



Heimdall Power

Product Sheets

Please note: some services require physical hardware



Base Monitoring

The base monitoring module provides insight into the real-time condition and historical performance of a specific power line



Available Data	Precision
Conductor Temperature	Celsius +/- 1 deg
Current	Ampere +/- 1 %
Line inclination relative accuracy absolute accuracy	+/- 0.01 degree +/- 0.05 degree
Sag	Meters *
Clearance	Meters *

How it works

Neuron data is combined with a power line model to provide the operator with information on line loading, temperature and estimates of sag and clearance.

Use Heimdall Cloud or a data connector to see aggregated values for each monitored value per line and per span.

Key Benefits

- Reduce risk of asset operation
- Improve emergency preparedness
- Optimize asset maintenance

* Varies with span geometry



Capacity Guardian

Ambient Adjusted Ratings *
Weather-based Dynamic Line Rating*
Sensor-based Dynamic Line Rating
Emergency Rating
N-1 Management

* Available as SaaS

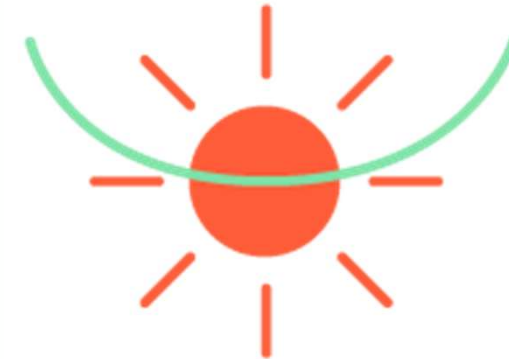


Ambient Adjusted Ratings

The AAR feature allows you to easily configure and calculate and forecast ambient adjusted ratings for your power lines

Weather data input	Specification
Weather Service Provider	Meteomatics
Spatial Resolution	90 x 90 m
Weather station calibration	Yes
Refresh interval	Hourly

AAR Characteristics	Specification
DLR model	CIGRE TB2.12
Ambient Temperature	Dynamic
Wind Speed Daytime	Default 0.6 m/s (Configurable)
Wind Speed Night	Default 0.4 m/s (Configurable)
Solar Radiation	1000 W/m ²
Forecasting	1 – 48 hours ahead
SCADA/EMS Integration	API or IEC104



How it works

Power lines are configured and monitored using “virtual sensors” which collect weather data for a specific line segment.

This information is translated to ambient adjusted rating results and forecasts.

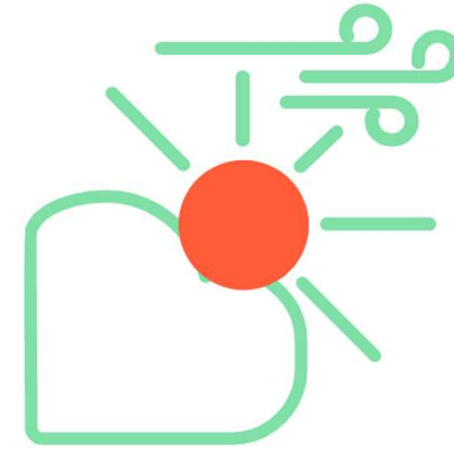
Key Benefits

- Increased line capacity
- Regulatory compliance
- Simple integration to SCADA/EMS



Weather-based Dynamic Line Rating

The weather based DLR feature allows you to easily configure and calculate and forecast DLR for your power lines.



Weather data input	Specification
Weather Service Provider	Meteomatics
Spatial Resolution	90 x 90 m
Weather station calibration	Yes
Refresh interval	Hourly

DLR Characteristics	Specification
DLR model	CIGRE TB2.12 or IEEE 738
Ambient Temperature	Dynamic
Wind Speed	Dynamic
Solar Radiation	Dynamic
Forecasting	1 – 48 hours ahead
Emergency Rating	Yes (5 min, 15 min, 30 min)
SCADA/EMS Integration	API or IEC104

How it works

Power lines are configured and monitored using “virtual sensors” which collect weather data for a specific line segment.

This information is translated to DLR results and forecasts which are risk-adjusted based on industry best-practices.

Key Benefits

- Increased line capacity
- Regulatory compliance
- Simple integration to SCADA/EMS

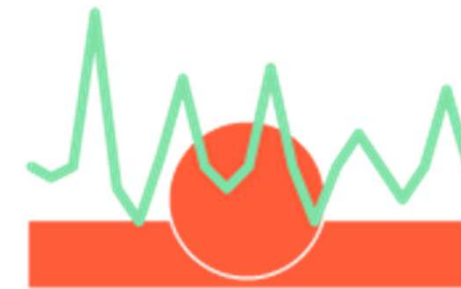


Sensor-based Dynamic Line Rating

Sensor-based DLR feature offers the most accurate DLR calculations and forecasts for your power lines

Weather data input	Specification
Weather Service Provider	Meteomatics
Spatial Resolution	Down to 90 x 90 m
Weather station calibration	Yes
Refresh interval	Hourly

DLR Characteristics	Specification
DLR model	CIGRE TB2.12 or IEEE 738
Ambient Temperature	Dynamic
Wind Speed	Dynamic
Solar Radiation	Dynamic
Forecasting	1 – 48 hours ahead
Selectable confidence intervals	Yes (80, 90, 95, 99 %)
Emergency Rating	Yes (5 min, 15 min, 30 min)
SCADA/EMS Integration	API or IEC104



How it works

The critical spans on the power line are instrumented with neurons that constantly monitor changes in load and conductor temperature

This information is combined with weather data to produce highly accurate and verifiable DLR values & forecasts. Forecasts are risk-adjusted and constantly updated to ensure a statistically valid confidence level.

