Niroo Transfo

**Manufacturer of Low-Loss Distribution Transformers,
Smart Monitoring & Anti-Theft Systems**

A Half-Century of Industry Pioneering
Approved Vendor for the Oil & Gas Sector (AVL)



Niroo Transfo Website

Online Catalog

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Our Story

Niroo Transfo’s journey began in early 1977, laying the groundwork for our first operational plant in Rasht by 1982. However, in an industry defined by rapid technological evolution, merely existing is never enough.

A pivotal transformation took place in 2011. Backed by strategic investment from Aras Saba Co., we entirely overhauled our production lines. The company was revitalized through state-of-the-art machinery, modernized technologies, and highly upgraded quality control frameworks. Over the past five decades, grid architectures, raw materials, manufacturing processes, and most importantly, client expectations, have drastically shifted. Our deep expertise isn't theoretical—it has been field-tested through the daily grind of designing, building, and rigorously testing thousands of transformers.

Entering the OTC market in early 2026 marked another major milestone, reinforcing our accountability to both the capital market and our business partners. We’ve navigated complex industry challenges to build a company our clients can blindly trust for on-time delivery, uncompromising quality, and peak product performance.

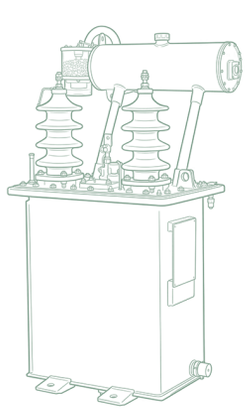
Our Mission

To engineer absolute reliability into the power grid. By delivering precision-driven engineering solutions and optimizing the Total Cost of Ownership (TCO), we help contractors meet tight project deadlines while providing operators with maximum energy efficiency.

Our Vision

To be the most trusted Engineering Partner in the regional power sector. Our horizon is defined by operating at the technological forefront—pioneering digital innovations like smart monitoring and IoT integration—and turning deep engineering insight into long-term industrial value.





Message from the Chairman

The modern business landscape is shifting at an unprecedented rate, and keeping pace requires a steadfast commitment to creativity, quality, and continuous innovation. At Niroo Transfo, we don't just react to market fluctuations; we drive our growth by creating distinct value and delivering superior engineering solutions.

For us, sustainable development means balancing financial robustness with relentless innovation. To achieve this, cultivating a dynamic corporate culture, where every team member is empowered to reach their absolute potential is our top priority. We firmly believe that investing in our people and boosting workforce productivity is the clearest path to long-term success.

By leveraging homegrown expertise to meet world-class standards, we look forward to building synergistic partnerships and making a lasting impact on Iran’s infrastructure and prosperity.

Abdollah Asgharnejad – Chairman of the Board

Careers & Corporate Culture

Niroo Transfo is an ecosystem for growth, continuous learning, and meaningful impact. As we expand our technical, engineering, and administrative teams, we actively seek driven, adaptable, and innovative professionals ready to contribute to a national success story. Within our dynamic workplace, team members work closely with seasoned industry experts, advancing their careers while creating real value for society.

Future Engineers Club

The future of the power sector belongs to young, visionary engineers. To bridge the gap between academia and industry, we founded the Niroo Transfo Future Engineers Club. This initiative provides a collaborative platform for students and alumni in Electrical, Mechanical, Software, AI, and Industrial Engineering to turn theoretical concepts into practical solutions. From sponsoring applied academic theses and joint research initiatives to offering hands-on internships and recruiting top-tier talent, the Club is designed to cultivate the next generation of industry leaders. Working side-by-side with our senior experts, members gain invaluable hands-on experience tackling large-scale national projects.



Product Portfolio

To fulfill our promise of engineering absolute reliability into the power grid, precision manufacturing must come first. Our equipment is the physical manifestation of the expertise we deploy to optimize your project costs. Niroo Transfo's distribution products are designed in strict compliance with the international IEC 60076 standard and the latest regulations of the Ministry of Energy, categorized into two main groups: Standard and Custom-Built.

Standard Products

Oil-Immersed Low-Loss Conservator Transformers (AB')



Three-Phase Transformers

Rated Power: 25 – 2500 kVA
Voltage Ratio: 20 / 0.4 kV
Cooling System: ONAN (Corrugated Tank)



Single-Phase Transformers

Rated Power: 10 – 50 kVA
Voltage Ratio: 20 / 0.231 kV
Cooling System: ONAN

Custom-Built Products

Design and manufacturing of highly specialized transformers up to 36 kV and 10 MVA, equipped with ONAN cooling systems (featuring either corrugated tanks or radiator banks), precisely engineered to meet exact customer specifications.

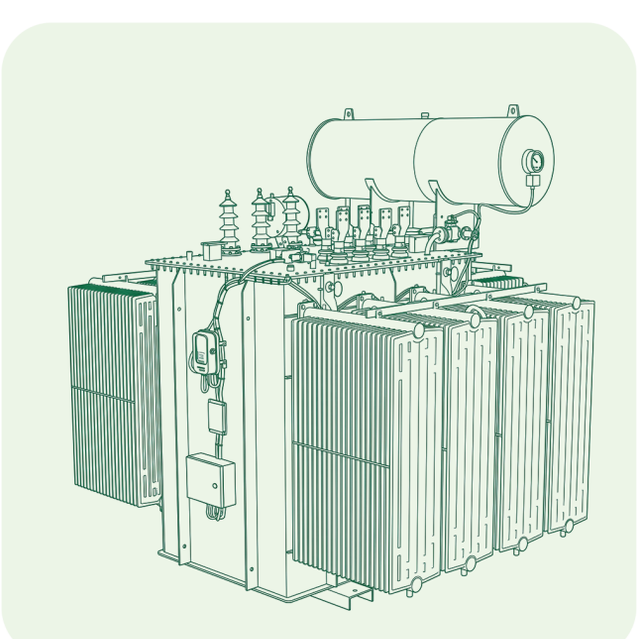
Hermetically Sealed Transformers: Manufactured for capacities up to 2500 kVA and voltage levels up to 36 kV. Their entirely enclosed construction prevents the insulating oil from coming into contact with the atmosphere, completely blocking the ingress of moisture and dust. This robust design significantly extends the operational lifespan of the transformer, making it the ideal solution for highly polluted or severely humid environments.

Gas-Cushion Hermetically Sealed Transformers: Engineered for higher power ratings ranging from 2500 kVA to 7500 kVA. These units feature a rigid tank architecture with radiator-based cooling. To safely compensate for oil volume fluctuations caused by thermal expansion, an inert nitrogen gas cushion is integrated directly above the oil level.

Solar Power Plant (PV) Transformers: Purpose-built to seamlessly handle the complex harmonic loads generated by solar inverters. Key engineering features include limiting the magnetic flux density to strictly below 1.7 Tesla to prevent core saturation and overheating. Furthermore, an electrostatic harmonic shield is installed between the high-voltage (HV) and low-voltage (LV) windings to dramatically reduce harmonic transfer, thereby safeguarding both the inverters and the broader power grid.

Other Custom-Engineered Solutions: Three-Winding Rectifier Transformers, Furnace Transformers, Dual-Voltage Transformers, Earthing Transformers & Earthing Transformers with Auxiliary Supply





Niroo Transfo:
Redefining Reliability and Risk Management

In industrial infrastructure and power distribution, a transformer is never just a physical component, it is the vital artery of your grid and the focal point of project risk. At Niroo Transfo, we bypass conventional marketing rhetoric to speak the universal language of business: Value Engineering, Risk Management, and Performance Optimization.

Delivering Custom-Engineered Solutions

Every power grid faces unique harmonic challenges, dimensional constraints, and geotechnical realities. Our true competitive edge lies in the agility of our engineering department. Whether designing transformers equipped with harmonic shields for solar power plants or engineering hermetically sealed tanks for heavily polluted and highly humid environments, Niroo Transfo delivers purpose-built engineering solutions rather than off-the-shelf products.

Engineering the Total Cost of Ownership (TCO)

The purchase price is only a fraction of what a transformer truly costs over its 30-year service life. Our R&D team has focused relentlessly on core design, using Step-Lap technology and precise thermal control of winding hot spots to reduce both no-load and load losses. The result is far less wasted energy and significantly lower hidden operating costs for your facility, year after year.

