

MIRA P



2.927.00XX / 6.2133.030

Product manual

8.0924.8001EN / v7 / 2025-01-24



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MIRA P

Firmware version 9.0.2.100 or higher

Product manual

8.0924.8001EN / v7 /
2025-01-24

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1 Overview

1.1 Instrument description

Metrohm Instant Raman Analyzers (MIRA) are handheld, high-power Raman spectrometers designed for rapid, nondestructive identification and verification of chemical and pharmaceutical samples, both liquid and solid. The MIRA spectrometers are the only handheld Raman spectrometers currently on the market with Orbital Raster Scan (ORS) technology.

1.2 Instrument versions

1.2.1 MIRA P

MIRA P instruments are available in the following versions:

Table 1 Product versions

Article number	Designation	Version feature
2.927.0010	MIRA P Basic	Starter package that contains the basic components required for operating MIRA P. Check Metrohm Website for included parts.
2.927.0020	MIRA P Advanced	Includes an attachment lens for analyzing materials directly or through containers (laser class 3b), as well as a vial holder attachment for analyzing samples contained in glass vials (laser class 1). Check Metrohm Website for included parts.
2.927.0030	MIRA P Flex	Includes the basic components needed to operate MIRA P without sampling attachments. Check Metrohm Website for included parts.

 Additional accessories can be purchased (see "[Displaying accessories](#)", chapter 1.5, page 6).

The article number and serial number for identification of the product can be found on the type label:

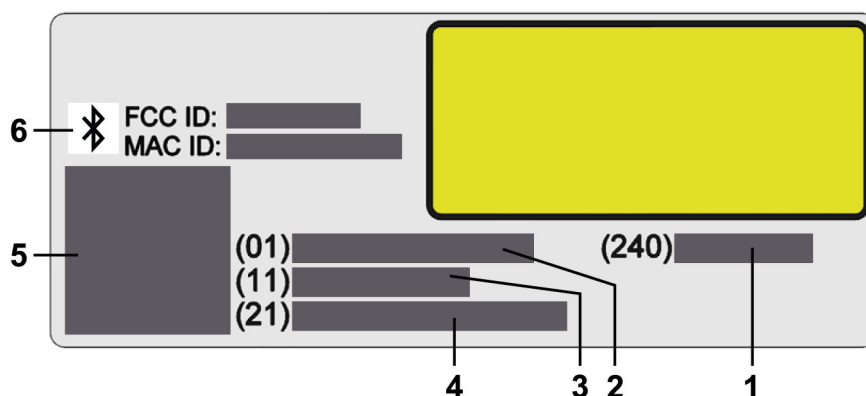
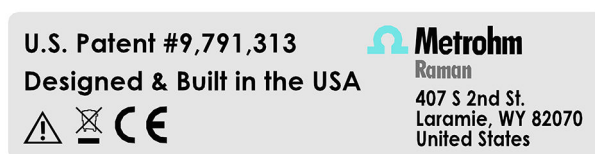


Figure 1 Instrument label at the bottom of the device

1	(240) = Metrohm article number	2	(01) = Global Trade Item Number (GTIN) in accordance with GS1 standard
3	(11) = Manufacturing date: month, year	4	(21) = Serial number
5	QR code	6	Bluetooth logo; FCC ID number (Federal Communications Commission); MAC address of the instrument

1.2.2 MIRA PowerPack

MIRA PowerPack is available in the following versions:

Table 2 Product versions

Article number	Designation	Version feature
6.2133.030	MIRA PowerPack External rechargeable battery.	May be operated together with MIRA P, MIRA M-3, MIRA XTR, MIRA DS.

The article number and serial number for identification of the product can be found on the type label:

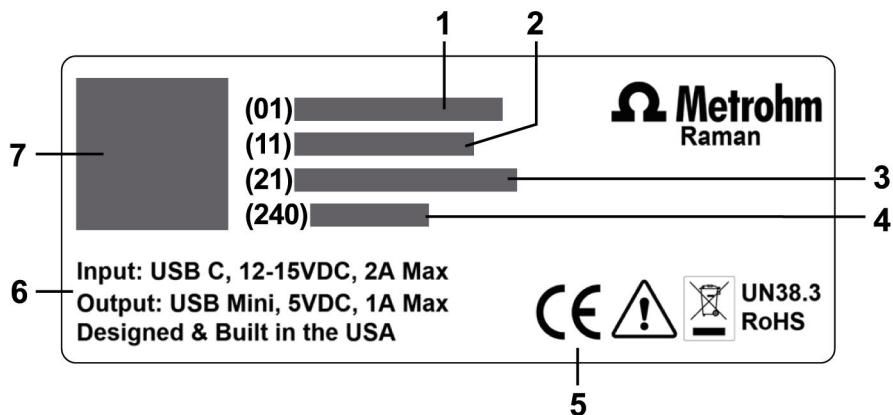


Figure 2 Label on MIRA PowerPack

1	(01) = Global Trade Item Number (GTIN) in accordance with GS1 standard	2	(11) = Manufacturing date: month, year
3	(21) = Serial number	4	(240) = Metrohm article number
5	Certification	6	Connection specifications
7	QR code		

1.3 Software

1.3.1 MIRA Cal P Software

In order to configure a **MIRA P** instrument, the following software is needed:

6.06071.010	Mira Cal Pharma USB Stick
-------------	---------------------------

To download the latest version of **MIRA Cal P** software (including firmware), click on the following link: <https://go.metrohm.com/s/uZsT4>

1.3.2 Tutorial MIRA Cal P

Refer to the following MIRA Cal P software tutorial for more information:

8.0105.8004EN	Tutorial MIRA Cal P
---------------	---------------------

Enter the product number (without the language code) in the search field on <https://www.metrohm.com> to search for the tutorial.

1.4 About the documentation

 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

Possible depictions in the documentation:

Depiction	Meaning
(5-12)	Cross-reference to figure legend (Figure number - <i>Element in the figure</i>)
1	Instruction step
Method	Parameters, menu items, tabs, and dialogs
File ► New	Menu path
[Continue]	Button or key
i	Supplementary information to the descriptive text
	Note In graphics, orange arrows or frames indicate the reference to the descriptive text. The relevant elements may also be colored orange.
	Movement In graphics, blue arrows indicate the movement direction. The elements to be moved may also be colored blue.

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1.5 Displaying accessories

Up-to-date information on the scope of delivery and on optional accessories can be found on the Metrohm website.

1 Searching for a product on the website

- Go to <https://www.metrohm.com>.
- Click on .
- Enter the article number of the product into the search field and press **[Enter]**.
 - **MIRA P Basic:** 2.927.0010
 - **MIRA P Advanced:** 2.927.0020
 - **MIRA P Flex:** 2.927.0030
 - **MIRA PowerPack:** 6.2133.030
- In the result list, click on the desired product.

