KOTSONS

POWER & DISTRIBUTION TRANSFORMERS

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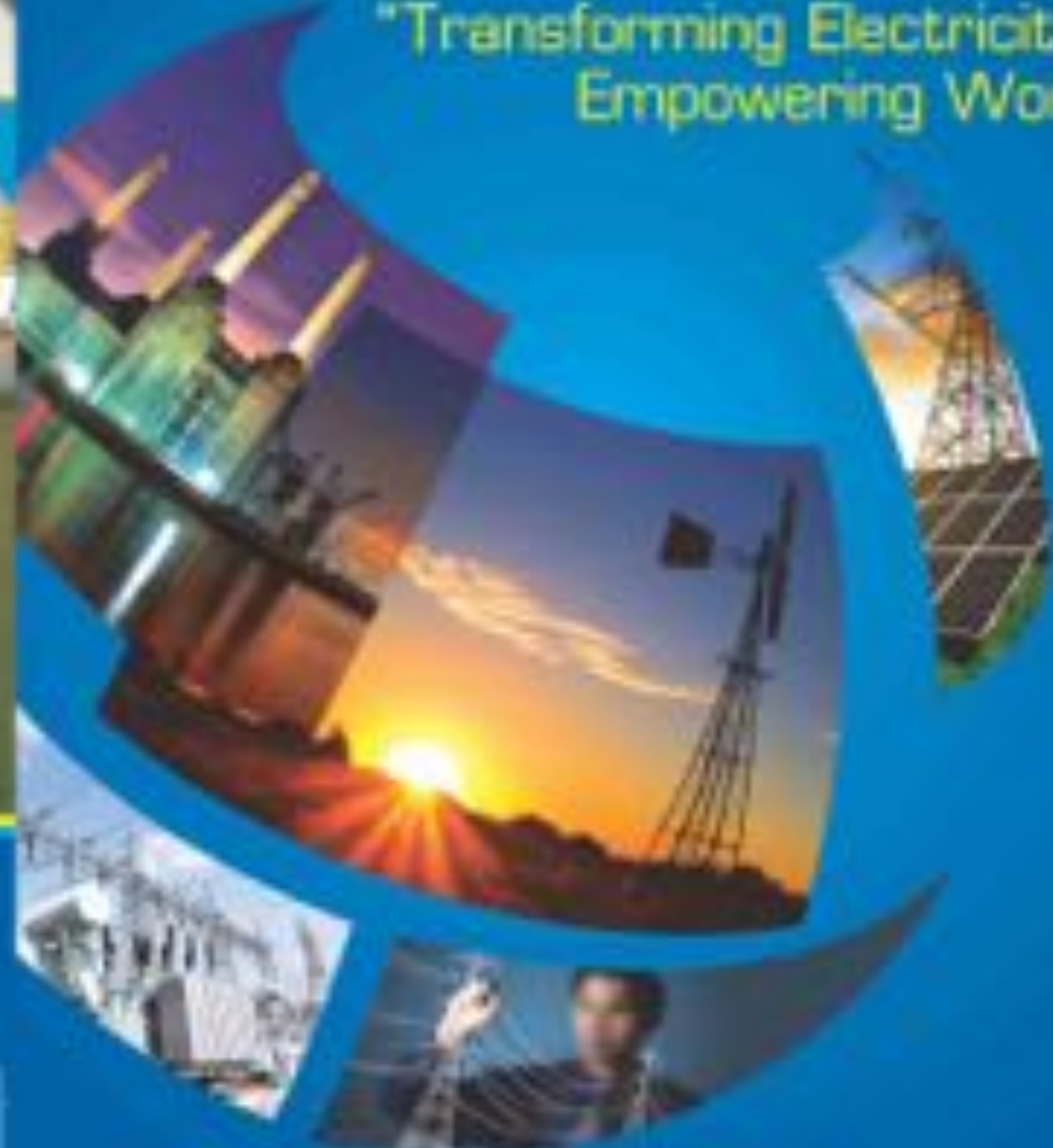
"Transforming Electricity
Empowering World"



www.kotsons.com

KOTSONS

Message from Chairman

With expertise spanning almost four decades in transforming power into efficient energy that's safe for users and the environment, KOTSONS has emerged as the undisputed leader in providing quality and reliable transformer manufacturing. At par with latest trends and internationally certified quality standards, KOTSONS has been instrumental in formulating short and long term plans to contribute in the development and promotion of the Nation's key industries, particularly in the field of power and distribution.

