




save energy, it is precious



Mfg. of all types of Distribution / Power & Furnace Transformers



**SYNERGY**  
transformers

An aerial photograph of an industrial facility, likely a refinery or chemical plant, captured at dusk. The scene is dominated by several large, cylindrical storage tanks and a complex network of pipes and scaffolding. The facility is illuminated by warm, yellow lights, contrasting with the cool blue tones of the twilight sky. In the background, a city skyline is visible across a body of water, with mountains rising in the distance. The overall atmosphere is one of industrial activity and modern infrastructure.

**SAFETY AND EFFICIENCY,  
COMBINED WITH LONG-TERM  
RELIABILITY,  
ARE THE HALLMARKS OF  
WORLD-RENOWNED PRODUCT  
PERFORMANCE.**

# INNOVATING, INVESTING, DELIVERING & ENERGIZING

For, Synergy Transformers to succeed, energy has to be everywhere. In our ideas, our goals, and our day-to-day work.

Energy is inspiring. Energy makes the world go round.



# ABOUT



We at Synergy Transformers are a team of engineers with expertise in electrical field. We are engaged in the manufacturing of distribution transformers and special purpose transformers under the brand name "synergy". We firmly believe in quality and that too backed up by after sales services to their installations throughout INDIA.

Synergy Transformers was established in the year 2004. The company is based at Agatrai 130 kms. North of Rajkot, one of the fastest growing industrial zone of the country. The city is well connected by air, rail and road.

We are manufacturing oil filled distribution transformers 100 KVA to 5 MVA and furnace and power transformers upto 15 MVA 66 KV class. We design and manufacture a complete rang of transformers in our class.

We at synergy transformers see that our customers get the best of the products and an excellent after sales service support.

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# 1. OIL IMMERSED DISTRIBUTION TRANSFORMER

We manufacture wide range of Oil Cooled Distribution Transformers. The standard range is 50 KVA to 3750 KVA.

## MAIN FEATURES

- (1) Designed for 25 years of trouble-free performance
- (2) Magnetic circuit - Step-lap designed for lower losses and excitation current cold-rolled silicon-steel plate M3 to M5, MOH and ZDKH type
- (3) Electric circuit - Electrolytic grade 99.99% high-quality oxygen-free copper lines with transposition in L.V. coil for current sharing in parallel conductors or copper foil.
- (4) Dielectric circuits - High Dielectric Insulation Property to withstand lightening impulse.
- (5) Thermal circuit - ONAN through natural convection for effective cooling through axial and radial ducts.

Modern manufacturing techniques ensure cost effectiveness, reliability and a long trouble-free performance

## STANDARD FITTINGS

- |                                      |  |
|--------------------------------------|--|
| (01) Rating & Diagram Plate          | (09) Drain-cum-Bottom-Filter Valve                         |
| (02) Earthing Terminals              | (10) Top Filter Valve with Plug                            |
| (03) Lifting Lugs                    | (11) Bi-directional Rollers                                |
| (04) Thermometer Pocket              | (12) Silica Gel Breather                                   |
| (05) Air Release Hole with Plug      | (13) Cooling Radiators                                     |
| (06) Oil Conservator with Drain Plug | (14) LV Side Cable Box & Copper Bus Bar Suitable for Cable |
| (07) Explosion Vent with Diaphragm   |  |
| (08) Oil Level Indicator             |  |

## PROTECTIVE DEVICES

- (01) Buchholz Relay with Alarm and Trip Contact upto 500 KVA
- (02) Oil Temperature Indicator with Alarm and Trip Contact
- (03) Winding Temperature Indicator with Alarm and Trip Contact
- (04) Magnetic Oil level gauge with Alarm Contact
- (05) Marshalling Box to House O.T.I. and W.T.C.

