

Technical Information



Pict. by courtesy of BEWAG Netz GmbH

## Initiation

Safe and reliable operation of high voltage overhead transmission lines (OHTL) under strict compliance given by technical and economical measures is mandatory for power utilities to guarantee a secure supply of electric energy to private and business customers.

The sag of the high voltage overhead transmission line is a pivotal parameter for operation and charging the OHTL with electric energy. For safety reasons there has to be a minimum distance between the OHTL and ground in all circumstances.

Overhead transmission lines are exposed to different environmental conditions such as heating treatment caused by the operating current, solar radiation, ambient air temperature, influence of wind and normal wear and tear. All of these parameters have a significant impact to the sag of the line.

Due to the complexity and up to now extreme cost intensive methods for measuring the line temperature (and calculating the sag) the dimensioning of the line structure demands high safety reserves to be calculated.

Reliable and cost effective realtime measurement of the line temperature (and the calculated sag) under different conditions will lead to a tremendous increased transmission capacity.

micca is now in the position to offer a revolutionary measuring system called



By using this convincing measuring method power utilities will be enabled to increase the efficiency of their existing infrastructure.

Investment cycles can be stretched and new built of infrastructure can partly be avoided.

**Tremendous cost savings in the range of 15% to 35% are feasible.**

Additional sensors on the mast for ambient air temperature, humidity, wind velocity, CO2 and ice accretion gives the opportunity to define high efficient maintenance concepts for the whole infrastructure.

## Transmission Line Sensor **emo\_Iss, emo\_Ish**

**emo\_Iss** and **emo\_Ish** measures, validates and transmits the Line Temperature. The influence of the Sensor body and the environmental conditions will be compensated. (Page 5, Thermal Flow Compensation). The Sensor can be used for different line materials.

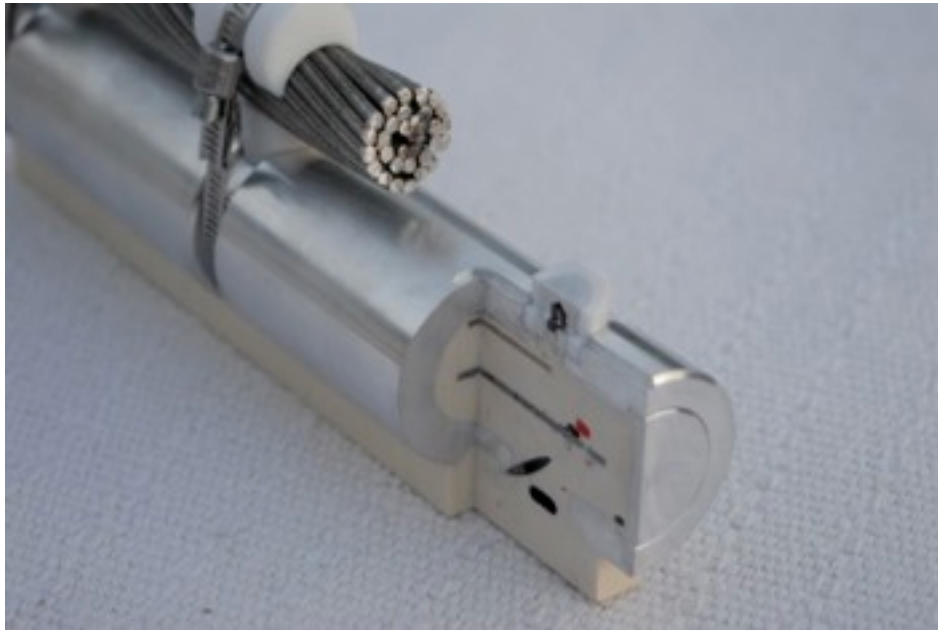


The sensor(s) **emo\_Iss** and **emo\_Ish** will be fitted to the high voltage line by using tearproof binders. The unit is equipped with 3 temperature sensors for measuring the line temperature and 1 reference sensor which measures the temperature of the sensor body. This method can compensate the influence of the environmental conditions as well as the influence of the sensor body itself. The measurement data are transmitted to the base station which is located on the mast using a DSSS 868 transmission unit. Energy supply is solved with batteries. Lifetime without maintenance is 10 years.

A validation of the values is done in the unit. Only approved values will be transmitted to the base station.

The linesensors are designed for 110kV, 220 (225)kV, 380 (400)kV voltage level systems with variable line diameter of 10mm to 35mm (Other voltage levels and line diameters can be offered upon request).

