

Service

OUR VISION

We provide solutions for a sustainable world in the new Energy Era

OUR MISSION

We deliver value with Energy, Environmental and Transportation solutions that improve our everyday life, through the integration of different skills and the most innovative technologies.

Our personnel operate in a professional environment of continuous development and learning.

OUR VALUES

- We focus on success of all our customers
- We strive for efficiency in order to maximise competitiveness
- We learn and adapt ourselves to deliver excellence
- We build trust always acting with safety and integrity
- We overcome challenges and deliver results resultados



Efacec

Efacec Power Solutions aims to be the preferred worldwide partner in delivering innovative and customized solutions for energy, mobility and the environment.

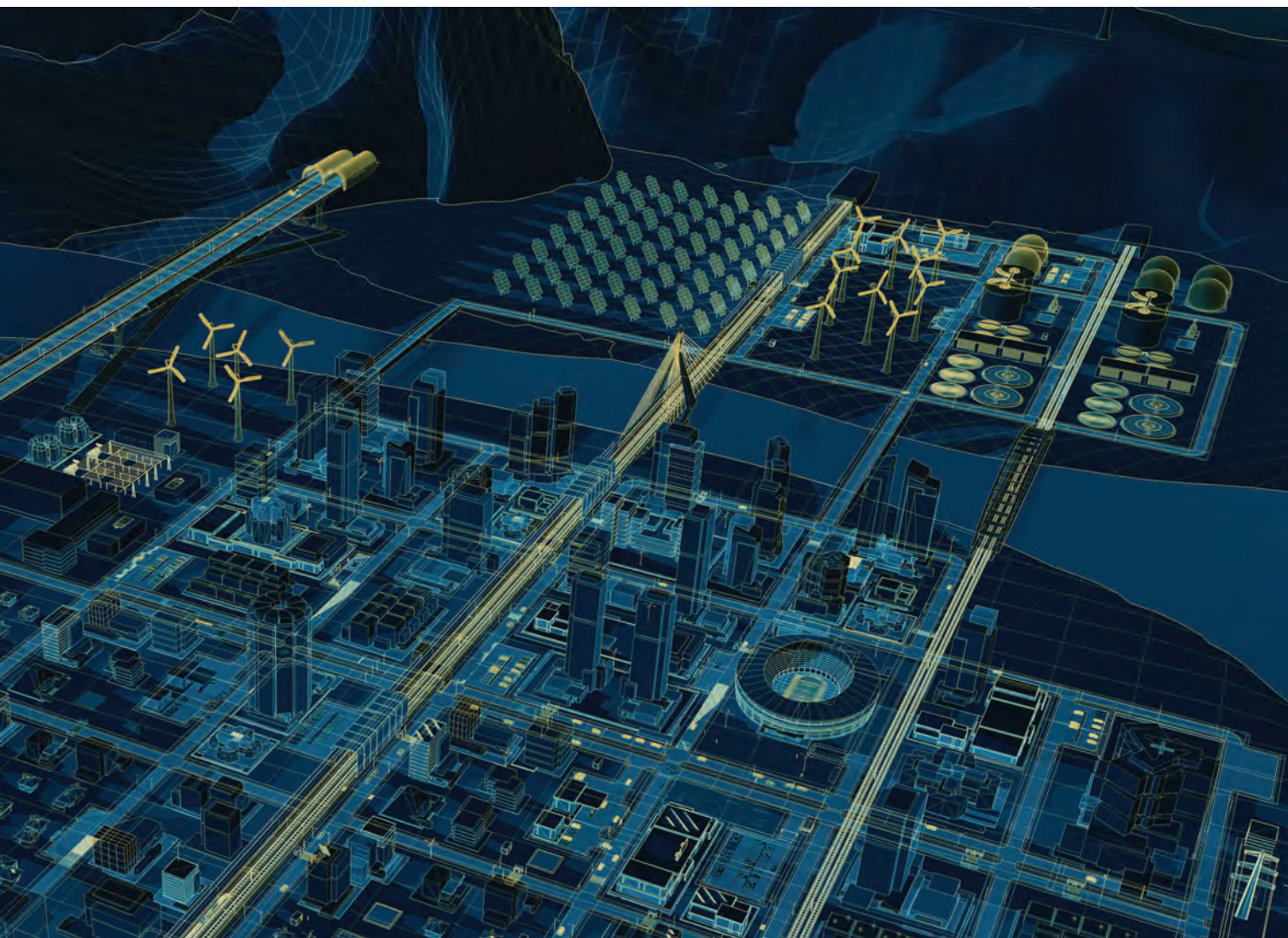
We are the largest Portuguese industrial company in the electrical and electromechanical sector, developing products, solutions and high technology systems that are part of the daily lives of millions of people. A strong technological capability, supports our activity in a culture of innovation, research and development.