## OPTIONAL ACCESSORIES ON REQUEST

- |                          |                             |
|--------------------------|-----------------------------|
| (01) Neutral C.T.        | (04) Jacking Pads           |
| (02) Shut - off Valves   | (05) Pressure Release Valve |
| (03) Annunciation Window |                             |



## OFF LOAD DISTRIBUTION TRANSFORMER

### TECHNICAL SPECIFICATIONS

Duty, Type	Outdoor / Indoor, Pole or Ground Mounted
Voltage Class	3.3, 6.6, 11, 22,33 Kv or any Specific
No of phases	1 or 3 phase
Frequency	50/60 Hz
Vector Group	Dyn 1 or Dyn 5 or Dyn 11 or any specific
Insulating Fluid	PCB Free Mineral Oil, both inhibited & uninhibited, as per IS/IEC and customer requirement
Class of Insulation	Class A
Tap Changer	Off Circuit or On Load
Tapping Range	±7.5% in 7 Step or ±5% in 5 Step with 2.5% Step Volts.
Winding Material	Aluminium or Copper with multi paper covering
Applicable Standards	IS 2026, IEC 76, ANSI, IEEE
Painting	Epoxy, Polyurethane or customer specific



On Load switch with 9, 13, 17 Position in 1 Step Voltage Ratio 1.2% to 2.5% Increase or Decrease.

## ON LOAD DISTRIBUTION TRANSFORMER (with AVR)



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## APPLICATIONS

A Distribution Transformer is a transformer that provides the final voltage transformation in the electric power distribution system, stepping down the voltage used in the distribution lines to the level used by the customer.



■ Domestic / Commercial



■ Engineering Industries



■ Auto Industries



■ Forging Industries



■ Ceramic Industries



■ Plastic Industries



■ Hospitals



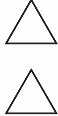

# 2 OIL IMMERSED FURNACE TRANSFORMER (Rectifier Duty Transformer)

Furnace Transformers are designed for induction melting and inducting heating for ferrous and non-ferrous metal.

Induction Furnace has coil constructed from heavy copper tubing. It is designed and tuned to the inverter circuit which applies a medium frequency (generally 500 Hz or 1000 Hz) voltage to the induction coil. The magnetic field produced by the induction coil induces eddy currents in the charge and heats it. Medium frequency is necessary to enhance the rate of heat generation.

The inverter circuit requires for its operation a D.C. voltage which is obtained by converting available three phase A.C. voltage. Transformers which are used for transforming available three phase A.C. voltage to required voltage for converter circuit of the induction furnace are referred to as induction furnace transformers. Thus they are essentially Rectifier / Converter Duty transformers.

Input voltage is derived from the rating of the rectifier transformers from standard three phase AC distribution voltage like 433 V, 3.3 kV, 6.6 kV, 11 kV, 33 kV, etc. These become the primary voltage of the transformer. Secondary voltage can be between 400 to 1000 V decided by the required D.C. output Voltage.

Sr. No.	Primary	Secondary	Remarks
1			(1) Secondary winding. (2) 2 way, using Bridge circuit. (3) 6 Pulse
2			(1) One delta and one star cell side windings (2) 2 way using Bridge circuit. (3) 12 Pulse

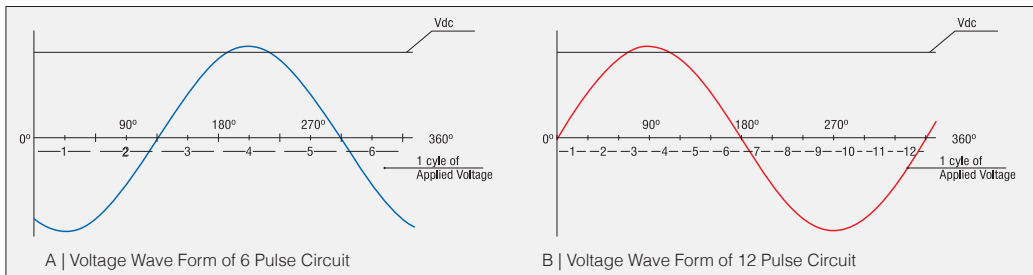
D-1 Typical Rectifier Transformer Winding Connections in common use



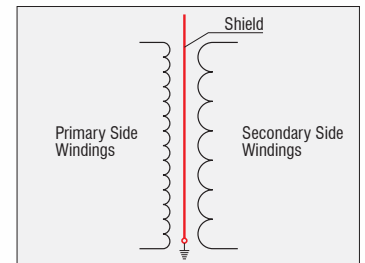
## FURNACE TRANSFORMER (6 PULSE)

### SPECIAL FEATURES

- (1) Electrostatic Earth Shield provided between Primary and Secondary side windings for protection of rectifier elements against voltage surges in Primary side windings. [Ref. D-3]
- (2) Use reduced current densities to limit losses due to harmonic currents.
- (3) Use reduced flux density to limit core losses due to harmonic flux.
- (4) Designed to suit 6 Pulse / 12 Pulse or other rectifier circuits as required by Furnace Manufacturer. Two active parts in one tank can also be provided.
- (5) Conforming to I.S. 2026 and I.S. 4540 - Specifications for Power Transformers and Specification for Rectifiers.



