ETS group

ETS GROUP COMPANIES

delivering network resilience and reliability

ETS GROUP COMPANIES

Transformer

Emirates Transformer & Switchgear - U.A.E.
IEO Transformatoren B.V. – Netherlands
Patel Trading Company – U.A.E.
HS Switchgear – U.A.E
HS Transformers – U.A.E
ENERGO Transformer & Switchgear – Ethiopia
Skipper ETS Electric – Nigeria
AAMTC – U.A.E.
NST – Oman
Emirates Technical Services – U.A.E.

Switchgear

Emirates Transformer & Switchgear - U.A.E.
HS Switchgear – U.A.E.
Patel Trading Company – U.A.E.
ENERGO Transformer & Switchgear – Ethiopia
Skipper ETS Electric – Nigeria
AAMTC – U.A.E.
NST - Oman

Service

Emirates Transformer & Switchgear - U.A.E.
Pro Energy General Contracting – U.A.E

delivering network resilience and reliability

OIL INSULATED

Emirates Transformer & Switchgear

delivering network resilience and reliability

TRANSFORMER DISTRIBUTION CLASS

Emirates Transformer & Switchgear manufacture a complete range of high-quality IEC Standard 11kV and 33kV voltage class liquid cooled pole and ground mounted distribution transformers. Our standard ratings start at 50kVA and go up to 4000kVA, they are designed to comply with the exacting technical demands of Electrical Distribution Network Operators worldwide.

ETS's transformer technology is derived from over 30 years of design and manufacturing excellence in our 'world-leading' facilities across Africa, Europe and the Middle East. Our manufacturing principles and processes exceed internationally recognised standards to ensure that only highly reliable and resilient transformers are connected to critical distribution networks.

Transformer designs are proven with an significant installed base applied in temperate, extreme and harsh condition environments I.E. extreme high temperatures, humid and tropical climates. This makes our product the product of choice for electrical utilities, industrial, oil and gas operators.

Whether the requirements is for breathing conservator or hermetically sealed type transformers we are able to support your specification and application needs.

OIL INSULATED

Specification & Technical Data

Offering high operational performance properties in terms of voltage ratio, losses, impedance temperature rise and optimised transformer layout or footprint.

Features:

Ratings: 50kVA to 5000kVA l Primary Voltage: ≤36kV voltage class l Phases: single & three
Class: ONAN/KNAN/ONAF/KNAF l Dielectric: mineral oil or ester fluid l Type: free breathing or sealed

Pole Mounted:

- Cable Box
  side mounted - LV
- Outdoor Bushing
  top cover – HV / LV
  top cover end - HV
- Connections
  dual primary - two HV bushings connect 2 Φ of 3 Φ system

Ground Mounted:

- Cable Box
  side mounted – HV / LV
- Connections
  dual primary - 2 HV bushings connect 2 Φ of a 3 Φ system

Product Specification

Rating (kVA)	50	100	200	250	315	500	1000	1500	2000	2500	3150
Mounting Type	P	P	P	P / G	P / G	G	G	G	G	G	G
HV (volts)	11,000 ≠ 21/2%, ≠ 5%										
LV (volts)	231, 400, 415, 433										
Vector Group	Dyn 11, Dyn 5										
Frequency	50 Hz or 60 Hz										
Temp. rise oil / winding	35 to 60°C / 45 to 65°C										
No Load Loss (W)	200	300	500	650	700	1100	1700	1900	2200	2800	3150
Load Loss (W)	1100	2000	2800	3350	3500	5500	7000	14000	21000	24000	31500
Impedance (%)	4				4.75			6			7

General Transformer Range

Distribution Liquid & CRT l Medium Power l Power l Earthing l Rectifier l Motor Start l Phase Shift l Generator l Voltage Regulating l Auto l Multi Tap ESP l Reactors l Solar l Wind Turbine l Furnace l Dual Ratio

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PAD MOUNTED TRANSFORMER

Emirates Transformer & Switchgear Ltd manufacture a complete range of high-quality Pad Mounted Transformer adhering to ANSI®/IEEE® standards. Our range covers 100kVA to 5000kVA

Designed and manufactured utilising high quality materials and production procedures to deliver a superior and reliable transformer which exceed the requirements of electrical utility and renewable applications.