Consistent Performance Through Integration

At Niroo Transfo, quality is not a claim; it is the result of strict adherence to international standards and rigorous control at every stage of production. Before dispatch, every unit undergoes routine and type testing in our in-house laboratory in accordance with IEC 60076. From the inspection of critical raw materials to the final electrical tests, this unbroken chain of checks minimizes failure rates and ensures high dielectric strength for your grid.

Smart Protection & Monitoring

By integrating industrial IoT modules, your transformer is elevated into a smart grid node. Real-time detection of unauthorized movement and the instant transmission of online alerts to a web-based dashboard ensure the absolute physical security of your site equipment.



24 months

Absolute Replacement Warranty. In the industrial sector, grid downtime translates to devastating financial losses. By providing an unconditional replacement warranty, we shift the equipment risk entirely from the client to the manufacturer, fully securing your capital investment.

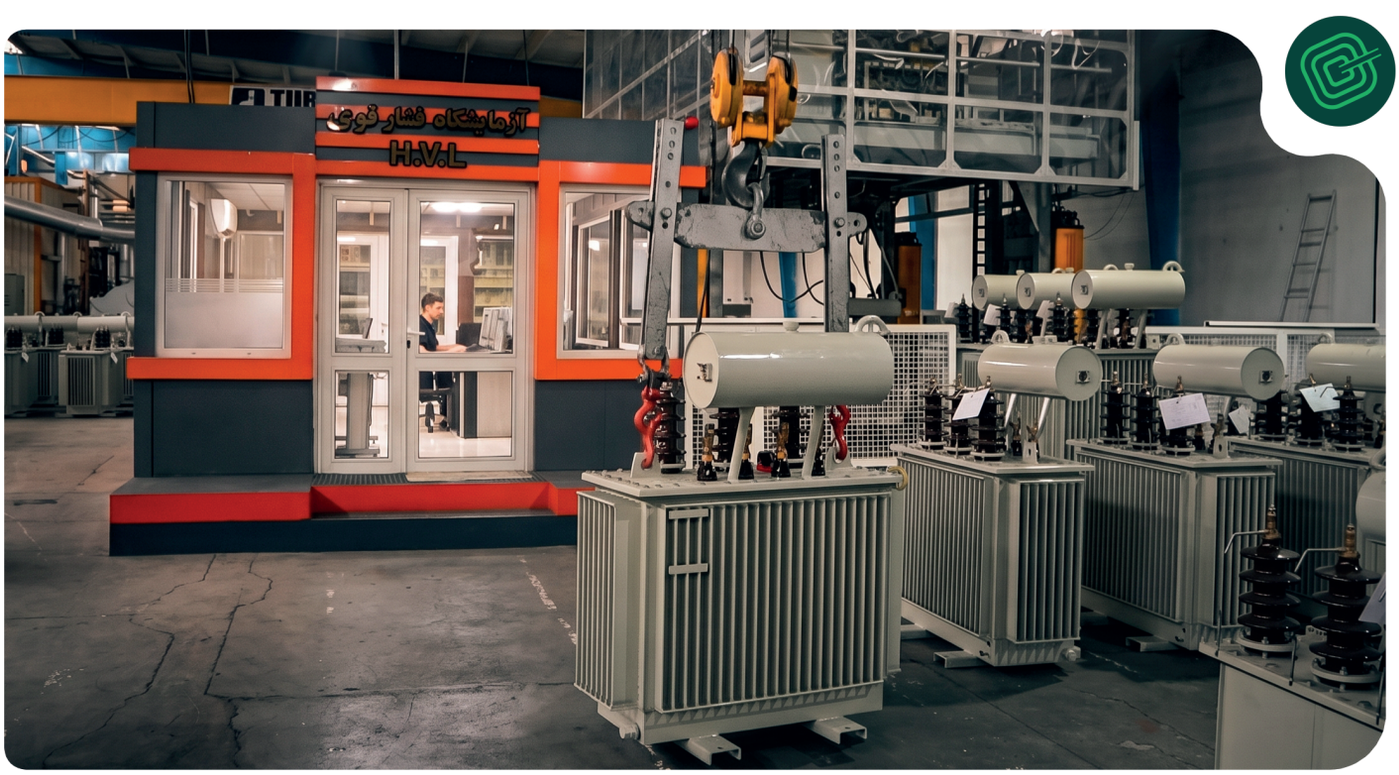
Lifecycle Management: A Long-Term Partnership

For us, delivering a product is not the finish line; it is the inception of an ongoing commitment. By deploying highly specialized after-sales service teams to supervise on-site commissioning, execute complex physical and chemical oil purification without the need for equipment relocation, and rapidly supply critical spare parts, we guarantee the long-term stability of your grid.

Agile Logistics & Complimentary Nationwide Shipping

Transporting heavy industrial equipment frequently presents significant financial and operational challenges for project sites. At Niroo Transfo, we have optimized our supply chain to offer free delivery of our transformers across the country. Beyond eliminating hidden logistical overhead from your project budget, this premium advantage ensures that your equipment arrives on-site in flawless physical condition, adhering strictly to rigorous heavy-cargo safety and handling protocols.

- Complete Product Range
- Quality Proven by Accredited Testing
- Ultra-Low Losses, High Efficiency
- Consultative Approach to Every Client



DIGI TRANSFO



Digi Transfo

The Premier E-Commerce Platform for Transformers and Power Grid Equipment

The Digi Transfo platform serves as a critical node in Niroo Transfo's digital ecosystem, engineered to provide agile, transparent, and direct procurement of electrical industry equipment. We established this digital infrastructure to eliminate the complexities of traditional purchasing, delivering the following steadfast guarantees and core values directly to your projects:

- 24-Month Unconditional Replacement Warranty
- 1-Year Comprehensive Anti-Theft Insurance
- Rapid & Punctual Delivery
- Accelerated Return on Investment (ROI)

WWW.DIGITRANSFO.COM

Transformer Manufacturing Stages

Quality is not an accident; it is engineered into every station on our production line. From the careful selection of core laminations to the calibration of automated machinery, our uncompromising rigor extends equipment lifespan and lowers the Total Cost of Ownership (TCO) for the end user.



1- Transformer Design

Transformers are engineered by our Technical and Engineering Department in strict compliance with the latest Tavanir regulations and IEC standards. Utilizing advanced electrical and mechanical analysis software, our design objectives include:

- Extending the operational lifespan
- Improving short-circuit withstand capability
- Optimizing the overall manufacturing cost
- Fulfilling customized client specifications
- Reducing load and no-load losses
- Maximizing operational efficiency
- Minimizing voltage drop
- Reducing audible noise levels



2- Active Part Manufacturing

The production of the active part encompasses core stacking, winding, and active part assembly.

At Niroo Transfo, we utilize Cold-Rolled Grain-Oriented (CRGO) silicon steel sheets, coated with magnesium silicate-phosphate, sourced from the world's most reputable core lamination manufacturers in premium grades. Based on our proprietary design methodologies, we employ a Core Type architecture. To engineer low-loss, low-noise transformers (designated as AB') in accordance with IEC 60076 standards, we utilize HiB grade core steel featuring a 7-step overlapping configuration known as Step-Lap. This specific technique is implemented to drastically minimize exciting current, reduce no-load losses, and significantly lower audible noise and vibration levels.



Transformer windings are among the most critical components, playing a foundational role in the reliable and efficient operation of the unit. Through electromagnetic induction, windings step the input voltage up or down to the required output voltage. Every transformer consists of at least two sets of windings: the primary winding (connected to the power source) and the secondary winding (connected to the load). At Niroo Transfo, Low-Voltage (LV) windings are constructed using high-conductivity copper rectangular wires or copper foils insulated with premium electrical paper. High-Voltage (HV) windings are wound utilizing either enamel-insulated round copper wire or paper-insulated rectangular copper wire.

Transformer Manufacturing Stages



The assembly of the active part is a critical milestone in transformer manufacturing. At Niroo Transfo, this entire process is executed under rigorous quality control and supervision to guarantee the absolute performance and integrity of the final product. This stage involves the precise integration of the transformer's core, primary and secondary windings, insulation materials, and associated internal components. Every phase of the active part assembly must adhere to the highest engineering standards to ensure optimal operational efficiency and uncompromised safety.



