



Manufacturer & Exporter

Muskaan Power Infrastructure Ltd.

REGD. OFFICE & WORKS : Sua Road, Industrial Area-C,

Dhandari Kalan, Ludhiana-141 014 INDIA

Tel. : 0161 - 2510641, 2510642, 2510643, 5088381

Fax : 0161 - 2510645, 5022381

E-mail : info@electricitysaver.com, info@muskaanengineers.com,

sales@muskaan.co.in info@muskaanpower.com

Website : www.electricitysaver.com www.muskaanengineers.com

www.muskaan.co.in www.muskaanpower.com

Customer Care : 1800 1800 641

Service Support : service@muskaan.co.in



MUSKAAN POWER INFRASTRUCTURE LTD.

AN ISO 9001 : 2008, ISO 14001 : 2004 & OHSAS 18001 : 2007 CERTIFIED CO.



NTH, ERDA & BEE APPROVED PRODUCTS

SAVE Electricity



MUSKAAN POWER
INFRASTRUCTURE LTD.

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Muskaan Power Infrastructure Ltd. is considered as one of the established name in the field of Electrical & Power equipments. We are engaged in manufacturing Distribution & Power Transformers, Servo Voltage Stabilizers, Plating Rectifiers, Hydrogenation Rectifiers, Isolation Transformers, Ultra Isolation Transformers, HT Two In One Systems, Dry Type Transformers, HT Servo Voltage Stabilizers, Furnace Transformers, Variable Transformers & Special Purpose Transformer under Muskaan's Brand.

Our focus has increasingly broadened to embrace the sustainable development through quality products with full backing support for service after sale.

We have been awarded with an ISO 9001 : 2008, ISO 14001 : 2004 & OHSAS 18001:2007 Certification from BSI on quality, infrastructure and entire products being manufactured. All our products are passed through various quality test stages to produce state-of-the-art technology product.

Our equipments are designed for producing high efficiency at lower costs with lesser payback period.

Enthusiast by this growth and guided by our principles of Creativity, Commitment, Concern, Care and Core values. We continue to create innovative & practical product line that surrounds industries to ushers in a better tomorrow.

We have a very strong customer base in India & exporting our equipments to more than 42 countries like South Africa, Angola, Zambia, Ghana, Jordon, Iraq, UAE, Tanzania, Uganda, Burundi, Benin, Burkina Faso, Liberia, Madagascar, Kenya, Nigeria, Sudan, Myanmar, Saudi Arabia, Malawi, Kongo, China, Singapore, Afganistan, Nepal & Bangladesh etc. and are increasing our clientele at a faster pace in other countries.

We have complete marketing offices / franchises in all parts of India with company associates at Abu Dhabi, Saudi Arabia, Tanzania, Kenya, Nigeria, South Africa, Mauritius, Jordan, Lebanon & Netherland

Our motto is to give our customer the value for the money of the product & life time services.



- ◆ DISTRIBUTION / POWER TRANSFORMERS : SINGLE PHASE UPTO 150 kVA both 11 & 33 kV Class
THREE PHASE UPTO 40 MVA, 132 kV Class
- ◆ TRANSFORMER WITH OLTC ARRANGEMENT : UPTO 40 MVA 132 kV Class
- ◆ FURNACE TRANSFORMERS : UPTO 20 / 28 MVA 110 kV Class
- ◆ DRY TYPE TRANSFORMERS (VPI): UPTO 5 MVA 33 kV Class
- ◆ EARTHING TRANSFORMERS : UPTO 2 MVA 11 kV Class
- ◆ VARIABLE TRANSFORMERS : UPTO 10 MVA 6 / 11 / 33 kV Class
- ◆ ISOLATION TRANSFORMERS / ULTRA ISOLATION TRANSFORMERS : UPTO 5 MVA
- ◆ UNITIZED SUBSTATION (PACKAGE SUBSTATION) : UPTO 6.3 MVA WITH OIL COOLED TRANSFORMER
UPTO 5 MVA WITH DRY CAST RESIN TRFR.
- ◆ AUTOMATIC SERVO VOLTAGE STABILIZERS : UPTO 7000 kVA FOR LOW VOLTAGE SYSTEM
- ◆ RECTIFIERS FOR DC APPLICATIONS : UPTO 20,000 DC AMPS
- ◆ HT AUTOMATIC VOLTAGE STABILIZERS : UPTO 15 MVA 11 & 33 kV Class
- ◆ HT TWO IN ONE COMBO SYSTEMS : UPTO 15 MVA 11 & 33 kV Class
- ◆ SPECIAL PURPOSE TRANSFORMERS : ANY KIND OF STEP UP / DN TRANSFORMERS FOR LT SUPPLY

Products Application

MUSKAAN'S Products are most suitable for all type of Industries where breakdown due to fluctuation results in heavy financial loss such as:

- ◆ Cement Plant
- ◆ Cold Storages
- ◆ Tea Estate
- ◆ Tube Mills
- ◆ Flour Mills
- ◆ Hospitals
- ◆ Engineering Units
- ◆ Rolling Mills
- ◆ Textile Mills
- ◆ Paper Mills
- ◆ Hotels
- ◆ Rice Shellers
- ◆ Nursing Homes
- ◆ Rubber Industries
- ◆ Food Processing Units
- ◆ Pharmaceutical Units
- ◆ Oil & Vanaspati Plants
- ◆ Footware & Leather Units
- ◆ Distilleries & Beverages
- ◆ MNC
- ◆ Electrical Utilities

Appreciations and Awards



Some of Our Esteemed Customers





MUSKAAN Designs, Manufacturer and Supplies “Customized Products” to meet the wide range of global market and ensure support services to enhance customer’s satisfaction.”

Joint efforts within the organization for excellence in all functional areas shall be the prime objective for achieving planned improvements. Improvement in different processes for minimum ownership cost to the customer shall be one of Muskaan’s goals by employing the most suitable material, optimized design and effective process.

Inherent commitment to comply with the requirements of International Standards and other regulations in Quality Management System and to continually improve its effectiveness in true spirit and action shall be the prime responsibility of every employee.

Adapting changes that could help us in continual improvement of our Systems, Practices and Business Performance on top priority.

