

# Misa



## Product Manual

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# Misa

Firmware version 10.0.1.0 or higher

## Product Manual

8.950.8001EN /  
2020-06-26

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# 1 Overview

## 1.1 Instrument description

Metrohm Instant SERS Analyzer (Misa) is a high performance, portable analyzer system used for rapid trace level detection / identification of illicit materials, food additives and food contaminants. Misa features a high-efficiency spectrograph equipped with Metrohm's unique Orbital-Raster-Scan (ORS) technology. It has a minimal footprint and extended battery life, perfect for on-site testing or mobile laboratory applications. Misa offers various laser class 1 Smart Tip attachments for flexible sampling options. The analyzer can be operated through Bluetooth® or USB connection.

## 1.2 Model versions

**Misa** is available in the following versions:

*Table 1 Model versions*

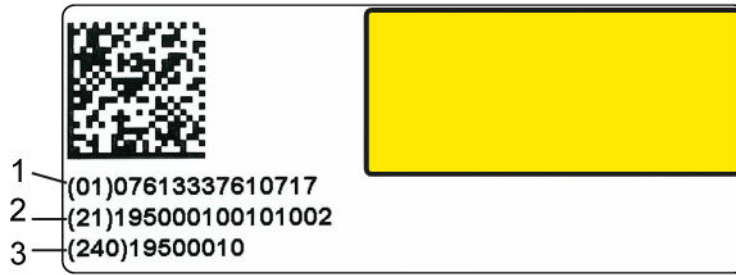
|            |   |               |
|------------|---|---------------|
| 2.950.0010 | Misa Basic <ul style="list-style-type: none"> <li>▪ With Misa Vial Holder</li> <li>▪ Other accessories (<i>see page 5</i>)</li> </ul>   | Laser class 1 |
| 2.950.0020 | Misa Advanced <ul style="list-style-type: none"> <li>▪ With P-SERS Attachment</li> <li>▪ With Misa Vial Holder</li> <li>▪ With Calibration Standard</li> <li>▪ And other accessories (<i>see page 5</i>)</li> </ul> | Laser class 1 |



### NOTICE

You can purchase other Smart Tips or accessories separately from Metrohm AG (*see "Accessories", page 5*).

The required numbers for the customer service can be found on the type plate (see example):



**1** (01) = External article number

**2** (21) = Serial number

**3** (240) = Metrohm article number

### 1.3 Misa Cal software

In order to use Misa, one of the following software is needed:

*Table 2 Model versions*

|            |                             |
|------------|-----------------------------|
| 6.6071.010 | Misa Cal (desktop software) |
| 6.6071.020 | Misa Cal M (mobile app)     |

The latest version of Misa Cal desktop software and firmware can be downloaded from the following link:

<https://www.metrohm.com/en-us/support-and-service/software-center/>

The Misa Cal M mobile app is available from Google Play™, search for **Misa Cal M** or scan the following QR code:





## 1.4 About the documentation



### NOTICE

Please read through this documentation carefully before putting the product into operation.

The document contains important safety information and warnings which you must follow in order to ensure safe operation of the instrument. Metrohm is not responsible for damages and safety hazards that occur from using the instrument in a manner that is not specified in the user manual.

### Symbols and conventions

The following icons and formatting may appear in this documentation:

|                               |   |
|-------------------------------|---|
| (5-12)                        | <b>Cross-reference to figure legend</b>   |
|                               | The first number refers to the figure number, the second to the product part in the figure. |
| <b>1</b>                      | <b>Instruction step</b>   |
|                               | Carry out these steps in the sequence shown.  |
| <b>Method</b>                 | Designations for names of parameters, menu items, tabs and dialog windows in the software.  |
| <b>File ► New</b>             | Menu or menu item   |
| <b>Work area / Properties</b> | Menu paths in order to arrive at a particular position in the software.                     |
| <b>[Next]</b>                 | <b>Button or key</b>  |

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## 1.5 Additional Information

Refer to following software tutorials for more information:

- Misa Cal software tutorial (8.0105.8024)
- Misa Cal M mobile app tutorial (8.0105.8025)

### 1.5.1 Accessories

Up-to-date information on the scope of delivery and optional accessories for your product can be found on the Internet. You can download this information using the article number as follows:

#### Downloading the accessories list

- 1** Enter <https://www.metrohm.com/> into your Internet browser.
- 2** Enter the article number of the product (e.g. **2.1001.0010**) into the search field.  
The search result is displayed.
- 3** Click on the product.  
Detailed information regarding the product is shown on various tabs.
- 4** On the **Included parts** tab, click **Download the PDF**.  
The PDF file with the accessories data is created.



#### NOTICE

When you receive your new product, we recommend downloading the accessories list from the Internet, printing it out and keeping it for reference purposes.



## 2 Safety

### 2.1 Product safety

This product exhibited no flaws in terms of technical safety at the time it left the factory. To preserve this status and ensure non-hazardous operation of the product, the following instructions must be observed carefully.

### 2.2 Hazard levels

The following warning messages indicate the severity of the danger and its possible effects.



#### DANGER

##### Immediate danger of life

Irreversible injuries that will result in death.

Warns of dangerous situations or unsafe actions that will most certainly cause severe injuries or death.

Lists measures to avoid hazard.



#### WARNING

##### Severe health hazards

Serious injuries that could result in death.

Warns of dangerous situations or unsafe actions that could result in serious injuries or death.

Lists measures to avoid hazard.





## CAUTION

### Health hazards or severe property damage

Warns of dangerous situations or unsafe actions that could result in moderate injuries or considerable property damage.

Lists measures to avoid hazard.

## 2.3 Warning symbols

Make sure that any additional hazard symbols are marked on the product for your operation of the product.