KOTSONS with its cost effective yet premium products and Total Quality Management (TQM), backed by a strong R&D team of engineers, together paved the path of continuous development that in turn contributes to an ever increasing graph of both users and profit.

An ever growing geographical reach, market size and product range, coupled with efficient technology transfer programs, enables KOTSONS to offer the most adapted solution for every need, everywhere and with the same top class level of quality.

Our aim at KOTSONS is to pick up these varied power requirements and transform them into convincing solutions with maximum quality.

Mr. Pawan Kumar Jain
(Chairman & MD)

Objective

- To provide competitiveness in price with continuous improvement in quality.
- Assurance to deliver goods on time.
- To provide optimum productivity through improved working methods and motivation of the employees.
- Ensure involvement and cooperation of our employees through effective communication and training on a regular basis.

Quality, Environmental & Safety Policy

"We at KOTSONS are committed to design, manufacture & supply transformers of agreed quality on time, every time to the satisfaction of our customers.

KOTSONS is further committed to prevention of pollution in all forms from its operations and will comply to all applicable legal requirements.

KOTSONS cares for the occupational health & safety and is committed to prevention of injury and ill health of its employees as well as other interested parties and will comply with all applicable legal requirements.

KOTSONS shall continually improve the effectiveness of the integrated management system."

Our Achievements

- 1979 - First Manufacturing Plant at Alwar
- 1991 - Second Manufacturing Plant at Ajra
- 1997 - First Export Order
- 1998 - ISO 9001 Certification
- 1998 - Export House Recognition
- 2001 - Transformer from 100kVA to 1000kVA type tested at KEMA, The Netherlands
- 2003 - Niryat Shree Award for year 1999-01 & Excellence Export Performance Award for the year 2001-02 by Honorable Vice President of India
- 2004 - Manufacturing Plant of Dry Type Transformers with Dupont
- 2004 - Manufacturing Plant of Single Phase Wound Core Transformers at Alwar
- 2005 - Manufacturing Plant for Amorphous Metal Core Transformers at Alwar
- 2005 - Manufacturing Plant for Toroidal Tanks at Ajra
- 2006 - Manufacturing Plant for Transformers at Raipur (Chhattisgarh)
- 2007 - ISO 14001:2004 Certification
- 2008 - New Manufacturing Plant at Alwar
- 2008 - Among the first manufacturers to get Bureau of Energy Efficiency (BEE) Labeling for 25kVA & 63 kVA
- 2009 - First manufacturer to get 5 star labeling from Bureau of Energy Efficiency for 25 kVA & 63kVA Transformers
- 2012 - Largest capacity wound core Transformers manufactured in India
- 2012 - State-of-the-art Manufacturing Plant for 3D Core Transformers
- 2013 - Development & Manufacturing of Higher rating energy efficient Amorphous Core Transformers upto 1MVA
- 2013 - Manufacturing Plant for Transformer Tanks with state of art Machinery (Robotic Welding, HP Plasma Cutting & CNC Corrugation Line) at Alwar
- 2015 - OHSAS 18001:2007 Certification
- 2016 - Penetrating into New Technology Market with Innovative & Energy Efficient Transformers for Solar & Wind Applications
- 2016 - Transformers type tested from KEMA, The Netherlands
  - 3200kVA - 11 kV/ 33 Design
  - 1800kVA - 33/0.433 Duo Design
  - 3400kVA - 11 kV

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Manufacturing Process

5 Manufacturing Units in India

40 Years of Experience

5,00,000+ Transformers in Network

40+ Countries with Network of Agents

KOTSONS PVT. LTD. certified for ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007 by DNV-GL, THE NETHERLANDS, is setting new benchmarks in quality and reliability. The state-of-the-art KOTSONS manufacturing units are fully equipped with the latest automated machinery and backed by a proficient team of well experienced engineers possessing premium that produce best in class quality, having almost no room for inefficiencies. Whether Single/Three-phase, Distribution & Power Transformers, Dry Type Resins Transformer or Oil Filled, CRGO Steel and Amorphous Metal Transformers, each product is uniquely designed according to individual factors such as voltage, power, climate, system topography, sound level and many more.

Enforcing stringent safety measures at every step, KOTSONS offers a safe working environment for all its employees that in turn contributes to increased efficiency and quality produce. The in-house team focuses not only on manufacturing but continuously endeavors design and innovate cutting-edge technology to deliver solutions that surpass customer expectations.