Offering high operational performance properties in terms of voltage ratio, losses, impedance temperature rise and optimised transformer layout or footprint.

Ratings: 100kVA to 5000kVA
Primary Voltage: ≤36kV voltage class
Standard: ANSI®/IEEE®
Phases: three
Class: ONAN/KNAN/ONAF/KNAF
Dielectric: mineral oil or ester fluid
Type: free breathing or sealed

CAST-RESIN INSULATED

Emirates Transformer & Switchgear

delivering network resilience and reliability

TRANSFORMER DISTRIBUTION CLASS

Emirates Transformer & Switchgear manufacture a complete range of high-quality IEC Standard 36kV voltage class ground mounted Cast-Resin type distribution transformers. Our standard ratings start at 50kVA and go up to 15MVA, they are designed to comply with industrial and commercial indoor technical applications.

ETS's transformer technology is derived from over 30 years of design and manufacturing excellence in our 'world-leading' facilities across Africa, Europe and the Middle East. Our manufacturing principles and processes exceed internationally recognised standards to ensure that only highly reliable and resilient transformers are connected to critical distribution networks.

Cast-resin dry type transformers are designed for indoor applications where transformers using hydrocarbon based (mineral oil) dielectric fluid mediums are not permitted due to the higher fire risk to people and property. Due to the reduced fire risk the installation of fire blast walls &/or deluge systems is greatly reduced and no transformer fluid containment system is necessary.

Offering lower maintenance regimes they are ideal for tropical humid climatic conditions which occur in hot climates.

Whether the requirements is from distribution to excitation type transformers we are able to support your specification and application needs.

CAST-RESIN INSULATED

Specification & Technical Data

Offering high operational performance properties in terms of low losses, low partial discharge, high electric strength, high overload capacity and excellent sound isolation available in bespoke metal clad outer enclosure.

Features:

Ratings: 50kVA to 15MVA | Primary Voltage: ≤36kV voltage class | Phases: three
Class: AN/ANAF | Fire Behaviour: F1 | Climate: C1, C2 | Condensation/Humidity: E2

Standard Equipment:

- Temperature Sensor
- Earthing Terminal
- Skid, Lifting Lugs, Pulling Eyes

Options:

- Anti-vibration Pads
- Electrostatic Screen
- Plug-In Bushing
- Forced Cooling
- Ventilated Enclosure

Product Specification

Standards:	IEC 60076-11, CENELEC HD 464,
Rated Power:	50kVA to 15 MVA
Rated Voltage:	≤36 kV
Cooling:	AN or ANAF
Protection Degree:	IP00, IP20, IP21, IP23, IP31, IP33
HV Winding:	Encapsulated, Aluminium/Copper foil
LV Winding:	Pre-impregnated or Encapsulated
Insulation System Temperature:	155°C (Class F) - 180°C (Class H)
Partial Discharges:	< 10 pC

Environmental: E2 environmental class certificate in accordance with IEC 60076-11 standards

Climatic: C1 & C2 climatic class certificate in accordance with IEC 60076-11 standards

Fire class: F1 burning behaviour certificate in accordance with IEC 60076-11 standards

General Transformer Range

Distribution Liquid & CRT | Medium Power | Power | Earthing | Rectifier | Motor Start | Phase Shift | Generator | Voltage Regulating | Auto | Multi Tap ESP | Reactors | Solar | Wind Turbine | Furnace | Dual Ratio

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POWER TRANSFORMER CLASS

Emirates Transformer & Switchgear manufacture a range of high-quality IEC Standard ≤66kV medium power transformers. Our range covers 2.5MVA to 30MVA. Designed and manufactured utilising high quality materials and production procedures to deliver a superior and reliable transformer which exceed the requirements of electrical utility sub-station applications.

