Product Catalogue

Low Losses Transformers

Energizing the Middle East

Tesar

A company of R&S

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Sustainability

LOW LOSS TRANSFORMERS FOR GREEN ENERGY

Tesar in the Middle East

Tesar, a leading manufacturer of cast resin transformers

Has a long history in the Middle East markets. Outstanding support is one of the many reasons customers choose Tesar in the past. To increase Tesar's ability to respond to growing customer needs, a localized office has been opened 2007 to provide greater responsiveness to valued customers.

Out of the office in Dubai Tesar customers can expect:

- Sales support
- Technical support
- On-site services
- Testing services

For specific service Tesar has their own facility in Al Ain and is also equipped with a test lab fully certified by ADWEA.

Tesar Gulf
Level 3, Spacebox, Tesar
Convention Tower,
Trade Centre
Dubai, UAE
tesargulf@tesar.eu
www.tesar.eu

The Tesar office in Dubai

Energy

Tesar transforms the Wind, the Sun and the Water in renewable Energy

After the Kyoto Protocol, the EU focused on an ambitious goal: the so-called climate energy package 20-20-20 in 2021 EU decided the new target for 2030, that is briefly to reduce the greenhouse gas emission by 40%. To rise up to 32% the energy produced by renewable sources and to finally reach the target 32.5% to get energy savings: all within 2030.

In the transformer field, the reduction of losses involves major benefits for the environment, linked to lower greenhouse gas emissions.

Based on this simple assumption, the European Commission published new directive 548/2014, and imposing Ecodesign Transformer to which all European manufacturers must comply.

The new directive has been applied in two steps, the first has been in force July 2015 to June 2021, and the second just started in July 2021. According to a study by the European Commission, it is estimated that more than 2.5% of all the energy consumed by EU countries is wasted through transformer losses.

The target is an ambitious goal: to decrease the total yearly losses per year the transformers installed by 3.7 MT of gas emissions per year, within 2025. As a consequence, Tesar aims to always supply a sustainable transformer to fully comply with Ecodesign regulations. It is to keep in mind, from an economical view point, that the standard definition of the life cycle cost of a product is the sum of its purchase price and operating costs over its lifetime.