D-2 Output Voltage Wave forms in 6 / 12 Pulse Circuit



D-3 Earthed Shield Provided Between Primary & Secondary Side Windings

### Why weights and dimensions of Induction Furnace Transformers are higher than Conventional Transformers ?

- (01) To achieve reduced current densities, more conductor cross section areas are required. Hence core weight increases.
- (02) To achieve reduced flux density, more core cross section area is required, hence core weight increases.
- (03) In a transformer, core weight and copper weight are inter dependent. Increase in conductor cross section requires that core window area be bigger resulting in increase of core weight also. Similarly increase in core cross section is achieved by increasing core dia. which increases mean dias of winding and the lengths of their mean turn. This increases copper weight also. Increase in core and copper weights increase the overall dimensions, increasing oil quantity, structural steel etc.
- (04) When an electrostatic shield is provided between the windings, more radial gap is required between the windings. This further increases core weight, copper weight, oil quantity and structural steel.



## FURNACE TRANSFORMER (12 PULSE)





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## APPLICATIONS

Furnace Transformers are used in steel plants, casting & forging industries where melting of metals is the primary business.



■ Induction Heating



■ Induction Melting

# 3. POWER TRANSFORMER



## SPECIFICATIONS

- (01) 3 phase, 50 Hz in voltages of 11kV, 22kV , 33kV, 66 kV & 110 kV
- (02) Off-circuit tap changer to provide  $\pm 5\%$ ,  $\pm 7.5\%$  &  $+5\%$  to  $-10\%$  taps in steps of 2.5%
- (03) On load tap changer to provide  $+5\%$  to  $-15\%$  taps in steps of 1.25% as standard range & also custom built for any other ranges. OLTC will be internally/externally mounted as per the requirement
- (04) Class A, uniform/non-uniform insulated
- (05) Vector group Dyn 11, YNd 11, YNyn 0
- (06) Continuous duty, double copper wound
- (07) Painting as per IS/IEC standards
- (08) Both HV & LV side outdoor bushings or cable boxes

- (09) Cooling radiators/fans.
- (10) Standard fittings as per IS/IEC standards
- (11) Buchholz relay with alarm and trip contact with shut off valves
- (12) Oil temperature indicator with alarm and trip contact
- (13) Winding temperature indicator with alarm and trip contact
- (14) Magnetic oil level gauge with alarm contact
- (15) Marshaling box to house oil temperature indicator and winding temperature indicator
- (16) Cooler control unit
- (17) Neutral current transformer

## FEATURES

- (01) Designed for 25 years of trouble-free performance
- (02) Design conforms to IS 2026, IEC 60076, ANSI and other relevant standards
- (03) Low power loss and low noise
- (04) Designed to withstand electrical impulses and thermal and dynamic stresses
- (05) Optimum utilization of active materials for compactness
- (06) Modern manufacturing techniques ensure cost effectiveness and reliability

## OPTIONAL ACCESSORIES

- (01) Winding temperature indicator and oil temperature indicator with remote indication
- (02) RTDs for winding temperature measurement
- (03) Oil preservation system through air cell/thermosphyon filter
- (04) Neutral earthing bar with epoxy supports



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## APPLICATIONS

Synergy manufactures power transformers from 3.0 MVA 33/11 kV upto 15 MVA, 66 kV voltage class. All transformers can be supplied with the desired tapplings for positive/negative voltage variation either with OFF circuit or ON load tap changers. We can also manufacture intermediate sizes with non standard voltage ranges as per customer requirements. Synergy power transformers are currently in operation in several power utilities playing an important role in efficient transmission and distribution of electricity.



■ Hydro Power Plant



■ Coal Power Plant



■ Solar Power Plant



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