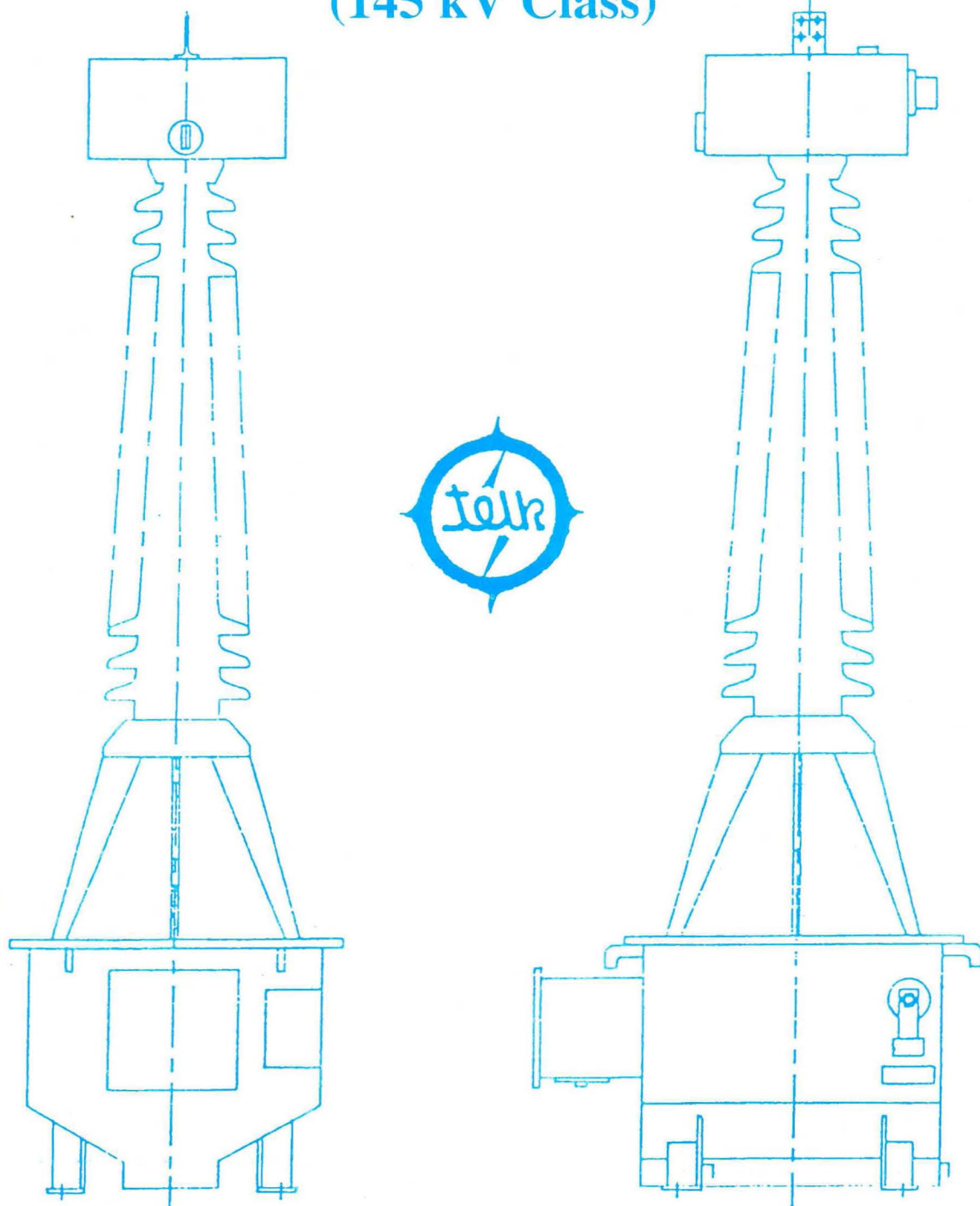


INSTRUCTION MANUAL OF VOLTAGE TRANSFORMER (145 kV Class)



