency of the ongoing train operation are the fundamental needs of the operators in the operation control centers.

The Dashboard of Sidytrac Live provides a clear overview regarding the traction power system based on train operation and the settings of the electrical network. The operator can evaluate the past, monitor the live operation, or can look into the near future to predict unwanted events. The operator can even try out settings before they are applied to the real system on the Power SCADA.





Selection between several stored timetables for simulation of current train operation



Changing switching states of the electrical network to investigate the influence in operation

Changeable image of electrical network

The switching states of substations, single feeders, bypasses, and other connections can be changed manually via the Control Center.

Adjustable train operations

The system also offers the possibility to adjust train operations, such as the timetable. In addition, the individually adjustable forecast time window allows the setting of the simulation duration as desired.

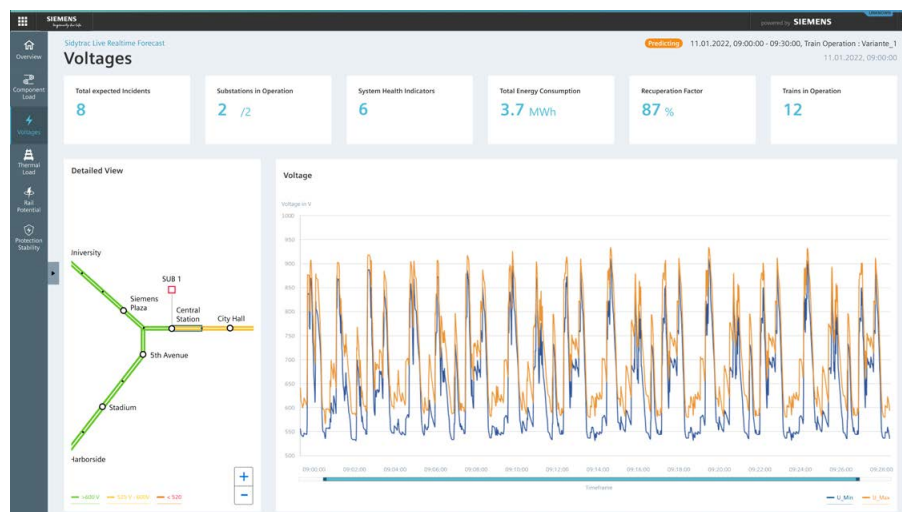
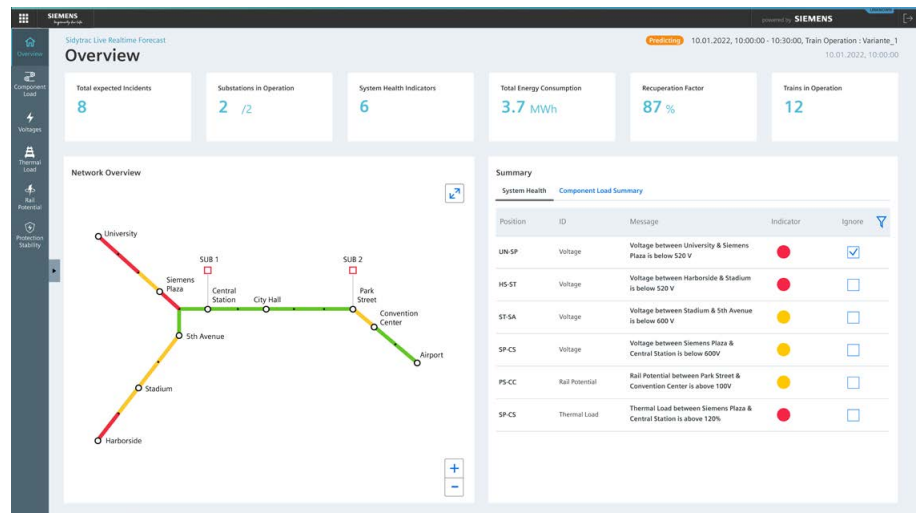
The relevant KPIs of the running simulations are displayed on the dashboard. The user can choose between two display formats, table, and diagram.

Flexible displaying of information

The dashboard can be adapted to the specific operational roles, so that the needed information is available all time. Analysis and KPIs can be customized to the operation needs.

Overview of all relevant events

Both the most important KPIs and the most important curves of relevant parameters are displayed with track accuracy and for defined sections. This includes thermal load, supply voltage and short-circuit detection and allows to see at first glance where problems might occur in the network in the next preview window.



Supply Voltage

The course of the voltage supply quality is calculated for the forecast time window. The simulated data are defined for a certain section on the line, the resulting minimum and maximum voltage is displayed in a diagram. The coloring in the line network (green, yellow, red) visualizes in which size range the voltage is within a line section.

