

Power Transformer and Shunt Reactor

Step Up Transformer

Step Down Transformer

Auto Transformer

Furnace Transformer

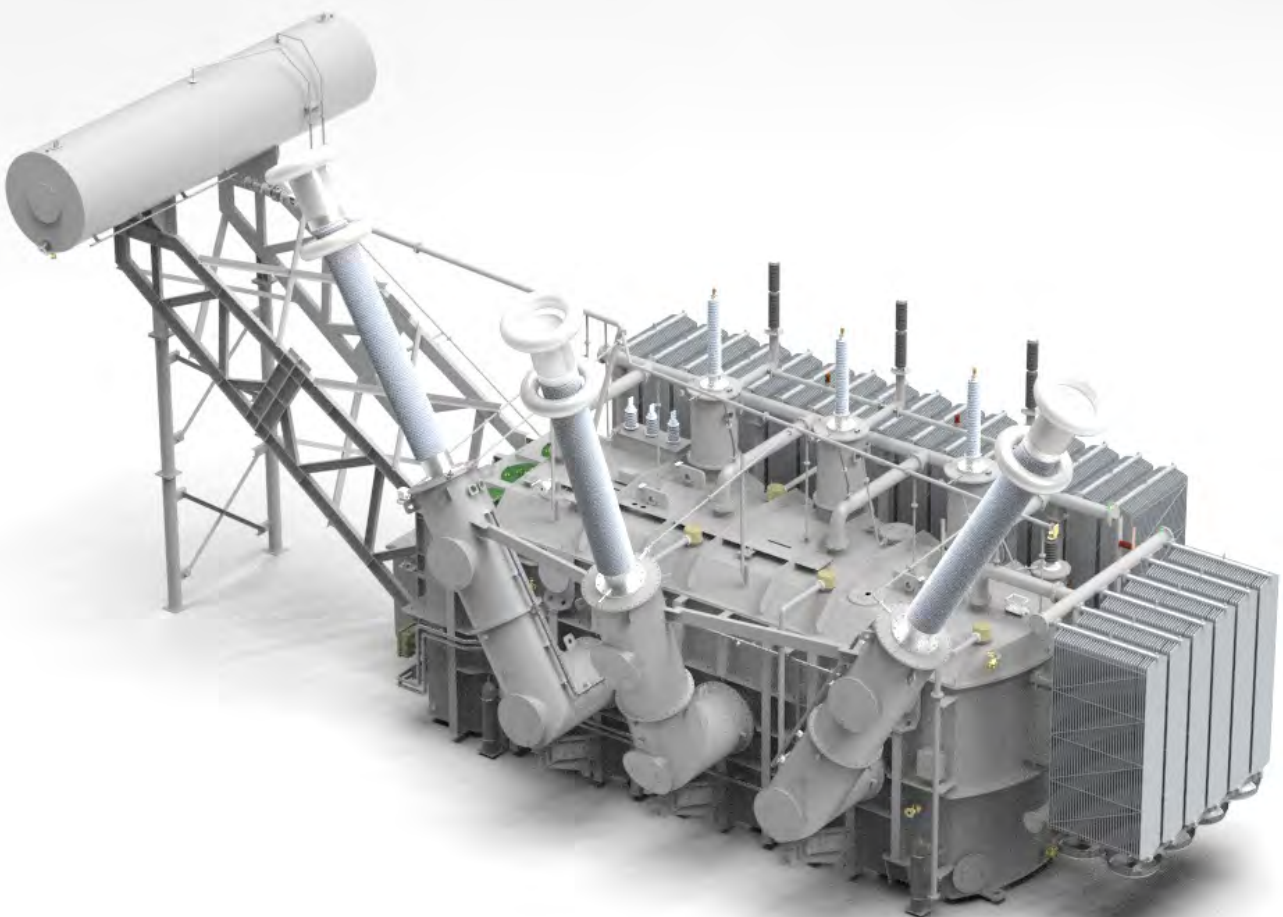
Scott Transformer

Less Flammable Power Transformer

Natural Ester Fluid Transformer

Gas Transformer

Shunt Reactor



ILJIN Electric is a global leader in the heavy electrical industry providing the best products and services with cutting edge technology of world class and competitiveness.



