



Oil-immersed transformer

Introduction of oil immersed transformer

oil immersed transformer of our company is independently designed on the basis of learning from latest technologies in China and overseas and according to characteristics of the grid in urban and rural China. Its performance indices are superior over GB/T6451 Specification and technical requirements for three phase oil immersed power transformers and fully meet JB/T3837-1996 Method of establishment for type of transformer products, Gb1094. 1.2-2013, GB1094.3.5-2003 Power transformers, and IEC-76, the recommended standard of International Electrotechnical Commission. The product is characteristic of low loss, reduced noise, and exemption of sweeping core. It is innovative in terms of safety, reliability, and economy. It is now taking the lead in China thanks to the top class technology. Features of the product are introduced as follows.

Prominent performance of energy conservation

No-load loss is reduced by 35% on average on the basis of the national standard GB/T6451-1999. Load loss is reduced by 10%~20% on the basis of relevant national standard.

Transformer iron core

Its iron core is manufactured based on 5-step lapping technique. The pile is in 45° inclined joint and pore-free binding construction. Silicon steel sheet is laid off with Italian longitudinal and transverse cutting lines. Blur of cutting opening has a size of no more than 0.02mm. In addition, advanced iron core piling and tilting workbench and rigorous techniques of piling and iron yoking without pre-piling ensure sufficient orientation of the grains in cold-rolled silicon steel sheet and reduce no-load loss of transformer effectively. Iron core is bound with polyester tape. Clamping structure is provided with flat clamp to reduce stray loss. Iron yoke clamping is provided with unique clamping and binding techniques that ensure clamping degree of the iron core. Meanwhile, mature techniques developed for years make iron core, anchor plate, bearing beam, and cushion block a firm integral so as to ensure optimum stress of iron core. This procedure reduces no-load loss as well as noise.

Transformer winding

High, medium, and low voltage windings are coiled on high strength insulating cylinder. Low voltage winding is in spiral construction with axial oil duct; medium and high voltage windings are made of high strength Avery Dennison paper wrapped composite conductor imported from US, improving the resistance against short circuit of the transformer. In all the windings, the interior side is equipped with locking stay (reinforcing stay) and the exterior side is equipped with locking stay as well. Cross direction fastening of winding is devised with "0" margin, are all interiorly designed with oil ducting mechanism for reducing maximum hot spot temperature rise inside winding and improving useful life. Independent regulating winding (for on-load voltage regulating transformer) further balances ampere turn of each winding, improves stability, eliminates deformation instability, reduces axial electric motive force incurred by external short circuit of transformer, and enhances dynamic stability of transformer in case of external failure and short circuit.

Insulation

Assembling and winding of transformer are both finished in fully enclosed cleaning shop. This procedure meets the requirements on cleanness and constant temperature of core and winding assembly for the manufacture of 500kV products, further ensuring the cleanness and dryness of the core and winding assembly. Kerosene gas-state drying device is used as well for optimizing cleanness of product. Bottom bearing plate and top clamping plate of the assembly are all made of electrical laminated wooden board with high mechanical strength and superior electrical property. Transformer stays and cushion blocks are processed under double precise cutting and rounding techniques for reduced partial discharge. Steel clamping piece and steel clamping nail have sufficient strength. The contact surface with contact to clamping plate is designed to the maximum. Meanwhile, the layout of bearing cushion block, stay, and clamping nail makes the stress on winding balanced and even as possible so as to improve overall stability of the assembly. The assembly is processed under integral assembling and constant pressure drying technique. The shortened winding is under even stress, so the short circuit resistance of each winding is improved. Furthermore, lower clamping piece and bottom part of tank are located rigidly and are regulated and locked up by back pressure nail. Upper beam and top part of tank are cured by epoxy resin. Therefore, the assembly could endure impacts under various transportation conditions and axial electric motive force during operation without displacement.

Leads

High and medium voltage tapping leads are fixed by support and introduced to switch. Low voltage leads copper bar is fixed on the upper plane of iron core clamping piece and bottom part of tank, thus stability of the leads increases. The standards and techniques for binding extruded parts of coil improves performance of low partial discharge.

Oil tank

Oil tank is in bell-shaped construction. The structure is shaped in corrugation by large-size bending press. Strengthened iron and reinforced plate of various sorts are cancelled. This design improves mechanical strength (20kPa vacuum degree, 80kPa positive pressure) as well as reduces welding seals, enlarges the area of dissipation, and enhances heat dissipation performance. In addition, corrugated box wall is radiating, thus reducing noise. The sealing parts of the oil tank is subject to special treatment and the tank body has experienced shot blasting that thoroughly eliminates oxide skin on the surface and sharp angles, burrs, and weld slag created by processing. This procedure also increases adhesion of paint, thus the exterior is highly qualified, pleasant, and durable. Radiator and components have been tested and checked in simulated severe environmental conditions, so elimination of leaks is assured of. All the flange faces are finished and are provided with groove and limiter mechanism. High quality Buna-N rubber gasket resistant to oil, weathering, and ozone is used for preventing leak from transformer. In addition, bolt connection between top and bottom parts of tank may also choose to weld the box edges for sealing upon customer request.

Cooling device and ancillary device

The device is generally air-cooled/self-cooled. It operates under full load when blower fan works. The load could be 67% of the full load when natural cooling is used and the blow fan stops. Gilled radiator is placed compactly and reasonably. Blower fan is often hanged on the gilled radiator and works horizontally or vertically. Oil conservator is always in capsule construction with built-in oil-resistant, airtight capsules that sufficiently separate air from oil and bring about complete sealing. In addition, stainless steel expanding conservator may also be mounted (oil stored interiorly or exteriorly), characteristic of absence of maintenance and operational stability. The company adheres to technological progress and implements complete quality assurance system. Thanks to reliable structural design and advanced techniques, our products always ensure low partial discharge, low noise, limited loss, and high reliability. The 110kV products have never experienced any damages and oil leak. They are up to latest international standards.