ESTA TRANSFORMERS

CORPORATE & TECHNICAL CATALOGUE / 2026

ENGINEERED FOR THE APPLICATION.

Custom transformer solutions up to 10 MVA / 36 kV

POWER / SPECIAL / DRY-TYPE / OIL-FILLED

OUR POSITION

NOT A CATALOGUE SUPPLIER.

AN ENGINEERING PARTNER.

We design, manufacture and re-engineer transformer solutions around real operating conditions, technical requirements and long-term performance expectations.

01 APPLICATION-SPECIFIC DESIGN

02 CONTROLLED MANUFACTURING

03 TRACEABLE VALIDATION

ABOUT ESTA

ENGINEERING BEFORE MANUFACTURING.

ESTA Transformer specializes in medium and low voltage power transformers, backed by production experience and engineering infrastructure.

ENGINEERING EVALUATION

- Load and harmonic assessments
- Thermal modeling
- Short-circuit strength validation
- Electromagnetic force calculations
- Site condition optimization

LONG-TERM PERSPECTIVE

Energy infrastructure represents a long-term investment. ESTA prioritizes low-loss performance, high efficiency, durable materials and extended service life.

DESIGNED TO PERFORM.

TECHNICAL CAPABILITY SNAPSHOT

DESIGNED AROUND THE OPERATING CASE.

10	36	02	100%
MVA	kV	TYPES	ETO
Power rating	Voltage level	Dry-type & oil-filled	Engineered-to-order

INTEGRATED CAPABILITY

DESIGN TO VALIDATION.

- Transformer design and engineering
- Winding and magnetic systems manufacturing
- Core manufacturing and assembly
- Testing, validation and documentation

CATALOGUE MAP / 01

CONTENTS

Nine sectors. Fifty-three detailed transformer product pages.

CATALOGUE MAP / 02

CONTENTS

Nine sectors. Fifty-three detailed transformer product pages.

ENGINEERING LIFECYCLE

FROM REQUIREMENT TO TRACEABLE DELIVERY.

01

REQUIREMENT

Duty profile, environment, constraints and standards.

02

ENGINEERING

Electrical, magnetic, thermal and mechanical design.

03

MANUFACTURING

Controlled winding, core assembly and integration.

04

VALIDATION

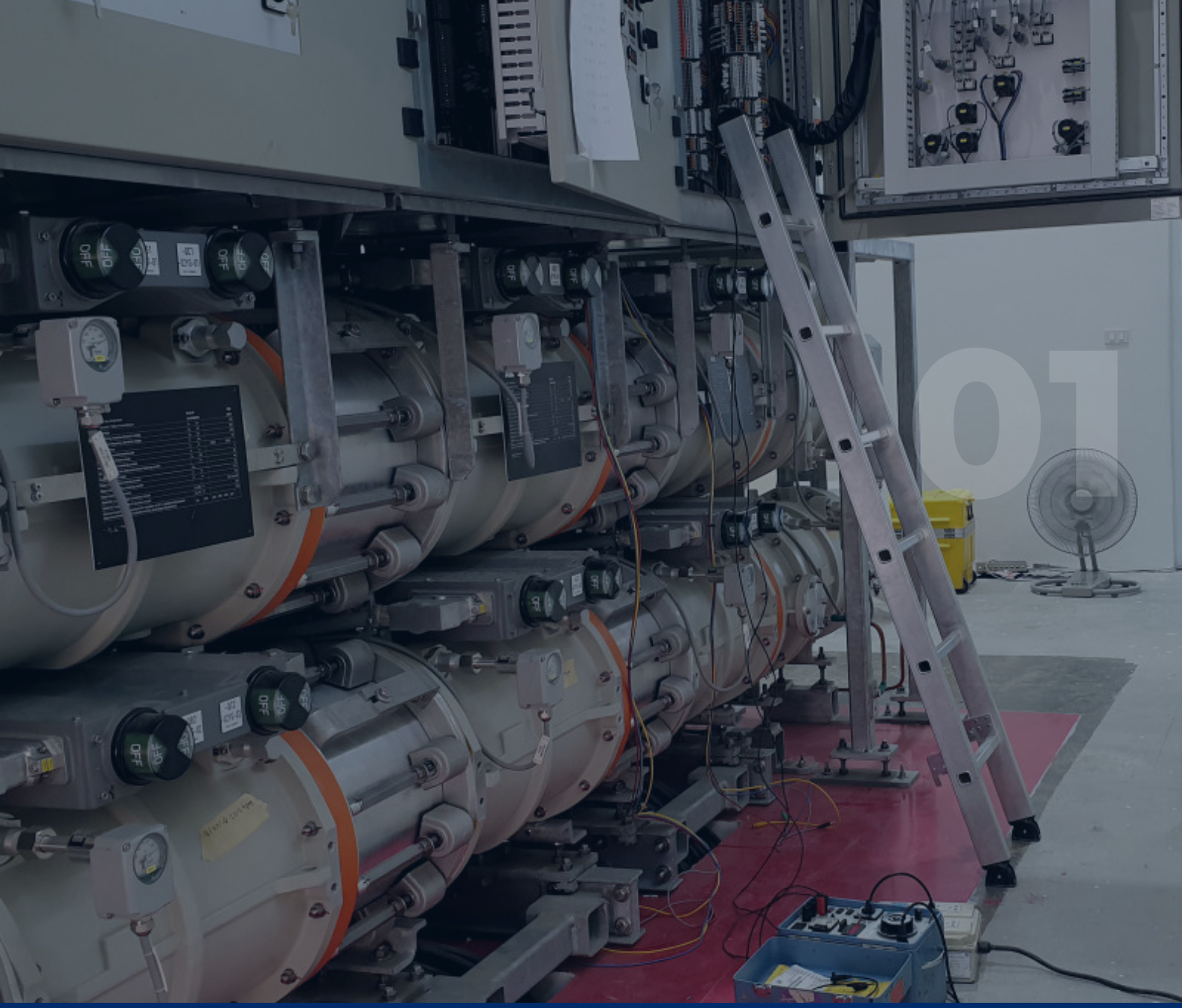
Routine tests, FAT and project-specific verification.

05

DOCUMENTATION

Test reports, technical files and traceability records.

Project-specific and special tests are performed at independent, internationally accredited testing laboratories.



SECTOR 01

MARINE & OFFSHORE TRANSFORMERS

ESTA Transformer designs and manufactures transformer solutions for marine and offshore applications using a fully engineered-to-order approach, rather than catalogue-based products.

Power rating: Up to 10 MVA

Voltage level: Up to 36 kV

Cooling: AN / AF / ONAN

SECTOR 01 / OVERVIEW

MARINE & OFFSHORE

ESTA Transformer designs and manufactures transformer solutions for marine and offshore applications using a fully engineered-to-order approach, rather than catalogue-based products. Marine and offshore environments impose demanding conditions such as high humidity, salt-laden atmosphere, continuous vibration, restricted installation space, and uninterrupted operation requirements. These conditions require a dedicated engineering discipline that goes beyond conventional...

APPLICATION AREAS

- Tugboats and workboats
- Cargo and container vessels
- Offshore oil & gas platforms
- FPSO / FSO units
- Offshore substations
- Marine auxiliary power systems

ENGINEERING FOCUS

- High vibration and shock resistance
- Enhanced insulation systems for humid and saline environments
- Low noise and vibration performance
- Compact layouts for restricted installation areas
- Easy access for inspection and maintenance

APPLICABLE FRAMEWORK

- IEC 60076 - Power Transformers
- IEC 60092 - Electrical installations on ships
- IEC 60529 - IP protection classes
- ISO 12944 - C5-M / C5-H corrosion protection

DETAILED PRODUCT PROFILES

06 PRODUCTS

MARINE & OFFSHORE / PRODUCT 01 OF 06

DECK MOUNTED & HARSH ENVIRONMENT TRANSFORMERS

Heavy-Duty Power Solutions for Exposed Marine and Offshore Installations

In marine and offshore projects, certain transformers are not installed in protected engine rooms but are directly exposed to open deck conditions and aggressive environmental factors. Standard marine designs are not sufficient for such applications.

ELECTRICAL SCOPE

POWER RANGE

100 kVA - 20 MVA

VOLTAGE LEVELS

400 V - 36 kV

FREQUENCY

50 Hz / 60 Hz

COOLING METHODS

ONAN / ONAF / Dry-type options

CUSTOM ENCLOSURE DESIGN AVAILABLE

Fully engineered-to-order configurations.

APPLICATIONS

- Open deck power distribution systems
- Offshore platform outdoor installations
- Marine modular energy systems
- Offshore wind platform connections
- Heavy-duty marine industrial equipment

ENGINEERED FEATURES

- High Protection Degree
- IP56 / IP65 enclosure protection
- Weather-sealed marine construction
- Advanced Corrosion Protection
- C5-M offshore coating system

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / Offshore environmental design criteria / Marine classification requirements

MARINE & OFFSHORE / PRODUCT 02 OF 06

GENERATOR STEP-UP (GSU) TRANSFORMERS

High-Reliability Voltage Step-Up Solutions for Marine and Offshore Power Generation Systems

In marine and offshore projects, the energy produced by onboard or platform-based generators must be stepped up to medium or high voltage levels for efficient transmission and distribution. Generator Step-Up (GSU) transformers used in such applications require exceptional mechanical strength, thermal stability, and continuous-duty performance. ESTA GSU Transformers are specifically engineered for offshore platforms, FPSO units, marine power plants,...

ELECTRICAL SCOPE

POWER RANGE
1 MVA - 100 MVA (project-dependent)

PRIMARY VOLTAGE
400 V - 15 kV

SECONDARY VOLTAGE
6.6 kV - 66 kV

FREQUENCY
50 Hz / 60 Hz

COOLING METHODS
ONAN / ONAF / OFAF / OFWF

ON-LOAD TAP CHANGER (OLTC) AVAILABLE
Fully engineered-to-order configurations available.

APPLICATIONS

- Offshore oil and gas platforms
- FPSO production vessels
- Marine-based power generation modules
- Shipboard cogeneration systems
- Offshore wind integration systems

ENGINEERED FEATURES

- Electromagnetic design calculations
- Short-circuit force analysis
- Thermal performance modeling
- Mechanical integrity assessment
- Project-specific FAT procedures

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / Offshore and power generation standards / Marine classification requirements (DNV, BV, ABS, LR)

MARINE & OFFSHORE / PRODUCT 03 OF 06

LOW MAGNETIC SIGNATURE TRANSFORMERS

Engineered for Naval Stealth and Electromagnetic Control Applications

In naval and military marine platforms, electromagnetic signature management is a critical operational requirement. Electrical equipment must operate without generating detectable magnetic fields that could compromise vessel stealth or interfere with sensitive onboard systems. ESTA Low Magnetic Signature Transformers are specifically engineered to minimize magnetic flux leakage and external field emissions, ensuring compliance with naval stealth and defense...

ELECTRICAL SCOPE

POWER RANGE

Project Specific

VOLTAGE LEVELS

Customized according to naval system requirements

FREQUENCY

50 Hz / 60 Hz

INSULATION CLASS

Class F / Class H

SHIELDED WINDING CONFIGURATIONS AVAILABLE

Fully engineered-to-order solutions.

APPLICATIONS

- Naval surface vessels
- Submarine support systems
- Military auxiliary ships
- Sensitive onboard electronic systems
- Mine countermeasure vessels

ENGINEERED FEATURES

- Magnetic field simulation analysis
- Stray flux measurement validation
- Thermal and short-circuit analysis
- Project-specific testing procedures
- Confidential project execution protocols

STANDARDS & COMPLIANCE

Project-specific standards, testing and documentation

MARINE & OFFSHORE / PRODUCT 04 OF 06

MARINE CAST RESIN TRANSFORMERS

Fire-Safe, Maintenance-Free Power Solutions for Marine Applications

Marine environments demand not only electrical reliability but also enhanced fire safety and reduced maintenance requirements. In passenger vessels, naval ships, offshore units, and sensitive onboard areas, dry-type solutions are often preferred over oil-filled systems. ESTA Marine Cast Resin Transformers are specifically engineered for shipboard and offshore installations where fire safety, compact design, and environmental resistance are critical.

ELECTRICAL SCOPE

POWER RANGE **Up to 5 MVA**	VOLTAGE LEVELS **400 V - 11 kV**	FREQUENCY **50 Hz / 60 Hz**
INSULATION CLASS **Class F / Class H**	COOLING METHOD **AN / AF**	OPTIONAL TEMPERATURE MONITORING SYSTEMS **Custom voltage configurations available.**

APPLICATIONS

- Passenger vessels and cruise ships
- Naval ships and military vessels
- Engine room external areas
- Offshore living quarters and control rooms
- HVAC and auxiliary systems

ENGINEERED FEATURES

- Structural Strength
- Reinforced winding support system
- Designed for vibration and mechanical stress
- Environmental Resistance
- High humidity tolerance

STANDARDS & COMPLIANCE

Self-extinguishing epoxy resin system / Reduced smoke emission / Suitable for installation in passenger zones / Designed in accordance with IEC 60076-11

MARINE & OFFSHORE / PRODUCT 05 OF 06

MARINE DISTRIBUTION TRANSFORMERS

Engineered for Harsh Marine Conditions. Designed for Critical Power Reliability.