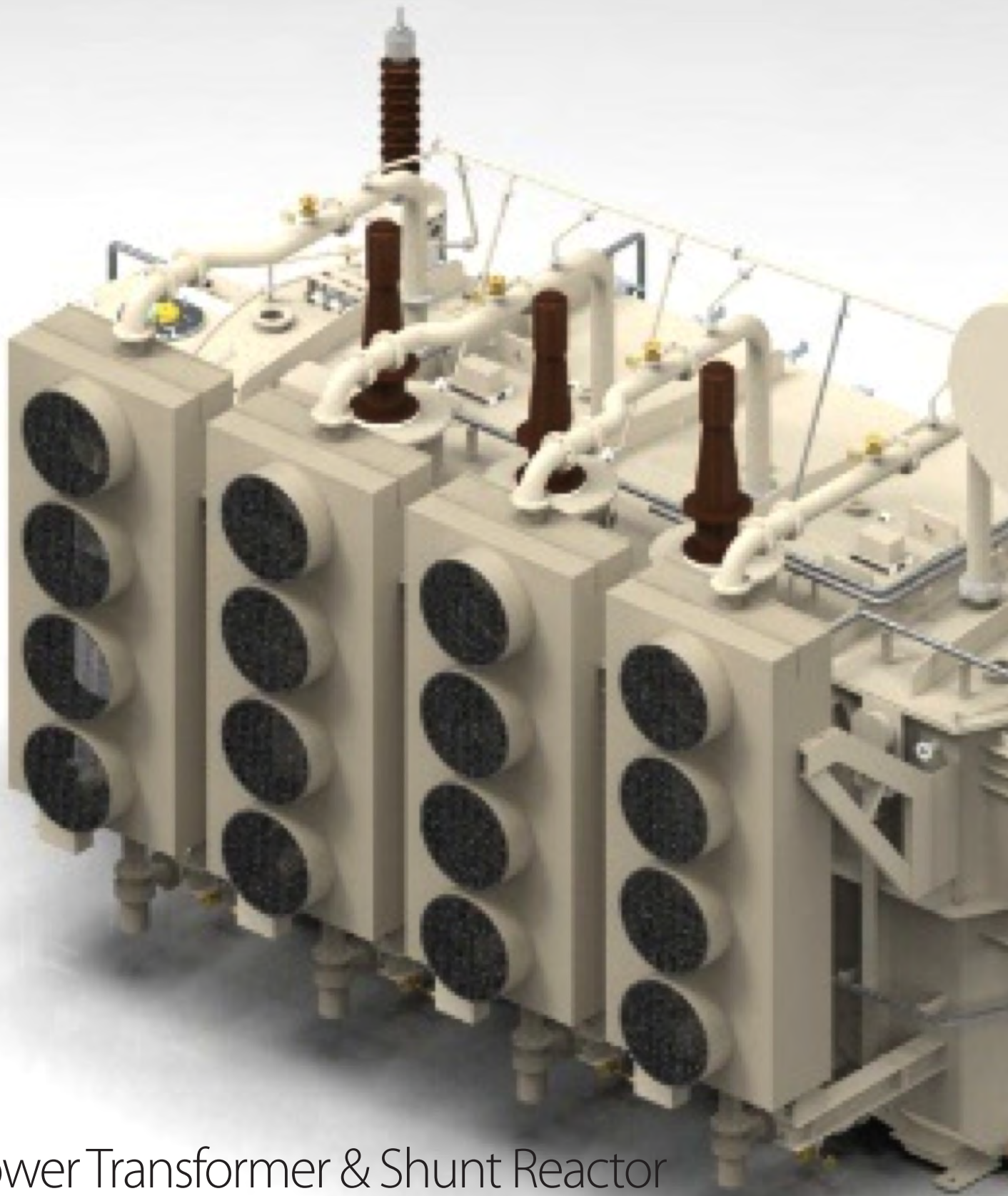


ILJIN Electric Co., Ltd., established in 1968 from ILJIN Metal industry Company, the parent company of ILJIN, is reborn as a global heavy electric specialist that supplies core equipment and services on power generation, transmission and transformation of electric power and distribution through continuous R&D and constant product innovation during the past four decades.