3- Active Part Drying Oven (Vacuum Drying Process)

To achieve complete moisture extraction, the fully assembled active parts undergo a highly controlled two-phase heating and vacuum process. Initially, the core and coil assembly is heated for 6 hours to reach a uniform temperature of 120°C. Following this, the active part is subjected to a deep vacuum environment for a minimum of 12 hours while strictly maintaining the 120°C temperature, ensuring the complete elimination of residual moisture from the cellulose insulation.



4- Tank Fabrication

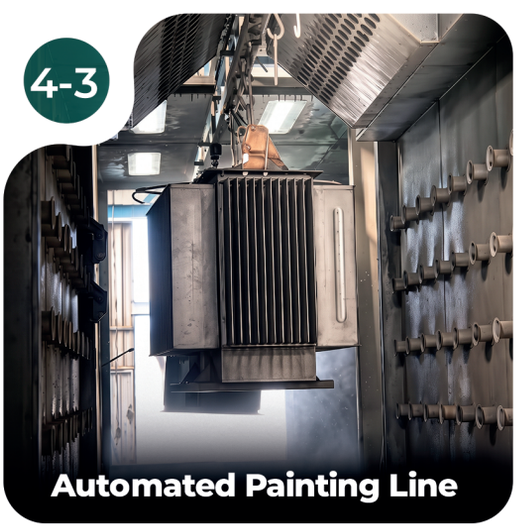
The transformer tank protects the core and windings and provides a sealed, secure enclosure for the insulating oil. Besides high mechanical strength, it must resist corrosion and keep its structural integrity over time. To achieve this, high-grade steel sheets from Mobarakeh Steel Company are cut, bent, and formed on advanced CNC laser cutting, bending, and punching machines.
To improve heat dissipation and thermal efficiency, the tank walls are made from 1.2 to 1.5 mm corrugated sheets supplied by internationally recognized brands. Tank fabrication includes the following stages:

- Tank Structural Design
- Raw Material Selection
- Precision Cutting and Forming
- Corrugated Wall Welding
- Weld Seam Testing and Quality Inspection
- Accessory Installation
- Shot Blasting, Painting, and Surface Coating
- Pressure and Leak Detection Testing

Transformer Manufacturing Stages



All fabricated tanks are initially subjected to metallic abrasive shot blasting. This crucial step provides preliminary degreasing, eradicates oxidation, and creates the optimal surface roughness required for maximum paint adhesion. Following the shot blasting process, the tanks enter a washing cabin where they are thoroughly cleansed and treated with specialized phosphate compounds for absolute degreasing. Finally, they are completely dried in a hot-air circulation cabin maintained at 80°C.



Niroo Transfo's fully automated painting line is powered by ALCON technology from Denmark. Given that distribution transformers are typically deployed outdoors and constantly exposed to sunlight, heavy precipitation, and corrosive environments, the tanks must possess exceptional coating durability and lifespan. Inside the powder coating cabin, a highly precise TRIBO electrostatic system is employed to guarantee the flawless adhesion of paint particles across all areas of the tank. Once coated, an automated conveyor system transports the tanks into the curing oven, where the paint is baked at 200°C to achieve a permanent bond with the body. In the final stage, the tanks are routed to a cooling cabin where their temperature is systematically reduced to ambient levels according to a specific schedule.



5- Final Assembly & Vacuum Oil Filling

Within a strict maximum window of 6 hours after exiting the drying oven, the active part is securely lowered into the fabricated tank and seamlessly transitioned to the oil injection station. The oil filling process is executed entirely automatically inside vacuum chambers at a controlled temperature of 80°C. The exact rate of oil injection is precisely calibrated based on the specific operational voltage of the transformer.

Routine Testing & Quality Assurance

All oil-immersed transformers undergo routine testing in strict accordance with the international standard IEC 60076-1 and applicable national regulations. These standards define the test methods, the equipment used, and the acceptance criteria for results. The mandatory routine tests are:

- Measurement of Winding Resistance
- Measurement of voltage ratio and verification of vector group
- Measurement of short-circuit impedance and load losses
- Measurement of no-load losses and no-load current
- Routine dielectric tests (separate-source applied voltage test and induced voltage test at increased frequency)

In addition to the standard test program, customers may request type tests, namely the temperature-rise test and the impulse voltage test, at an additional cost. Short-circuit withstand testing (per IEC 60076-5) and other special tests defined in the IEC 60076 series can also be carried out on a representative unit from the ordered batch, upon the customer's formal request.



Quality Control & Quality Assurance (QC/QA)

At Niroo Transfo, our QC/QA departments work to a zero-defect manufacturing strategy that sustains quality through every phase of production. This unbroken chain of checks begins with the rigorous evaluation of critical raw materials, such as CRGO electrical steel and insulating oils, and continues with precise in-process inspections at every production station. In the final stage, every transformer undergoes routine testing in our High-Voltage Laboratory, in accordance with IEC 60076, to verify its electrical performance and mechanical durability before dispatch.

Engineered and Manufactured to the Latest Global Standards

Quality is no coincidence; it is the result of strict adherence to international requirements. Every stage of design, engineering calculation, and manufacturing follows the latest editions of the IEC 60076 standards. This compliance ensures high thermal stability, dielectric strength, and long equipment life under demanding grid conditions.

Standards	Specifications
IEC60076-1	General electrical and mechanical requirements and corresponding tests.
IEC60076-2	Regulations for cooling methods and transformer temperature rise.
IEC60076-3	Detailed execution of dielectric tests applicable to transformers.
IEC60076-4	Guide to the lightning and switching impulse testing.
IEC60076-5	Short-Circuit Withstand Requirements and Typical Impedance Voltages of Distribution Transformers
IEC60076-7	Loading guide and permissible overload criteria.
IEC60076-8	Application guide and requirements for parallel operation.
IEC60076-10	Determination of maximum sound levels.
IEC60076-16	Requirements for dry-type and liquid-immersed transformers for wind turbine applications.
IEC60076-18	Methods and equipment requirements for Frequency Response Analysis (FRA).
IEC60076-20	General principles and calculation methods for transformer energy efficiency.
IEC62874	Equipment and procedures for estimating transformer lifespan.
IEC60815	Determination of permissible pollution levels for bushings.
IEC60354	Thermal distribution diagrams and temperature rise curves for oil and windings.
IEC60296	Comprehensive requirements for mineral insulating oils used in transformers.
IEEE C57.159	Design requirements for transformers used in solar power plants.