ETS's transformer technology is derived from over 30 years of design and manufacturing excellence in our 'world-leading' facilities in Europe, Middle East, and Africa. Our manufacturing principles and processes exceed internationally recognised standards to ensure that only highly reliable and resilient transformers are connected to critical electrical networks. Fully optimised designs meet customer's unique requirements for loss limitation, harmonics, physical size and weight to deliver a total engineered and reliable solutions for a broad range of applications.

Transformer designs are proven with an significant installed base applied in temperate, extreme and harsh condition environments I.E. extreme high temperatures, humid and tropical climates. This makes our product the product of choice for electrical utilities and large industrial operators.

Whether the requirements is for ONAN/KNAN or ONAF/KNAF type transformers we are able to support your specification and application needs.

OIL INSULATED

Specification & Technical Data

Offering high operational performance properties in terms of voltage ratio, losses, impedance temperature rise and optimised transformer layout or footprint.

Features:

Ratings: 2.5MVA to 30MVA l Primary Voltage: ≤66kV voltage class l Phases: three
Class: ONAN/KNAN/ONAF/KNAF l Dielectric: mineral oil or ester fluid l Type: free breathing

Standard:

- IEC 60076

Accessories:

- OLTC, RTCC, Surge Arresters, CT's

Key Features:

- low losses
- low noise
- anti-short circuit capability
- high reliability
- hermetically sealed structure
- corrugated type fluid tank
- maintenance-free

General Transformer Range

Distribution Liquid & CRT l Medium Power l Power l Earthing l Rectifier l Motor Start l Phase Shift l Generator l Voltage Regulating l Auto l Multi Tap ESP l Reactors l Solar l Wind Turbine l Furnace l Dual Ratio

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ETS Group Company

PSS

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PACKAGE SUBSTATION SOLUTIONS

Emirates Transformer & Switchgear has developed a reputation for designing, manufacturing and supplying quality package substations. The unit comprises of a distribution oil transformer, HV ring main unit and LV feeder pillar mounted on one common platform to make a compact and easy design layout.

Our flexible designs accommodate various RMU and feeder pillar positions to meet individual customer requirements and substation housing options. All our package substations are weather proof and suited for either indoor or outdoor locations.

Standard ratings are 500, 1000, 1500kVA although we offer other ratings up to a maximum of 3000kVA. Package substations provide operators with reductions in cost, footprint and cable run lengths.

Unit Combinations:

- transformer & LV feeder pillar
- transformer & HV ring main unit (RMU)
- transformer, LV feeder pillar & HV ring main unit (RMU)

Specials:

- metering unit – HV side
- easy access disconnection chamber

OIL INSULATED

Specification & Technical Data

The RMU can be supplied as an oil or SF_6 insulated type with a fused switch or vacuum circuit breaker and a metering unit option to suit specific customer technical requirements.

Feeder Pillar units come in three variations: BS J-Type fuses, DIN Standard fuses or Circuit Breakers

Housing Options: Sheet Steel / Aluzinc, GRP, Containerised

Specification:

Ratings: 50kVA to 3000kVA l Primary Voltage: ≤33kV voltage class l Phases: three
Class: ONAN l Dielectric: mineral oil l Type: free breathing or sealed

Standards:

- IEC 62271-202
- IEC 60076
- IEC 61439 (LV Feeder Pillar)

Conformity:

- DEWA
- SEWA
- ADDC
- AADC
- ADWEA
- EWA
- MEW
- MZEC
- MEDC
- Dhofar Power
- Saudi Electric Company
- Ethiopian Electrical Utility

