The

EAC 2000–125 Control Unit


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Please note: Some components described in this manual may be optional. The delivery volume depends on the ordered configuration.

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Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies.

Please note: This documentation is available in English only.

Attention: Please read the safety information on pages 7 and 8 before using the instrument.

Related Manuals

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<thead>
<tr>
<th>Related Manuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA 125 Manual</td>
</tr>
<tr>
<td>DAT 125 Software manual</td>
</tr>
<tr>
<td>CPC Electronics for EA 125</td>
</tr>
</tbody>
</table>

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Conditions of CE Compliance

OMICRON instruments are designed for use in an indoor laboratory environment. For further specification of environmental requirements and proper use please refer to your quotation and the product related documentation (i.e. all manuals, see individual packing list).

The OMICRON EAC 2000-125 Control Unit complies with CE directives as stated in your individual delivery documentation if used unaltered and according to the guidelines in the relevant manuals.

Limits of CE Compliance

This compliance stays valid if repair work is performed according to the guidelines in the relevant manual and using original OMICRON spare parts and replacements.

This compliance also stays valid if original OMICRON upgrades or extensions are installed to original OMICRON systems following the attached installation guidelines.

Exceptions

OMICRON cannot guarantee compliance with CE directives for components in case of

- changes to the instrument which are not authorised by OMICRON, e.g. modifications, add-on's, or the addition of circuit boards or interfaces to computers supplied by OMICRON.

The customer is responsible for CE compliance of entire experimental setups according to the relevant CE directives in case of

- installation of OMICRON components to an on-site system or device (e.g. vacuum vessel),
- installation of OMICRON supplied circuit boards to an on-site computer,
- alterations and additions to the experimental setup not explicitly approved by OMICRON

even if performed by an OMICRON service representative.

Spare Parts

OMICRON spare parts, accessories and replacements are not individually CE labelled since they can only be used in conjunction with other pieces of equipment.
1. Introduction

The EAC 2000-125 control unit operates over the kinetic energy range $<$0.5 eV to 2000 eV. It is particularly suited for high voltage applications that require high long term electronic stability with low ripple and low noise characteristics.

The control unit essentially consists of an IEEE 488 computer interface card and highly stable programmable power supplies for the lens, hemispheres and fringe field voltages. The associated channel electron multiplier supplies are external to the unit.

The elements of the lens on the EA 125 are driven by a separate precision high voltage reference supplies. The non-linear lens voltages are derived from a 65535 point digital function stored in EPROMs. The lens voltage supplies operate in FAT (fixed analyser transmission, i.e. constant pass energy) and FRR (fixed retard ratio) modes for any pass energy from 0.5 eV to 100 eV or retard ratios $\times$0.1 to $\times$50.

The EAC 2000-125 contains four 16-bit DAC's and two 8-bit control latches. These control the pass energy (PE) or retard ratio (RR), scan width, kinetic energy (KE), FRR/FAT switch, multiplier ON/OFF and divide-by-ten mode for PE and KE plus magnification modes for the lens. All of these are programmed and controlled by an IEEE microcontroller which transmits received data across an opto-isolated boundary.

Key Features

- Low noise  $<$ 20 meV at 1000 eV
  $<$ 10 meV at 10 eV.
- High stability  $<$ 50 ppm of set voltage per °C and per hour.
- Multi point digitally generated zoom lens curve for the lens elements.
- GPIB interface with optical isolation.

Normal Use

The EAC 2000-125 is an electronics control unit designed for use with the EA 125 hemispherical analyser. A version of this control unit is available for use with the AR 65 analyser. The control unit has been designed to cater for electron spectroscopy applications such as XPS, AES, UPS and for Synchrotron radiation studies.

The EAC 2000-125 is only to be used

- in combination with the OMICRON EA 125 hemispherical analyser (EAC 2000-125)
- in combination with a DAT 125 interface board, an IEEE 488 interface card and the DAT 125 software package (see also page 12)
with original cable sets which are explicitly specified for this purpose

- with all cabling connected AND SECURED; IF APPLICABLE
- with all electronics equipment switched on
- in an indoor research laboratory environment
- by personnel qualified for operating delicate scientific equipment
- in accordance with all related manuals.

