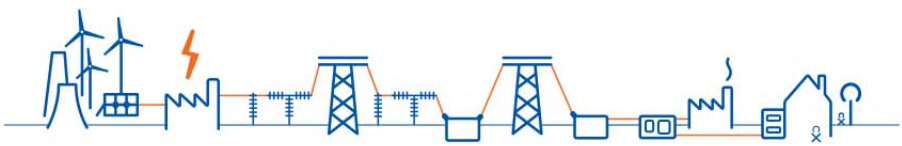
SGB MY
Your dedicated partner
of the SGB-SMIT Group

OIL DISTRIBUTION TRANSFORMERS



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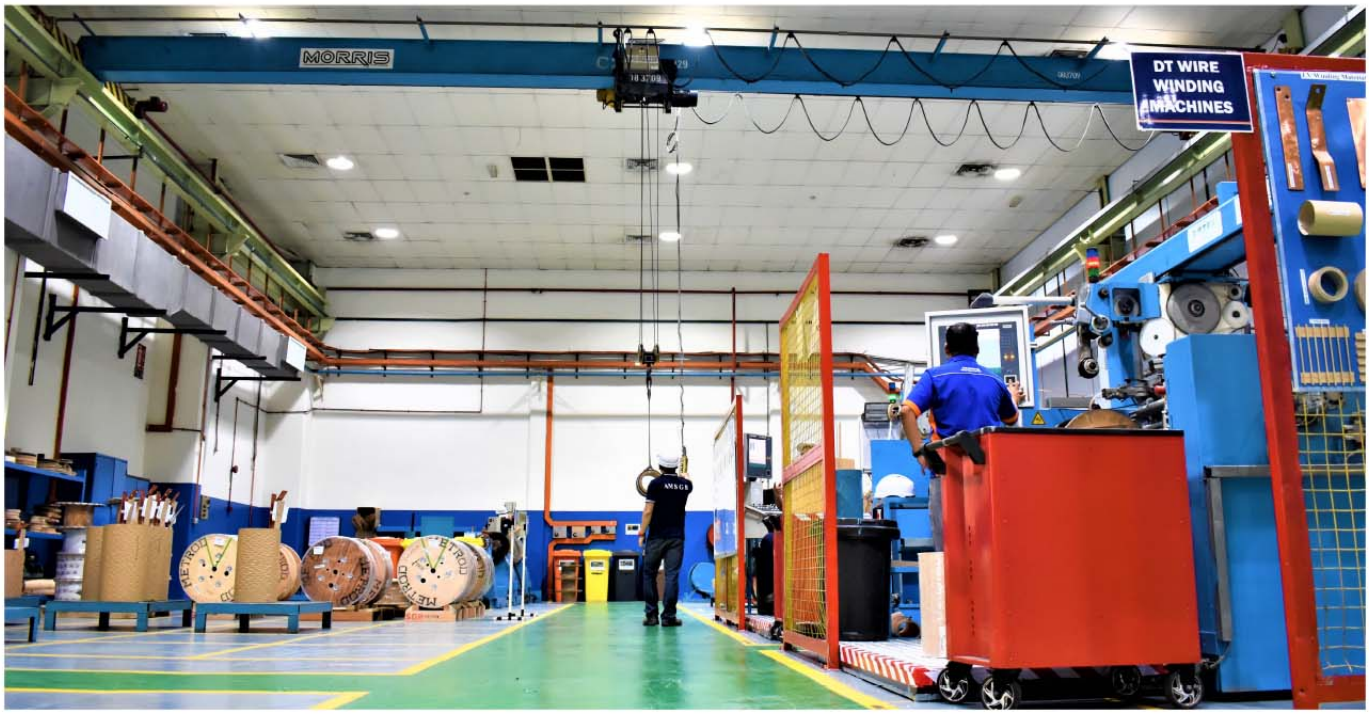


