ABB transformers
Reliable and customized solutions

Power and productivity
for a better world™

Reliable and customized solutions
ABB transformers are everywhere

In almost every place where people live and work you will find at least one transformer. But as long as it keeps working and supplying power to the escalator in the department store, the hotel lift, the office computer, the classroom in the school, the oven in the local bakery, the farm machinery or the petrochemical plant nobody gives it a second thought.

However, transformers are one of the most important units in every production process. Without them the core activities of nearly every business and factory would come to a standstill - with serious financial consequences.

After nearly 100 years developing and manufacturing transformers we are well aware of this dependency. This is why we are zero tolerant with the performance, security or reliability of our products. We never compromise with design, materials, manufacturing methods, environmental protection or recycling.

Our objective is to support you and to add value to your activities by offering a comprehensive range of quality transformers. We also provide top class service and support.

With this approach we can tailor the most appropriate technical solution to every problem: A high quality solution with better service and support better for the environment and yet with greater availability and a lower total cost ownership than our competitors.

All over the world - in underground railways, in amusement parks and every place where people work or live - you will find ABB transformers at work.

ABB invites you to find the optimal solution to your application and to see with your own eyes that even our standard solutions are special.

Why ABB?

ABB is offering the best and most reliable products according to meet the demanding requirements of all our customers. We offer our customers:

- Quality - guaranteed by the most modern technology, equipment, processes and constantly improved in ABB R&D centers all over the world,

- Speed - the shortest delivery time - within days instead of weeks,

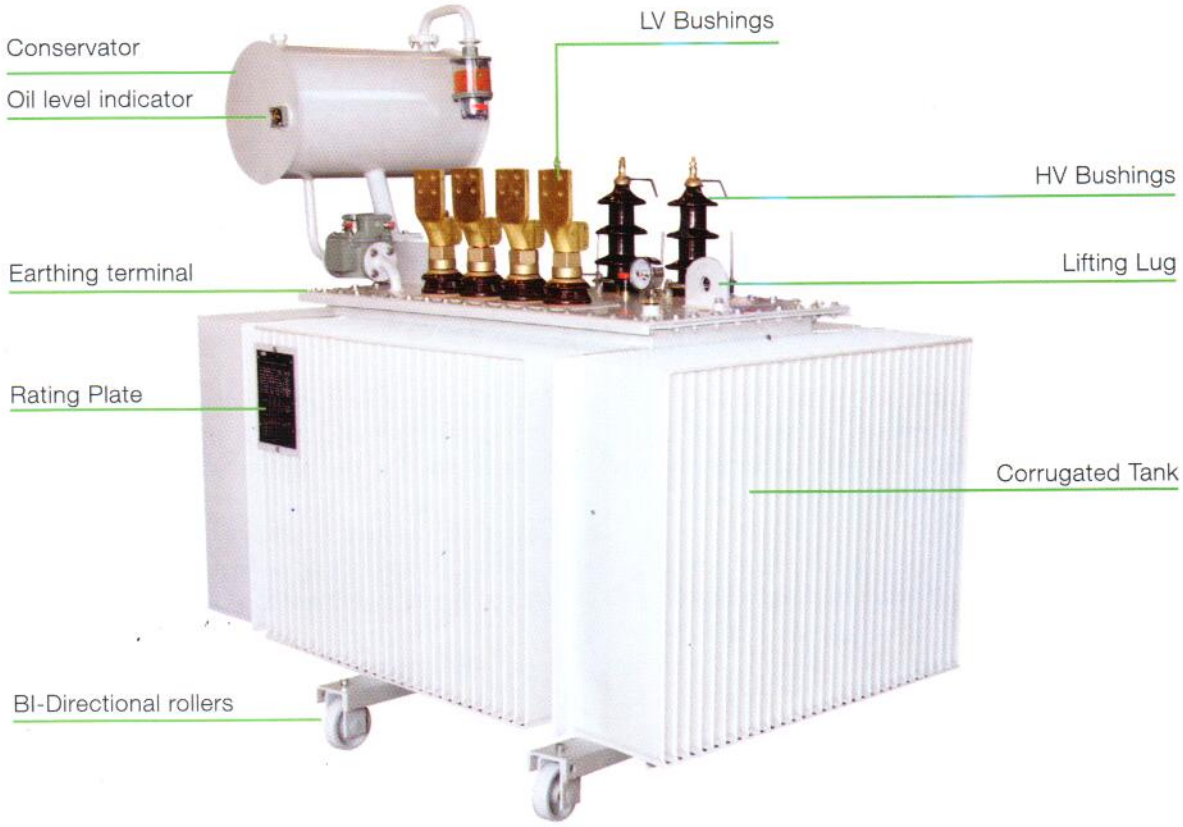
- Focus Factories concept - specialized factories that are focused on specific product ranges to deliver consistent quality and competitive products across the globe.