Detailed information regarding the product is displayed.

2 Displaying accessories and downloading the accessories list

- Scroll down to the following (subject to availability):
 - **Included parts**
 - **Optional parts**
 - **Scope of delivery and optional parts** (PDF download)

 Metrohm recommends keeping the downloaded PDF for reference purposes.

2 Safety

2.1 Intended use

MIRA P

MIRA P is a portable Raman spectrometer. The instrument is suitable for indoor and outdoor use. It enables contactless and non-destructive analysis of liquids, solids and powders.

MIRA P was developed for rapid, nondestructive determination and verification of different material types, such as pharmaceutical APIs and auxiliary materials.

Depending on the intended use, the instrument is equipped with a suitable sampling attachment (Smart Tip). The nominal ocular hazard distance (NOHD) applicable to the respective Smart Tip must be taken into account at all times.

 The **Standoff Attachment** is not meant to be used outdoors. It may be operated only in a defined and monitored laser area.

MIRA PowerPack

MIRA PowerPack is an external rechargeable battery designed to extend the time of operation.

MIRA PowerPack may only be operated together with MIRA P, MIRA M-3, MIRA XTR or MIRA DS.

2.2 Responsibility of the operator

The operator must ensure that the basic regulations on occupational safety and accident prevention are observed. The operator has the following responsibilities:

- Identify the hazards to the safety and health of its personnel and implement the necessary protective measures and precautions.
- Instruct personnel in the safe handling of the product.
- Train personnel in the use of the product according to the user documentation (e.g. install, operate, clean, eliminate faults).
- Train personnel on basic occupational safety and accident prevention regulations.
- Provide personal protective equipment (e.g. protective glasses, gloves).
- Provide suitable tools and equipment to carry out the work safely.
- Ensure compliance with applicable laws, regulations and standards.

The product may be used only when its status is perfect. The following measures are required to ensure the safe operation of the product:

- Check the status of the product before use.
- Remedy defects and malfunctions immediately.
- Maintain and clean the product regularly.

2.3 Requirements for operating personnel

Only qualified personnel may operate the product. Qualified personnel are persons who meet the following requirements:

- Basic regulations on occupational safety and accident prevention are known and complied with.
- Knowledge of handling hazardous chemicals is present. Personnel have the ability to recognize and avoid potential dangers.
- Knowledge regarding the application of fire prevention measures is present.
- Safety-relevant information is communicated and understood. The personnel can operate the product safely.
- The user documentation has been read and understood. Personnel operate the product according to the instructions in the user documentation.

CAUTION – Operations, settings or procedures other than those specified in the user documentation may result in hazardous radiation exposure.

2.4 Safety instructions

2.4.1 Danger from electrical potential

A considerable risk of injury exists in connection with touching live parts.

- Never open the housing of the instrument when the power cord is connected. You can not service or replace any parts inside the housing.
- Only personnel who have been issued Metrohm qualification may perform service and repair work on electric and electronic parts.
- The electrical safety of the instrument is ensured as part of the international standard IEC 61010.

2.4.2 Laser safety

Nominal ocular hazard distance (NOHD)

The following information refers to the nominal ocular hazard distance (NOHD) for the instrument MIRA P in accordance with EN 60825-1 (Safety of laser products), *(see page 51)*.

Risk of injury by laser radiation

Laser radiation can cause serious eye damages.

- Instruments must be used by trained personnel only. Follow the safety measures and instructions.
- Avoid exposure to laser radiation and specular reflections. Do not point the instrument at people.
- When working with open laser beams (3B laser classification of the complete device), **appropriate protective glasses** must be used, see Operating specifications chapter in the MIRA device manuals.
- Observe the nominal ocular hazard distance (NOHD) for the Smart Tip used ([see page 51](#)). This distance defines the danger zone.
- Observe national laws.
If there is no specific safety standard or safety regulation for the working area, observe the standard ANSI Z136.1 or supplement IEC 60825.14 for guidance on the safe use of lasers.

You can purchase protective laser glasses (6.7560.010) from Metrohm Raman ([see "Displaying accessories", chapter 1.5, page 6](#)).

Laser classification of the MIRA P

The laser classification of the complete device depends on the Smart Tip used.

Attached Smart Tip	Complete device classification	
	Laser Class 1	Laser Class 3B
Right Angle Attachment		X
Intelligent Universal Attachment		X
Standoff Attachment		X
Contact Ball-Probe		X
Calibrate/Verify Attachment (CVA)	X	
Vial Holder	X	
Tablet Holder	X	
Short Working Distance Attachment Lens (SWD)		X
Long Working Distance Attachment Lens (LWD)		X
Extra Long Working Distance Attachment Lens (XLWD)		X

Interlock mechanism

Vial Holder, Tablet Holder and CVA 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.

Risk of injury when measuring thermally sensitive materials

Measuring a thermally sensitive sample that is in a tightly sealed vessel can lead to a pressure increase and subsequent explosion of the vessel.

2.4.3 Warning stickers on the instrument

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



1	Laser aperture	2	Laser aperture sticker
3	Laser class	4	Laser specification / serial number (bottom of instrument)
5	Type plate		

Emergence of laser



Laser aperture

Laser specifications

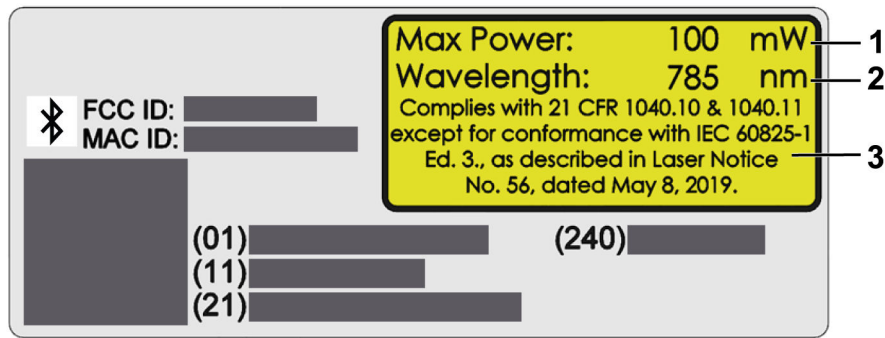


Figure 3 Sticker at the bottom of the instrument

1 Max Power: 100 mW

2 Wavelength: 785 nm

3 Compliance

Complies with 21 CFR 1040.10 & 1040.11
except for compliance with
IEC 60825-1 Ed.3, as described in the Laser
Notice No. 56, dated May 8, 2019.