## Transmission Line Sensor **emo\_Iss, emo\_Ish**

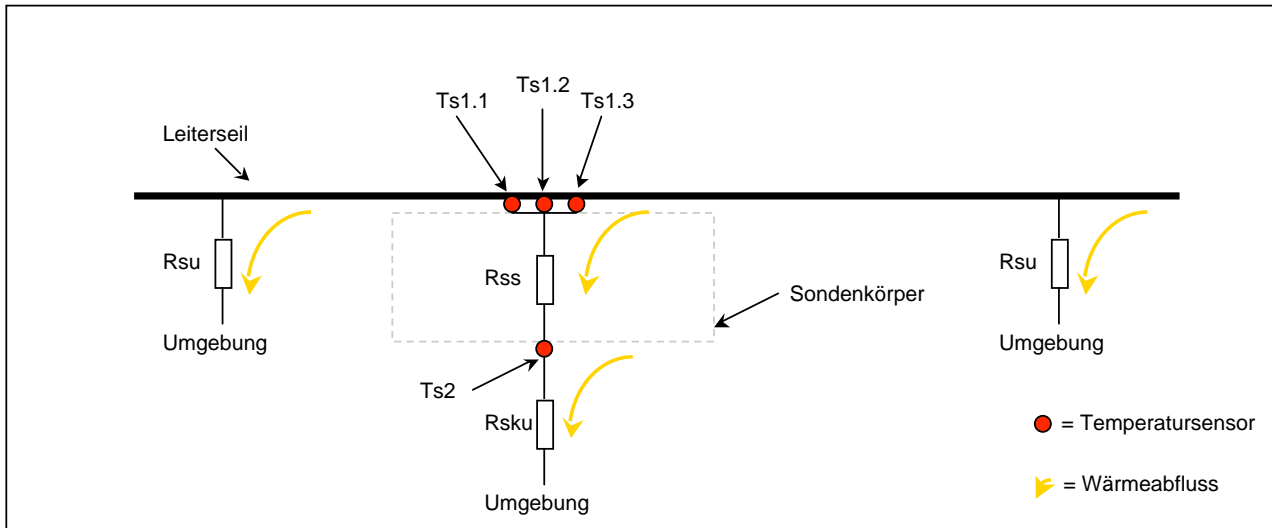


The standard measuring cycle of **emo\_Iss** is set to 1 Minute. Depending on the Battery Lifetime the cycle can be adapted.



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## Thermal Flow Compensation emo\_Iss, emo\_Ish



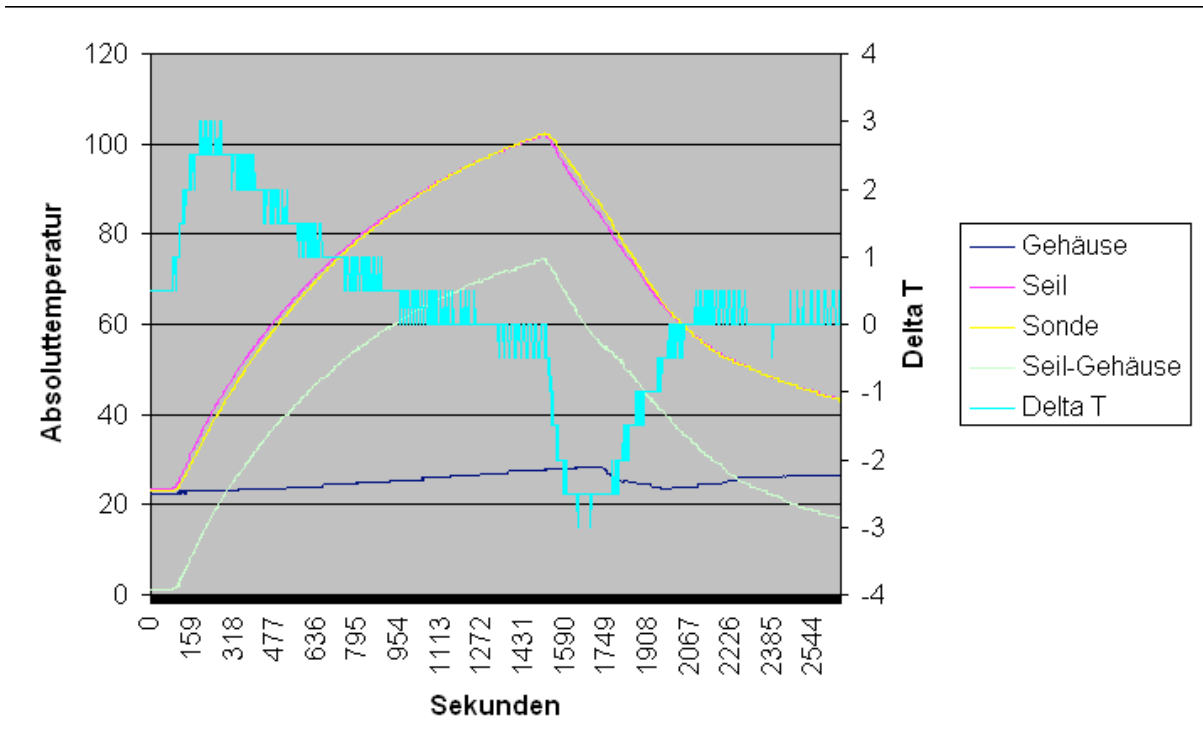
For measuring the precise line temperature two areas are used in **emo\_Iss** and **emo\_Ish**. The first one is the measurement area directly on the line. Sensors Ts1.1, Ts1.2 and Ts1.3 are coupled to the line directly. A validity check is done with the acquired measurement values. The valid value is defined as the calculated average of the two sensors which have the least deviation to each other.