Investment in the international market and the continuous investment in innovation and new technologies, have ensured for the company a strong and sustained position.

These factors are the basis for sustainable growth and the development of Efacec.

We develop the most advanced technologies based on competence, quality and entrepreneurship.

With an established presence in more than 60 countries, and utilising technology, 90% of which is our own, Efacec is today an internationally recognised company.



SERVICE

The Efacec Service unit has a team of more than 150 employees and a permanent presence in Portugal, Spain, Angola, Mozambique and Algeria.

The accumulated experience and competence allows us to provide services with the highest quality standards, certified according to ISO 9001: 2008, ISO 14001: 2004 and OHSAS 18001: 2007, ensuring adequate solutions to customers' needs in:

- Industrial facilities
- Hydroelectric plants
- Thermoelectric power plants
- Small hydro power plants
- Co-generation plants
- Wind farms
- Substations
- Transformation stations

ON SITE AND IN FACTORY

We conduct inspection, testing, diagnostics, maintenance, repair and commissioning of work, in:

- AC & DC Motors
- LV & MV Motors
- Alternators
- Wind generators
- Excitation, command, control and protection systems for motors and alternators
- Distribution Transformers
- Transformation stations
- Power transformers
- MV and HV circuit breakers
- MV and HV disconnectors
- MV Switches
- MV/LV electrical switchboards
- Protection Relays



TRANSFORMERS

Power and Distribution

POWER TRANSFORMERS

Commissioning

- Assembly of accessories
- Oil and filler treatment
- Electrical tests on active part and oil
- Activation Assistance

Improvement and repair (on-site and in factory)

- Replacement or enhancement of accessories
- Replacement of active part components (winding, magnetic circuit, on and off voltage regulators)
- Drying of the active part
- Treatment or replacement of oil
- Exterior painting
- Pre-and post-intervention tests

Inspection / Revision of Load Regulators (on-site and in factory)

Passivation and Regeneration of Oil

Transformers Maintenance Management (multi-year contracts)

Design / Installation of Monitoring Systems

- Online monitoring of various transformer parameters, including temperatures and gases dissolved in the oil and monitoring of crossings
- Transformer performance analysis

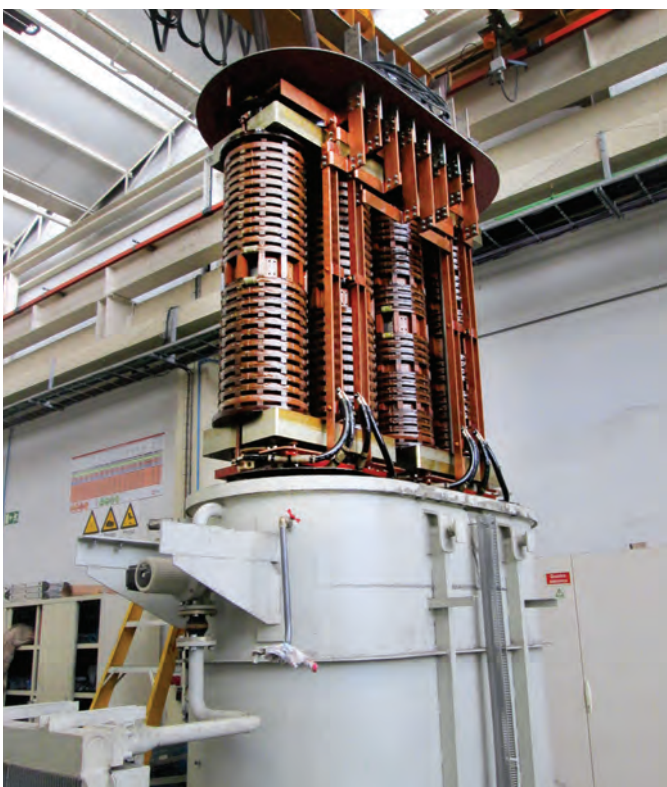
On-site Diagnostic Tests

- Measurement of insulation resistance
- Measurement of transformation ratio
- Measurement of ohmic resistance
- Dynamic switching resistance measurement
- Capacity and delta tangent measurement (dielectric losses)
- Dielectric Frequency Response Measurement (FDS)
- Excitation current measurement
- Short-circuit impedance measurement
- Verification of the auxiliary circuits of control and protection of the transformers
- Collection of oil samples for testing in the Efacec laboratory:
 - Physical-chemical
 - Dissolved gas analysis (DGA)
 - Detection and quantification of PCBs / chlorine content
 - Determination of the amount of furan compounds
 - Passivator content (when applicable)
 - Corrosive sulphur detection
 - Particle Content
 - Frequency response analysis (FRA)