Marine environments are significantly more demanding than standard industrial installations. Continuous vibration, salt-laden humidity, load fluctuations, and limited installation space require dedicated engineering expertise. ESTA Marine Distribution Transformers are specifically designed to ensure long-term reliability, operational continuity, and electrical stability in shipboard and offshore power systems.

ELECTRICAL SCOPE

POWER RANGE **100 kVA - 10 MVA**	VOLTAGE LEVELS **440V / 690V / 3.3kV / 6.6kV / 11kV**	FREQUENCY **50 Hz / 60 Hz**
INSULATION CLASS **Class F / Class H**	COOLING METHOD **ONAN / ONAF / AN**	TAP CHANGER **Off-load or On-load (optional) / Fully engineered-to-order solutions available.**

APPLICATIONS

- Main and auxiliary switchboards
- Engine room power distribution
- Propulsion support systems
- Pumps, compressors, and heavy onboard loads
- HVAC and vessel service systems

ENGINEERED FEATURES

- Structural Reinforcement
- Vibration-resistant core and tank structure
- Marine-grade mechanical fastening systems
- Corrosion Protection
- C4 / C5-M marine coating system

STANDARDS & COMPLIANCE

DNV / Bureau Veritas (BV) / ABS / Lloyd's Register (LR)

MARINE & OFFSHORE / PRODUCT 06 OF 06

SHORE-TO-SHIP ISOLATION TRANSFORMERS

Secure, Stable and Efficient Power Transfer for Port Electrification Systems

Shore-to-Ship power systems - also known as Cold Ironing - have become a critical component of modern port infrastructure. In order to comply with environmental regulations, reduce emissions, and improve operational efficiency, vessels must shut down onboard generators while at berth and connect safely to onshore power supply. ESTA Shore-to-Ship Isolation Transformers are engineered to provide galvanic isolation between the port gri...

ELECTRICAL SCOPE

POWER RANGE

500 kVA - 20 MVA

VOLTAGE LEVELS

400 V - 36 kV

FREQUENCY

50 Hz / 60 Hz

MULTI-VOLTAGE ADAPTATION

(shore-to-vessel matching)

OFF-LOAD OR ON-LOAD TAP CHANGER OPTIONS

Project-specific

HARMONIC LOAD COMPATIBLE DESIGN

Fully customized configurations available for project-specific requirements.

APPLICATIONS

- Cruise vessels
- Ro-Ro and container ships
- Naval port facilities
- Offshore support vessels
- Port electrical substations

ENGINEERED FEATURES

- Designed to withstand
- Salt-laden coastal environments
- High humidity conditions
- Sudden load transitions
- Continuous duty operation

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / IEC / IEEE 80005 (Cold Ironing standard) / Applicable marine classification requirements

SECTOR 02

RAILWAY & TRANSPORTATION TRANSFORMERS

Engineered-to-Order Transformer Solutions for Railway & Transportation Applications

Power rating: Up to 10 MVA

Voltage level: Up to 36 kV

Cooling: AN / AF / ONAN

SECTOR 02 / OVERVIEW

RAILWAY & TRANSPORTATION

ESTA Transformer designs and manufactures transformer solutions for railway and transportation infrastructure using a fully engineered-to-order approach, rather than catalogue-based products. Railway applications require continuous operation, high resistance to shock and vibration, wide ambient temperature ranges, and maximum operational reliability. For this reason, ESTA does not offer standard products for railway projects; each solution is engineered from the ground up according to project-specific...

APPLICATION AREAS

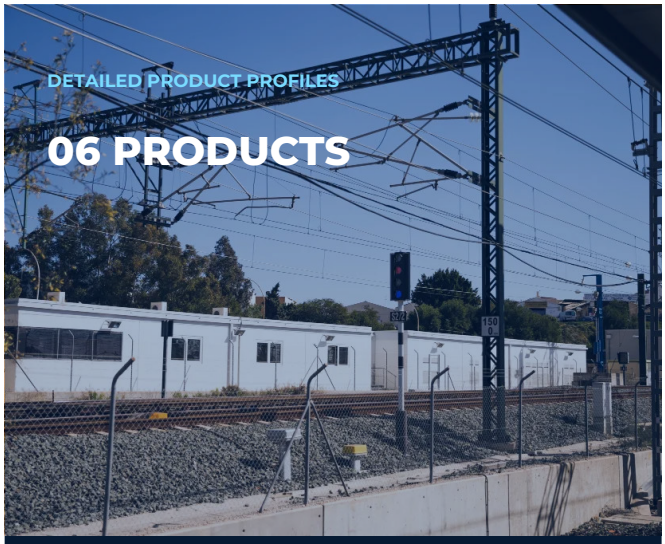
- Metro and tramway systems
- Railway infrastructure facilities
- Signaling and control systems
- Traction substations and auxiliary power systems
- Depots, maintenance and workshop facilities
- Transportation-related industrial installations

ENGINEERING FOCUS

- Compliance with EN 50155 environmental requirements
- EN 61373 shock and vibration resistance
- Stable operation across wide temperature ranges
- Continuous-duty performance and high availability
- Low maintenance requirements

APPLICABLE FRAMEWORK

- EN 50155 - Railway electronic equipment
- EN 61373 - Shock and vibration
- IEC 60076 - Power transformers
- EN 61000 - Electromagnetic compatibility (EMC)



DETAILED PRODUCT PROFILES

06 PRODUCTS

RAILWAY & TRANSPORTATION / PRODUCT 01 OF 06

CONVERTER DUTY TRANSFORMERS

Harmonic-Resistant Power Solutions for Power Electronics-Based Railway Systems

Modern railway systems rely extensively on power electronics for traction control, speed regulation, and energy management. Variable Frequency Drives (VFDs), IGBT-based converters, and other nonlinear loads introduce harmonic distortion, rapid current fluctuations, and increased thermal stress. Standard transformers are not designed to operate reliably under such demanding conditions.

ELECTRICAL SCOPE

POWER RANGE
500 kVA - 20 MVA

VOLTAGE LEVEL
400 V - 15 kV

FREQUENCY
50 Hz / 60 Hz

HARMONIC-COMPATIBLE DESIGN
Project-specific

6-PULSE / 12-PULSE / CUSTOMIZED CONFIGURATIONS
Project-specific

OFF-LOAD OR ON-LOAD TAP CHANGER OPTIONS
Fully engineered-to-order solutions.

APPLICATIONS

- Railway converter substations
- VFD-driven traction systems
- GBT-based traction converters
- Power electronics integration projects
- Metro and high-speed rail infrastructure

ENGINEERED FEATURES

- Harmonic Tolerance
- Windings designed for high harmonic current content
- Increased thermal margin
- Low-loss magnetic core optimized for nonlinear loads
- Thermal Performance

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / Power electronics application requirements / Railway technical specifications

RAILWAY & TRANSPORTATION / PRODUCT 02 OF 06

IMPEDANCE BOND TRANSFORMERS

Critical Power Component for Railway Signaling and Return Current Control

Impedance Bond Transformers are specialized devices used in railway infrastructure to provide controlled return current paths while ensuring the safe operation of track circuits and signaling systems. These units create electrical continuity for traction return currents while maintaining isolation for signaling frequencies, thereby enhancing operational safety and system integrity.

ELECTRICAL SCOPE

CONCRETE ENCAPSULATED TYPE

Suitable for outdoor installations / High resistance to mechanical impact

OIL-IMMERSED TYPE

High return current capacity / Enhanced thermal performance

ELECTRICAL CHARACTERISTICS

High return current carrying capability / Low impedance loss

APPLICATIONS

- Track circuit systems
- AC traction return current paths
- Signaling and power interface points
- Metro, tramway, and railway infrastructure
- Return current balancing systems

ENGINEERED FEATURES

- Electromagnetic Control
- Compatible with signaling systems
- Minimized electromagnetic interference
- Controlled stray magnetic flux
- Mechanical Strength

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / Railway technical specifications / Signaling system requirements / National and international railway standards

RAILWAY & TRANSPORTATION / PRODUCT 03 OF 06

ONBOARD DRY-TYPE RAILWAY TRANSFORMERS

Compact and High-Safety Power Solutions for Rolling Stock Applications

Onboard railway electrical systems require specialized engineering solutions due to limited installation space, continuous vibration, mechanical shocks, and strict fire safety requirements. ESTA Onboard Dry-Type Railway Transformers are specifically engineered to deliver reliable, lightweight, and fire-safe power solutions for rolling stock applications.

ELECTRICAL SCOPE

POWER RANGE **10 kVA - 2 MVA**	VOLTAGE LEVEL **Project-specific**	FREQUENCY **50 Hz / 60 Hz**
INSULATION CLASS **Class F / Class H**	COOLING METHOD: AIR NATURAL (AN) OR AIR FORCED (**Project-specific**	COMPACT AND LIGHTWEIGHT CONFIGURATION **Fully engineered-to-order according to rolling stock design requirements.**

APPLICATIONS

- Metro vehicles
- Tram systems
- Electric multiple units (EMU)
- High-speed trains
- Passenger and suburban trains

ENGINEERED FEATURES

- Mechanical Robustness
- Designed for continuous vibration and mechanical shock
- Reinforced mounting structure
- Lightweight yet rigid construction
- Fire Safety Compliance

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076-11 / Railway rolling stock technical requirements / Fire safety compliance standards

RAILWAY & TRANSPORTATION / PRODUCT 04 OF 06

RAILWAY AUXILIARY TRANSFORMERS

Reliable Power Supply for Station and Onboard Auxiliary Systems

In railway and urban transportation projects, not only traction power but also auxiliary systems must operate continuously and safely. Lighting, HVAC, signaling equipment, control panels, and security systems require stable and reliable power supply. ESTA Railway Auxiliary Transformers are specifically engineered to ensure uninterrupted and safe energy supply for these critical auxiliary loads.

ELECTRICAL SCOPE

POWER RANGE **500 kVA - 20 MVA**	VOLTAGE LEVEL **400 V - 15 kV**	FREQUENCY **50 Hz / 60 Hz**
HARMONIC-COMPATIBLE DESIGN **Project-specific**	6-PULSE / 12-PULSE / CUSTOMIZED CONFIGURATIONS **Project-specific**	OFF-LOAD OR ON-LOAD TAP CHANGER OPTIONS **Fully engineered-to-order solutions.**

APPLICATIONS

- Metro and tram stations
- Railway technical buildings
- Signaling and control systems
- HVAC installations
- Lighting and security infrastructure

ENGINEERED FEATURES

- Stable Voltage Supply
- Designed for sensitive electronic equipment
- Withstands voltage fluctuations
- Continuous Operation
- Suitable for 24/7 duty conditions

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / Railway technical specifications / Local grid and utility standards

RAILWAY & TRANSPORTATION / PRODUCT 05 OF 06

RAILWAY MEDIUM VOLTAGE POWER TRANSFORMERS

Reliable and Durable Power Solutions for Railway Infrastructure

In railway and urban transportation projects, power continuity, voltage stability, and operational safety are critical. Medium voltage power transformers used in metro, light rail, and regional railway systems must withstand dynamic load variations, harmonic distortion, and continuous-duty operation. ESTA Railway Medium Voltage Power Transformers are engineered for applications up to 15 kV, delivering high reliability and long service life in demanding railway...

ELECTRICAL SCOPE

POWER RANGE
500 kVA - 15 MVA

VOLTAGE LEVEL
400 V - 15 kV

FREQUENCY
50 Hz / 60 Hz

COOLING METHODS
ONAN / ONAF / Dry-type options

TAP CHANGER
Off-load or On-load (optional)

HARMONIC-COMPATIBLE DESIGN
Fully engineered-to-order voltage and power configurations available.

APPLICATIONS

- Metro and light rail substations
- Regional railway power supply points
- Station power distribution centers
- Railway auxiliary infrastructure systems
- Urban transportation energy networks

ENGINEERED FEATURES

- Dynamic Load Capability
- Windings designed for sudden load changes
- High short-circuit withstand strength
- Thermal design optimized for continuous operation
- Harmonic Compatibility

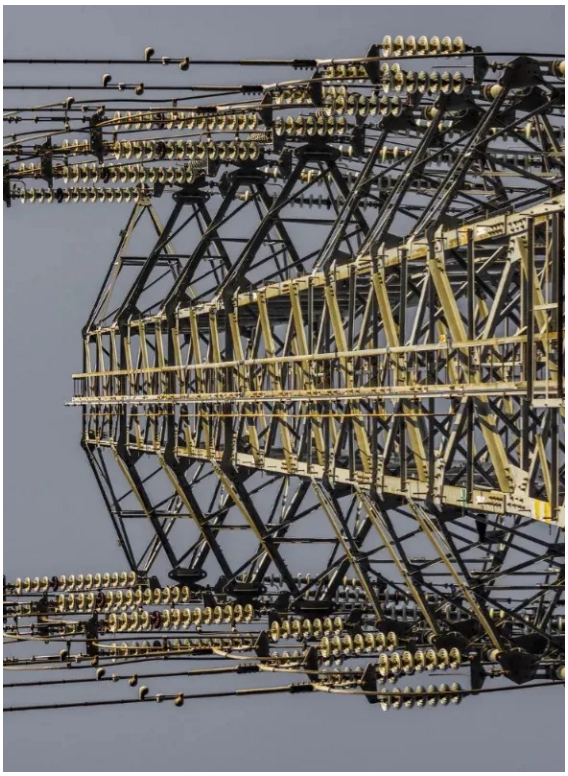
STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / Railway infrastructure requirements / Local grid and utility standards

RAILWAY & TRANSPORTATION / PRODUCT 06 OF 06

RECTIFIER TRANSFORMERS FOR METRO & TRAM SYSTEMS

In metro and tramway systems, traction power is commonly supplied through DC networks. In these systems, AC power from the utility grid must be converted into controlled DC voltage levels such as 750 V DC or 1500 V DC. Rectifier transformers are the critical interface between the AC supply network and the DC traction system.