ABB Common Technology (CT)

Our transformers are manufactured to provide you with a high quality and reliable transformer. ABB has developed a Common Technology (CT) platform, which defines design standards, equipment and processes used in all our factories. Use of this Common Technology enables us to guarantee our customers a high quality and consistent product.

The key production features of our small and medium distribution common technology are:
- Oval core,
- Step lap,
- Automatic cutting and stacking of core legs,
- Windings directly wound on the core legs or mandrels
- epoxy diamond dotted paper insulation between LV layers,
- tapered or full width layer insulation in HV windings.

Construction features



Description

ABB factories manufacture a wide range of oil and dry type transformers. This brochure describes three phase oil type distribution transformers up to 5000 kVA and 36kV. They are used to step down three-phase high voltage to low voltage for power distribution, mainly in urban areas and for industrial applications. Our standard transformers are designed for use in moderate climates and can be installed both outdoors and indoors. The loading capability is designed to comply with IEC 354. Distribution transformers can be hermetically sealed (the tank is completely filled with oil) or equipped with an oil conservator. Tanks are constructed with flexible corrugated walls (fins) which enables sufficient cooling of the transformer. The corrugated walls also compensate for the changes in the oil volume during operation. An advantage of the hermetically sealed transformers is that oil is never in contact with the atmosphere thus avoiding periodic oil analysis.

Our transformers are adaptable for pole mounting, ground mounting or assembly in substations.

Benefits and features

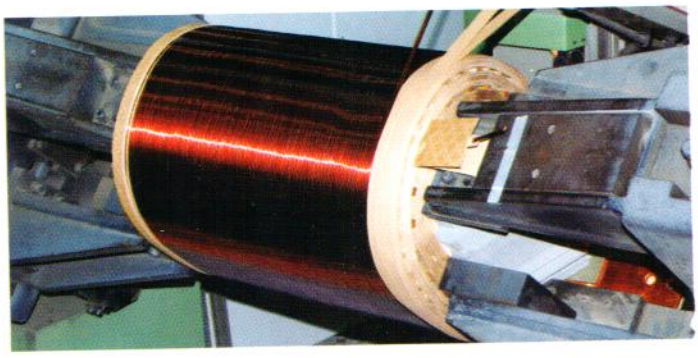
Conservator type:

- Corrugated tank, -HV and LV DIN bushings,
- Off-circuit tap changer,
- Oil drain device,
- Lifting lugs,
- Earthing terminals,
- Name plate,
- Thermometer pocket
- Mineral oil (inhibited or uninhibited),
- *Magnetic oil level indicator,
- *Buchholz relay,
- *Oil filling plug on the conservator,
- *Dehydrating breather.

For hermetically sealed transformers the previous 4 items with the (*) will be:

- Oil filling plug on the cover,
- Pressure relief device.

Other product types with different dimensions and technical specifications can be designed and manufactured on request.



