

TRANSFORMING NEPAL THROUGH POWER



नेपाल ईकरात इन्जिनियरिङ्ग क. प्रा. लि.  
NEPAL EKARAT ENGINEERING CO. PVT. LTD

[www.neek-transformer.com](http://www.neek-transformer.com)

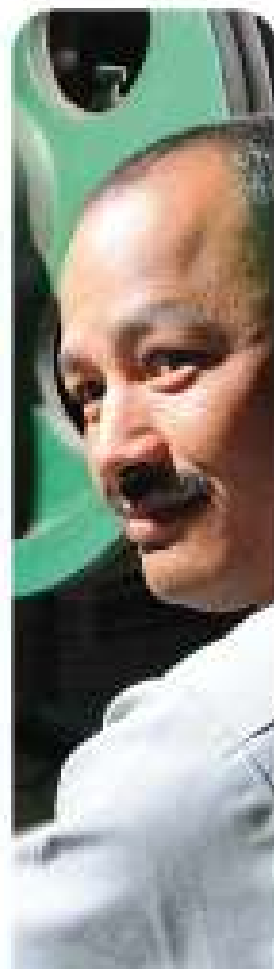
# COMPANY'S CORE VALUES

## VISION:

To be market leader of Power & Distribution Transformer in Nepal with sound technical excellence.

## MISSION:

1. Develop customer relationships which provide services tailored to specific customer needs;
2. Provide employees with on-going training to enhance knowledge and skills, develop problem solving and decision making abilities, and offer opportunities for advancement;
3. Apply cost effective production systems and sound fiscal planning;
4. Utilize Continuous Process Improvement strategies to ensure the highest quality products and services.



# ABOUT US



NEEK was established in a joint venture between young Nepalese Entrepreneurs and "Ekarat Engineering Public Co. Ltd." of Thailand in the year 1990. With continued support from our valued customers over the years, we have been able to serve for the last Twenty five years in the manufacturing and supply of Distribution Transformers.


NEEK has a capacity to manufacture up to 10 MVA and up to 132 kV class Distribution Transformers. The manufacturing plant at Hetauda is equipped with state-of-art equipment and a highly skilled technical work force. From 1992, we have manufactured various ratings of distribution transformers and supplied to the electricity utilities, hydropower projects, small hydro powers, hospitals, shopping complex and industries. We have also completed the successful repair and maintenance work of Power Transformers up to 10MVA 3-Phase, 33/11 kV and Power Transformers up to 30 MVA 3-Phase, 132/11 kV. This gives us the extra insight while manufacturing our product, for our customers.

The first product of NEEK was launched in August 1992 and with that, NEEK has been consistent in quality and continues to make the most sought after transformers in the country. Out of the installed Distribution Transformers in Nepal, most of the quantities have been supplied by NEEK. The total production capacity and its product range makes NEEK the largest and the most efficient manufacturer of Distribution Transformers in the country.

To keep pace with the changing technology and upgrades, regular training is provided to NEEK employees at all levels. Our refresher programs allow workers to benefit from local or foreign experts and our Engineers are sent abroad for training in related fields to be updated with present technological upgrades.

Nepal Ekarat Engineering has been exclusive in being able to offer products manufactured according to customer requirements in a clean, healthy and safe environment.

All incoming raw materials are carefully chosen, inspected and tested before it is used for these long-life products. From core laying, coil winding, tank fabrication and assembly, each step is carefully monitored by experts and tested by the latest equipment for the quality and in accordance with the international standards.

NEEK is certified with the ISO 9001: 2015, as an adherence in the manufacturing of quality products in a clean, healthy and safe environment that follows the principle and procedures of QMS in every aspect of our manufacturing process for the continual improvements of quality in our products. We have recently achieved the  NS Standard **ने. गुण. १६६** for our transformers.



# TECHNICAL EXCELLENCE

While choosing a transformer, the buyer should not only consider the initial price of the transformer but also the estimated maintenance costs, the cost of no-load losses in the iron core, the cost of load losses of the windings, the quality of raw materials used and the effectiveness of the after-sales services offered.

In order to determine the most economical design for a particular application, it is important to know the capitalized value that is affected by a particular kind of loss. This value can then be compared to the initial cost. It is found that higher initial cost caused by the use of high-grade CRGO silicon steel sheets and copper windings are counter balanced by lower operational costs.

NEEK transformers are manufactured using quality material and by the most modern and reliable technology and methods, hence resulting in a superior product. Custom designs that offers optimum results as per individual customer needs are available upon request.