ELECTRICAL SCOPE

POWER RANGE
1 MVA - 20 MVA

PRIMARY VOLTAGE
6.6 kV / 10 kV / 15 kV

SECONDARY VOLTAGE
Configured for 750 V DC / 1500 V DC systems

FREQUENCY
50 Hz / 60 Hz

6-PULSE / 12-PULSE / 24-PULSE CONFIGURATIONS
Project-specific

HARMONIC-MITIGATING DESIGN
Fully engineered-to-order solutions according to project specifications.

APPLICATIONS

- Metro DC traction substations
- Tramway power supply infrastructure
- Railway rectifier stations
- Urban transportation DC traction systems
- Public transportation energy projects

ENGINEERED FEATURES

- High Harmonic Tolerance
- Winding configuration optimized for rectifier operation
- Magnetic core designed to withstand harmonic distortion
- Low-loss design under nonlinear load conditions
- High Current Capability

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / Railway technical specifications / Metro and tram infrastructure requirements

03

SECTOR 03

HAZARDOUS AREA (ATEX / IECEX) TRANSFORMERS

Engineered-to-Order Transformer Solutions for Explosive Atmospheres

Explosion-Proof (Ex d)

Increased Safety (Ex e)

Pressurized (Ex p)

SECTOR 03 / OVERVIEW

HAZARDOUS AREA

Electrical equipment used in environments containing explosive gases or dust must be engineered according to principles fundamentally different from standard industrial designs. In such applications, safety is not a feature - it is a requirement. ESTA designs and manufactures transformer solutions compliant with ATEX and IECEx requirements. Our engineering approach focuses on eliminating ignition risks, ensuring operational safety, and providing long-term reliability.

APPLICATION AREAS

- Oil & gas facilities
- Refineries
- Chemical and petrochemical plants
- Offshore platforms
- Underground mining
- Paint and solvent production facilities

ENGINEERING FOCUS

- Flameproof enclosure engineering
- Pressure containment and sealing design
- Surface temperature control
- Magnetic and thermal analysis
- Certification-compliant documentation

APPLICABLE FRAMEWORK

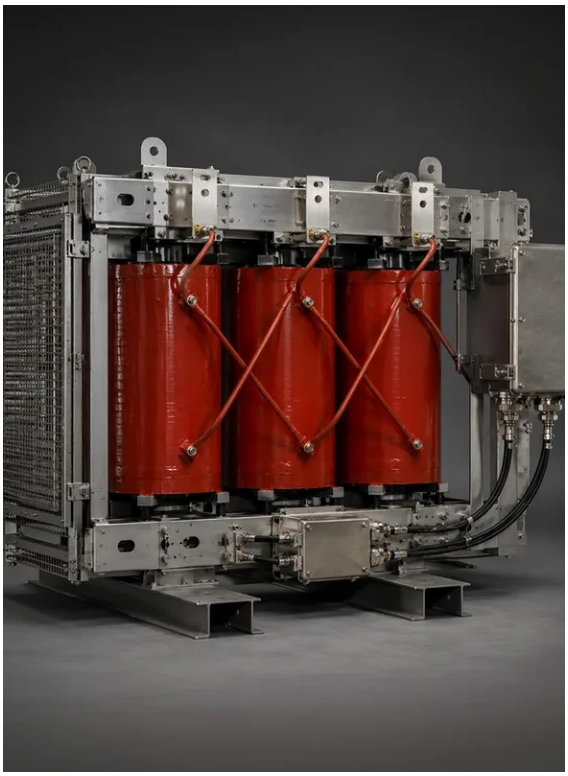
- ATEX 2014/34/EU
- IECEx Certification System
- IEC 60076
- EN 60079 series

DETAILED PRODUCT PROFILES

06 PRODUCTS

HAZARDOUS AREA / PRODUCT 01 OF 06

ATEX CAST RESIN TRANSFORMERS



Oil-Free and Safe Power Solutions for Hazardous Environments

ATEX Cast Resin transformers are dry-type solutions designed for applications where oil-filled equipment is not preferred in hazardous gas or dust environments. The oil-free construction reduces fire load, eliminates leakage risks, and provides a safe alternative for indoor Zone 2 and Zone 22 installations.

ELECTRICAL SCOPE

POWER RANGE	VOLTAGE LEVEL	FREQUENCY
50 kVA - 5 MVA	400 V - 15 kV	50 / 60 Hz

COOLING TYPE	INSULATION CLASS
AN / AF	Class F / Class H

APPLICATIONS

- Chemical plants
- Petrochemical production areas
- Paint and solvent facilities
- Gas filling stations
- Process industry installations

ENGINEERED FEATURES

- Ex e (Increased Safety)
- Ex ec
- Zone 2 / Zone 22
- Oil-Free Construction
- Epoxy cast resin windings

STANDARDS & COMPLIANCE

ATEX 2014/34/EU / IECEx / EN 60079-0 / EN 60079-7

HAZARDOUS AREA / PRODUCT 02 OF 06

ATEX CONTROL & ISOLATION TRANSFORMERS

Safe Low-Power Supply Solutions for Hazardous Environments

ATEX control and isolation transformers are designed to supply safe power to control circuits, instrumentation systems, and low-power auxiliary equipment operating in explosive gas or dust environments. These transformers provide secure energy supply through ignition risk minimization and controlled surface temperature design.

ELECTRICAL SCOPE

POWER RANGE

100 VA - 100 kVA

VOLTAGE LEVEL

24 V - 1000 V

FREQUENCY

50 / 60 Hz

SINGLE-PHASE OR THREE-PHASE OPTIONS

Project-specific

EX E / EX EC CONFIGURATIONS

Fully engineered-to-order voltage and connection configurations.

APPLICATIONS

- ATEX panels
- Instrumentation systems
- PLC and control systems
- Gas detection systems
- Process automation equipment

ENGINEERED FEATURES

- Ex e (Increased Safety)
- Ex ec
- Zone 2 / Zone 22
- Insulation Safety
- Reinforced insulation structure

STANDARDS & COMPLIANCE

ATEX 2014/34/EU / IECEx / EN 60079-0 / IEC 61558

HAZARDOUS AREA / PRODUCT 03 OF 06

EXPLOSION-PROOF TRANSFORMERS (EX D)

Explosion-Proof (Ex d) transformers are designed to prevent internal explosions from propagating to the surrounding hazardous atmosphere. This protection concept ensures safe operation in Zone 1 and Zone 2 environments where explosive gases may be present.

ELECTRICAL SCOPE

POWER RANGE

50 kVA - 10 MVA

VOLTAGE LEVEL

400 V - 36 kV

POWER RANGE

50 kVA - 10 MVA

VOLTAGE LEVEL

400 V - 36 kV

ON-LOAD OR OFF-LOAD TAP CHANGER OPTIONS

Fully engineered-to-order solutions.

APPLICATIONS

- Oil & gas production facilities
- Refineries
- Chemical plants
- Offshore platforms
- Tank farms

ENGINEERED FEATURES

- Contains any internal explosion within the enclosure
- Withstands explosion pressure
- Utilizes certified flamepath joints and flanges
- Controls external surface temperature
- Designed for Zone 1 and Zone 2

STANDARDS & COMPLIANCE

ATEX 2014/34/EU / IECEx / EN 60079-0 / EN 60079-1

HAZARDOUS AREA / PRODUCT 04 OF 06

INCREASED SAFETY TRANSFORMERS (EX E)

Increased Safety (Ex e) transformers are designed to prevent arcs, sparks, and excessive surface temperatures during normal operation, eliminating potential ignition sources. This protection concept provides a reliable and efficient solution for Zone 2 environments. ESTA Ex e transformers are engineered with controlled surface temperature, reinforced insulation systems, and certification-compliant design.

ELECTRICAL SCOPE

POWER RANGE
50 kVA - 5 MVA

VOLTAGE LEVEL
400 V - 15 kV

FREQUENCY
50 / 60 Hz

COOLING TYPE
Oil-immersed or dry-type

TAP CHANGER
Optional / Fully engineered-to-order solutions.

APPLICATIONS

- Oil & gas facilities
- Chemical and process industries
- Gas compressor stations
- Offshore modules
- Tank storage areas

ENGINEERED FEATURES

- Prevents arcs and sparks
- Maintains surface temperature within T-class limits
- Incorporates reinforced insulation
- Minimizes risk of loose electrical connections
- Surface Temperature Control

STANDARDS & COMPLIANCE

ATEX 2014/34/EU / IECEx / EN 60079-0 / EN 60079-7

HAZARDOUS AREA / PRODUCT 05 OF 06

MINING TRANSFORMERS

Flameproof Power Solutions for Underground Mining Environments

Electrical equipment used in underground coal mines operates in environments containing methane gas and coal dust, representing the highest explosion risk category. Group I (M1 / M2) equipment is subject to stricter safety requirements than standard ATEX Group II equipment.

ELECTRICAL SCOPE

POWER RANGE
100 kVA - 10 MVA

VOLTAGE LEVEL
400 V - 36 kV

FREQUENCY
50 / 60 Hz

FLAMEPROOF ENCLOSURE
Project-specific

RAIL-MOUNTED OR FIXED TYPE OPTIONS
Fully engineered-to-order solutions.

APPLICATIONS

- Underground coal mines
- Mine gallery power distribution systems
- Underground substations
- Mining railway transport systems
- Conveyor and equipment power supply

ENGINEERED FEATURES

- Flameproof Housing
- Explosion pressure-resistant heavy steel enclosure
- Certified flamepath surfaces
- Impact and vibration resistance
- Surface Temperature Control

STANDARDS & COMPLIANCE

ATEX 2014/34/EU - Group I / IECEx / EN 60079-0 / EN 60079-1

HAZARDOUS AREA / PRODUCT 06 OF 06

PRESSURIZED TRANSFORMERS (EX P)

The Pressurized (Ex p) protection concept prevents the ingress of explosive gases into the enclosure by maintaining a positive internal pressure using clean air or inert gas. This method is widely used in high-power installations and containerized ATEX substations.

ELECTRICAL SCOPE

POWER RANGE
500 kVA - 20 MVA

VOLTAGE LEVEL
400 V - 36 kV

FREQUENCY
50 Hz / 60 Hz

OIL-IMMERSED OR DRY-TYPE OPTIONS
Project-specific

OPTIONAL OLTC
Fully engineered-to-order integrated solutions.

APPLICATIONS

- Containerized ATEX substations
- Skid-mounted power modules
- Offshore process platforms
- Refineries and petrochemical plants
- High-power hazardous area distribution systems

ENGINEERED FEATURES

- Maintains positive pressure inside the enclosure
- Prevents explosive gas ingress
- Includes pressure monitoring and alarm system
- Provides safe shutdown functionality
- Pressure Control System

STANDARDS & COMPLIANCE

ATEX 2014/34/EU / IECEx / EN 60079-0 / EN 60079-2

SECTOR 04

MEDICAL & HEALTHCARE TRANSFORMERS

Engineered-to-Order Transformer Solutions for Medical & Healthcare Applications

Power rating: Up to 10 MVA	**Voltage level: Up to 36 kV (system-dependent)**	**Cooling: AN / AF / ONAN**

SECTOR 04 / OVERVIEW

MEDICAL & HEALTHCARE

ESTA Transformer designs and manufactures transformer solutions for medical and healthcare infrastructures using a fully engineered-to-order approach with patient safety as the primary design driver. In medical applications, transformers are not merely power components; they are an integral part of electrical safety, system reliability, and patient protection. For this reason, ESTA does not offer catalogue-based products for medical projects. Each solution is engineered from the ground up based on the specific...