Core

The magnetic circuit is of the three-column type with mitred joints. It is manufactured with first rate, grain oriented magnetic, cold-rolled silicon steel laminations. The mounted core is clamped down in order to reduce vibrations and minimize noise levels. Further noise level and no load losses decreasing are achieved by step lap core construction.

Core design is an important factor of any transformer's efficiency. The geometric core arrangement and the materials chosen determine the losses and noise levels. Grain oriented transformer sheet steel is used in the core construction. It is cut by the most modern, fully automated core cutting machinery and assembled into limb and yoke sets. This results in high dimensional accuracy, excellent space factor, and low loss values. By using step-lap technology, the no-load currents can be reduced improving the drawbacks associated with reactive power compensation.

Windings

The windings are made of two components, conductor material and the insulation material. The conductors used are a high grade electrolytic copper or aluminum. They are insulated with pure cellulose or double enamel. The HV windings are wound either with round, double enamel insulated, or rectangular, paper insulated wire. The LV windings are wound with rectangular paper or insulated wire or foil. The windings are designed to meet the customer's insulation level requirements and also to withstand the short circuit forces as outlined in IEC 60076-5. The neutral point of LV windings are brought up to the tank cover.

Off-circuit tap changer

The tappings of the HV winding are connected to the off-circuit tap changer located horizontally between the yoke and the tank cover. The handle is located on the cover and should only be operated when the transformer is de-energized. The design prevents setting the off-circuit tap changer to intermediate positions. The mechanism can also be padlocked during normal transformer operation.

Insulating liquids

The mineral oil - both inhibited and uninhibited types - with its electrical and chemical characteristics is in compliance with the IEC Standards and is P.C.B. and P.C.T. free.

ABB provides and promotes its own solution as well. BIOTEMP® is biodegradable, vegetable based oil dielectric insulating fluid used in electrical transformers. The product reduces environmental threats posed by transformer insulating oil spills.

Construction features

Tank and cover

Tank walls are made of corrugated cooling surfaces. The bottom plate, side and frames are of welded construction. The welds are tested for oil tightness. All protection device flanges, bushings, tap switch drive and lifting lugs are fitted on the tank cover. The cover is bolted to the tank frame.

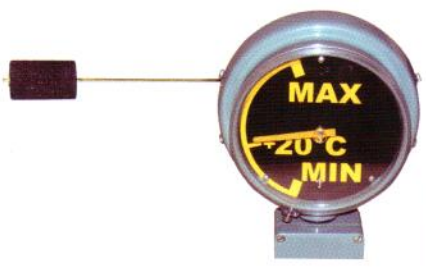
The underbase channel is welded to the base plate and the rollers are suitable for either longitudinal or transverse movements. Single pole 3-phase transformers are delivered with flat base as standard, but optionally can be equipped with underbase channel beams where bi-directional wheels are a requirement.

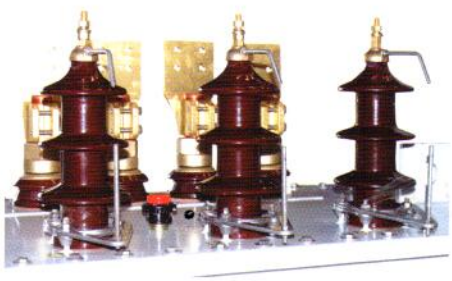
Options and accessories

- Plug-in bushings on HV side
- Bus Bar bushings on LV side
- Dial type thermometer with two contacts
- Oil level indicator
- Pressure relief valve with or without contacts
- Multifunction protection device
- HV and LV cable boxes (IP 54)
- Off-circuit tap changer with 5 or 7 positions
- Thermometer pocket
- bi-directional rollers
- Pole brackets integrated on tank
- Arcing horns
- Terminal box (IP 54)
- Detachable Radiators (rating above 3150 kVA)

Painting and surface treatment

All metal parts are carefully sand-blasted. The initial protective coating is made up of a single coat of one pack epoxy paint. The final paint coating is made up of several coats of paint. All units are painted in RAL 7033 but other colors are available on request. Electrostatic painting and detailed painting procedures for different environmental conditions are also available.