The purpose of testing is to prove the validity of all technical data and to ensure the sound performance of the transformer. NEEK transformers are subjected to Routine tests which are carried out on all transformers and Type Tests are carried out on all of the new designs of the Distribution Transformers.

## TYPE TESTS

- Temperature Rise Test
- Impulse Test

## SPECIAL TESTS

- Short - Circuit Test

## ROUTINE TESTS

- Ratio Test
- Resistance Measurement
- Polarity and Phase Relation Test
- No Load Loss Test
- Excitation Current Test
- Impedance and Load Loss Test
- Applied Potential Test
- Induced Potential Test
- Oil Test
- Insulation Resistance Test
- Leakage Test





Automatic Core Cutting Machine



12.6 MVA 132/6.6 kV Power Transformer being repaired Kulekhani-II Hydropower

# AMORPHOUS CORE TYPE DISTRIBUTION TRANSFORMERS

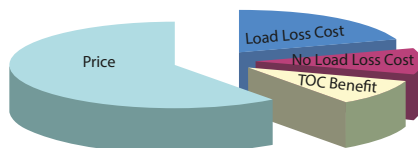


NEEK has been manufacturing Amorphous metal core type distribution transformers, side by side with the conventional Silicon Steel Core type Distribution Transformer. It is estimated that 10% of all electricity generated is lost because of distribution inefficiency, inherent in the operation of distribution transformers which are of two types of energy loss: load loss that vary depending on transformers loading and no loss that occur in the magnetic cores and take place over Easier Magnetic Switching Means Lower Core Losses the life of the transformer regardless of the load.

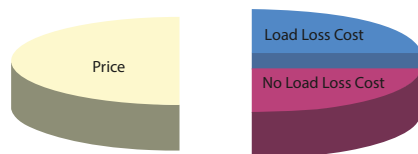
Amorphous Metal exhibits a structure in which the metallic molecules occur in a random pattern and having non-crystalline alloy steel just like glass. As there are no grains, the flux experiences least resistance in any direction. As opposed to the rigid grains structure of silicon steel, this unique structure enables easy magnetization and demagnetization. The material's unique structure results from rapid solidification manufacturing process, which requires cooling the molten alloy at the rate of one million degrees Celsius per second.

The key feature of the Amorphous Core Transformers is that we can gain a reduction up to 80% in the no-load loss, which occurs in the core of the transformer when compared with conventional CRGO silicon steel transformer. When the transformer is energized, the core material switches its magnetization 100-120 times per second depending on the operating frequency of the system. The extent of the energy losses that occur in the core is determined by how easily the core can switch magnetization: the easier the switching capability, the lower the losses.

## TRANSFORMER PURCHASE ON A TOTAL OWING BASIS



AMDTs



SiFe DTs

One method of illustrating how AMDTs provide economic savings is by evaluating on a Total Owning Cost (TOC) basis. TOC encompasses both the initial cost of the transformer, plus the future cost of the energy losses over the life of the equipment. The essence of transformer loss evaluation is to recognize that there is a cost of losses associated with the distribution transformer purchase decision that is just as important as the initial price. A user who saves on the initial purchase price of the transformer may in fact be losing money by not properly considering the value of the energy losses over the transformer's active life.

$$\text{TOC} = \text{Initial Purchase Price} + \text{Cost of Future Energy Losses}$$

The chart illustrates that despite a higher initial cost, the use of AMDTs results in overall financial savings for the utilities over the life of the transformer; compared with the use of conventional silicon steel core transformers.

# FEATURES NEEK TRANSFORMERS



NEEK Transformer being lifted in rural area of Bhutan

## IRON CORE

Cold Rolled Grain Oriented (CRGO) magnetic silicon steel sheets of high quality are used to make the iron core. The most practical transfer of magnetic flux from the limbs to the yoke is achieved by inter-leaving the alternate joints, thus reducing no load losses.

## HV & LV WINDINGS

Round enamel-insulated copper conductors are wound to form layer type, disc type-high voltage coils. The coils are wound with constant tension directly onto a pressboard cylinder. The layer insulation papers adapted according to electrical requirements. Paper-insulated rectangular copper conductors are used to form wound layer type low-voltage coils, wound with constant tension directly onto a pressboard cylinder. Ample measures are taken to ensure the mechanical rigidity and the electrical soundness of both the HV and LV coils.