Distribution transformers are used to step down three-phase high voltage to low voltage for power distribution, in metropolitan areas, rural areas and for industrial applications. The transformers in standard versions are designed for use under the service conditions mentioned in IEC 60076 and can be installed both outdoors and indoors. Our transformers are individually designed to suit their particular location and application. Each one conforms not only to customer requirements but also to any applicable standards and directives

SPECIFICATIONS

- Standards : IEC, DIN, BS,

RATINGS

- 50kVA – 5,000 kVA, three phase, 60/65°C Temperature rise
  50 Hz, 60 Hz

HIGH VOLTAGE

- 3 kV – 36kV

VECTOR GROUP

- Dy, Yy, Dd, Yd

IMPEDANCE VOLTAGE

- 4 - 7%

COOLING

- ONAN, ONAF

OVERLOADING

- Overloading of transformers is guided by the relevant IEC 60076-7 - Loading guide for oil-immersed power transformers.

OIL PRESERVATION SYSTEM

Based on customer specification, SGB MY offers Distribution transformers in two different constructions mainly :

1. Hermetically sealed type with or without gas cushion
2. Breathing type with oil conservator

The hermetically sealed transformers have a system of oil preservation that prevents oil in contact with atmosphere. This improves the ageing properties of the oil thus avoiding periodic oil analysis and no maintenance is required on these transformers during their lifetime. Hermetically sealed transformers are recommended for being used in high humid environment, limitation of maintenance service, pole-mounted transformers, and confined space conditions such as package or compact substation units

Mainly there are two kinds of construction in hermetically sealed transformers. The pressure excursions are absorbed by the elastic movement of permanently sealed corrugated tank or by an inert gas, preferably by nitrogen gas cushion placed above the oil surface in the sealed system.

1A. HERMETICALLY SEALED - WITHOUT GAS CUSHION

These transformers are normally completely filled with insulating oil and without nitrogen cushion. The tanks are provided with corrugated fin walls. The corrugated tanks are considered as elastic tanks and the fins expand and contract based on the varying temperature conditions, thereby absorbing the pressure variation during the life of the transformer.

To ascertain the mechanical withstand capability of the corrugated tanks of hermetically sealed transformers without gas cushion, pressure cyclic test in accordance to EN 50464-4 is conducted. This test is considered as an endurance test, conducted on a tank which is considered as representative in design and the test is carried out by each manufacturer of corrugated tanks as an acceptance test.

OIL PRESERVATION SYSTEM

1.B. HERMETICALLY SEALED - WITH GAS CUSHION

These transformers are normally provided with a nitrogen cushion above the dielectric fluid. The expansion and contraction of the fluid are absorbed by a combination of the fins elasticity and the gas cushion. The internal pressure of the transformer may slightly increase because of the compression of the gas cushion. Hence extra reinforcement is provided for the corrugated fins to withstand the operating pressure in the service.

2. BREATHING TYPE WITH OIL CONSERVATOR

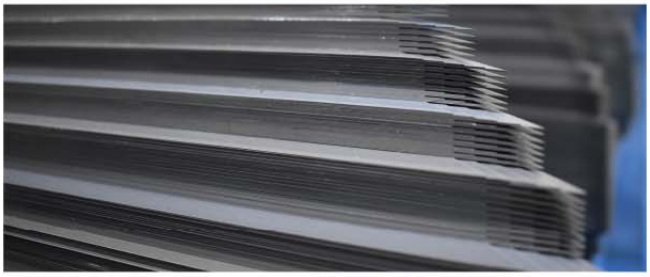
The conservator oil preservation system uses an expansion tank to and from which the transformer oil may flow freely as it expands or contracts due to oil temperature changes. This system always provides a head of oil above the main tank and keeps it completely filled.

CONSTRUCTIONAL FEATURES

CORE

Core design is an important factor in any transformer's efficiency. The geometric core arrangement and the material chosen determines the losses and noise levels. The cores of the transformers are made of grain oriented magnetic, cold-rolled silicon steel laminations with low losses. The decision of selecting electrical steel is based upon the no load loss requirement.

Core is built horizontally by stacking the laminations on core stacking tables. SGB MY has got motorised core stacking tables for 90° longitudinal rotation and 360° rotation in vertical position of core limbs for fast and better assembly of core.