- ◆ To operate its business with the highest level of Integrity, Responsibility and Accountability and to continue to build on the Trust & Confidence of stakeholders that the organization has earned over the years.
- ◆ To be an Open, Responsive, Participative and Entrepreneurial organization.
- ◆ To stay quite ahead of the competition & reinforce leadership through exemplary standard of quality, relentless R&D, dedicated customer service, superior product performance, outstanding technical support, improved manufacturing processes, world class testing facilities, professional management, customer-centric marketing practices and significant contribution to community.
- ◆ To promote the cause of energy savings through Innovation, Product Customization and providing Value Added Solutions to the customer.



Vision

MPIL aims to be a prominent global player and a national leader in the field of Power Transmission and Distribution, promoting the cause of energy saving through constant innovation and customization of products, and introduction of value added solutions for its honoured customers. It is getting set to become a one stop shop for Power and Distribution Transformers, Automatic Servo Voltage Stabilizers and other allied products scaling newer height of technology, setting quality benchmarks for all its products and services and ensuring satisfaction to all its customers.



Domestic Market

Export Destination

African Countries:

Kenya, Tanzania, Uganda, Ethiopia, Nigeria, S.Africa, Ghana, Zambia, Zimbabwe, Angola, Egypt, Rwanda, Burundi, Benin, Burkina Faso, Liberia, Madagascar, Malawi, Ivory Coast

Middleeast Countries:

UAE, Sharjah, Saudi Arabia, Jordan, Kuwait, Iraq, Afghanistan, Yemen

Southeast Countries:

China, Nepal, Bangladesh, Bhutan, Myanmar, Malaysia, Sri Lanka, Singapore

European countries:

Malta, UK, Sweden, Hungary

US Countries:

Kingston, Canada



EXPORT MARKET

Enhancing customer satisfaction through International Quality Standards. An ISO 9001 : 2008 certification have created a special place for MUSKAAN'S products in the market, both in India and abroad.

At MUSKAAN quality not only determines the end product but also the Systems, Processes and Operations at all levels. The organization is committed to a Global Quality System Focused on customer solutions which is achieved through advanced testing facilities, continuous in-house R & D initiative, superior products and services, improved automation, repair customer support & technical expertise.

All our products are ERDA /CPRI/NTH approved. Apart from section-wise testing of components and sub-assemblies, each transformer is tested to international standards of acceptance. Joint efforts within the organization for excellence in all functional areas are the prime-movers for achieving planned improvements and development in different processes, resulting in minimum Total Ownership Cost of the products.

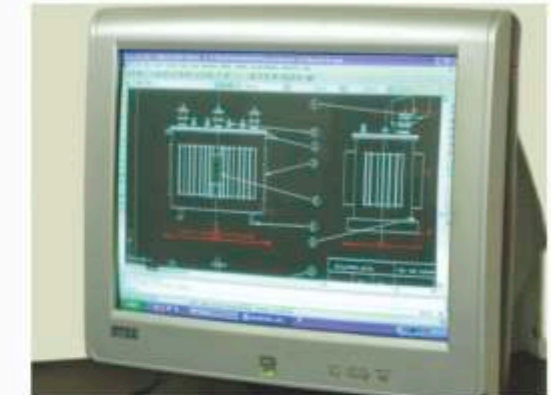
The organization believes that customer deserve the very best in service and its team members endeavour to always place quality at the threshold of importance, not only in servicing customers, but also in the way that the organization contributes to the community.

Core Values

- ◆ World class manufacturing facilities
- ◆ Modern technology
- ◆ Continuous research and Development
- ◆ Total customers focus
- ◆ Global orientation

Our Focus

- ◆ Material Section
- ◆ Manufacturing Process Static (Strength) and Dynamic (Growth) Performance
- ◆ Error Prevention instead of Error Correction





Product Range

- ◆ Upto 150 kVA Single Phase both 11 & 33 kV Class
- ◆ Upto 40 MVA, 132 kV Class
- ◆ Upto 40 MVA OLTC 132 kV Class

Applicable Standards

IS, IEC, ANSI, JIS, BS, DIN etc.

Transformer Options

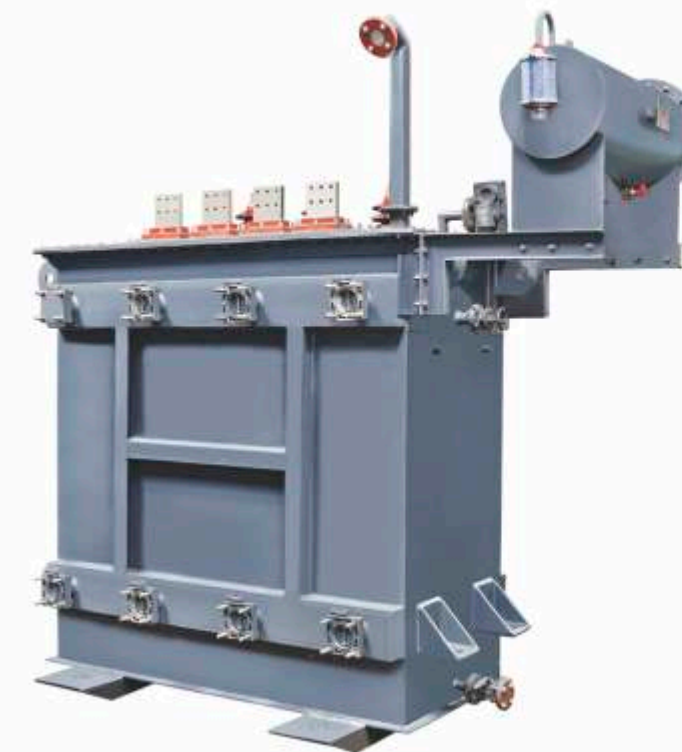
- ◆ Cooling Tubes / PSR Radiators / Corrugated Tanks
- ◆ Pole Mounted / Ground Mounted
- ◆ Free Breathing / Hermetically Sealed / With CSP / Non CSP
- ◆ Winding-Copper/Aluminium (Foil / Rectangular Wire / Round Wire)
- ◆ Fittings and Accessories, Cable Terminations etc. : as required