The following warning symbols in the documentation and at hazard areas of the product point out hazard potentials:



– Warning of a hazard area



## NOTICE

### Warning symbol on the product

If this warning symbol is on the product, read the respective documentation prior to installation and initial start-up.



– Warning of electric shock from electrical potential



– Warning of danger of fire and explosion from highly flammable substances and gases



– Warning of danger of poisoning and chemical burns from chemical hazardous substances



– Warning of danger of infection and poisoning from biological hazardous substances



– Warning of risk of injury from high temperatures



- Disposing hazardous and environmentally damaging substances

If they are not followed, this may result in:

- Disturbing, injuring and/or killing of people
- Malfunction and/or damage to instruments and infrastructure
- Damage and/or contamination of the environment



## WARNING

### General dangers at workplace

If the safety measures are not followed, working in a laboratory bears a high risk of injury, which can endanger life and health.

- Only professionally trained and qualified specialist personnel may operate the products.
- Follow the applicable provisions concerning work safety and all regulations on wearing protective clothing.
- Use suitable tools to perform your work.
- Check the fill level of waste bottles or waste canisters and analysis vessels, and make sure they do not overflow.
- Use protective grounding when working with highly flammable substances and gases.

## 2.5.2 Danger from electrical potential



## WARNING

### Electric shock from electrical potential

Risk of injury by touching live components or through moisture on live parts.

- Never open the housing of the instrument.
- Protect live parts (e.g. power supply unit, power cord, connection sockets) against moisture.
- If you suspect that moisture has gotten into the instrument, disconnect the instrument from the energy supply. Then notify Metrohm Service.
- Only personnel who have been issued Metrohm qualification may perform service and repair work on electrical and electronic components.
- The electrical safety of the instrument is ensured as part of the international standard IEC 61010.

### 2.5.3 Laser safety



## WARNING

### Risk of injury by laser radiation

Misa is a class 1 laser product and is safe under all conditions of normal use. Use of controls or adjustments or performance of procedures other than those specified in the user manual may result in exposure to hazardous levels of laser radiation.

- Follow the safety measures and instructions.
- Do not use the instrument in a manner that is not specified in the user manual.
- Do not open the housing of the instrument.
- Do not disable or circumvent the interlock protection mechanism of the Smart Tips.
- Follow the provisions of the IEC 60825-1 standard "Safety of laser products" and the regulations for the use of laser systems in your country.

### Laser classification depending on Smart Tips

| Attached Smart Tip   | Laser Class 1 |
|----------------------|---------------|
| Calibration Standard | X             |
| Misa Vial Holder     | X             |
| P-SERS Attachment    | X             |

Calibration Standard, Misa Vial Holder, and P-SERS Attachment have an interlock mechanism for measurement. This mechanism prevents laser radiation from emerging.

The laser stops immediately if:

- The lid of the Smart Tip is opened.
- The attached Smart Tip is disconnected from the instrument.

### 2.5.4 Warning stickers on the instrument

The instrument is equipped with stickers that warn of potential hazards. These warning stickers are listed and explained in this chapter.



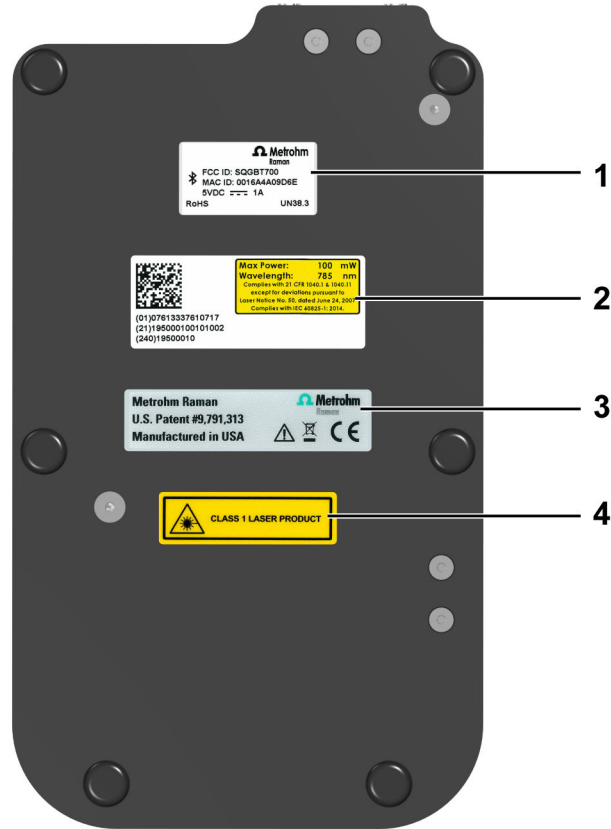


Figure 1 Misa – Rear

- |                          |  |
|--------------------------|--|
| <b>1 Bluetooth label</b> | <b>2 Laser specifications / article number and serial number</b> |
| <b>3 Type plate</b>      | <b>4 Laser classification</b>                                    |

**Laser classification**

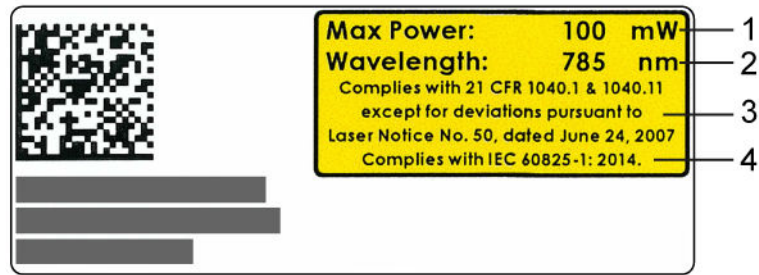
Misa corresponds to the following laser classification:



- Class 1 laser product

**Laser specifications**

The following specifications refer to the laser embedded in Misa:



|   |   |
|---|---|
| <b>1</b> Max Power: 100 mW  | <b>2</b> Wavelength: 785 nm             |
| <b>3</b> Complies with 21 CFR 1040.1 & 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 | <b>4</b> Complies with IEC 60825-1:2014 |

### 2.5.5 Danger from radiofrequency radiation

**CAUTION**

**Exposure to radiofrequency radiation**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

- This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

## 2.6 Responsibility of the operator

- Eliminate defects or damage which impair operating safety without delay.
- Eliminate malfunctions which could impair safety without delay.
- The rules, regulations and instructions listed in the present document are not the only valid ones. Comply with the applicable statutory rules, government agency directives and regulations.
- Unauthorized modification of the products excludes any and all liability on the part of the manufacturer for any damage resulting from this as well as for any consequential damage. No modifications, attachments or conversions which could impair safety may be carried out on the products without the approval of the manufacturer.
- Spare parts must meet the technical requirements established by the manufacturer. Original spare parts always meet these requirements.
- Personnel must be familiar with this safety-relevant information and it must be available for consultation at all times.

## **2.7 Personnel requirement**

Only qualified personnel may operate this product. A qualified person is a user who has thoroughly reviewed this document and has a comprehensive understanding of the operations of the instrument.

The instrument is used for the analysis of chemical compounds, some of which may be hazardous. The user must be capable of recognizing and avoiding possible dangers, and be aware of standards, laws and regulations governing the handling of such chemicals.



### 3 Functional description

#### 3.1 Overview of the instrument

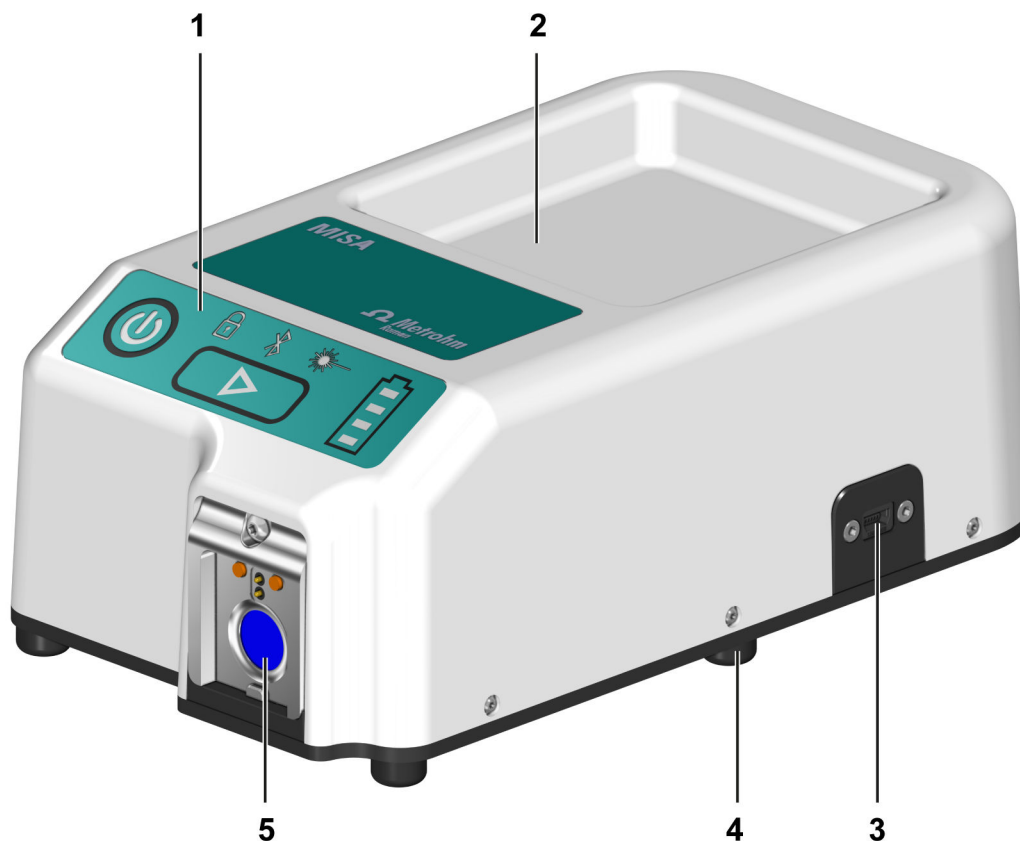


Figure 2 Misa – Front

**1 Control panel with indicators**

Allows operation of Misa and displays its status. See "Control panel with indicators", page 16.

**2 Storage compartment**

Storage for samples and Smart Tips.

**3 USB connector**

Connects Misa to a computer. See "Connecting Misa via USB", page 22.

**4 Rubber foot**

Misa is portable but operated standing on rubber feet.

**5 Magnetic Smart Tip fixture / laser aperture**

Smart Tips are attached to the magnetic Smart Tip fixture for data acquisition. See "Attaching Smart Tips", page 24.

## 3.2 Smart Tips

Each Smart Tip allows an individual way of data acquisition. Smart Tips are attached to the instrument with magnetic connectors. Smart Tips contain a memory chip so that the instrument can identify them. Due to design, Smart Tips will not allow operation of Misa when seated in an incorrect position.