WINDINGS

The windings of the transformers are made of high grade electrolytic copper or aluminium. The High Voltage windings are wound either with round enamel insulated, or paper insulated wire. The Low Voltage windings are wound with paper insulated wire or foil. The winding construction is characterized by high dielectric strength with high resistance to atmospheric surges and to the effects of short-circuits. Neutral points of the Low Voltage windings are brought to the tank cover or to the tank side wall.

Windings area in SGB MY is facilitated with controlled temperature for less humidity and dust. SGB MY winding machines are computer based to minimize manual errors and consistent manufacturing of windings.

CONSTRUCTIONAL FEATURES

OFF-CIRCUIT TAP CHANGER

The off-circuit tap changer is of 5-position type connected on the High Voltage side with a handle located on the cover / side wall. The tap changer should be operated only when the transformer is deactivated. Tap changers with tap position up to 9 are provided on request.

CORE COIL ASSEMBLY

Core coil assembly is one of the key process in transformer manufacturing. It is very important to secure core coil assembly free from dust and excess humidity for better quality control. SGB MY is facilitated the coil assembly area with controlled temperature for less humidity and dust. Most advanced roller assembly line in core coil assembly area improve productivity and give better quality control.

PAINTING AND SURFACE TREATMENT

All metal parts are carefully sandblasted. The painting is made with a single coat of one-pack epoxy paint. The finishing paint is made with two or three coats based on the environmental condition in accordance to the standard.

INSULATION OIL

The liquid dielectric serves as a medium of cooling and conveys heat from the windings to the cooling system. The mineral oil with its electrical and chemical characteristics is in complies with the IEC Standards and is P.C.B. free. Mineral oil is usually used for outdoor applications. Other insulating liquids like Silicone and Midel oil are provided on request. Silicone and Midel oil are classified as less flammable fluids and are used when flammability is a concern. MIDEL 7131 / MIDEL eN being both readily biodegradable and classified as nonhazardous to water, is an environmentally friendly and alternative to conventional transformer fluids

TANK AND COVER

The transformer tank is generally corrugated fin wall type. Alternately plain wall tank with cooling radiators are also offered based on customer specification.

The cover is bolted to the tank frame. Welded cover is provided based on customer requirement. The transformer undercarriage is provided with bi-directional rollers tunable by 90° to allow longitudinal and transverse movement on flat surfaces.