Laser class

The following laser classification is used for all MIRA instruments.



Invisible laser radiation
Avoid exposure to beam
Class 3B laser product

2.5 Design of warning messages

The present documentation uses warning messages as follows.

Structure

1. Severity of the danger (signal word)
2. Type and source of danger
3. Consequences of disregarding the danger
4. Measures for averting the danger

Hazard levels

Signal color and signal word designate the hazard level.

 **DANGER**
Indicates an immediate danger. It will result in serious injuries or death if not avoided.



WARNING

Indicates a potential danger. Failure to avoid the danger may result in death or serious injury.



CAUTION

Indicates a potential danger. If not avoided, it may result in light or minor injuries.

NOTICE

Indicates a potentially damaging situation. If not avoided, the product or something in the surrounding area could be damaged.

2.6 Meaning of warning signs

Warning signs on the product or in the documentation indicate potential dangers or draw attention to certain behaviors in order to avoid accidents or damage.

Depending on the application purpose, the operating company attaches additional warning signs to the product. The corresponding instructions of the operator must be followed.

Table 3 Warning signs according to ISO 7010 (examples)

Warning signs / meaning		Warning signs / meaning	
	General warning sign		Warning of hot surface
	Warning of sharp object (cut/puncture)		Warning of hand injuries (crushing)
	Warning of electrical voltage		Warning of corrosive substances
	Warning of optical radiation		Warning of a laser beam
	Warning of flammable materials		Warning of biological hazard
	Warning of toxic materials		



3 Functional description

3.1 Overview of the instrument

Front

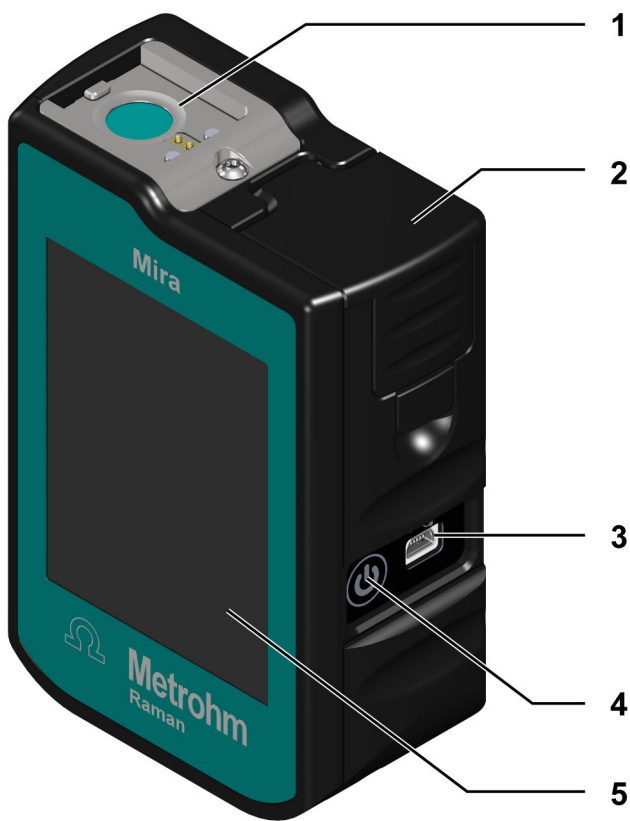


Figure 4 MIRA P – Front

1	Magnetic smart tip fixture/ laser aperture	2	Battery compartment
3	Type B mini USB connector	4	On/off switch
5	Touch screen		

Rear

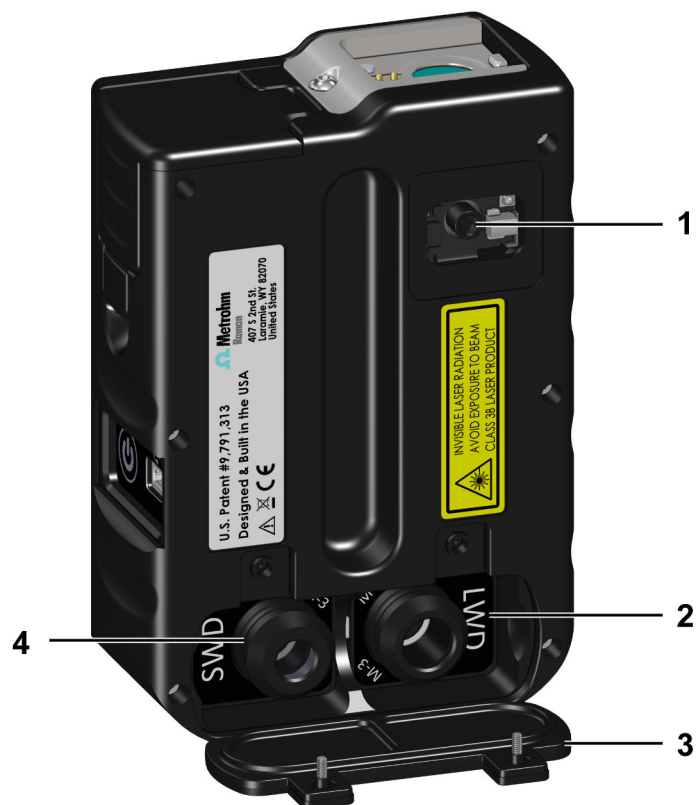


Figure 5 Mira P - Rear

- | | | | |
|----------|-----------------------------|----------|---|
| 1 | Barcode reader | 2 | Long Working Distance Attachment Lens (LWD) Storage |
| 3 | Accessories covering | 4 | Short Working Distance Attachment Lens (SWD) Storage |

Case

The instrument and attachments are delivered in a case. The contents vary depending on the product version.