Manufactured as per internationally recognized standards, KOTSONS are largest Indian suppliers of Oil-filled and Dry Type Resmer® CRGO Silicon Steel and Amorphous Metal transformers.

Design

KOTSONS has a team of highly qualified, skilled and well experienced design engineers, software engineers and drafters, who are fully trained in advanced 2D & 3D CAD software and other areas. All 3D models are developed for dimensional accuracy & less mechanical interfaces. Later shop floor drawings are auto generated from these 3D models. These drawings are compatible to our CNC HB Plasma Cutting machines and other world modern machines to manufacture the right components at first go.

Software wing of our engineering department has successfully developed computer programs for Electrical design calculations enabling millions of iterative calculations converging to a most optimum design. This is also exclusively for National and International tenders where capitalization of losses considered is vital. Constant update is to achieve complete set of design calculations, bill of materials and constructional drawings, all with a single click of a mouse.

KOTSONS has a variety of design options for different types of conductor and core materials. A massive data base has already been established based on the previous test results.

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1. CORE - Amorphous (Wound)

The core is of high quality amorphous ribbon imported from Hitachi Metals (USA), having very low loss formed into several cores of rectangular shape, bolted together to the frames firmly to prevent vibration and noise. The core is designed to ensure permanency of the core loss with continuous working of transformers. Suitable provisions are made in the bottom core clamp / bottom plate of the transformer to avoid the movement of prime part.

1. With the use of Berger machine, Precise dimensional control is achieved in core cutting along with stacking, resulting in bonded edge for core integrity and thereby increasing the transformer's reliability.
2. The assembled amorphous cores are then annealed in inert atmosphere for stress relieving and lower eddy current losses.
3. All assembled cores are tested for pre no load losses before proceeding for core coil assembly process.

2. CORE – CRGO(Stacked/Wound/SOI Wound)

The core is of high quality silicon steel (Lo-Ket coated with, useful procured from internationally reputed brands, having low loss and formed into several cores of rectangular shapes or cut-to-length stacked form with step-lap construction, bolted together to the frames firmly to prevent vibration and noise. The core is designed to ensure permanency of the core loss with continuous working of the transformers. Suitable provisions are made in the bottom core clamp / bottom plate of the transformer to avoid the movement of prime part.

1. With the use of Uni-Cam machines for wound cores, diagonal cutting & step core loops Winding machine for 3D wound cores & CNC cut-to-length machine for stacked cores with precise dimensional control is achieved in core cutting / forming along with winding / stacking resulting in burr free edge for core integrity and thereby increasing the transformer's reliability.
2. The assembled wound cores are then annealed in inert atmosphere for stress relieving and lower eddy current losses.
3. All assembled cores are tested for pre no load losses before proceeding for core coil assembly process.

3. Winding

We use of windings are wound from Copper / Aluminum conductors with polyesterimide enamel class B insulation / EPC. The enamel covering confirm to IEC 60317 Part-8. The windings are progressively wound (HV over LV) in single one piece rectangular / circular construction for better voltage regulation and mechanical strength. The inter layer insulation is of Epoxy bonded Paper. Winding are done in clean atmosphere to prevent possible accumulation of dust particles. The coils are further processed for dimensional control through automatic roller pressing winding machine, which improves winding and short circuit withstanding capabilities. The pressure of shots in winding are made in order to control temperature problem and rise for both winding & oil.

Windings can be made with Copper / Aluminum with Foil / Strip / Round wire of any combination to suit customers requirements. Accurately located taps and a large winding cross section keeps unbalanced amperes turns to minimum. Unbalanced ampere-turns create forces causing short circuits that pace the high voltage and low voltage coils apart vertically. By minimizing the ampere-turns unbalance, vertical forces are correspondingly reduced, thus making the design stronger under short circuit stresses. The large areas presented by the layer type winding result in a low ground capacity, which gives a nearly straight line surge distribution throughout the winding.

All windings are checked and tested for all quality parameters and quality reports for windings & materials characteristics data are maintained for verification.

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4. Core Coil Assembly

Core Coil Assembly is done in two methods, according to shape of the core. In stack core construction, core is kept steady in vertical direction and coils are lowered from the top. Whereas in wound core construction, coils are kept steady in horizontal direction and core is inserted into the coils. In case of 3D core coil assembly, the core is fixed on a special winding machine and the winding takes place on each core limb individually.

Core & Coil assembly for distribution / power transformers uses special insulating materials like crepe paper tubes & multi paper covered conductors for Oil-filled and fiberglass & Nomex® insulation for Dry Type and are very strong and robust in construction to withstand short-circuit forces. They are adequately clamped with the tank so that no movement is possible within the tank because of transport jerks or short circuit forces.