---

**Warning: Lethal Voltages!!**

Adjustments and fault finding measurements as well as installation procedures and repair work may only be carried out by authorised personnel qualified to handle lethal voltages.

---

**Attention:** Please read the safety information in all relevant manuals before using the instrument.
2. Safety Information

⚠️ The EAC 2000-125 may only be handled by authorised personnel.

⚠️ Important:
- Please read this manual before using the EAC 2000-125!!
- Check for correct power supply voltage before connecting any equipment.
- Do not obstruct the EAC 2000-125 ventilation holes and ensure there is sufficient air circulation so as to avoid overheating.
- The safety notes and regulations given in this documentation have to be observed at all times.

⚠️ Warning: Lethal Voltages!!
Adjustments and fault finding measurements may only be carried out by authorised personnel qualified to handle lethal voltages.
- Lethal voltages are present inside the EAC 2000-125 and the filtered plug.
- Lethal voltages are present at the SHV outputs of the EAC 2000-125.
- Lethal voltages are present at the 9-pin plug of the filtered plug.

⚠️ Always
- All connectors which were originally supplied with fixing screws must always be used with their fixing screws attached and tightly secured.
- Always disconnect the mains supplies of all electrically connected units before
  - opening the vacuum chamber or a control unit case,
  - before touching any cable cores or open connectors,
- Leave for a few minutes after switching off for any stored energy to discharge.
This product is only to be used:

- indoors, in laboratories meeting the following requirements:
  - altitude up to 2000 m,
  - temperatures between 5°C / 41°F and 40°C / 104°F (specifications guaranteed between 20°C / 68°F and 25°C / 77°F)
  - relative humidity less than 80% for temperatures up to 31°C / 88°F (decreasing linearly to 50% relative humidity at 40°C / 104°F)
  - pollution degree 1 or better (according to IEC 664),
  - overvoltage category II or better (according to IEC 664)
  - mains supply voltage fluctuations not to exceed ±5% of the nominal voltage
3. Front Panel Layout

The EAC 2000-125 front panel provides a continuous two line, large character, back lit LCD display. It indicates the currently selected output values of the kinetic energy (KE) and the fixed pass energy (PE) or retard ratio (RR). The LCD display has its own built-in microcontroller.

The displayed KE and PE/RR values are for the purpose of identifying whether or not the EAC unit is setting these voltages properly. The values are converted directly from the analogue reference voltages using a 12-bit ADC. The displayed KE and PE/RR values will be accurate to only the nearest 1 volt in \( \times 1 \) mode and to the nearest 0.1 volt in \( \div 10 \) mode.

In fixed pass energy scans the pass energy is continuously selectable in the range

- 5 eV to 100 eV in \( \times 1 \) mode
- 0.5 eV to 10 eV in \( \div 10 \) mode

In fixed retard ratio scans the retard ratio is continuously selectable in the range

- 1 to 50 in \( \times 1 \) mode
- 0.1 to 5 in \( \div 10 \) mode

Two LED indicator lights give a visual status for POWER ON / MULTIPLIER ON.
4. **Back Panel Layout**

![Diagram showing back panel layout](image)

**Figure 2.** Layout of the EAC 2000-125 back panel, schematic diagram.

<table>
<thead>
<tr>
<th>Voltage Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+5 V</td>
<td>Green indicator LEDs for DC power supply. Under normal operating conditions all LEDs should be lit.</td>
</tr>
<tr>
<td>+15 V</td>
<td>This unit is supplied with a 3-pin standard European mains socket for AC input of 100/110/120/200/220 or 240 volts ±5% and 50 or 60 Hz, set to customer specification. It provides high frequency input filtering and converts the AC supplies to regulated DC supplies with overload protection. The wire insulations of the standard 3-lead mains cable are coloured in accordance with the following code:</td>
</tr>
<tr>
<td>-15 V</td>
<td>Brown: Live</td>
</tr>
<tr>
<td>+70 V</td>
<td>Green/Yellow: Earth</td>
</tr>
<tr>
<td>-70 V</td>
<td>Blue: Neutral</td>
</tr>
</tbody>
</table>

Mains fuse(s): 5 mm ∅, 20 mm long

use

2 A (T) for 200-240 V ac
4 A (T) for 100-120 V ac

To change the fuse:

- disconnect mains
- lift the flap using a screw driver for leverage
- replace the fuse as indicated above
- re-fit the fuse holder.