Energy saving transformers by Tesar

40 %
Co2 Emissions
vs 1990

+

32 %
greater use of
renewable energies

+

32,5 %
use of primary energies
vs BAU*

Within the year

2030

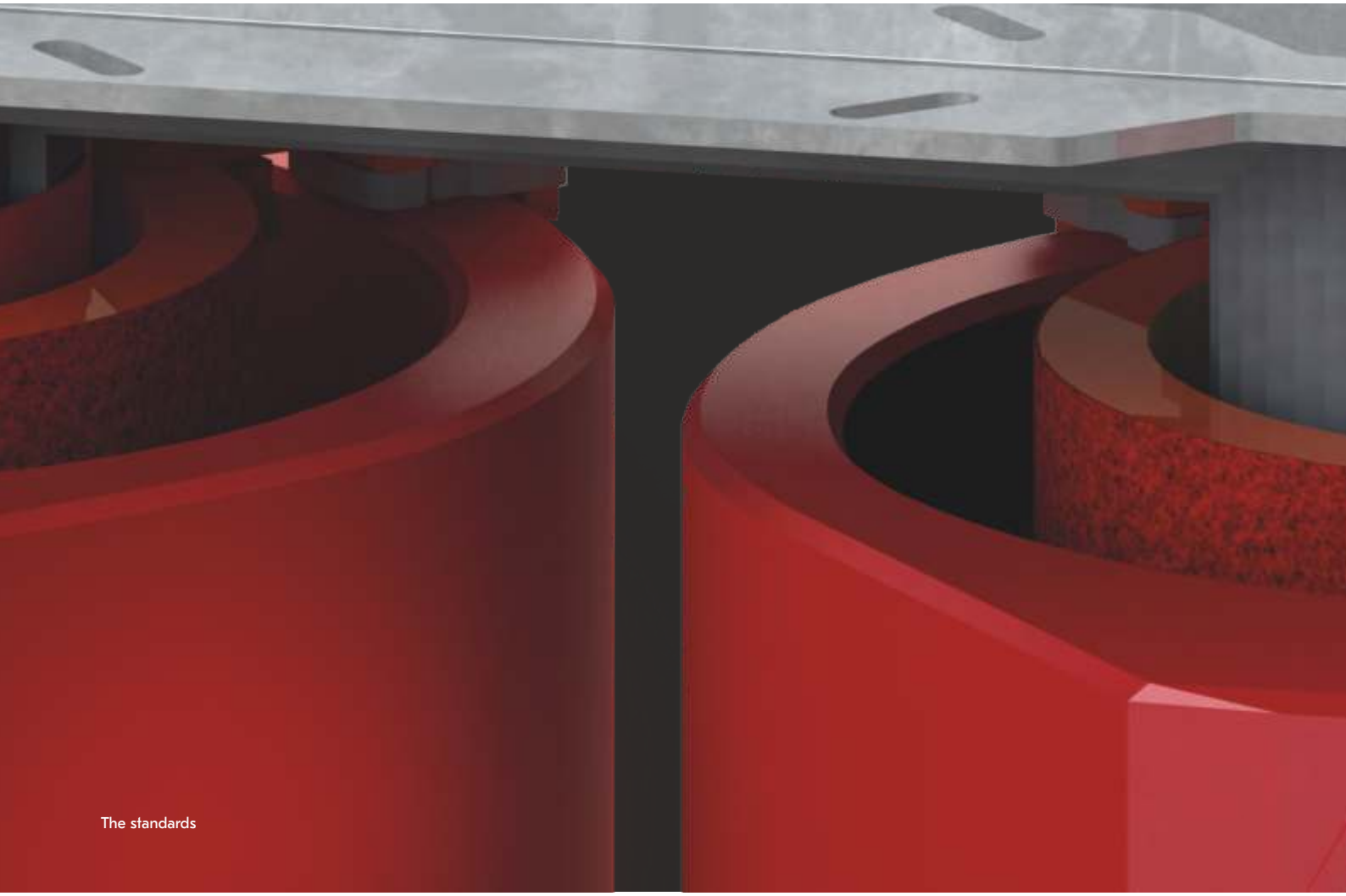
*Business-As-Usual

The Standards
State of the Art

Tesar transformers are above average

During the years, a lot of standards have taken care of the efficiency level of dry type transformers: from HD 538 (in 1997); in 2004 it published the international standard IEC 60076-11, which represented the first real guide for dry type transformers, and contains, amongst others, the milestone pertinent to climatic, ambient and fire classes (E-C-F).

Now, since July 2019, the "new" IEC 60076-11:2018-10 is the last international standard to be followed for designing cast resin transformers.
It is replacing the previous revision extending his rules up to a maximum rated insulation level of 72.5 kV.



The standards

Our Proposal
Italian quality

Tesar transformers for different needs

Ecodesign transformers

The transformer is fulfilling the Ecodesign Directive of EU and EN 50588-1. The transformer allows a reduction in energy consumption and as a consequence a reduction in greenhouse emissions. This is our Top Model.

Advanced transformer

Developed thanks to 35 years of Tesar experience in the field of cast resin transformers. It's able to be installed in every site and location without any limitation. The transformer can be customized to the client's specific requirements.

Traction converter transformer

From 6 pulse to 24 pulse designable for all load-duty classes. Suitable for railways, metro, tramway and other electrical vehicles.

Basic transformer

This transformer, with a maximum rated power of 2500kVA, has its strength point in its lighter weight, if compared to the advanced model, of the same characteristics. Thanks to these features, it represents the best compromise where restriction or limitation of weight and dimensions are required.

Rectifier transformer

This transformer can be 6 pulse, 12 pulse, 18 pulse and 24 pulse up to 20 MVA.
Suitable for any industrial application.

PV inverter transformer

Inverter transformers suitable for any photovoltaic application.

Different variations available

Certified Quality
with an impressive portfolio

Big difference in the quality of manufacturing, control and outcome

Tesar is proud to claim fully approved CESI Laboratory and an impressive portfolio of routine, type and special tests, following the IEC standards in force or by other methods agreed with the client.