The Heavy Electric division that provides total solution for supplying stable power from power stations & large-sized plants to customer has been recognized globally through the successful execution of domestic and overseas turnkey projects. The Heavy Electric division is emerging as a global heavy electric total solutions company that leads the 21st century by setting customer satisfaction as its top priority.

Since starting its power business through the development of substation fittings for the first time domestically, the Heavy Electric division is developing and manufacturing core device of electric equipment such as EHV transformer, EHV GIS, IPB, Gas S/W, Recloser and C-GIS. Furthermore, the Heavy Electric division is expanding its power business area by providing IT Technology products, eco-friendly products and smart grid products.





Power Transformer & Shunt Reactor

ILJIN is a reliable business partner
in the power industry



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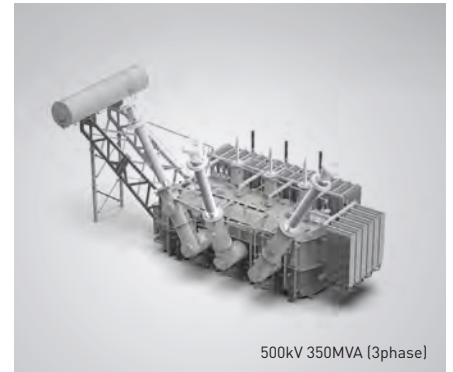
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PRODUCT RANGE / OIL-IMMERSED TRANSFORMER DESIGN

Production Range

ILJIN ELECTRIC is becoming a world-class transformer manufacturer by meeting international standards such as IEC and ANSI, securing the ability to design, manufacture, and test in accordance with customer specifications in each country.

It supplies a variety of transformers that meet customer requirements and produces special transformers for various purposes such as single-phase or three-phase transformers, auto-transformer or multi-winding transformers, and shunt reactors.



| Phase / Rated Frequency | | Contents |
|-------------------------|-------------------------|--|
| Phase / Rated Frequency | | 1 or 3 Phase / 50 or 60 Hz |
| Insulation | | Oil Type |
| Rated Voltage | | Up to 765kV |
| Frame | Oil Preservation System | Conservator With Air Seal Cell Type N2 Sealed Type |
| | Cooling System | ONAN, ONAF, OFAN, OFAF, ODAF, OFWF, ODWF, KNAN, KNAF, KFAF |
| | Base | Skid, Roller |
| Capacity | | Up to 1,000MVA |
| Application | | Substation, Generation Plant, Transmission & Distribution System, Electric Furnace, Scott Connection |
| Applied Standard | International Standard | IEC, ISO |
| | National Standard | KS, JEC, ANSI, BS, GOST, CSA |
| | Association Standard | KMC, ES, NEMA, TR2, ANSI (IEEE), JEMA |

PRODUCT RANGE / GAS TRANSFORMER DESIGN

Production Range

ILJIN ELECTRIC is becoming a world-class transformer manufacturer by meeting international standards such as IEC and ANSI, securing the ability to design, manufacture, and test in accordance with customer specifications in each country.

It supplies a variety of transformers that meet customer requirements and produces special transformers for various purposes such as single-phase or three-phase transformers, auto-transformer or multi-winding transformers, and shunt reactors.



154kV 20MVA GDWF [1phase]



154kV 20MVA GDAF [1phase]



154kV 20MVA GDAF [1phase]

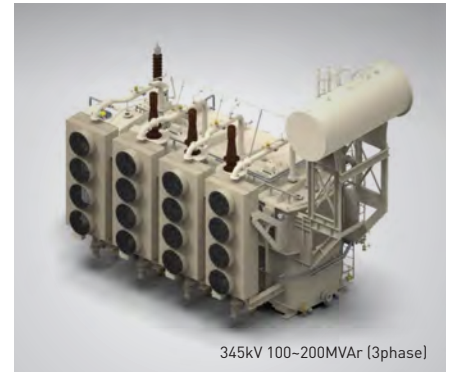
| Phase / Rated Frequency | | Contents |
|-------------------------|------------------------|---|
| Phase / Rated Frequency | | 1 or 3 Phase / 60 Hz |
| Insulation | | SF ₆ Gas |
| Rated Voltage | | Up to 154kV |
| Frame | Cooling System | GDWF, GDAF |
| | Base | Skid, Roller |
| Capacity | | Up to 60MVA |
| Application | | Substations requiring fire safety (e.g. Urban substation, etc.) |
| Applied Standard | International Standard | IEC,ISO |
| | National Standard | KS,JEC,ANSI |
| | Association Standard | ES,NEMA, ANSI (IEEE) |