<table>
<thead>
<tr>
<th>LED Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN TOL</td>
<td>LED indicator. If the LED is lit, then the respective module is functioning normally. Otherwise see chapter 7: &quot;Trouble Shooting&quot;.</td>
</tr>
</tbody>
</table>
## Back Panel Layout

<table>
<thead>
<tr>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OUTPUT</strong></td>
<td>SHV connector for voltage output of the respective module.</td>
</tr>
<tr>
<td><strong>SYS QND</strong></td>
<td>BNC connector for system ground to ensure equal ground potential for all modules.</td>
</tr>
<tr>
<td><strong>MP</strong></td>
<td>Trim potentiometers, pre-set for standard working distance. Adjust if working distance is not standard, see EA 125 manual.</td>
</tr>
<tr>
<td><strong>CEM ON/OFF</strong></td>
<td>3-pin mini DIN socket. Channeltron® (CEM) power supply unit is switched ON/OFF remotely by the computer with &quot;slow start up&quot;. Delay between multiplier start-up and starting a scan should be 2 seconds.</td>
</tr>
<tr>
<td><strong>24-pin connector</strong></td>
<td>24-pin connector for IEEE 488 cable. The default address is 1. Optionally an even number between 2 and 28 could be selected.</td>
</tr>
</tbody>
</table>
5. Computer Requirements

The lens and analyser voltages and multiplier on/off are controlled via an IEEE interface from a PC based computer to the EAC 2000-125 unit. A special version of the SPECTRA software, known as DAT 125, is used as the communication link between the user and the computer. This software also communicates with a counter board and processes the signal. Both the IEEE board and the DAT 125 counter board reside in the computer.

The DAT 125 interface board fits into a spare expansion slot of the host computer. It contains 5 counter channels.

Computer requirements:

- 386, 486, 586 or Pentium based PC (math co-processor recommended)
- two spare ISA compatible slots (at least fully 8 bit required)
- Microsoft compatible mouse (preferably 3 button bus mouse e.g. Genius GM-F302),
- VGA graphics adapter and monitor,
- DOS 6.22 or higher,
- 2 MByte RAM and
- 5 MByte of free hard disk space.

Hard copy output is supported to

- HPGL plotter
- HP paint jet
- HP LaserJet printer or compatibles.

The "Image"-Option (necessary for scanning Auger spectroscopy) requires a third expansion slot in the computer.
6. Getting Started

The complete system comprises the following units:

1. EA 125
2. EAC 2000-125 (optional EAC 300-125)
3. Channeltron® multiplier power supplies
4. Pulse preamplifier
5. Receiver
6. PC with DAT 125

The Channeltron® multiplier power supply unit generates up to 3.6 kV and is switched ON/OFF remotely from the EAC 2000-125 with "slow start up". This link is optically decoupled.

A pulse preamplifier detects electron pulses and filters out the system ground noise using a high speed comparator circuit with adjustable threshold for background noise rejection. The electrical signal is converted to an optical signal within the preamplifier unit and then transmitted to the receiver via a 5 m long optical fibre link.

Both pulse (TTL) and analogue signal outputs are provided. The digital (TTL) output pulses are input into the pulse counter board; the analogue voltage output is proportional to count rate and is provided for a user-supplied DVM or X-Y recorder.

For connecting your EAC 2000-125 to the EA 125 analyser please refer to figure 3.

⚠️ **Attention: Installation procedures** may only be carried out by authorised personnel qualified to handle lethal voltages.

Switch off all units and wait for a few minutes (for discharge of the power supplies) before connecting or disconnecting any cables.

Make sure all high voltage plugs are secured before switching any one of the electronics units on.

All connectors which were originally supplied with fixing screws must always be used with their fixing screws attached and tightly secured.
Figure 3. EAC 2000-125 wiring diagram for use with EA 125 U5.
7. Trouble Shooting

Mains Switch Power Failure

The mains power supply fuse is located inside the power cable connector plug. Check the correct operating voltage is available and that the appropriate fuse is fitted, see page 10.