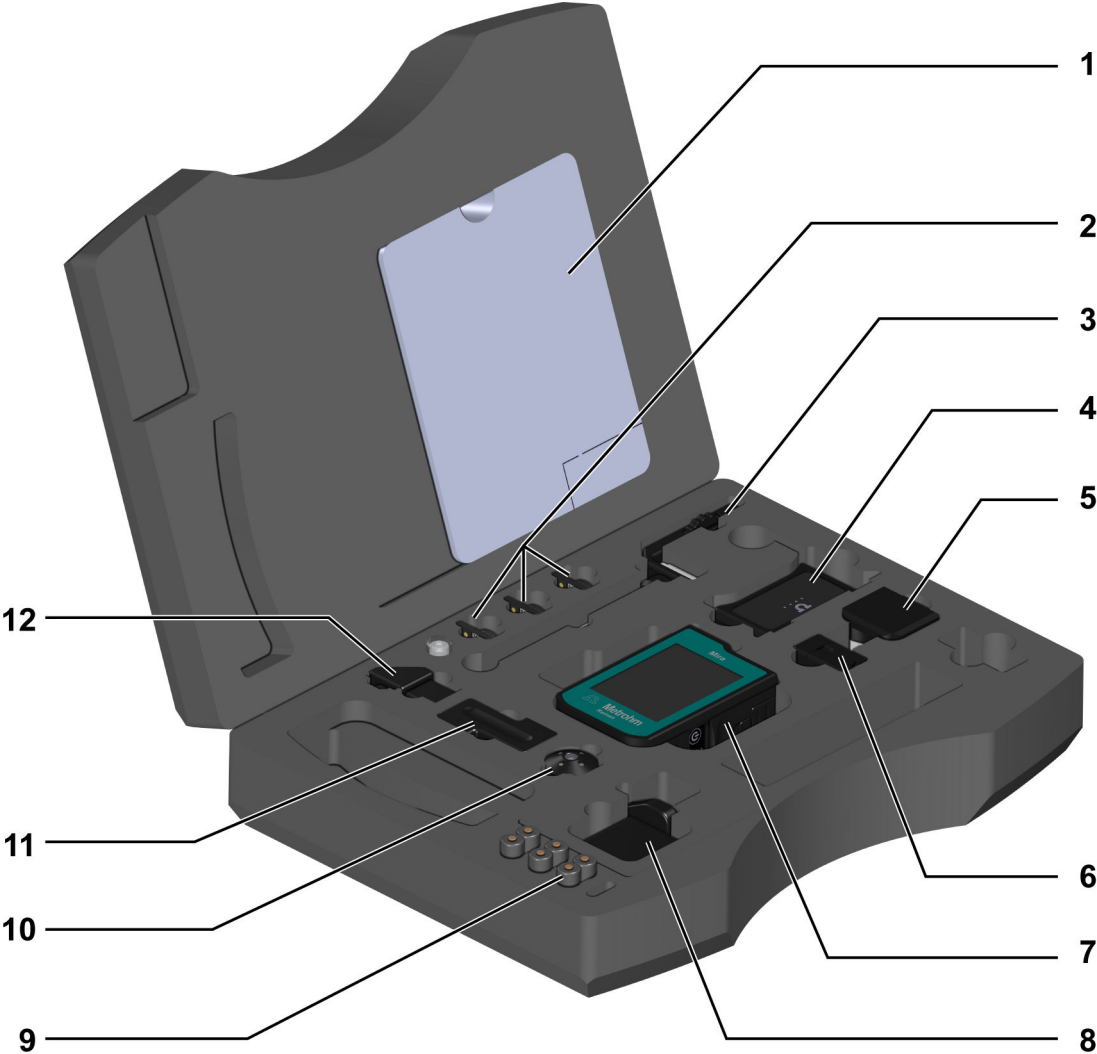


Figure 6 Mira P – Case (example)

1	Manual	2	SWD / LWD / XLWD
3	Contact Ball-Probe	4	MIRA PowerPack
5	Tablet Holder	6	Vial Holder
7	Mira P	8	Power supply unit
9	Batteries	10	iUA – MIRA intelligent Universal Attachment
11	Calibrate/Verify Attachment (CVA)	12	Right Angle Attachment

4 Delivery and storage

4.1 Delivery

Inspect the delivery immediately upon receipt:

- Check the delivery against the delivery note to ensure completeness.
- Check the product for damage.
- If the delivery is incomplete or damaged, contact your regional Met-
trohm representative.

4.2 Packaging

The product and accessories are supplied in protective special packaging. Keep this packaging to ensure safe transportation of the product. If a transport locking device is present, keep this as well for future reuse.

4.3 Storage

MIRA P

 Always remove batteries if the instrument is not in use.

MIRA PowerPack

- Check the storage conditions at least every 1 to 2 months ([see page 48](#)).
- 2 to 3 LED are likely sufficient.
- Recharge if necessary.

5 Installation

5.1 Energy supply with batteries

Battery indicator	Charge status
	Full
	Almost full
	Half full
	Yellow battery warning Metrohm recommends replacing the batteries when the battery indicator changes color from yellow to red.
	Red battery warning The instrument will give a low battery warning and then shut down.

Automatic shutdown

You can configure an automatic shutdown to save battery life ([see "Configuration", chapter 7.4, page 43](#)).

An optional MIRA PowerPack is available for 9+ hours operating time ([see "Energy supply with MIRA PowerPack", page 20](#)).

Changing batteries

The instrument uses 2 replaceable or rechargeable batteries of the AA 1.5 V DC type.



Battery type recommendation

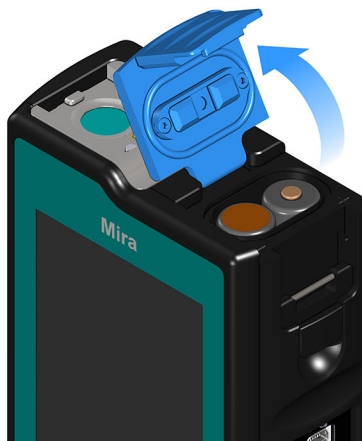
Use AA Energizer® Ultimate Lithium™-type batteries. Metrohm recommends as well rechargeable NiMH Panasonic eneloop pro™ batteries.

1



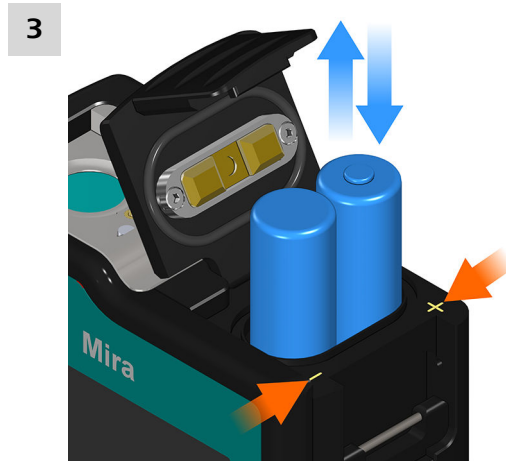
- Pull the lever.

2



- Open the top lid.

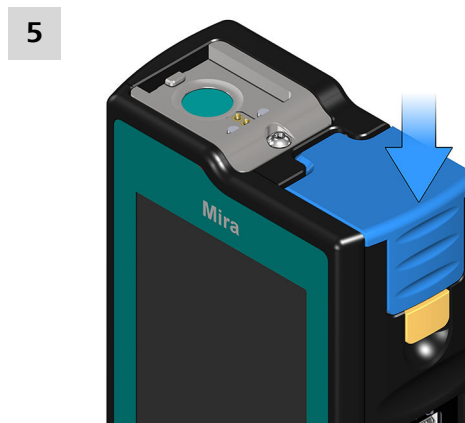




- Replace the batteries. Refer to the plus and minus signs on the housing.