Sidytrac Live as a training option in offline mode

Training on demand in a realistic environment and real system reactions are the basis for good employee qualification. With Sidytrac Live as a training system, there is now a solution to train in particular the interplay of operational dependencies related to the actual train operation and the traction power supply system.

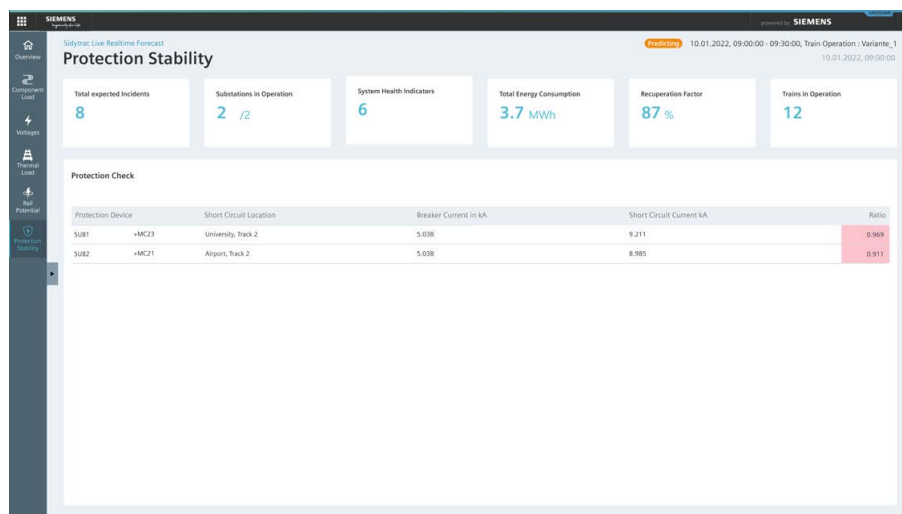
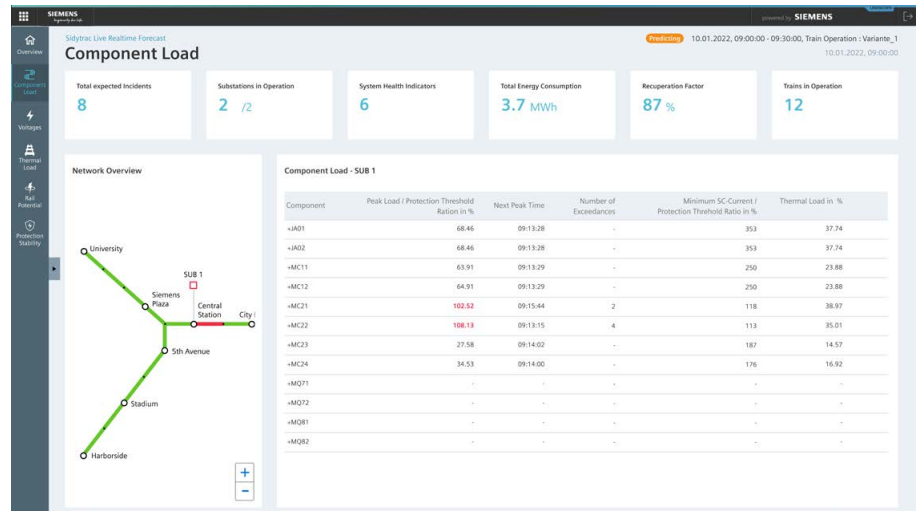
The Offline Training System comes as a standalone solution without connection to partner systems. Driving operation and network configurations can be adjusted manually. Various KPIs are displayed on a dashboard.

It is also possible to calculate the energy demand for a given forecast window under certain circumstances like switching state of the electrical network and current timetables. Through "what-if scenarios" done by the operator the best switching state can be achieved under the point of voltage quality, losses, and energy consumption.

Component Load

The thermal load of all relevant components (e.g. transformers, rectifiers, cables) at a certain time is displayed in the Component Load display window.

The calculation of potential peak loads can predict tripping of protective devices.



Protection Stability Check

The Protection Stability Check continuously checks all current protection settings as well as the overcurrent shutdown conditions of the railroad system. All possible short-circuit currents are evaluated by the system.

Sidytrac Live monitors the protection stability of the system by checking the operating peak currents against the protection settings.

