English Reference Manual **Q3 Dosing Module** for XPR Analytical Balances

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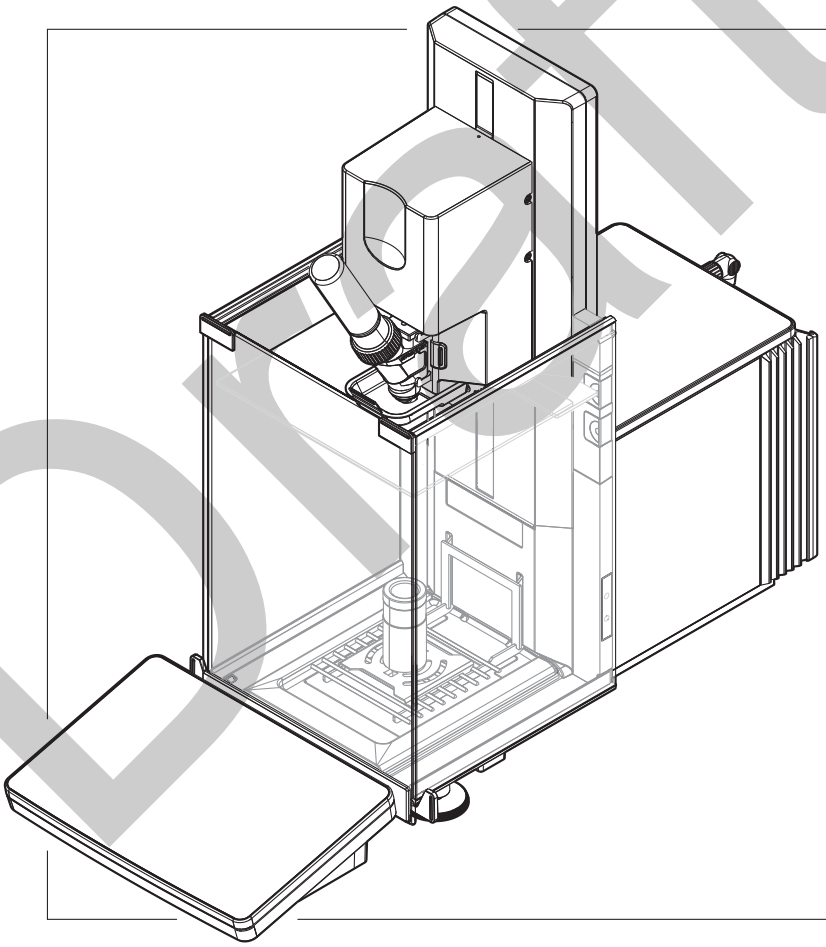

METTLER TOLEDO

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Reference Manual **Q3 Dosing Module**

English

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1 Introduction

Thank you for choosing a METTLER TOLEDO instrument. The instrument combines high performance with ease of use.

This document is based on the software version V 2.21.

1.1 Further documents and information

▶ www.mt.com/MS-precision

This document is available in other languages online.

▶ www.mt.com/Q3-RM

Search for software downloads ▶ www.mt.com/labweighing-software-download

Search for documents ▶ www.mt.com/library

For further questions, please contact your authorized METTLER TOLEDO dealer or service representative.

▶ www.mt.com/contact

1.2 Explanation of conventions and symbols used

Conventions and symbols

Key and/or button designations and display texts are shown in graphic or bold text, e.g., **Printer**.

Note For useful information about the product.

Refers to an external document.

Elements of instructions

- Prerequisites

1 Steps

2 …

⇨ Intermediate results

⇨ Results

1.3 Acronyms and Abbreviations

English term	Translated term	Explanation
EMC		Electromagnetic Compatibility
FCC		Federal Communications Commission
INI		Installation Instructions
LPS		Limited Power Source
POM		Polyoxymethylene
RFID		Radio-frequency identification
RM		Reference Manual
SELV		Safety Extra Low Voltage
SOP		Standard Operating Procedure
UM		User Manual
USB		Universal Serial Bus

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1.4 Compliance information

The compliance information related to this product can be found in appendix.

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2 Safety Information

- Read and understand the instructions in this manual before using the instrument.
- Keep this manual for future reference.
- Include this manual if you pass on the instrument to other parties.

If the instrument is not used according to the instructions in this manual or if it is modified, the safety of the instrument may be impaired and Mettler-Toledo GmbH assumes no liability.

2.1 Definitions of signal words and warning symbols

Safety notes contain important information on safety issues. Ignoring the safety notes may lead to personal injury, damage to the instrument, malfunctions and false results. Safety notes are marked with the following signal words and warning symbols:

Signal words

WARNING	A hazardous situation with medium risk, possibly resulting in death or severe injury if not avoided.
CAUTION	A hazardous situation with low risk, resulting in minor or moderate injury if not avoided.
NOTICE	A hazardous situation with low risk, resulting in damage to the instrument, other material damage, malfunctions and erroneous results, or loss of data.

Warning symbols

General hazard: read the User Manual or the Reference Manual for information about the hazards and the resulting measures.