The following Smart Tips are available:

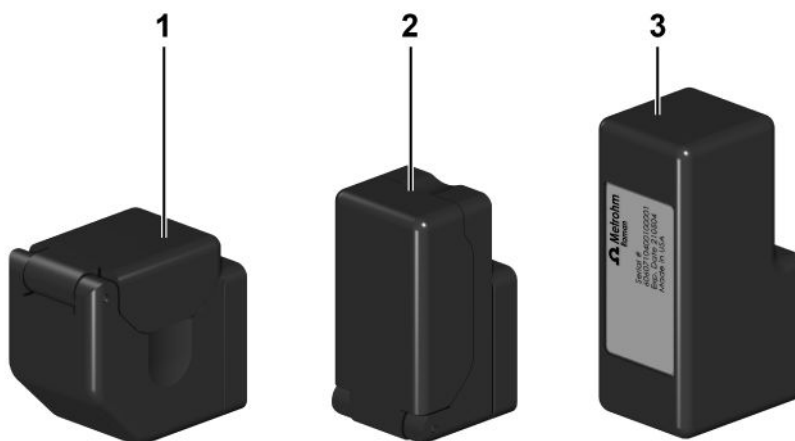


Figure 3 Misa – Smart Tips

### 1 Misa Vial Holder (6.07505.040)

The Misa Vial Holder is used for samples in glass vials.

The interlock mechanism allows measurement with class 1 laser operation. The laser stops if the lid is opened.

### 2 P-SERS Attachment (6.07505.030)

The P-SERS Attachment accommodates proprietary P-SERS strips.

The interlock mechanism allows measurement with class 1 laser operation. The laser stops if the lid is opened.

### 3 Calibration Standard (6.07501.010)

The Calibration Standard is needed for the calibration of the instrument. The Calibration Standard contains an ASTM 1840 reference sample.

### 3.3 Control panel with indicators

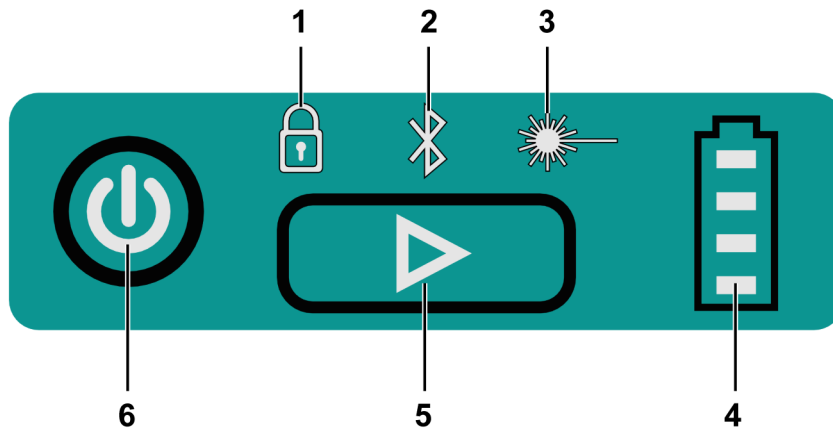


Figure 4 Misa – Control panel with indicators

#### 1 Interlock indicator

Lights up in red when the current state of Misa prevents an acquisition, for example if the Smart Tip is not attached correctly.

#### 3 Laser status indicator

Lights up when the laser is active.

#### 5 Acquisition button

Activates the laser for data acquisition.

#### 2 Bluetooth connectivity indicator

Flashes blue if the Bluetooth wireless technology of Misa is active. See *"Connecting Misa via Bluetooth"*, page 22.

#### 4 Battery charge indicator

Displays the charging status of the battery, see *"Battery charge indicator"*, page 20.

#### 6 On/off switch

Switches Misa on or off. The on/off switch lights up green when Misa is switched on. See *"Switching Misa on and off"*, page 21.

## **4 Transport and storage**

### **4.1 Checking the delivery**

Immediately upon arrival of the merchandise, check the shipment against the delivery note to ensure completeness and absence of damage.

### **4.2 Storing the packaging**

The product is supplied in extremely protective packaging together with the separately packed accessories. Keep this packaging, as only this ensures safe transportation of the product.

## 5 Installation

### 5.1 Setting up the product

The product has been developed for operation indoors and may not be used in explosive environments.

Place the product in a location of the laboratory which is suitable for operation and free of vibrations and which provides protection against corrosive atmosphere and contamination by chemicals.

Observe the dimensions and weights of the individual products and modules that are part of the complete system. You will find this information in the "Technical specifications" section.

Protect the product against excessive temperature fluctuations and direct sunlight.

The power cord and other connecting cables must not be replaced with impermissible cables.

The power cord, where available, or other cables connecting to control instruments must be accessible during operation.

### 5.2 Installing Misa Cal on Windows

Refer to the Misa Cal software tutorial (8.0105.8024) for the installation of Misa Cal desktop software on a Windows® computer.

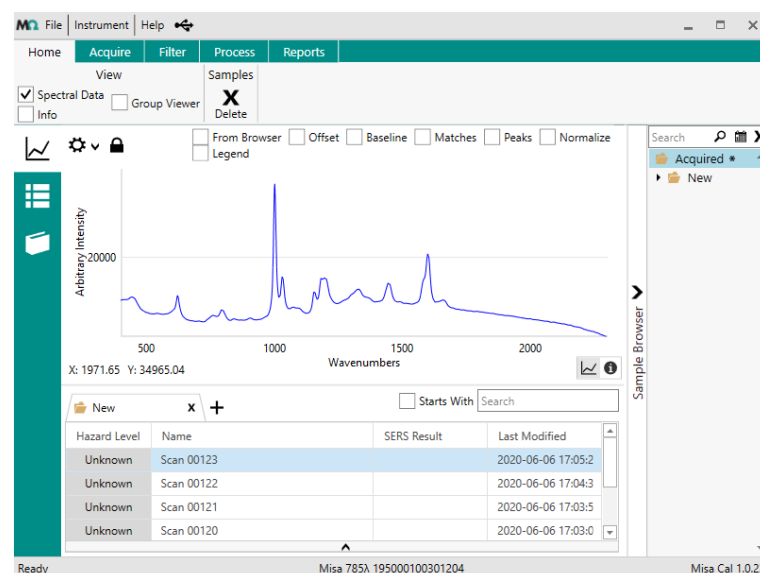


Figure 5 Misa Cal – General overview



## 5.3 Installing Misa Cal M for Android

Refer to the Misa Cal M mobile app tutorial (8.0105.8025) for the installation of Misa Cal M on an Android™ device.

