DESCRIPTION • INSTALLATION

INSTRUCTIONS

"STANDARD" OIL TO WATER THERMOSIPHON HEAT EXCHANGER

General

The "Standard" oil to water heat exchanger for Westinghouse transformers is designed for thermosiphon (OW) operation only. To obtain proper flow the heat exchanger must be mounted as high as possible on the transformer case below the gas space. Valves are provided at the oil inlets and outlets of the heat exchanger to allow removal in the field, without lowering the oil level. The heat exchangers may be supplied with a single or multiple parallel path for oil flow. **Care should be taken to be certain all valves are open when operating the heat exchanger.** Figure 1 is a typical section of the "Standard" heat exchanger.

Construction

Tubes. The "Standard" water cooler has a single tube construction. The tubes are ¾" I.D. with .065" thick copper wall with aluminum finning.

Tube Sheets. There are two tube sheets, a water tube sheet and an oil tube sheet, separated by an air space. The tubes are rolled into each tube sheet to provide a pressure-tight seal. Any leak in the joints may be detected between tube sheets and will cause leaks to air but not between fluids.

Shell. The oil side shell is a fabricated steel shell.

Water Boxes. The water boxes are welded steel construction with a bolted-on cover. A rubber gasket is used for a seal.

Assembly

The entire cooler has welded joints except at the water box covers. Gasketing is required at the oil nozzles only. Vents and drains are provided on the oil and water sides of the cooler. The water box assembly is such as to give four passes to the water system.

Factory Tests

The water side of the cooler is tested at 125 psig. The oil side is tested at 15 psig with hot oil for 24 hours.

Installation

Water connections should be made to allow free discharge on the outlet side of the cooler. All throttling of water should be done on the water inlet to the cooler (bottom connection).

Always vent the cooler before operating to insure that no air has been trapped in the cooler.

Operation

Ascertain that all oil circuit valves are open. Start water flowing and adjust to proper rate stamped on instruction plate.

Maintenance

Cooling coils may be cleaned by removing the water box covers and reaming the tubes. Brushes are available which will do a very satisfactory job of cleaning.

Under normal operating conditions, the oil furnished with Westinghouse transformers will not leave a deposit in the heat exchanger. Thus, it should not be necessary to clean the oil compartment. If, due to poor operating procedure, the oil has deteriorated to the point of sludging and must be changed, it is important to flush out all sludge from the bundle with clean oil. This should be done at the same time that the transformer is flushed and the oil reconditioned.

If there is any suspicion that the heat exchanger has been damaged during shipment, it should be tested before being put into service. To do this, connect a pressure pump, valve, and pressure gauge to the ¾ inch vent in the water compartment. Pump oil into the heat exchanger until full. Bring the pressure up to 100 pounds per square inch by means of the pump and close the valve tightly. If all connections are tight and there are no leaks in the heat exchanger, the pressure

should hold practically constant for five minutes. There is a leak somewhere if the pressure begins to drop immediately after the valve is closed and continues to drop steadily.

The oil compartment may be tested by closing the valves in the oil circuit and applying pressure to the oil compartment in the same manner prescribed above. The pressure on the oil compartment should, however, be limited to 15 pounds per square inch to avoid damage to the valves.

In the event of a leak, the manufacturer should be notified and he will prescribe the proper procedure to follow.

Whenever a water cooled transformer is shut down in cold weather, precautions must be taken to prevent freezing of water in the heat exchanger. The best method of protecting the heat exchanger is to drain all water from it and the associated piping. Since the tubes in the heat exchanger are straight, they will be self-draining and blowing out will not be necessary. There is, however, a possibility that water could be trapped in the compartment at either end of the heat exchanger. The ¾ inch vent and drain plugs in the water transfer compartment and the ¾ inch plugs in the water inlet and outlet should be removed during shutdown in cold weather.