- Close the lid.



- Push the lid downwards until the lock release mechanism engages.



Figure 8 MIRA PowerPack – Rear

1 USB-C connector

USB connector for charging MIRA PowerPack.

 Do not bend the cable.



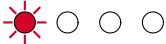
Charging instructions

MIRA PowerPack is shipped at <25% charge, in accordance with IATA regulations. Please charge MIRA PowerPack fully before first use.

- 1 Plug the power charger to the power grid and connect the USB-C plug to MIRA PowerPack USB-C connector.

The charge indicator will flash briefly while MIRA PowerPack determines the charge voltage.

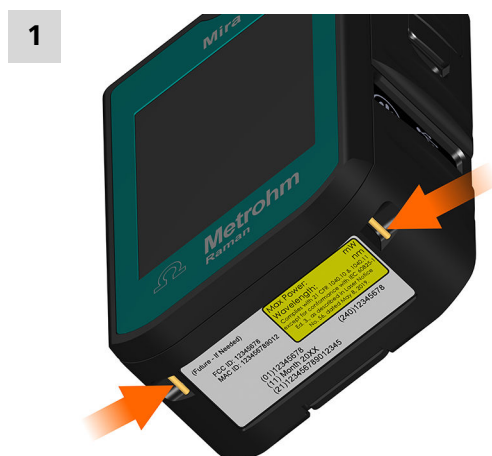
After a few seconds, the charge indicator will display the current state of charge.

Charging procedure	
	0%–25%
	25%–50%
	50%–75%
	75%–100%
	100%
Red lights progressing from 1 to 4	Charging procedure paused due to temperature.

 If no LED lights up after 30 minutes of charging procedure, press  for 10 seconds.

- 2** As soon as MIRA PowerPack is fully charged (all 4 LEDs are green), disconnect the power charger from the power grid.

Installing MIRA PowerPack



- Remove the lanyard from the lanyard pins.

2



- Holding the MIRA P and MIRA PowerPack with the front side facing forward, hook MIRA PowerPack's right latch onto the instrument's right lanyard pin.
- Press and hold down the lock button.
- Rotate MIRA PowerPack's left latch onto the instrument's left lanyard pin.
- Release the lock button.

3



- Connect the USB Mini-B plug to the instrument.

4

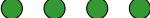
- Attach the lanyard to the MIRA PowerPack lanyard pins.

Checking the MIRA PowerPack state of charge

1

To check the state of charge, press the Check button .

MIRA PowerPack charge indicator will light for approximately 3 seconds. 4 LED indicator lights show the state of charge.

MIRA PowerPack state of charge	
	75%–100%
	50%–75%
	25%–50%
	<25%
	<5%, No output

5.3 USB connection

 We do not recommend to use third party USB cables, only use the provided Metrohm USB Mini-B cable (order number 6.215.1110).

Energy supply

For stationary use in the laboratory, you can operate the instrument with the USB interface which is connected to a powered USB hub. The USB hub also allows data transfer.

Battery charging function

The instrument has no charging function for rechargeable batteries. You must replace drained batteries.

Synchronization

Connect the instrument to the Windows PC that uses the USB Mini-B cable.

If the instrument is off, connecting the USB cable to a Windows PC initiates an instrument start-up.

Refer to **Tutorial MIRA Cal P** for detailed information (*see "Tutorial MIRA Cal P", chapter 1.3.2, page 3*).

5.4 Safe shutdown

 To prevent unexpected behavior in the instrument, always perform a safe shutdown.

A **safe shutdown** is performed in the following cases:

- The on/off switch is pressed.
- The battery is low.
- A battery-powered instrument is not in use for the duration specified in the shutdown delay.

An **unsafe shutdown** is performed in the following cases:

- The on/off switch is pressed and held for 3 seconds or longer.
- The battery door is opened while running on batteries only.
- The USB is unplugged while running on USB only.

6 Initial configuration



Configuration

Use **MIRA Cal P** software to change instrument settings or to install spectral libraries.

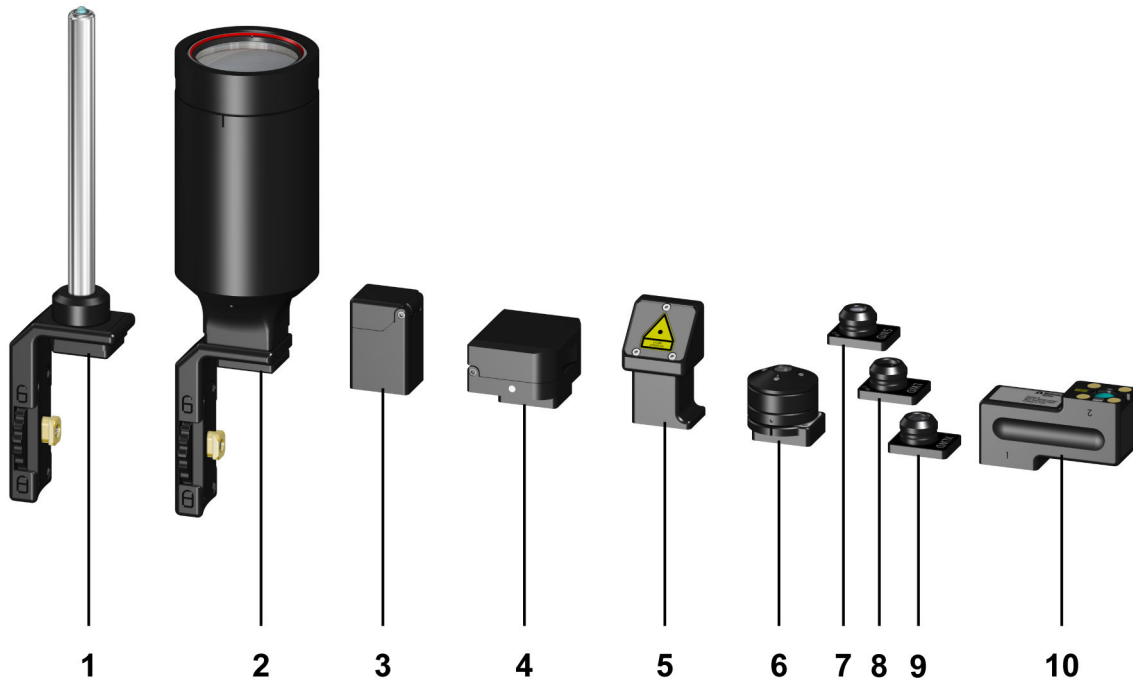
Refer to **MIRA Cal P** software tutorial for detailed information ([see "Tutorial MIRA Cal P", chapter 1.3.2, page 3](#)).

