

Metrohm Preventive Maintenance



The key to accuracy, reliability and longevity for
your Metrohm analyzers

Metrohm Preventive Maintenance

02

Prevention is the best medicine – and saves money

With the purchase of your Metrohm analyzer, you have made the choice for first-class quality. To ensure you can enjoy this quality and trust the accuracy of your measurement results throughout the entire lifetime of your Metrohm instrument, regular maintenance is essential.

Basically, your Metrohm analyzer requires care and attention the same way your car does: Regular maintenance prevents instrument failure and protects against costly repairs, saving you money throughout the entire life cycle of your instrument.

With normal use, we recommend having preventive maintenance performed **at least once a year**; depending on the level of use, shorter intervals may be necessary.

Metrohm Service – experts at your side

You can rely on the competence and expertise of the Metrohm service engineers. Metrohm subsidiaries and distributors in more than 120 countries worldwide mean, that our service is never far away.

Our trained and certified service engineers will ensure that your analyzer gets the best possible care and maintenance – for a long, trouble-free service life.



Basic elements of preventive maintenance

Before we do anything else, we clarify your needs and ask about any specific requests. Based on the the usage profile of your instruments, we can assess the scope of maintenance work your instrument is likely to need. This makes sure we can complete our job as smoothly as possible.

Any maintenance work we do is performed in accordance with a clearly defined, standardized procedure (an SOP). We inspect your analyzer onsite, clean it thoroughly, and then assess its status. If necessary, the moving parts are greased and lubricated, and worn parts are replaced.

In the second part of our visit, we run a series of tests on your analyzer to ensure that all components are functioning properly. The preventive maintenance visit concludes with the calibration of your analyzer using calibrated reference tools appropriate for the task.

Documentation of all the work done and of the results is provided.



Elements of preventive maintenance

04

Maintenance

The first steps of a preventive maintenance visit include on-site inspection, cleaning, and subsequent status

assessment of your analysis system. As a precaution, all wearing parts are also replaced.



1.

At the the start of our visit, the Metrohm service engineer asks about the use and operation of the instrument, including any incidents that might be relevant for assessing its current status. The details and the scope of the maintenance work is defined together with you.



2.

The Metrohm service engineer assesses the **current status** of your analyzer and collects the necessary customer data. If necessary, and if requested, this data will be backed up before the actual maintenance work starts.



5.

If necessary, the **instrument** will be opened **in compliance with the directives** for the prevention of ESD (electrostatic discharge), so as not to damage the highly sensitive electronic components.



6.

The Metrohm service engineer will perform a **thorough cleaning** of the interior of the instrument. Next, a thorough **visual inspection** will be made of the mechanical and electronic components and cabling. Particular attention will be paid to potential damage by any liquids that may have leaked into the instrument.



3.

Dirt can make assessing the status of your instrument more difficult, and may even affect the instrument's functionality. Thorough **cleaning** of all **externally** accessible surfaces using the proper tools and cleaning agents is therefore the first important task of the Metrohm service engineer.



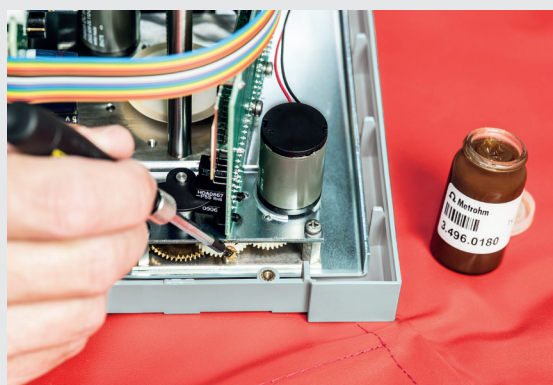
4.

Performing a scrupulous **visual inspection**, the Metrohm service engineer identifies any possible damage due to wear or exposure to chemicals, in addition to damage to electrical contacts (e.g., through corrosion) that could disrupt the function of the system.



7.

Mechanical wear and corrosive liquids can affect the function of various components over time. The **timely replacement of wear parts** not only improves the accuracy of results, but also prevents sudden failure and malfunctions.



8.

Moving parts require a fine film of grease in order to operate with the least possible friction and wear. Applying a **lubricant and/or grease** is an integral part of any regular preventive maintenance.

Elements of preventive maintenance

06

Testing and calibration

After the device has been fully serviced, reassembled and the nominal status restored, it will be thoroughly tested to ensure that all the manufacturer's specifications are met. Calibration of the important parameters is done

with traceable measurement equipment and software tools that have been developed especially for this purpose. All work is done according to Metrohm SOPs and is documented in detail.



1.

An important test performed at the very beginning is the **Safety Check**. This entails using a multimeter to check the safety of the electrical connection.



2.

Proper signal transmission via various **communication interfaces** (USB, MSB, ...) is essential to the reliable operation of the system as a whole. This functionality is checked with specially developed test adapters with the associated testing software.



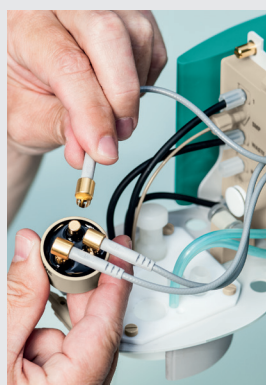
5.

Along with the column and the detector, the quality of an ion chromatographic measurement depends on the proper functioning of pumps. Key indicators are **pressure accuracy, pressure stability, and a pressure integrity test** (leak test).



6.

In optical measurement systems such as NIR spectrometers, measurement quality is highly dependent on **wavelength accuracy and photometric stability**. To ensure precision, the instruments are calibrated using **certified reference standards**.



3.

Accurate and reproducible analysis results depend on the detection of minute current and voltage changes. In titration and voltammetry/CVS, specially developed and calibrated tools are used to ensure precision in the testing and **calibration of measuring inputs**.



4.

The exact dosing of liquids is a critical factor in titrations. A high-precision dosing drive is responsible for ensuring accuracy. A **special spindle measuring device and a calibrated gauge** are used to make an exact check of the accuracy of the drive.



7.

The Metrohm service engineer will document all necessary status assessment data in easy-to-understand **reports and calibration certificates** that will be issued to you.



8.

In the **wrap-up discussion**, the Metrohm Service Engineer and you go over the work that was done and the results that were obtained. Drawing attention to potential improvements in the handling and use of the instruments is just as much an integral part of this discussion as is the scheduling of the next maintenance activities.

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