Technical data

Standard Low Loss Designs (Conservator Type - EGYPT)

HV (kV) Syst. Volt.	HV (kV) Nom. Volt.	LV (kV) Nom. Volt.	Power	Imped.%	NLL (watt)	LL(watt) @ 95 °C	Dimensions L(mm)	W(mm)	H(mm)	Total Weight kg	Oil Weight kg	Wheel Dimensions (mm) Base Diam.	Width	
12	3.3 6.6 10.5 11	0.400	50	4	168	875	900	670	1330	500	120	520	125	40
			63		224	1260	900	670	1330	500	120			
			100		272	1505	1060	715	1360	640	150			
			160		384	2170	1525	650	1390	800	175			
			200		456	2520	1440	880	1490	1100	210			
			300		576	3815	1575	835	1795	1365	265	670		50
			500		700	5460	1685	880	1910	1912	349			
			630	4.5	850	6400	1715	920	1920	2269	390			
			800	5	1015	7700	1845	995	2020	2775	481		160	
			1000		1222	9450	1925	1095	2010	3024	517	820		
			1250	6	1500	11700	1970	1140	2145	3680	630			
			1500		1785	13860	2060	1310	2145	4070	730			
			1600		1950	14900	2060	1310	2145	4325	730			
			2000	6.5	2736	15750	2240	1350	2285	5400	915			
			2500		3400	21300	2285	1460	2400	6123	1035	1070	200	70
			3000		3800	30000	2470	1465	2580	7520	1350			
	11 10.5	6.6	3500	6.5	4000	34000	2800	2350	3000	11000	2390	1200		
			4000	7	6500	35000	2800	2600	3000	11000	2500			
			5000	7.15	6500	37000	2800	2600	3000	11500	2500			
24	15 20 22	0.400	50	4	168	875	900	670	1330	500	120	520	125	40
			63		224	1260	900	670	1330	490	120			
			100		272	1505	1060	715	1360	640	150			
			160		384	2170	1525	650	1390	850	185			
			200		456	2520	1440	880	1490	1110	205			
			300		576	3815	1575	835	1795	1365	265	670		50
			500		700	5460	1685	880	1910	1912	349			
			630	4.5	850	6400	1715	920	1920	2269	390			
			800	5	1015	7700	1845	995	2020	2775	481		160	
			1000		1222	9450	1925	1095	2010	3261	531	820		
			1250	6	1500	11700	1970	1140	2145	3680	630			
			1500		1785	13860	2060	1310	2145	4070	730			
			1600		1950	14900	2060	1310	2145	4325	730			
			2000	6.5	2736	15750	2240	1350	2285	5358	920			
			2500		3400	21300	2285	1460	2400	6123	1035	1070	200	70
			3000		3800	30000	2470	1465	2580	7520	1350			
		6.6	3500	6.5	4000	34000	2800	2350	3000	11000	2390	1200		
		10.5	4000	7	6500	35000	2800	2600	3000	11250	2500			
		11	5000	7.15	6500	37000	2800	2600	3000	11500	2500			

Standard Loss Designs (Hermetically Sealed Type - AFRICA**)

