

## Installation Notes

# ETP ACTIVE FILM Multipliers Model 14511

Install the ETP ACTIVE FILM Multiplier™ as per instructions in the mass spectrometer manual. This ACTIVE FILM Multiplier™ model is a direct plug-in replacement for Hewlett-Packard mass spectrometer models 5970 MSD, 5992, 5992A, 5992B, 5993, 5993B and 5995.

### TO ENSURE OPTIMUM PERFORMANCE

All parts of the electron multiplier and analyzer must be handled using clean, high-vacuum procedures. All tools should be cleaned with AR grade methanol. The electron multiplier and all internal analyzer parts should be handled with clean, lint-free gloves.

#### IMPORTANT

**ACTIVE FILM Multipliers™** are shipped ready to install in your mass spectrometer. In the unlikely event that your electron multiplier becomes contaminated with vacuum pump oil, due to a vacuum failure in the mass spectrometer, cleaning may be required. In this event, follow the cleaning instructions included in this installation note. **DO NOT** use any other cleaning procedure as it could risk damage to the multiplier.

### INSTALLATION AND ELECTRICAL CONNECTIONS

Install the ETP ACTIVE FILM Multiplier™ as per instructions in the mass spectrometer manual. This ACTIVE FILM Multiplier™ model is a direct plug-in replacement for Hewlett-Packard mass spectrometer models 5970 MSD, 5992, 5992A, 5992B, 5993, 5993B and 5995.

There are three electrical connections to the AF511 ACTIVE FILM Multipliers™ which are made via the three pins in the base of the multiplier. These pins align with connectors in the vacuum flange of the mass spectrometer. The multiplier is fixed into position by two mounting screws.

The positions of the three connection pins (1. HV, 2. X-ray shield, and 3. signal output) are shown in the diagram. (The multiplier ground is connected via the mounting bracket).

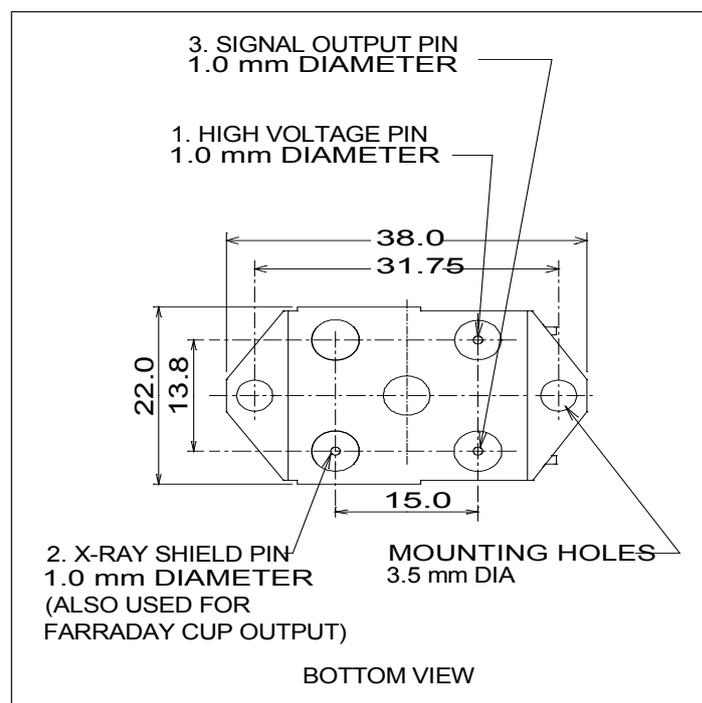
### MAINTENANCE STORAGE AND HANDLING

#### 1. Storage of ACTIVE FILM Multipliers™

The active dynode surfaces of an ACTIVE FILM Multiplier™ are composed of a totally new stable-in-air material and can be repeatedly exposed to the air with no loss in performance.

The original packaging is designed for long term storage. The multiplier is delivered in two sealed plastic bags, the outer bag containing silica gel. If the multiplier is to be stored for long periods it is best left in its original packaging until required.

In its original packaging, the shelf life of the ACTIVE FILM Multiplier™ is guaranteed for two years from ETP's shipping date. If it is necessary to store the multiplier without its original packaging, it should be kept in a dust free, dry environment. Ideally it should be stored in a glass desiccator containing Silica Gel.