APPLICATION AREAS

- Hospitals and healthcare complexes
- Operating rooms and intensive care units
- MRI, CT, and medical imaging systems
- Medical equipment manufacturers (OEM)
- Laboratories and diagnostic centers
- Critical healthcare infrastructure systems

ENGINEERING FOCUS

- Compliance with IEC 60601-1 patient safety requirements
- Low leakage current and safe electrical isolation
- Electromagnetic compatibility (EMC)
- Thermal stability for continuous operation
- Low acoustic noise and vibration

APPLICABLE FRAMEWORK

- IEC 60601-1 - Medical electrical equipment
- IEC 61558 - Power and isolation transformers
- IEC 60076 - Power transformers
- EN 61000 - Electromagnetic compatibility (EMC)

DETAILED PRODUCT PROFILES

06 PRODUCTS

MEDICAL & HEALTHCARE / PRODUCT 01 OF 06

HOSPITAL POWER DISTRIBUTION TRANSFORMERS

Reliable and Continuous Power Infrastructure for Healthcare Facilities

Hospitals operate 24/7 and require uninterrupted power at all times. Electrical failure in healthcare facilities does not only cause operational disruption - it can directly impact patient safety. Transformers used in hospital power distribution systems must therefore be designed with maximum reliability, low losses, voltage stability, and long service life in mind.

ELECTRICAL SCOPE

POWER RANGE
100 kVA - 10 MVA

VOLTAGE LEVEL
400 V - 36 kV

FREQUENCY
50 Hz / 60 Hz

OIL-IMMERSED OR DRY-TYPE OPTIONS
Project-specific

ON-LOAD OR OFF-LOAD TAP CHANGER
Fully engineered-to-order configurations.

APPLICATIONS

- Main hospital distribution substations
- Backup power integration (Generator & UPS systems)
- Clinical and outpatient buildings
- Diagnostic and laboratory centers
- University hospitals

ENGINEERED FEATURES

- High Operational Continuity
- Designed for continuous 24/7 operation
- Optimized thermal performance
- Enhanced insulation reliability
- Low-Loss Construction

STANDARDS & COMPLIANCE

IEC 60076 / Optional IEC EcoDesign compliance / Hospital electrical infrastructure specifications

MEDICAL & HEALTHCARE / PRODUCT 02 OF 06

LOW LEAKAGE MEDICAL TRANSFORMERS

Safe and Stable Power Solutions for Sensitive Medical Equipment

Medical imaging and diagnostic systems require significantly higher electrical stability and safety standards compared to conventional industrial equipment. Leakage current, stray magnetic field, and electrical noise can directly impact device performance and diagnostic accuracy.

ELECTRICAL SCOPE

POWER RANGE

1 kVA - 500 kVA

VOLTAGE LEVEL

Project-specific

FREQUENCY

50 Hz / 60 Hz

SINGLE-PHASE OR THREE-PHASE

Project-specific

OPTIONAL SHIELDED CONSTRUCTION

Fully engineered-to-order for OEM integration.

APPLICATIONS

- MRI systems
- CT scanners
- X-ray systems
- Ultrasound equipment
- Laboratory analyzers

ENGINEERED FEATURES

- Ultra-Low Leakage Current
- Optimized winding insulation
- Reduced capacitive couplin
- Performance below IEC limits
- Magnetic Field Control

STANDARDS & COMPLIANCE

IEC 61558 / IEC 60601 (medical device compliant design approach) / IEC 60076 / Project-specific testing and validation processes are applied.

MEDICAL & HEALTHCARE / PRODUCT 03 OF 06

MEDICAL AUTOTRANSFORMERS & VOLTAGE STABILIZING TRANSFORMERS

Voltage Adaptation and Stable Power Solutions for Medical Equipment

Voltage fluctuations and grid incompatibilities in healthcare environments can directly affect the performance of sensitive medical equipment. MRI, CT, X-ray systems, and laboratory devices require stable and precisely adapted voltage supply.

ELECTRICAL SCOPE

POWER RANGE
1 kVA - 5 MVA

VOLTAGE CONVERSION RATIO
Project-specific

FREQUENCY
50 Hz / 60 Hz

SINGLE-PHASE OR THREE-PHASE
Project-specific

MANUAL OR AUTOMATIC VOLTAGE REGULATION OPTIONS
Fully engineered-to-order configurations.

APPLICATIONS

- MRI and imaging systems
- Laboratory equipment
- Medical OEM manufacturers
- Hospital voltage adaptation projects
- International equipment voltage conversion

ENGINEERED FEATURES

- Voltage Stability
- Stable output suitable for sensitive medical devices
- Designed to handle load fluctuations
- Low Loss & High Efficiency
- Optimized magnetic core

STANDARDS & COMPLIANCE

IEC 60076 / IEC 61558 / IEC 60601 compliant design approach / Project-based validation and testing processes are applied.

MEDICAL & HEALTHCARE / PRODUCT 04 OF 06

MEDICAL ISOLATION TRANSFORMERS

Safe Power Solutions for Operating Rooms and Critical Healthcare Areas

In healthcare facilities, electrical failure is not merely an operational issue - it is a life safety risk. Operating rooms, intensive care units, emergency departments, and other critical medical areas require electrical systems designed to prioritize patient protection and uninterrupted operation.

ELECTRICAL SCOPE

POWER RANGE

3 kVA - 200 kVA

VOLTAGE LEVEL

230 V / 400 V (custom configurations available)

FREQUENCY

50 Hz / 60 Hz

INSULATION CLASS

Class F / Class H

PROTECTION DEGREE

IP21 - IP23 (optional higher ratings available) / Fully engineered-to-order...

APPLICATIONS

- Operating rooms
- Intensive care units (ICU)
- Angiography rooms
- Dialysis centers
- Emergency departments

ENGINEERED FEATURES

- Low Leakage Current Design
- Compliant with IEC leakage current limits
- Optimized winding insulation
- Reduced capacitive coupling
- Thermal Stability

STANDARDS & COMPLIANCE

IEC 61558-2-15 / IEC 60364-7-710 / IEC 60076 / Medical IT system requirements

OPERATING ROOM (OR) ISOLATION PANEL TRANSFORMERS

Compact and Integrated Power Solution for Critical Surgical Areas

Operating rooms represent the most critical application of medical IT systems. In these environments, power supply is provided through isolation panels, and the system must continue operating safely even in the event of a first insulation fault. ESTA Operating Room Isolation Panel Transformers are engineered for full compatibility with insulation monitoring devices (IMD), alarm modules, and medical distribution panels.

ELECTRICAL SCOPE

POWER RANGE
3 kVA - 25 kVA

VOLTAGE LEVEL
230 V / 400 V

FREQUENCY
50 Hz / 60 Hz

PANEL-MOUNT CONFIGURATION
Project-specific

LOW LEAKAGE CURRENT DESIGN
Custom compact dimensions available.

APPLICATIONS

- Operating rooms
- Intervention rooms
- Anesthesia areas
- Sensitive laboratory areas
- Radiology departments

ENGINEERED FEATURES

- Compact Panel-Compatible Design
- Designed for integration inside OR panels
- Optimized power-to-size ratio
- Low Leakage Current
- Compliant with IEC limits

STANDARDS & COMPLIANCE

IEC 61558-2-15 / IEC 60364-7-710 / IEC 60076 / Medical IT system requirements

MEDICAL & HEALTHCARE / PRODUCT 06 OF 06

ULTRA LOW NOISE TRANSFORMERS

Acoustically and Magnetically Optimized Solutions for MRI and Sensitive Imaging Systems

MRI and advanced imaging systems operate in environments that are extremely sensitive both acoustically and electromagnetically. Standard transformers may:

ELECTRICAL SCOPE

POWER RANGE
10 kVA - 5 MVA

VOLTAGE LEVEL
Project-specific

FREQUENCY
50 Hz / 60 Hz

DRY-TYPE OR OIL-IMMERSED OPTIONS
Project-specific

OPTIONAL MAGNETIC SHIELDING
Fully optimized for acoustic and magnetic performance.

APPLICATIONS

- MRI rooms
- Imaging centers
- Oncology clinics
- Sensitive laboratory areas
- Radiology departments

ENGINEERED FEATURES

- Ultra-Low Acoustic Noise
- Vibration-damping mounting systems
- Optimized magnetic core structure
- Reduced magnetostriction design
- Stray Magnetic Field Control

STANDARDS & COMPLIANCE

IEC 60076 / IEC 61558 / Medical imaging environment requirements / Project-specific acoustic measurements and magnetic field verification are performed.

SECTOR 05

MILITARY & DEFENSE TRANSFORMERS

Engineered-to-Order Transformer Solutions for Mission-Critical Defense Applications

Power rating: Up to 10 MVA

Voltage level: Up to 36 kV

Cooling: AN / AF / ONAN

SECTOR 05 / OVERVIEW

MILITARY & DEFENSE

ESTA Transformer designs and manufactures transformer solutions for military and defense applications using a fully engineered-to-order approach, with a strong focus on mission reliability, operational continuity, and system security. In defense projects, transformers are not merely power equipment; they are an integral component of mission success, infrastructure resilience, and operational safety. For this reason, ESTA does not offer standard or catalogue-based products for military and defense...

APPLICATION AREAS

- Military bases and facilities
- Radar and communication systems
- Defense industry manufacturing plants
- Command and control centers
- Mission-critical power infrastructure
- Fixed and mobile military systems

ENGINEERING FOCUS

- High mechanical robustness and vibration resistance
- EMI / EMC control for sensitive electronic environments
- Designs suitable for harsh environmental conditions
- Stable thermal performance for continuous operation
- Mission continuity and operational safety

APPLICABLE FRAMEWORK

- IEC 60076 - Power transformers
- EN 61000 - Electromagnetic compatibility (EMC)
- Project-specific military and defense technical specifications
- Full compliance with customer and defense industry technical requirements

DETAILED PRODUCT PROFILES

07 PRODUCTS

MILITARY & DEFENSE / PRODUCT 01 OF 07

EMI / EMC SHIELDED MILITARY TRANSFORMERS

Power Solutions for Electromagnetically Sensitive Defense Systems

Electromagnetic interference (EMI) and electromagnetic compatibility (EMC) are critical parameters in military system design. Radar systems, communication infrastructure, command centers, and sensitive defense electronics must be protected against power-source-induced interference.

ELECTRICAL SCOPE

POWER RANGE

10 kVA - 10 MVA

VOLTAGE LEVEL

Project-specific

FREQUENCY

50 Hz / 60 Hz or 400 Hz

SINGLE-PHASE OR THREE-PHASE

Project-specific

SHIELDED WINDING AND ENCLOSURE OPTIONS

Fully engineered-to-order.

APPLICATIONS

- Radar systems
- Military communication infrastructure
- Command and control centers
- Electronic defense systems
- Sensitive defense electronics

ENGINEERED FEATURES

- Electromagnetic Shielding
- Electrostatic shield
- Optional magnetic shielding
- Reduced stray magnetic field
- EMI Reduction

STANDARDS & COMPLIANCE

IEC 60076 / Project-specific EMC requirements / Defense system technical specifications

MILITARY & DEFENSE / PRODUCT 02 OF 07

HIGH CURRENT DEFENSE TRANSFORMERS

Specialized High-Current Power Solutions for Defense Infrastructure

Certain defense industry applications require exceptionally high current capacity for specialized power and test infrastructure systems. Transformers used in these environments must be engineered to withstand:

ELECTRICAL SCOPE

VERY HIGH CURRENT CAPACITY

10,000 A - 40,000 A and above

VOLTAGE LEVEL

Project-specific

FREQUENCY

50 Hz / 60 Hz or customized

LOW-IMPEDANCE DESIGN

Project-specific

CUSTOM BUSBAR OUTPUT CONFIGURATIONS

Fully engineered-to-order according to operational requirements.

APPLICATIONS

- Defense-grade test infrastructure
- High-current rectifier systems
- Specialized power supply units
- Pulsed power applications
- Heavy-duty military energy systems

ENGINEERED FEATURES

- High Current Capability
- Reinforced conductor cross-sections
- Low-loss, low-impedance construction
- Designed for extreme current tolerance
- Thermal Performance

STANDARDS & COMPLIANCE

IEC 60076 / Project-specific defense technical specifications / High-current application requirements

MILITARY & DEFENSE / PRODUCT 03 OF 07

LOW IR SIGNATURE TRANSFORMERS

Specialized Power Solutions for Thermal Signature-Controlled Defense Applications

In certain defense applications, equipment thermal signature (IR signature) is a critical operational parameter. Conventional transformers may generate elevated surface temperatures and thermal emissions that increase infrared detectability.

ELECTRICAL SCOPE

POWER RANGE

50 kVA - 10 MVA

VOLTAGE LEVEL

Project-specific

FREQUENCY

50 Hz / 60 Hz or 400 Hz

OIL-IMMERSED OR DRY-TYPE OPTIONS

Fully engineered-to-order.

APPLICATIONS

- Specialized defense platforms
- Mobile military systems
- Naval and land deployments
- Mission-critical infrastructure

ENGINEERED FEATURES

- Thermal Emission Control
- Optimized surface temperature design
- Reduced thermal radiation characteristics
- Specialized Coating Systems
- IR-optimized surface coatings

STANDARDS & COMPLIANCE

IEC 60076 / Project-specific defense technical specifications / Thermal performance requirements

MILITARY & DEFENSE / PRODUCT 04 OF 07

MILITARY 400 HZ POWER TRANSFORMERS

High-Frequency Power Solutions for Defense and Aerospace Applications

400 Hz power systems are widely used in military aviation, defense test infrastructure, and specialized high-frequency applications. Standard 50/60 Hz transformer designs are not suitable for 400 Hz operation. Higher frequency requires optimized magnetic design, reduced core losses, and dedicated insulation engineering.