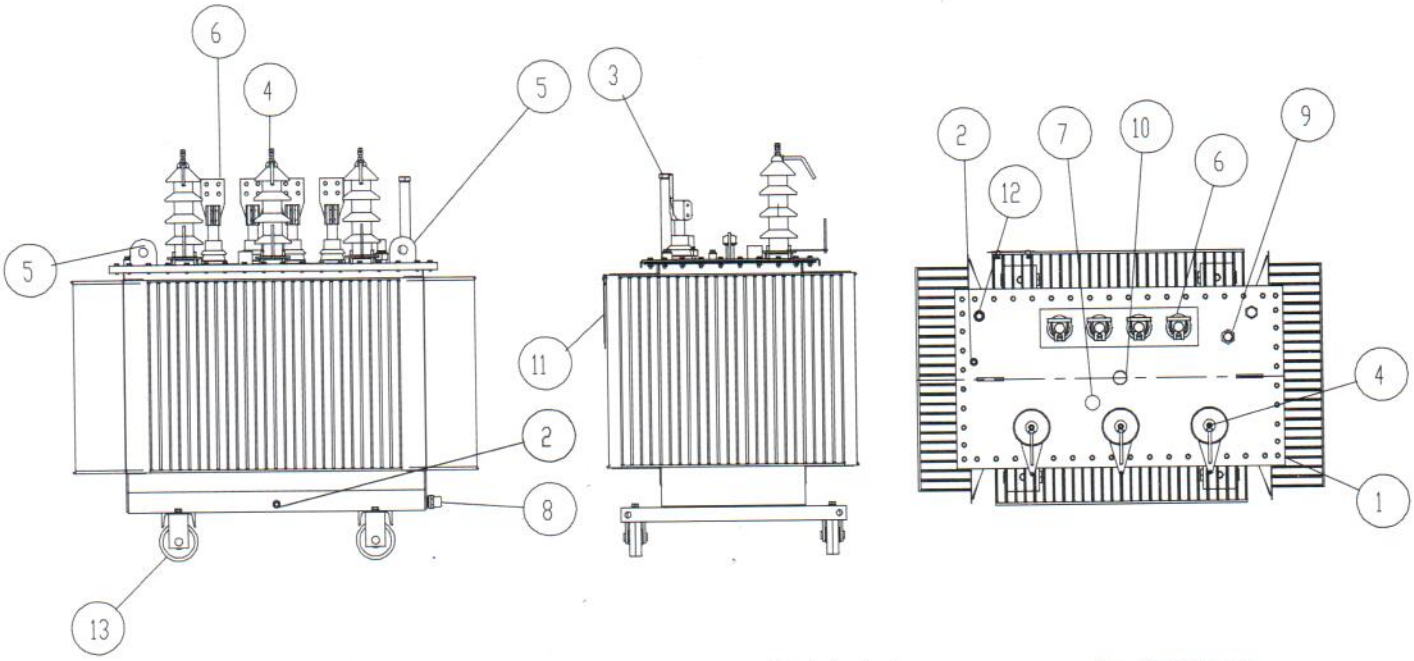
HV (kV) Syst. Volt.	HV (kV) Nom. Volt.	LV (kV) Nom. Volt.	Power	Imped.%	NLL (watt)	LL(watt) @ 75 °C	Dimensions L(mm)	W(mm)	H(mm)	Total Weight kg	Oil Weight kg	Wheel Dimensions (mm) Base Diam.	Width	
36	30 33	0.400 0.415 0.420 0.433	50	4.5	280	1100	940	720	1290	510	130	520	125	40
			100		400	1750	1035	745	1365	740	180			
			160		530	3300	1165	795	1380	800	190			
			200		600	3700	1100	770	1570	1000	250			
			250		750	4000	1120	835	1485	1115	255			
			315		880	5000	1300	850	1500	1400	290	670		50
			400		1000	5700	1350	870	1510	1550	315			
			630	4.5 - 6	1300	8600	1565	995	1550	2000	425			
			800	5.5 - 6.5	1500	10000	1705	1095	1605	2390	480		160	
			1000		1800	12000	1845	1190	1640	2820	570	820		
			1250		2250	14000	1890	1210	1705	3210	620			
			1600		2500	17000	1975	1265	1820	3980	750			
			2000	6.8	2800	22000	2155	1455	1860	4600	830			
			2500		3400	24800	2220	1460	2020	6200	1000	1070	200	70
			3150		3800	30000	2400	1465	2280	7400	1375			
		11 15	5000*	7.15	6500	35000	2800	2600	3000	11500	2500	1200		

* 5000 kVA - Conservator Type Tank

** All Hermetically Sealed - AFRICA Transformers in Table 2 can be produced with conservator type Tank considering slightly increase in dimensions and suitable accessories change.