General Transformer Range

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FLUID INSULATED

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IEO TRANSFORMERS SINCE 1945

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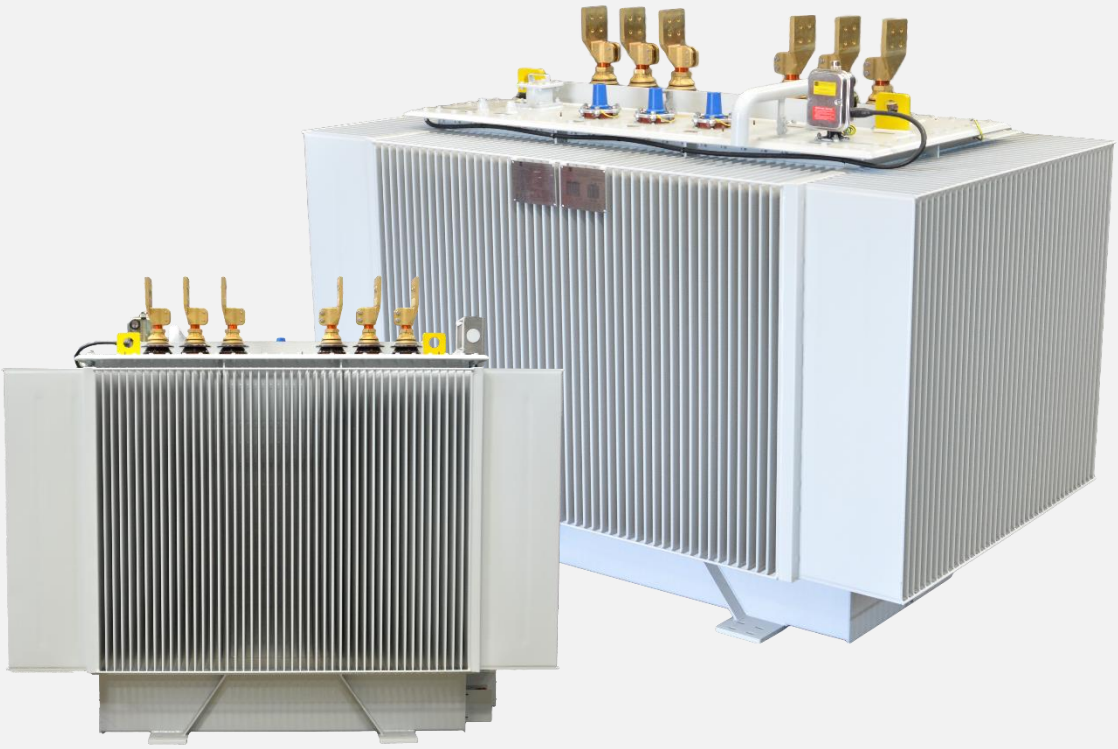
SOLAR PV INVERTER TRANSFORMER



ETS specialises in providing transformers that are a crucial component in the infrastructure of Solar PV Plants. Transformers utilised in either PV solar applications require different design parameters when compared to traditional liquid distribution transformer design principles.

The ETS Group offers Renewable Energy Generation operators total security in designing and manufacturing fit-for-purpose quality transformers to deliver network resilience and reliability ensuring daily generation hours are fully maximised without any non-productive blackout periods.

PV Solar power applications experience steady-state loading during inverter operation, and during sunlight hours there is a dampened reaction process and more constant loading on the transformer. Transformers experience their highest load during the peak sunlight and temperature hours which can have a significant impact on the internal temperature of the transformer and therefore the reliability and life span of the asset.

Large invertors utilised in PV Solar energy harvesting induce significant amounts of harmonics which cause additional losses in the transformer, these harmonics require to be dissipated through filtration to ensure they do not enter the electrical network. Solar generation farms that utilise multiple invertors require separate multiple secondary core windings to connect multiple inputs.

Cooling Dielectric Fluid

Ester Transformer Solutions

To fully subscribe to the environmental and eco-friendly credentials supporting renewable energy power generation, we recommend optimised transformers designs using ester based dielectric insulation fluids (natural or synthetic). Both Ester dielectric fluids are extensively proven in transformer applications and are Fire Safe K-Class Rated, Fully Bio-degradable, Sustainable and Pose no threat to the environment.