For units that have been in storage or inoperative for a period of time where ambient temperatures and water temperatures are near or below freezing, care should be taken to prevent freezing of the water in the cooler when energizing. When in doubt about the possibility of forming ice in the cooler this practice should be followed:

For OW Units:

(1) Energize unit. When top oil reaches 25°C start water flow and adjust for proper flow.

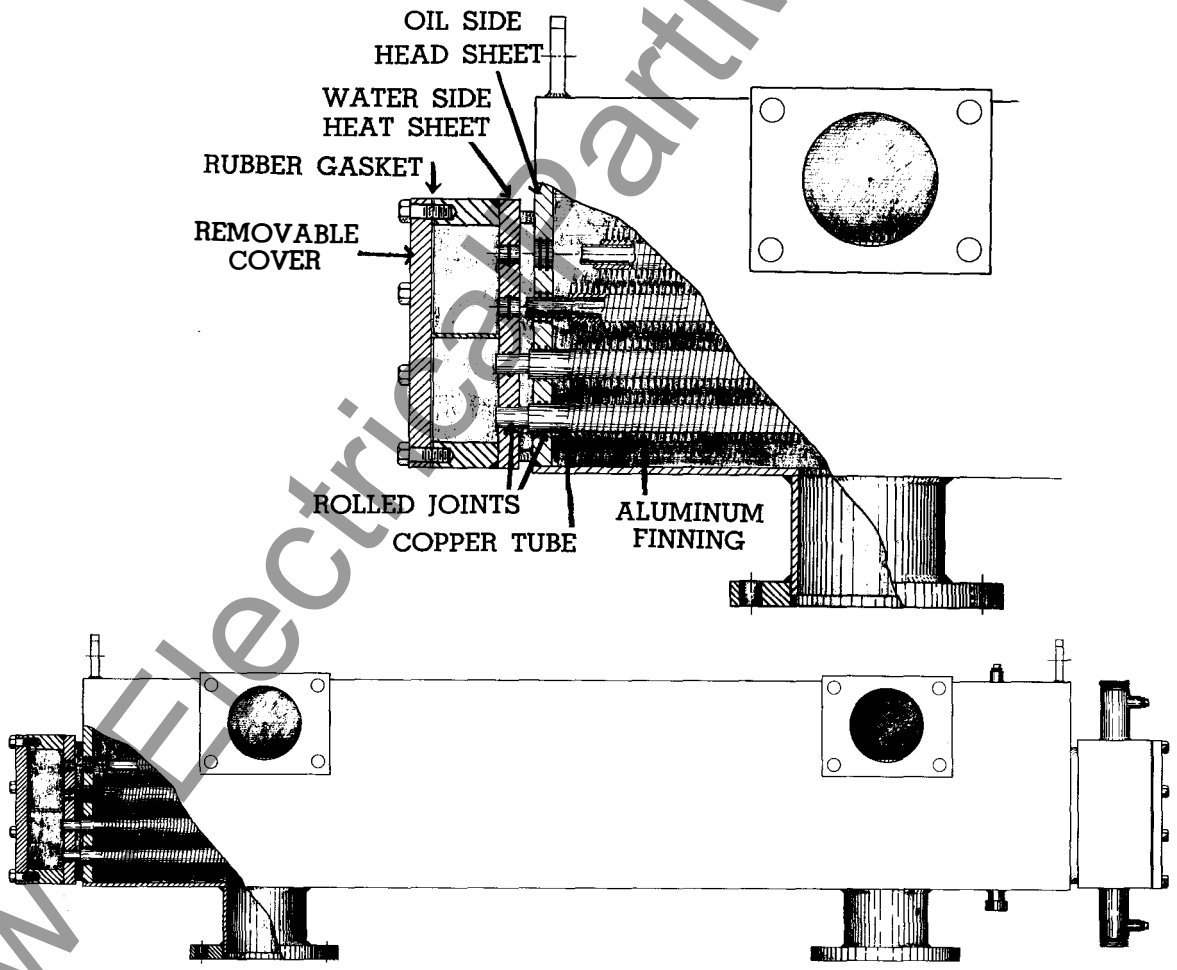

FIG. 1. TYPICAL WESTINGHOUSE STANDARD "OW" COOLER.

