



**Grid Solutions**  
a GE and Alstom joint venture

SERVICES PRODUCT SOLUTIONS

# Repair, refurbish, redesign

## Mobile workshop and HV test facility

Servicing all types of large and special transformers up to 400 kV and 500 MVA onsite is an effective solution to increase performance, reduce downtimes and avoid heavy transport



### BENEFIT FROM MOBILITY

- Reduced outages and downtimes
- Optimised costs
- Accurate diagnostics
- Asset reliability validated
- Technical expertise

## Taking care of power transformers

As a critical component of networks, power transformers are essential to transmission. Keeping our customers' assets available, safe, reliable and at optimal performance is our day to day focus.

Our experienced teams can accurately diagnose any incorrect operation or failure in transformers onsite. They can design and implement the most optimised, reliable, time and cost efficient repair or upgrade and perform high voltage test validations.

The advanced onsite facility is designed to support condition assessment and diagnostics, while allowing staff to conduct major repairs including invasive work, replacement or redesign of the active part's main components including windings replacement.

### FLEXIBILITY

The mobile facility can be set up onsite close to the transformer, reducing down time and loss of availability when a spare transformer is not available.

The onsite solution avoids any heavy transport and allows maintenance and test operations to be performed anywhere at anytime: in remote regions, with poor infrastructures, under difficult weather conditions and legal constraints. The solution eliminates all risks and costs linked to transformer transportation.

### QUALITY

Extended repairs or upgrades of large transformers are carried out under controlled ambient conditions, where cleanliness and orderliness are the same as in our factory workshops.

Our experts follow proven processes using standard tooling and equipment developed in collaboration with our transformer factories. The advanced drying equipment and processes with accurate monitoring can achieve the same low residual moisture as for new products. High voltage tests are performed to validate the reliability of the transformer at the end of the works.

### EXPERTISE

Grid SOLutions advanced mobile solution takes advantage of our decades of experience as a transformer manufacturer.

Our certified field experts bring added value to your project with their profound technical knowledge, allowing efficient condition assessments, failure and damage analyses, repair specifications and re-design.

Reduce downtimes by up to

**3 months**

compared to alternatives

Alstom experts have also developed complementary skills including onsite major works project management to smooth operations.

Extended experience in manufacturing and repairs allows our teams to carry out: dismantling, intrusive work, repairs or replacement of active key components, reclamping, reconditioning and the erection of all types of transformers.

## SCOPE OF SERVICES

Grid Solutions offers large and special power transformer services onsite:

### REPAIR, REFURBISHMENT AND REDESIGN

EQUIPMENT	SERVICES
Mobile workshop made of large steel structure and cladding / Controlled atmosphere / Advanced drying equipment / Heavy lifting equipment or mobile crane / Transformer repair tooling developed with Alstom Transformer factories and workshops	<ul style="list-style-type: none"> <li>• Repair and retrofit including comprehensive work on the active part with windings and insulation components replacement</li> <li>• Modification and redesign for performance improvement including rated power, voltage, thermal upgrade</li> </ul>

### DIAGNOSTIC AND VALIDATION TESTS

EQUIPMENT	SERVICES
Containerised high voltage test set with variable frequency drives to perform tests between 40 and 200 Hz / High voltage check and test equipment	<ul style="list-style-type: none"> <li>• Advanced condition assessment during maintenance outage</li> <li>• Advanced fault investigation after failure</li> <li>• Validation of performance and reliability of onsite repair, refurbishment and upgrade</li> </ul>

## GRID SOLUTIONS' TRANSFORMER REPAIR EXPERIENCE

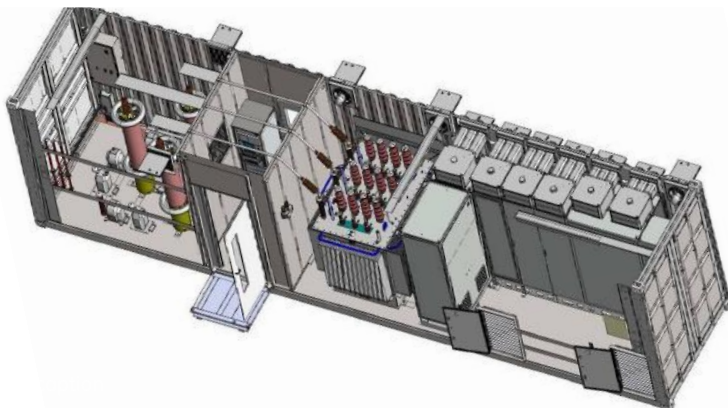
- Onsite repair of 70 MVA 400 kV GSU transformers, including core lamination and active part/bottom insulation replacement
- Onsite repair of 225 MVA 132 kV transformers for industrial applications
- Onsite repair of 418 MVA 550 kV transformers including critical new welding requiring removal of main tank cover

## TESTS AVAILABLE ONSITE (compliant with IEC 60076)

Ratio and vector group / DC windings resistance measurement

Applied voltage test	up to 300 MVA
Induced overvoltage test with PD measurement	up to 500 MVA
No load loss test measurement	up to 300 MVA
Load loss test and short circuit impedance measurement	up to 500 MVA
Heat run test (with capacitor bank)	up to 500 MVA

Check and diagnostic tests including Sweep Frequency Response Analyser (SFRA), Dielectric Response Analyser (DRA)



## OTHER TRANSFORMER SERVICES

### Asset management

To prolong asset lifetimes and ensure reliability, Grid Solutions offers condition-based maintenance on critical transformers or on the full fleet.

### Oil analysis

Complete oil analysis can be performed in Alstom's laboratories to keep you constantly up-to-date on the overall condition of your transformers. Studies and reports created by our experts inform and support your decisions on transformer maintenance.

### Strategic spare parts management

Grid Solutions offers strategic spare parts management to mitigate risks. Maintaining such stocks allows fast repairs within short timeframes.

### Technical training and competence development

Grid Solutions Technical Institute offers a full range of training that encompasses all aspects of transformer knowledge - from fundamentals to operations and maintenance. Training combines theory and practice on real equipment

Grid Solutions experts can recommend and provide optimised solutions, taking into account cost, time and technical constraints. Solutions include repair, refurbishment or upgrade, onsite or in one of our workshops worldwide.

For more information please contact  
 GE Grid Solutions

### Worldwide Contact Center

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