Offering high operational performance properties in terms of voltage ratio, losses, impedance temperature rise and optimised transformer layout or footprint.

Specification:

Ratings: 1MVA to 10MVA | Primary Voltage: ≤33kV voltage class | Phases: three
Class: ONAN/KNAN or ONAF/KNAF | Dielectric: mineral oil or ester fluid | Type: finwall or radiator

PV Solar Inverter Transformer – Proposition:

Innovative Design and Engineering: ETS specialise in high-efficiency transformers for PV solar, ensuring top performance and safety.

Customized Solutions for Solar Projects: Custom-built transformers, tailored for both grid connections and decentralized installations.

Quality and Compliance: Our solar transformers meet international standards built for harsh conditions, and are rigorously tested for durability.

Sustainability and Eco-friendliness: ETS focuses on eco-friendly transformers, aligning with our commitment to sustainability.

Design Features:

- Proven Quality
- Enhanced Reliability
- Increased Efficiency
- Eco-Design
- Extended Lifecycle
- Grid Compatibility
- Hermetically Sealed

ESTER INSULATED

Emirates Transformer & Switchgear

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delivering network resilience and reliability

RENEWABLE TRANSFORMER

Ester Transformer Solutions

GREEN NETWORKS

Renewable power generation technologies will provide circa 40% of the world's energy requirements by 2040, and they will continue to require transformers in their electrical networks. Energy generated from solar and wind power conversion sources will represent the fastest growing renewable sector.

Our experience in the specifics of renewable transformer application designs extend back over 20 years. Transformers utilised in either PV solar or Wind Turbine applications require different design parameters when compared to traditional liquid distribution transformer design principles.

ETS and IEO fully understand the unique and differing cyclic loading demand characteristics applied to the transformer from these applications and the internal forces they need to endure as part of a critical network connected to solar and/or wind generation energy harvesting systems. Our experience and designs counter any negative impact to overall performance, reliability and life expectancy of the transformers

The ETS Group offers Renewable Energy Generation operators total security in designing and manufacturing fit-for-purpose quality transformers to deliver network resilience and reliability ensuring daily generation hours are fully maximised without any non-productive blackout periods.

Wind Turbine Transformers

Due to advances in insulation material technologies utilised in the construction of transformers, we are able to develop a transformer design with an overall smaller footprint and a reduced width dimension to facilitate their installation inside the turbine nacelle. The combination of high temperature withstand insulation media and high performance synthetic ester dielectric fluid allow higher internal transformer temperature operation, but without causing any premature thermal aging in the insulation materials.

PV Solar Transformers

PV Solar power applications experience steady state loading during inverter operation, and during sunlight hours there is a dampened reaction process and more constant loading on the transformer. Transformers experience their highest load during the peak sunlight and temperature hours which can have a significant impact on the internal temperature of the transformer and therefore the reliability and life span of the asset.

Large invertors utilised in PV Solar energy harvesting induce significant amounts of harmonics which cause additional losses in the transformer, these harmonics require to be dissipated through filtration to ensure they do not enter the electrical network. Solar generation farms that utilise multiple invertors require separate multiple secondary core windings to connect the several inputs.

Cooling Dielectric Fluid

Ester Transformer Solutions

To fully subscribe to the environmental and eco-friendly credentials supporting renewable energy power generation, we recommend optimised transformers designs using ester based dielectric insulation fluids (natural or synthetic). Both Ester dielectric fluids are extensively proven in transformer applications and are Fire Safe K-Class Rated, Fully Bio-degradable, Sustainable and Pose no threat to the environment.

We also offer traditional mineral oil dielectric fluids for PV Solar transformer cooling but this not recommended for Wind Turbine applications.