PRODUCT RANGE / SHUNT REACTOR DESIGN

Production Range

ILJIN ELECTRIC is becoming a world-class transformer manufacturer by meeting international standards such as IEC and ANSI, securing the ability to design, manufacture, and test in accordance with customer specifications in each country.

It supplies a variety of transformers that meet customer requirements and produces special transformers for various purposes such as single-phase or three-phase transformers, auto-transformer or multi-winding transformers, and shunt reactors.



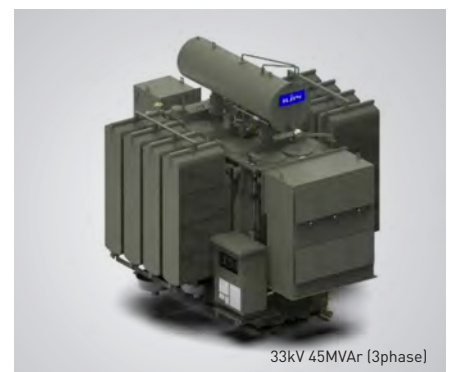
345kV 100-200MVar (3phase)



154kV 20MVar (1phase)



154kV 30-60MVar (3phase)



33kV 45MVar (3phase)

| Contents | | Descriptions |
|-------------------------|-------------------------|--|
| Phase / Rated Frequency | | 1 or 3 Phase / 50 or 60 Hz |
| Insulation | | Oil Type |
| Rated Voltage | | Up to 345kV |
| Frame | Oil Preservation System | Conservator With Air Seal Cell Type N2 Sealed Type |
| | Cooling System | ONAN, ONAF, OFAN, OFAF, ODAF, OFWF, ODWF, KNAN, KNAF, KFAF |
| | Base | Skid, Roller |
| Capacity | | Up to 200MVar |
| Tap Changer Type | | Fixed, Linear, Reversing, Coarse-Fine, De-energized |
| Application | | Networks with distributed generation (e.g. solar, wind power plants, etc.) Transmission system with long overhead lines or cables Substation with rapidly changing loadconsumption (e.g. metropolis, etc.) |
| Applied Standard | International Standard | IEC, ISO |
| | National Standard | KS, JEC, ANSI, BS, GOST, CSA |
| | Association Standard | KMC, ES, NEMA, TR2, ANSI (IEEE), JEMA |