ELECTRICAL SCOPE

FREQUENCY

400 Hz

POWER RANGE

10 kVA - 5 MVA

VOLTAGE LEVEL

Project-specific

SINGLE-PHASE OR THREE-PHASE

Project-specific

LOW-LOSS MAGNETIC DESIGN

Fully engineered-to-order according to application requirements.

APPLICATIONS

- Military aviation ground support systems
- 400 Hz military power distribution systems
- Defense-grade test infrastructure
- High-frequency rectifier systems
- Radar and specialized electronic power supply systems

ENGINEERED FEATURES

- High-Frequency Optimization
- 400 Hz compatible magnetic core
- Reduced core losses
- Optimized magnetic flux density
- Compact Construction

STANDARDS & COMPLIANCE

IEC 60076 / Project-specific defense technical specifications / High-frequency application requirements

MILITARY & DEFENSE / PRODUCT 05 OF 07

MOBILE / CONTAINERIZED MILITARY TRANSFORMERS

Integrated and Deployable Power Solutions for Field Operations

Military operations require rapidly deployable, transportable, and reliable energy infrastructure. Mobile and containerized power systems are ideal for temporary bases, forward deployment areas, and field operations.

ELECTRICAL SCOPE

POWER RANGE

100 kVA - 15 MVA

VOLTAGE LEVEL

400 V - 36 kV

FREQUENCY

50 Hz / 60 Hz or 400 Hz

OIL-IMMERSED OR DRY-TYPE OPTIONS

Project-specific

INTEGRATED PROTECTION AND DISTRIBUTION SYSTEMS

Available as fully integrated containerized solutions.

APPLICATIONS

- Temporary military bases
- Field operation zones
- Mobile radar and communication systems
- Forward deployment areas
- Emergency defense infrastructure

ENGINEERED FEATURES

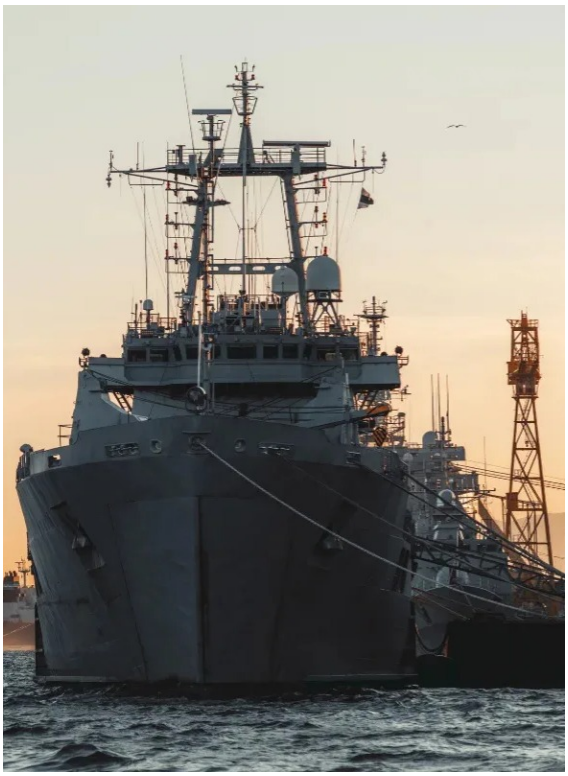
- Mobility
- ISO container compatible
- Rapid deployment configuration
- Crane and forklift lifting points
- Integrated System

STANDARDS & COMPLIANCE

IEC 60076 / Project-specific military technical specifications / Mobile infrastructure requirements

MILITARY & DEFENSE / PRODUCT 06 OF 07

NAVAL & SHIPBOARD MILITARY TRANSFORMERS



Reliable and Durable Power Solutions for Naval Defense Platforms

Electrical systems installed on naval defense platforms must withstand vibration, humidity, salt exposure, mechanical shock, and electromagnetic interference. Additionally, magnetic signature control and electromagnetic compatibility are critical in naval applications.

ELECTRICAL SCOPE

POWER RANGE
50 kVA - 15 MVA

VOLTAGE LEVEL
400 V - 36 kV

FREQUENCY
50 Hz / 60 Hz or 400 Hz

OIL-IMMERSED OR DRY-TYPE OPTIONS
Project-specific

MARINE-GRADE INSULATION SYSTEM
Fully engineered-to-order configurations.

APPLICATIONS

- Military vessels
- Patrol ships
- Support ships
- Naval base infrastructure
- Defense marine platforms

ENGINEERED FEATURES

- Defense marine platforms
- High humidity tolerance
- Corrosion-resistant construction
- Marine-grade coating systems
- Mechanical Strength

STANDARDS & COMPLIANCE

IEC 60076 / Project-specific military technical specifications / Naval platform requirements (project-based classification)

MILITARY & DEFENSE / PRODUCT 07 OF 07

RUGGEDIZED MILITARY POWER TRANSFORMERS

High-Reliability Power Solutions for Mission-Critical Defense Infrastructure

Military energy infrastructure operates under significantly more demanding conditions than conventional civilian applications. Equipment is exposed to harsh environments, mechanical stress, vibration, shock loads, rapid load variations, and potential electromagnetic interference. Transformers used in defense applications are therefore not merely power devices - they are mission-critical system components.

ELECTRICAL SCOPE

POWER RANGE

100 kVA - 20 MVA

VOLTAGE LEVEL

400 V - 36 kV

FREQUENCY

50 Hz / 60 Hz

OIL-IMMERSED OR DRY-TYPE OPTIONS

Project-specific

• ON-LOAD OR OFF-LOAD TAP CHANGER

Fully engineered-to-order configurations according to project requirements.

APPLICATIONS

- Military base power infrastructure
- Radar and surveillance systems
- Command and control centers
- Defense manufacturing facilities
- Mission-critical energy supply systems

ENGINEERED FEATURES

- Mechanical Robustness
- Designed for high vibration environments
- Reinforced structure against shock loads
- Suitable for field and outdoor deployment
- Thermal Reliability

STANDARDS & COMPLIANCE

IEC 60076 / Project-specific military technical specifications / Design approach referencing applicable MIL-STD requirements (project-dependent)

SECTOR 06

INDUSTRIAL & OEM APPLICATIONS

Engineered-to-Order Transformer Solutions for Industrial Systems & OEM Projects

Power rating: Up to 10 MVA

Voltage level: Up to 36 kV

Cooling: AN / AF / ONAN

SECTOR 06 / OVERVIEW

INDUSTRIAL & OEM

ESTA Transformer designs and manufactures transformer solutions for industrial facilities and OEM (Original Equipment Manufacturer) projects using a fully engineered-to-order engineering and manufacturing approach. In OEM projects, ESTA acts not merely as a supplier, but as an active engineering partner involved throughout the product development lifecycle. Each solution is developed from the ground up, taking into account system requirements, mechanical constraints, electrical performance...

APPLICATION AREAS

- Machine and system manufacturers (OEMs
- Industrial production facilities
- Energy and process industries
- Custom machinery and automation systems
- Test and measurement infrastructure
- High-performance industrial applications

ENGINEERING FOCUS

- Project- and system-specific electrical design
- Stable thermal performance for continuous operation
- Mechanical robustness and vibration control
- EMC-compliant design
- Manufacturability and long-term production continuity

APPLICABLE FRAMEWORK

- IEC 60076 - Power transformers
- IEC 60204 - Safety of machinery - electrical equipment
- EN 50160 - Voltage characteristics of electricity supplied by public networks
- EN 61000 - Electromagnetic compatibility (EMC)

DETAILED PRODUCT PROFILES

07 PRODUCTS

INDUSTRIAL & OEM / PRODUCT 01 OF 07

AUTOTRANSFORMERS & VOLTAGE ADAPTATION TRANSFORMERS

Engineered Solutions for Industrial Voltage Conversion and System Compatibility

Differences in grid voltage and frequency standards across regions often prevent direct operation of imported industrial equipment. Voltage mismatch may result in:

ELECTRICAL SCOPE

POWER RANGE
1 kVA - 30 MVA

VOLTAGE CONVERSION RATIO
Project-specific

FREQUENCY
50 Hz / 60 Hz

SINGLE-PHASE OR THREE-PHASE
Project-specific

MANUAL OR AUTOMATIC VOLTAGE ADJUSTMENT OPTIONS
Fully engineered-to-order.

APPLICATIONS

- Imported machine voltage adaptation
- Motor starting applications
- Temporary site installations
- Industrial voltage conversion projects
- Energy optimization systems

ENGINEERED FEATURES

- Voltage Adaptation
- High-efficiency voltage conversion
- Low-loss magnetic design
- Compact & Cost-Effective Construction
- More compact than isolation transformers

STANDARDS & COMPLIANCE

IEC 60076 / IEC 61558 (depending on the application) / Project-specific technical specifications

INDUSTRIAL & OEM / PRODUCT 02 OF 07

CONVERTER DUTY / DRIVE TRANSFORMERS

Engineered Solutions for Harmonic-Loaded and Dynamic Industrial Drive Systems

Large motor drive systems (VFDs), inverter-based applications, and rectifier-fed equipment generate significant harmonic distortion and impose additional electrical and thermal stress on transformers. Conventional distribution transformers are not suitable for such environments. The design must ensure:

ELECTRICAL SCOPE

POWER RANGE
250 kVA - 50 MVA

VOLTAGE LEVEL
400 V - 36 kV

FREQUENCY
50 Hz / 60 Hz

OIL-IMMERSED OR DRY-TYPE CONSTRUCTION
Project-specific

MULTI-SECONDARY OR PHASE-SHIFTING CONFIGURATIONS AVAILABLE
Project-specific

APPLICATIONS

- Large motor drive systems (VFD)
- Pump and compressor stations
- Cement and mining facilities
- Chemical and petrochemical plants
- Industrial inverter applications

ENGINEERED FEATURES

- Harmonic Endurance
- K-factor design approach
- Harmonic-resistant insulation system
- Additional thermal margin
- Dynamic Load Capability

STANDARDS & COMPLIANCE

IEC 60076 / Harmonic load requirements / Project-specific technical specifications

INDUSTRIAL & OEM / PRODUCT 03 OF 07

INDUSTRIAL ISOLATION TRANSFORMERS

Engineered Solutions for Equipment Protection and Electrical Separation

In industrial environments, certain equipment must be protected from electrical noise, ground potential differences, and grid-related disturbances. Isolation transformers provide galvanic separation between primary and secondary circuits, ensuring operational safety and equipment protection.

ELECTRICAL SCOPE

POWER RANGE
1 kVA - 10 MVA

VOLTAGE CONVERSION RATIO
Project-specific

FREQUENCY
50 Hz / 60 Hz

SINGLE-PHASE OR THREE-PHASE
Project-specific

OPTIONAL ELECTROSTATIC SHIELDING
Fully engineered-to-order.

APPLICATIONS

- CNC and precision machinery
- Laboratory and testing equipment
- Automation and control panels
- Data centers and IT infrastructure
- Sensitive non-medical industrial applications

ENGINEERED FEATURES

- Galvanic Isolation
- Complete electrical separation
- Enhanced grounding safety
- Noise & Interference Reduction
- Electrostatic shield

STANDARDS & COMPLIANCE

IEC 60076 / IEC 61558 (depending on the application) / Project-specific technical specifications

INDUSTRIAL & OEM / PRODUCT 04 OF 07

INDUSTRIAL POWER DISTRIBUTION TRANSFORMERS

Reliable and Efficient Energy Infrastructure for Industrial Facilities

In industrial environments, energy continuity is fundamental to operational efficiency. Power distribution transformers are critical components of the main electrical infrastructure in factories, production lines, and heavy-duty industrial plants. ESTA Industrial Power Distribution Transformers are engineered to deliver reliable, efficient, and stable performance under continuous heavy-load conditions.

ELECTRICAL SCOPE

POWER RANGE

100 kVA - 50 MVA

VOLTAGE LEVEL

400 V - 36 kV

FREQUENCY

50 Hz / 60 Hz

OIL-IMMERSED OR DRY-TYPE CONSTRUCTION

Project-specific

ON-LOAD (OLTC) OR OFF-CIRCUIT (OCTC) TAP CHANGER OPTIONS

Fully engineered-to-order according to project requirements and plant load...

APPLICATIONS

- Manufacturing facilities
- Heavy industrial plants
- Automotive production lines
- Food and chemical processing plants
- Logistics and warehouse centers

ENGINEERED FEATURES

- Continuous Operation Reliability
- Designed for 24/7 industrial operation
- Stable voltage output
- Capable of handling load fluctuations
- Energy Efficiency

STANDARDS & COMPLIANCE

IEC 60076 / IEC EcoDesign (optional) / Project-specific technical requirements / Type testing and Factory Acceptance Tests (FAT) available upon request.