DISTRIBUTION TRANSFORMERS

Distribution Transformers Improvement and Repair

- Replacement or enhancement of accessories
- Rewinding
- Repair and supply of vats and lids
- Treatment of dielectric oil
- Tests





SWITCHGEAR

High and Medium Voltage

Commissioning of MV/HV Equipment

- Assembly
- Tests
- Activation Assistance

Revamping of LV/MV/HV Facilities and Equipment

- Replacement of circuit breakers and disconnectors
- Replacement of transformers
- Replacement of protections
- Replacement of LV and MV switchgears
- Turnkey solutions

MV/HV Equipment Repair and Improvement

- MV/HV circuit breakers
- MV/HV disconnectors
- LV and MV switchgears



FACILITIES MAINTENANCE

and Asset Management

Multiannual and Multi-disciplinary Maintenance Contracts

- Maintenance of electrical substations
- Maintenance of wind farms
- Maintenance of industrial facilities
- Maintenance of transformation stations

Maintenance Management of LV/MV/HV Electrical Installations

- Predictive maintenance
- Preventive maintenance
- Corrective Maintenance

Inspection with Multicopters (drones)

- Visual inspection to detect the condition of the equipment in service
- Visual inspection to detect the physical state of structures
- Thermographic inspection for detection of hot spots

Expertise, Counseling and Training

- Diagnosis of failure of electrical power systems equipment
- Forensic analysis of defects
- Advice of technical solutions adapted to the needs of customers
- Selectivity studies
- Test and parameterization of protection relays
- Technical training





ROTATING MACHINES

Repair/Maintenance of LV, MV Electric Motors and Alternators

- Manufacture of coils in ResinRich or VPI system
- Low and medium voltage winding
- Repair and/or execution of rotor coils of synchronous machines
- Repair/replacement of magnetic circuits
- Repair or manufacture of rotor cages
- Collectors for AC and DC electric motors
- Repairing/replacing brushes and brush holders
- Repair of shafts
- Dynamic balancing

Design and Development of Protection and Control Systems for Motors and Alternators

- Design, installation and testing of winding rotor motor starters
- Design/installation of voltage regulators
- Design/installation of excitation systems for synchronous machines

Maintenance Management of Motors and Alternators at Facilities (Multi-Annual Contracts)

On-site and Laboratory Electrical Testing

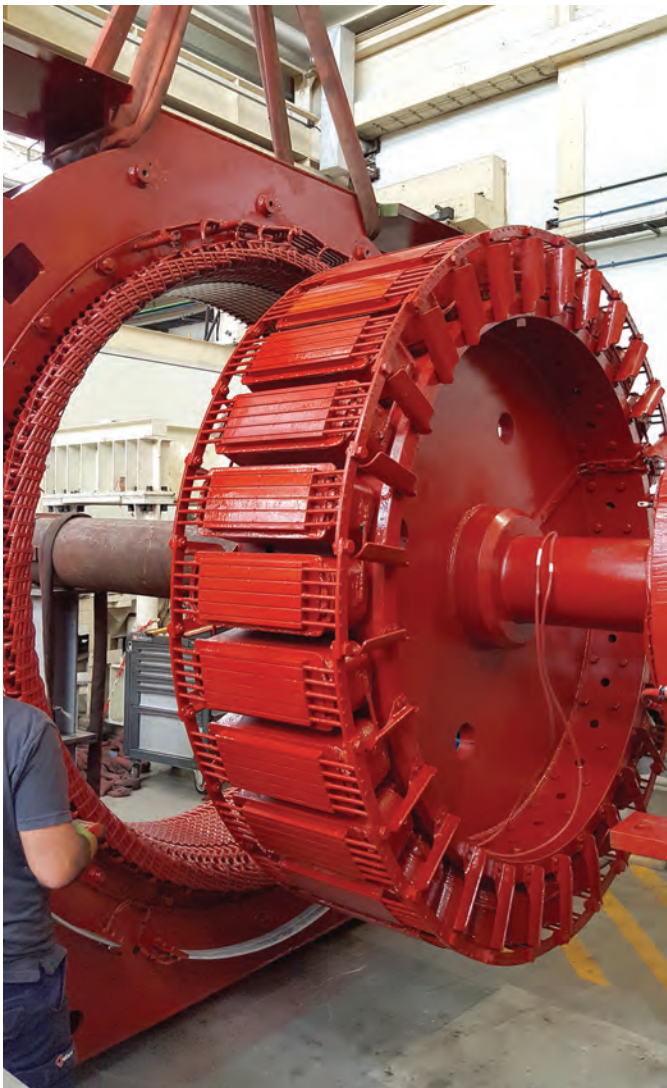
- Insulation resistance
- Absorption and polarization coefficients
- Ohmic resistance
- Inductance
- Capacity
- Magnetization
- AC and DC dielectric strength
- Tangent delta and off-line partial discharges
- Current leakage
- Shock wave