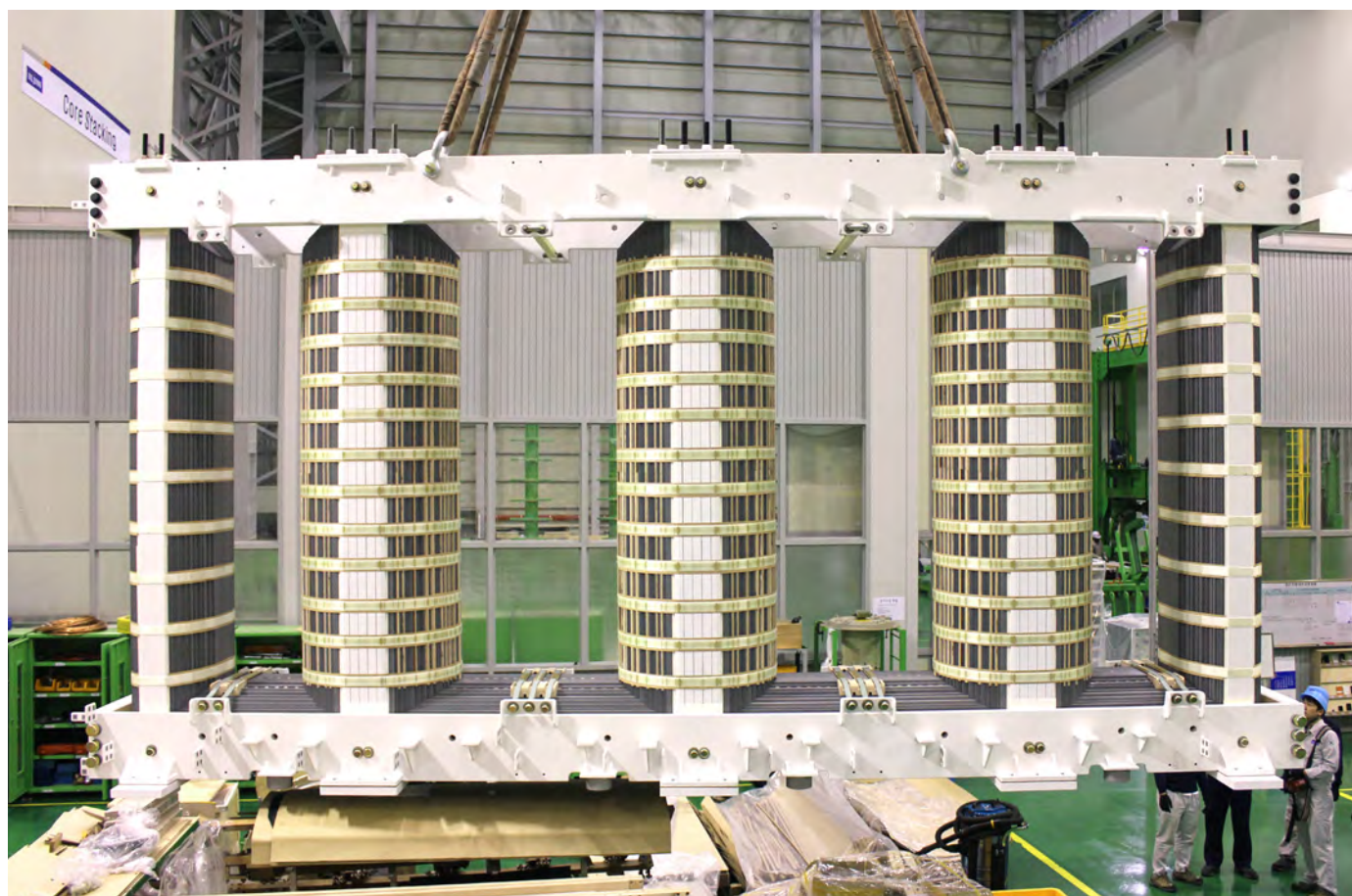
Core

The standard core construction type of ILJIN transformer is 'core form type having three legs core or five legs core for three phases ; two legs core or three legs core for single phases; four legs core for Scott transformer according to the customer's requirement.

Cold Rolled Grain oriented silicon steel sheets with high permeability and low hysteresis loss are used in the construction of cores. They are thinly stratified to reduce eddy loss, and the joints are arranged with the form of step-lap types to reduce loss and noise

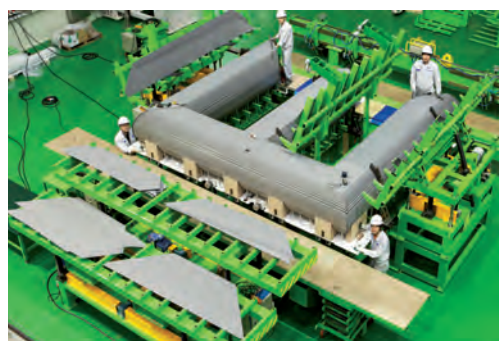


· AUTO CORE CUTTING MACHINE (CUT TO LENGTH)

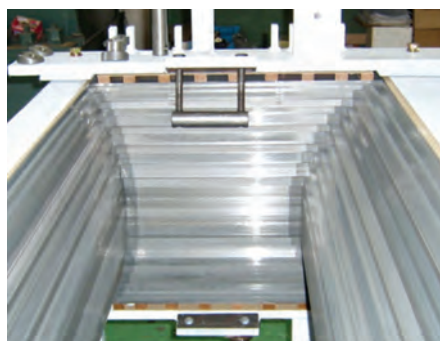


· CORE ASSEMBLY

ILJIN's Clamping method gives sturdy support and short-circuit strength to the windings by creating even pressure across the silicon steel sheets, keeping them firmly pressed together. This method helps to keep the core damage-free during transportation.