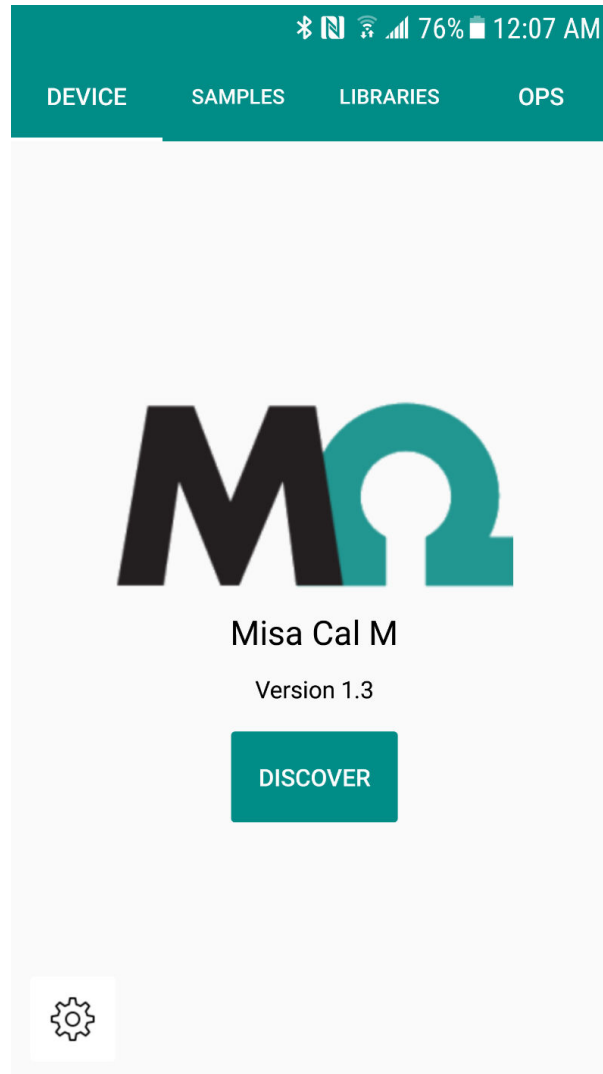


Figure 6 Misa Cal M – Home screen



## 5.4 Supplying Misa with energy

Misa is provided with an internal battery. The charge status of the internal battery is displayed on the battery charge indicator on the Misa control panel.



### NOTICE

The internal battery cannot be replaced by the user. To service the battery, please contact Metrohm Service.

### 5.4.1 Charging the internal battery

- 1 To supply Misa with energy and charge the internal battery, connect Misa with the USB Mini-B cable to a 5V USB power supply unit or a computer.

The battery charge indicator flashes slowly while the battery is charging.





### NOTICE




We do not recommend to use third party USB cables. Only use the provided Metrohm USB Mini-B cable (6.2151.110).

### 5.4.2 Battery charge indicator

The charge status of the internal battery is displayed on the battery charge indicator on the Misa control panel:

Table 3 Battery charge indicator

| Battery indicator   | Charge status  |
|---|----------------|
|  | 4 bars (100 %) |
|  | 3 bars (75 %)  |

| Battery indicator   | Charge status   |
|---|---|
|  | 2 bars (50 %)   |
|  | 1 bar (25 %)  |
|  | Low battery warning<br>We recommend to charge the battery when the battery indicator is flashing. |



## NOTICE

Misa switches off if the battery charge status is below 5%.

## 5.5 Switching Misa on and off

### Switching Misa on

- 1 Press the on/off switch.  
The on/off switch lights up in green. Misa is ready for operation.

### Switching Misa off

- 1 Disconnect the instrument from Misa Cal or Misa Cal M.
- 2 Press the on/off switch.  
The green light of the on/off switch goes out. Misa is switched off.

### Resetting Misa

A reset can be performed on the instrument if any errors are encountered during its operation.

- 1 Press and hold the on/off switch for 10 seconds.  
If the instrument was initially on, it will turn off and then power back on after 10 seconds.  
If the instrument was initially off, it will turn on after 10 seconds.

## 5.6 Connecting Misa via USB

The USB connection supplies Misa with energy and enables the operation of Misa with Misa Cal desktop software.

### Connecting Misa to Misa Cal via USB

- 1 Connect Misa to a Windows computer using the USB Mini-B cable.  
Connection via USB to a Windows computer supplies Misa with energy and enables the connection and operation of Misa with Misa Cal. Refer to the Misa Cal software tutorial (8.0105.8024) for more information about the connection of Misa Cal to Misa.

### Connecting Misa to a USB power supply unit via USB

- 1 Connect Misa to a 5V USB power supply unit using the USB Mini-B cable.  
Connection via USB to a 5V USB power supply unit supplies Misa with energy and charges the internal battery of Misa. See *"Supplying Misa with energy"*, page 20.



### NOTICE

We do not recommend to use third party USB cables. Only use the provided Metrohm USB Mini-B cable (6.2151.110).