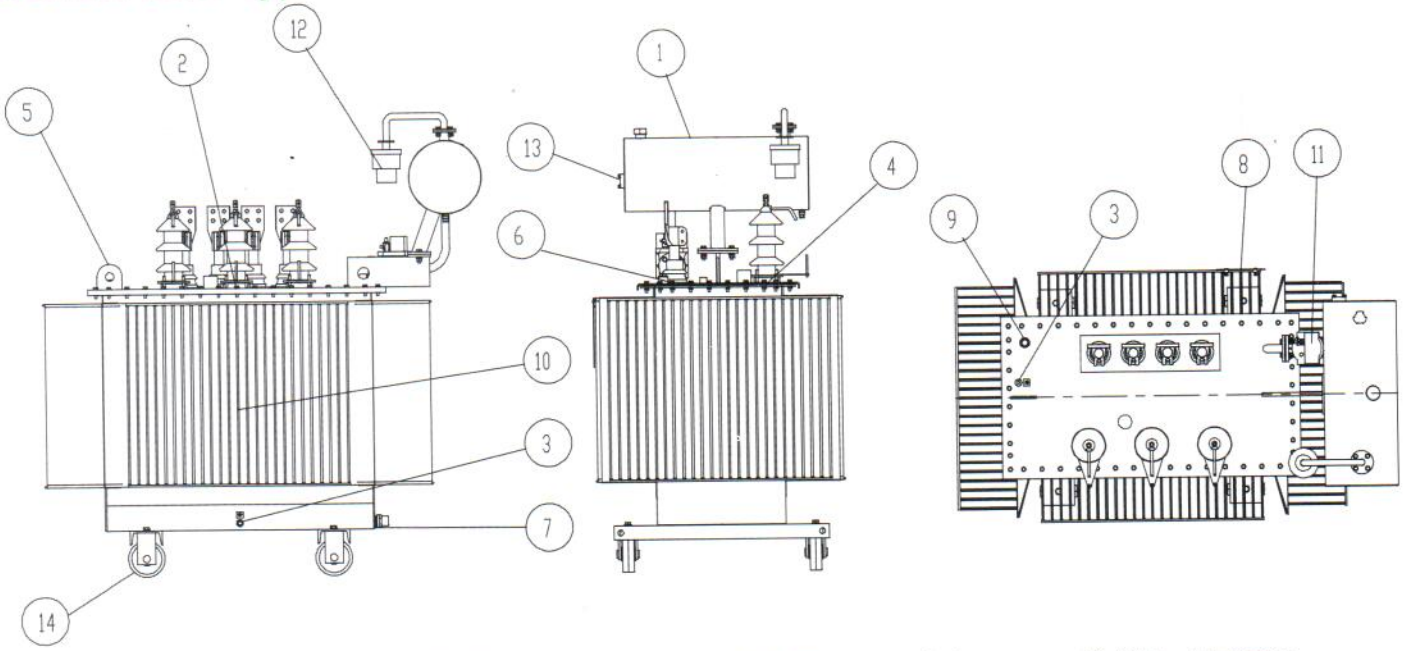
Technical drawing

Hermetically sealed type



1- cover
2- Earth Terminal
3- Filling pipe
4- HV Bushing
5- Lifting lug
6- LV bushing
7- off load tap changer
8- Oil drain device
9- Oil level indicator
10- Pressure relief valve
11- Rating plate
12- thermometer pocket
13- Bi-directional rollers

Conservator type



1- Conservator
2- cover
3- Earth Terminal
4- HV Bushing
5- Lifting lug
6- LV bushing
7- Oil drain device
8- Rating plate
9- thermometer pocket
10- Transformer tank
11- Bushholz relay
12- dehydrating breather
13- Oil level indicator
14- Bi-directional rollers

Quality and references

Quality and testing

Our production facilities where all ABB transformers are manufactured are certified according to ISO 9001:2008, ISO 14001:2004, BS-OHSAS 18001:2007.
At the end of the manufacturing process the transformers are individually tested in accordance with the IEC Standards.