DC Power Supplies

Green indicators (+5 V, +15 V, -15 V, +70 V, -70 V), when illuminated, show that these outputs are normal.

When an indicator is not lit this shows a circuit current overload condition which may be due to an external electronics fault. The DC supply circuits are designed to withstand current overloading; they will recover when the fault condition is removed.

Find the faulty module by unplugging the units one by one. To do so

- Switch off the mains switch.
- Unplug a module.
- Switch mains back on.

Programmed Power Outputs

Red indicators marked "IN TOL" show that the output voltage is correct within a tolerance of 1%.

When an indicator is not lit this shows a circuit current overload condition due to one of the following

- an external electronics fault
- the module being asked to deliver voltages outside its designed mode of operation, e.g. if retard ratio and kinetic energy combine to give an out-of-range pass energy.

The DC supply circuits are designed to withstand current overloading; they will recover when the fault condition is removed.

If an IN TOL light on the module is not lit, begin by unplugging the SHV cables to the module. If the light remains off, then unplug all SHV cables to the EAC 2000-125 unit. If, after unplugging all cables to the EAC 2000-125, the light is still off, then the fault is probably somewhere in the EAC unit or an illegal output has been requested by the computer.

If a fault is suspected in a module then check the output voltage, see table 2.

Inspect the suspect module for obvious faults, e.g. broken tracks, failed soldering joints, or disconnected wires.
The repair and setting up of these units is most quickly achieved by returning the sub-unit to the factory. For the procedure see page 23.

**Typical Problems**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero pulse count</td>
<td>Check multiplier on/off cable. Check multiplier voltage (see preamplifier manual for further information).</td>
</tr>
<tr>
<td>Computer failure</td>
<td>Check IEEE 488 cable connection.</td>
</tr>
<tr>
<td>Peaks shifted</td>
<td>Check sample ground/earth. Check inner and outer voltage (P.E. INNER and P.E. OUTER). Check analyser output cable.</td>
</tr>
<tr>
<td>Low sensitivity</td>
<td>Check sample positioning. Check lens voltages. Check multiplier voltage. Check excitation source.</td>
</tr>
<tr>
<td>Poor resolution</td>
<td>Check sample ground/earth to system. Check analyser cable ground/earth to system. Check fringe field and inner and outer hemisphere voltage.</td>
</tr>
</tbody>
</table>

**Spectrometer Voltage Checks**

**Warning: Lethal Voltages!!**

Adjustments and fault finding measurements as well as installation procedures and repair work may only be carried out by authorised personnel qualified to handle lethal voltages.

Please note: The unit should always be allowed to warm up for at least 20 minutes before checking.

For voltage checks use digital voltmeter (10 MΩ input) with a 1:100 high voltage input probe (1000 MΩ input).

Please note: Many high voltage probes/DVMs need to be calibrated/matched to produce accurate readings.

- Ensure the spectrometer voltages are all set to zero.
- Disconnect the spectrometer voltage cable at the feedthrough.

Please note: Do not disconnect any other cable!

- Set the multiplier bias voltage to 6.80 on the potentiometer which is located on the MULTIPLIER SUPPLIES unit.
- Using the DAT 125 software set the following parameters, see table 2:
  - Work function = 0
scan mode = constant pass energy (+1 eV, +5 eV or +10 eV)
magnification mode = high, medium or low
kinetic energy = 5 eV, 10 eV or 40 eV.

- Measure the voltages at the respective pins of the cable plug, see figure 7. The values should be approximately the same as those shown in the table below.