After CCA is made then HV/LV routing is done in accordance with the required Vector Group and type of bushing / cable termination.

5. Tank up

Oil-filled - The core and coil assembly is dried in an oven at a temperature of 90°C - 110°C, to improve insulation resistance and remove ingress of moisture in the insulation materials. The dried core coil assembly is boxed up in a pre-fabricated MS Tank, and vacuum process is applied for filling oil in the transformer tanks. Oil-filled transformer will be PCB free Mineral oil / Midel 7131 / Silicon oil / Ester oil / Nynas Hybrid etc. as per customer's requirements.

Dry Type - The core and coil assembly is enclosed in metallic enclosure designed and fabricated in accordance with NEMA or customer's specification and HV/LV connections are covered with heat shrinkable sleeves & epoxy terminal boards.

6. Testing & Inspection

All Routine / Type tests as per the relevant standards / customer specifications are conducted. Every transformer is pressure tested, and then, the job is finished and kept ready for dispatch. Special tests like noise test / seismic test / partial discharge etc. can be done at third party labs like KEMA / CPRI / ERDA etc. as per customer requirements.

7. Packing & Dispatch

KOTSONS has complete in-house facilities for packing the finished goods with modern machinery compatible for any kind of transport (i.e. road / rail / sea etc.). Third Party inspection as per customer requirements and fumigation in containers and according to International Standards for Phytosanitary Measures 15 (ISPM 15) is done for all transports.

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Backward Integration Process

1. Conductor Plant

In a fast growing, competitive and diverse electrical equipment industry quality often becomes the most distinguishing product feature. In order to achieve and sustain high quality standards, we have felt fledged in-house conductor processing facilities to meet all types of design requirements and expectations of our customers with various types of shapes and sizes.

We have imported latest machinery from wire drawing to enamel coating, heat treatment to paper covering everything. We have fully skilled and trained workforce, also ensures proper processing with complete QC checking.

Our production facilities have the expertise in manufacture of winding wire of all types – copper, aluminum, round and rectangular. Our production systems are often customized to meet our design department's complete needs.

Our product line includes Enamelled Copper Wire (ECW), Enamelled Copper Strips (ECS), Bare Copper Strips (BCS), Bare Copper Wire (BCW) and Enamelled Aluminium Wire (EAW). Our end products meet all of the well-known Indian and International standards including IS, IEC, JIS and NEMA. This provides utmost confidence to our Indian and overseas customers regarding the reliability and consistent quality of Conductors processed by us.

We use Electrolytic grade copper conductor and high conductivity copper conductors and best in class insulating materials are enamel which guarantees the desired high Voltage, Elongation & insulation thickness and other quality parameters.

2. Fabrication (The back bone of KPL)

We have full fledged in-house fabrication facilities to meet day to day increased expectations of our customers with various types of shapes and sizes. We have imported latest machinery from MI Photos to Robotic welding with fully skilled and trained workforce.

Core Clamps to Tanks and Corrugated Wall Panels to Cable Boxes, all are manufactured in different sizes and from different materials. Reliable welded joints are guaranteed even for different materials. As with all the fittings, our modern manufacturing plants ensure precise positioning and tight-as fitting accuracy. All our welders are well qualified and are trained by ESAB Welding Institute at regular intervals to acquire up-to-date welding techniques.

Leak Proof Welding (QC/QA)

Thanks to the latest UT technology for ensuring proper welding with 100% leak-proof, KOTSONS has developed economic leak testing methods to ensure perfect welding by Magna-flow DP finishing system.

Sheet Metal Work Shop

We have imported latest press brake fully programmable CNC type, High bending accuracy bending any complex shape, Slitting range ..... etc.

Corrugation Wall Panel

One of the best cooling systems for natural cooling of the transformer is achieved by Corrugation. KOTSONS has imported Full Automatic CNC Line for making these panels, from folding to bending, everything on computer.

3. Surface Treatment & Corrosion Protection

KPL's surface technology is subject to very high standards since many of the constructions such as corrugated tanks for offshore plants have to resist extremely hard conditions in their later operational environments.