Design Features:

- optimised loads
- extended asset life expectancy
- efficiencies
- low cost of ownership
- low no-load losses (non-daylight hours)
- ≤33kV voltage ratings

Applications:

- multiple inverter
- battery energy storage systems
- high temperature & performance
- load cycle capability
- fixed efficiency loads

General Transformer Range

Distribution Liquid & CRT | Medium Power | Power | Earthing | Rectifier | Motor Start | Phase Shift | Generator | Voltage Regulating | Auto | Multi Tap ESP | Reactors | Solar | Wind Turbine | Furnace | Dual Ratio

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ETS Group Company

OIL INSULATED

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OIL & GAS TRANSFORMER

HARSH ENVIRONMENTS

Emirates Transformer & Switchgear has vast experience in the design, manufacture and the application of transformers for all critical and harsh environments present in on-shore, off-shore and refining oil and gas operations. Our core business values are founded in safety and reliability, these core principles are paramount in every process we undertaking across our facilities and apply on supply partners to ensure we provide the customer with complete security and confidence that only the highest quality and most reliable transformers are supplied.

Our experience in the specifics of specialist oil and gas sector transformer application designs extend back over 25 years. Transformers utilised in this sector are some of the most technically challenging transformer designs which require extensive experience, knowledge and appreciation of the exacting application and environmental requirements. Oil and gas applications require different transformer design parameters when compared to traditional liquid transformer design principles.

ETS fully understands the unique and differing demand characteristics applied to the transformer when refining or extracting crude oil from the ground or sea bed. Specialist step-up multi-tap, phase shift, booster, VSD and many more types form part of our product portfolio for the petrochemical, oil and gas market sectors. We typically supply applications for motors, pumps, compressors and drilling machinery required for on-shore, off-shore or refinery operations.

ETS are the supplier of choice for chemical, petrochemical, oil and gas operators through the delivery of complete security in the design and manufacture of fit-for-purpose quality transformers to deliver system resilience and reliability ensuring safer daily operations which are productive without non-productive blackout periods due to the transformer performance.

OIL INSULATED

Emirates Transformer & Switchgear

delivering network resilience and reliability

On-shore Transformers

Transformers located in on-shore facilities are necessary for general electrical distribution to the extraction of crude oil from underground oil fields many kilometers below the surface. On-shore locations are still exposed to harsh environments, be that extreme hot or cold climates; categorised as a mildly corrosive environment, transformers are typically constructed using hot dip galvanised tank and radiators with a paint coating finish for protection from abrasive conditions such as, sandstorms present in desert areas.

Off-shore Transformers

Off-shore platforms are some of the most extreme operations to be found across all industrial sectors with exposure to extreme temperatures (hot or cold), weather and abrasive conditions. Similar to on-shore facilities transformers are used for general electrical distribution to the extraction of crude oil from oil fields many kilometers below sea level. Categorised as a severe corrosive environment, transformer are constructed of stainless steel 316L tank/radiators and passivated for additional protection and durability. External accessories are stainless steel and cable box enclosures have a minimum IP66 or NEMA 4X class.

Refinery Transformers

Crude oil refining operations are comple[illegible]es requiring a mandatory level of safety due to the hazardous and explosive environments t[illegible]und in refining processes. Transformers are used for general electrical distribution to specialist transformers for compressor and pump converters or drives.

Fire Safe Ester Dielectric Fluid

We are the regional technology leader for ester transformers with substantial experience designing and producing oil & gas transformers utilising fire safe ester dielectric fluids as an alternative to traditional mineral transformer oil.

In safety critical oil and gas environments, fire and safety officers strive to identify opportunities to further mitigate the risk of potentially catastrophic fire events. The global oil and gas sector has been at the forefront for adopting the use of fire safe ester dielectric fluids in transformers to achieve higher operational safety standards by using a dielectric fluid that has a K-Class rated fire point of above 300°C. Ester dielectric fluids are extensively proven in transformer applications and are Fire Safe K-Class Rated, Fully Bio-degradable, Sustainable and Pose no threat to the environment.