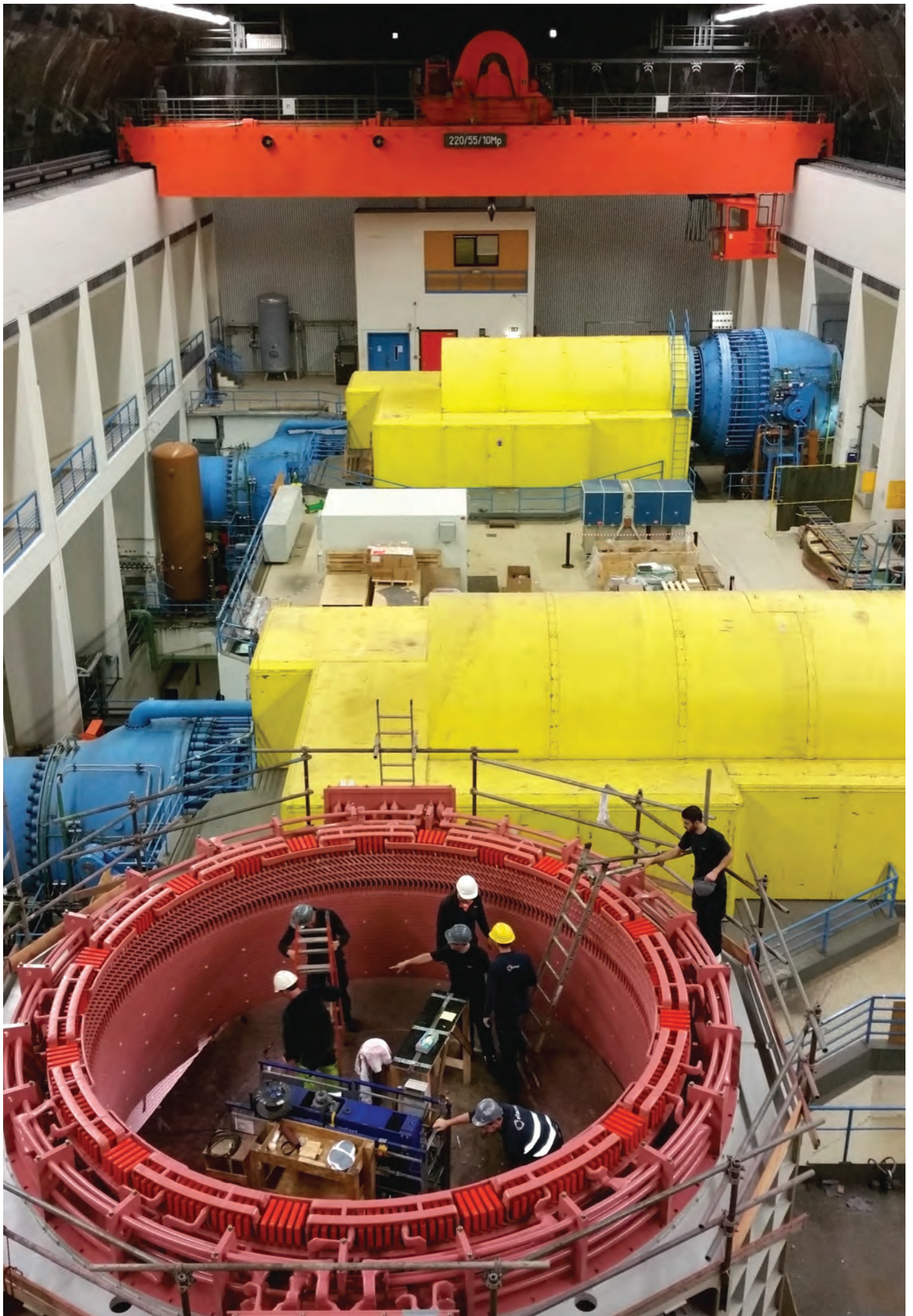
On-Site Mechanical Analysis

- Measurement of vibrations
- ODS Analysis - Operating Deflection Shape
- Balancing
- Alignments (Laser)

Insulation Condition Test of Rotating Machine Windings (EDA III)

Thermographic Inspection





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