The Tesar instruments are always monitored and kept fully calibrated. Calibration certificates available upon request. Tesar is qualified to ISO 9001, ISO 14001, ISO 45001 standards.

Certified to the latest standards

E-C-F Classes

Tesar cast resin transformers in all climates

IEC 60067-11 imposed the transformers to be certified for environmental, climatic and fire classes. Tesar, one of the very first worldwide, to pass all off the classes, in 2004, E2-C2-F1.
Now, since July 2019, the "new" IED 60076-11:2018-10 is the last international standard to be followed for the designing of cast resin transformers.
New more strict rules have been introduced adding further environmental and climatic classes. So, Teras obtained the certification E4-C3-F1

Environmental Class E

- E2: Frequent condensation or light pollution or combination of both
- E3: Frequent condensation or medium pollution or combination of both
- E4: Frequent condensation or heavy pollution or combination of both

Climatic Class C

- C1: the transformer is suitable for operation at ambient temperature not below -5°C, but may be exposed during transport and storage to ambient temperatures down to -25°C
- C2: the transformer is suitable for operation, transport and storage to ambient temperatures down to -25°C
- C3: the transformer is suitable for transport and storage at -40°C and operation -25°C
  Note: Tesar has decided to test in house the transformer at -50°C, proving it to be suitable for extreme climate.

Fire behavior Class F

- F1: Transformer is subject to a fire hazard. Restricted flammability is required. The emission of toxic substances and opaque smoke shall be minimized.

Tesar transformer during climate test

Beyond the standards

Innovative, efficient and confident

Beyond F1 test

Studying and testing the behavior of a transformer after the F1 (Fire) test, the result was positive: after a fire event, a Tesar transformer is in a condition to run without any problems.

Electromagnetic analysis

The level of electromagnetic emission of electrical equipment must be kept under control in respect of the limit imposed by law and above all the health of the people working or living in the surrounding area of the equipment. Tesar transformers not only fulfill the limit of 10 μT imposed by the DPCM regulation of 08.07.2003.

But the intensity of magnetic field can be additionally reduced by equipping the transformer with a metal enclosure.

Tesar

ATTACHED TO THE TEST CERTIFICATE

2013.02.0063-001	1000
50	Dyn11
11000 / 415	(+2) (-2) x 2.5%

N°	Description	Result
1	INDUCE VOLTAGE TEST AT 80% OF RATED VOLTAGE (50Hz - 100Hz - 60s)	POSITIVE
2	SEPARATE SOURCE VOLTAGE TEST ON HV SIDE AT 80% OF RATED VOLTAGE (21.4kV - 50Hz - 60s)	POSITIVE
3	SEPARATE SOURCE VOLTAGE TEST ON LV SIDE AT 80% OF RATED VOLTAGE (1.4kV - 50Hz - 60s)	POSITIVE
4	MEASUREMENT OF VOLTAGE RATIO AND CHECK OF PHASE DISPLACEMENT	POSITIVE
5	PARTIAL DISCHARGE MEASUREMENT (LESS THAN 10μC)	POSITIVE

ATTACHED PICTURES

Date 07/04/2014

TESAR s.r.l. Arsoli Italy (Tel. +39 0775 3171.1 Fax +39 317391)

Fire behaviour

A world of reliability

Over 100.000 installations

Tesar stands for innovation and first-rate quality since 1979

More than 100.000 units running worldwide: this is the business card of Tesar. Since 1979, Tesar is in the market with its own Design, Quality and R&D, improving continuously. In 1983 Tesar was the first to study and test the fire condition behavior.

In 2004 Tesar was one of the very first manufacturers worldwide to reach E2-C2-F1 qualification (Environmental, Climatic and Fire test) and in 2013 E3 condition for transformer installations in windmills.

In 2021, according to IEC 60076-11:2018-10, Tesar reached a new prestigious goal, obtaining, thanks to its continuous research and development, the qualification for E4-C3-F1.

Our cast resin transformers

Emirates Towers, Sheikh Zayed Road Dubai - UAE

Sheikh Zayed Grand Mosque, Abu Dhabi - UAE

New Muscat International Airport, Muscat - Oman

History of Tesar in Gulf Countries

More than 30 years of experience in GCC

Tesar, since 1985, started to study the best solutions according to technical specifications of the main utilities in Middle East.