This is why, we have latest steel components in our blasting plant to 100% to ensure absolute surface cleanliness and paint adhesion. For obtaining optimum corrosion protection, we have several painting plants, using different coating procedures depending on the product's geometry or the requirement:

- Spray Coating
- Flow Coating
- Powder Coating
- Hot-Zinc Spray

KPL's most modern painting plants are equipped with suspended rail systems (conveyor) for passing through the painting booth and leading it under controlled with our paint supplier and their training system help us to keep our workforce to date with technology.

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Product Description

Completely Self Protected Distribution Transformers

Applicable Standards : BS EN/IEC 60076

Wide range of CSP transformers in accordance to above standards with different combinations can be manufactured. The CSP transformers are generally designed and manufactured to comply with the IEC publications 60076. CSP feature can be provided in the following range of transformers

- Single Phase: 5kVA-167 kVA
- Three Phase: 12 kVA-630 kVA

Insulation level : 12 kV / 24 kV / 36 kV

- Indoor /Outdoor installation
- Conductor : Copper or Aluminum as per customer requirement
- ONAN / Amenities as per customer requirement
- Hermetically sealed type (with gas cushion) /Tank filled/ Conservator type (with Conservator)
- Color : as per customer requirement
- Cooling arrangement : Corrugation or Pressed steel Radiators
- Maximum ambient temperature : as per customer specification
- Rise in Temperature rise : as per customer specification
- Average winding temperature rise : as per customer's specification

Concept of CSP transformers

CSP technology is more known for high performance distribution transformers which mitigate the operation and maintenance problems associated with conventional transformers. CSP technology enables a transformer to protect itself from secondary faults, lightning protection, persistent severe overloads, and provides visual warning of the overload conditions. CSP technology also protects the distribution system to which it is connected in case of its failure. This means that in case of failure of the transformer, it gets isolated from the system.

Components and benefits of the CSP System

CSP System has four essential components. They are:

1. Oil Immersed Circuit Breaker for overload and secondary fault protection
2. Signal Light for indication during overload condition on transformer
3. HV fuse for over current protection by isolating a failed transformer from the system
4. Surge Arrester for lightning protection

Oil Immersed Secondary (Low Voltage) Circuit Breaker

The oil immersed circuit breaker is installed on the secondary (low voltage) side of the transformer. It provides the stable over current protection to the transformer and responds to secondary faults external to the transformer by tripping and prevents any thermal damage occurring to the transformer.

Besides protecting from secondary fault, the breaker also provides thermal protection to the transformer. It is a electro mechanical device with three major elements. These elements are:

- Temperature sensing through the use of bimetallic strips which are built into the breaker such that the load current flows through them. The bimetallic strips responds thermally to the temperature of the transformer oil and also to the temperature changes created by the flow of the load current through them
- Latching and tripping functions
- The signal light latch
- The emergency control assembly
- The magnetic trip device
- Inverse time Current interrupter

Signal Light

The signal circuit is mechanically connected to the circuit breaker latching and tripping systems through an auxiliary contact. A signal light is mounted on the wall of the transformer tank. It gives a visual assured indication when the transformer oil temperature reaches a specified preset value of temperature during overload condition. Once the signal light glows then it can be turned off only by manually operating the external handle of the circuit breaker.

Primary (High Voltage Fuse) Expulsion Fuse for System Protection

In a CSP transformer the primary fuse is placed in oil and connected in series with the primary winding. This expulsion fuse is to protect that part of the electrical distribution system, which is ahead of the transformer from faults which occur inside of the distribution transformer. If a fault occurs in the windings or some other part of the transformer, it will cause abnormally large currents to flow, resulting in the fuse to melt open and clear the circuit. Thus, the fault is limited only to those customers who are served by this particular transformer and service is maintained on the rest of the system.

Surge Arrester

The surge arrester are mounted near to the high voltage bushings to shorten the ground lead connection between the arrester and the transformer, reducing the lightning impulse voltage stress on the transformer winding. The surge arrester diverts the flow of surge to earth by changing its impedance characteristics from high resistance to low resistance.

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Three Phase Distribution Transformers

(Ground Mounted / Pad Mounted / Pole Mounted)

KOTSONS manufactures a wide range of distribution and medium power transformers. These transformers can be free breathing or hermetically sealed. Conventional transformers are fitted with a conservator with breather for free breathing while hermetically sealed are without breathing with welded cover.

• Applicable standards : IEC / ANSI /BIS / IS / SABS/ CENELEC / GOST

Wide range of transformers in accordance to above standards with different combinations can be manufactured. The transformers are generally designed and manufactured to comply with the IEC publications 60076.