Standards

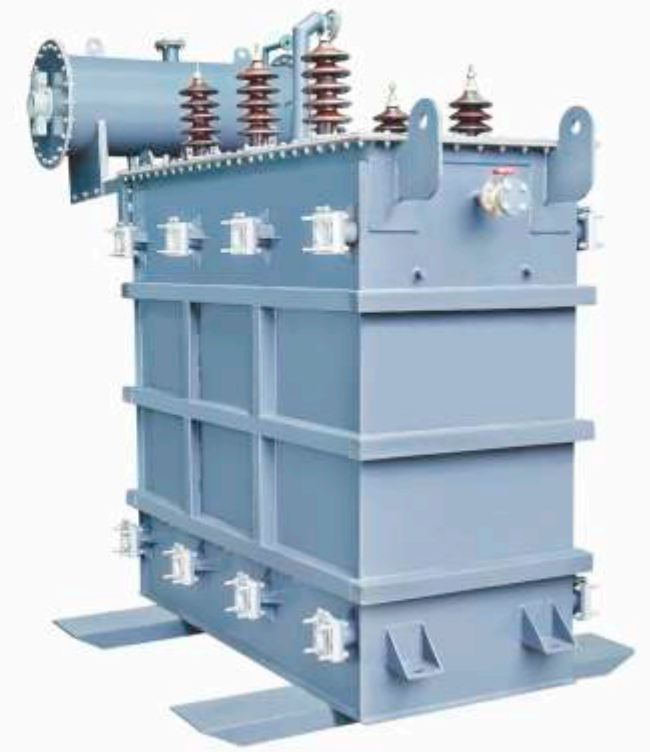
Muskaan's transformers are designed & tested as per IS: 2026, BS-171, IEC-76 & IEC-726.



Power Transformer



Power Transformer



Power Transformer

Vector Group

Transformers will be connected as per vector group reference Dyn11, Ynd 11. Other vector groups can be offered as per specific requirements.

Terminal Arrangement

H. V. - Bare Bushings or Cable Box, L. V. - Bare Bushings or Cable Box. Disconnecting chambers can also be provided on both HV and LV Cable boxes.

Temperature Rise

Muskaan's transformers are designed for a maximum temperature rise of 40/50 degree C of oil / winding. Lower temperature rise can be offered on request.

Tappings

- A. Off Circuit Tap Changing Switch : Tappings from +5% to -5% in steps of 2.5% for HV variation or as per customer's requirement.
- B. On Load Tap Changer : 16 steps OLTC for HV variation from + 5% to - 15% in steps of 1.25% or as per specific requirements. OLTC for remote / auto / parallel operation can also be offered.



Inner view of transformer



Power Transformer



Power Transformer

Quality Control And Routine Tests

All Muskaan's transformers undergo rigorous quality control checks and are routine tested as per IS/IEC in our fully equipped laboratory. Any specific test required by the customer can also be arranged.

Standard Fittings

1. Rating and diagram plate
2. Earthing terminals - 2 Nos
3. Lifting lugs
4. Oil level indicator (Plain)
5. Drain-cum bottom filter valve with plug
6. Oil filling hole with plug on conservator
7. Oil conservator with drain plug
8. Air release plug
9. Silicagel air breather
10. Bi-directional flat rollers
11. HV terminals-outdoor bushings
12. LV terminals-outdoor bushings
13. Radiators
14. Filter valve with plug
15. Thermometer pocket
16. Oil temperature indicator
17. Externally operated off circuit tap changing switch
18. Explosion vent
19. Sampling valve (for 2000 KVA & above transformers only)



Transformer with OLTC arrangement

Accessories On Request

1. LV and HV cable boxes
2. Winding temperature indicator (WTI)
3. Buchholz relay
4. Magnetic oil level gauge
5. Marshalling box
6. Disconnecting chamber
7. Pressure relief valve
8. Oil temperature indicator with electrical contacts (OTI)



Distribution Transformer
(Corrugated Sealed Type, Pole Mounted)



Inner view of Transformer

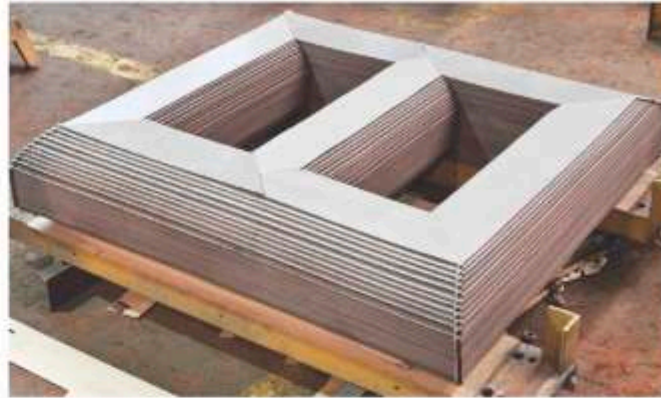


Distribution Transformer
(Breathing Type Floor Mounted)

Superior Feature Of Muskaan's Make Distribution & Power Transformers

Core

The core is constructed from low loss, cold rolled, grain oriented, annealed laminations of electrical sheet steel conforming to the latest international standards. Special frame is built in-house for clamping the core to reduce the magnetic noise as well as making the whole structure rigid & robust.



Insulation

Precompressed board PARMALI board and JAPANESE insulation paper of best quality is used.



Windings

Coils are wound with electrolytic high conductivity paper covered or synthetic enameled copper conductors. Cooling ducts are provided to keep the hot spot temperature as low as possible. Coils are dried in electric ovens. Rigid connection support and coil clamping is provided to ensure high short circuit strength.

Tanks

The tanks are made of M.S. steel plates/sheets with adequate bracing & stiffness. Tanks are pressure tested to withstand any type of inside or outside pressure. All the external surfaces are given a primary coat of zinc chromate, red oxide and two finishing coats of grey paint. The inner surfaces are given a coat of heat and oil resisting paint.



Oil

Oil is tested for resistivity, dielectric and acidic characteristic conforming to IS-335 / IEC 60296 Before topping up oil is filtered thoroughly.