TRANSFORMERS AND ELECTRICALS KERALA LIMITED
ANGAMALLY KERALA

MADE IN INDIA

VOLTAGE TRANSFORMER

APPLICATION:-

Voltage transformer is used to transform high tension line voltage to low voltage in order to supply appropriate voltage to measuring instruments, relays and other similar apparatus. It can be used with voltmeters for voltage measurement or in combination with current transformer for power measurements. It can also be used for the operation of the protective relays and similar devices.

CONSTRUCTION:-

Grounding voltage transformer
- TYPE-FORM: OEGLV-MC

Grounding type voltage transformer essentially consists of primary and secondary windings, core, lower tank, porcelain insulator and expansion chamber. The core is made of high quality CRGO steel and has a rectangular construction. The secondary and primary windings are of high quality PVA/PEI-AI enamelled copper wire wound concentrically around the core. The core and coil assembly is mounted and housed in the lower tank. A hollow porcelain insulator is clamped to the lower tank and expansion chamber by bolting through its metal flanges cemented at the ends. The secondary winding terminals are brought out and terminated in a terminal box fitted to the side of lower tank. A terminal block is provided in the terminal box for proper identi-

cation of terminals. Cable glands are provided on the terminal box for taking out connections from the terminal block. The terminal of the primary winding which is to be earthed during service is brought out through a small bushing and is connected to the lower tank. The high voltage terminal of primary winding is taken out through an insulated condenser housed in the hollow porcelain insulator and connected to the line terminal provided on the expansion chamber.

DRYING:

The drying, degassing and oil impregnation of the insulating paper are of great importance for the quality and reliability. The internal body of the transformer is subjected to heat and vacuum cycle in a drying chamber to extract the moisture accumulated in the paper during storage and handling. For this purpose, special drying ovens are available and the drying process is checked continuously by taking measurements. The drying period depends on the voltage class. At the end of the drying, the insulation is impregnated by oil under vacuum to avoid partial discharges by trapped gas bubbles. The elimination of moisture and oxygen during the drying process prevents ageing of oil-paper dielectric.

HERMETIC SEALING:-

Hermetic sealed construction is used to ensure that the high quality of insulation achieved during manufacture is preserved during the service life of the transformer. A simple and safe method of hermetic sealing using dry nitrogen gas above oil is adopted. Nitrogen gas does not in any way affect the properties of oil and paper. When the oil expands or contracts due to temperature variations, the nitrogen gas in the expansion chamber undergoes changes in pressure. Also depending on the pressure and temperature, a part of the gas will be absorbed by oil. The volume of expansion chamber and the gas pressure at the time of initial filling are adjusted, so that gas pressure will not increase to a high value under normal working voltages and temperatures.

TANKS:-

Both expansion chamber and lower tank are of high quality steel and can withstand full vacuum and pressure during the drying process and stresses occurring in transit. The outer surface of ferrous parts are given light grey, 631 of IS:5 enamel paint over a rust inhibitive coat of ready mixed zinc chrome primer. Steel surface coming in contact with transformer oil are given a coat of oil-

resisting varnish. Galvanised of bolts and nuts are used as fasteners. All welded and gasket joints are subjected to leak tests.

SPECIFICATION AND TEST REPORT:-

For detailed specification, connection details and other performance requirements, refer to rating plate drawing.

Separate test reports are available for all units conforming to IS-3156

GENERAL OUTLINE ARRANGEMENT:

Refer to drawing, TK426795 for base details, overall dimension etc.

FITTINGS AND ACCESSORIES:-

Voltage transformer is normally provided with the following standard fittings and accessories.

