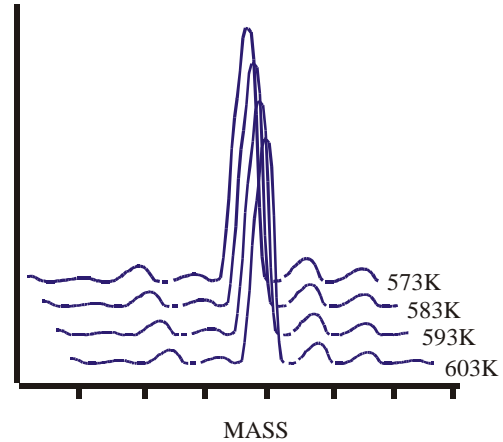
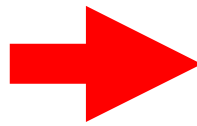
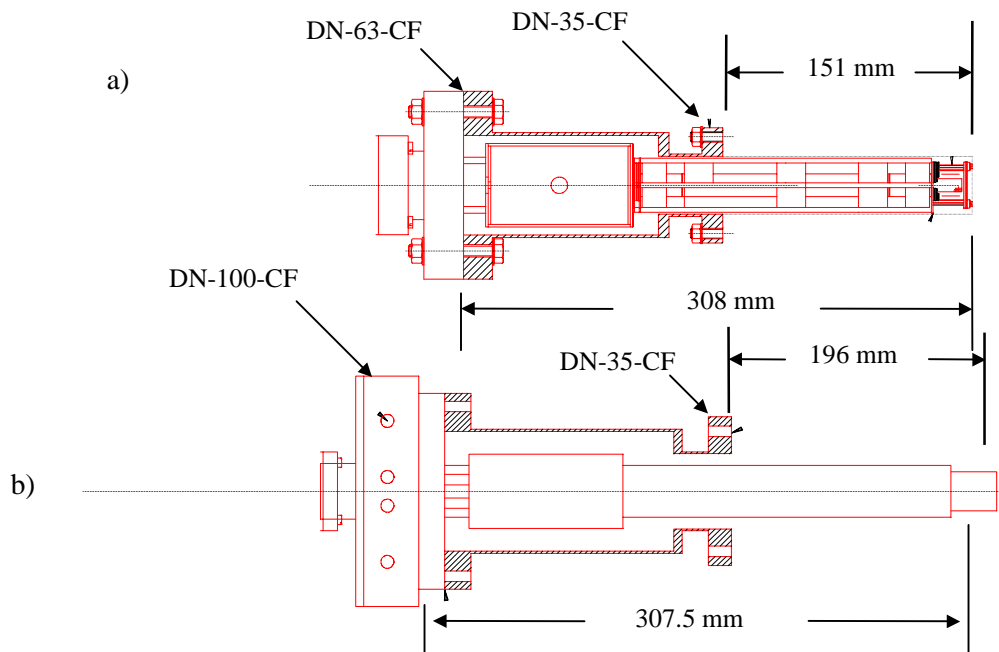
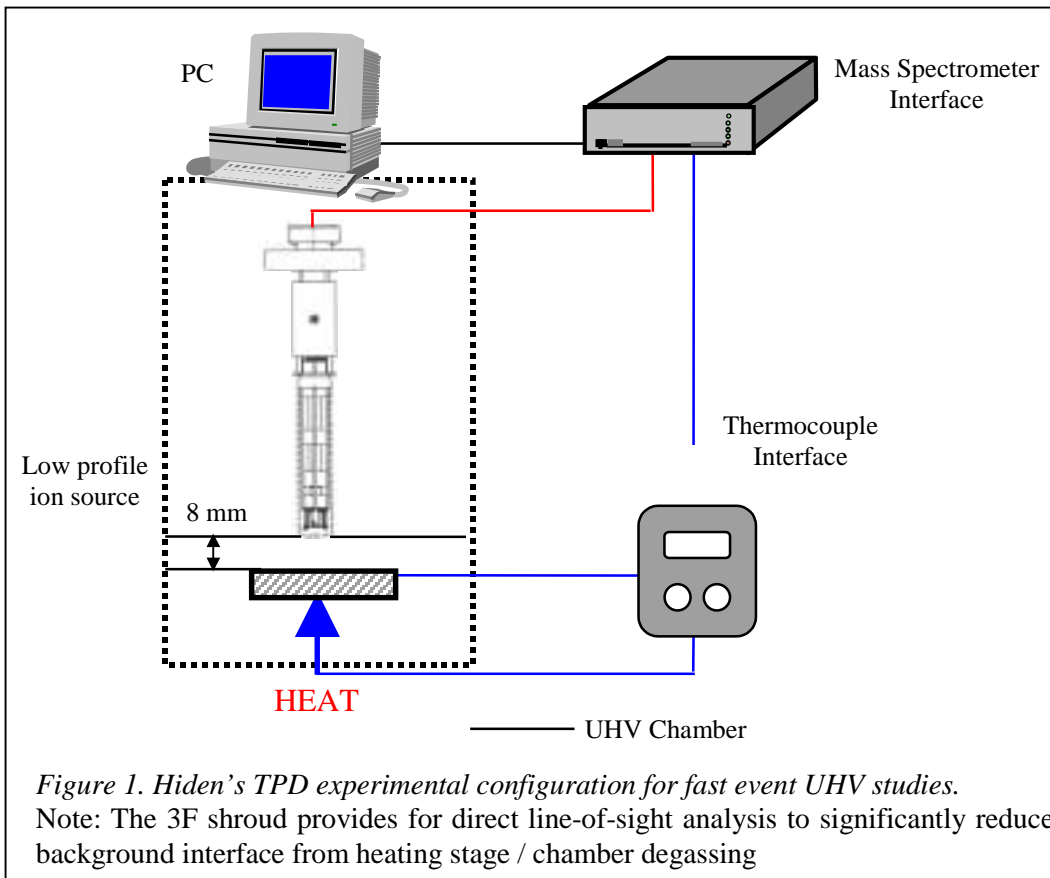