Range : Upto 5 MVA

Multiple Shielding Techniques employed to reduce the inter winding capacitance to below 0.005 picofarad and increases DC Isolation to over 1000 Megaohms.

Technically any transformer that has no direct current path between its primary & secondary windings provides isolation from any kind of leakage in Current, Spikes / Surges produced in the system. Provision of electrostatic shield in between primary & secondary winding depends upon its construction, specification & performance characteristics.

Isolation / Ultra Isolation Transformer are being used to protect Electronic & Sophisticated equipments, CNC Machines from the excessive line voltage transients, spikes / surges produced in the system. Electrostatic shielding helps in grounding these spikes & not allowing to pass on to the secondary side of the transformer.

Variable Transformers

Range : Upto 10 MVA 6 / 11 / 33 kV Class

These kind of transformers are used for testing applications where variable output is required from zero to any voltage. These kind of transformers are widely used in transformer / motor / generator manufacturing units to perform various electrical tests.

The construction of these variable transformers is very simple & consists of Buck / Boost Double Wound Transformer and +/- Type linear rolling contact regulator for stepless control. Variable transformers are widely available upto 10MVA.



Isolation / Ultra Isolation & Furnance Transformer

Furnace Transformer are built in delta / star connection with neutral as floating & electrostatic shielding is used to protect the furnace from any kind of Earth Fault Tripping.



Variable Transformer

Range : Upto 5 MVA 11 / 33 KV Class

Product Range

50 kVA to 5000 kVA, 11 kV & 33 kV Class suitable for Indoor applications with off circuit tap links, off circuit tap switch, on load tap changer (Indigenous & Imported) in both CRT/ UPI Designs.

Standards

The Dry Type transformer are manufactured to comply with National & International Standards BIS, IS:11171, IEC 76.

Quality

MUSKAAN'S products are certified from ISO 9001:2008 by BSI. MPIL has set up a complete quality management system to offer the best customer satisfaction.

Description

MPIL manufacture Ventilated Dry Type Transformer are totally maintenance free and safe from fire as material used are metals, ceramics, fiberglass and resin It is environment friendly as there is no oil, hence handling becomes easier and there are no chances of spillages and leakages and there is minimal non toxic smoke in case of fire.

MPIL offers Ventilated Dry Type Transformers with class H/E insulation which can bear heat upto 180/220 degree C and can be used in humid and chemically polluted atmosphere.

Winding

LV & HV Winding are done in dust free air conditioned winding shops. Rectangular copper strips are used for LV winding insulated with Nomex while HV winding are of copper wire insulated with Nomex or suitable material for temperature rise if wrapping is not possible due to small diameter.



Dry Type Transformer - VPI Type

VPI

The transformer coils are thoroughly dried in an PLC controlled oven and the coils are then completely sealed with an insulating varnish / resin (class H/C) through an vacuum pressure impregnation process. Muskaan's is having a state of the art PLC controlled VPI process fully penetrates and seals the coils into a high strength composite unit for complete environment protection, hence can be used in humid and chemically polluted atmosphere. Coils are then cured to develop bonding.

Testing

All transformers are tested for routine test. MPIL has in-house facilities for conducting all routine tests as per IEC & IS.

Routine Tests

- ◆ Measurement of Winding Resistance
- ◆ Measurement of Voltage / Turns Ratio
- ◆ Measurement of Impedance Voltage / Short Circuit
- ◆ Impedance & Load Loss
- ◆ Measurement of No Load Loss & No Load Current
- ◆ Measurement of Insulation Resistance
- ◆ Di-Electric Tests

Environmental Impact Operation Aspects

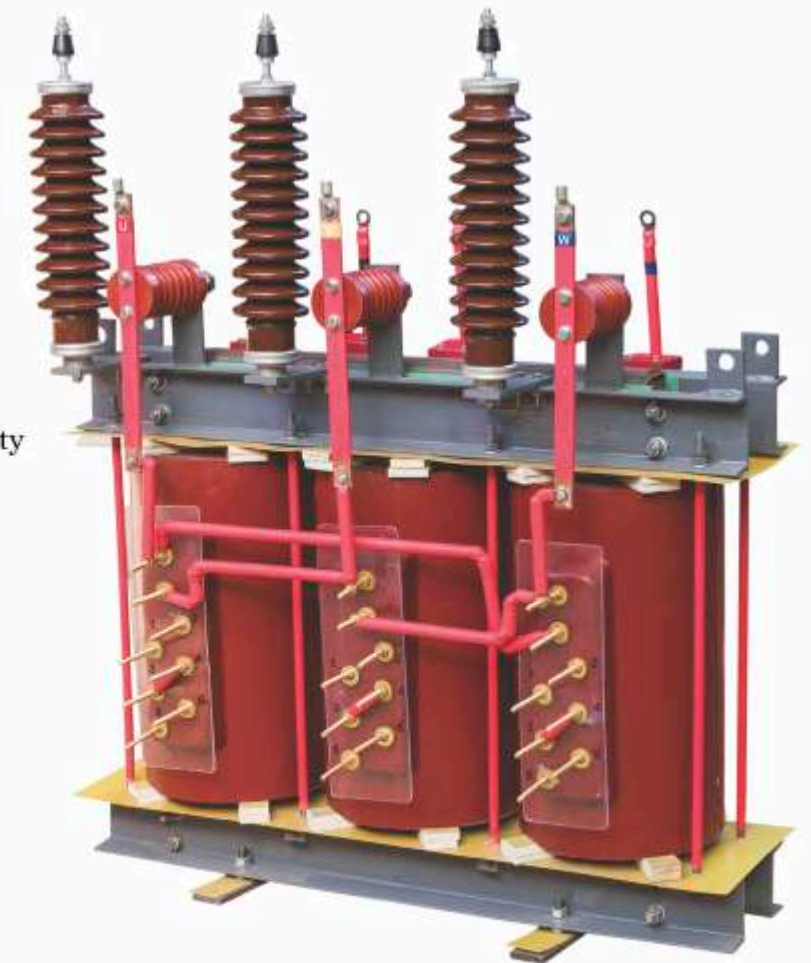
- ◆ Transformers insulated with Nomex brand materials are extremely safe, even when exposed to fire
- ◆ High flame resistance, & low smoke and no toxic off-gasses
- ◆ Class H & E ventilated dry type transformers can be built smaller, reducing the footprint to the environment, conserving space
- ◆ Insulation is friendly to use during manufacturing - no skin irritants or surface chemicals