## CORRUGATED TANK

The tank and cover are made of high quality sheet steel, which has to pass a stringent quality test. The tank is fabricated on a rigid bottom with an oil drainage outlet, corrugated sidewalls and an upper frame. After the components are welded together, the first leakage test is performed on the tank. Internal surfaces are prepared for painting by sand blasting. The standard paint finish is a two-coast process of rust inhibiting primer followed by a high specification finish coating. The tank provides structural strength to the complete product and the design has the main influence on heat dissipation.

## BUSHINGS

HT bushings shall have full wave impulse withstand voltage or basic impulse insulation level (BIL) as per the IEC Standard / DIN Standard / IS Standard.

## TAP-CHANGER

In order to provide a constant output voltage despite of the voltage fluctuation on the input system the high voltage windings are provided with the tapings connected to an off-circuit tap-changer mounted on the tank cover and operated externally. The tapping positions are fixed by means of locking pins. On-load tap changer can be upon request and also the tapping position for the off-circuit tap changer can be adjusted upon customer's requirement.

## VACUUM DRYING

The core-cast assembly and tanks are placed in a vacuum oven chamber to extract the accumulated moisture. Immediately after drying, the transformers are tanked and filled with pre-dried, degassed transformer oil. The required quality of the oil is confirmed by the laboratory tests.

## BUCHHOLZ RELAY

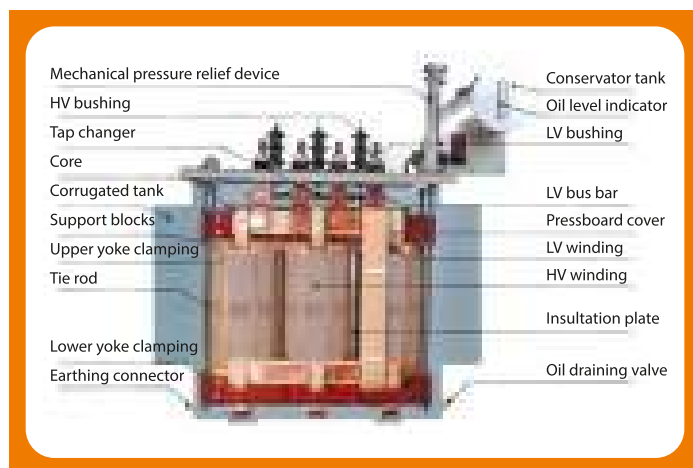
This protects the transformer from damage due to internal short circuits and faults. The alarm contact in the double float design signals oil sinkage and formation of gas, while a trip contact is activated in the event of server malfunctions. This can be available upon customer request for a lower rating Distribution Transformers below 1500 kva also.

## DIAL THERMOMETER

It shows the actual oil temperature. Alarm and Signals are provided as protection against overloading.

## TRANSFORMER OIL

Each Transformer shall be supplied with high quality, clean, dry and tested oil, which complies with the BS 148/84, IEC 296 standards.



# OUR PRODUCTS NEEK DISTRIBUTION TRANSFORMERS





- Distribution Transformers
- Ultra efficient low loss Transformers using amorphous metal core
- Low voltage dry type Transformers
- Furnace Transformers
- Welding Transformers
- Rolling contact type -  
LT. Automatic Voltage Stabilizer  
HT Automatic Voltage Stabilizer  
HT Transformer with built in Automatic Voltage Stabilizer

# ACCESSORIES



HV bushing with terminal connectors



Dehydrating breather with silica gel (for conservator tank)

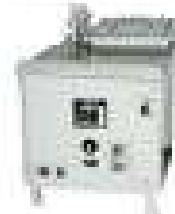


Magnetic oil level indicator with contacts (upon customer requirements)



On load tap changer, OLTC (upon customer requirements, on 11Kv & 33Kv system)

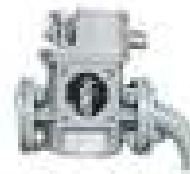
Mechanical pressure relief device (for 800 Kva and above)



Winding Temperature indicator & Oil Temperature Indicator, WTI and OTI (upon customer requirements)



Corrugated Tank



Double-float Buchholz relay (for conservator type transformers of 1500 Kva and above)