<table>
<thead>
<tr>
<th></th>
<th>High Magnification</th>
<th>Medium Magnification</th>
<th>Low Magnification</th>
<th>Tolerance</th>
<th>Filter Board Test Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kin. energy</td>
<td>5</td>
<td>10</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pass energy</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Univ. 1</td>
<td>+12.5</td>
<td>0</td>
<td>0</td>
<td>±10%</td>
<td>OP1</td>
</tr>
<tr>
<td>Univ. 2</td>
<td>-2.75</td>
<td>-8.88</td>
<td>0</td>
<td>±10%</td>
<td>OP2</td>
</tr>
<tr>
<td>Univ. 3</td>
<td>0</td>
<td>0</td>
<td>-36.0</td>
<td>±10%</td>
<td>OP3</td>
</tr>
<tr>
<td>Zoom</td>
<td>-3.45</td>
<td>-2.53</td>
<td>-24.5</td>
<td>±5%</td>
<td>OP4</td>
</tr>
<tr>
<td>Focus 2</td>
<td>5</td>
<td>40</td>
<td>60</td>
<td>±5%</td>
<td>OP5</td>
</tr>
<tr>
<td>Focus 1</td>
<td>2.5</td>
<td>27.5</td>
<td>35.0</td>
<td>±5%</td>
<td>OP6</td>
</tr>
<tr>
<td>Outer hemisphere</td>
<td>-4.30</td>
<td>-6.51</td>
<td>-33.0</td>
<td>±1%</td>
<td>OP7</td>
</tr>
<tr>
<td>Inner Hemisphere</td>
<td>-3.57</td>
<td>-2.85</td>
<td>-25.7</td>
<td>±1%</td>
<td>OP8</td>
</tr>
<tr>
<td>Fringe field</td>
<td>-4.00</td>
<td>-5.00</td>
<td>-30.0</td>
<td>±1%</td>
<td>OP9, OP10</td>
</tr>
</tbody>
</table>

Table 2. Voltage checks. Values are with respect to ground. The actual measured voltages may vary by the indicated tolerance values due to individual fine tuning.

If the measured voltages are all in accordance with the values given in table 2, then proceed to the next step, which involves checking the voltages with the cable connected.

- Ensure the spectrometer voltages are all set to zero.
- Re-connect the spectrometer cable at the feedthrough.
- Make sure all other cables are also properly connected to the spectrometer.
- Remove the four screws on the outer corners of the filtered plug which is located on the spectrometer voltage cable at the feedthrough.
Please note: The four inner screws hold the circuit board to the lid of the filtered plug. Do not remove these screws.

- Loosen the two gland nuts that secure the cable at the filtered plug.
- Carefully pull back the cover and turn it over (making sure all cables are loose in the box) to access the filtered plug circuit board.
- Secure the lid / filter board assembly using two of the cover screws as shown in figure 4.

Caution: Circuits in the filtered plug operate at high voltages. Grounding or shorting of these wires may result in damage to one or more component(s).

- Using the DAT 125 software set the parameters as given in table 2.
- Measure the 9 spectrometer voltages at the respective "OP" points on the filtered plug circuit board, see figure 4. Note that the numbers on the board are the same as the pin numbers. The values should be the same as those shown in the table 2.

Attention: The pin-out numbering relating the 9-way feedthrough to the analyser is not the same as the test point numbering relating the filtered plug to the analyser potentials. When checking voltages always use figure 4 in relation to table 2.
Figure 4. Filtered plug circuit board layout, schematically.

Attention: After completing the measurements set all voltages back to zero and replace the filtered plug cover. Do not leave this cover loose any longer than necessary as there are exposed high voltages.
8. Connections and Pin Assignments

Internal Connections

Figure 5. Internal connections. FB = Front Bias, M = Multiplier Output. The numbers refer to the pin numbers in figures 6 and 7.
Plug and Feedthrough Pin Assignments

9 WAY FEEDTHROUGH FOR EA125 ANALYSER

[Diagram of 9-way feedthrough pin layout]

VIEW FROM OUTSIDE THE VACUUM

Figure 6. 9-way feedthrough pin layout.

9-WAY VOLTAGE CABLE PLUG FOR EA 125 ANALYSER

[Diagram of 9-way voltage cable plug pin assignments]

Figure 7. 9-way voltage cable plug pin assignments.