Advantages

- ◆ High level of safety
- ◆ No flammable liquids
- ◆ No pollution from leaks solution
- ◆ No toxic off-gasses
- ◆ Can be placed close to the load
- ◆ More efficient
- ◆ Increased emergency overload capability
- ◆ Improved reliability
- ◆ Easy to repair (open coils)
- ◆ Low Noise and low maintenance



Dry Type Transformer - Cast Resin Type



Open Type Cast Resin Fitted with Lightning Arrestors

Specification For Muskaan's Dry Type Transformers

MPIL makes Indoor/Outdoor, 3 phase, 50/60 Hz, vacuum impregnated, AN/FA cooled, step up/step down, double wound with Cu conductor transformer from 50 kVA to 5000 kVA upto 33kV class with H/E class insulation and designed to withstand short circuit, & impulse test in accordance to IEC / IS.

PARAMETERS	VPI	CAST RESIN
Conductor Insulation	Nomex	Non woven polyester
Thermal Rating	F or H/C	F/B or F
Process	Conventional Winding Assembly	Cast Mold Assembly
Impregnation	Vacuum pressure impregnation	Vacuum casting
Repair	Possible	Not Possible
Cracking	Not Possible	Possible
Overloading	High Over load margin	No Over load margin
Environment concern	Can be easily disposed off	Large amount of resin to be disposed off
Safety	No toxic of gases, no melting	Emission of toxic gases
Partial Discharge	Free of partial discharge	Partial discharge is possible due to high

Warranty

MUSKAAN'S VPI transformer are guaranteed for satisfactory performance for a period of 12 Months from the date of dispatch. Any part found defective during this period, as a consequence of bad design, manufacturing or workmanship should be repaired free of cost by us within mutually agreed schedule.

Range

Upto 6.3 MVA with Oil Cooled Transformer
Upto 5 MVA with Dry Cast Resin Transformer

Salient Features

- ◆ Design conforms to IEC 62271-202 Standards
- ◆ IP 53 / IP23 degree of protection
- ◆ Compartmentalized construction prevents accidental entry of energized areas
- ◆ Designed to withstand electrical impulses, thermal and dynamic stresses
- ◆ Low power loss and low noise transformer
- ◆ Reliable, Robust and long trouble free performance
- ◆ Number of feeders for LV can be customer specific
- ◆ MV / LV Switchgear as per requirement

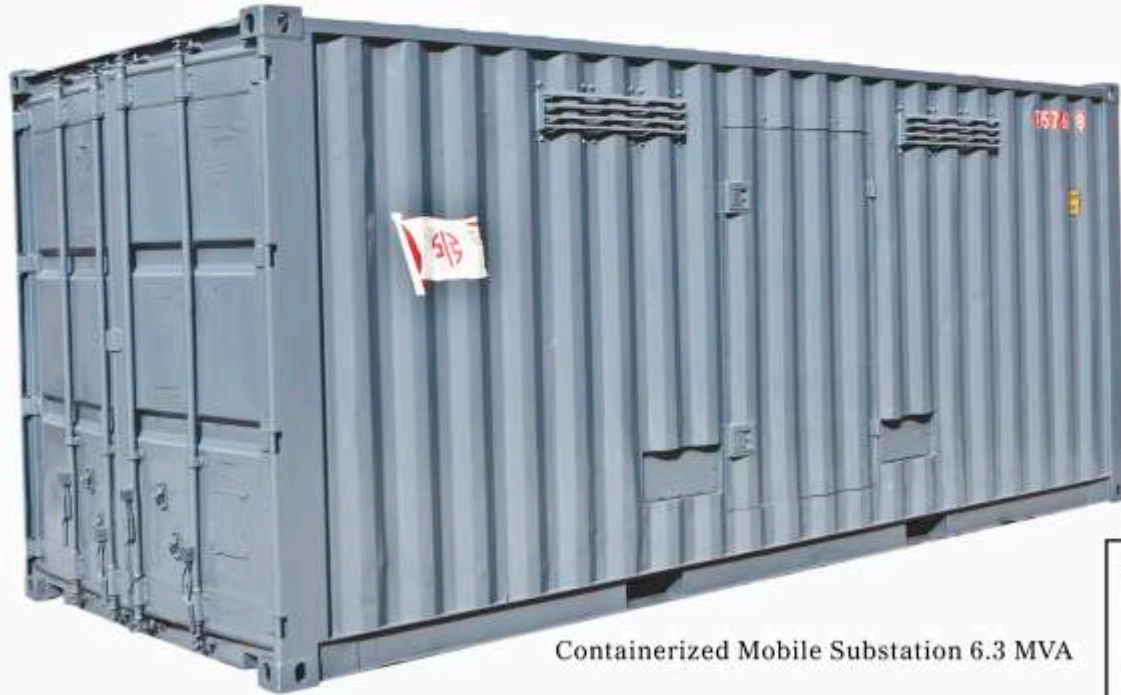


Skidbase Package Substation



UNITIZED SUBSTATION COMPONENTS

HV Compartment	Transformer Compartment	LV Compartment
Ring Main Unit (RMU)	Oil Filled Transformer or Dry Type Cast Resin Transformer	Incomer air circuit breaker and distribution MCCB's with built in over current and short circuit protection
Internal Lighting	Internal Lighting	Metering (Voltmeter and ammeter with selector switch)
Compartment fitted with lockable swing handle and three point lach	Cable / Bus Bars for HV & Lv circuit breaker connection	Electrical Indicators
Over current & earth fault protections	Current Transformers for metering	Internal Lighting
Door limit switch	Louvered Covers	Space heater with thermostat control
Boots for cable termination		Auxiliary supply plug & socket Compartment fitted with lockable swing hand and three point latch.