ISO IEC DIN CE IEEE Advancing Technology for Humanity

Materials Lab

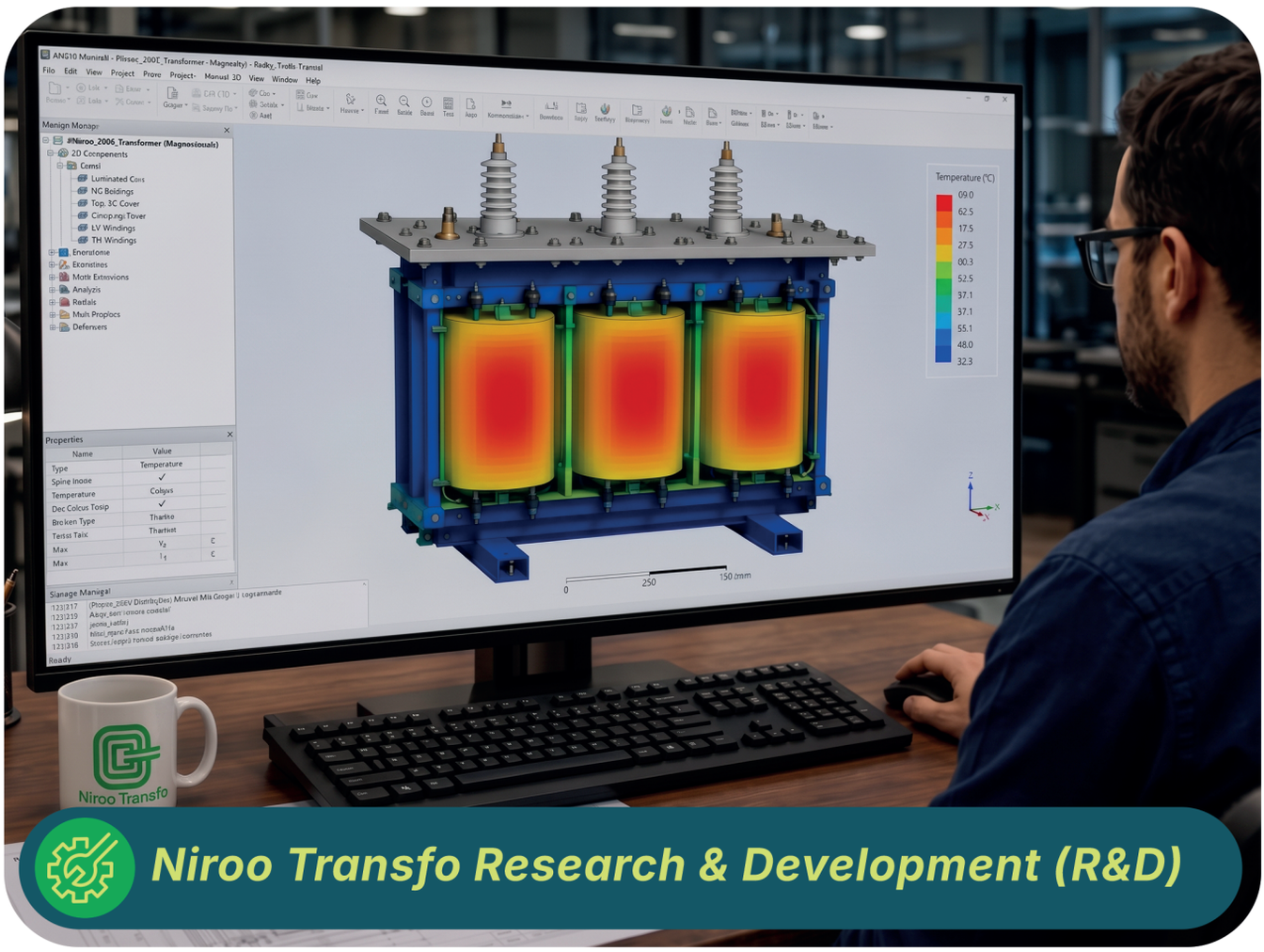


High-Voltage Lab



Rigorous Inspections

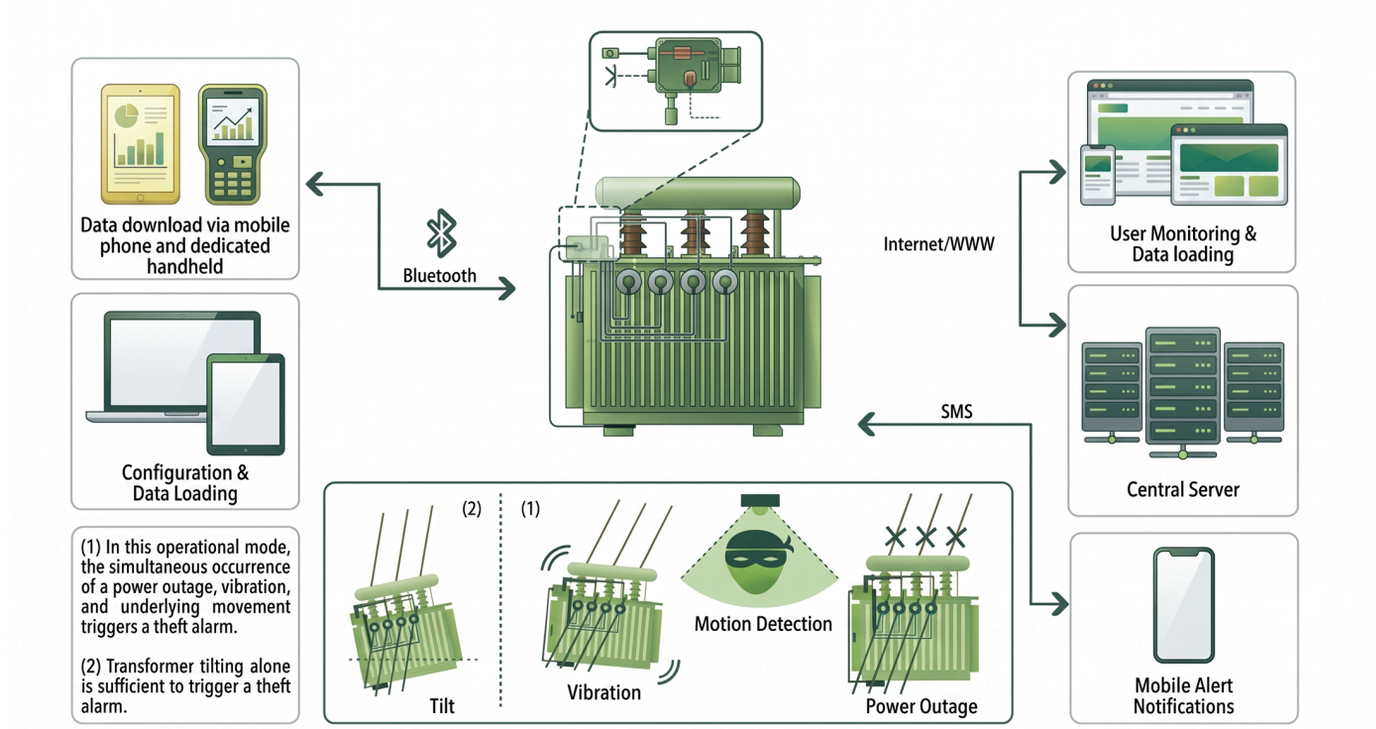




Niroo Transfo's R&D department is the beating heart of our innovation—the exact point where deep engineering expertise converges with state-of-the-art electrical and mechanical simulation software, including ANSYS, COMSOL, JMAG, and SOLIDWORKS. Through ultra-precise electromagnetic and thermal modeling, alongside strategic hot-spot management, we maximize the reduction of core and winding losses to unlock peak operational efficiency. The direct result of this rigorous process is the engineering of a new generation of custom-built, low-loss transformers that drastically slash operating expenses. Prior to mass manufacturing, all R&D designs are prototyped and subjected to the most uncompromising validation tests in our advanced laboratories, ensuring absolute reliability and full compliance with IEC 60076, IEEE standards, and Ministry of Energy regulations.

Smart Transformer Monitoring & Anti-Theft System

One of Niroo Transfo's most distinctive solutions is our smart monitoring and anti-theft system, engineered to deliver comprehensive transformer protection. Equipped with an integrated web-based platform, this device enables continuous, real-time tracking of equipment health and grid connectivity. Upon detecting any anomalous vibration, mechanical impact, or unauthorized displacement, the system immediately activates localized audio-visual deterrent alarms. Simultaneously, live alert signals and incident reports are transmitted directly to a secure web dashboard and support teams, proactively neutralizing the threat of equipment damage or theft.



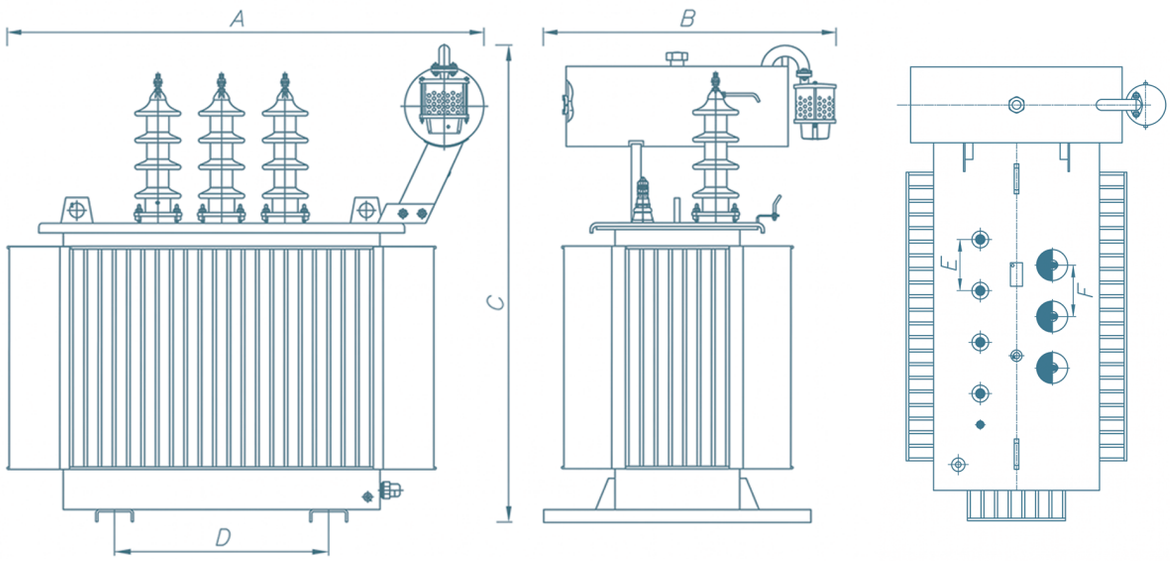
Smart Transformer Monitoring & Anti-Theft System (DTMS) Infographic



Key Capabilities of the DTMS

- Detects and reports any suspicious event, such as impact, movement, vibration, tilting, unauthorized displacement, or power cut to the transformer. While activating an on-site audible alarm, the system instantly sends warning signals and reports to subscribers' mobile phones, the central server, and a web-based panel, so that any damage or theft can be prevented.
- Measures voltage, current, power factor, and active, reactive, and apparent power for each phase, independently and simultaneously.
- Calculates the temperature of the transformer's internal hot spots and issues a timely warning when it reaches a critical temperature.