· CORE STACKING



· CORE BINDING



· ERECTION OF CORE ASSEMBLY

Winding

ILJIN strictly takes care of moisture and dust, during the manufacture process. Especially, every engineer and other staff-members always have to enter the Air Shower Machine before they get in to the workshop for the winding process.

The winding is made by copper conductor covered with several layers of insulation paper and enamel coating of high dielectric strength. And the CTC(Continuously Transposed Conductor) is composed of several wires individually covered with enamel and this entire wire unit is covered with several layers of insulation paper.



· WINDING SHOP



Layer Winding



Interleaved Winding



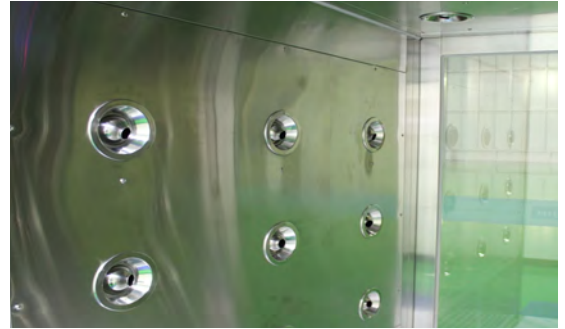
Disc Winding



Helical Winding

· THE VARIETY OF WINDING

Layer, Interleaved, Disc, Helical Winding



· AIR SHOWER MACHINE

staff-members always have to enter the Air Shower Machine before they get in to the workshop for the winding process.



· HORIZONTAL WINDING MACHINE



· VERTICAL WINDING MACHINE

Core and Coil Assembly

For insulation, all ILJIN transformers have a concentric winding structure. One or more insulating cylinders are placed around the core legs. The number of insulating cylinder depends on the voltage stress between the leg and the winding itself.

Vertical spacers are provided to produce an oil duct for the cooling of windings. Between the low and high voltage winding a number of insulating cylinders are provided at fixed distance from each other by using vertical spacers. The insulating cylinders are also placed between the phases.

After core and coil assembly is completed, it will be dried in the vapor phase drying plants under high vacuum condition for the purpose of eliminating moisture content.



· CORE AND COIL ASSEMBLY SHOP



· CORE AND COIL ASSEMBLY



· CORE AND COIL ASSEMBLY



· VAPOR PHASE DRYING PLANT

All of core and coil assembly should go through vapor phase drying process under vacuum condition to extract any moisture in core and coil.

FINAL ASSEMBLY

Final Assembly

Tanks have sufficient strength to withstand on internal pressure and full vacuum without damage and permanent deformation. In addition Tanks are designed to be endured ocean transportation, earthquake and un-expected bad weather. And we double check the cracks and other weak points of welding parts before painting through the non-destructive inspection.

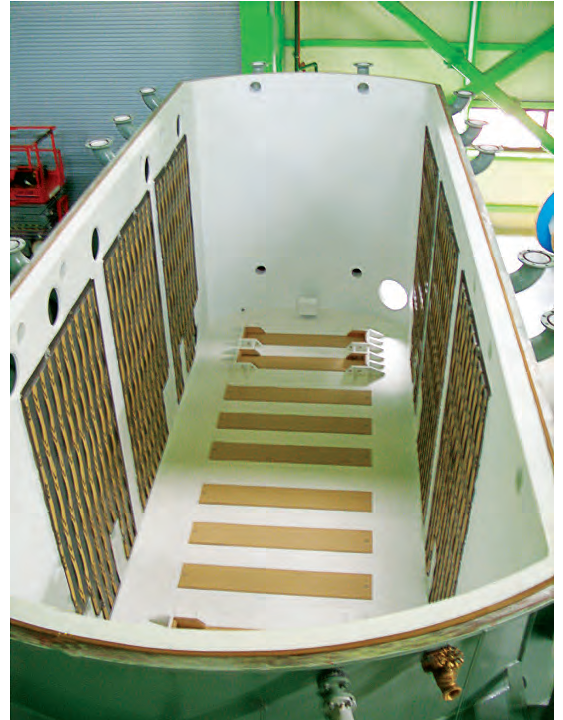
After conducting the in-tanking work and assembling the exterior parts, vacuum and oil filtration are performed.