Thanks to the continuous analysis, development and strict collaboration with the main GCC utilities (M/s DEWA, M/s ADWEA/ADDC, M/s Kahramaa, M/s MEW, M/s SEC, M/s DCRP, M/s EWA/EDD, M/s FEWA, M/s EMPOWER, M/s AADC, and so on...) Tesar, nowadays, has a leadership position in the electricity sector in the Middle East.

Burj Khalifa, Dubai - UAE

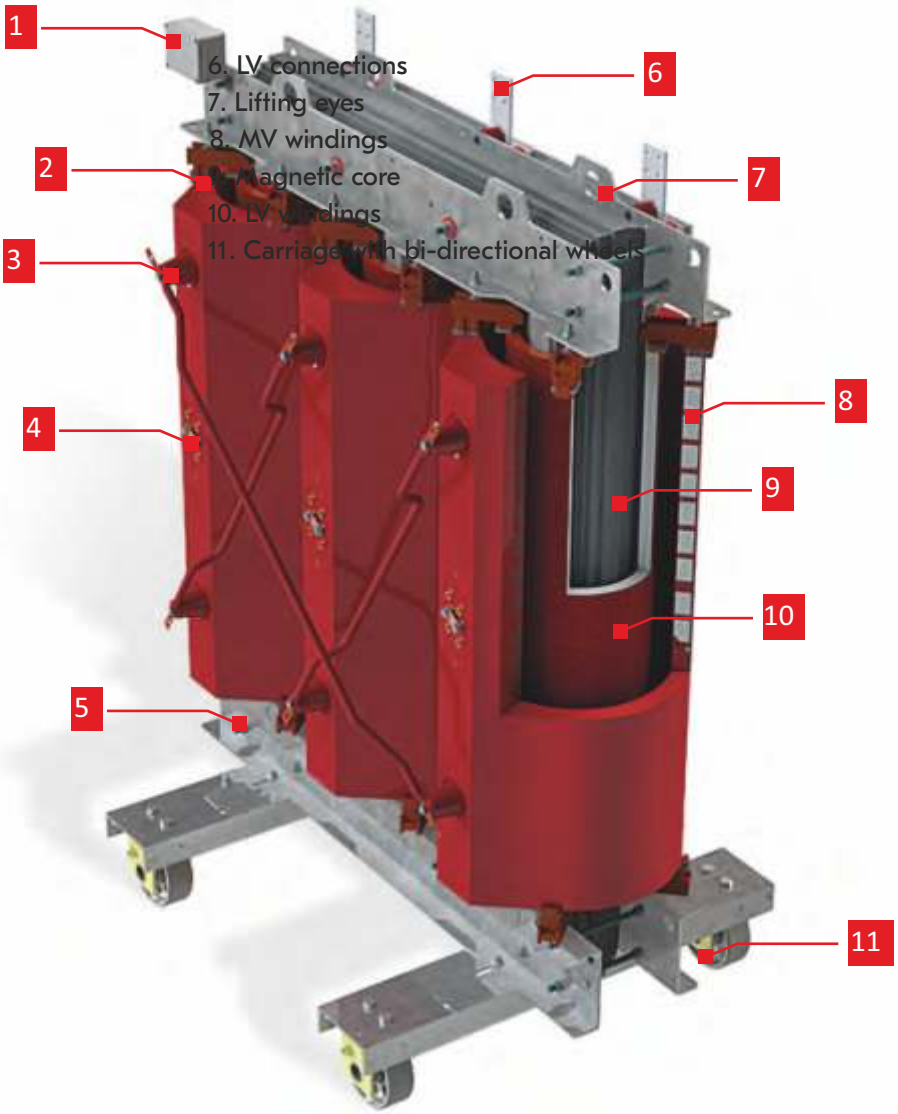
Yas Marina F1 circuit, Yas Island Abu Dhabi

Al Bayt Stadium, Doha - Qatar

Description and Characteristics

Description and characteristics

1. Auxiliary terminal box
2. PT 100 or PTC Sensors in LV windings
3. MV connections
4. MV tap changer
5. Magnetic core frame
6. LV connections
7. Lifting eyes
8. MV windings
9. Magnetic core
10. LV windings
11. Carriage with bi-directional wheels



Metal Enclosures
For maximum protection

Metal enclosures

Provides protection against solid objects and liquids and prevents personnel from entering into direct contact with live parts. Fully custom designed and made to any kind of installation.

