

Instruction Book



TYPE SL CORE FORM SUBSTATION TRANSFORMER
WITH TYPE URT LOAD TAP CHANGER

Class OA/FOA/FOA
21/28/35 Mva
138000 - 14400/8314Y Volts
Three Phase, 55⁰ Rise, 60 Cycles

for

CITY PUBLIC SERVICE BOARD

Customer's Order 44510

G.O. SA-34127-UR - S.O. RAR-6250

September, 1964

I.B. 47-614-C1018

Westinghouse Electric Corporation

Transformer Divisions
Sharon Plant, Sharon, Pennsylvania

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GENERAL DESCRIPTION

The Load Tap Changing Power Transformer covered by this Instruction Book is fully described in the description which follows. For specific description, see Instruction Plate listed with the drawings.

Apparatus included in the transformer is as follows.

1. Transformer unit.
2. Automatically controlled load tap changer for regulation of secondary voltage.
3. Necessary current transformer for line drop compensation.
4. Control panel for load tap changer.
5. Forced oil equipment and controls.

The Main Core and Coil Assembly is located in an oil-filled, sealed compartment. The assembly consists of a main power, regulating transformer, and a preventive auto transformer. Instruction Leaflet 48-060-4 describes the construction used in the main and regulating unit.

Current Transformers for the line drop compensator are Ring Type, mounted on the bushings.

A No-Load Tap Changer is mounted on top of the regulating unit to permit selection of primary taps. As this device will not break exciting current, it should never be operated when transformer is excited.

Load Tap Changer is described in I.L. 48-064-12.

Automatic Control for LTC is described in I.L. 48-064-14 & I.L. 47-065-9.

Forced Oil Equipment is described in I.L. 48-063-27, I.L. 46-714-5, and I.L. 48-063-13.

RECEIVING-HANDLING-STORING

Inspection of Shipment: The Load Tap Changing Power Transformer is always shipped as completely assembled as possible. Lightning arresters, if mounted on the transformer, are removed to avert possible damage. All relays are blocked to prevent possible damage to the moving parts from shipping shocks. The shipment will consist of the transformer unit plus one or more boxes of details. A packing list will be found in boxes marked "PACKING LIST INSIDE". Check shipping list immediately and notify carrier of any shortage or damage.

Handling: The transformer is furnished with lifting hooks on each corner of the tank near the cover. In addition, provision is made for jacking and skidding. The outline will indicate jacking lugs either on base or corner of tank. Do not jack on corner of tank unless pads are provided for the purpose. Refer to outline drawing for complete weights. Dimensions should be checked with shipping clearances in advance so that route to installation site may be checked.

If the transformer is not to be put in immediate service, the unit should be checked to insure that there are no oil leaks and that the doors to the control compartments are tightly closed.

When moving transformer, the moving parts of all control relays must be firmly blocked. Clapper relays may be blocked by inserting paper between armature and core, or by fastening armature closed by looping a rubber band over it. Plunger relays may be blocked by inserting paper between plunger and core, or by blocking contacts so that plunger cannot move.

Storing: If the unit is not to be installed for several weeks, a heater should be installed to prevent condensation of moisture.

INSTALLATION

As the base will ordinarily be prepared in advance, it will only be necessary to place the transformer on the prepared foundation, install accessories removed for shipment, and connect the incoming and outgoing lines. *The transformer case must always be solidly grounded.* A terminal is provided on the tank for this purpose.

Before putting in service the following operations are necessary:

1. Operate the tap changer by hand crank over its entire range to make sure there is no binding.
2. Remove all blocking from the relays.
3. Check oil level in main tank and tap changer compartment.
4. With the L.V. main breaker open, energize transformer from the high voltage lines.
5. Operate the tap changer from the manual control switch.
6. Check tap changer for "hunting".
7. Place tap changer on approximate voltage connection and set for automatic operation if that is desired.
8. Set line drop compensator per I.B. 47-065-9.

OPERATION

Normally the Load Tap Changing Power Transformer will perform its function automatically and without supervision, except for periodic inspection and adjustment.

PRINCIPLES OF OPERATION

A description of the tap changer control is found in the Instruction Leaflet which is listed in the table of contents, see front of book.

Refer to the wiring diagram and supplementary leaflets for other equipment.

OPERATING INSTRUCTIONS

Connections for high voltage taps are made by an externally operated no-load tap changer. The transformer must be disconnected from the lines when this device is operated.

The secondaries of all current transformers are connected to ground. The transformer should never be operated with these grounds removed. NEVER open a current circuit when the current transformer is carrying current.

EMERGENCY INSTRUCTIONS

1. Overheating may be caused by:
 - (a) Restricted cooling (all radiator valves not open).
 - (b) Overload.
 - (c) Low oil level.
 - (d) Internal winding fault or wrong connections.
2. The self-resetting relief device will operate due to excessive internal pressure. This pressure may be caused by:
 - (a) Internal fault.
 - (b) Overheating.
 - (c) Overfilling with oil.
 - (d) Too much nitrogen pressure when blowing out gas space.
 - (e) Filling with oil from a pressure pump without allowing for venting.

MAINTENANCE

A regular schedule of inspection should be set up. A frequency of at least once a month is recommended. At each inspection the following should be noted:

1. Oil level in main tank and tap changer.
2. Load, oil temperature and ambient.
3. Relay contacts burned.
4. Load Tap Changer operations.
5. Control compartments dry and clean.
6. There are no oil leaks.
7. Vacuum-Pressure gage reading consistent with operating temperature of the oil and within the operating range specified on the nameplate.
8. Check target on the self-resetting pressure relief device on the cover.
9. When furnished on the transformer:
 - (a) Position of the continuous and maximum indicating pointers of the thermal load indicating relay.
 - (b) Nitrogen gas supply pressure.

Oil samples should be taken at regular intervals from the transformer and load tap changer and tested in accordance with the instructions for care of the oil.

Refer to supplemental leaflets in the back of this Instruction Book for additional information for care of the oil and apparatus.