### *Application of HAL/3F RC PIC series mass spectrometers with MASsoft software for Temperature Programmed Desorption studies in UHV*



#### **General Features**

- Hiden/3F RC PIC systems are high sensitivity, UHV specific quadrupole mass spectrometers developed for fast event gas studies including flash and temperature programmed desorption.
- The quadrupole analyser is a precision assembly comprising a triple mass filter allowing for enhanced long term stability, high transmission and enhanced high mass sensitivity. It is available with a low profile electron impact ioniser with twin oxide coated iridium filament and a pulse ion counting Channeltron electron multiplier detector. Mass range options are 300, 510 and 1000 amu.
- The temperature interface with signal conditioning module can typically ramp the temperature between 170 to 1200 K, using a K type thermocouple as standard and allows acquisition of mass spectral data synchronised with temperature data.
- The HAL/3F RC PIC is fully PC controlled via RS232 or Ethernet link, providing for simultaneous data acquisition from multiple systems. With power on and filament status indicators the RC interface unit is mains powered and provides full user control of acquisition parameters.
- Windows™-MASsoft PC software provides for fast data acquisition through either user configured acquisition files or pre-set modes selected by icon.



**Figure 2.** Drawings of the (a) HAL/3F RC PIC 301/501 and (b) HAL/3F RC PIC 1000. The drawings illustrate the mounting flange options for both system types.