General characteristics

- Sendzimir steel sheet
- Colour RAL 7032
- Openings for HV/LV cable entry from top or bottom
- Transformer-mounted or floor-mounted

Optional accessories

- HV/LV cable boxes with or without cable gland plates/glands
- Auxiliary connection box
- AREL mechanical interlocks
- Cable supports
- Bar work to meet bus-duct, if any

Metal Enclosures

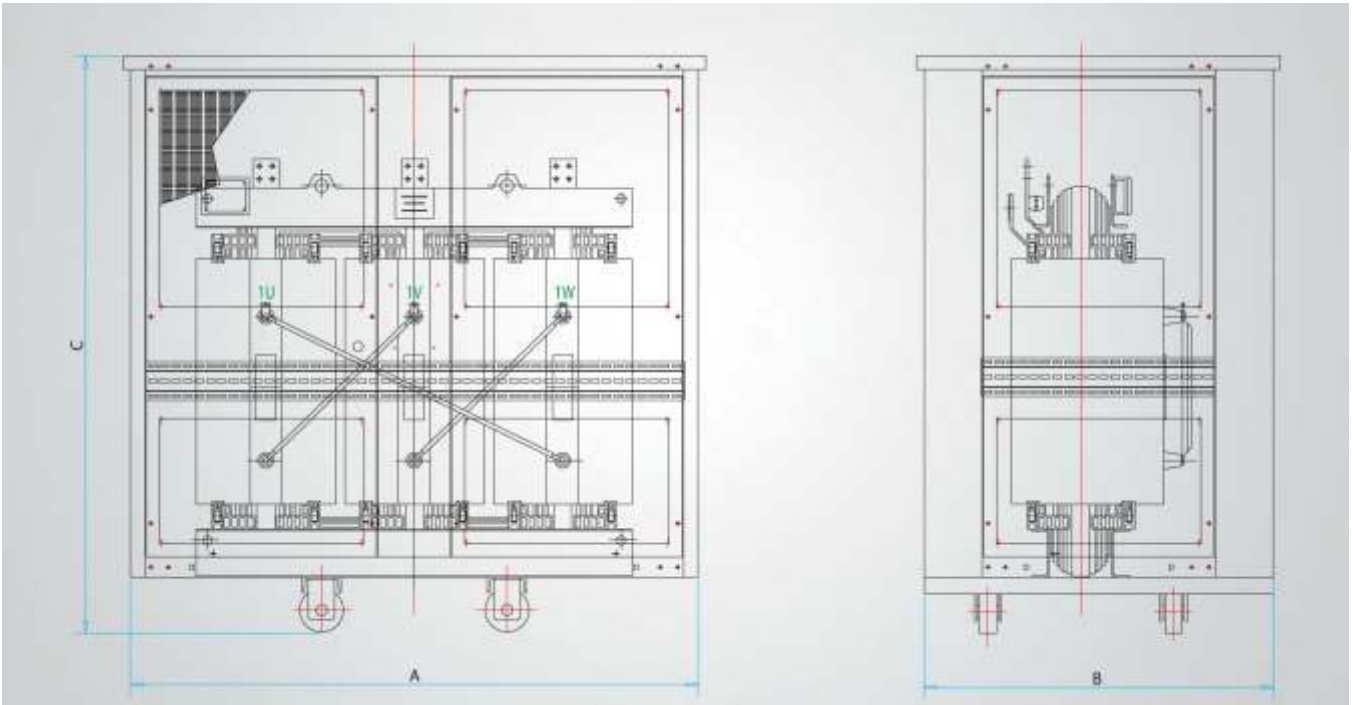
Protection Degree	Solid Objects	Liquids	Installation
IP21	Protection against solid bodies 12 mm	Protection against vertically falling drops of water	Indoor
IP31	Protection against solid bodies 2.5 mm	Protection against vertically falling drops of water	Indoor
IP23	Protection against solid bodies 12 mm	Protected against direct sprays of water up to 60° from the vertical	Indoor/Outdoor
IP33	Protection against solid bodies 2.5 mm	Protected against direct sprays of water up to 60° from the vertical	Indoor/Outdoor