7 Operation and control

7.1 Smart Tips – Overview

Smart Tips are attached to the instrument with magnetic connectors. The Smart Tips contain a memory chip so that the instrument can identify them. By design, Smart Tips will not allow operation of the instrument when seated in an incorrect position.

The scope of delivery depends on the instrument version (*see "MIRA P", chapter 1.2.1, page 1*). You can purchase other Smart Tips separately (*see "Displaying accessories", chapter 1.5, page 6*). The following Smart Tips are available:



1 Contact Ball-Probe (6.07506.030)

3 Vial Holder (6.07502.000)

5 Right Angle Attachment (6.07506.000)

2 Standoff Attachment (6.07506.020)

4 Tablet Holder (6.07504.000)

6 iUA – MIRA intelligent Universal Attachment (6.07506.060)

7 Short Working Distance Attachment Lens (SWD) (6.07505.010)

8 Long Working Distance Attachment Lens (LWD) (6.07505.000)

9 Extra Long Working Distance Attachment Lens (XLWD) (6.07505.020)

10 Calibrate/Verify Attachment (CVA) (6.06071.040)

Tip	Description
1	The Contact Ball-Probe allows data collection on a sample without focus adjustment. Simply contact the substance with the probe to acquire the data. The 6" (15.3 cm) length of the stainless steel construction allows for easy cleaning. The focal point on the probe is 400 microns from the tip of the lens. This means the probe will not perform well on substances through a bag. The probe is designed for direct contact with liquids and solids. Sleeves are available to prevent contamination of the Contact Ball-Probe. Laser class 3B operation.
2	The Standoff Attachment enables data collection from a manually adjustable distance of 0.25 m to 1.5 m. The Standoff Attachment can be used for the determination of the contents in a 55-gallon drum/barrel or scan a container from across the room. The Standoff Attachment is not meant to be used outdoors. It is designed for use in low-light situations. Laser class 3B operation.
3	The Vial Holder is used for samples in glass vials. The interlock mechanism allows measurement with laser class 1. The laser stops if the housing is opened.
4	The Tablet Holder is used for different tablet or capsule shapes. A spring-loaded holder helps to mount and position the sample. The interlock mechanism allows measurement with laser class 1. The laser stops if the housing is opened.
5	The Right Angle Attachment allows the collection of data by placing the substance on a surface and laying the MIRA P down next to the substance with the Right Angle Attachment covering the substance. Ideal for a baggie on the hood of a squad car. Laser class 3B operation.

Tip	Description
6	The iUA provides the flexibility of a universal attachment with the intelligent mode of operation of the MIRA Smart Tips. - Use position ● for direct contact. The focal point is approximately 1 mm from the end of the attachment. - Use position ●● for thin plastic bags. The focal point is approximately 4 mm from the end of the attachment. - Use position ●●● for focusing through bottles. The focal point is approximately 8 mm from the end of the attachment. Laser class 3B operation.
7	The Short Working Distance Attachment Lens (SWD) is used for point and shoot measurement at short distances, for samples with direct contact or in thin plastic bags. The focal point is approximately 1 mm from the top of the lens. Laser class 3B operation.
8	The Long Working Distance Attachment Lens (LWD) is used for point and shoot measurements at long distances, typically for samples in thick-walled bottles. The focal point is approximately 8 mm from the top of the lens. Laser class 3B operation.
9	The Extra Long Working Distance Attachment Lens (XLWD) is used for extra long distance point and shoot measurements for samples in very thick containers such as glass bottles. The focal point is approximately 18 mm from the top of the lens. Laser class 3B operation.
10	The Calibrate/Verify Attachment (CVA) is needed for the calibration of the instrument. The CVA contains a toluene-acetonitrile calibration standard and a polystyrene verification sample.

7.2 Attaching Smart Tips

Using Calibrate/Verify Attachment (CVA)

 The CVA has 2 positions. Attaching the Smart Tip works the same way for both positions.

1



- Attach the Smart Tip by engaging the bottom left corner of the tip into the left edge of the mounting point. Rotate the tip into position.

Side **1** of the CVA contains a toluene-acetonitrile standard for **calibration**.

Side **2** of the CVA contains a polystyrene sample for **verification**.

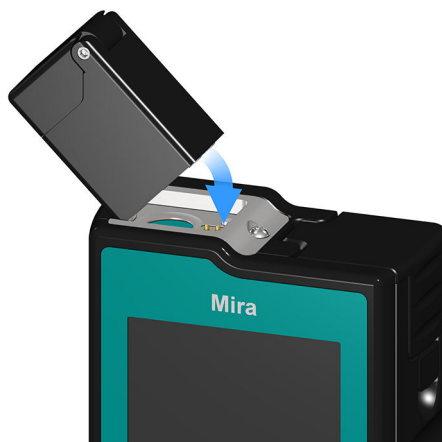


Using Vial Holder

Closing the lid prevents laser radiation from emerging.

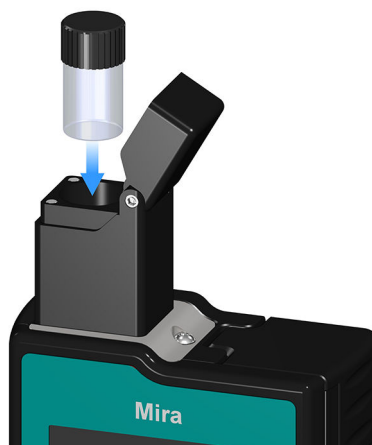
The lid contains a safety feature which cancels the measurement and stops the laser if you open the lid.

1



- Attach the Smart Tip by engaging the bottom left corner of the tip into the left edge of the mounting point. Rotate the tip into position.

2



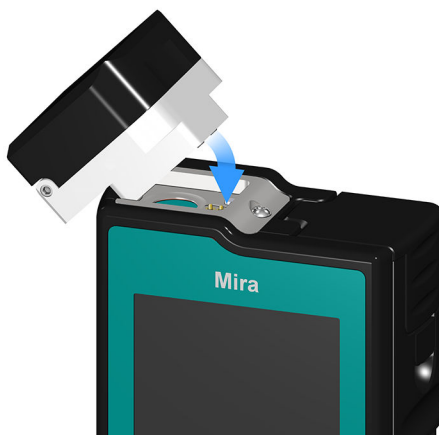
- Open the Vial Holder and insert a vial to measure its contents.