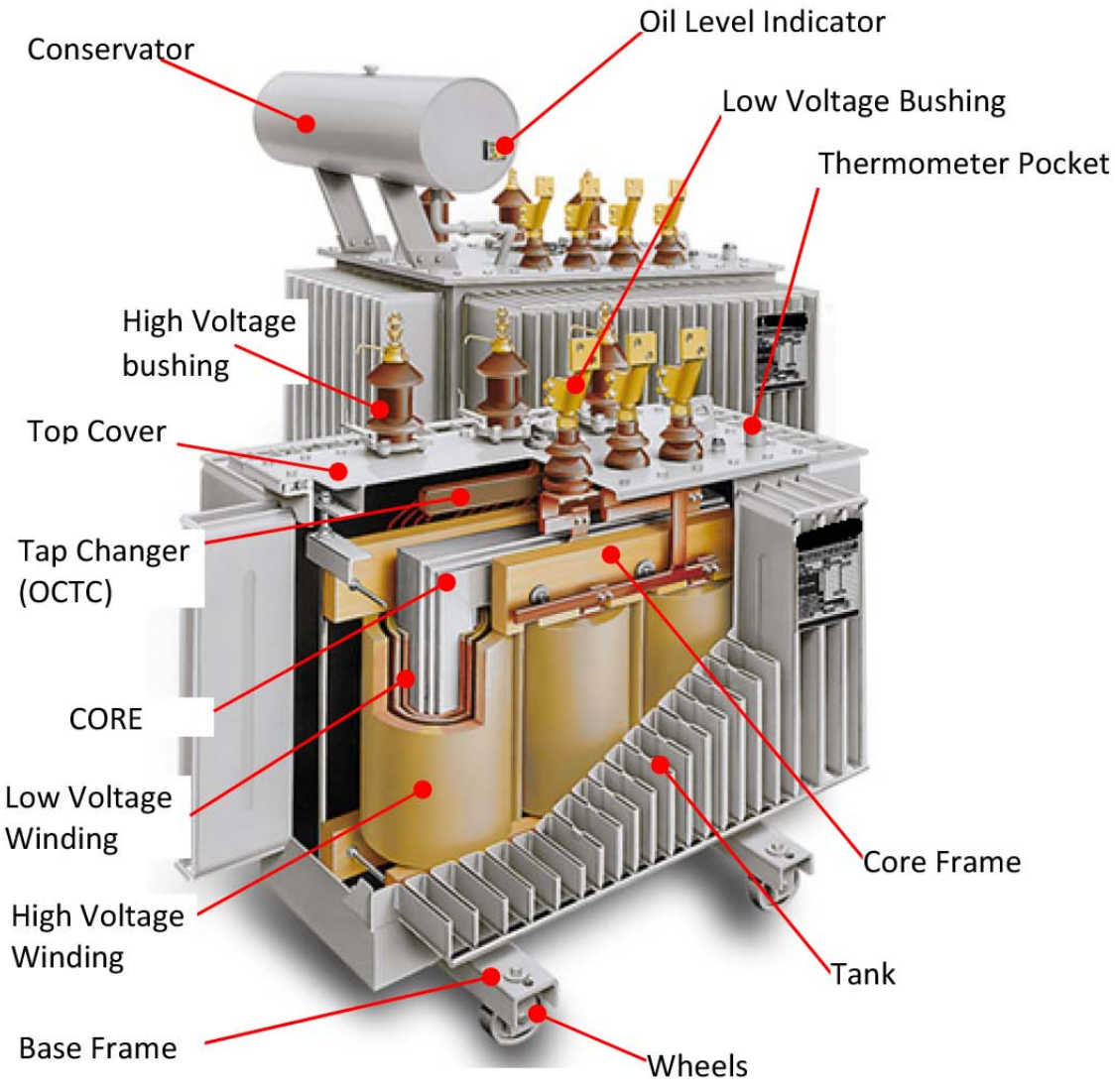
CONSTRUCTIONAL FEATURES

STANDARD FITTINGS / ACCESSORIES

- Oil filling plug
- DIN/EN bushings
- Oil-level indicator
- Dial type thermometer
- Pressure relief device
- Oil filling pipe
- Oil drain valve
- Off-circuit tap changer
- Earthing terminals
- Lifting lugs
- Lashing lug
- Rating plate
- Dehydrating breather (conservator type)

OPTIONAL ACCESSORIES

- Plug-in bushings
- Dial type thermometer with two contacts
- DGPT2 / RIS / DMCR control device
- Pressure – vacuum gauge
- Pressure switch
- Pressure relief valve with contacts
- Buchholz relay (conservator type)
- Tap changer with more than five positions
- LV/HV Cable boxes / Common cable box
- Jacking pad
- Bidirectional rollers
- Protection CTs



SPECIAL FEATURES

FINAL TESTING

The final electrical testing is an essential part of quality assurance when manufacturing these products. Tests include routine tests and also type tests and special tests. They are carried out in accordance with the relevant standards or as agreed with the customer. The test facilities at SGB MY consist of test laboratory for distribution transformer and large distribution transformers. The test laboratory is designed for testing the following items:

- Oil type distribution transformer upto 5MVA, 36kV
- Oil type large distribution transformer upto 40MVA, 69kV
- Dry type distribution transformer upto 6.3MVA, 36kV

Tests can be carried out in SGB MY laboratory:

ROUTINE TESTS:

A test to which each individual Transformer is subjected.