On request, Tesar may design suitable enclosures with degree of protection up to IP54

Overall Dimensions

Type	A	B	C	Weight
	mm	mm	mm	kg
25	1800	1200	1760	245
28	2000	1200	2020	280
38	2200	1200	2100	350
40	2200	1200	2350	400
50	2500	1350	2500	500
55	2500	1350	2500	550
60	2700	1550	2500	600
61	2700	1550	2650	650
70	3000	1550	3000	850
90	3300	1850	3000	1050

The enclosure can be supplied assembled on transformer or in a separate kit



Metal Enclosure Drawing

Our Accessories

To equip the transformer exactly as needed

Different environments and applications have different needs. For that reason, Tesar offers a wide range of accessories — to always have the perfect solution for our customers.

TSX1s and/or TTC Temperature Control Device

Electronic unit for temperature control of cast resin transformers.

- Nos. 4 analog input channels for windings and magnetic core temperature monitoring
- Nos. 4 output relays (Fans, Alarm, Trip and Generic Alarm)

Temperature is monitored through PT100 Ω. TSX1s and TTC temperature thresholds are fully adjustable. TSX1s and TTC are provided with RS485 serial port — RTU MODBUS protocol or ethernet.

TSX3 Temperature Control Device

Electronic unit for temperature control of cast resin transformers.

- Nos. 4 analog input channels for endings and magnetic core temperature monitoring.
- Nos. 4 output relays (Fans, Alarm, Trip and Generic Alarm)

Temperature is monitored through PTC.

TSX6s and/or TTF Fan Protection Device

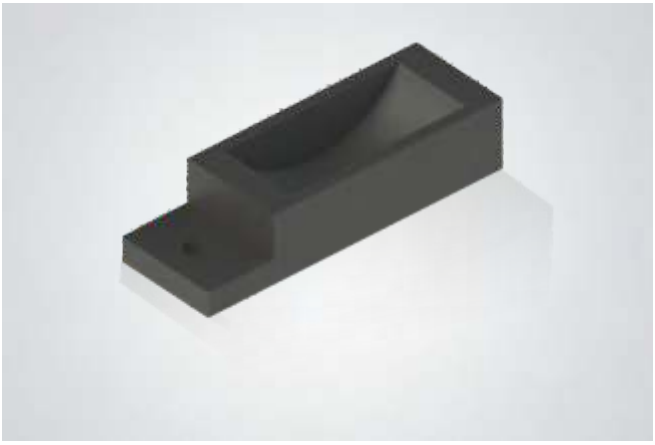
Electronic unit for protection and control of ventilation system.

- Nos. 2 digital inputs for ventilation system enabling
- Nos. 2 output signals for fans malfunctioning
- Nos.6 power supplies equipped with magnetic-thermal relay

Through the TSX6s and/or TTF relay, ventilation fans are constantly monitored and protected.

PT 100 Ω and PTC sensors

Provides real-time temperature monitoring. One PT 100 Ω sensor is installed in each LV winding. An additional Pt 100 Ω sensor can be installed to monitor magnetic core temperature. Two PTC's are installed on each LV winding, signaling when specific alarm and trip temperature thresholds are reached. Temperature sensors are wired to an auxiliary box installed on transformer metal frame.



Antivibration pads

Anti-vibration pads are smart and compact solution, reducing vibration and the noise level of transformer. They prevent transformer vibrations from being transmitted to the surrounding environment.

Ventilation Bars

The air forced fan cooling system reduces transformer operating temperature and allows for temporary or continuously rated transformer power increase. The ventilation system, comprised of two fan bars each with three motors, can increase transformer rated power by up to 140%.

MV surge arresters

The primary protection against atmospheric and switching over voltages. A convenient and reliable solution to extend transformer lifetime. Highly recommended for installation where high lightning strike activity is foreseen.

Main Features

Low operation costs

The low losses in the magnetic core and in the windings reduce the costs of operation.

Frames

Hot deep galvanized frames assure the best performance in a polluted environment.

