



Instruction Manual #101



**General Instructions
for Installation and
Operation**

Single Phase Pole Mounted Distribution Transformers

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ERMCO Distribution Transformers

- P. O. Box 1228, Dyersburg, TN 38025-1228
- Phone: 731-285-9121
- Fax: 731-287-4104

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INTRODUCTION

This instruction manual provides general information for the installation, operation, and maintenance of ERMCO single phase, pole mounted transformers. These transformers are to be applied and used per the "usual service conditions" describes in ANSI C57.12.00 (General Requirements for Liquid-Immersed Distribution, Power and Regulation Transformers).

RECEIVING AND INSPECTION

ERMCO pole transformers are shipped filled with insulating transformer oil. Immediately upon receipt, and before being put in service, transformers should be inspected for any external damage or loose parts caused by shipping and handling. Damage presumed to have occurred during shipment should be noted, and your ERMCO sales representative contacted.

Extreme care is taken at the factory in the processing and sealing of the transformer to insure that it is clean and dry, and of adequate dielectric strength. Normally, therefore, it is not recommended that the transformer seals be broken for internal inspection. If it is decided, nevertheless, that the transformer be opened, adequate precautions should be taken as outlined elsewhere in these instructions.

HANDLING AND INSTALLATION

Transformers should be lifted by the lifting lugs only. The transformer bushings should not be used for lifting or moving the transformer into position. The transformer should be kept upright at all times and not tipped over on its side for any reason. This will prevent air bubbles from entering the coil which could degrade the dielectric strength. Support lugs for direct pole mounting are provided in accordance with ANSI standards. Hangers and kickers for cross arm mounting is to be provided by the user.

When installed, transformers should be protected from dangerous overloads, overvoltages and lightning by suitable, approved devices.

OIL

Transformers are thoroughly dried at the factory and filled with ERMCO inhibited mineral oil having a minimum dielectric strength of 30 kV at 60 Hz when tested per ASTM D-877. ERMCO inhibited mineral oil contains less than 1 ppm of PCB's at time of manufacture. The transformer should never be energized unless it is filled with oil.

If it should be found necessary to add to or replace the oil in the transformer, only clean dry oil having the minimum dielectric strength of 30 kV and less than 1 ppm PCB's should be used. Before opening the transformer, sufficient time should be allowed for the transformer to come to temperature equilibrium with the air in the room to eliminate the possibility of moisture condensation from the air.

A recommended procedure for opening the transformer is to first bring the interior of the transformer to atmospheric pressure by venting the automatic pressure relief valve furnished on all ERMCO transformers. The cover band may then be removed. Natural rubber hose should not be used in the transfer of oil. The correct oil level at 25EC is marked on the inside of the tank.

Care should be taken to re-seal the transformer so that moisture is permanently excluded from the interior. A pressure test using dry air or nitrogen, may conveniently be made through the pressure-vacuum fitting, after removing the pressure relief valve, to be sure all seals are tight. Pressurize the transformer to 10 psi and hold for 30 minutes. A drop in pressure during this time would indicate the

transformer is not properly sealed and the tank and fittings should be checked and the leak repaired. Finally, the pressure relief valve should be installed and carefully tightened.

CONNECTIONS

Refer to the transformer nameplate for the kVA rating and the permissible connections. No connections other than those shown on the nameplate should be made; and none of the connections should be changed while voltage is applied to the transformer.

For three-wire low voltage connections, the loads between the line terminals and neutral should be as nearly equal as possible. More than one-half the rated kVA should not be applied between any one line terminal and neutral.

Provision is made for grounding the tank by means of a tapped pad or ground connector.

On single high voltage bushing transformers, it is advisable, for safety reasons, to connect the tank and the low voltage neutral to the system neutral through conductors of adequate capacity before voltage is applied to the transformer. Connection should then be made to the low voltage and finally to the high voltage. When disconnecting the transformer, all high voltage connections, including those to protective devices should be opened first.

For low voltage bushings with eyebolt connection, the recommended torque on the eyebolt is: 15 to 20 foot pounds for the 3/8 inch eye and 30 to 35 foot pounds for the 1/2 inch eye.

OVERLOAD AND OVERVOLTAGE PROTECTION

Transformer protection against overloads and overvoltages may be obtained by suitable devices applied in the field to conventional transformers, or by use of protected transformers (ERMCO CSP or CP types) as supplied from the factory.

1. Fuses

High voltage fused cutouts are recommended for protection of conventional transformers against overloads and to protect the line against outages.

On ERMCO CSP and CP transformers, a fusible protective link, mounted inside the tank, is provided in series with each HV terminal. In case of internal failure of the transformer, the protective link disconnects the transformer from the line without affecting line fuses or breakers.

When the available fault current exceeds the maximum interrupting rating of the protective link, a current limiting fuse should be used in series with the protective link.

2. Lightning Arresters

Conventional transformers should be protected by properly rated lightning arresters. Ground connections on the arresters should be made before connection to the high voltage line is made.

CSP transformers are lightning protected by gapped or direct connected lightning arresters bolted to mounting pads welded to the tank wall. Gapped arresters have an adjustable electrode on the top terminal of the arrester to obtain the proper gap setting to the bushing electrode.