Range : 25 kVA - 10/16 MVA

Insulation level : 12 kV / 24 kV / 36 kV / 52 kV

- Indoor / Outdoor installation
- Conductor : Copper or Aluminium as per customer requirement
- Core : CRGO / Amorphous as per customer requirement
- 3 / 5 Core type can also be supplied
- CSP (Completely Self Protected) feature can be recommended up to 400 kVA
- Maximum ambient temperature : as per customer's specification
- Top oil Temperature rise : as per customer's specification
- Average winding temperature rise : as per customer's specification
- Hermetically sealed type (with gas cushion / Nofal filled) / Conservator type (with Conservator)
- Color : as per customer's requirement
- Cooling : ONAN/ONAF as per customer's requirement
- Cooling arrangement : Corrugation or Pressed steel Radiators
- On Load Tap Changer with RTCC & AVR, can be provided above 1000 kVA, if required
- Safety devices can also be provided upon request
- Other optional fittings as required can be provided upon request

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Power Transformers

Applicable Standards : IEC / ANSI / BS / IS / [illegible]

KOTSONS manufactures wide range of power transformers upto 25 MVA with voltage class of 36 kV. These transformers are generally free breathing type. Oil filled transformers (PCB free Mineral Oil / Midel 7131 / Silicone Oil / Nynas Nytro, etc. as per customer's requirements. Wide range of transformers in accordance to above standards with different combinations can be manufactured. The transformers are generally designed and manufactured to comply with the IEC publications 60076.

From 3150 kVA to 25000 kVA

Insulation level : 24 kV : 36 kV

- Indoor / Outdoor installation
- Conductor: Copper or Aluminium as per customer's requirement
- Core : [illegible] type
- Amorphous core type can be supplied up to [illegible] kVA
- 3 D Core type can be supplied up to 5000 kVA
- Maximum ambient temperature : as per customer's specification
- Top Oil temperature rise : as per customer's specification
- Average winding temperature rise : as per customer's specification
- Conventional Conservator Free Breathing type (with dehumidifier / with air cell (Bladder))
- Colour : as per customer's requirement
- Cooling : ONAN/ONAF as per customer's requirement
- Cooling arrangement : Corrugation or Pressed Steel Radiators
- Altitude : as per customer's requirement
- On Load Tap Changer with RTCC & AVR, can be provided above [illegible] kVA if required
- Safety devices can also be provided upon request
- Other optional fittings as required can be provided upon request

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Amorphous Core Transformers

KOTSONS has set up state of the art amorphous metal core transformer manufacturing facility by importing the latest amorphous metal core manufacturing equipment. This plant has the latest equipment in India to produce energy efficient amorphous metal transformer cores that are annealed under absolute inert atmosphere to get at most lower losses thereby ensuring the energy savings in comparison with the similar transformers in India.

Amorphous metal exhibits a unique random molecular structure unlike the rigid grain structure of the silicon steel. This, in turn, enables easy magnetization & demagnetization, thereby reducing hysteresis loss. Further processing of amorphous metal in very thin lamination (approximately 1/10th of silicon steel lamination) this drastically reduces eddy current losses.

Advantages of Amorphous Metal Transformers over Transformers with CRGO Silicon Steel :

i. The thickness of Amorphous Metal is 0.025mm against CRGO silicon steel core (thickness 0.23-0.3 mm). Lesser is the thickness in sheet results in lower eddy current loss

ii. Random molecular structure of amorphous metal causes less friction than CRGO when a magnetic field is applied. This allows easy magnetization and demagnetization significantly lowers hysteresis losses. Plus, amorphous core significantly reduces overcurrent which is about 69-75%

iii. Saves energy and therefore reduces greenhouse gases and other pollution

iv. Excellent option to reduce distribution losses and improve efficiency

v. Superior electrical performance under harmonic condition. Possible to improve power quality and mitigate harmonics

vi. Lower temperature rise, slower deterioration of insulators and hence longer life

vii. Increase in use of power electronics has resulted in considerable amount of higher harmonics distortion in electrical power system. Higher frequency harmonics lead to increase in transformer core losses whereas amorphous alloy provides lower loss under high frequency

viii. Easy for repair and replacement of coils

A comparison between typical silicon steel distribution transformers, high efficiency silicon steel distribution transformers & amorphous metal distribution transformers (AMDT)

Transformer Rating 3 Phase, 11 Kv	Core losses with best grade of CRGO (Watts)	Typical core loss with Amorphous metal (Watts)	% Loss reduction/ Energy saving
25 KVA	90	28	69%
100 KVA	310	88	75%
250 KVA	630	150	71%
630 KVA	1400	310	77%
1000 KVA	2000	750	70%
2500 KVA	5000	1200	76%

General Description

Applicable Standards : IEC / ANSI / BS / IS / SABS / CENELEC / GOST

Wide range of transformers in accordance to above standards with different combinations can be manufactured. The transformers are generally designed and manufactured to comply with the IEC publications 60076.

