TRADITION - MANUFACTURING INSTRUMENT TRANSFORMERS SINCE 1947

UNIQUE DESIGN - OPEN-TYPE MAGNETIC CORE

FLEXIBLE DESIGN - EVERY UNIT IS DESIGNED TO SATISFY SPECIFIC CUSTOMER REQUIREMENT

LONGEVITY AND RELIABILITY - DESIGNED FOR AT LEAST 50 YEARS OF SERVICE LIFE

SSVT

POWER VOLTAGE TRANSFORMER

72,5 to 550 kV
10 to 167,5 kVA

Application

- Power supply of auxiliary systems and services within a substation
- Power supply of remote industrial consumers (communication towers and antennae, mines, pump stations)
- Temporary supply of local consumers during substation construction
- Primary supply of remote consumers and communities

User Benefits

- Reliable power supply directly from high voltage
- Tailor-made design - Every transformer is designed according to specific requirements from each customer
- Dual function - Possible provisions both for power supply and measurement or protective purposes in a single enclosure
- Eliminates the need for an auxiliary supply via a power transformer tertiary winding or a separate distributive transformer
- Small footprint due to a compact design
- Substantial reduction in building costs of a substation intended for power supply of remote consumers
- Unparalleled operation safety with minimal maintenance necessary

Definition

Single phase insulated power voltage transformers are intended to be connected to high voltage system and used for a direct supply of low voltage level electrical power to substations or remote consumers, in areas where distribution grid is not accessible.

Based on the well proven design of an open-core inductive voltage transformer type SSVT, the power voltage transformer type SSVT inherits all features and advantages of that type of instrument transformer.

Performance

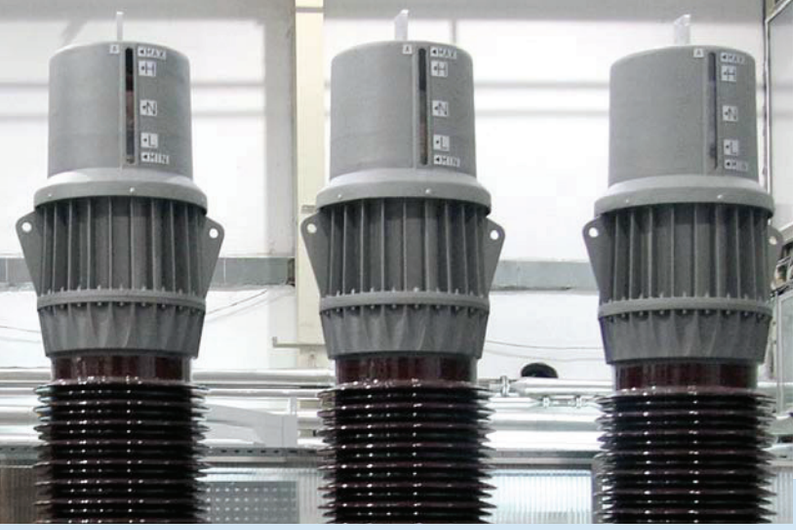
- U_m: from 72,5 kV up to 550 kV
- Rated output: 10 - 167,5 kVA
- Rated secondary voltage according to customer requirements
- Rated frequency: 50 or 60 Hz

Main Features

- Direct connection to high voltage system and power transformation to low voltage
- Unique design with an open magnetic core - ensuring ferroresonance immunity
- Explosion safe design
- High quality paper-oil main insulation
- Partial discharge free on power-frequency withstand voltage
- Stainless steel bellows oil expansion system
- Sealing for life - every single unit is vacuum tested
- Standard ambient temperatures from -35 to +40 °C, extreme temperature range available upon request
- High quality porcelain or composite (silicone shed) insulator
- Service experience in seismically active regions
- Non-corrosive hardware

Accessories and Options

- Series-parallel reconnection of the power winding (option)
- Up to two additional measuring or protection windings (option)
- Off load voltage regulation realised via a tap in the secondary terminal box (option)
- Internal overpressure indicator as an online monitoring system (option)
- Terminal for measuring dielectric dissipation factor (tgδ)
- Oil level indicator
- Transport shock indicators



DESIGN

Magnetic Core and Secondary Windings

The magnetic core is made of stacked silicone steel sheets. Open core (single limb) design ensures a linearized magnetizing characteristic of the transformer, which eliminates possibility of ferroresonance within the power system.

Secondary windings are wound with high-grade insulated copper conductor directly onto the core, ensuring uniform flux density along the core height. Design and large cross-section makes them capable of withstanding a secondary short circuit, thus contributing to transformer safety.

In order to minimise stray losses, the secondary winding is made from several enamel-insulated conductors connected in parallel or from stranded cables, depending on the power rating of the transformer.

Paper-Oil Insulation

The high voltage primary side is insulated from the low voltage secondary side by means of oil impregnated paper of high dielectric strength.