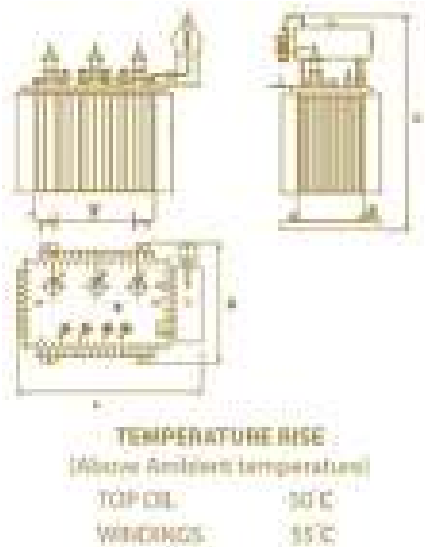
Tap Changer



Dial-type thermometer with alarm and trip contacts (for 1000 Kva and above)

- LV bushing with terminal connectors
- Conservator tank (for conservator type Transformer)
- Oil level indicator
- Lifting eyes
- Thermometer pocket
- Name Plate with connections diagram
- Oil check valve with drain plug
- Earth Terminal
- Bi-Directional wheels for (500-3000 Kva)

# STANDARD DIMENSIONS OF NEEK TRANSFORMERS



## GENERAL SPECIFICATIONS AND SCOPE

The specifications outlined below cover core type, oil immersed, natural self cooled, single phase and three phase distribution transformers suitable for both outdoor and indoor installation.

POWER KVA	PHASE	VOLTAGE SYSTEM 11000-400 V					VOLTAGE SYSTEM 33000-400 V					LOSSES (WATTS)			% IMPEDANCE
		L (mm)	W (mm)	H (mm)	OIL (Liters)	WT (Kgs)	L (mm)	W (mm)	H (mm)	OIL (Liters)	WT (Kgs)	NO LOAD	LOSSES	LOAD	
		11KV	33KV	75° C											
25	3 Phase	790	470	1010	90	320	960	770	1540	210	600	75	75	460	4
50	3 Phase	880	520	1070	120	480	1010	780	1450	230	630	120	140	750	4
100	3 Phase	960	770	1230	190	690	1030	830	1600	330	860	220	290	1210	4
150	3 Phase	1030	770	1320	240	900	1210	930	1685	470	1410	295	295	1675	4
200	3 Phase	1420	610	1390	270	1060	1520	970	1730	430	1250	365	500	2100	4
250	3 Phase	1560	680	1470	350	1360	1740	780	1760	500	1450	455	700	2550	4
300	3 Phase	1540	750	1490	350	1410	1690	840	1820	530	1600	550	740	3000	4
400	3 Phase	1670	790	1630	410	1600	1700	880	1810	550	1850	745	900	4025	4
500	3 Phase	1820	930	1640	520	2040	1850	890	1950	650	2100	960	1100	5150	4
630	3 Phase	1870	1030	1780	470	2200	2120	1190	2060	860	2890	1200	1300	6800	4
800	3 Phase	1970	1050	1840	630	2590	2150	1070	2070	960	3080	1300	1400	11000	5
1000	3 Phase	2030	1150	1940	670	3000	2250	1160	2080	1030	3550	1500	1600	13000	5
1250	3 Phase	2220	1280	2090	980	4040	2230	1120	2260	1230	4150	1600	1700	14500	5
1600	3 Phase	2320	1300	2170	1350	4700	2350	1130	2420	1430	4910	2000	2100	17000	6.25
2000	3 Phase	3070	2140	2290	1430	5600	2490	1260	2490	1640	5910	2600	2700	20000	6.25
2500	3 Phase	2750	1590	2250	1670	6900	2780	1400	2500	2040	7040	3000	3200	24000	6.25
3000	3 Phase	2890	1730	2290	1850	7500	2900	1530	2560	2230	7820	3500	3700	28500	6.25

## POWER RANGE

1 - 50 kVA (Single Phase)  
25 - 10000 kVA (Three Phase)

## VOLTAGE SYSTEM

11 kV, 33 kV, 66kV and 132kV, 50Hz.

## STANDARDS

The Transformers shall be manufactured and tested in accordance with:

- The Latest IEC 76 Standards.
- The Latest ANSI, VDE and DIN Standards if requested by the customer.

## SERVICE CONDITION AND INSTALLATION

Altitude: Up to 1000 m above sea level, other altitude can be designed upon customer requested. Ambient air temp: 40 to 45°C

POWER KVA	PHASE	VOLTAGE SYSTEM 11000-230 V					LOSSES (WATTS)			% IMPEDANCE
		L (mm)	W (mm)	H (mm)	OIL (Liters)	WT (Kgs)	NO LOAD LOSSES	LOAD LOSS 75° C		
15	1-Phase	520	440	970	45	180	75	370	4	
25	1-Phase	600	490	1020	60	220	130	500	4	
50	1-Phase	580	650	1180	80	270	200	850	4	

TEMPERATURE RISE (above Ambient Temperature)	
TOP OIL	50°C
WINDINGS	55°C

These figures are approximate for estimation purpose for SILICON Steel Core Type Distribution Transformer. Technical data for transformers above 3000 kva can be provided upon request of the customer.