We also offer traditional mineral oil dielectric fluids for oil and gas transformers.

Operator & EPC Experience:

- ADNOC On-shore / Off-shore
- ADCO, ADGAS, ENOC, GASCO, ZADCO
- SAUDI ARAMCO
- KOC, KNPC
- Petroleum Development Oman
- SHELL
- Petronas
- Qatar Petroleum, QGPC, QAFCO, Qatargas
- IOOC
- Schlumberger
- GE Oil & Gas
- Occidental
- Hyundai Heavy Industries
- L&T Hydrocarbon
- Baker Hughes
- Petrofac
- QXY
- Siemens

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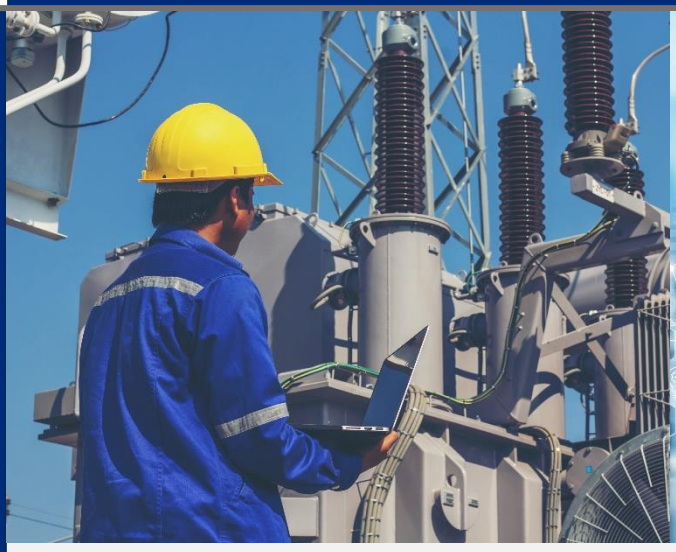
ETS Group Company

REPAIRS

Emirates Transformer & Switchgear

delivering network resilience and reliability

SERVICE & MAINTENANCE



Emirates Transformer & Switchgear has significant experience and available resources to undertake the maintenance, repair or refurbishment of distribution and power transformers. Our vastly experienced service team has the capability to preform on-site annual preventative maintenance contracts or carry out a complete transformer refurbishment in one of our facilities.

stay connected

- annual maintenance contracts
- health condition assessment
- transformer condition assessment
- preventative maintenance programmes
- qualified & experienced team 300+ years
- trusted transformer experts
- any rating or make of transformer

get reconnected

- expert assessment & analysis
- efficient identification of issue & resolution
- qualified & experienced team 300+ years
- emergency unit replacement
  - stocked distribution transformers
  - stocked spare components & assemblies
  - stock & inventory control systems
- expediated repair & re-energisation
- trust a premier transformer manufacturer
- any rating or make of transformer

ETS completely understand transformers,
trust only ETS to maintain & care for your critical asset fleet!

REPAIRS

Emirates Transformer & Switchgear

delivering network resilience and reliability

On-site

- preventative maintenance
- emergency call-out
- repair & test
- dielectric sampling & filtration

maintenance

- annual preventative maintenance
- health check assessment & report
- transformer condition assessment
- leak inspection
- leak repair
- replace gaskets
- radiator repair
- radiator replacement
- replace protection devices
- bushing/insulator - inspect, clean, replace
- recharge nitrogen blanket

dielectric

- mineral oil, synthetic & natural ester
- dielectric fluid diagnostics
- sampling & gas analysis (DGA)
- filtration - degassing, drying, regeneration
- vacuum retro-filling

tests

- insulation - DC megger
- winding resistance
- turn ratio
- magnetic balance
- vector group