Technical Specifications of Three-Phase Transformers



Dimensions of Distribution Transformers (25 – 315 kVA)

Power (kVA)	25	50	75	100	125	160	200	250	315
A (mm)	800	898	960	1043	1043	1175	1210	1293	1567
B (mm)	690	690	690	695	700	705	722	780	970
C (mm)	1361	1391	1419	1525	1439	1508	1567	1566	1605
D (mm)	520	520	520	520	520	520	520	520	670
E (mm)	120	150	150	150	150	150	150	150	150
F (mm)	265	265	265	265	265	265	265	265	265
Wheel Diameter	-	-	-	-	-	-	-	-	-
Wheel Width	-	-	-	-	-	-	-	-	-

Dimensions of Distribution Transformers (400 – 2000 kVA)

Power (kVA)	400	500	630	800	1000	1250	1600	2000
A (mm)	1637	1697	1847	2001	2057	2147	2387	2646
B (mm)	970	840	945	1110	1152	1262	1384	1389
C (mm)	1611	1665	1758	1825	2018	2300	2364	2475
D (mm)	670	670	670	670	820	820	820	1070
E (mm)	150	150	150	150	180	180	180	180
F (mm)	265	265	265	265	265	265	265	265
Wheel Diameter	150	150	150	150	200	200	200	200
Wheel Width	50	50	50	50	68	68	68	68

Electrical & Physical Specifications of AB' Distribution Transformers (1)

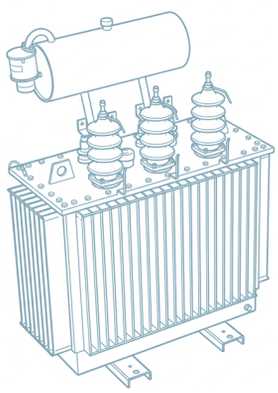
25 – 315 kVA

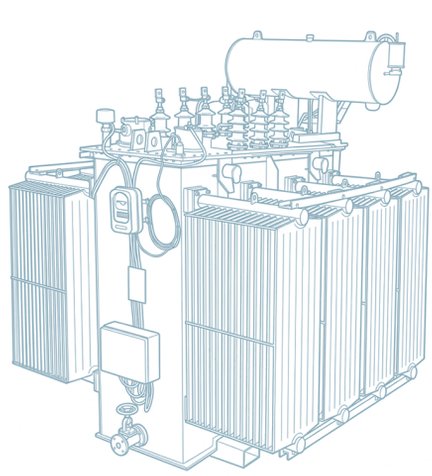
Rated power (kVA)	25	50	75	100	125	160	200	250	315
Voltages (kV)	20/0.4	20/0.4	20/0.4	20/0.4	20/0.4	20/0.4	20/0.4	20/0.4	20/0.4
Currents (A)	0.72/36	1.44/72.2	2.17/108	2.89/144	3.61/180	4.62/231	5.77/289	7.22/361	9.1/455
Cooling system	ONAN	ONAN	ONAN	ONAN	ONAN	ONAN	ONAN	ONAN	ONAN
Altitude from sea level(m)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Ambient temperature (°C)	45	45	45	45	45	45	45	45	45
Separate source voltage test (kV)	50/3	50/3	50/3	50/3	50/3	50/3	50/3	50/3	50/3
Frequency (Hz)	50	50	50	50	50	50	50	50	50
Impedance voltage (%)	4	4	4	4	4	4	4	6	6
Vector Group	Yzn5	Yzn5	Yzn5	Yzn5	Yzn5	Yzn5	Yzn5	Dyn5	Dyn5
Voltage regulation (%)	±1x4%	±1x4%	±1x4%	±1x4%	±1x4%	±1x4%	±1x4%	±2x2.5%	±2x2.5%
Noload-Loss (W)	90	145	203	260	305	375	440	530	625
Load Loss (W)	700	1100	1420	1750	1990	2350	2760	3250	3840
Oil weight (Litre)	101	127	163	169	226	210	244	289	333
Total Weight (kg)	339	497	570	630	751	846	999	1120	1387

400 – 2000 kVA

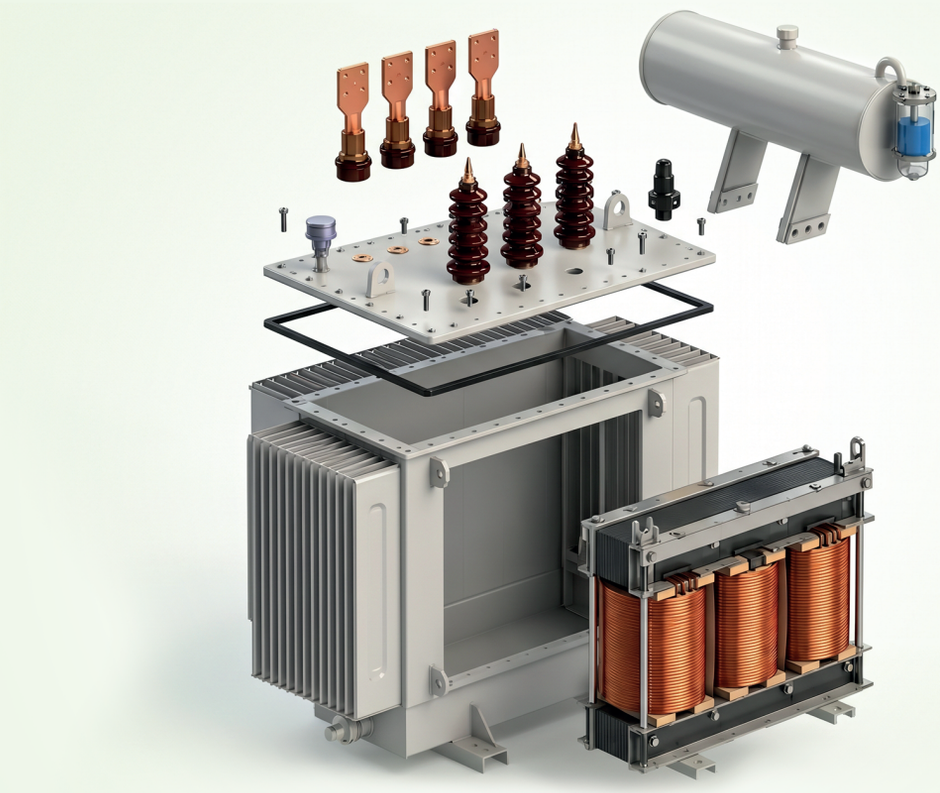
Rated power (kVA)	400	500	630	800	1000	1250	1600	2000
Voltages (kV)	20/0.4	20/0.4	20/0.4	20/0.4	20/0.4	20/0.4	20/0.4	20/0.4
Currents (A)	11.55/577	14.4/722	18.2/909	23.1/1155	28.9/1443	36.1/1804	46.2/2309	57.7/2887
Cooling system	ONAN	ONAN	ONAN	ONAN	ONAN	ONAN	ONAN	ONAN
Altitude from sea level(m)	1000	1000	1000	1000	1000	1000	1000	1000
Ambient temperature (°C)	45	45	45	45	45	45	45	45
Separate source voltage test (kV)	50/3	50/3	50/3	50/3	50/3	50/3	50/3	50/3
Frequency (Hz)	50	50	50	50	50	50	50	50
Impedance voltage (%)	6	6	6	6	6	6	6	6
Vector Group	Dyn5	Dyn5	Dyn5	Dyn5	Dyn5	Dyn5	Dyn5	Dyn5
Voltage regulation (%)	±2x2.5%	±2x2.5%	±2x2.5%	±2x2.5%	±2x2.5%	±2x2.5%	±2x2.5%	±2x2.5%
Noload-Loss (W)	750	840	940	1155	1400	1760	2200	2800
Load Loss (W)	4600	5370	6750	8450	10500	13180	17000	21250
Oil weight (Litre)	401	444	580	714	748	894	1124	1514
Total Weight (kg)	1669	1886	2367	2836	3285	3835	4898	6242

(1) Dimensions and weights are approximate and may vary with design modifications.