Benefits

- Improved training experience for operator through improved feedback about impact of switching operation on power supply network
- Forecast simulation for variable forecast time
- Simulation using defined train operations
- Adaptation of power supply configuration
- Analysis of electrical KPI, e.g. thermal and peak load, voltage, rail potential

Sidytrac Live with connection to **Sitras RSC**

Sitras RSC (RailSCADA) network control system is used for controlling, monitoring, archiving and evaluating in traction power supply and rail infrastructure.

In this application, switching positions can be changed and the load flow is controlled. This has a direct impact on train operation and system status.

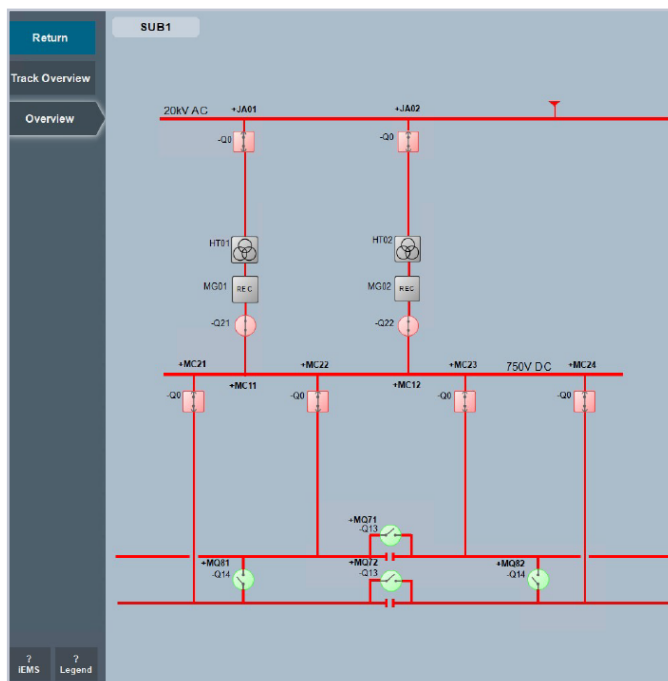
Sidytrac Live can connect to Sitras RSC.

Through this innovative connection, a hands-free transfer of changes in actual traction power supply system takes place.

This allows an accurate forecast at short notice.

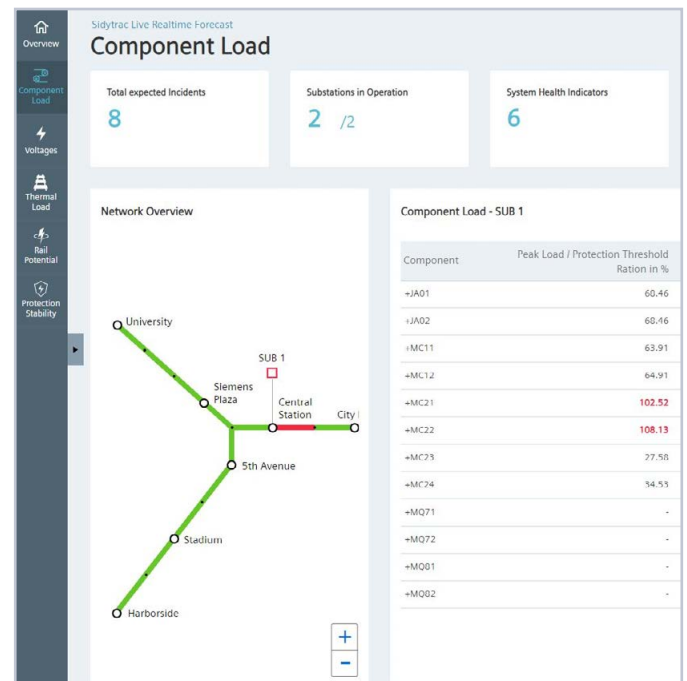
You are always notified in advance about critical situations on the network - based on the current switching states and without your own active intervention.

This system can also be used for training purposes in combination with a training SCADA system, or online in the operations control center supporting daily operations.



Sitras RSC:

Detailed view into a substation with connection to AC 20 kV network and a DC 750 V busbar trackside. Changes in switching states are immediately recognized by Sidytrac Live.



Sidytrac Live Dashboard:

Visualization of component loads, and further alerting based on real switching states from online system Sitras RSC.

**Published by
Siemens Mobility GmbH**

Otto-Hahn-Ring 6
81739 Munich
Germany

For more information please contact:

Siemens Mobility GmbH
Rail Infrastructure
Electrification
Mozartstr. 33b
91052 Erlangen
Germany

electrification.mobility@siemens.com
siemens.com/rail-electrification

Sitras Sidytrac Live / Product Information
No. A6Z00052399899 / Version 1.0.1

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