Single Phase: 10 kVA-167 kVA,

Three Phase: 10 kVA-5000 kVA,

Insulation level : 12 kV / 24 kV / 36 kV

- Indoor / Outdoor installation
- Conductor : Copper or Aluminium as per customer's requirement
- Hermetically sealed type (with gas cushion / fully filled) / Conventional type (with Conservator)
- Color : as per customer's requirement
- Cooling : ONAN/ONAF as per customer's requirement
- Cooling arrangement : Corrugation or Pressed steel Radiators
- Maximum ambient temperature : as per customer's specification
- Top oil Temperature rise : as per customer's specification

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3D Core Transformers

KOTSONS Pvt. Ltd., as a part of their continuous efforts towards promotion of energy efficient and green technology environment has added a new product in their portfolio, the 3D Core transformers.

3D Core is a structure with 3 identical single frame continuously wound by several trapezoidal tape; three pillars of the core shape a equilateral triangle and the 3 phases are symmetrical. 3 phase magnetic circuits of the core are completely balanced, the magnetization direction is identical with the direction of rolling of silicon steel; magnetic flux distribution is even with neither top nor seam; there is neither obvious high resistance area nor distortion of density of magnetic flux of the seams.

Advantages of 3D Transformers over conventional stack core / wound core type transformers:

3D Core transformer is an energy saving transformer with better structure and performance. It has the following outstanding benefits:

- Reduced Material: Less Weight
- Reduced Energy Loss: Energy Saver
- 3 Phase Equilibrium: Equal Load
- Low No-load Current
- Low Noise: Installation anywhere
- Overload Capacity: Natural Cooling
- Strong Energized: Short circuit Protection
- Low Strength of Electromagnetic Field
- Low Current Harmonic Spectrum
- Anti-shock

Applicable standards : IEC / ANSI / BIS / IS / SABS / CENELEC / GOST

Wide range of transformers in accordance to above standards with different combinations can be manufactured. The transformers are generally designed and manufactured to comply with the IEC publication 60076.

Range : From 50 kVA to 5000 kVA
Insulation level : 12 kV / 24 kV / 36 kV

- Indoor / Outdoor installation
- Conductor : Copper or Aluminium as per customer's requirement
- CSP (Completely Self Protected) feature can be provided up to 630 kVA
- Maximum ambient temperature : as per customer's specification
- Top Oil Temperature rise : as per customer's specification
- Average winding temperature rise : as per customer's specification
- Hermetically sealed type (with gas cushion / fully filled) / Conventional type (with Conservator)
- Color : as per customer's requirement
- Cooling : ONAN/ONAF as per customer's requirement
- Cooling arrangement : Corrugation or Finned steel radiators
- On Load Tap Changer with RTCC & AVR, can be provided above 500 kVA, if required
- Safety devices can also be provided upon request
- Other optional fittings as required can be provided upon request

KOTSONS

Dry Type Transformers

Open Ventilated Dry Type (ONDT) Vacuum Pressure Impregnated (VPI) Eco Friendly Transformers

KOTSONS was one of the first Indian manufacturers to use the DuPont Nomex® based solution and develop Ventilated Dry Type Transformers in collaboration with E. I. du Pont de Nemours and Company, U.S.A.

KOTSONS Eco Friendly VPI transformer coils are vacuum pressure impregnated in high temperature varnish. The process includes complete submersion in varnish under vacuum and pressure and regulated curing using PLC controlled equipment to ensure consistency. The finished coils are effectively sealed and sealed against moisture, dirt, and most industrial contaminants. A 220°C Class NOMEX® Listed insulation system is used on KOTSONS ONDT VPI transformers regardless of specified temperature rating. This system accommodates a standard temperature rise of 150°C. Optional temperature rises of 80°C and 115°C and fan cooling allow for an unexpected overload capacity.