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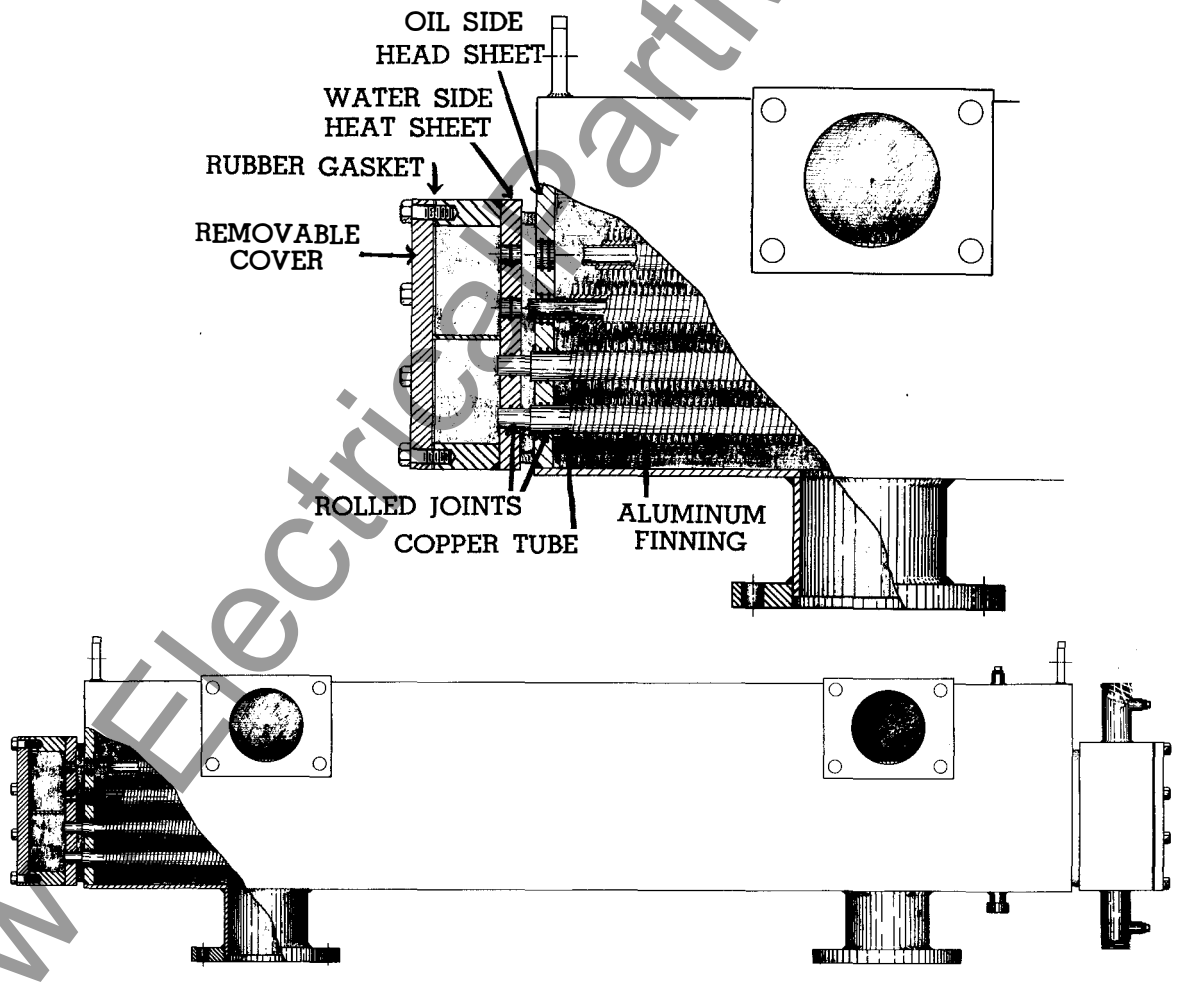

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