## 5.7 Connecting Misa via Bluetooth

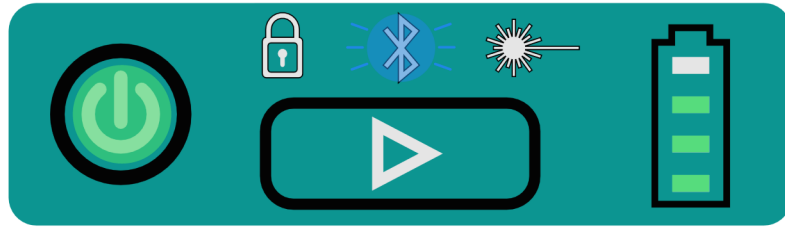
The Bluetooth connection enables the operation of Misa with Misa Cal M.



### NOTICE

Bluetooth is activated on Misa by default and only deactivated during connection to Misa Cal via USB. Bluetooth cannot be enabled or disabled manually.

A blue flashing Bluetooth indicator on the control panel indicates that Bluetooth is activated and Misa is ready to connect.



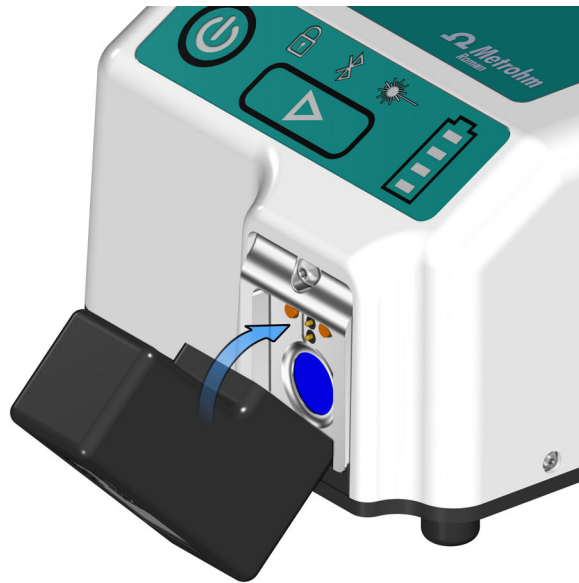
Refer to the Misa Cal M mobile app tutorial (8.0105.8025) for more information about the connection of Misa Cal M to Misa.

## 6 Operation and control

### 6.1 Attaching Smart Tips

#### Using Calibration Standard

- 1 Attach the Smart Tip by engaging the bottom edge of the Smart Tip into the bottom edge of the magnetic Smart Tip fixture. Rotate the Smart Tip into position.





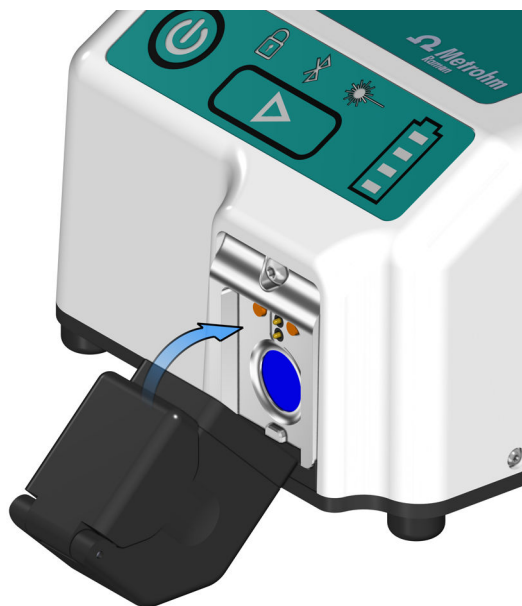
### Using Misa Vial Holder



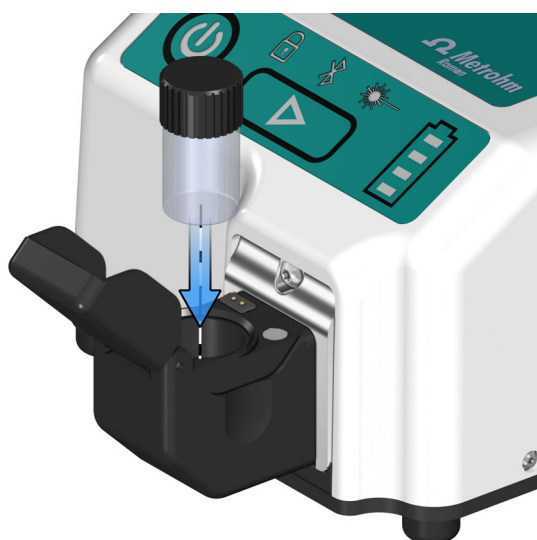
## NOTICE

The lid contains a safety feature which cancels the measurement and stops the laser if you open the lid.

- 1 Attach the Smart Tip by engaging the bottom edge of the Smart Tip into the bottom edge of the magnetic Smart Tip fixture. Rotate the Smart Tip into position.