1. 14mm dia double hole primary terminal pad (Stainless steel).
2. Oil level sight window.
3. Oil filling and draining hole with cover (Filling or draining of oil is not recommended in service-refer maintenance details).
4. Lifting lugs.
5. Secondary terminal box with 25mm dia hole for cable gland or cable conduit entry.

6. Clamp type earth terminal.
7. Rating plate.
8. Secondary terminal block and fuses in secondary circuit.

HANDLING INSTALLATION AND MAINTENANCE:-

The voltage transformer is despatched in wooden crates in vertical position. Unpacking should be done with special care so as not to damage the porcelain and terminal bushing.

It can be installed readily on concrete pedestals of steel structures. Bolt holes are provided at the base for this purpose. Ensure that porcelain is clean and free from all dust, grease and particles of packing materials, before commissioning.

In order to keep the hermetic sealing intact, the flanged joints with gasket in between shall not be tampered with. The cover of the secondary terminal box alone need be opened for making connections.

In case of heavy pollution deposits due to the surrounding atmosphere conditions, periodic external cleaning of the porcelain insulator and all exposed surfaces is recommended.

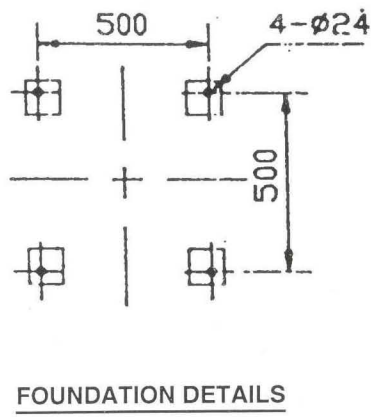
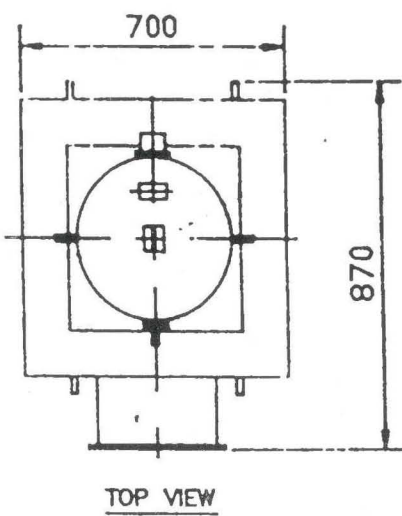
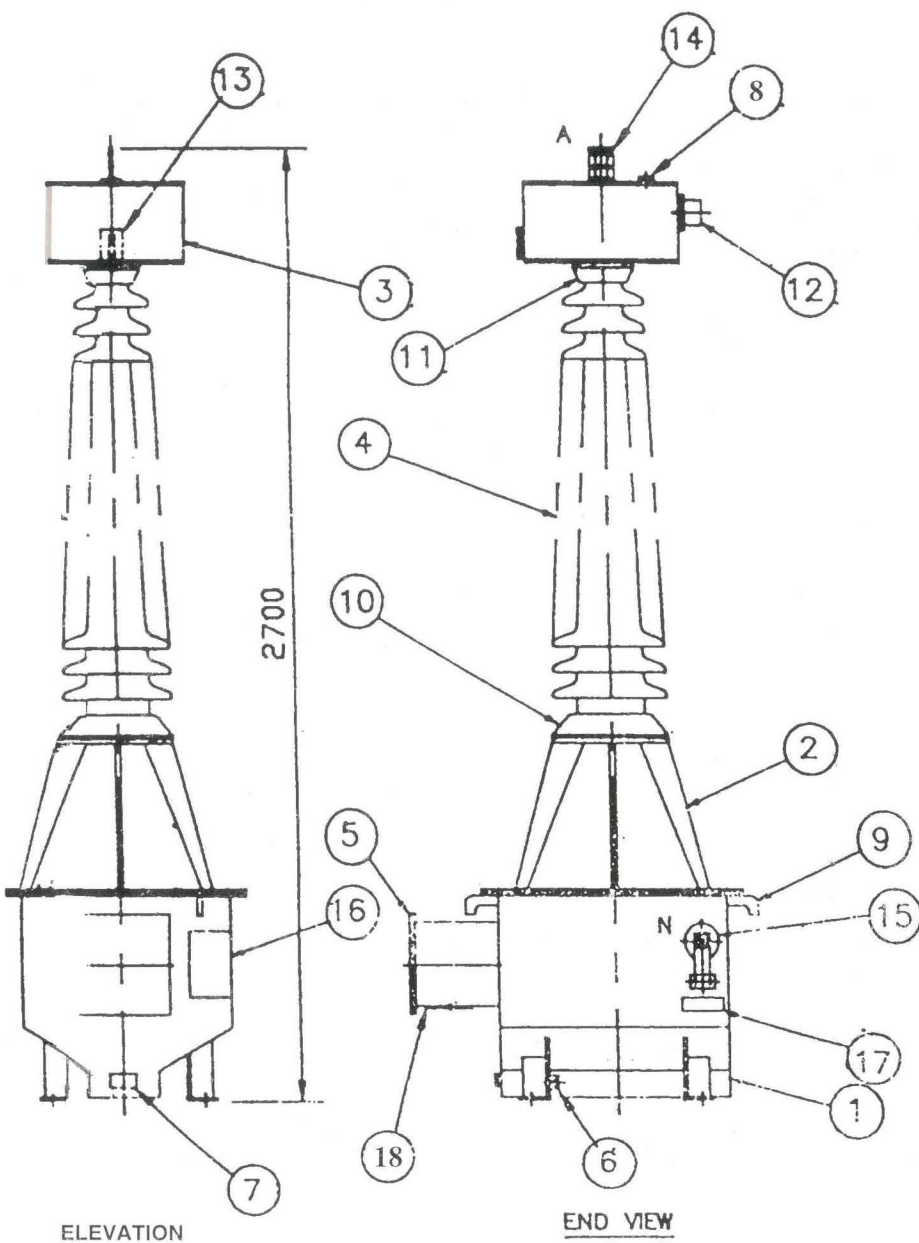
Since the voltage transformer is hermetically sealed and no material harmful to the oil is used, there is no necessity for extraction of samples of oil for analysis or for reconditioning. However, oil level has to be checked