Using Tablet Holder

Closing the lid prevents laser radiation from emerging.

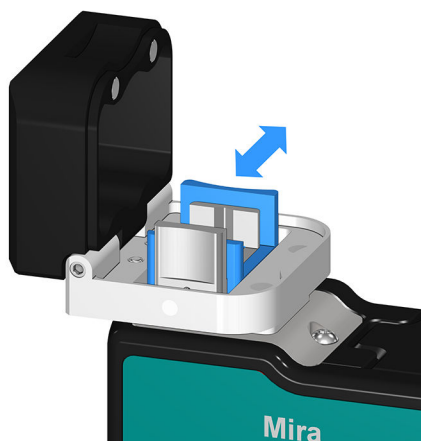
The lid contains a safety feature which cancels the measurement and stops the laser if you open the lid.

1



- Attach the Smart Tip by engaging the bottom left corner of the tip into the left edge of the mounting point. Rotate the tip into position.

2



- Open the Tablet Holder.
- Push the levers and position the sample in the middle.
- Release the levers to fix the sample.
- Close the Tablet Holder.

Using Intelligent Universal Attachment (iUA)



WARNING

Eye damage from laser radiation

Laser radiation can cause serious eye damages.

- Instruments must be used by trained personnel only. Follow the safety measures and instructions.
- Avoid exposure to laser radiation and specular reflections. Do not point the instrument at people.
- When working with open laser beams (3B laser classification of the complete device), **appropriate protective glasses** must be used, see Operating specifications chapter in the MIRA device manuals.
- Observe the nominal ocular hazard distance (NOHD) for the Smart Tip used. This distance defines the danger zone.
- Observe national laws.

If there is no specific safety standard or safety regulation for the working area, observe the standard ANSI Z136.1 or supplement IEC 60825.14 for guidance on the safe use of lasers.

1



- Attach the Smart Tip by engaging the bottom left corner of the attachment into the left edge of the mounting point. Rotate the attachment into position.



2



- Rotate the attachment to change the position. The attachment has 3 positions.



The number of dots above the notch indicates the position:

Table 4 Intelligent Universal Attachment (iUA)

Sampling	Focal point	Dots on attachment
Surface (direct contact)	$\cong 1\text{ mm}$	Position ●
Bag	4 mm	Position ●●
Bottle	8 mm	Position ●●●



Using attachment lenses (SWD, LWD, XLWD)



WARNING

Eye damage from laser radiation

Laser radiation can cause serious eye damages.

- Instruments must be used by trained personnel only. Follow the safety measures and instructions.
- Avoid exposure to laser radiation and specular reflections. Do not point the instrument at people.
- When working with open laser beams (3B laser classification of the complete device), **appropriate protective glasses** must be used, see Operating specifications chapter in the MIRA device manuals.
- Observe the nominal ocular hazard distance (NOHD) for the Smart Tip used. This distance defines the danger zone.
- Observe national laws.

If there is no specific safety standard or safety regulation for the working area, observe the standard ANSI Z136.1 or supplement IEC 60825.14 for guidance on the safe use of lasers.

- 1 ▪ Attach the Smart Tip by engaging the bottom left corner of the tip into the left edge of the mounting point. Rotate the tip into position.



Using Right Angle Attachment



WARNING

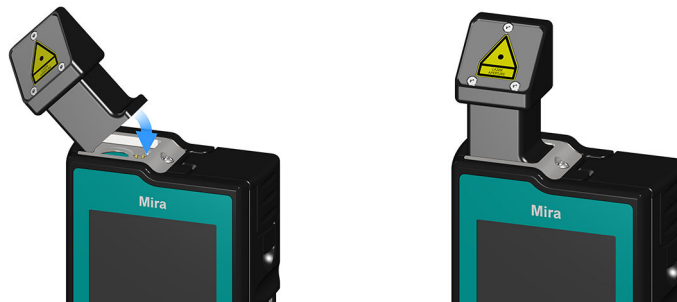
Eye damage from laser radiation

Laser radiation can cause serious eye damages.

- Instruments must be used by trained personnel only. Follow the safety measures and instructions.
- Avoid exposure to laser radiation and specular reflections. Do not point the instrument at people.
- When working with open laser beams (3B laser classification of the complete device), **appropriate protective glasses** must be used, see Operating specifications chapter in the MIRA device manuals.
- Observe the nominal ocular hazard distance (NOHD) for the Smart Tip used. This distance defines the danger zone.
- Observe national laws.

If there is no specific safety standard or safety regulation for the working area, observe the standard ANSI Z136.1 or supplement IEC 60825.14 for guidance on the safe use of lasers.

- 1 ▪ Attach the Smart Tip by engaging the bottom left corner of the tip into the left edge of the mounting point. Rotate the tip into position.



Using Contact Ball-Probe



WARNING

Eye damage from laser radiation

Laser radiation can cause serious eye damages.

- Instruments must be used by trained personnel only. Follow the safety measures and instructions.
- Avoid exposure to laser radiation and specular reflections. Do not point the instrument at people.
- When working with open laser beams (3B laser classification of the complete device), **appropriate protective glasses** must be used, see Operating specifications chapter in the MIRA device manuals.
- Observe the nominal ocular hazard distance (NOHD) for the Smart Tip used. This distance defines the danger zone.
- Observe national laws.

If there is no specific safety standard or safety regulation for the working area, observe the standard ANSI Z136.1 or supplement IEC 60825.14 for guidance on the safe use of lasers.

1



- Attach the Smart Tip: Seat the brass knob into the recess on the left side of the MIRA P.

2



- Tighten using the brass knob on the attachment. Do not over tighten.

Using Standoff Attachment



WARNING

Eye damage from laser radiation

Laser radiation can cause serious eye damages.

- Instruments must be used by trained personnel only. Follow the safety measures and instructions.
- Avoid exposure to laser radiation and specular reflections. Do not point the instrument at people.
- When working with open laser beams (3B laser classification of the complete device), **appropriate protective glasses** must be used, see Operating specifications chapter in the MIRA device manuals.
- Observe the nominal ocular hazard distance (NOHD) for the Smart Tip used. This distance defines the danger zone.
- Observe national laws.

If there is no specific safety standard or safety regulation for the working area, observe the standard ANSI Z136.1 or supplement IEC 60825.14 for guidance on the safe use of lasers.

- i** The **Standoff Attachment** is not meant to be used outdoors. It may be operated only in a defined and monitored laser area.