Salient Features & Advantages of ONDT VPI Dry transformers:

1. Excellent mechanical and short circuit strength due to the VPI Process.
2. No danger of fire or explosion. No liquids to leak hence no flammable liquid & no oil pollution.
3. Less weight than comparable cast resin units.
4. Low total ownership costs and low initial costs.
5. Use of NOMEX® upgraded Insulation Materials, listed 220°C insulation system, regardless of temperature rating.
6. VPI transformers are non-explosive with high resistance to flame and do not require vaults, containment dikes, or expensive fire suppression systems.
7. Low Partial Discharge - VPI process ensures void free insulation system.
8. Moisture ingress Resistant & Immune to polluted atmosphere.
9. Easy to repair (open coils) due to UNIT design.
10. Eco Friendly, No harm to environment at the end of Life.

Temperature Rise / Overload Capacity:

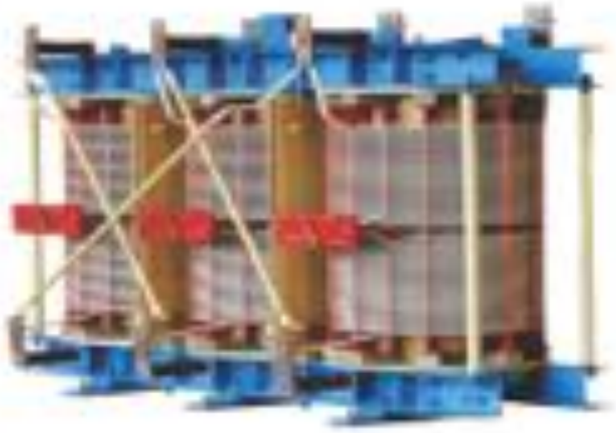
Temperature Rise	Rated Rated kVA	Rated kVA at 150°C	Fan Cooled kVA
150°C	1000	1000	1333
115°C	1000	1150	1533
80°C	1000	1250	1666

Standard VPI Range & Features

- Up to 5000KVA & up to 33kV
- Aluminium / Copper Windings
- With Dry Type On Load Tap Changer
- Step Lap Interleaved Core / Amorphous Metal Core
- 220°C insulation system - 115°C average temperature rise
- Vacuum pressure impregnation with high temperature varnish
- Vibration isolation pads between Core, Coil and Enclosure
- Base equipped with lacking Pads and designed for Rolling or Skidding the Enclosure in any direction
- Suitable for Package Substation Installation
- 100% DE Partial Discharge Test

Options & Accessories

- UL listing
- IEEE 344 - Seismic Certification
- NEMA 3R enclosure
- 80°C or 115°C average temperature rise
- Copper windings
- Provisions for Future Fan Cooling (FFA)
- Electronic temperature monitor
- Instrumentation, Alarms/Leads
- Low optimized designs
- All-Rigid terminal chambers
- Special paint colors



Special Purpose Transformers

Special Purpose Transformers (SPTs) are explained by its name itself; these are made for a specific purpose / application. From designing to manufacturing everything is special and specific. Few types of SPTs are listed below.

- Dual Ratio Transformers
- Auto Transformers
- Rectifier Transformers
- Reactor Transformers
- Earthing Transformers
- LT – LT Transformers
- Dual Secondary Transformer for Solar PV Application
- Package Sub Station Transformer with RMU & [illegible]

KOTSONS designs and manufactures custom designed special transformers for industrial and power applications. We offer customized maintenance and service solutions for transformers with state-of-the-art machinery & equipment and testing facilities.

At KOTSONS each transformer is designed as a new product and customized to comply with specific customer requirements. The KOTSONS engineering team covers the complete design of a transformer: from designing of core and coils to the tank and its supporting structures with proper cooling system and full protection.

Transformer engineering begins from electromagnetic and thermal design of core and windings. This activity is performed by means of standardized calculation programs developed by our Design Department. Also the latest 2D and 3D FEM software tools are used for particular studies, such as distributed capacitances of phase-shifter multi-winding transformers, eddy current and stray losses calculation due to harmonics, hot-spots calculation and localization on windings and magnetic, mechanical stresses due to short-circuit, insulation assessment.

Transformer mechanical design is carried out using 3D software tools allowing dimensions optimization, mechanical stress evaluation and taking into account special external conditions (Seismic Zone, Low Noise Level).

Each transformer is supplied with a set of basic documents describing its features and functionalities, such as fabrication drawings, P&ID connection drawings, auxiliary circuit / schematic wiring diagrams, cooling system drawings, user's manual.

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Certifications

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Our Customers

International Customers

Schneider Electric

PHCN

Rural Energy Agency

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GECOL

NIPP

CEET

Domestic Customers

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SIEMENS

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BSES

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