- Ratio measurement and vector group test
- Winding resistance measurements
- Measurement of no-load losses and no-load currents
- Measurement of load losses and short-circuit impedances
- Test with induced voltage
- Test with applied voltage
- Functional test of the transformers

TYPE TESTS:

A test made on a transformer which is representative of transformers, to demonstrate that these transformers comply with specified requirements not covered by routine tests. These are intended in principle to prove a new design or a series of transformers.

- Temperature rise measurement
- Lightning impulse voltage test

SPECIAL FEATURES

SPECIAL TESTS:

A test other than a type test or a routine test, agreed by the manufacturer and the purchaser.

- Sound level measurement
- Zero-sequence impedance measurement
- Capacitance and loss factor (tan-δ) measurement
- Measurement of the insulation resistance

EXTERNAL SPECIAL TEST:

- Dynamic short circuit test, can be performed in international laboratories like CESI/KEMA/ASTA etc.

TECHNICAL DATA

Note:The table shows technical parameter of standard design.SGB MY can offer transformers as per customers specification and different performance figures upon request.

			ELECTRICAL			WEIGHT			DIMENSION		
kVA	HV (Volts)	LV (Volts)	No Load Loss (W)	Load Loass (W)	Impedance (%)	Oil (kg)	Active part (kg)	Tx (kg)	Length (mm)	Width (mm)	Height (mm)
100	11000	433	300	1500	4.75	190	350	700	1250	650	1100
300	11000	433	600	2800	4.75	285	830	1300	1450	850	1300
500	11000	433	1000	4100	4.75	385	1155	1800	1500	900	1400
750	11000	433	1200	6000	4.75	600	1500	2500	1700	850	1550
1000	11000	433	1400	7000	4.75	700	1900	3200	1800	950	1650

			ELECTRICAL			WEIGHT			DIMENSION		
kVA	HV (Volts)	LV (Volts)	No Load Loss (W)	Load Loass (W)	Impedance (%)	Oil (kg)	Active part (kg)	Tx (kg)	Length (mm)	Width (mm)	Height (mm)
1000	11000	433	1500	11500	6.0	550	1280	2680	1850	1800	1850
1250	11000	433	1700	14000	6.0	615	1420	3100	1900	1800	1950
1500	11000	433	1800	17000	6.0	715	1720	3300	2050	1900	2050
2000	11000	433	2100	21000	6.0	850	2100	4500	2000	2150	2200
2500	11000	433	3000	25000	6.0	1100	2600	5200	2250	2300	2350
3000	11000	433	3000	29000	7.0	1270	2970	5900	2400	2350	2500
3500	11000	433	3400	34000	7.0	1770	3420	7900	2450	2450	2700
4000	11000	433	4000	38000	7.0	1965	4200	8800	2500	2450	2650
5000	11000	433	4250	50000	7.0	2900	5400	12400	3100	3250	3050

AFTER SALES AND SERVICE

ACTIVITY BY SGB MY

SGB MY offers after sales and service support for all kind of power and distribution transformers. Dedicated service team of experienced staff (Electrical & Mechanical) is offering you an on-site investigation and complete support at site in case of minor issues or recommendation for repair at factory in case of major problems.

Below are the services offered being an OEM and transformer specialist.

1. Visual inspection and functional tests (Yearly or half yearly, based on equipment criticality)
   - Complete visual checks for any leakage, rusting or any other abnormalities
   - Check of bushing condition and termination check
   - Check of gasket joints
   - Check of silica gel condition
   - Functional tests for protection accessories
   - Tap changer operation check
   - Oil level check

2. Major maintenance at every five years
   - Low voltage electrical tests
   - Functional tests for protection accessories
   - Oil sampling and oil analysis
   - Oil filtration or replacement if required

3. Complete transformer servicing/overhauling at site for aged transformers
   - Low voltage electrical testing
   - Thermal imaging to check internal hot spots
   - Gasket replacement
   - Oil filtration/replacement
   - Tank repair for any leakage
   - Paint touch-up
   - Check of protection wiring and repairing

4. In-factory repair/overhauling
   - Complete refurbishment of transformer
   - Replacement of major components
   - Oil replacement
   - Drying of active part
   - Tank replacement
   - Routine testing

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