OEM MACHINE BUILDER TRANSFORMERS

Integrated and Engineered Power Solutions for Machine Manufacturers

Machine builders (OEMs) require compact, reliable, and globally compatible power solutions that integrate seamlessly into their equipment architecture. In OEM applications, transformers are not merely power devices - they are integrated components of the machine design.

ELECTRICAL SCOPE

POWER RANGE
1 kVA - 5 MVA

VOLTAGE LEVEL
Project-specific

FREQUENCY
50 Hz / 60 Hz

SINGLE-PHASE OR THREE-PHASE OPTIONS
Project-specific

ISOLATION, AUTOTRANSFORMER, OR CUSTOM DESIGN CONFIGURATIONS
Fully engineered-to-order according to machine specifications.

APPLICATIONS

- CNC machines
- Plastic injection molding systems
- Industrial press machines
- Packaging and automation equipment
- Robotic production lines

ENGINEERED FEATURES

- Compact & Integrated Construction
- Panel-mount compatible
- Space-saving design
- Custom dimensions and terminal configurations
- Global Market Compatibility

STANDARDS & COMPLIANCE

IEC 60076 / Harmonic load requirements / Project-specific technical specifications

SPECIAL APPLICATION TRANSFORMERS

Engineered Solutions Beyond Standard Designs

Certain industrial applications cannot be addressed with standard catalog products. Unusual voltage levels, high-frequency operation, extreme current requirements, dynamic load profiles, or project-specific technical constraints demand advanced engineering solutions. ESTA Special Application Transformers are developed to deliver fully customized solutions beyond conventional design limits.

ELECTRICAL SCOPE

POWER RATING
Project-specific

VOLTAGE LEVEL
Custom design

FREQUENCY
50 Hz / 60 Hz / special frequency

SINGLE-PHASE / THREE-PHASE / MULTI-SECONDARY CO
Project-specific

ISOLATION / RECTIFIER / HIGH-CURRENT OPTIONS
Fully engineered-to-order according to client specifications.

APPLICATIONS

- Test and laboratory systems
- R&D infrastructure
- High-frequency applications
- Special voltage and current conversion projects
- Prototype machine platforms

ENGINEERED FEATURES

- Project-Oriented Engineering
- Load profile analysis
- Electrical modeling
- Thermal simulation
- Flexible Design Platform

STANDARDS & COMPLIANCE

ESTA Special Application Transformers are developed to deliver fully customized solutions beyond conventional design limits. / IEC 60076 / IEC 61558 (depending on the application) / Project-specific technical specifications

INDUSTRIAL & OEM / PRODUCT 07 OF 07

HIGH IP & HARSH ENVIRONMENT TRANSFORMERS

Engineered Power Solutions for Severe Environmental Conditions

Certain industrial applications operate in environments exposed to heavy dust, high humidity, chemical vapors, outdoor installation, and extreme temperatures. Standard transformer designs may not withstand such conditions.

ELECTRICAL SCOPE

POWER RANGE

100 kVA - 30 MVA

VOLTAGE LEVEL

400 V - 36 kV

FREQUENCY

50 Hz / 60 Hz

OIL-IMMERSED OR DRY-TYPE CONSTRUCTION

Project-specific

IP54 / IP55 / IP65 / IP66 ENCLOSURE OPTIONS

Fully engineered-to-order based on site conditions.

APPLICATIONS

- Cement plants
- Mining facilities
- Port and outdoor installations
- Chemical processing plants
- Tropical climate regions

ENGINEERED FEATURES

- High IP Protection
- Dust and water ingress protection
- Sealed enclosure construction
- Corrosion Resistance
- Specialized coating systems

STANDARDS & COMPLIANCE

IEC 60076 / IEC 60529 (IP protection rating) / ISO corrosion class requirements

SECTOR 07

METALLURGICAL & ARC FURNACE TRANSFORMERS

ESTA Transformer designs and manufactures transformer solutions for copper, aluminum, and arc furnace (EAF) processes using a heavy-industry-focused engineering discipline and a fully engineered-to-order approach.

Power rating: Up to 10 MVA

Voltage level: Up to 36 kV

Secondary side: Very low voltage / very high current

SECTOR 07 / OVERVIEW

METALLURGICAL & ARC FURNACE

ESTA Transformer designs and manufactures transformer solutions for copper, aluminum, and arc furnace (EAF) processes using a heavy-industry-focused engineering discipline and a fully engineered-to-order approach. Metallurgical applications involve: These operating conditions go far beyond conventional industrial transformer requirements. For this reason, ESTA does not offer catalogue-based products for metallurgical and arc furnace applications. Each solution is engineered from the ground up...

APPLICATION AREAS

- Copper smelting and refining plants
- Aluminum smelting and electrolysis facilities
- Electric Arc Furnaces (EAF)
- Ladle Furnaces
- Induction melting systems
- Heavy industry and metal processing plants

ENGINEERING FOCUS

- High short-circuit withstand strength
- Mechanical and thermal robustness for heavy industrial duty
- Electrical stability under rapid load variations
- Designs supporting continuous process operation
- Long-term reliability under extreme operating conditions

APPLICABLE FRAMEWORK

- IEC 60076 - Power transformers
- IEC 60289 - Reactors
- Project-specific metallurgical and process technical specifications
- Full compliance with customer and EPC technical specifications

DETAILED PRODUCT PROFILES

06 PRODUCTS

METALLURGICAL & ARC FURNACE / PRODUCT 01 OF 06

ELECTRIC ARC FURNACE (EAF) TRANSFORMERS

High-Power, High-Current Solutions for Modern Steelmaking Facilities

Electric Arc Furnace (EAF) operations represent one of the most demanding applications in heavy industry. Extreme current levels, rapid load fluctuations, frequent short-circuit events, and severe harmonic distortion require transformer designs beyond conventional power transformer standards. EAF transformers are not merely power supply units - they are critical process components that directly influence arc stability, melting efficiency, energy...

ELECTRICAL SCOPE

POWER RANGE **5 MVA - 150 MVA**	SECONDARY CURRENT **Project-specific ultra-high current design**	PRIMARY VOLTAGE **According to plant infrastructure**
FREQUENCY **50 Hz / 60 Hz**	OIL-IMMERSED HEAVY-DUTY CONSTRUCTION **Project-specific**	ON-LOAD TAP CHANGER (OLTC) OR **Project-specific**

APPLICATIONS

- Integrated and mini-mill steel plants
- Scrap melting furnaces
- High-capacity EAF production lines
- Specialty steel manufacturing facilities

ENGINEERED FEATURES

- Ultra-High Current Capability
- Reinforced high-cross-section conductors
- Optimized low-impedance secondary design
- Designed to withstand extreme electromagnetic forces
- Short-Circuit Strength

STANDARDS & COMPLIANCE

IEC 60076 / Metallurgical project technical specifications / Project-specific short-circuit and endurance requirements / Factory acceptance testing (FAT) and project-based performance verification are available upon request.

METALLURGICAL & ARC FURNACE / PRODUCT 02 OF 06

FURNACE AUXILIARY TRANSFORMERS

Reliable Power Infrastructure for Auxiliary Systems in Metallurgical Plants

In large-scale metallurgical facilities, beyond the main furnace transformer, dedicated and reliable power infrastructure is required for cooling systems, hydraulic units, fans, control panels, and auxiliary distribution networks. The uninterrupted operation of auxiliary systems is essential for process safety and production continuity.

ELECTRICAL SCOPE

POWER RANGE
100 kVA - 10 MVA

VOLTAGE LEVEL
400 V - 36 kV

FREQUENCY
50 Hz / 60 Hz

OIL-IMMERSED OR DRY-TYPE CONSTRUCTION
Project-specific

IP-RATED FIELD CONFIGURATIONS
Designed according to plant architecture.

APPLICATIONS

- Furnace cooling pumps
- Hydraulic and mechanical drive systems
- Ventilation and fan units
- Control and automation panels
- Auxiliary power distribution networks

ENGINEERED FEATURES

- Continuous Operation Capability
- Designed for 24/7 operation
- Stable voltage output
- Environmental Resistance
- Suitable for dusty and high-temperature environments

STANDARDS & COMPLIANCE

IEC 60076 / Industrial plant technical specifications / Project-specific site requirements

FURNACE BALANCING EQUALIZING TRANSFORMERS

Current and Load Balancing Solutions for High-Power Metallurgical Systems

In large-scale metallurgical plants, particularly in multi-electrode furnaces and parallel power configurations, balanced current distribution is critical for process stability and equipment longevity. Current imbalance may result in:

ELECTRICAL SCOPE

POWER RATING

Project-specific

LOW-IMPEDANCE CONFIGURATION

Project-specific

HIGH CURRENT CAPABILITY

Project-specific

OIL-IMMERSED OR DRY-TYPE CONSTRUCTION

Fully engineered-to-order based on system architecture.

APPLICATIONS

- Multi-electrode arc furnaces
- Parallel power block configurations
- Large-scale metallurgical facilities
- AC and DC hybrid systems

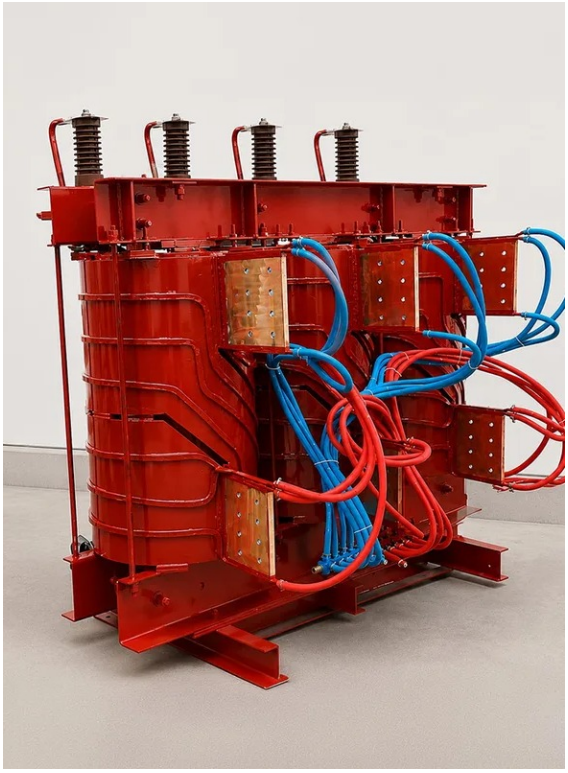
ENGINEERED FEATURES

- Current Equalization
- Phase-to-phase load balancing
- Electrode current optimization
- Parallel system stabilization
- Process Stability

STANDARDS & COMPLIANCE

IEC 60076 / Metallurgical plant technical requirements / Project-specific current balancing criteria

HIGH CURRENT BUSBAR TRANSFORMERS



Engineered Solutions for Ultra-High Current Metallurgical Applications

In certain metallurgical processes, secondary current levels can reach tens of thousands of amperes. Standard secondary terminal designs are insufficient in such applications, requiring dedicated busbar-based configurations. ESTA High Current Busbar Transformers are engineered with:

ELECTRICAL SCOPE

SECONDARY CURRENT

10,000 A - 100,000 A and above

POWER RATING

Project-specific

VOLTAGE LEVEL

According to process requirements

OIL-IMMERSED HEAVY-DUTY CONSTRUCTION

Project-specific

LOW-IMPEDANCE SECONDARY DESIGN

Fully engineered-to-order.

APPLICATIONS

- Electric Arc Furnaces
- Ferroalloy production plants
- High-current rectifier systems
- Electrolysis and DC industrial processes

ENGINEERED FEATURES

- Ultra-Low Impedance Configuration
- Optimized winding geometry
- Controlled current density
- Reduced energy losses
- Reinforced Busbar Output System

STANDARDS & COMPLIANCE

IEC 60076 / Requirements for high-current applications / Project-specific mechanical strength criteria

METALLURGICAL & ARC FURNACE / PRODUCT 05 OF 06

LADLE FURNACE (LF) TRANSFORMERS

Precision Power Solutions for Secondary Metallurgical Refining

Ladle Furnace (LF) operations play a critical role in secondary metallurgy, enabling precise temperature control, alloy adjustment, and chemical composition refinement after primary steelmaking. Unlike primary EAF systems, LF transformers require enhanced voltage stability, controlled arc performance, and reliable harmonic management to ensure metallurgical consistency and product quality.