A substantial number of semi-conductive capacitive screens are inserted into the layers of paper insulation so as to adequately distribute the high-frequency overvoltages. Another advantage of the open-core design is that it enables the main insulation to be completely machine produced in shape of a cylinder.

The paper insulation is then dried in high vacuum and impregnated with high grade inhibited and degassed (moisture content of no more than 2 ppm) mineral transformer oil.

We guarantee the oil in our transformers not to contain polychlorinated biphenyls and terphenyls (PCB & PCT).

The paper-oil insulation is closed in and hermetically sealed off from ambient air by means of a stainless steel bellows. The stainless steel bellows compensates the thermal oil expansion and thus also serves as an expansion mechanism and an oil level indicator.

All of the points mentioned above ensure excellent and long lasting dielectric properties of the transformers main insulation.

Primary Winding

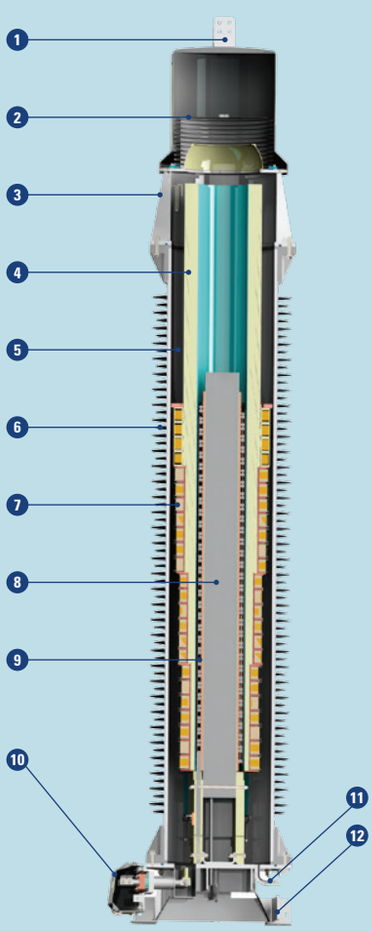
The advantage of the open core design lies in having the primary winding composed of multiple sections uniformly stacked vertically along the height of the transformer. This ensures controlled distribution of dielectric stress on internal and external insulation.

Due to a slender design and a large surface for heat transfer, the sectioned primary winding ensures excellent cooling properties.

Off-load tapping can be provided either on the secondary or the primary winding. In both cases, the tap connections are available in the secondary terminal box.

Cross-Section Drawing

1. Primary (high voltage) terminal
2. Stainless steel bellows / Oil level indicator
3. Heat sink
4. Main insulation
5. Mineral oil
6. Insulator with flanges
7. Primary (high voltage) winding
8. Open core
9. Secondary (low voltage) winding
10. Secondary terminal box and secondary (low voltage) terminals
11. Oil filling valve
12. Transformer base



Insulator

As per request, the external insulation can be either porcelain or composite. The porcelain insulators are made of the highest quality C130 aluminous porcelain, while the composite insulators are composed of a glass-fibre reinforced resin tube and silicone rubber sheds.

The insulators creepage distance is based on the ambient air pollution and is to be quoted in the inquiry.

Terminals

The high voltage primary terminal is made of aluminium alloy or, alternatively, of corrosion protected (tin or silver plated) electrolytic copper. The terminal shape and type are both chosen according to applicable standard and customers' requirements and practice.

Secondary windings terminals, along with provisions for earthing are located in the secondary terminal box.

Cable glands or plates provide entry to the secondary terminal box and are designed in accordance with customers' needs.

Size, type and material of secondary terminals depend on the transformer power rating, relevant standard and customer requirements and practice.

Transformer Base

The transformer base is made of high quality steel which is hot dip galvanized and additionally painted for long-lasting corrosion resistance. The transformer base accommodates the secondary terminal box, along with various other accessories, such as name plates, oil sampling and filling valve, lifting lugs, earthing terminals and an optional oil overpressure indicator.

Transformer Dimensions

Power voltage transformers are produced according to specific customer requirements and usually in small series.

Transformer dimensions vary depending on rated voltage level, rated power, secondary voltage and impedance voltage as well as on various mechanical and environmental parameters.

Transformer dimensions are also susceptible to change in the course of technical developments.

Explosion Safe Design

One of the main advantages inherited from the inductive voltage transformer design is service safety.

Being composed of independent and insulated sections, the primary winding provides explosion safety. In an unlikely case of a between-turns or between-layers failure within the primary winding, the fault remains localized to only one section and cannot spread to the entire primary winding. This ensures inherent explosion safety of SSVT power voltage transformers.

Furthermore, in case of unexpected oil pressure rise, the controlled pressure compensation and release take place through the metallic bellows without oil being spilled, thus preventing damage to the transformer. This also results in mechanical detachment of the bellows cover, and serves as a viable automatic disconnect mechanism from the HV grid. Finally, our transformers can be equipped with an oil over-pressure sensor used to signal the operator or a control system in case of irregular pressure build-ups and thus operate as a simple, robust and reliable on-line monitoring system.