Standard Transformer Accessories



Accessories	25-160 kVA	200-315 kVA	400-500 kVA	630-800 kVA	1000-2000 kVA
HV Bushings	✓	✓	✓	✓	✓
Arcing Horns	✓	✓	✓	✓	✓
LV Bushings	✓	✓	✓	✓	✓
Oil Level Indicator	✓	✓	✓	✓	✓
Buchholz Relay	-	-	-	-	✓
Earthing Terminal	✓	✓	✓	✓	✓
Transport Wheels	-	-	✓	✓	✓
Off-Circuit Tap Changer	✓	✓	✓	✓	✓
Rating Nameplate	✓	✓	✓	✓	✓
Oil Temperature Indicator	-	-	-	✓	✓
Drain Valve	✓	✓	✓	✓	✓
Conservator Tank	✓	✓	✓	✓	✓
Thermometer Pocket	-	✓	✓	✓	✓
Dehydrating Breather	✓	✓	✓	✓	✓

Key Transformer Accessories



Magnetic Oil Level Indicator (MOLI)

Serving as a primary protective device, the magnetic oil level indicator consists of a dial mechanism and a flange, available in both contact-equipped and non-contact variants. It is specifically engineered to display the oil level on the side wall of the conservator tank. The dial is calibrated to position the indicator needle horizontally at a reference temperature of 20°C, while functioning accurately up to an oil temperature of 110°C and a pressure of 0.5 bar.



Dehydrating Breather & Silica Gel

In transformers equipped with a conservator tank that breathes atmospheric air, a chamber filled with silica gel is utilized to extract airborne moisture. Additionally, an oil-seal cup is positioned at the base of the breather to trap suspended dust particles, thereby preventing oil degradation and extending the operational lifespan of the transformer.



Oil Temperature Indicator (OTI)

Mounted on the tank wall or cover, these thermometers are designed to continuously monitor and display the top oil temperature of the transformer. They are typically equipped with two microswitches designated for "Alarm" and "Trip" functions. The dial features a primary pointer indicating the real-time oil temperature, alongside a maximum-indicating pointer that records the highest temperature the transformer has reached.



Winding Temperature Indicator (WTI)

When the operational requirements mandate monitoring the winding temperature in addition to the oil temperature, this specialized device is deployed. The WTI calculates the winding hotspot by integrating two key parameters: the current flowing through the hottest phase (via a CT) and the top oil temperature.

Key Transformer Accessories



Buchholz Relay

This critical protection device safeguards the transformer against internal faults, including gas accumulation caused by dielectric oil decomposition, sudden oil level drops due to leakage, and violent oil surges triggered by internal short circuits. Upon detecting an anomaly, the relay instantly transmits signals to issue a trip command.



Pressure Relief Valve (PRV)

Available in both standard and contact-equipped configurations, the PRV is engineered to prevent tank deformation or catastrophic explosion by venting excess internal pressure when it surpasses safe limits. The installation of this valve is strictly mandatory for hermetically sealed transformers, given their entirely enclosed, non-breathing architecture.



Vacuum and Pressure Gauge

Primarily deployed in gas-cushion hermetically sealed transformers, this precision gauge measures the internal nitrogen gas pressure. It ensures accurate pressure monitoring both during the initial gas injection phase and throughout the transformer's active operation.



Protection Current Transformers (CTs)

Protection CTs are predominantly installed on the neutral terminal to accurately detect potential fault currents flowing through the neutral point. By transmitting these current readings to the associated substation protection relays, they facilitate immediate trip commands, thereby preventing severe equipment damage.

Key Transformer Accessories



Cooling Fans

In transformers equipped with an ONAN/ONAF cooling system, forced-air cooling fans are strategically mounted beneath the radiator fins to enhance airflow circulation and optimize the thermal management of the unit. The operation of these fans is typically automated based on the top oil temperature. To seamlessly control this process, these transformers utilize four-contact Oil Temperature Indicators (OTI), configured specifically for: Alarm, Trip, Fan ON, and Fan OFF commands.



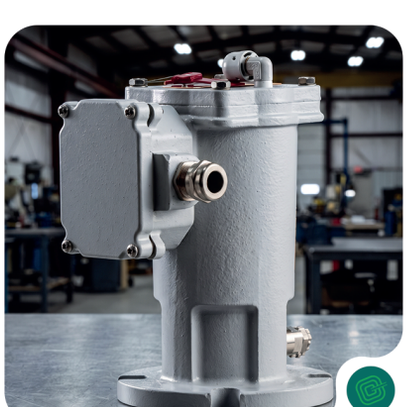
Hermetic Protection Relay (Oil Level Monitor)

This device functions similarly to an oil level sight glass, specifically designed for hermetically sealed transformers. When the oil level drops within the filling tube, an internal float descends. Upon reaching the designated alarm threshold, the main coupling actuates an electrical microswitch. Conversely, if thermal expansion or other factors cause the oil level to rise and stabilize at 20mm above the alarm point, the indicator automatically resets.



DGPT2 Protection Relay for Hermetic Transformers

In hermetically sealed transformers, the DGPT2 relay provides complete protection using the same logic as a Buchholz relay. It detects gas accumulation caused by partial discharges or abnormal internal hot spots, and if the gas volume exceeds the preset threshold, it issues an immediate trip command. The DGPT2 also monitors oil pressure and temperature, protecting the transformer against excessive pressure and abnormal temperature rises, which improves safety and operational reliability.



Sudden Pressure Relay (SPR)

Although related to the Pressure Relief Valve (PRV), the Sudden Pressure Relay (SPR) responds only to the rate of pressure rise, not to absolute pressure. Typically mounted on the side wall of gas-cushion hermetically sealed transformers, it reacts instantly to the rapid oil pressure surge caused by severe internal faults, such as short circuits or inter-turn winding faults. In sealed units, it is the primary device for detecting internal faults, the same role a Buchholz relay plays in conservator-type transformers.

Key Transformer Accessories



Bushings

Predominantly manufactured from high-grade porcelain, bushings are employed to provide the necessary creepage distance and insulation between the live connection points (cables or busbars) and the grounded tank cover. For voltage levels of 12 kV and above, they must be equipped with arcing horns. Furthermore, in highly polluted environments, plug-in (socket-type) bushings are utilized to ensure optimal reliability.



Oil Level Sight Glass

The sight glass facilitates continuous visual monitoring of the oil level. It is mounted directly on the oil filling tube, featuring a robust brass main body that houses an oil-resistant internal float. This device is engineered to withstand a maximum internal pressure of 0.5 bar.



Painting

Niroo Transfo's fully automated painting line is designed, installed, and commissioned utilizing ALCON technology from Denmark, executing an advanced TRIBO electrostatic powder coating process. This ensures a uniform, highly durable finish resistant to severe environmental impacts and corrosive agents. Following powder application, the tanks are baked in a curing oven at 200°C before undergoing a controlled cooling phase. The final exterior color complies with the RAL 7032 standard.