Containerized Mobile Substation 6.3 MVA



General technical specifications of Package Substation

Electrical Characteristics	
Rated Voltage	12 & 36 kV
Rated Insulation Level (kVrms / kVp)	28 / 75
Rated frequency (Hz)	50 / 60 Hz
RMU	As per International Standards.
Transformer	11/0.433 kV, OR 33 / 0.433 kV, 3 Phase, 50 Hz with off circuit tap switch +/-5% in steps of 2.5% Vector group Dyn11 / YND 11 OR As Per Customers Requirement
LV Breakers Incomer Breaker Distribution MCCB's	As Per Customers Requirement
Transformers	
Application	Power Generation / Transmission / Distribution / Mining
Type	Oil Type / Dry Type
Rated operational voltage	415 V to 6.6 / 11 / 22 / 33 kV
Max power rating	160 KVA to 6.3 MVA
Standard	IS 2026-1977 / IEC 60076

Range : Upto 20000 DC Amps.

Brief Specifications:

- Input Voltage : 380 - 440 Volts, 3-Phase 50Hz. AC supply
- Output Voltage : Fixed Rated maximum DC voltage or variable from zero to maximum rated voltage.
- Output Current : Rated maximum DC current
- Temperature Rise : Less then 35°C above ambient at the top of the oil.
- Efficiency : 12V Rect - 82%, 24V Rect - 90%, 100V Rect - 94%, 200V Rect-96% More than 250V Rect-More than 97%
- Ripple Content : Less than 5%
- Insulation : 'A' class for oil cooled.

Salient Features

MUSKAAN'S rectifier equipments are wound with electrolytic Prime grade copper strip to minimize power losses, in comparison to Aluminium conductor used by many other manufacturers. Our equipments are designed liberally as per capacity and are Ideally suitable for marginal over loading conditions.

We use vertical rolling contact type voltage regulator wound with heavy section of copper strips suitable for 100% continuous duty cycle or industrial applications, in comparison to conventional wire wound regulators used by other manufacturers. The carbon rollers move on both sides of the winding.

DIODES: Silicon diodes are tested in-house, similar PIV batch and same forward drop diodes are used in the equipment for equal load sharing and reducing the power losses of diodes.

LAMINATION CORE : We use imported CRGO lamination core which have minimum power losses and results in better efficiency of equipment and saving in energy bill.

PAINTS : We are painting the equipment with Epoxy paint which is resistant to acidic environment of plating process and enhance the life of the equipment by preventing it from corrosion.

METER : We use reputed make AE/RISHAB make DC meters only which are very accurate and durable.

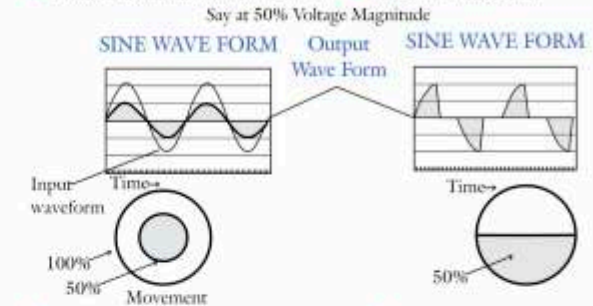
CONSTANT VOLTAGE CONTROLLER (CVC) (OPTIONAL) : We offer CVC Electronic attachment with rectifier equipments, which will maintain constant output voltage or current as per setting automatically irrespective of input voltage variation.

SERVICING : MUSKAAN have maintained enviable reputation in market in after sales service. This fact can be verified from any of our customers.



Advantage for roller type Regulator as compared to Thyristorised control

Roller Type Regulator Thyristorised Control
 • No wave form distortion at any load. • Wave form distortion.



- ◆ Electrical wave form is like a moving wheel. For 50% Rated Voltage the Dia of wheel is reduced accordingly i.e. magnitude for a wave is decreased.
- ◆ Higher power factor of more than 0.95 is achieved.
- ◆ The system is simple and can be repaired and maintained even by simple mechanic.
- ◆ The cost of spares is very negligible.
- ◆ Over all losses are less.
- ◆ It is like cutting the wheel by 50% and then moving the wheel i.e. wave form is cut as shown at full magnitude.
- ◆ The power factor is lower between 0.5 to 0.9.
- ◆ The system is specialized and needs specially trained Electronic Engineer to repair and maintain. The cost of replacement is very high.
- ◆ Over all losses are more.

Range : Upto 15 MVA 11 & 33 kV Class

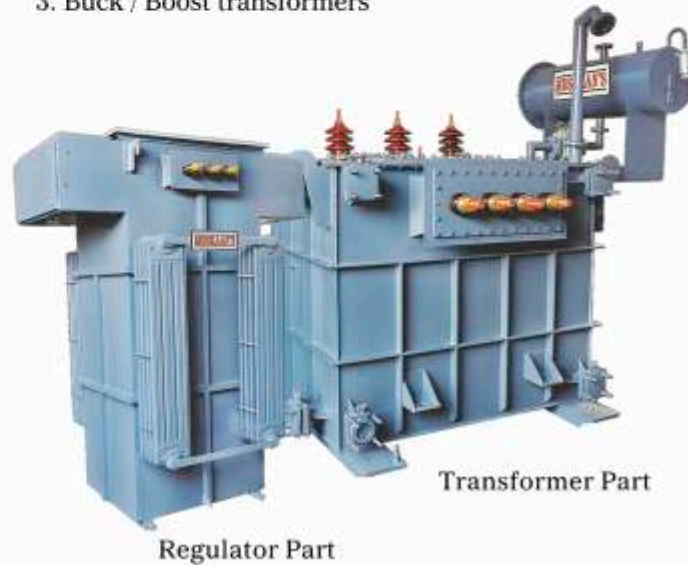
Even after the installation of standard off circuit distribution transformer, the voltage fluctuation on the LT side persists due to limited range of voltage correction of the transformer. To control the voltage fluctuations, it is ideal to install Servo Controlled Automatic Voltage Controller either on LT side or HT side.

MUSKAAN'S make Transformers with built-in rolling contact type AVR suitable for indoor / outdoor installation, copper wound HT two-in-one system is a revolutionary landmark in the industry when it comes to voltage regulation and stabilization. Even after the installation of standard distribution transformer the problem of low / high voltage on the LT side persists, resulting in improper operation of the electrical equipments, premature failure & production loss of a plant. The standard off-circuit tapping of transformers can correct limited voltage variation and cannot regulate the voltage while in 'On Load' conditions. We have developed state-of-the-art technology two-in-one system with Transformers having built-in HT Automatic voltage regulator that operates on load, sleeplessly & gives stabilized voltage on the LT Side. The equipment is basically a combination of HT AVR with a standard distribution transformer.