**Specification:**

|   |   |  |
|---|---|--|
| Mass Range  | : | 300 amu, 510 amu and 1000 amu.   |
| Maximum Operating Pressure                          | : | $5 \times 10^{-6}$ Torr.   |
| Resolution  | : | 5% Valley between adjacent peaks of equal height throughout the mass range. Software adjustable.   |
| Detector  | : | Ion Counting/Channeltron Electron Multiplier digital detector.   |
| Minimum Detectable Partial Pressure                 | : | $5 \times 10^{-15}$ Torr.  |
| Detector Dynamic Range                              | : | 7 decade continuous linear or log scale.   |
| Maximum Scan Rate Mass Scanning                     | : | >200 amu/sec   |
| Trend Analysis                                      | : | >80 mass channels/sec  |
| Ion Source  | : | Low profile electron bombardment type, radially symmetric.   |
| Filament  | : | Twin filament. Oxide coated iridium is standard.   |
| Electron emission                                   | : | Software variable 20 $\mu$ A to 2mA. 1 mA is standard  |
| Electron energy                                     | : | Software variable 0V to 150 eV. 70 eV is standard  |
| Ion energy  | : | Software variable 0V to 10 eV. 3eV is standard   |
| Analog inputs                                       | : | Two inputs each $\pm 10$ V or $\pm 1$ V FSD. Option available to extend to 9 inputs. Enables acquisition of mass spectral data with temperature.   |
| Ion pulse output                                    | : | TTL level, 25 ns wide pulses. Gated by dwell time or ungated (continuous). Direct output of counts for use with a high speed multichannel analyser   |
| Trip relays   | : | 2 X changeover relay contacts for protection of external equipment and process signalling.   |
| Analyser mounting flange                            | : | 300,510 amu - DN-63-CF (4½"/114mm OD Conflat-type)<br>or DN-35-CF (2¾"/70 mm OD Conflat-type)<br>1000 amu DN-100-CF (6"/152 mm OD Conflat-type)<br>or DN-63-CF (4½"/114mm OD Conflat-type) |
| Analyser insertion length from mounting flange face | : | HAL/3F RC PIC 301 - (DN-63-CF) : 308mm<br>HAL/3F RC PIC 510 - (DN-63-CF) : 308mm<br>301 or 510 - (DN-35-CF) : 151mm<br>HAL/3F RC PIC 1000 - (DN-100-CF) : 408.5mm<br>- (DN-63-CF) : 189mm  |
| RF head dimensions for HAL/3F RC PIC 301/510        | : | Height - 101mm, Width - 355mm, Depth - 216mm<br>Depth is distance from vacuum face of analyser mounting flange.  |
| RC2 interface unit dimensions                       | : | Height: 90mm/2U<br>Width: 19" rack mounting<br>Depth: 450mm  |
| Cable lengths                                       | : | 3M standard.   |
| RC2 interface to RF head                            | : | Longer lengths to 30m available  |
| RC2 interface to PC                                 | : | Up to 15 metres with RS232 link.<br>Up to 750 metres with unbridged Ethernet link.<br>3m Ethernet cable with T piece supplied as standard.   |
| Power requirement                                   | : | 110-120 VAC, 220-240 VAC, 0.25 KVA.  |

**Features include:**

- Low profile ion source. The source may be positioned to within 8mm of the desorbing surface.
- Fast data acquisition. Scan rates to 5 msec per amu.
- Mixed mode scanning, Trend Analysis, Histogram & Analog peaks with multi-window display.
- TTL signal direct output for external use with multichannel scalar cards.
- Gating input/output for pulsed gas studies with 1 µsec gating resolution.
- Wide dynamic range. 7 decade continuous log scale.
- Automatic mass scale alignment.
- Integral mass spectral library with full editing facilities.
- Data export facility to ASCII format and to all Windows™ devices for printing/plotting
- Windows™-MASsoft software configured for RS232, RS422 or Ethernet BNC, LAN network.
- Cursor for peak height identification under mouse control.
- Optional quartz UHV shroud / liquid N<sub>2</sub> cooled stainless steel UHV shroud provides line of sight sampling of UHV species, reducing the background signal from surrounding parts of the sample stage during the temperature ramp.
- Optional mounting flanges available are - DN-63-CF or DN-35-CF for the 300 or 500 amu instruments and DN-100-CF or DN-63-CF for the 1000 amu instrument.

**Hidden components and Part numbers**

| Component   | Part Number          |
|---|----------------------|
| HAL/3F RC 301 PIC   | 553021               |
| HAL/3F RC 510 PIC   | 555021               |
| HAL/3F RC 1000 PIC  | 551021               |
| Thermocouple temp. interface with signal conditioning mod. (type K-standard)  | 800401               |
| Thermocouple temp. interface with signal conditioning mod. / programmable output, 0-10V (PID) used for eg. sample heating | 800406               |
| UHV compatible shroud   | 440103(300,510 amu)  |
| UHV compatible shroud   | 440104 (1000 amu)    |
| Liq. N <sub>2</sub> cooled UHV compatible shroud  | 440101 (300,510 amu) |
| Liq. N <sub>2</sub> cooled UHV compatible shroud  | 440102 (1000 amu)    |

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