Transformer Oil

All insulating oils used in our distribution transformers are Uninhibited Mineral Transformer Oils, strictly complying with the IEC 60296:2020 standard. The technical specifications are detailed in the table:

Technical Specifications		Acceptance Limits
Kinematic Viscosity	mm^2/S	≤ 12
Pour Point	°c	≤ -40
Breakdown Voltage (After Treatment)	kV	≥ 30 / (70)
Density	g/ml	≤ 0.895
Dielectric Dissipation Factor (DDF)	---	≤ 0.005
Appearance	---	Clear, no suspended matter
Acidity (Neutralization Value)	mgKOH/g	≤ 0.01
Corrosive Sulfur	---	Not corrosive
Flash Point	°c	≥ 135

General On-Site Installation & Commissioning Guide

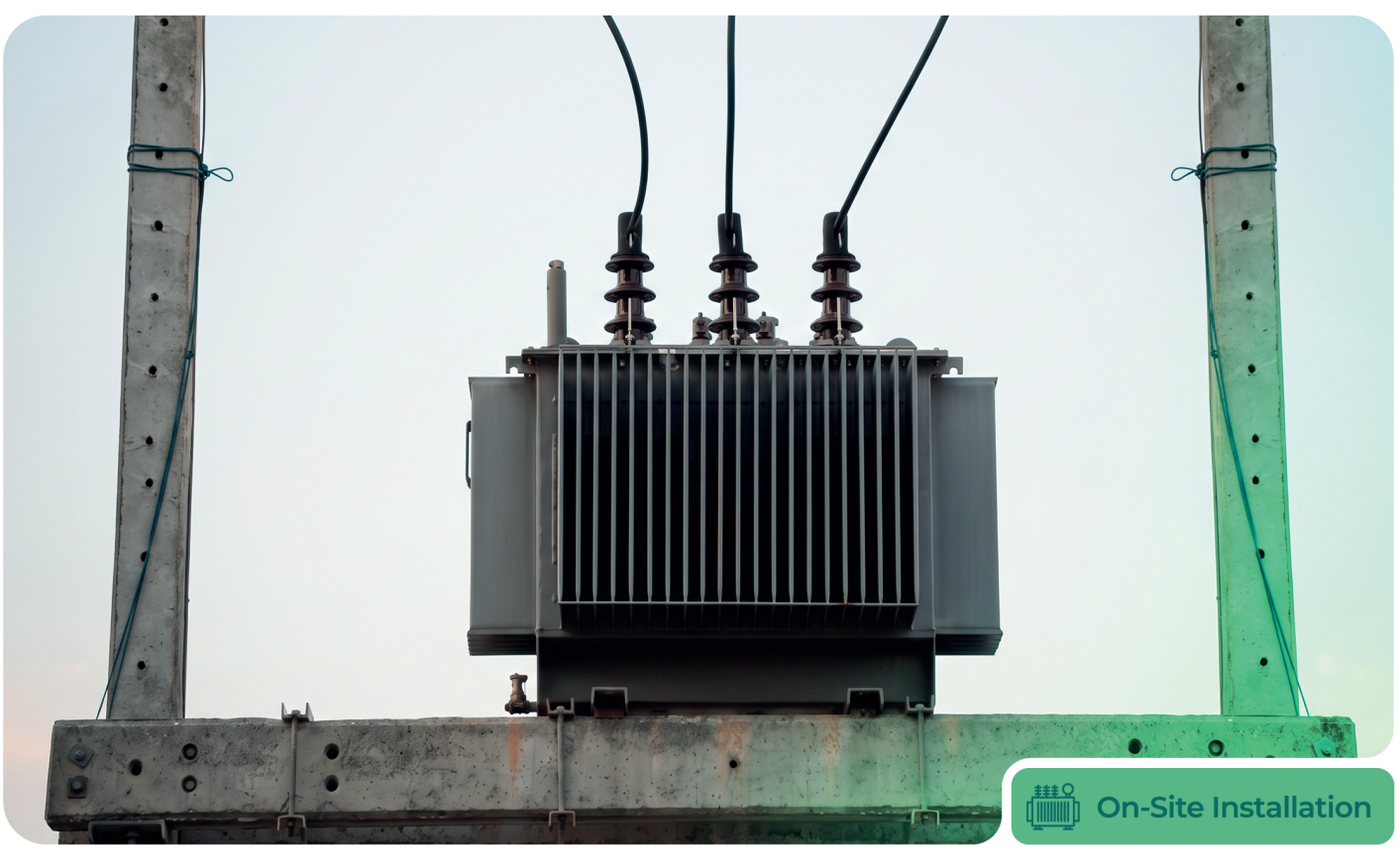
To carry out pre-commissioning electrical tests safely and maintain proper installation standards, the following prerequisites and safety rules must be strictly observed.

Essential Prerequisites: Before any testing, the transformer must be firmly secured to its foundation with the specified anchoring hardware and channel bases, and the tank must be filled with insulating oil to the specified level. The output terminals must be fully disconnected from the load, and all external bushings must be thoroughly cleaned.

Smart Transformer Monitoring & Anti-Theft System

1 Insulation Resistance (Megger) Test

The primary objective of this test is to measure the insulation resistance between the high-voltage (HV) and low-voltage (LV) windings, as well as between each winding and the grounded tank body. It verifies whether the critical insulation clearances, established during the transformer's design and calculation phase, have been compromised by improper handling, mechanical shocks during transit, or incorrect installation procedures. It is important to note that insulation resistance is not a fixed baseline: the results are strongly affected by several variables, including ambient humidity, oil temperature, bushing spacing, and the unit's rated voltage. Field measurements should therefore be carefully compared with established reference values and factory test results.



Testing Procedure

- The transformer tank must be securely grounded via the designated earthing terminal.
- Short-circuit the High-Voltage (HV) terminals.
- Short-circuit the Low-Voltage (LV) terminals.

Insulation Resistance Testing Steps

A) **Measuring insulation resistance between HV and LV windings:**
Apply the test voltage using a Megger device between the HV and LV windings. Record the insulation resistance values in megaohms (MΩ) at exactly 15 seconds and 60 seconds. Throughout the duration of the test, with the exception of the initial few seconds, the resistance value should demonstrate a gradual increase.

B) **Measuring insulation resistance between HV windings and the tank:**
Ground the LV terminals and apply the test voltage between the HV terminals and the grounded tank. Record the values following the exact procedure outlined in Step A.

C) **Measuring insulation resistance between LV windings and the tank:**
Ground the HV terminals and apply the test voltage between the LV terminals and the grounded tank. Record the values strictly as specified in Step A.

E) **Final Calculation (Dielectric Absorption Ratio):**
The ratio obtained by dividing the 60-second insulation resistance value by the 15-second value must be greater than 1.35.

Insulation Resistance Testing Steps

- HV Winding
- LV Winding
- Transformer Tank
- Measuring Instrument
- Winding Insulation Resistance

2 Voltage Ratio Measurement and Tap Changer Functional Test

Testing Procedure

- Securely ground the transformer tank via the designated earthing terminal.
- Apply a three-phase 380V supply to the HV side. Simultaneously, read the induced voltage on the corresponding phase of the LV side, strictly accounting for the vector group connection. After calculating the phase values based on the specific connection type, determine the exact ratio of the recorded voltages.
- During the voltage ratio measurement, the no-load currents must be recorded using an appropriate ammeter across all tap positions and comparatively analyzed.
- In accordance with the IEC 60076 standard, the acceptable tolerance for this error is strictly within ±0.5% at the principal (rated) tap. Furthermore, the voltage ratio measurement must be systematically executed across all tap changer steps.



3 No-Load (Excitation) Current Measurement from the HV Side

Objective of the Test

Measuring the no-load current at a reduced voltage, such as 380 V, is carried out specifically to detect latent winding faults that remain undetected by standard diagnostic methods such as winding resistance or voltage ratio tests (for example, inter-turn winding faults).

To ensure the highest possible measurement accuracy, the transformer's magnetic core must be completely free of residual magnetism left by prior DC testing. For this reason, no-load current measurements must always be performed before measuring the DC resistance of the windings.

Testing Procedure

- The transformer tank must be securely grounded via the designated earthing terminal.
- Before applying the input voltage, appropriate protective fuses must be installed in the supply circuit to safeguard the measuring instruments against potential overcurrents.
- Apply a three-phase 380V supply to the High-Voltage (HV) terminals.
- Utilize a clamp-on ammeter to accurately measure the no-load currents at Tap 1.
- Following each no-load current measurement, the windings must be grounded for a sufficient duration to ensure complete electrical discharge.

No-Load Current Distribution Across Various Connections

Due to the specific distribution characteristics of magnetic flux within the core, no-load currents will inherently vary based on the winding connection configuration:

A) Star (Y) Connection: The no-load currents in the two outer phases are symmetrical and inherently higher than the current in the center phase. The expected current ratio is typically 1:0.8:1.
B) Delta (D) or Zigzag (Z) Connection: The currents in two adjacent phases are symmetrical and lower than the current in the remaining phase. The expected current ratio is typically 1.3:1:1.