The fluctuating voltage from grid is initially controlled by the HT AVR and then fed to the transformer resulting in the constant L.T. Output within +/- 1% accuracy and the biggest advantage being its robust design; Lesser losses & more efficiency make the distribution transformer to utilize up to 100% capacity.

The unit consists of:

1. Step down double wound in copper construction
2. On load stepless rolling contact type voltage regulator
3. Buck / Boost transformers

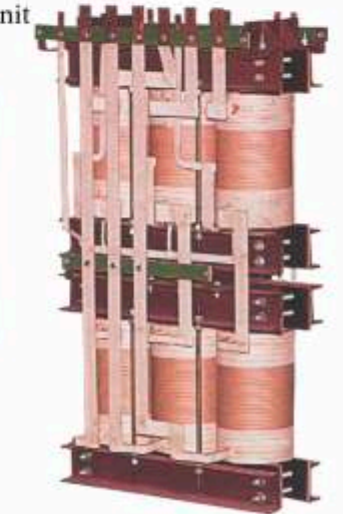
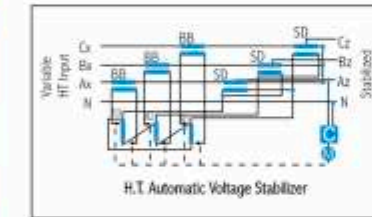


Advantages of Built - in AVR

- ◆ Space Saving
- ◆ Better Efficiency
- ◆ Protection of Motor etc.
- ◆ Reduced Installation Cost
- ◆ Reduction in Electricity Bill

MUSKAAN'S H.T. Stabilizer Comprises of:

- ◆ Step down unit, double wound
- ◆ Buck / Boost unit, double wound
- ◆ Stabilizer unit, auto wound delta connected with rolling contacts capable of moving on the winding through Automatic, Motorized
- ◆ Manual mechanism for regulation of the voltage at the output side. Control unit



Close view of Regulator

Auto & Buck / Boost Transformer Assembly

H.T. Automatic Voltage Stabilizer

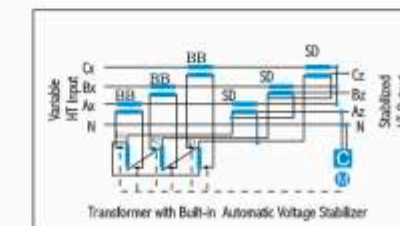
Range : upto 15 MVA 11 & 33 kV class

MUSKAAN'S make Copper wound, HT AVR suitable for indoor/outdoor installation, copper wound HT AVR system is a revolutionary landmark in the industry when it comes to voltage regulation and stabilization. Even after the installation of standard distribution transformer the problem of low / high voltage on the LT loss of a plant. The standard off-circuit tapping of transformers can correct limited voltage variation and cannot regulate the voltage while in 'on Load' conditions.

We have developed state of the art technology HT Automatic voltage regulator that operates on load, sleeplessly & gives stabilized voltage on the HT side. The fluctuating voltage from grid is initially controlled by the HT AVR and then fed to the transformer resulting in the constant H.T. Output within +/- 1% accuracy and the biggest advantage being its robust design, Lesser losses & more efficiency make the distribution transformer to utilize up to 100% capacity.



- SD = Stepdown transformer
- BB = Buck / Boost transformer
- R = Regulator
- M = Servo Motor
- C = Electronic Control Circuit



RANGE : Upto 7000 kVA for Low Voltage

In spite of best efforts, no state electricity board can ensure constant voltage to the customer because of long and inadequate distribution lines and irregular load pattern on distribution transformers. Generally Voltage is low during day time and high during night hours. Moreover on holidays, peak hours, rainy days and when agricultural and Industrial load is switched off, the voltage rises sharply which is more dangerous.

This higher current affects the electrical motors (particularly smaller capacity motors upto 7.5 H.P) in three ways:

1. Higher current produces higher losses in electrical motors which causes premature failure of winding.
2. These higher losses of electric motors also increase the losses of cables, switches, transformers & other associated equipments.
3. For smooth continuous operation of motors, over load relays are usually set at 20% higher setting.



2.5 MVA Dry Type Stabilizer

With the installation of the Servo Controlled Voltage Stabilizer and maintaining 390/400 volts, the motor will operate smoothly drawing 15-20% lesser current and correspondingly the relay setting can be reduced by 15-20%. In case single phasing occurs, the relay will trip in 40-50 seconds. The motor can withstand the high current for this period and will be safe. Also, the relays, contactors, switchgears, etc. incorporated with the motor, will be safe.



The table below compares the behavior of 60 watt lamp at different voltage:

Voltage	Current	Watts	Luminous Intensity	Life in Hours
220	0.25	54 W	690	2000
230	0.26	60 W	710	1000
240	0.27	65 W - 8.3% More	820	575
250	0.28	70.6 - 17.6% More	943	338
260	0.29	75.4 - 25.6% More	1073	200
270	0.31	83.4 - 39% More	1213	100

Description of Servo Controlled AVC :

MUSKAAN'S Servo Stabilizer is manufactured as per IS : 9815 & primarily consists of the following :

1. Linear Plus / Minus type Vertical Rolling Contact Voltage Regulator
2. Double Wound Buck / Boost type Series Transformers
3. Electronic Control Circuit and Meter Panel

In our regulator we are using heavy section of electrolytic grade rectangular copper strip instead of copper wire to minimize the losses & increase the efficiency of equipment. We are also using self lubricating Carbon Roller Assemblies instead of ordinary Carbon Brushes which offers more reliability and trouble free performance of the equipment.

2. Double Wound Buck / Boost type Series Transformers

In our Buck / Boost transformer we are using CRGO lamination to minimize iron losses and coils of Buck/Boost transformer are wound with heavy section of multi strips electrolytic copper to minimize copper losses for getting better efficiency of the equipment.

