Introduction
Rising cost and performance pressures are forcing many operators to increase the utilization capacity of their transformers. Moderately aged transformers and network couplers are increasingly being operated at higher rates and in many cases using nominal power for the first time.

At the same time, operating downtimes planned for maintenance have been reduced or completely eliminated.

Siemens Customer Services offer specific planning and prompt delivery of high quality spare parts and components.

Features
Spare parts from Siemens offer:

- Stringent quality assurance standards to ensure that spare parts are manufactured in accordance with the Siemens OEM specifications
- Continuous improvement of technology and materials
- Outage planning and support based on customized spare parts programs

A central aspect of the spare parts program is outage planning. Our experienced specialists provide specific recommendations for spare parts for planned maintenance work, and ensure that they are delivered on time.

What’s more, in the event of an outage there is always a spare parts specialist on hand to help you before, during and after the shutdown phases.

Benefits
- Increased availability and reliability
- Extended maintenance intervals
- Cost savings due to extended service life
- Higher operational safety
- Lower outage costs due to immediate supply of spares

Scope of work / deliverable
- Advice on operating your transformer, and on its maintenance and general performance
- Take advantage of a spare parts program from Siemens tailored to your needs
- OEM technology

Customer Services for Transformers
Transformer Spare Parts

Seals | Special production series | Oil level indicators
--- | --- | ---
Terminal lugs | Porcelain bushings | Oil flow indicators
### Technical details

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated operating time</th>
<th>Degree of impact</th>
<th>Probability of fault</th>
<th>Possible effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN bushing</td>
<td>20–30 years</td>
<td>Very high</td>
<td>Low</td>
<td>The most likely fault to occur in a porcelain bushing is a mechanical malfunction. Breathing or cracking could possibly result in oil leaking, electric discharge or even fire.</td>
</tr>
<tr>
<td>Capacitor bushing</td>
<td>15–20 years</td>
<td>Very high</td>
<td>Medium</td>
<td>Capacitive bushing faults can result in contamination of the active part, oil leaking and explosions.</td>
</tr>
<tr>
<td>Gasket</td>
<td>10–15 years</td>
<td>Medium</td>
<td>High</td>
<td>Oil leaking could lead to pollution of the environment and fire or impair the continuation of the workflow process.</td>
</tr>
<tr>
<td>Valves (slide valves)</td>
<td>10–15 years</td>
<td>Medium</td>
<td>Medium</td>
<td>Leakages due to wear caused by ageing.</td>
</tr>
<tr>
<td>Pump</td>
<td>10–15 years</td>
<td>High</td>
<td>Medium</td>
<td>A pump fault interrupts the flow of oil in the cooling circuit and results in overheating and interruption of function.</td>
</tr>
<tr>
<td>Fan</td>
<td>5–10 years</td>
<td>Medium</td>
<td>Medium</td>
<td>A ventilator fan fault interrupts the flow of air to the cooling circuit and could result in overheating and interruption of function.</td>
</tr>
<tr>
<td>Rubber bag</td>
<td>10–15 years</td>
<td>Medium</td>
<td>Medium</td>
<td>Warning/disconnection by oil level indicator.</td>
</tr>
<tr>
<td>Buchholz relay</td>
<td>5–15 years</td>
<td>High</td>
<td>Medium</td>
<td>Gases occurring in the transformer oil are not indicated. Serious faults cannot be detected.</td>
</tr>
<tr>
<td>Oil level indicator</td>
<td>10–15 years</td>
<td>Medium</td>
<td>Medium</td>
<td>The exact oil level is important for the correct operation of the transformer. If the oil level indicator fails, this can result in unscheduled shutdown and even do damage to the windings.</td>
</tr>
<tr>
<td>Oil and winding thermometer</td>
<td>10–15 years</td>
<td>Medium</td>
<td>Medium</td>
<td>High temperatures influence the properties of the oil and accelerate ageing of the transformer.</td>
</tr>
<tr>
<td>Air dehumidifier</td>
<td>10–15 years</td>
<td>Low</td>
<td>High</td>
<td>Moisture accumulates in the transformer oil, leading to reduced breakdown strength and to accelerated ageing of the solid insulation.</td>
</tr>
<tr>
<td>Pressure relief valve</td>
<td>5–10 years</td>
<td>High</td>
<td>Medium</td>
<td>A fault in the pressure relief valve could lead to a catastrophic explosion or cause the welds on the tank to crack.</td>
</tr>
<tr>
<td>Oil/water flow indicator</td>
<td>10–15 years</td>
<td>Medium</td>
<td>Medium</td>
<td>The nonfunctioning of these indicators can lead to overheating. In serious cases, this might even destroy parts of the equipment.</td>
</tr>
</tbody>
</table>

All rights reserved. Trademarks cited in this document are the property of Siemens AG, its affiliates, or their respective owners in the scope of registration.

Subject to change without prior notice. The information in this document contains general descriptions of the technical options available, which may not apply in all cases.

---

**Siemens AG**
Energy Management
Humboldtstr. 59
90459 Nuremberg, Germany

Customer Support Center
Phone: +49 (911) 433 78 78
E-mail: support.energy@siemens.com

© Siemens AG, 01.2018, V 1.0