

FINAL INSPECTION PRIOR TO ENERGIZATION

After the Package Compact Substation has been found to be in good condition and the protective equipment is operational, the substation may be connected to the network. However, it is recommended that the transformer to be left to settle for 1 or 2 days after installation so those air bubbles in the oil have time to dissolve before connecting the voltage.

Before energizing the unit, a complete electrical inspection should be made. The following checklist should be used as a minimum requirement.

Electrical Inspection

All external connections have been made properly (phasing of connections to terminals, etc.).

All connections are tight and secure.

All accessory circuits are operational. Check the transformer protective equipment and test the function of their electrical circuits: Thermometers (alarms, tripping)

Pressure relay (tripping) Oil level indicator

Ensure that all fuses are inserted and in the correct position all tap connections are properly positioned. The neutral and ground connections have been properly made.

Mechanical Inspection

All shipping members have been removed.

There is no obstructions in or near the openings for ventilation. No tools or other articles are left inside the enclosures.

All protective covers are in place or closed and bolted tight.

MAINTENANCE AND PERIODIC INSPECTION

In order to assure a long lifetime and correct and reliable operation of equipment delivered for this facility it is of utmost importance to perform maintenance regularly. Following general rules should always be considered before starting maintenance activity.

1. Authority from responsible engineer shall always be obtained before starting any maintenance.
2. Follow safety procedure established in carrying out the work.

Realize that no set of safety *or maintenance instructions* will ever be written that can adequately cover all accident possibilities.

Therefore "**SAFETY**" as dictated by actual current conditions, always takes precedence over any previously prepared safety or maintenance instructions. Assume nothing. Take the precautions that you personally deem necessary in addition to those included in standard practice.

- Be familiar with the drawings and previous test records before starting activity.
- Scrutinize maintenance instructions given for the equipment to be maintained.

Maintenance information is given in the Operation and Maintenance Manual for each type of equipment.

The main dangers of such process are:

- Inaccessible lubrication points (greased for life) cannot be lubricated and may seize up.
- Areas not lubricated may be subject to corrosion.
- The high-pressure spray may damage equipment.
- Especially protective coatings may be removed.

Bolt Tightness

All connections should be tight and secure. Bolts and nuts on bus bar and terminal lugs should be torqued and marked properly.

Inspection and Testing

The need for preventive maintenance will vary on operating conditions. Where heavy dust conditions exist, an accumulation of dust on the equipment may affect the operation of unit substation and its protective apparatus.

When normal maintenance inspection and cleaning of bus connections, relays, lug connections, and other part of the distribution system is being made, it is advisable to operate and check circuit breaker or switch-disconnect or operation.

Routine Field Testing

Routine field testing of the electrical equipment is intended to enable maintenance personnel to determine, without laboratory conditions or complicated equipment, that a particular electrical equipment is able to perform its basic circuit functions.

The following constitutes a guide to tests that might be performed during routine maintenance.

1. Insulation Resistance Test

Extreme atmospheres and conditions may reduce the dielectric with stand ability of any insulating material. An instrument commonly known as "megger" is used to perform this test.

The voltage recommended for this test should be at least 50 percent greater than the circuit rating; however, a minimum of 500 volts is permissible. Tests should be made between phases of opposite polarity as well as from current carrying parts of the circuit protective device to ground. Also, a test should be made between the line-and-load terminals with the circuit protective device in the "OFF" position.

Resistance values below one mega ohm are considered unsafe and should be investigated for possible contamination on the surfaces

NOTE: For individual circuit protective device's resistance readings, load and line conductors should be disconnected. If not disconnected, the test measurements will also include the characteristics of the attached circuits. A temperature and humidity reading are recommended and recorded during the testing period.

Insulation resistivity is markedly effected by temperature and humidity conditions. Based condition of one (1) mega ohm per kV assumes a 20°C wet bulb reading. The following table shall be used to adjust readings to the 20°C constant.

2. Connection Test

Connections to the circuit protective device should be inspected to determine that a proper electrical joint is present. If overheating in these connections is evident by discoloration or signs of arcing, the connections should be removed and the connecting surfaces clean before re-connections. It is essential that electrical connections be made properly to prevent and reduce overheating.

3. Mechanical Operation

During routine tests, mechanical operation of the circuit protective devices or disconnects should be checked by turning it "ON" and "OFF" at least three times.

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