· IN-TANKING PROCESS



· IN-TANKING PROCESS



· TANK & MAGNETIC SHIELD

In order to reduce stray loss from leakage flux, we attach magnetic shields on the wall of tank.



· FINAL ASSEMBLY

TESTING

Testing

We possess reliable world-class testing and measuring equipment, and a system that provide our customers with products of the highest quality. Characteristic tests, insulation tests and temperature rise test that meet international standards such as IEC, ANSI, JEC and BS.

- 01) Ratio Test
- 02) Polarity & Phase Relation Test
- 03) Winding Resistance Measurement
- 04) Impedance Voltage & Load Losses
- 05) Excitation Current & No Load Losses
- 06) Temperature Rise
- 07) Lightning Impulse
- 08) Switching Impulse
- 09) Low Frequency And Partial Discharge Test
- 10) BCT Polarity Test
- 11) BCT Resistance Test
- 12) BCT Allowable Error Test
- 13) BCT Excitation Current Characteristic
- 14) BCT Power Frequency Test
- 15) BCT Insulation Resistance Test
- 16) OLTC Insulation Resistance Test
- 17) OLTC Control Circuit Applied Voltage Test
- 18) Dissolved Gas In Oil Analysis
- 19) Low Frequency Test On Auxilliary Devices And Control And Current Transformer Circuits
- 20) Operation & Control Circuit Intensity Test
- 21) Audible Sound Level
- 22) Winding & Core Insulation Resistance
- 23) Insulation Power Factor & Capacitance
- 24) SFRA Test
- 25) Zero-Phase Sequence Impedance Voltage
- 26) DFRA Test

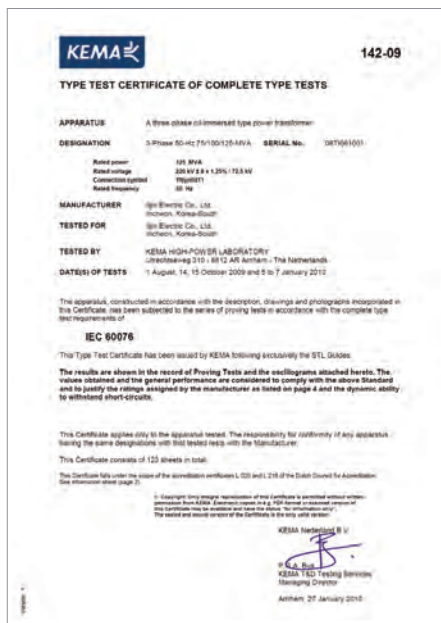


QUALITY ASSURANCE

Quality Assurance

ILJIN Electric promises trust in products and services provided based on continuous R&D and excellent quality competitiveness.

We are doing our best to obtain test certification according to international standards such as KERI and KEMA test certification to satisfy customer's detailed requirements, relevant standards, and national standards including quality, environment, and safety and health certification systems.



TYPE TEST CERTIFICATION :

3 PHASE 50Hz 75/100/125MVA
220/72.5kV Power Transformer TESTED
BY KEMA HIGH-VOLTAGE LABORATORY, HOLLAND

COMPLETION OF TEST :

