

## Installation & calibration notes for Acrastyle's Liquid Neutral Earthing Resistors

### Rating

The rating of the resistor is shown on the data plate. This plate also gives the objective resistance and temperature figures, and the resistor serial number. In the case of resistors with multiple ratings, all ratings are stated together with the appropriate objective resistance figures.

### Fixing

The resistor is normally placed on a prepared concrete plinth. Fixing holes are provided in the base angle but fixing down bolts are not provided unless specifically called for at the quotation stage. We do not consider it necessary to use fixing bolts for resistors except in the case of low rated units which may have a high centre of gravity in which case the drawing will state the fixing down bolt requirements.

### Terminal bushing

The central bushing requires three concentric beads of Kelseal applying to the underside of the flange before seating onto the top of the spun lid. One bead to be positioned outside the fixing hole PCD, the other two beads to be positioned inside the PCD. This will provide a waterproof seal between the flange and the lid. The stainless steel fixing bolts are then to be fitted with the heads projecting from the top of the bushing flange. A washer is required between the head and the flange. The fixing under the lid requires a washer, spring washer and nut. When securing the bushing nuts and bolts, it is essential to ensure that the lower bushing stem is equidistant from the inner surface of the tank wall. This is to ensure that the electrode can be mounted concentrically with the tank.

### Centre electrode

The central electrode is suspended from the main terminal bushing and it is strongly recommended that the electrode is fixed only when the resistor is in its final position, due to the stress which can occur in the main bushing by the 'pendulum' effect of the electrode if the resistor is moved with the electrode mounted on the terminal stem. The electrode is secured to the heater protective mesh before dispatch from our works for transit only.

It is possible to attach the electrode to the main terminal bushing by working through the vent/inspection cover, but the preferred method is lifting the resistor top, after removal of the peripheral fixing clamps, by means of a crane and fix the electrode outside the confines of the tank. When the electrode has been mounted on the terminal stem and after tightening the cover fixing clamps, it is essential to check that the electrode is concentric with the tank wall along the whole of its length. The eccentricity between tank wall and electrode must not exceed 19mm ( $\frac{3}{4}$ "') at any point.

### Electrolyte

A quantity of sodium carbonate ( $\text{Na}_2\text{CO}_3$ ) in a powder ash form is supplied in a transparent PVC bag which is secured to the heater protection mesh in the base of the tank. The amount of powder supplied is not indicative of the amount required for a particular rating; which amount must be found by test.

It is recommended that about 50% of the powder is added to two gallons of warm distilled water and thoroughly mixed to make a concentrate solution. The concentrated solution should be progressively added to the distilled water in the resistor, ensuring that the solution is dispersed and a calibration reading taken after each addition to the water in the resistor.

The resistance should be established by the voltage drop method using an A.C. current of not less than 5 amperes. If the testing supply is taken from between a phase and earthed neutral system ensure that the neutral connection is made to the earth lug of the tank.

The objective resistance for the resistor is given at a stated ambient temperature and the resistance achieved during setting up should relate to the electrolyte temperature prevailing. The electrolyte has a negative temperature coefficient of resistance and a curve is enclosed with these instructions which show the variation of resistance, as a percentage of the objective resistance, with the change in electrolyte temperature.

### Tank vent

A combined vent and inspection manhole is provided in the tank top cover. The lid of the vent is so designed that it cannot be accidentally left in the open position, and the electrical clearance between the centre bushing and the vent cover is maintained with the cover in the open position.

### Drain valve

The drain valve may be padlocked in any position to prevent unauthorised operation.

### Immersion heaters & thermostats

The heaters and thermostats are located in a stainless steel fabricated unit which is bolted to a prepared aperture in the tank wall, all fixing bolts for the assembly are external to the electrolyte and minimise the risk of leakage which could occur when heater/thermostat pockets were screwed directly into the tank wall. The assembly is fitted with a lift-off cover which may be padlocked; the cover, heaters and thermostat may be removed without loss of electrolyte.

### Overhead line termination

The line is terminated on the main central electrode bushing which is fitted with a

(M20 x 2 thread for 11Kv), (M24 x 2 thread for 33Kv) stem complete with nuts. Terminal lugs of sockets are not provided unless specifically agreed.