Advantages :

- ◆ Power saving (reduction in power bills)
- ◆ Reduction in mdi
- ◆ Reduction in breakdown of electrical / electronic equipments
- ◆ Improvement in power factor (at higher voltage)
- ◆ Better efficiency in plant
- ◆ Uniform quality / lesser tripping
- ◆ Improvement in quality of end products
- ◆ Unmeasurable benefits
- ◆ Depreciation as per income tax act (in india only)

The table below compares the behavior of 5 H.P. motor at different voltage:

Input Voltage	Current	KVA	P F
400	7.5 A	5.2	0.8
425	11% More	18% More	0.7
435	19% More	28% More	0.61
445	26% More	38% More	0.57

MUSKAAN'S Automatic Voltage Controller consists of very simple electronic control circuit for monitoring and controlling voltage, repair & maintenance of which is very easy.

The regulator and Buck/Boost transformer are oil cooled, housed in same or separate sheet steel tanks. Radiators are provided for effective cooling. The coils of voltage regulator & Buck / Boost Transformers are vacuum impregnated and oven dried as per IS.



Technical Specifications

MUSKAAN'S Servo Stabilizer are available in wide range & various models according to customer's requirement for balanced / Unbalanced supplies with following specifications:

Input Voltage	360-460 V,	340-460 V,	320-480 V,	300-480 V,	280-500 V
Efficiency (Approx.)	99.5%	99.3%	99%	98.8%	98.7%
Output Voltage	400 V + 1%, 3 Phase, 50 Hz*				
Cooling	Naturally Oil Cooled.				
Type	Indoor / Outdoor	Response Time : Instantaneous			
Temperature Rise (Max.)	30° C above ambient	Accuracy : +/- 1%			
Mounting	On Uni-directional Wheels				
Wave form distortion	Nil				
Duty Cycle	100% Continuous				

*Non standard ranges are also in our scope of supply. Output voltage of 380 - 415 volts is also in scope of supply.

Superior Feature of Muskaan Make Automatic Voltage Controller

Temperature rise

It is designed for 30-35 degree C above ambient. Suitable for any kind of ambient temperature conditions.

Core

Core is constructed from Low Loss of CRGO M-4 Grade conforming to latest standards & is fitted & clamped with special built in-house frames to reduce the magnetic noise & to make the structure rigid & robust.

Windings

Use paper covered electrolytic grade copper strip for winding. Cooling ducts are provided to keep the hot spot temperature as low as possible.

Oil

Oil of IS:335 standard is being used & is filtered before topping.

Tanks & paint

Tanks are made of M.S. Sheets with adequate bracing & stiffeners are given a coat of Epoxy Primer & Epoxy paint for better life. Both light grey & Siemens grey (RAL7032) are available in colour.



Linear Rolling Contact Regulator Inner view of Automatic Voltage Controller



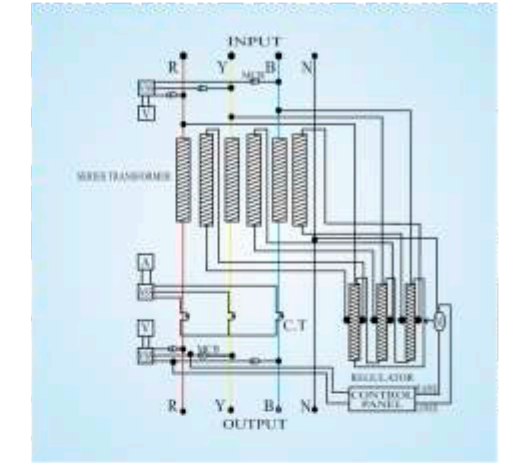
Close view of Regulator



Carbon Roller Assembly

Table below gives approximate quantitative Advantages of Automatic Voltage Controller at various fluctuation levels :

Input Voltage Variation	% Reduction in Breakdown Possible		Approx. Power Saving Possible	
	Motor Load Below 10 HP.	Lighting Load	Motor Load Below 10 HP.	Lighting Load
380-400 volts	Nil	Nil	Nil	Nil & No Servo Stabilizer Required
380-420 volts	5%	10%	3%	5%
380-440 volts	10%	20%	5%	10%
360-460 volts	40%	40%	7%	20%
360-480 volts	60%	60%	10%	30%
340-500 volts	80%	80%	15%	37%



Power Circuit Diagram

Comparison between Muskaan's make & conventional make Automatic Voltage Controller

MUSKAAN'S Make roller type regulator

- ◆ Power consumption is 0.5 to 1.5% depending upon the model and input voltage variation
- ◆ Suitable for continuous 100% duty cycle
- ◆ The carbon (graphite) Roller rolls, while moving on the coil track, so contact point of the roller goes on changing which prolongs the life of the rollers
- ◆ Life at full load is 15-20 years
- ◆ Negligible losses in full Buck / Boost Condition
- ◆ Five years Unconditional Guarantee

Conventional make with carbon brush regulator

- ◆ Power consumption is 2 to 7% depending upon the model and input voltage variation
- ◆ Suitable for only 50% to 60% duty cycle
- ◆ Since the contact is by brush having flat surface, wear & tear of the brush is more and requires frequent replacement
- ◆ Maximum life is 3-5 years at full load
- ◆ Max. Losses in full Buck / Boost condition
- ◆ Normal Guarantee / Warrantee for one year

Loss Comparison of Muskaan's make Regulator & Conventional make Regulator

Capacity	MUSKAAN make Roller type regulator losses	Conventional make Carbon brush type Dimmerstat losses
60 A	575 W	1050 W
75 A	730 W	2055 W
100 A	900 W	3105 W



Conventional Regulator

Payback period

It has been assessed with long experience & customer's feedback that the payback period of Automatic Voltage Controller is well within 6-12 months depending upon the site conditions.

Education

Children, the future of our nation, have the right to receive attention and proper nurturing. MPIL is sensitive towards the educational demands and reaches out for the activities of education to the poor and needy children at free of cost.

Social Welfare

At MPIL, well contemplated efforts are made towards the weaker section. They are provided with education and medical facilities. We make sure that they are offered opportunities to grow and be independent. We are committed to support various social causes which also include the welfare and marriage of poor girls.