High reliability

The high technology employed in the manufacturing process of windings gives the product a high level of reliability.

Maximum safety

The resin and insulating materials employed in the design and construction of Tesar transformers guarantee a high level of self-extinguishing characteristics and low emission of toxic gases.

No need for maintenance

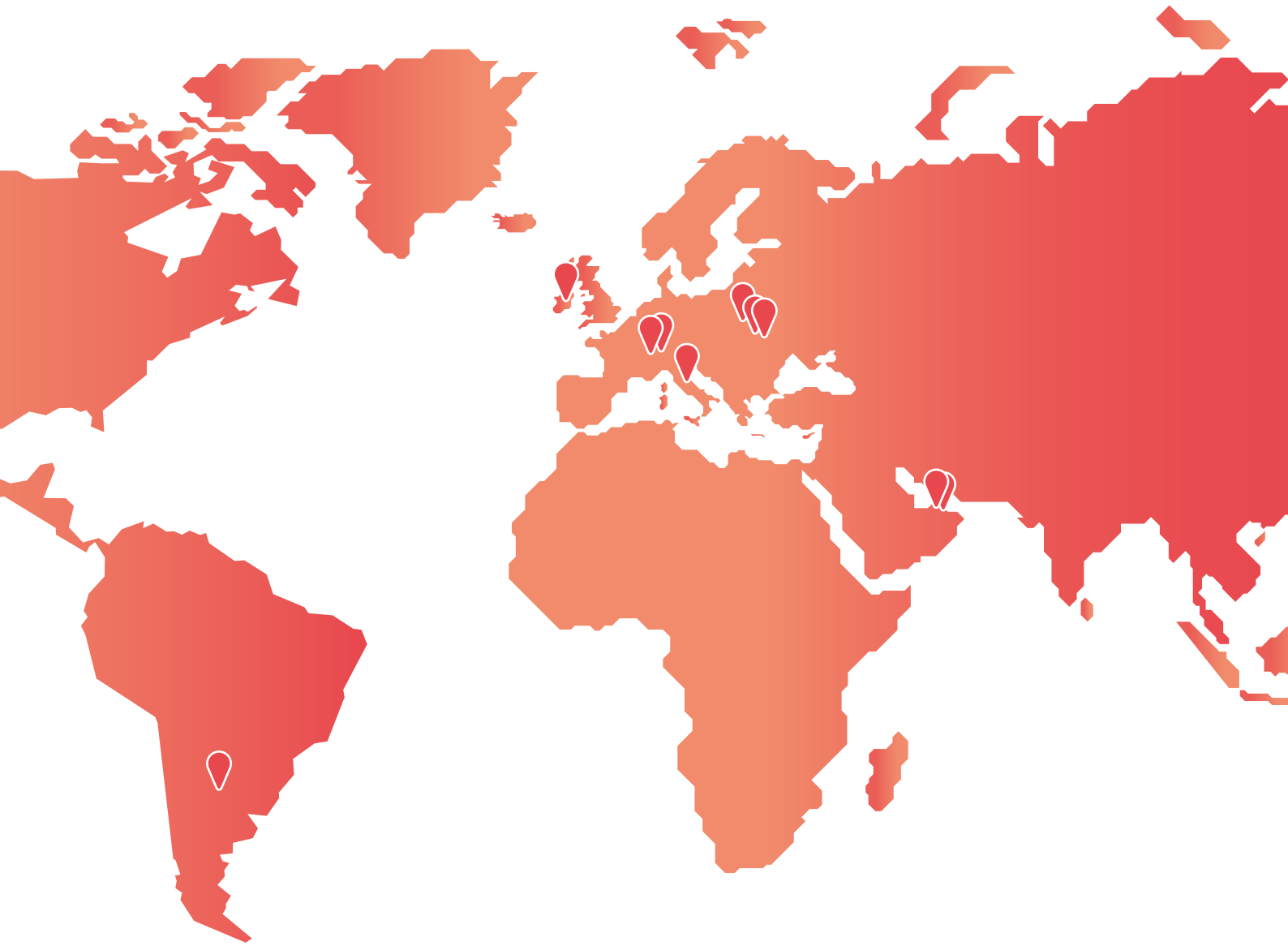
Tesar cast resin transformers are designed in such a way as to withstand the worst climatic and environmental conditions. Preventive maintenance consists of a simple visual check.