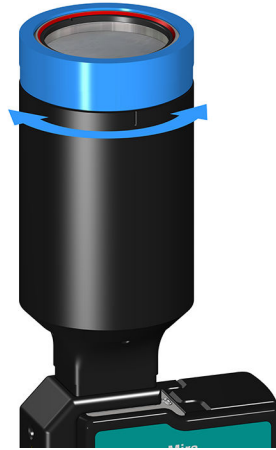


- Attach the Smart Tip: Seat the brass knob into the recess on the left side of the instrument.



- Tighten using the brass knob on the attachment. Do not over-tighten.

3



- Manually adjust the adjustment ring to the desired Standoff distance and perform the measurement.

 Metrohm recommends using a tripod in connection with the Standoff Attachment.

7.3 Data acquisition

The following steps show how to measure samples with the instrument.

 Operating procedures and users have to be defined and synchronized beforehand in MIRA Cal P. Refer to MIRA Cal P software tutorial for more information (*see "Tutorial MIRA Cal P", chapter 1.3.2, page 3*)

Make sure the instrument is connected to the power supply or has battery power.

1 Switching on the instrument

Switch on the instrument using the on/off switch.

2

Select your user name from the dropdown list, enter your password and click on **[Login]**.

3

If not already done, attach the correct smart tip to the instrument
(see "Attaching Smart Tips", chapter 7.2, page 30)

Within an operating procedure a certain smart tip type may be required. A data acquisition will only be possible when the instrument recognizes the correct smart tip.

4 Selecting an operating procedure

Select an operating procedure from the dropdown list.

5 Read a barcode



Click on  to use the barcode reader instead of typing in by hand.

Barcode functionality and behavior is defined in the operating procedure.

Click on **[Next]**.

6 Enter Batch ID, Lot ID, Container

Enter the Batch ID, Lot ID and Container by hand or use the barcode reader.

Click on **[Next]**.

7 Arm laser

Click on **[Arm laser]**.

Laser armed display is displayed.

8 Measuring the sample

- Click on **[Acquire]** to start the measurement.

When the data is acquired, a spectrum is displayed with information according to the definitions in the operating procedure.

9 Measuring the next sample

Click on **[Next]** to start the next measurement.

7.4 Configuration

Open Settings

1



Click on  to go to the settings section.

Speaker

Enable or disable the internal speaker. This will activate an acoustic signal when the barcode reader is used.

Calibrate Instrument

Calibrate the instrument ([see "Calibration", page 44](#)).

System Suitability Test

Conduct a system suitability test ([see "System suitability test \(SST\)", page 44](#)).

Automatic Shutdown

By default, no automatic shutdown is configured.

To conserve battery charge, an automatic shutdown can be specified. A battery-powered instrument will automatically shut down after the specified time.

Example: With the automatic shutdown time **3**, a battery-powered instrument will automatically shut down after 3 minutes of being not in use.

 The automatic shutdown will affect only battery-powered instruments. For an instrument connected to a power supply, to MIRA PowerPack or to a PC, the automatic shutdown is disabled.

Battery Chemistry

There are many different types of AA batteries. For an accurate battery life indicator, it is important to choose the battery chemistry that is being used in the device. The two chemistries that are supported are Li and NiMH.

Set the battery chemistry:

- 1** In the Settings section, click on **[Battery Chemistry]**.

- 2** Select the battery type:

- Lithium
- NiMH

The change will be reflected by the text in the battery indicator. This setting is persistent.

 We recommend to change the batteries when the battery indicator changes color from white to yellow, orange or red.

7.4.1 Calibrate an instrument

Calibration

- 1 Attach the CVA.

- 2 Click on the instrument settings icon

- 3 Click on **[Calibrate Instrument]**.

- 4** Click on **[Calibrate]**.

 Instrument calibration can also be done in Mira Cal P with a connected instrument.

System suitability test (SST)

- 1 Attach the CVA.

- 2 Click on the instrument settings icon 

- 3 Click on **System Suitability Test**.

4 Click on **Run SST**.

7.5 Safe shutdown

 To prevent unexpected behavior in the instrument, always perform a safe shutdown.

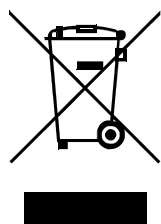
A **safe shutdown** is performed in the following cases:

- The on/off switch is pressed.
- The battery is low.
- A battery-powered instrument is not in use for the duration specified in the shutdown delay.

An **unsafe shutdown** is performed in the following cases:

- The on/off switch is pressed and held for 3 seconds or longer.
- The battery door is opened while running on batteries only.
- The USB is unplugged while running on USB only.

9 Disposal



Properly dispose of chemicals and of the product to reduce negative effects on the environment and public health. Local authorities, waste disposal companies or dealers provide more detailed information on disposal. Observe the WEEE EU directive (WEEE = Waste Electrical and Electronic Equipment) for the proper disposal of waste electronic equipment within the European Union.

10.4 Dimensions and materials

10.4.1 MIRA P – Dimensions and materials

Dimensions

<i>Width</i>	88.2 mm
<i>Depth</i>	45.3 mm
<i>Height</i>	125.5 mm
<i>Display</i>	3.7" TFT LCD resistive touch display, glove-compatible

Samples for Vial Holder

Vial Holder Vials 15 mm x 26 mm

Weight

705 g

Material

<i>Housing</i>	Aluminum anodized
<i>Accessories covering</i>	Thermoplastic elastomers (TPE-E)

Ruggedization

MIL-STD-810H Method 514.8 CAT 4	Common Carrier, Packaged
MIL-STD-810H Method 514.8 CAT 4	Composite 2 Wheeled Trailer, Packaged
MIL-STD-810H Method 514.8 CAT 4	Composite Wheeled Vehicle, Packaged
MIL-STD-810H Method 516.8 Procedure IV	Packaged, Logistic Transit Drop Test (Transit Drop, 26 drops from 48 inches to wood backed by con- crete)
MIL-STD-810H Method 516.8 Procedure VI	Bench Handling
MIL-STD-810H Method 512.6 Procedure I	Immersion

Dust and water



Protection Level of protective glasses D LB5 775–795 nm
(according to EN 207)

NOHD – Nominal Ocular Hazard Distance

Contact Ball-Probe	34.5 cm
Standoff Attachment at 0.25 m setting	12 m
Standoff Attachment at 1.5 m setting	125 m
Right Angle Attachment	34 cm $\pm$ 5 cm
iUA - intelligent Universal Attachment	34 cm $\pm$ 5 cm
Short Working Distance Attachment Lens (SWD)	34 cm $\pm$ 5 cm
Long Working Distance Attachment Lens (LWD)	34 cm $\pm$ 5 cm
Extra Long Working Distance Attachment Lens (XLWD)	66 cm $\pm$ 5 cm