Before the transformer is put into service, the gap type arrester electrode should be checked for proper gap alignment and spacing. Adjustments should be made as necessary.

3. Secondary Breakers

ERMCO CSP and CP transformers are protected against secondary overloads and short circuits by an internally mounted circuit breaker. The function of the breaker is to open the low voltage circuit and protect the transformer from faults or severe overloads.

The breaker operating mechanism is designed to be operated by a lineman's hot stick. Transformers are shipped with the circuit breakers closed.

To open the low voltage manually, move the handle fully counterclockwise so that the pointer moves from the "C" (closed) to "O" (open), at which point the circuit is open. Verify that the circuit breaker is latched in the "open" position. To ensure the discharge of the static charge which is sometimes present in the low voltage winding due to capacitance, it is recommended that the low voltage be grounded after opening the circuit breaker until after the high voltage is disconnected.

To close the breaker, rotate the handle fully counterclockwise to "R" (reset), which engages the latch mechanism, and then clockwise to "C" (closed). If a fault exists or an excessive load exists at the time the breaker is closed, the breaker will reopen even though the handle is held in the "C" (closed) position.

Some breakers are provided with a red signal light which gives warning that the load has reached a value near the tripping point of the breaker. The signal light remains lighted until reset (turned off) by means of the breaker operating handle. Transformers should not be operated under load conditions that will cause the red light to appear frequently, since it indicates an overload on the transformer. When such a condition exists, it is recommended that a larger transformer be substituted to avoid impairing the life of the smaller unit.

To reset the signal light without disconnecting the load, rotate the handle to "L" (light), and then return to "C" (closed). If the light fails to go out, the transformer is still overheated. To check the signal light bulb when the transformer is in service, rotate the handle to "L" (light). The light should turn on. If it does not, the bulb should be replaced.

Some circuit breakers are equipped with an emergency overload device which can be used to restore service following a circuit breaker operation due to overload. The emergency overload lever is located immediately above the breaker operating handle. With the emergency lever in the normal position, the breaker will trip at its normal setting as calibrated at the factory. Moving the lever in a clockwise direction increases the setting so a higher temperature is required to trip the breaker. The emergency setting may be adjusted to an intermediate or extreme value. This emergency setting provides extra load capacity and still permits manual breaker operation, and also retains short circuit protection of the transformer. It is important that the emergency setting be used only when, and as long as, absolutely necessary because its use will result in a reduction of transformer life.

A meter seal is provided on the emergency lever to prevent tampering. It is recommended that a new seal be applied to the lever when it is returned to the normal position after emergency operation.

The breaker is a thermal and short circuit protective device for the transformer. It is not recommended that the breaker be used for routine disconnect operations.

GASKETS

Cover and bushing gaskets are all made of Buna-N Nitrile rubber. Gaskets may be reused if not damaged. Covers must seat evenly of the gaskets so that pressure is distributed evenly. The cover band must be tightened firmly to insure an effective seal.

DUAL VOLTAGE AND TAPS

ERMCO transformers rated for more than one primary voltage are equipped with a dual voltage switch or tap changer. These switches are externally operated, but should never be operated while the transformer is energized. When switching from one voltage to another, make sure the switch is in the proper position before re-energizing the transformer. After turning the switch, tighten the locking device to minimize the possibility of unintentional movement.

STORAGE

Transformers should be stored filled with oil and in a clean dry place, if possible where there will be no extreme temperature changes. Before the transformer is put in service, it should be checked in the same manner as when received.

MAINTENANCE

A periodic visual inspection of the transformer is recommended. At such times, the general condition of the following should be noted:

1. High voltage bushings;
2. Low voltage bushings;
3. Arresters (if provided);
4. Evidence of oil leakage;
5. Ground connections;
6. Accessories;
7. Safety labels.

Where tanks show evidence of rusting or deterioration of the finish, they may be cleaned and then retouched with paint. It is necessary to remove all loose paint and rust by wire brushing, scraping, or sanding, and clean with a good solvent. Apply an acrylic lacquer, alkyd enamel, two part urethane or silicone alkyd primer, allow to dry, and then apply a color matched compatible top coat and allow to dry.

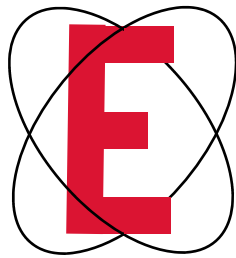
If metal is rusted to the point of being weak such that the tank integrity can be compromised, repair or replace the part rather than painting it.

REPLACEMENT PARTS

Replacement parts are available from ERMCO. When ordering parts, give a complete description of the part. Also, give the kVA, voltage, and serial number of the transformer, all of which may be found on the nameplate.

ADDITIONAL INFORMATION

Complete information on details of construction, installation, operation and maintenance can be obtained from the ERMCO factory or your nearest ERMCO Sales office.



ERMCO

Transformers & Components

2225 Industrial Road
P. O. Box 1228
Dyersburg, TN 38025-1228



Phone: 731-285-9121
Fax: 731-287-4104
Web Site: www.ermco-eci.com