periodically. Any abnormal reduction in oil level indicates leak and should be investigated.

Before commissioning, make sure that N terminal (Neutral) to lower tank connection is kept undisturbed and earthing of all earth terminals provided on the lower tank.

Cleaning of porcelain insulator and painting of outer parts are to be carried out at regular intervals which depend on atmospheric conditions.

DRN	MNS	27.5.94	TITLE	145 kV	TELK	TELK DRG. No.
CHD	RMA	27.5.94	VOLTAGE TRANSFORMER		ANGAMALLY KERALA	TK 426795
APPD	DKI	28.5.94				



SPECIFICATIONS:

- HIGHEST SYSTEM VOLTAGE : 145 kV
- TOTAL MASS (Approx) : 575 kg
- OIL QUANTITY (Approx) : 150 L
- TOTAL CREEPAGE DISTANCE : 3625 mm

Part No.	Part Name
1	LOWER TANK
2	UPPER TANK
3	EXPANSION CHAMBER
4	PORCELAIN INSULATOR
5	SEC. TERMINAL BOX
6	EARTH TERMINAL CLAMP-2 No.
7	OIL DRAIN HOLE COVER
8	NITROGEN SEALING COVER
9	LIFTING LUG-4 No.
10	LOWER METAL FITTING
11	UPPER METAL FITTING
12	EXPLOSION VENT
13	OIL LEVEL SIGHT WINDOW
14	PRI.TERMINAL (LINE)
15	PRI. TERMINAL (NEUTRAL)
16	RATING PLATE
17	CAUTION PLATE
18	GLAND PLATE



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