#### 2. Care and Handling of ACTIVE FILM Multipliers™

Handling of the multiplier should be carried out using normal high vacuum handling methods to keep the multiplier clean and free of contamination.

Powder-free gloves should be used to prevent finger-oils from contaminating the multiplier via direct contact with skin. All tools, mountings and equipment should be cleaned before coming into contact with the multiplier.

Care should be taken to minimize the exposure of the multiplier to airborne particles of dust or lint. Dust particles within the multiplier can cause increased background noise.

Exposure of the multiplier to a high humidity environment should be avoided as it can cause noisy operation. In the event of this situation occurring, the multiplier will very likely recover after 18-24 hours under the vacuum of the mass spectrometer.

The rugged design of the ACTIVE FILM Multiplier™ makes it easy to handle. Nonetheless, an electron multiplier is a precision instrument and all reasonable care should be taken when handling.

### 3. Cleaning ACTIVE FILM Multipliers™

If the multiplier becomes contaminated with pump oil, performance can sometimes be restored by cleaning the multiplier to remove oil from the active surfaces. Do not to operate an oil contaminated multiplier until it has been cleaned using the procedures described below. **Operating a multiplier that is contaminated with oil can result in irreversible damage to the performance of the multiplier's active surfaces.**

**The recommended technique for cleaning an ACTIVE FILM Multiplier™ requires the following equipment:**

- ultra-sonic cleaner
- glass beaker (properly cleaned)
- Heptane (AR or HPLC grade)

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|  | <b>WARNING</b>   |
|  | Heptane is a volatile, flammable solvent and appropriate care should be taken. |

**Under no circumstances should the multiplier come into contact with halogenated solvents.**

Cleaning Method:

- Place multiplier in beaker and fill with Heptane until multiplier is fully immersed.
- Place beaker in ultra-sonic cleaner and clean for approximately 10 minutes.
- Dispose of used solvent in an appropriate manner and refill beaker with fresh Heptane. Place beaker in ultra-sonic cleaner and clean for approximately 10 minutes.
- Repeat step c.
- Allow to dry at room temperature. Precautions should be taken to keep the multiplier as free from dust as possible.
- Bake multiplier for 3 hours at 120°C.

### 4. Obtaining the Best Lifetime From ACTIVE FILM Multipliers™

The gain of a correctly installed multiplier will fall very gradually with time, requiring the applied high voltage to be increased periodically to restore multiplier performance. This is the normal aging process of the multiplier. The operating life obtain for the multiplier will vary between applications and is affected by a number of factors including;

- the operating environment - lower operating pressure and lower partial pressure of hydrocarbons in the vacuum chamber will increase multiplier life.
- operating gain of the multiplier - operation with lower applied voltages (lower gain) will improve multiplier life.
- output current - lower average output currents will improve multiplier life.

Rapid loss of multiplier performance can occur during a failure in the vacuum pumping system resulting in either severe contamination of the multiplier by pump oils or arcing by the multiplier high voltage due to loss of high vacuum. Refer to section 3 for details of cleaning Active Film Multipliers™ after contamination by pump oils.

### PRODUCT WARRANTY

SGE products are warranted to meet the stated quality and performance and to be free of defects in materials or workmanship for a period of forty five (45) days from the date of shipment. ETP **ACTIVE FILM** Electron Multiplier™ shelf life is guaranteed for two years from the invoice date. During that period the electron multiplier is guaranteed against any faulty materials or workmanship leading to operational failure at the time of installation. Operational failure is defined as performance falling below specification. The warranty implies free replacement of the defective product only, upon proper written proof of defect and upon return of the defective product. It does not apply to mishandling of product by the customer, either in use or in storage, nor to claims made after the warranty period has elapsed.

No other warranty or representation is expressed or implied by SGE for its products with respect to merchantability, fitness for any particular purpose, or any other matter. SGE shall not, under any circumstances, be liable for any accidental, consequential, or compensatory damages arising from use of or in conjunction with its products. The maximum liability for breach of warranty shall be the invoiced price of the said product(s).

**In consideration of the health and well being of our employees, we respectfully insist that SGE products contaminated by hazardous materials NOT BE RETURNED.**



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