Certifications & Accreditations

Through rigorous compliance with national and international standards, Niroo Transfo has successfully attained the following prestigious certifications and approvals:

- Tavanir (Iran Generation, Transmission and Distribution Management Company) Approval
- Niroo Research Institute (NRI) Certification
- Energy and Power Industries Laboratories (EPIL) Test Reports and Approvals
- Certified Member of the Iran Electrical Industry Syndicate (IEIS)
- ISO 9001:2015 Quality Management System Certification

Industrial Applications & Sectors Served

Niroo Transfo's advanced products and custom-engineered solutions have been successfully deployed across a wide spectrum of critical infrastructure and heavy industrial projects:

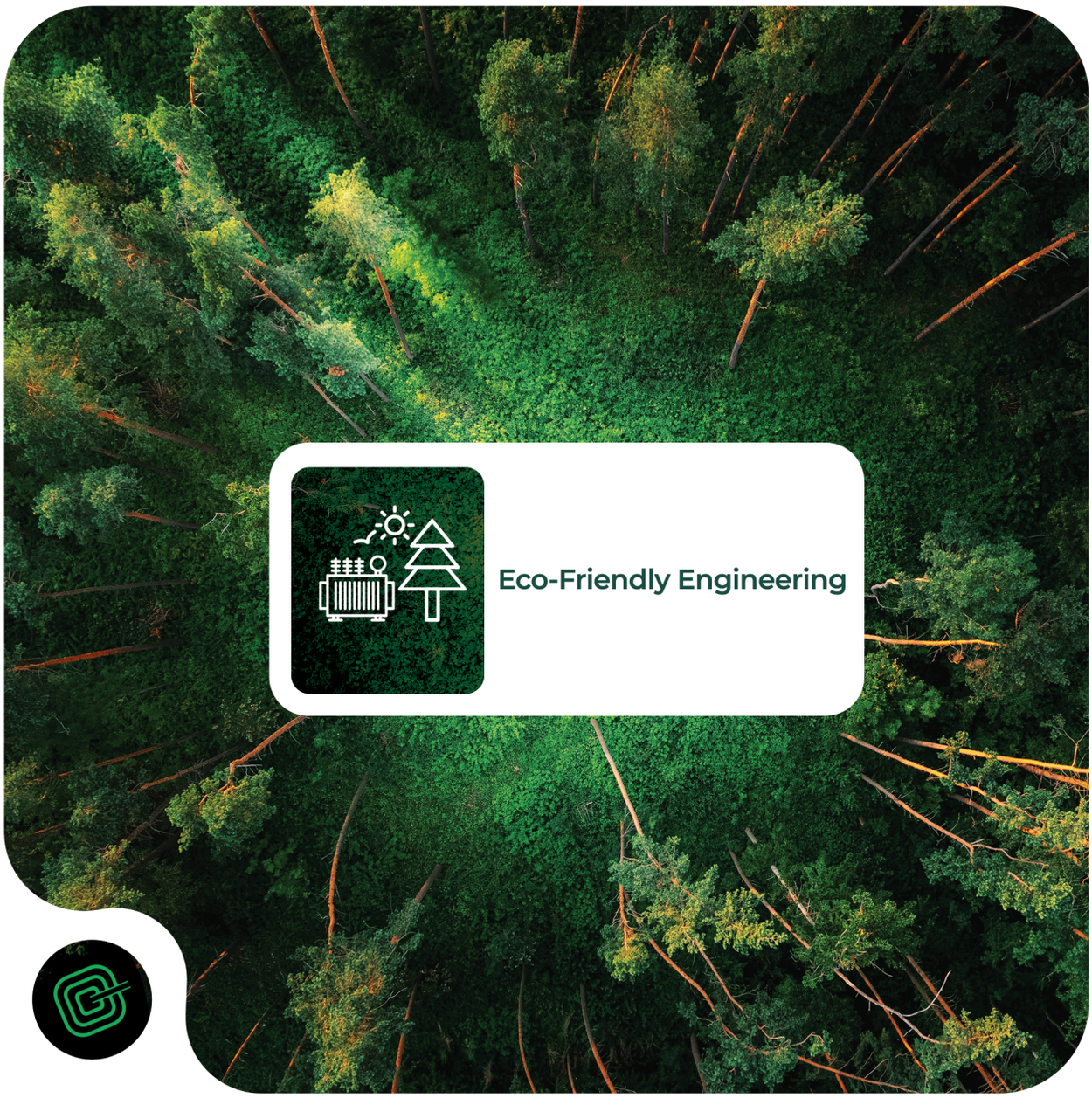
- Steel & Metallurgy Industries: Utilizing Furnace and Rectifier Transformers
  Mining Sector
- Oil, Gas & Petrochemicals: Utilizing Hermetically Sealed Transformers, Autotransformers, and Special-Purpose Transformers
- Power Generation & Solar Power Plants (PV)
- Water & Wastewater Infrastructure and Civil Projects
- Transportation & Infrastructure: Utilizing Three-Winding and Dual-Voltage Transformers
- Healthcare Facilities, Commercial & Administrative Complexes, Industrial Estates, and Manufacturing Plants




E.P.I.C.
Energy&Power Industries Laboratories Co.(LLC)
ISO IEC 17025 Accredited Lab and Inspection Body
Test report: L13-50030-T2 Page 1 of 18 LQF-510-02
EPIL TEST REPORT
Project No.: L13-50030
Equipment Under Test: Distribution Transformer Monitor (DTM)
Model/Type : DTM-501
S/N : 0991XXXX9354
Rating : 250 VAC, 50 Hz, IP66
Manufactured by: Niroottransfo Co.
Applicant: Niroottransfo Co.
Trade Mark: Niroottransfo
Tested According to: Client Request
Reception Date of Sample: 20-Aug-2019 Testing Date: 26-Aug-2019
Issue Date: 01-Sep-2019
Test Result: PASS
No. of pages: 18
Prepared and Tested by: Test Engineer
Verified by: Technical Manager
Approved by: Engineering Deputy of Test and Inspection
Chief, Industrial Officer
Technical Department
Accredited Lab
Office: Unit 12, No.2, Boojari Sabet Dead-End, Corner of Fatmian St., Bozorgmehr St., Vali-Asr Ave., Tehran-Iran
Postal Code: 1416854523 Tel: 021-61971 Fax: 021-66174283
Lab: Karaneh Research City, Supa Blvd., 8Th of Karaj-Qazvin Freeway, Iran Tel: 021-61971 Fax: 021-66174283




CERTIFICATE
This document certifies that the Competence of Quality Management Systems of:
Niroo Transfo MFG Co.
Have been assessed and found to meet the requirements of:
ISO 9001:2015
Quality Management System
The certificate is valid for the following scope of operation:
Manufacturer of Distribution Transformers
This certificate may be renewed for the further periods stated below upon surveillance carried out by QNB. Upon such successful surveillance, the certificate shall be endorsed with regard to the relevant period, by the appropriate QNB mark of conformity. Without such mark of conformity label for the relevant period, this certificate shall be invalid for the relevant period.
Date of issue: 26 Aug 2025 Date of Expiry: 25 Aug 2028
QNB INAAC
Registration Number QNB126228
Signed by: Martin Thornley Chief Executive Officer, QNB certification
The validity of this certificate can be verified from the following website, www.qnbcert.com
QNB Certification Ltd Registered in Sweden. Goteborgsvagen 95A, 44557, Surte, Sweden



At Niroo Transfo, environmental protection is more than corporate social responsibility; it is built into our design, manufacturing, and product development philosophy. By using energy-efficient technologies and continuously optimizing our production processes, we work to minimize our environmental footprint and support sustainable development across the power industry. Our core sustainability initiatives include:

- Energy Efficiency: Engineering and manufacturing high-efficiency, low-loss transformers that significantly reduce energy consumption.
- Noise Control: Producing low-noise transformers to reduce noise pollution.
- Renewable Energy Support: Developing specialized transformers for solar power plants, supporting the global transition to renewable energy.
- Green Manufacturing: Sourcing part of our factory's electricity from an on-site solar PV system, with ongoing expansion plans to increase our use of clean energy.
- Water Conservation: Using water purification and recycling systems in our production lines for better management of water resources.
- Responsible Resource Management: Refining, storing, and managing insulating oils in strict compliance with environmental regulations.
- Leakage Prevention: Using high-quality components, fittings, and advanced sealing systems to prevent oil leakage and protect the surrounding environment.