Nu Instruments
Service & Upgrades
ICP-MS, GD-MS, IRMS, Noble Gas

www.nu-ins.com
Nu Instruments provides a range of post-warranty service solutions to suit various customer requirements. Several annual maintenance service contracts are available as well as attractive on-demand solutions. These services allow our customers to focus on their core activity and leave their maintenance needs and worries to us.

<table>
<thead>
<tr>
<th>Service</th>
<th>Essential</th>
<th>Expanded</th>
<th>Expanded for Academia</th>
<th>Comprehensive</th>
<th>Comprehensive+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual preventative maintenance visit</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Basic consumables for PM visit</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Prioritised access to technical support</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>On-site support</td>
<td>Not included (discounted rate available)</td>
<td>For single reported breakdown</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Spare parts requirements</td>
<td>(Discounted rate available)</td>
<td>For single reported breakdown</td>
<td>For single reported breakdown</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>1st priority for on-site support</td>
<td>Prioritised ahead of non-contract customers</td>
<td>Prioritised ahead of non-contract customers</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>1st priority for technical support</td>
<td>Prioritised ahead of non-contract customers</td>
<td>Prioritised ahead of non-contract customers</td>
<td></td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Annual consumables kit</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Dedicated response times</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3rd party OEM items</td>
<td></td>
<td></td>
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<tr>
<td>Application training credits</td>
<td></td>
<td></td>
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<tr>
<td>Further discounts on consumables</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Preferential pricing on performance enhancing upgrades</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

Different levels of benefits included in Nu Instruments Maintenance Service Solutions:

- Pre-planned, budgeted service expenditures
- Full service coverage solutions include an unlimited number of unscheduled visits to handle unexpected breakdown events
- Optimised instrument performance and maximized operational time
- Discounted pricing on Nu Instruments stand-alone aftermarket services

For more information go online: www.nu-ins.com
Enhanced Sensitivity Interface Upgrade

- Maximized intermediate vacuum
- Enhanced transfer optics
- Minimal effect on oxide levels
- Significantly improved sensitivity
- Uncompromised analytical performance

Software Switchable Pre-amplifiers Upgrade

- Selected preamplifiers each can be fitted with two resistors of various sizes (10^{10}\Omega, 10^{11}\Omega, 10^{12}\Omega), in order to enlarge the dynamic range of the chosen Faraday detectors.
- The 10^{12}\Omega resistor is suitable for detecting smaller beams with a higher signal to noise ratio. The 10^{10}\Omega resistor is suitable for larger beams.
- Fast switching between different resistor values using the software without breaking the pre-amplifier housing vacuum

Daly Upgrade

- Larger dynamic range
- Better gain stability
- Larger linear range
- Wider peak flat
- Longer life time

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Low Sulphur Upgrade

- Low sulphur gas panel and tubings are offered to significantly reduce the instrument sulphur background making it more suitable for low-level sulphur analysis
- Uncompromised analytical performance without any side effect on other isotope systems

Dry Pump Upgrade

- The compact 110 m³/h air-cooled Edwards nXLi110 dry pump improves pumping efficiency and generates ca. 10% sensitivity enhancement without elevating the oxide formation or inducing any non-linear mass bias behaviour.
- Reduces the frequency of preventative maintenance.
- Eliminates the formation of hydrocarbon molecules and therefore the background counts for actinides.

High Mass IC Upgrade

- Ideal for U-Pb geochronology, low level B and Li isotope measurements

P3 Source Upgrade

- Enhanced Sensitivity Interface.
- All new innovative torch box design allowing easy connection of a wide range of sample introduction devices.
- Robust water-cooled 3rd generation RF Generator with frequency tuning, delivers rapid response to changing matrix conditions Improved RF shielding
- Easy access to expansion chamber front plate for exchanging of cones
- Maximum stability and reliability
**Water Trap Cold Finger Upgrade**

- Replaces existing Nu Carb chiller and water trap with a low volume fully temperature controlled cold finger and high purity valve.
- Removes water from sample CO$_2$ cryogenically as before using liquid nitrogen as a coolant.
- For clumped isotopes there is an increase in sample throughput as pressure of CO$_2$ is higher during transfer through the Adsorption trap.
- Reduction in laboratory noise as the water trap chiller is removed.
- Reduction in electricity consumption of the instrument.

**Horizon HD Filter Upgrade**

- Improves precision and sensitivity in measurement of deuterium content in hydrogen (δ2H).
- Reduces sample size requirement.
- Incorporates a mini-ESA filter in front of the HD Faraday cup.
- Prevents low energy He$^+$ from entering HD Faraday cup (all continuous flow applications).
High Resolution Enhancement Upgrade

The high resolution upgrade fits our new ion source to provide greatly improved resolving power (MRP, defined by m/dm, where dm corresponds to 5 to 95% on the side of the peak). The original Noblesse offered MRP>1500, but our new source achieves MRP>5000 in the axial detector. This unique source can be adjusted continuously for higher sensitivity or higher resolving power, without using an adjustable slit. MRP=5000 provides easy resolution of all carbon based interferences at Ar, potentially leading to more accurate results, especially for young or small samples. $^{40}\text{Ar}^{++}$ can also be resolved from $^{20}\text{Ne}^+$, which makes Ne analyses simpler, removing the need for $^{40}\text{Ar}^{++}$ correction.

Atmospheric Liquid Nitrogen Dewar Upgrade

The atmospheric liquid nitrogen system offers a lower consumption of liquid nitrogen (1.5 lph vs. >3 lph for a pressurized vessel) and reduced cost of ownership as regular safety inspections as not required as with a pressurized vessel.

Fixed Source Slit Upgrade

The fixed source slit upgrade provides multiple slits of the same size which can be selected independently as each is eroded by the ion beam. This extends the service time between replacements and therefore improves the operational uptime available for the Astrum.
Fixed Slit Upgrade

The fixed slit upgrade allows Attom to be used for multiple resolution methods in an automated batch with reproducible changes in resolution. The use of multiple slits of the same size extends the service intervals for source slit replacement as alternate slits can be selected as others wear through from the intense ion beam. The independent operation of both the source and collector slits means that different resolutions can be selected by matching each source slit size with different collector slits.

Fast Magnet Electronics Upgrade

The fast magnet upgrade for Attom significantly improves the speed of analysis for all methods that require magnet field changes. For Hall probe controlled magnet jumping, jump times are now 1-2 ms/amu and hysteresis loops are 0.6-0.8 seconds (compared to the previous 15ms/amu and 6-8 seconds hysteresis loop). This means that a typical method cycle of 10 isotopes across the full mass range with 1 second of data acquisition at each mass would take 11.1 seconds compared to over 20 seconds previously. Similarly, for LinkScan analysis, the fast magnet controller has a new 200V LinkScan option which allows the collection of full mass spectra in both the up and down scan in 103ms compared to the previous 220ms.

Enhanced Sensitivity Interface Upgrade

The ES interface is designed to enhance the dry aerosol sensitivity of the Attom for laser ablation and desolvator applications. Improvements up to a factor of 3 have been reported (a) with no impact on the normal wet aerosol sample introduction performance. The interface also includes a screw-in locking ring mount for the sample cone which is more robust and easier to handle than the previous generation sample cone mount system.

Innovators in Mass Spectrometry. We deliver cutting-edge science and technology solutions, and offer our customers unparalleled support and maintenance service through the comprehensive AMECARE program.

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