ELECTRICAL SCOPE

POWER RANGE **5 MVA - 80 MVA**	SECONDARY CURRENT **Process-specific configuration**	PRIMARY VOLTAGE **According to plant grid design**
FREQUENCY **50 Hz / 60 Hz**	OIL-IMMERSED HEAVY-DUTY DESIGN **Project-specific**	ON-LOAD TAP CHANGER (OLTC) FOR PRECISE VOLTAGE CONTROL **Project-specific**

APPLICATIONS

- Secondary steel refining plants
- Alloy adjustment operations
- Temperature homogenization processes
- Specialty steel production lines

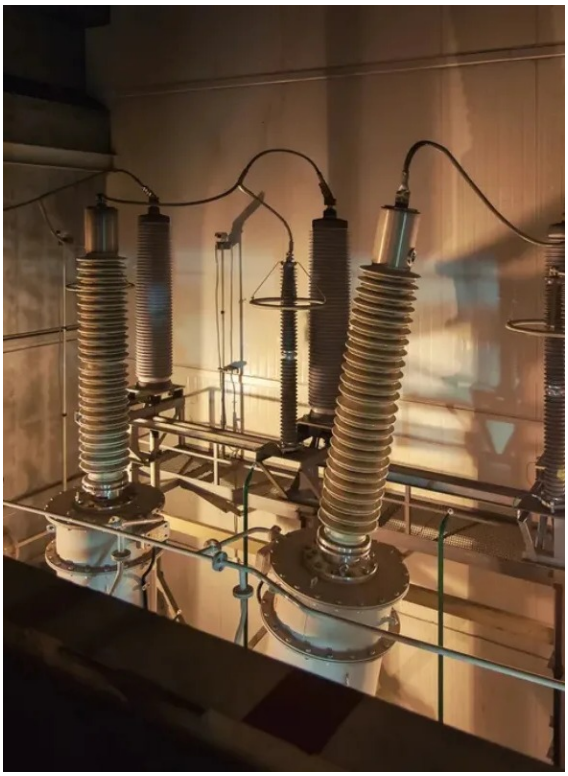
ENGINEERED FEATURES

- Precision Voltage Regulation
- High-resolution tap step configuration
- Smooth voltage transition under load
- Optimized arc stability for refining processes
- Harmonic & Dynamic Load Tolerance

STANDARDS & COMPLIANCE

IEC 60076 / Metallurgical project technical requirements / Project-specific mechanical and thermal endurance criteria

METALLURGICAL RECTIFIER TRANSFORMERS



Engineered Power Solutions for DC Arc Furnaces and High-Capacity Rectifier Systems

Many metallurgical processes require AC power to be converted into DC supply. DC arc furnaces, electrolysis plants, and high-capacity rectifier systems demand transformer designs that differ significantly from conventional power transformers. Key design criteria include:

ELECTRICAL SCOPE

POWER RANGE **5 MVA - 80 MVA**	SECONDARY CURRENT **Process-specific configuration**	PRIMARY VOLTAGE **According to plant grid design**
FREQUENCY **50 Hz / 60 Hz**	OIL-IMMERSED HEAVY-DUTY DESIGN **Project-specific**	ON-LOAD TAP CHANGER (OLTC) FOR PRECISE VOLTAGE CONTROL **Project-specific**

APPLICATIONS

- DC arc furnaces
- Electrolysis plants (copper, aluminum, etc.)
- High-capacity rectifier systems
- Multi-phase DC power applications

ENGINEERED FEATURES

- Multi-Secondary & Phase-Shifting Configuration
- Harmonic mitigation-oriented design
- Reduced grid harmonic impact
- Ripple control optimization
- High Current Strength

STANDARDS & COMPLIANCE

IEC 60076 / Rectifier application technical specifications / Project-specific harmonic criteria

SECTOR 08

RENEWABLE ENERGY & POWER GENERATION

Up to 10 MVA	Up to 36 kV	Engineered-to-order

SECTOR 08 / OVERVIEW

POWER GENERATION & RENEWABLE

Auxiliary power transformers provide critical power supply to internal systems of power plants, ensuring reliable operation of pumps, cooling systems, control units, and protection systems. ESTA Transformer delivers engineered-to-order auxiliary transformers designed for continuous-duty operation, high reliability, and seamless integration within power generation facilities.

APPLICATION AREAS

- Thermal power plants
- Hydroelectric power plants
- Gas turbine and combined cycle plants
- Renewable power plant auxiliary systems
- Substation auxiliary supply systems
- Industrial power generation facilities

ENGINEERING FOCUS

- Designed for continuous-duty operation
- Stable voltage regulation under varying load conditions
- High efficiency and low-loss design
- High short-circuit withstand capability
- Robust construction for industrial environments

APPLICABLE FRAMEWORK

- IEC 60076 - Power transformers
- IEC 60034 - Rotating electrical machines (generator interface)
- Utility and EPC specifications
- Project-specific international standards

DETAILED PRODUCT PROFILES

04 PRODUCTS

POWER GENERATION & RENEWABLE / PRODUCT 01 OF 04

COMPACT SUBSTATIONS (SKID-MOUNTED SOLUTIONS)

Compact Substations (Skid-Mounted Solutions) are pre-engineered and factory-assembled power distribution units that integrate transformers, medium voltage (MV) switchgear, and low voltage (LV) panels into a single, transportable system. Designed for rapid installation and minimal on-site work, these solutions significantly reduce project timelines while ensuring high reliability and consistent quality. ESTA Compact Substations are engineered for industrial,...

ELECTRICAL SCOPE

POWER RANGE
Up to 10 MVA

PRIMARY VOLTAGE
Up to 36 kV

SECONDARY VOLTAGE
400 V - 6.6 kV

FREQUENCY
50 Hz / 60 Hz

TRANSFORMER TYPE
Oil-immersed / Dry-type options

INTEGRATED SYSTEMS
MV switchgear / LV panels / Protection systems / Fully engineered-to-order...

APPLICATIONS

- Industrial facilities
- Marine and offshore platforms
- Renewable energy plants (solar / wind)
- Construction and infrastructure projects
- Data centers

ENGINEERED FEATURES

- High Mechanical Strength
- Skid-mounted robust steel structure
- Designed for transportation and lifting conditions
- Vibration-resistant construction
- Environmental Protection

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC standards / MV / LV switchgear standards / Power distribution system requirements

POWER GENERATION & RENEWABLE / PRODUCT 02 OF 04

GENERATOR STEP-UP (GSU) TRANSFORMERS

Generator Step-Up (GSU) transformers are critical components used to increase generator output voltage to transmission levels, ensuring efficient and reliable power transfer to the grid. In marine and offshore applications, these transformers must operate continuously under harsh environmental conditions while maintaining high thermal stability, mechanical strength, and operational reliability. ESTA GSU Transformers are engineered for offshore platforms, marin...

ELECTRICAL SCOPE

POWER RANGE 1 MVA - 100 MVA	PRIMARY VOLTAGE 400 V - 15 kV	SECONDARY VOLTAGE 6.6 kV - 66 kV
FREQUENCY 50 Hz / 60 Hz	COOLING METHODS ONAN / ONAF / OFAF / OFWF	ON-LOAD TAP CHANGER (OLTC) Available / Fully engineered-to-order configurations available.

APPLICATIONS

- Offshore oil and gas platforms
- FPSO production vessels
- Marine-based power generation modules
- Shipboard cogeneration systems
- Offshore wind integration systems

ENGINEERED FEATURES

- Electromagnetic design calculations
- Short-circuit force analysis
- Thermal performance modeling
- Mechanical integrity assessment
- Project-specific FAT procedures

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / Offshore and power generation standards / Marine classification requirements (DNV, BV, ABS, LR)

POWER GENERATION & RENEWABLE / PRODUCT 03 OF 04

SOLAR INVERTER TRANSFORMERS

Solar Inverter Transformers are designed to step up the output voltage of inverter-based photovoltaic (PV) systems for efficient transmission and grid integration. In modern solar power plants, these transformers operate under variable load profiles, harmonic-rich conditions, and continuous daily cycling. Therefore, high efficiency, thermal stability, and harmonic tolerance are critical design factors. ESTA Solar Inverter Transformers are engineered to ensure...

ELECTRICAL SCOPE

POWER RANGE	PRIMARY VOLTAGE	SECONDARY VOLTAGE
100 kVA - 10 MVA	400 V - 1.5 kV	10 kV - 36 kV

FREQUENCY	COOLING METHODS	TAP CHANGER
50 Hz / 60 Hz	AN / AF / ONAN	Off-load tap changer (optional)

APPLICATIONS

- Utility-scale solar power plants
- Distributed PV systems
- Rooftop solar installations
- Solar farms with central or string inverters
- Hybrid renewable energy systems

ENGINEERED FEATURES

- High Mechanical Strength
- Designed for outdoor installation and long-term operation
- Robust structure for transportation and site conditions
- Reliable performance under thermal cycling
- Environmental Protection

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / Renewable energy and solar standards / EcoDesign (EU Tier 2)

WIND TURBINE TRANSFORMERS

Wind Turbine Transformers are specifically designed to convert and transmit the electrical energy generated by wind turbines to medium or high voltage levels for grid integration. These transformers operate under highly dynamic load conditions, variable environmental factors, and space-constrained installations such as nacelles or tower bases. ESTA Wind Turbine Transformers are engineered for maximum efficiency, compact design, and long-term reliability i...

ELECTRICAL SCOPE

POWER RANGE	PRIMARY VOLTAGE	SECONDARY VOLTAGE
500 kVA - 10 MVA	400 V - 1 kV	10 kV - 36 kV

FREQUENCY	COOLING METHODS	TAP CHANGER
50 Hz / 60 Hz	AN / AF / ONAN	Off-load tap changer (optional) / Fully engineered-to-order configurations...

APPLICATIONS

- Onshore wind farms
- Offshore wind turbines
- Nacelle-mounted transformer systems
- Tower base installations
- Renewable energy grid integration systems

ENGINEERED FEATURES

- High Mechanical Strength
- Compact and vibration-resistant design for turbine operation
- Reinforced structure for transport and installation
- Designed for dynamic load conditions
- Environmental Protection

STANDARDS & COMPLIANCE

Designed and manufactured in accordance with: / IEC 60076 / Renewable energy standards / Wind turbine application requirements

SECTOR 09

DATA CENTER & CRITICAL POWER TRANSFORMERS

Data centers and critical power infrastructures require uninterrupted power supply and maximum system reliability. Transformers used in these applications must be designed considering harmonic loads, redundant power architectures, parallel operation requirements, and continuous-duty conditions...

Up to 10 MVA	Up to 36 kV	Engineered-to-order

SECTOR 09 / OVERVIEW

DATA CENTER & CRITICAL POWER

Data centers and critical power infrastructures require uninterrupted power supply and maximum system reliability. Transformers used in these applications must be designed considering harmonic loads, redundant power architectures, parallel operation requirements, and continuous-duty conditions. ESTA Transformer develops data center transformer solutions based on UPS systems, A/B power distribution architectures, and continuous operational demands. Each design is optimized for lo...

APPLICATION AREAS

- Data centers
- Server and cloud infrastructures
- Telecommunication facilities
- Financial and banking data centers
- Edge data center applications
- UPS and critical power systems

ENGINEERING FOCUS

- Designed for harmonic load conditions
- Low-noise optimized construction
- Engineering tailored for redundant power architectures
- Parallel operation compatibility
- Low-loss and high-efficiency optimization

APPLICABLE FRAMEWORK

- IEC 60076 Power Transformers
- Design approach compatible with IEC 62040 UPS systems
- Applicable EN standards
- ISO 9001 Quality Management System

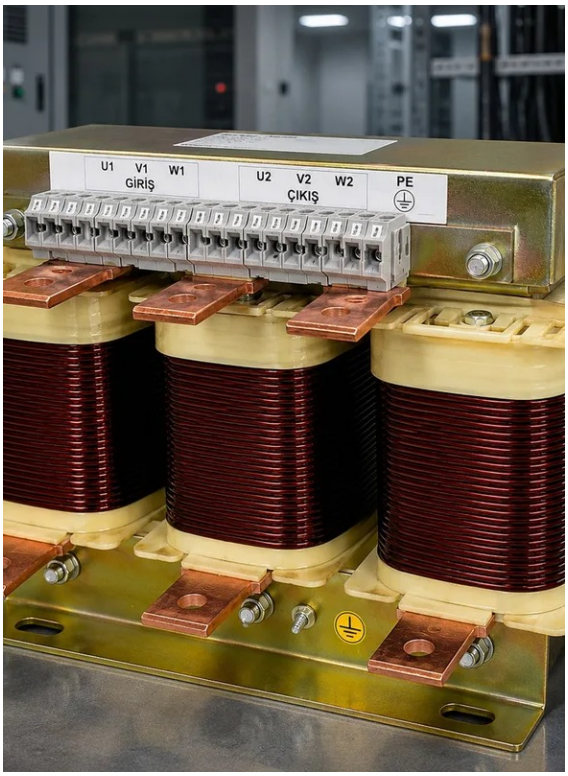
DETAILED PRODUCT PROFILES

05 PRODUCTS

DATA CENTER & CRITICAL POWER / PRODUCT 01 OF 05

HARMONIC MITIGATION TRANSFORMERS

Harmonic Mitigation Transformers are specifically designed to reduce harmonic distortion caused by non-linear loads such as variable frequency drives (VFDs), rectifiers, and inverter-based systems. These transformers improve overall power quality, reduce system losses, and enhance the performance and lifespan of connected equipment. ESTA Harmonic Mitigation Transformers are engineered for high harmonic suppression efficiency, stable operation, and reliable...