**2** Open the lid and insert a vial to measure its content.



**3** Close the lid.





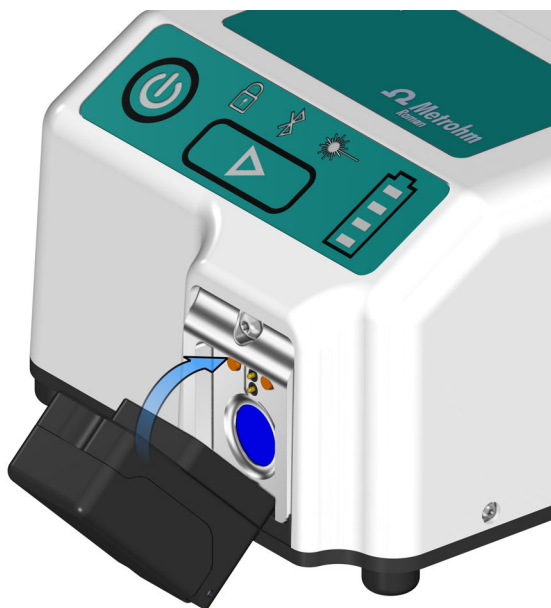
### Using P-SERS Attachment



## NOTICE

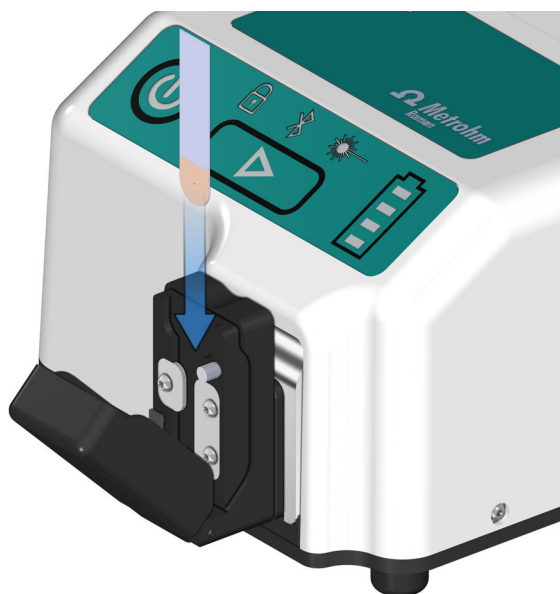
The lid contains a safety feature which cancels the measurement and stops the laser if you open the lid.

- 1 Attach the Smart Tip by engaging the bottom edge of the Smart Tip into the bottom edge of the magnetic Smart Tip fixture. Rotate the Smart Tip into position.



- 2 Open the lid and place the P-SERS strip, **printed side down and facing the laser aperture**, into the slot.

The P-SERS Attachment accommodates the strip at the optimal depth.



### NOTICE

Only use Metrohm P-SERS strips with the P-SERS Attachment.



- 3 Close the lid.



- 4 After the data acquisition (see "Acquiring data", page 30), open the lid of the P-SERS Attachment and remove the strip.
- 5 Wipe down interior surfaces with a laboratory wipe or swab. Use ethanol or isopropanol to clean the Smart Tip.



## NOTICE

Cleaning is intended to remove residues from previous P-SERS strips, rather than for polishing the window.



## 6.2 Acquiring data

### Misa Cal desktop software

Refer to the Misa Cal software tutorial (8.0105.8024) for instruction on using Misa Cal desktop software to acquire data and configure the instrument.

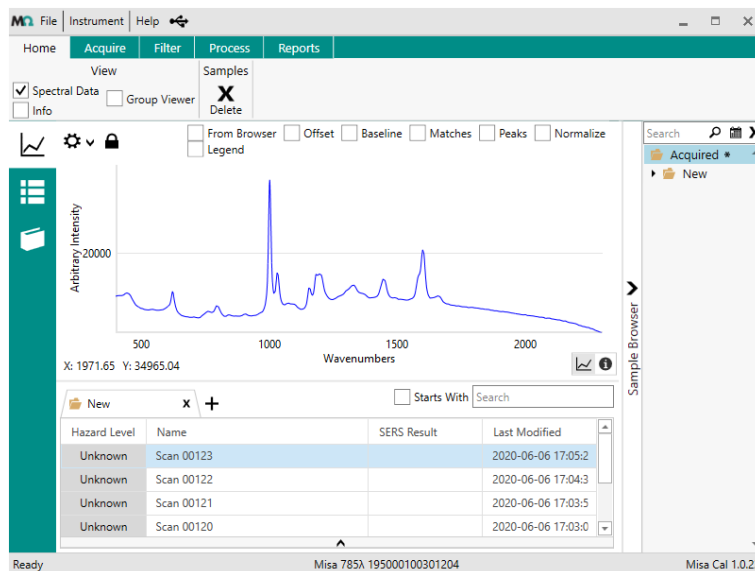


Figure 7 Misa Cal – General overview

### Misa Cal M mobile app

Refer to the Misa Cal M mobile app tutorial (8.0105.8025) for instruction on using Misa Cal M app on an Android device to acquire data and configure the instrument.

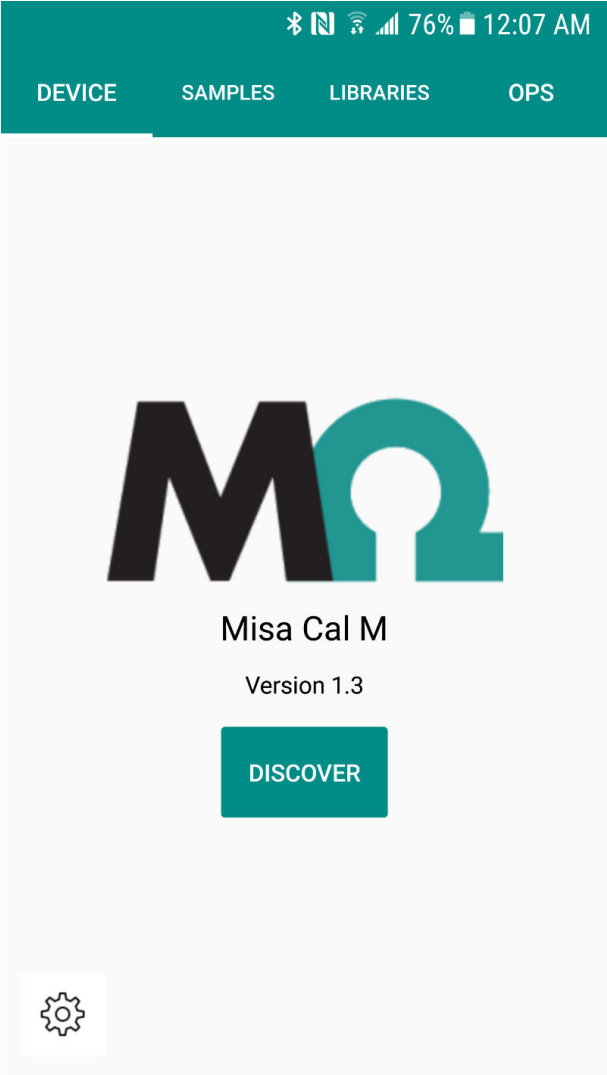


Figure 8 Misa Cal M – Home screen

## 7 Maintenance

### 7.1 Maintenance agreement

Maintenance of the product is best carried out as part of an annual service performed by specialist personnel from Metrohm. Shorter maintenance intervals may be necessary if you frequently work with caustic and corrosive chemicals. Metrohm Service personnel are properly trained in procedures for safely repairing the instrument.

