Sensformer™: Born connected

Introducing the digital transformers family
From Transformer to Sensformer
Transformers are positioned at each critical node in the energy grid, from power generation stations all the way down to the industrial and private consumers – yet up until now, they were only perceived as "voltage transforming devices". With the newly introduced Sensformer™ the transformer shall evolve into an info-hub.

The Sensformer™ enables its operators to master present and future challenges like increasing the share of renewables into the grid, distributed energy resources, e-mobility, global industrial competition and finally the quest for the most efficient and reliable power supply. These challenges are best overcome with access to real-time digital data. For this reason, Siemens is pioneering with its digital management of transformers.

This is done with a smart and robust IoT gateway securely transmitting the minimum amount of required information to a cloud-based storage and visualization platform.

The Sensformer™ comes with visualization and analytics. Operators get a comprehensive and quick overview about their assets and thus can improve their operations. The corresponding data platform is an open ecosystem using data from the Sensformer™ intelligently.

Benefits of a Sensformer™
- Reduced vulnerability, by limiting actual physical measurements & avoiding unnecessary IT equipment at site (e.g. no local analytics).
- Easy connectivity, by provision of a secure GSM connection which is easy to set-up and does not interfere with or require secondary IT infrastructure.
- Enabling real time asset management using a standard and open cloud solution for easy and quick insights to all connected assets and enhanced operational decisions.
- A platform for the future, enabling customer-centric co-creation of applications and offering value to all operations.

Data Handling and Security
Siemens fully understands the ever increasing cybersecurity requirements and therefore we ensure that we comply with state-of-the-art security and encryption technologies such as (ISO / IEC 27001).

For data transmission to the cloud storage, an end-to-end encryption is used. Each Sensformer™ has a unique ID, which is also used for encryption. The transmission is via HTTPS with 256-bit TSL encryption. We also comply with best in class data handling and management guidelines to ensure that data from different customers is strictly separated and secured on the cloud.

A Sensformer™ is predominantly collecting and transmitting data to a secure storage and analytics tool. For safety and security reasons, there is no functionality to actively influence a customer's operation or transformer asset.
Sensformer™ Features at a glance

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<tr>
<th>Feature</th>
<th>Description</th>
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<tr>
<td>Measuring of oil Level, oil temperature, winding current and GPS location plus indirect computing information like ambient temperature &amp; humidity, weather warnings, etc.</td>
<td>Web and Mobile interface providing instant information like equipment details, fleet localization, trend visualization, alarm information, load indications</td>
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<td>Connectivity via GSM (GPRS/EDGE/3G/4G) or Ethernet with TLS 1.2/ IPsec,</td>
<td>Open platform for co-creation of software applications</td>
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<td>Batch transmission with 1 min/batch with up to 1 sample per second</td>
<td>Remote firmware update possibility using M2M software (only at customer’s request)</td>
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<td>Compliant with relevant cyber security standards like NERC CIP, ISO and IEC 27001</td>
<td>Compliant with all relevant standards (e.g. EMC Directive 2014/30/EU, IEC/EN 60529 and IEC/EN 61010 IEC/EN 61000, IEC/EN 60068)</td>
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<td>Secure cloud-based data storage with SHA1 based integrity checks and 2-level user authentication</td>
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Sensformer™ hardware and sensors
The Sensformer™ will be delivered pre-equipped with all necessary hardware. The IoT gateway will be pre-configured and will either be installed in the control cabinet (IP20) or on the transformer tank (IP65).

It comes with the following measurement signals per default:
- Top oil temperature, via additional PT100 in additional thermometer pocket
- Oil level, via existing oil level indicator with additional contact. Alternatively the contact from the Buchholz Relay can be used.
- Winding current, via current transducer attached to the secondary circle of the existing current transformer

The hardware is optimized to be robust, e.g. by minimization of handling activities, reduction of sensors as well as avoidance of local analytics hardware. Furthermore, the connectivity is based on a “read-only” concept without any influence to the transformer operation.

Unleashing the power of digitalization
The Sensformer™ offers an easy and secure entry platform for digitalization. While providing the basic functionalities, it holds tremendous opportunities for operators to create and use applications in future.

The Sensformer™ enables its operator to optimize the quality and speed of operational decisions as well as to become more flexible, act faster and more efficiently in troubleshooting...or to completely avoid it.

A mobile app offers secure mobile connectivity to gain an instant overview about asset status and real-time data, enhancing asset management. Key KPIs push messages in case of alarms.

Join the Journey...
The Sensformer™ provides an open platform that enables co-creation of customer-centric use cases and applications.

Physics will always remain the same. However, in the digital age enables us to merge it with information to create a new standard and reality – Sensformer™: born connected