ELECTRICAL SCOPE

POWER RANGE
50 kVA - 5 MVA

PRIMARY VOLTAGE
400 V - 15 kV

SECONDARY VOLTAGE
400 V - 690 V

FREQUENCY
50 Hz / 60 Hz

COOLING METHODS
AN / AF

CONFIGURATION
Multi-winding / Phase-shifting designs / Fully engineered-to-order configuration...

APPLICATIONS

- Data centers
- Industrial drives (VFD systems)
- Renewable energy systems
- Rectifier and converter systems
- UPS systems

ENGINEERED FEATURES

- High Mechanical Strength
- Designed for continuous operation under non-linear loads
- Reinforced structure for long service life
- High durability under thermal stress
- Environmental Protection

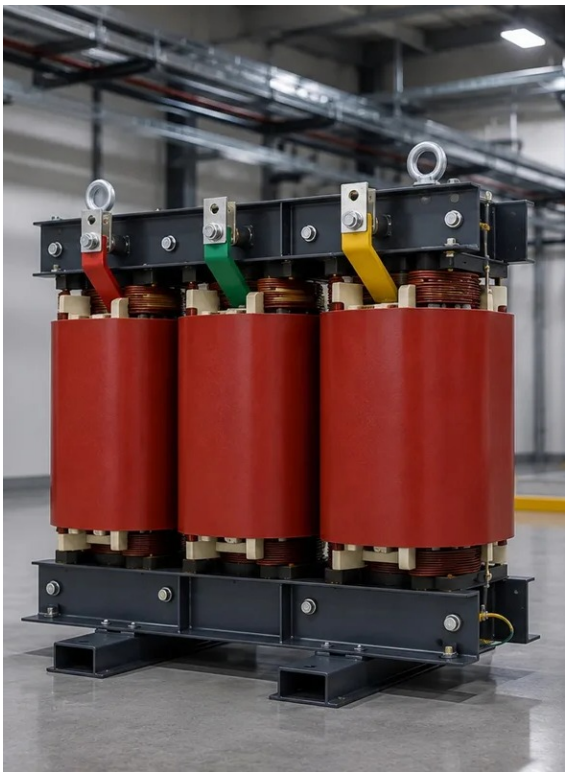
STANDARDS & COMPLIANCE

IEC 60076 / Power quality and harmonic standards / Industrial application standards

DATA CENTER & CRITICAL POWER / PRODUCT 02 OF 05

ISOLATION TRANSFORMERS

Isolation Transformers are designed to provide electrical separation between input and output circuits, ensuring enhanced safety, reduced noise, and improved power quality. They are widely used in sensitive environments where equipment protection, voltage stability, and noise suppression are critical. ESTA Isolation Transformers are engineered for high reliability, low leakage, and optimal performance in industrial, medical, and critical power applications.



ELECTRICAL SCOPE

POWER RANGE
1 kVA - 5 MVA

PRIMARY VOLTAGE
Up to 36 kV

SECONDARY VOLTAGE
110 V - 690 V

FREQUENCY
50 Hz / 60 Hz

COOLING METHODS
AN / AF / ONAN

CONFIGURATION
Single-phase / Three-phase / Fully engineered-to-order configurations...

APPLICATIONS

- Hospitals and medical equipment
- Data centers and IT systems
- Industrial automation systems
- Sensitive electronic equipment
- Laboratories and testing facilities

ENGINEERED FEATURES

- High Mechanical Strength
- Robust construction for continuous operation
- Reinforced winding structure
- Long mechanical life
- Environmental Protection

STANDARDS & COMPLIANCE

IEC 60076 / Electrical safety standards / Application-specific regulations (medical / industrial)

LOW LOSS DISTRIBUTION TRANSFORMERS

Low Loss Distribution Transformers are designed to minimize energy losses in continuous operation environments, ensuring maximum efficiency and reduced operating costs. These transformers are critical in modern power distribution systems where energy efficiency, sustainability, and long-term performance are key priorities.

ELECTRICAL SCOPE

POWER RANGE
25 kVA - 5 MVA

PRIMARY VOLTAGE
Up to 36 kV

SECONDARY VOLTAGE
400 V - 690 V

FREQUENCY
50 Hz / 60 Hz

COOLING METHODS
ONAN / ONAF / AN

CONFIGURATION
Oil-immersed / Dry-type options / Fully engineered-to-order configurations...

APPLICATIONS

- Utility distribution networks
- Industrial facilities
- Commercial buildings
- Data centers
- Infrastructure projects

ENGINEERED FEATURES

- High Mechanical Strength
- Robust construction for continuous operation
- Reinforced winding structure
- Long mechanical life
- Environmental Protection

STANDARDS & COMPLIANCE

IEC 60076 / Electrical safety standards / Application-specific regulations (medical / industrial)

DATA CENTER & CRITICAL POWER / PRODUCT 04 OF 05

MEDIUM VOLTAGE SUPPLY TRANSFORMERS

Medium Voltage Supply Transformers are designed to provide reliable and efficient power transfer from utility grids to distribution systems in industrial, commercial, and critical infrastructure applications. These transformers ensure stable voltage levels, high efficiency, and long-term operational reliability under continuous load conditions.

ELECTRICAL SCOPE

POWER RANGE
100 kVA - 20 MVA

PRIMARY VOLTAGE
Up to 36 kV

SECONDARY VOLTAGE
400 V - 6.6 kV

FREQUENCY
50 Hz / 60 Hz

COOLING METHODS
ONAN / ONAF / AN

TAP CHANGER
Off-load tap changer (OLTC optional) / Fully engineered-to-order configuration...

APPLICATIONS

- Industrial facilities
- Commercial buildings
- Data centers
- Utility distribution systems
- Infrastructure projects

ENGINEERED FEATURES

- High Mechanical Strength
- Designed for continuous and stable operation
- Reinforced structure for long service life
- High resistance to electrical and mechanical stress
- Environmental Protection

STANDARDS & COMPLIANCE

IEC 60076 / Utility and distribution standards / Industrial application requirements

DATA CENTER & CRITICAL POWER / PRODUCT 05 OF 05

UPS TRANSFORMERS

UPS Transformers are designed to ensure seamless integration with uninterruptible power supply (UPS) systems, providing stable, isolated, and reliable power for critical applications. These transformers operate under dynamic load conditions, frequent switching cycles, and harmonic-rich environments, requiring high electrical stability and robust design.

ELECTRICAL SCOPE

POWER RANGE
10 kVA - 5 MVA

PRIMARY VOLTAGE
400 V - 11 kV

SECONDARY VOLTAGE
400 V - 690 V

FREQUENCY
50 Hz / 60 Hz

COOLING METHODS
AN / AF

CONFIGURATION
Isolation / Autotransformer options / Fully engineered-to-order configurations...

APPLICATIONS

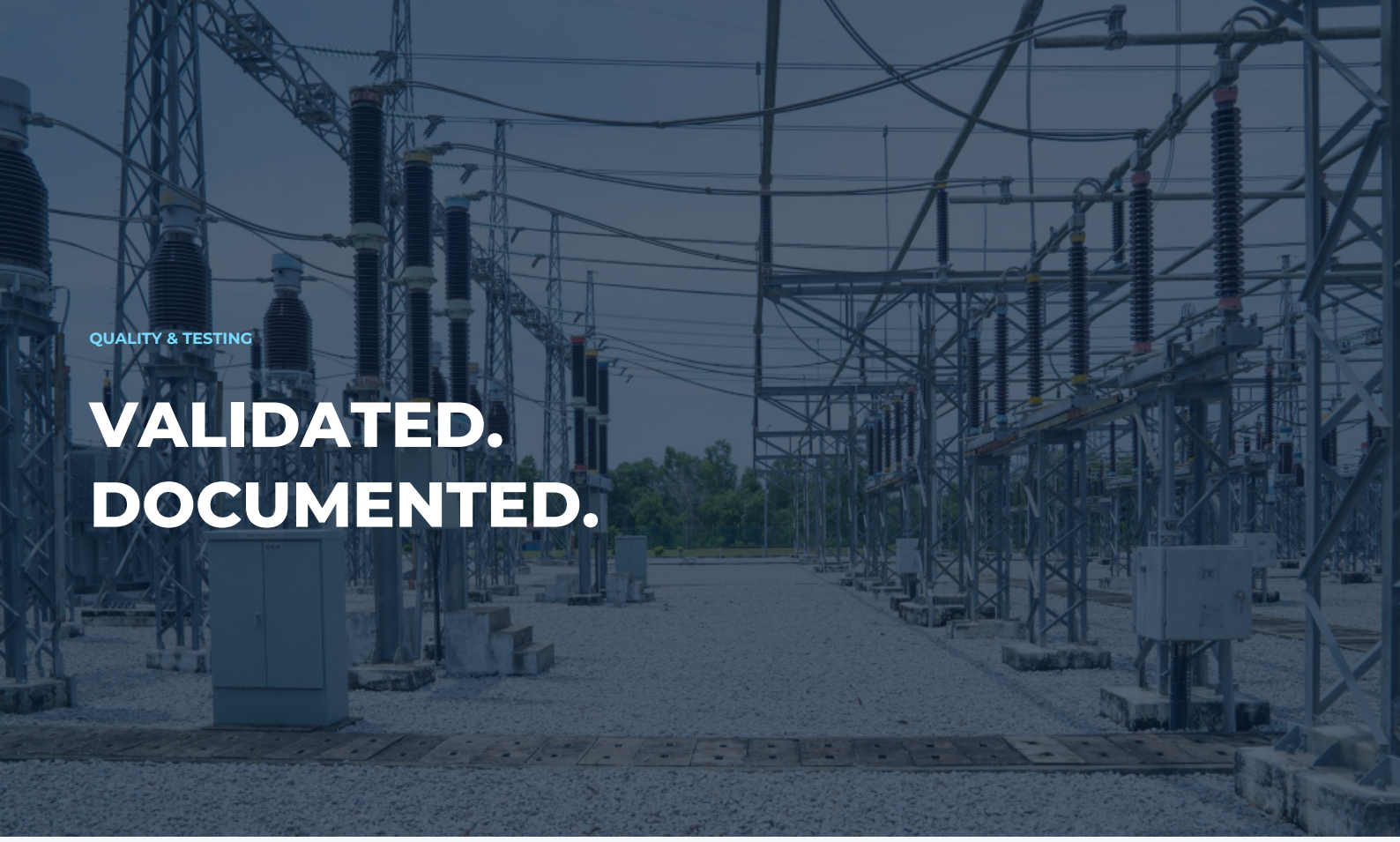
- Data centers
- Hospitals and healthcare facilities
- Industrial automation systems
- IT and telecom infrastructure
- Banking and financial institutions

ENGINEERED FEATURES

- High Mechanical Strength
- Designed for continuous operation under dynamic load conditions
- Reinforced structure for long service life
- Reliable performance under switching cycles
- Environmental Protection

STANDARDS & COMPLIANCE

IEC 60076 / UPS system standards / Power quality and safety standards



QUALITY & TESTING

VALIDATED. DOCUMENTED.

Quality and testing are integral to ESTA's engineering process. Every transformer is delivered with full traceability, detailed test reports and technical documentation.

ROUTINE TESTS

- Electrical performance
- Insulation integrity
- Functional verification

PROJECT VALIDATION

- Factory Acceptance Tests
- Thermal performance
- Project-specific special tests

TRACEABILITY

- Controlled manufacturing records
- Technical files
- Detailed test reports

Project-specific and special tests are performed at independent, internationally accredited testing laboratories.

QUALITY, SAFETY & COMPLIANCE

COMPLIANCE BY DESIGN.

ESTA Transformers operates in alignment with international quality, safety and regulatory standards. Certification supports the engineered-to-order manufacturing philosophy.

01 **ISO CERTIFICATES**

Controlled management systems and quality processes.

02 **ATEX / IECEx**

Hazardous-area design and certification scope by project.

03 **CE / EU COMPLIANCE**

Applicable EU directives and conformity requirements.

04 **PROJECT-SPECIFIC**

Customer, EPC, class and application-specific requirements.

Current certificate scope and validity are available upon request.

WHY ESTA

BUILT FOR THE REAL OPERATING CASE.

01

NO STANDARD ANSWER

The project begins with duty, environment and requirements.

02

INTEGRATED ENGINEERING

Electrical, magnetic, thermal and mechanical design in one process.

03

CONTROLLED MANUFACTURING

Engineering intent carried into winding, core and assembly.

04

VERIFIED PERFORMANCE

Routine tests, FAT and project-specific validation.

05

TRACEABLE DELIVERY

Technical documentation, quality records and engineering support.

ENGINEERED-TO-ORDER / TESTED / TRACEABLE

PROJECT CONTACT

LET'S ENGINEER THE RIGHT SOLUTION.

Share your operating conditions, rating, voltage level, installation environment and applicable standards with ESTA's engineering team.

DISCUSS YOUR PROJECT

estatransformers.com/contact-us/

WHAT TO SHARE

- Power rating and voltage levels
- Load and duty profile
- Installation environment
- Cooling and enclosure requirements
- Applicable standards and approvals

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TRANSFORMERS

RELIABLE POWER.
ENGINEERED PERFORMANCE.

Custom transformer solutions up to 10 MVA / 36 kV