Routine cleaning of the instrument can be done using non-corrosive cleansers such as water, ethanol, or acetone.

Metrohm Service offers every form of technical advice for maintenance and service of all Metrohm products.

### 7.2 Cleaning Misa



#### **WARNING**

##### **Danger of poisoning and chemical burns from chemical hazardous substances**

Poisoning and/or chemical burns by contact with aggressive chemical substances.

- Use only detergents that do not cause any unwanted side reactions with the materials to be cleaned.
- Clean contaminated surfaces.
- Wear protective equipment.
- Use exhaust equipment when working with vaporizing hazardous substances.
- Dispose of chemically contaminated materials (e.g. cleaning material) properly.



## WARNING

### Electric shock from electrical potential

Risk of injury by touching live components or through moisture on live parts.

- Never open the housing of the instrument.
- Protect live parts (e.g. power supply unit, power cord, connection sockets) against moisture.
- If you suspect that moisture has gotten into the instrument, disconnect the instrument from the energy supply. Then notify Metrohm Service.
- Only personnel who have been issued Metrohm qualification may perform service and repair work on electrical and electronic components.
- The electrical safety of the instrument is ensured as part of the international standard IEC 61010.

### Cleaning the surfaces of Misa

#### Prerequisites:

- Misa is switched off.
- Misa is disconnected from the power grid.

- 1 Clean the surfaces with a damp cloth. Water or ethanol can be used as a cleaning medium.



## NOTICE

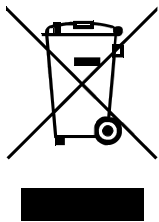
If the suspicion arises that liquids have found their way into the instrument, disconnect the instrument from the power grid and contact your Metrohm Service.



## NOTICE

The connectors must only be cleaned with a dry cloth.

# 8 Disposal



This product is covered by European Directive, WEEE – Waste Electrical and Electronic Equipment.

The correct disposal of your old product will help to prevent negative effects on the environment and public health.

More details about the disposal of your old product can be obtained from your local authorities, from waste disposal companies or from your local dealer.



## 9 Technical specifications

### 9.1 Ambient conditions

|                               |               |  |
|-------------------------------|---------------|--|
| <b>Nominal function range</b> | -20 to +50 °C | at max. 80% relative humidity, noncondensing |
| <b>Storage and transport</b>  | -20 to +50 °C |  |

### 9.2 Energy supply

|  |               |   |
|--|---------------|---|
| <b>Internal battery specifications</b> | 3.6 V, Li-Ion | not user serviceable                      |
| <b>Nominal input voltage</b>           | 5 V DC        |   |
| <b>Power consumption</b>               | max. 500 mA   | up to 8 hours continuous usage            |
| <b>USB Mini-A/B power requirements</b> |               | instrument connected to a powered USB hub |
| <i>Input voltage</i>                   | 5 V DC        |   |
| <i>Nominal input current</i>           | max. 500 mA   |   |

### 9.3 Interfaces

|                      |   |
|----------------------|---|
| <b>USB connector</b> | Type A/B mini USB connector (USB 2.0) with the following functions:<br>Power supply<br>Data transmission<br>with USB cable (6.2151.110) |
|----------------------|---|



## 9.4 Dimensions and materials

### Dimensions

|               |        |
|---------------|--------|
| <i>Width</i>  | 110 mm |
| <i>Depth</i>  | 220 mm |
| <i>Height</i> | 80 mm  |

### Samples for Vial Holder

|              |               |
|--------------|---------------|
| <i>Vials</i> | 15 mm x 26 mm |
|--------------|---------------|

### Samples for P-SERS Attachment

|                      |                                     |
|----------------------|-------------------------------------|
| <i>P-SERS strips</i> | use only with Metrohm P-SERS strips |
|----------------------|-------------------------------------|

**Weight** 1,100 g

### Material

|                             |                    |
|-----------------------------|--------------------|
| <i>Housing</i>              | Polypropylene      |
| <i>Base</i>                 | Anodized Aluminium |
| <i>Accessories covering</i> | Anodized Aluminium |

## 9.5 Operating specifications

|  |  |
|--|--|
| <b>Laser wavelength</b>                    | 785 nm $\pm$ 0.5 nm                                      |
| <b>Laser output power</b>                  | $\leq$ 100 mW  |
| <b>Wavenumber range</b>                    | 400–2,300 cm <sup>-1</sup>                               |
| <b>Spectral resolution</b>                 | 8–10 cm <sup>-1</sup> (FWHM)                             |
| <b>Detection technique</b>                 | Orbital Raster Scan (ORS™)<br>to average over the sample |
| <b>Laser class according to EN 60825-1</b> | Class 1  |



## 10 Regulatory information

### FCC Part 15 Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



### CAUTION

#### Exposure to radiofrequency radiation

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

- This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.



### WARNING

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



FCC Grant of Equipment Authorizations of this device and transmitters installed in this device can be found at FCC website by entering the FCC ID number on the device.