Transformer monitoring system is an efficient tool to monitor and diagnose the status and condition of transformer and its equipment. NSET solution provides scalable options for monitoring and diagnosing different parameters of a transformer. The system is equipped with scalable options for integrating sensors and measuring equipment to a common processing platform. All the data are processed on the transformer unit, equipped with an efficient processing unit suitable for outdoor installation. The processing unit is equipped with different communication options. It has the capability for aggregating and buffering the data and it has a web server option that provides online visualization for remote connections over the internet. In the control centre, a server PC platform ensures appropriate database storage for lifetime data of the transformer.

- Efficient power transformer monitoring system
- Customer’s tool helps to diagnose problems and maintain equipment
- State-of-the-art technology
Main Features

1. Main data
- Apparent, active and reactive power
- Load factor
- Operating voltage and load current
- Digital circuit states of Buchholz relay, oil level of main tank

2. Bushings
- Amplitude and number of overvoltages HV and MV side (3 phase)
- On-line capacitances of HV an MV condenser bushings
- Change of capacitance of HV and MV condenser bushings
- Capacitive displacement current (ic) of HV and MV condenser bushings

3. Insulation
- Hot-spot temperature
- Top oil temperature (according to Thermal model)
- Aging rate and lifetime consumption
- Gas-in-oil, Moisture-in-oil
- Partial Discharge (PD)

4. Overload
- Over currents and short-circuit currents
- Overload capacity
- Actual losses
- Emergency overloading time

5. Cooling system
- Ambient temperature, in and outlet temperature of cooler
- Operating times and circuit state of fans and pumps
- Cooling efficiency (thermal resistance Rth)
- Frequency regulated fans (optimal cooling, reduced noise)

6. OLTC
- OLTC position, number of switching operations
- Sum of switched load current of tap changer
- Duration of tap changing, switching time
- Oil temperature in OLTC compartment

7. Control and Visualization
- Web server on monitoring IED
- Data storage (life time storage of transformer)
- Protocol (IEC 60870-5-101/104 / Modbus / IEC 61850)
- Architecture (Flexible)
### Main Technical Specification

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating temperature</strong></td>
<td>-40 ... + 55 °C</td>
</tr>
<tr>
<td><strong>Protection degree</strong></td>
<td>IP54</td>
</tr>
<tr>
<td><strong>Processing unit</strong></td>
<td>compact CPU with scalable features and communication options, without moving parts</td>
</tr>
<tr>
<td><strong>Data processing</strong></td>
<td>data aggregating and buffering on transformer processing unit</td>
</tr>
<tr>
<td><strong>Supported protocols</strong></td>
<td>Modbus RTU, Modbus ASCII, Modbus TCP, IEC 61850, IEC 60870-5-101, 104, other protocols on request</td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td>web server option for on-line visualization, touch screen panel</td>
</tr>
<tr>
<td><strong>Minimum data resolution</strong></td>
<td>10µs</td>
</tr>
<tr>
<td><strong>Aggregating data resolution</strong></td>
<td>1 ms ... 600 s</td>
</tr>
<tr>
<td><strong>Operating system</strong></td>
<td>standard MS operating system, standard MS/Oracle database</td>
</tr>
</tbody>
</table>