



### Ⓜ MODEL 412A DC VOLTMETER-OHMMETER-AMMETER

#### RANGE SWITCH MAINTENANCE

The following precaution should be exercised when cleaning the 412A VTVM range switches. The Pyro-film resistors have a silicon coating -- be careful to not wash the silicon off these resistors when cleaning the range switch. If you should accidentally remove the silicon coating it may be reapplied by using Dupont Silicon Insulcone.

#### 412A-19W and 412A-19W-1 (White Wafers)

This switch should be cleaned with distilled water or with Freon TF and completely dried off. Any other cleaning agents may contain harmful chemicals which could attack the wafer material causing it to crack or lose its high impedance characteristics.

You may notice some cracks in the range switch. These should be cleaned; however, the cracks themselves are not detrimental to the switch operation unless the wafer has been broken.

If you should have a drying oven available, you may use a detergent and warm water solution to wash the switch. This washing should be followed by a very complete rinsing -- with distilled water as a last rinse -- to insure that all impurities are removed from the switch wafers, followed by an overnight drying at approximately 120° F. If a good rinse process is not used, there is a possibility of impedance leakage paths between contacts on the wafer which will show up as a defect in the instrument operation.

#### 412A-19A and 412A-19B (Green Wafers)

This range switch contains wafer material which is the most recent available. There are many cleaning agents which may be used.

Cleaning agents containing soap, acetone, Freon TF or PC and ethanol will not attack this switch. Any cleaning agent containing weak acids, weak alkalis,

or organic solvents such as toluene, carbon tetrochloride, or chlorinated compounds may cause the wafer material to swell, thus should not be used. We recommend use of either Freon TF or a soap and warm water wash. The wash must be followed by a complete rinsing, followed by a rinse with distilled water and overnight drying in an oven at approximately 120° F.

When using the soap and water cleaning process, it is imperative that all residue be rinsed free of the wafers to eliminate leakage paths between wafer contacts which will show up as a defect in the instrument operation.

Extreme caution should be used when handling the range switch after it has been cleaned to prevent oils from your hands contaminating the switch wafers. There is acid in this oil which can permanently etch the wafers in addition to creating a sticky surface on the wafer. White cotton gloves are recommended when handling the range switches.

#### Lubrication

The detent assembly should have a small amount of lubrication applied to it following the cleaning process.

There is no need to lubricate the rotors or contacts on the switch wafers. Any lubrication applied to the wafers will cause dirt to stick and could create a leakage path for possible malfunction.

Ⓜ stock numbers for recommended material:

- Freon TF, 16 oz. spray can . . . 8500-0232
- Lubriplate, 1/2 oz. tube . . . . . 6040-0018
- Gloves, white cotton . . . . . 8650-0002