No need for maintenance

Katara Hotel, Doha - Qatar

Oman Convention and Exhibition Center, Muscat - Oman

Highest Quality



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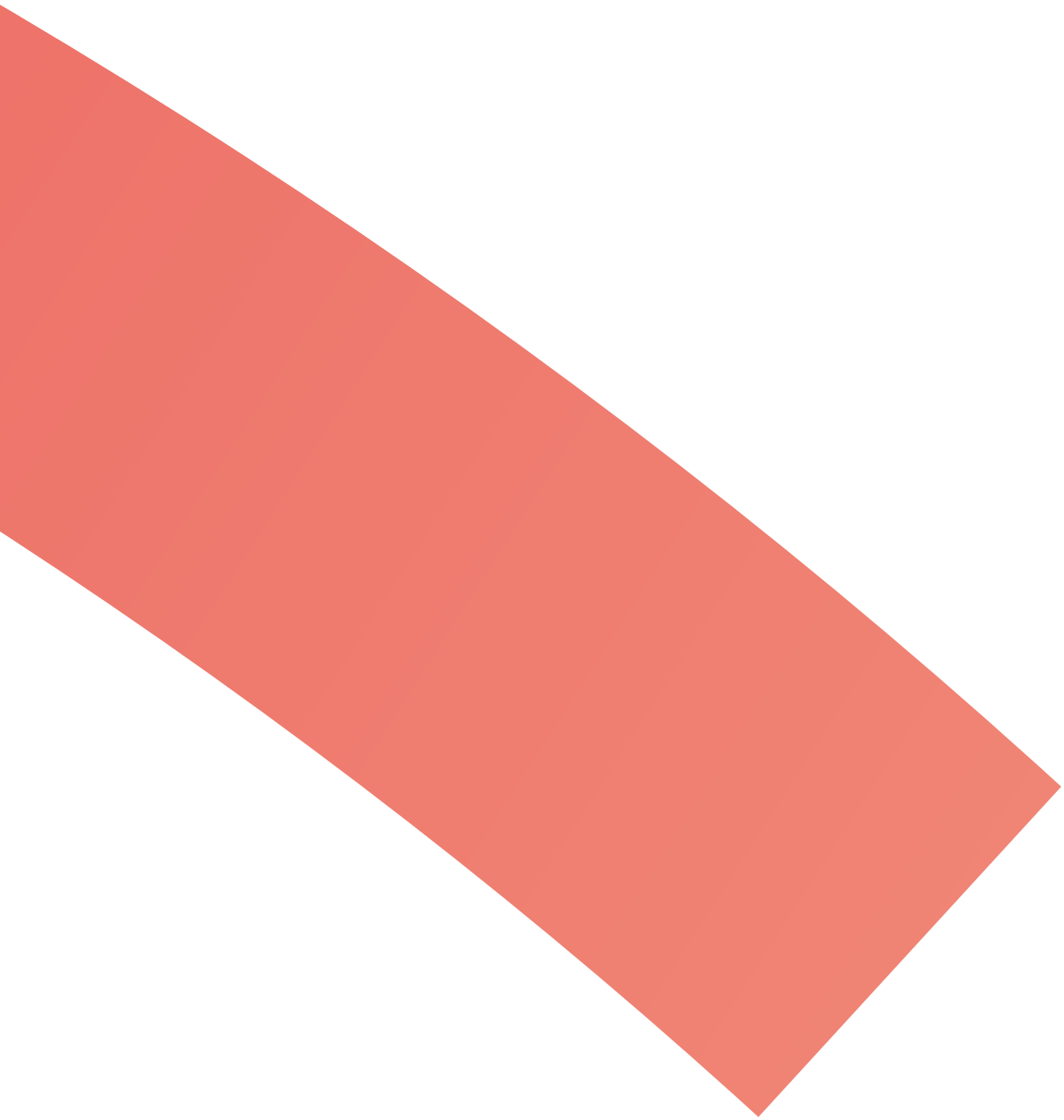

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