Note: For indoor installation cable box on HV & LV side is provided and standard / additional accessories can be provided upon customer requirement

\*Market items are as per  NS Standard for power transformers **जे. गुण. १६६**

# TO PROVIDE A COMPLETE SOLUTION TO VOLTAGE FLUCTUATIONS

With the expertise in the manufacturing of distribution Transformers under the brand name NEEK, Nepal Ekarat Engineering Co. Pvt. Ltd. Now introduces to our valued customers with the rolling contact type automatic Voltage Stabilizer for the complete protection against voltage fluctuation.

NEEK Rolling contact type automatic Voltage Stabilizer is safe, precise and reliable. Voltage control equipment required essentially for sites have fluctuating voltage conditions that can damage or affect the performances of sophisticated Industrial, Medical, Electronic, Printing or Photographic equipment etc, with output voltage accuracies. It has a silent operation free from the gear tricks of conventional stabilizers.

With the new microprocessor controlled control system, which NEEK is developing for the Rolling contact type automatic Voltage Stabilizer and with its digital system. NEEK stands incomparable from the other manufactures of the Rolling contact type automatic Voltage Stabilizer in the country.

NEEK provides customized range for the Rolling contact type automatic Voltage.

## INPUT & OUTPUT REQUIREMENTS

### Input Voltage:

- 240-460 Volts
- 280-460 Volts
- 300-460 Volts
- 320-460 Volts

### Output Voltage:

- 400/415/440 Volts

### TYPE:

- Balance Input & Balance Load
- Unbalance Input & Unbalanced Load

### PHASE:

- Single Phase
- Three Phase



## COMPARISON BETWEEN NEEK & THE CONVENTIONAL MAKE AUTOMATIC VOLTAGE CONTROLLER

### NEEK 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 goes on changing which prolongs the life of the rollers.
- Life at full load is 15-20 years.
- Negligible losses in full Buck/Boost

### Conventional Make with Carbon Brush Regulator

- Power consumption is 2 to 7% depending upon the model and input voltage variation.
- Suitable for continuous 30% to 40% duty cycle
- Since the contact is by brush having flat surface, wear and tear of the brush is more and requires frequent replacement.
- Maximum life at full load is 2-3 years.
- Max losses in full Buck/Boost Condition.

## ADVANTAGES

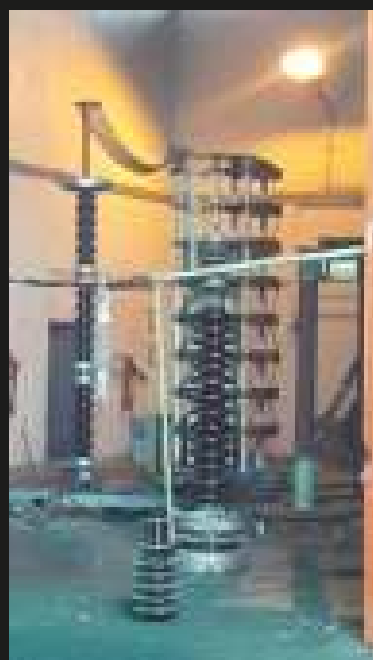
- Reduction in breakdown of electrical equipments.
- Improvement in power factor (only in case of high voltage).
- Power saving (reduction in power bills). Uniform quality of end products.

## L.T. AUTOMATIC VOLTAGE STABILIZER

L.T. Automatic Voltage Stabilizer holds its potential for units having either L.T. Supply or Low capacity H.T. Connections. The same can be manufactured for Balanced Supply and Unbalanced Loads or Unbalanced Supply for Unbalanced Loads.

The range of input supply that the stabilizer is designed for depends upon the voltage condition at the supply point. However some standard ranges for L.T. Stabilizers are as under.

Input Voltage	360-450V	350-460V	320-460V	300-460V
Efficiency (as calculated)	99.60%	99.50%	99.355-99.00%	98.70%
Output Voltage	400V 3 Phase, 50Hz			
Cooling	Naturally Oil Cooled			
Type	Indoor			
Temperature	35 degrees C above ambient			
Mounting	On uni-directional Wheel			
Wave from distortion	Nil			
Duty Cycle	100% Continuous			





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