

## **RECTIFIER – Operation Procedures**

**WARNING!** This equipment poses an electrical shock hazard and the following should only be attempted by qualified personnel.

**Operating personnel should observe the following before attempting to operate or adjust the rectifier:**

1. Do not tamper with AC power supply terminals of AC circuit within the rectifier unless the AC power, external to the unit, is turned "OFF". Contact with this high voltage can produce severe or fatal shock.
2. Rectifiers with DC ratings above 50 volts DC have high voltage on the adjustment taps, AC to stack terminals, and can not be handled unless rectifier circuit breaker is turned "OFF".
3. Do not exceed AC or DC ratings of the rectifier. Operating the rectifier at higher than nameplate ratings will result in eventual failure of the rectifier.
4. If overload protection trips repeatedly, investigate and eliminate cause before attempting further operation of rectifier.
5. If rectifier components overheat, or there is any evidence of electrical failure, turn rectifier "OFF", immediately. Do not attempt to operate rectifier until proper inspection and repairs have been completed.
6. The positive DC output terminals should always be connected to the anodes. NEVER connect this positive DC terminal to the structure to be protected, as irreparable damage will occur to the structure.
7. Oil immersed rectifiers must have the oil level maintained at the specified level for proper cooling of components and also to meet rigid requirements for Class 1, Group D hazardous areas.
8. For three phase units, all similar (coarse or fine) voltage tap settings MUST be on the same "step" in all phases before AC power is turned "ON". Operating the rectifier with either the coarse or fine taps on different settings will destroy the transformer.
9. Return instruction manual and wiring diagrams to pocket provided on the inside of door. Do not place in bottom of rectifier and allow ventilation to be restricted.

### **ROUTINE CHECKS PRIOR TO OPERATION:**

Your Universal Rectifier was fully inspected, carefully tested and was in top operating condition at the time of shipment. Instances where damage has resulted in shipping, handling, storage or installation are rare but possible. As a result, the following routine checks of your Universal Rectifier, as well as the external AC and DC circuits are recommended:

1. **VISUAL INSPECTION.** Inspect unit for possible damage that may have resulted in shipping, handling, or installation. If damage exists, do not attempt operation of rectifier until repairs have been completed.
2. **AC POWER SUPPLY.** Check phase and voltage of AC power supply. These should correspond to AC ratings of the unit. Where rectifiers have dual voltage ratings (110/220 or 220/440) care should be taken to make AC connections for voltage employed. Notice tag attached to panel indicates AC voltage wiring of the unit. Wiring diagram indicates changes to be made for other input AC voltages.

3. **DC CIRCUITS.** Zero the DC meters. External DC load should be in proper operating condition. Connect ground bed (anodes) to positive (+) DC output terminal. Connect structure to be protected to negative (-) DC output terminal.
4. **CONNECTIONS.** Make sure all connections to and in your Universal Rectifier are tight. Where Universal voltage tap changer is used, voltage tap adjusting knobs need only be hand tight.

#### **TO PLACE YOUR UNIVERSAL RECTIFIER IN OPERATION:**

When in operation, the actual DC voltage and current output of the Universal Rectifier are indicated by the voltmeter and ammeter on the instrument panel of the rectifier. Care should be taken that these meter readings do not exceed either the DC voltage or DC current ratings of the unit. If ratings are exceeded, turn AC power "OFF" immediately. During the voltage tap changing operation described below, the AC power should be turned "OFF" at the circuit breaker or safety switch.

Observe the above and proceed as follows:

1. Set all voltage tap controls on lowest setting.
2. Turn external AC power supply "ON".
3. Close circuit breaker or safety switch of rectifier ("ON" position).
4. Check DC ammeter and voltage readings on instrument panel.

#### **TO ADJUST DC VOLTAGE AND CURRENT:**

The following steps should be followed in sequence observing precautions in steps I, II and III until desired DC current and/or voltage is attained.

1. With coarse control at lowest setting, increase fine control setting in progressive steps throughout its full range and observe DC output voltmeter and ammeter.
2. Before Increasing coarse control setting, return fine control setting to lowest position.
3. Change coarse control setting to next higher position.
4. Repeat steps 1, 2, and 3.
5. Proceed in this manner until current output is obtained.

#### **MAINTAINING DESIRED CURRENT AND VOLTAGE:**

The rectifier unit will respond to electrical changes in the system external to the unit, such as pronounced fluctuation of AC line voltage or changes in ground bed resistance. Such changes can alter the operating DC voltage and/ or current output of the rectifier. Periodic inspections should be made to assure desired operation and prevent any overloading. Voltage adjustments should be made as required. A permanent record of the current and voltage readings should be maintained. Any pronounced change that is not attributable to voltage adjustment should be investigated.