Factory

inspection – external & internal
disassemble/reassemble
investigate component condition
replace/repair components
rewinds
tank enclosure clean &/or paint
routine test as per IEC 60076

services

- full inspection & evaluation
- disassemble, drain & de-tank
- inspect components remove/replace
  bushing, insulators, gaskets, seals
- winding replacement
- vector group change
- change bushing type
- replace tap switch
- active part vacuum drying
- full reconditioning, clean & paint
- tank modification

dielectric

- accredited dielectric fluid laboratories
- mineral oil, synthetic & natural ester
- dielectric fluid diagnostics
- sampling & gas analysis (DGA)
- filtration - degassing, drying, regeneration
- vacuum retro-filling

tests

- accredited laboratory – IEC 17025
- routine as per IEC 60076
  temperature rise
  lightening impulse
- special as per IEC 60076
  sound level measurement
  harmonic measurement
  zero sequence impedance measurement
  capacitance tan delta measurement
  sweep frequency response analysis
  lightening Impulse with chopping

General Transformer Range

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ETS Group Company

PTC

Patel Trading Co Middle East LLC

QUALITY | TRUST | EXCELLENCE
IN ELECTRICAL SUPPLIES SINCE 1969

- **Power Cable Accessories**
- **Overhead Line items & Accessories**
- **Earthing & Lighting Protection**
- **Transformer Accessories**
- **Wire accessories**

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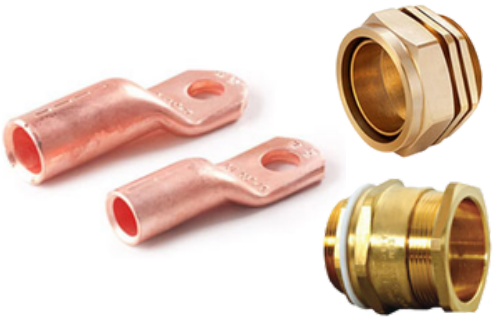
POWER CABLE ACCESSORIES

Cable Joints

Termimations



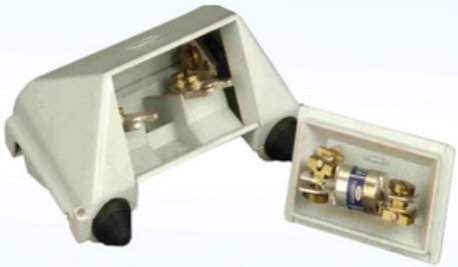
Copper Lugs & Glands

Clamps

Ferrules

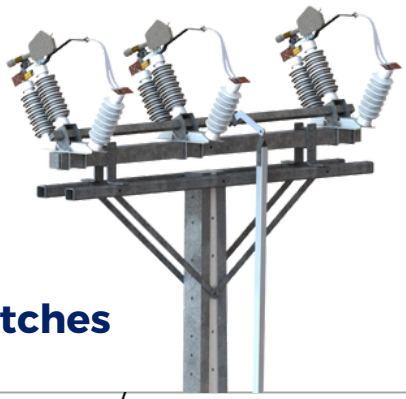
Bimettalic Lugs

OVERHEAD LINE ITEMS & ACCESSORIES

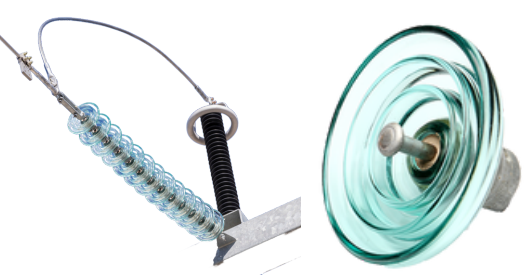


Cutout Fuse

Dropout Fuse



Switches



Glass & Composite insulators

Wooden poles

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EARTHING & LIGHTING PROTECTION

Rods

Pits

Clamps

TRANSFORMER ACCESSORIES

Silica Gel Breather

Transformer Oil

PTC

Patel Trading Co Middle East LLC

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IN ELECTRICAL SUPPLIES

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