The routine tests are according to IEC 60076-1:
- Measurement of winding resistance,
- Measurement of voltage ratio & check of phase displacement
- Measurement of short-circuit impedance and load loss,
- Measurement of no-load loss and current,
- Dielectric routine tests,
- Tests on on-load tap-changers, where appropriate.

Upon request, witnessed type/special tests can be carried out:
- Temperature-rise test (IEC 60076-2)
- Dielectric type and special tests (IEC 60076-3)
- Partial discharge test (IEC 60270)
- Measurement of zero-sequence impedance (IEC 60076-1)
- Short-circuit withstand test (IEC 60076-5),
- Measurement of the harmonics of the no-load current (IEC 60076-1)
- Measurement of insulation resistance to earth of the windings

Quality Policy

To ensure that we meet our responsibilities and obligations to our customers, our people, our partners, our suppliers and to our shareholders we are committed to the following Quality Objectives:
- Deliver on-time & on-quality products, systems and services that meet or exceed our customer's expectations..

- Identify and understand our customer's expectations, measure customer perceptions, and implement improvements to increase customer satisfaction.

- Enable and engage our people at all levels in a relentless drive to improve operational performance along the value chain from suppliers to customers.

- Increase the motivation and skills of our people to add value to our customers and our businesses, through continual training and development.

- Leverage our partners & suppliers strengths to improve our products and our businesses from product design through production, installation and operation.

- Embed social responsibility & company ethics policies in our business practices.

- Continually improve environmental, health and safety performance through all products, operations, systems and services.

References

ABB has thousands of liquid filled transformers at work all over the world in many different applications, such as utilities, windmills, compact substations and industrial transformers. ABB transformers has more than 20,000 units in the Egyptian grid beside its distinguished reference list across Middle East & Africa

Egypt:
Utility Electricity Companies, Arab Contractors Orascom, El-Sewedy, Enppi, Pgesco, Petrobel, Alex. Construction, Amer Group, Energya

Other Countries:
Algeria, Angola, Benin, Botswana, Burkina Faso, Cameroun, Cote d'Ivoire, Djibouti, D.R. Congo, Ethiopia, Ghana, Gabon, Jordan, Kenya, Libya, Mozambique, Nigeria, Rwanda, Senegal, Syria, Tanzania, Togo, Tunisia, Uganda, Yemen Zambia.

ABB Transformers Porfolio

More than 70 production units in 25 countries, and 36 service centers in 28 countries

Liquid filled distribution transformers:
- Up to 10,000 kVA and 36 kV
- Single phase and 3 phase
- Pole mounted, ground mounted and pad mounted
- IEC, IEEE/ANSI and other local standards

Dry type transformers:
- Up to 63,000 kVA and 72.5 kV
- Open Wound, Vacuum Cast Coil
- RESIBLOC, EcoDry , hi-T Plus, TriDry, HiDry72, PoleDry, Direct-water cooled

Small power transformers:
- 10,000 – 63,000 kVA and up to 170 kV

Large and Medium Power Transformers:
- A complete range of power transformers up to 1000 kV AC and 800 kV DC

Insulation and components:
- High voltage bushing, Oil- or resin-impregnated
- On-load tap changers, Vacuum or conventional
- De-energized tap changers
- Distribution and power transformer components
- Smart Grid monitoring devices
- Transformer protection and preservation systems
- Cellulose insulation material
- Flexible and rigid laminate insulation materials
- Hollow core composite insulators
- Renewal and replacement parts

Services

- Installation and Commissioning,
- Training
- Testing and maintenance
- Spare parts procurement

Contact us

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