JANUARY 27, 2010



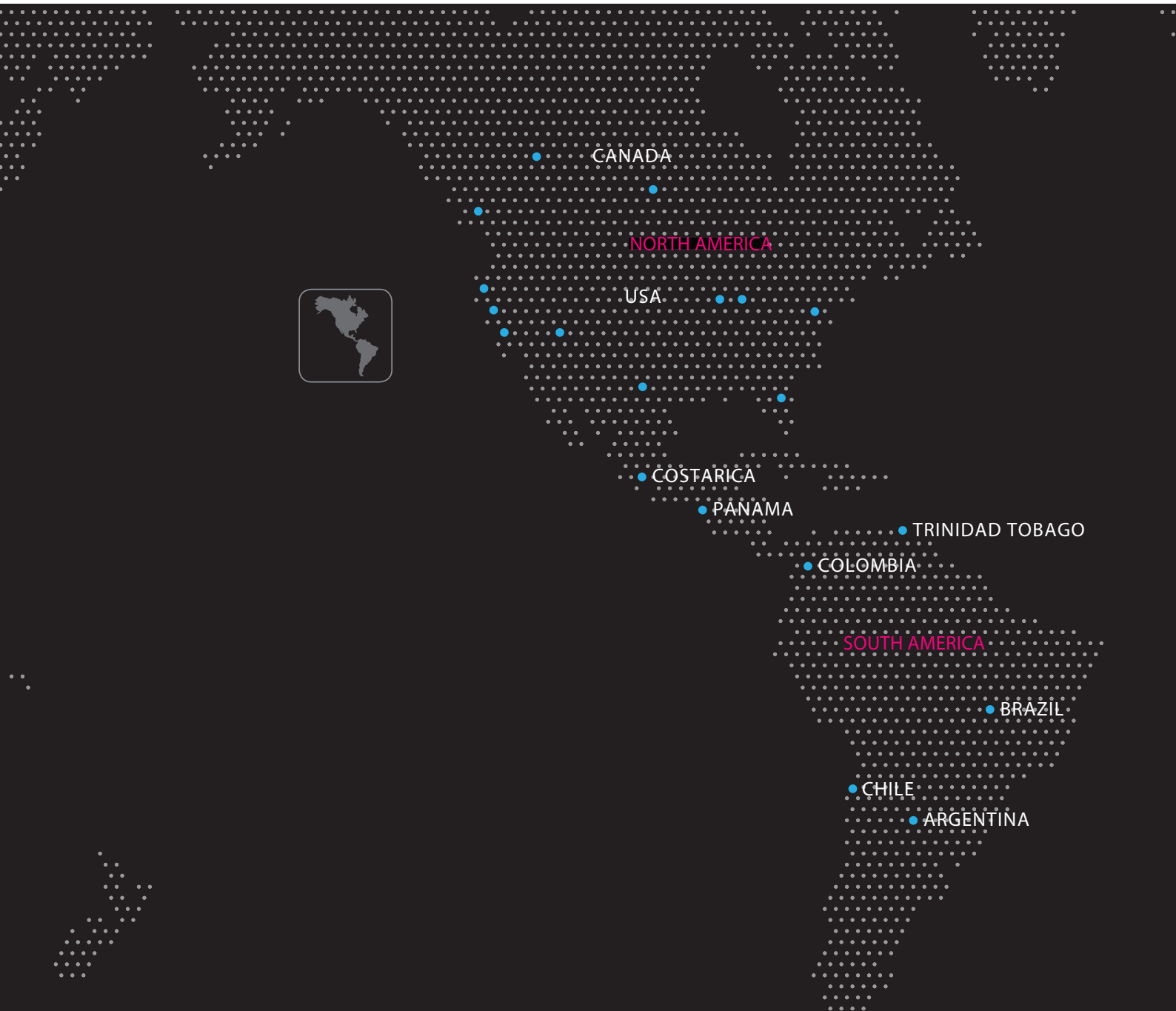
KS Q ISO 45001:2018 / ISO 45001:2018



KS Q ISO 9001:2015 / ISO 9001:2015



KS ISO 14001:2015 / ISO 14001:2015



Tunisia, 3PHASE 225kV 200MVA



USA, 3 PHASE 69kV 150MVA



Australia, 3 PHASE 132kV 45MVA

ILJIN Electric Global Network

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• Hwaseong 1st Plant



• Hwaseong 2nd Plant



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• Hongseong Plant



• Ansan Plant



• ILJIN Industry complex



ILJIN ELECTRIC CO., LTD. HEAVY ELECTRIC DIVISION

| | | |
|--------------------------------|--|---|
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| Hongseong Factory | 32200, 99, Sandan-ro 388 beon-gil, Galsan-myeon, Hongseong-gun, Chungcheongnam-do | Tel : 82-41-413-3252 Fax : 82-41-631-9860 |
| Website | www.iljinelectric.co.kr | |
| ILJIN Family | ILJIN Electric / ILJIN Diamond / ILJIN Materials / ILJIN Display / ILJIN Steel / ILJIN Unisco / ILJIN Hysolus / Alpinion Medical Systems | |