Attention: The pin-out numbering relating the 9-way feedthrough to the analyser is not the same as the test point numbering relating the filtered plug to the analyser potentials. When checking voltages always use figure 4 in relation to table 2.
## 9. Specifications

### Specifications EAC 2000-125

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control unit case</td>
<td>500 mm deep × 440 mm wide × 113 mm high for 19 inch Eurorack, 3U high. Weight 17.3 kg</td>
</tr>
<tr>
<td>Control unit</td>
<td>fan cooled and ventilated</td>
</tr>
<tr>
<td>Controls</td>
<td>all continuously variable</td>
</tr>
<tr>
<td>Control unit front panel</td>
<td>483 mm wide, 133 mm high</td>
</tr>
<tr>
<td>Power supply</td>
<td>100/110/120/200/220/240 V AC ±5% single phase, 50/60 Hz set to customers requirements, max. power consumption 250 watts.</td>
</tr>
<tr>
<td>Kinetic energy range</td>
<td>5 eV to 2000 eV or 0.5 eV to 200 eV in divide-by-ten mode</td>
</tr>
<tr>
<td>Scan control start energy</td>
<td>0.5 eV to 2000 eV</td>
</tr>
<tr>
<td>Energy span</td>
<td>0.5 eV to 2000 eV</td>
</tr>
<tr>
<td>Maximum scan rate in FRR mode</td>
<td>5 eV / s</td>
</tr>
<tr>
<td>Maximum scan rate in FAT mode</td>
<td>20 eV / s, 50 eV / s</td>
</tr>
<tr>
<td>high magnification</td>
<td>50 eV / s</td>
</tr>
<tr>
<td>medium and low magnification</td>
<td>5 eV / s</td>
</tr>
<tr>
<td>Pass energy range in FAT mode</td>
<td>5 eV to 100 eV or 0.5 eV to 10 eV in divide-by-ten mode</td>
</tr>
<tr>
<td>Retard ratio range in FRR mode</td>
<td>1 to 50 or 0.1 to 5 in divide-by-ten mode</td>
</tr>
<tr>
<td>Noise</td>
<td>typical 5 mV at pass energy outputs (inner and outer sphere, fringe field) measured with respect to ground in 1:10 mode, range 0.1 Hz to 100 kHz &lt; 10 mV in ×1 mode</td>
</tr>
<tr>
<td>Stability of output voltages</td>
<td>&lt; 500 ppm/week, &lt; 50 ppm/°C</td>
</tr>
</tbody>
</table>

### Specifications Filtered Plug

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtered plug</td>
<td>Weight: 2.3 kg incl. cables.</td>
</tr>
<tr>
<td>Cable</td>
<td>Cable length: 5 m. The cable splits into two parts with 9 × SHV + 1 × BNC on one part and one single SHV on the other part.</td>
</tr>
</tbody>
</table>
Service Procedure

Should your equipment require service

- Please contact OMICRON headquarters or your local OMICRON representative to discuss the problem. Preferably use the provided FAX form below to make sure all necessary information is supplied and because the required service engineer may not be available immediately.

  The service department may also be contacted via e-mail.
  CompuServe: "ccmail:service at omihqger"
  Internet: "service@omihqger.ccmail.compuserve.com"

- Always note the serial number of your instrument or have it at hand when calling.

If you have to send any equipment back to OMICRON

- Please contact OMICRON headquarters before shipping any equipment.

- Place the instrument in a polythene bag.

- Use the original packaging and transport locks.

- Take out a transport insurance policy.

For UHV equipment only:

- Make sure the plastic transport cylinder is clean and no dust or packaging materials can contaminate the instrument.

- Wear suitable cotton or polythene gloves.

- Re-insert all transport locks (if applicable).

- Cover the instrument with aluminium foil and/or place it in a polythene bag.

- Fix the instrument into its plastic cylinder (if applicable).

- Include a filled-in and signed copy of the "Declaration of Decontamination" at the back of the related manual.

No repair of UHV equipment will be carried out without a legally binding signed decontamination declaration!
**FAX**

<table>
<thead>
<tr>
<th>To</th>
<th>From</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMICRON Vakuumphysik GmbH</td>
<td></td>
</tr>
<tr>
<td>Test and Service Department</td>
<td></td>
</tr>
<tr>
<td>Idsteiner Straße 78</td>
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<td>FAX: .......................................</td>
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<th>Type of Instrument</th>
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<tr>
<td>Purchasing Date</td>
<td>..........................................................</td>
</tr>
<tr>
<td>(Last Service Date)</td>
<td>..........................................................</td>
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</tbody>
</table>

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