The second area is the body itself. Sensor Ts2 is delivering the reference value which is used for compensation of tampering influences.

By using this measure the influence of the sensor body as well as the influence of environmental conditions like rain, snow fall, solar radiation etc, can be compensated.

The correction curve is stored in the sensor.

# Thermal Flow Compensation emo\_Iss, emo\_Ish



Temperature Curves

## Base Station **emo\_bs(x)**

The basestation is mounted to the mast by using a clamp design. The distance for wireless transmission between the sensors and the base station is 15m. This ensures the safe acquisition of all values from all monitored transmission lines on the mast.

Up to 12 sensors and/or datasources can be connected to the base station.

Once an hour the base station transmits the collected and prestored datas to the **emo\_ohtlgrid** database. The transmission uses the GSM/GPRS communication path.

Under these conditions the base station works without maintenance for a period of 3 years by using built in batteries.

Alternatively the base station can be equipped with solar panels and rechargeable batteries.



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Optionally the base station can serve additional sensors for ambient air temperature, wind velocity, humidity and co2. In principal sensors (e.g. metereology) which are already in use can be connected after clarifying the interface requirements

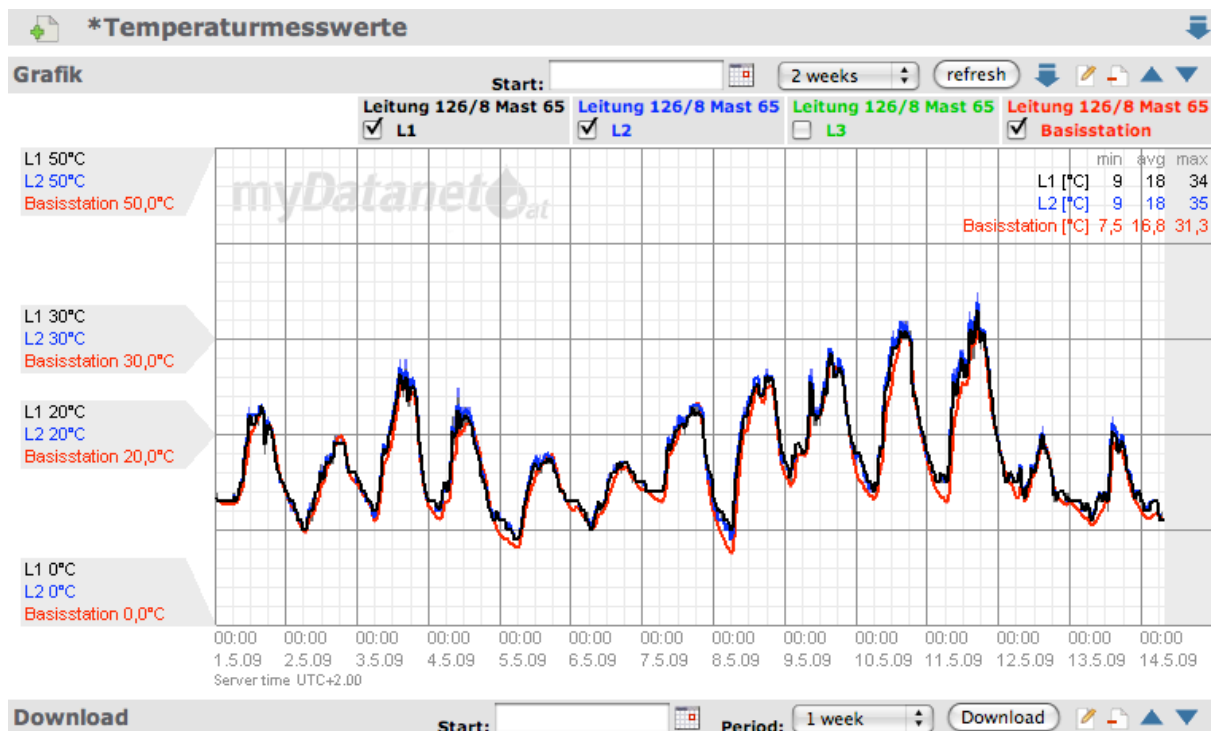
Additionally to the temperature measurement values the battery voltage of the sensors and the base station, GSM field strength, field strength of the sensors and the temperature of the base station are transmitted to the database. Positioning based on GSM cell information is also transmitted.

# Telemetry- and Server Software **emo\_ohtlgrid**

The acquired and transmitted values are stored and processed in the **emo\_ohtlgrid** database. The standard operation modus enables a datastorage for 20 years. The database system is designed for fast data processing and handling of huge amount of data. In comparison to SQL based systems **emo\_ohtlgrid** achieves a hundred times better performance.

Different kind of graphical data display can be chosen. Automatic handover to existing north bound systems can be done via XML, filetransfer or IEC command structures.

Adaptions to existing protocols can be achieved with convincing economic efforts.



## Contact



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