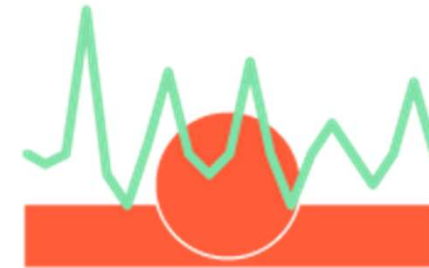
Key Benefits

- Increased line capacity
- Better n-1 management
- Regulatory compliance
- Safest DLR method
- Simple integration to SCADA/EMS



Emergency Rating

Emergency Ratings are short term power line ratings that allow the operator to briefly overload the line in an emergency or N-1 situation. Emergency ratings are provided by default with weather-based and sensor-based DLR products.



Weather data input	Specification
Weather Service Provider	Meteomatics
Spatial Resolution	Down to 90 x 90 m
Weather station calibration	Yes
Refresh interval	Hourly

DLR Characteristics	Specification
DLR model	CIGRE TB2.12 or IEEE 738
Ambient Temperature	Dynamic
Wind Speed	Dynamic
Solar Radiation	Dynamic
SCADA/EMS Integration	API or IEC104

How it works

The operator selects a time-interval 5, 15 or 30 minutes for the situation and the system calculates a resulting emergency rating are based on the current environmental conditions on the line.

Emergency ratings are risk-adjusted to account for sudden changes in heating or cooling conditions. Power lines monitored by neurons offer additional protection by monitoring conductor temperature increase.

Key Benefits

- Better n-1 management
- Avoid re-dispatching
- Avoid CENS
- Simple integration to SCADA/EMS



Contingency Analysis

Contingency analysis allows operators to quickly evaluate which actions to take in n-1 situations.

This feature can be customized to work with any DLR offering.



Feature	Specification
DLR Model support	Any sensor- or weather based DLR model
Real-time contingencies	Yes
Forecasted contingencies	Yes (1 – 4 hours ahead)
Risk-adjustment	Yes (80, 90, 95, 99%)
Integration of contingency list	Through API

How it works

The contingency analysis page is continuously updated with a list of possible contingencies from the utilities SCADA system. Each contingency is analysed according to the available capacity for the affected line.

Operators then make an informed decision on whether to overload the line or re-dispatch power and switch off the affected line.

Key Benefits

- Lower re-dispatching costs
- Improved security of supply
- Better n-1 management



The Heimdall API

The Heimdall API allows you to seamlessly connect Heimdall Power data streams to your proprietary systems



API features	Specification
Authorization	OAuth 2.0
Data Format	JSON
Supported Clients	Java, Python, C# /.NET5
Certificates	Self-signed
API Architecture	REST-based

How it works

The Heimdall API is a REST-based API which allows TSOs/DSOs to easily integrate data from Heimdall Power to 3rd party systems, DMZ-servers or to in-house data lakes.

See more:
<https://api.heimdallcloud.com>

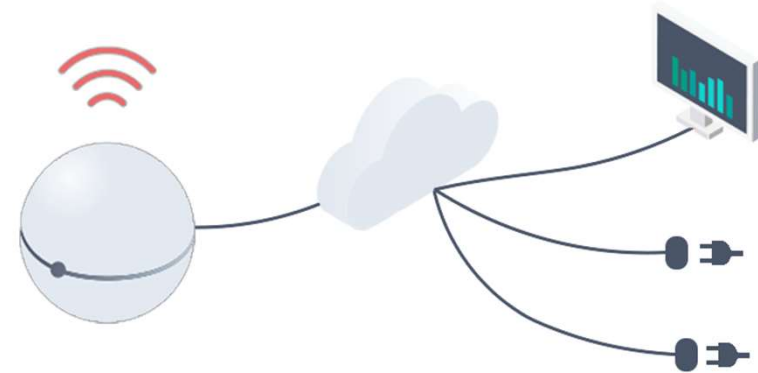
Key Benefits

- Easy integration with internal systems
- Safe & secure
- Quick to set up



IEC 104-60870 Connector

The IEC 104 connector allows you to seamlessly stream data from Heimdall Power data streams to your SCADA/EMS system.



IEC 104 Integration	Specification
Authentication	OAuth 2.0 / IP Restriction
Hosting	MS Azure / On Prem
ASDU Addresses	Fully configurable
Signal List	Fully configurable
IEC Compatibility	IEC 104-60870-5
Supported languages	C#

How it works

An IEC104 client is set up as a dedicated VM which listens to client data and translates to IEC104 compatible format.

Data is transmitted to the customers IEC104 server or DMZ for further ingestion.

Key Benefits

- Push-based data-exchange
- SCADA-native format
- Fully configurable wrt. signal list
- Client can be self-hosted