Electrical shock

Notice

2.2 Product-specific safety notes

Intended use

This dosing system is designed to be used in analytical laboratories by trained staff. The dosing system is intended for weighing and dosing powder or liquid samples.

Any other type of use and operation beyond the limits of use stated by Mettler-Toledo GmbH without consent from Mettler-Toledo GmbH is considered as not intended.

Responsibilities of the instrument owner

The instrument owner is the person holding the legal title to the instrument and who uses the instrument or authorizes any person to use it, or the person who is deemed by law to be the operator of the instrument. The instrument owner is responsible for the safety of all users of the instrument and third parties.

METTLER TOLEDO assumes that the instrument owner trains users to safely use the instrument in their workplace and deal with potential hazards. METTLER TOLEDO assumes that the instrument owner provides the necessary protective gear.

Protective equipment

Chemical-resistant gloves

Gloves

Lab coat

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⚠ WARNING

Death or serious injury due to electric shock

Contact with parts that carry a live current can lead to death or injury.

1 Only use the METTLER TOLEDO power supply cable and AC/DC adapter designed for your instrument.
2 Connect the power cable to a grounded power outlet.
3 Keep all electrical cables and connections away from liquids and moisture.
4 Check the cables and power plug for damage and replace damaged cables and power plugs.

⚠ WARNING

Injury and/or damage due to hazardous substances

Chemical, biological or radioactive hazards can be associated with the substances processed by the instrument. During dosing procedures, small amounts of the dosed substance may become airborne and penetrate the instrument or contaminate its surroundings.

The substance characteristics and related hazards is the full responsibility of the instrument owner.

1 Be aware of possible hazards associated with the substance and take adequate safety measures, e.g., those stated on the safety data sheet provided by the manufacturer.
2 Make sure that every instrument part in contact with the substance will not get altered or damaged by the substance.

⚠ WARNING

Injury or damage due to powder handling

Powders may get compacted in the dosing head and block it. Too much force applied by the dosing head mechanism may lead to a break and potentially hazardous substances may get airborne.

1 Handle the dosing heads with care.
2 If the dosing head seems blocked, avoid further dosing. Remove the head from the instrument and turn it upside down to loosen the powder.
3 Cease work immediately in the event of leak or break.

⚠ WARNING

Injury and/or damage due to reacting, flammable, or explosive substances

During the dosing procedure, substances could be combined and cause an exothermic reaction or explosion. This includes powders, liquids, and gases. It may lead to serious injuries and significant material damage.

The sample characteristics and related hazards is the full responsibility of the instrument owner.

1 Be aware of possible hazards associated with reacting, flammable, or explosive substances.
2 Ensure a working temperature low enough to prevent the formation of flames or an explosion.

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⚠ WARNING

Injury or death due to toxic substances

If you use toxic, explosive, or flammable liquids with the pump, the exhaust air will be contaminated.

– Connect a tube to the exhaust air outlet to collect the contaminated air.

⚠ WARNING

Injury and/or damage due to reacting substances

When pressure is released from the bottle, the air/gas in the bottle moves back towards the pump. The air/gas coming from the coupled outlets mixes in the pump. Molecules of the substances in the various bottles can get in contact through this contaminated air/gas.

1 Do not connect bottles with incompatible liquids to the same pump simultaneously.

2 Before connecting a second, incompatible liquid to the pump, disconnect the first bottle and purge the pump cavity with clean air/gas.

⚠ WARNING

Injury and damage to pump or bottle due to high pressure

High pressure from external gas can damage the pump or the bottle.

1 Use a regulator on the external gas line.

2 Ensure that the pressure of the external gas does not exceed 0.5 bar (7.2 psi).

⚠ CAUTION

Injury due to splashing liquids

If the pressure in the bottle is not released, liquid might splash when removing the micro dosing valve, opening the bottle, or removing the liquid tube.

– Always release pressure before removing the micro dosing valve, opening the bottle, or removing the liquid tube.

⚠ CAUTION

Injury due to leaking liquids

Wrongly cut tubing can result in leaking connections.

– Cut the tubes with a tube cutter or a sharp knife.

⚠ CAUTION

Injury due to moving parts

– Do not reach into the working area while parts of the instrument are moving.

⚠ CAUTION

Injury due to sharp objects or broken glass

Instrument components, e.g., glass, can break and lead to injuries.

– Always proceed with focus and care.

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NOTICE

Damage to the instrument due to the use of unsuitable parts

Using unsuitable parts with the instrument can damage the instrument or cause it to malfunction.

– Only use parts from METTLER TOLEDO that are intended to be used with your instrument.

NOTICE

Damage to the instrument

The instrument contains no user-serviceable parts.

1 Do not open the instrument.

2 In the event of problems, please contact a METTLER TOLEDO representative.

NOTICE

Damage to the instrument due to inappropriate cleaning methods

The instrument can be damaged by certain cleaning agents, solvents, or abrasives. If liquids enter the housing, they can damage the instrument.

1 Only use a wet cloth with water and a mild detergent to clean the instrument or terminal.

2 Wipe off any spills immediately.

3 Make sure that no liquid penetrates the instrument.

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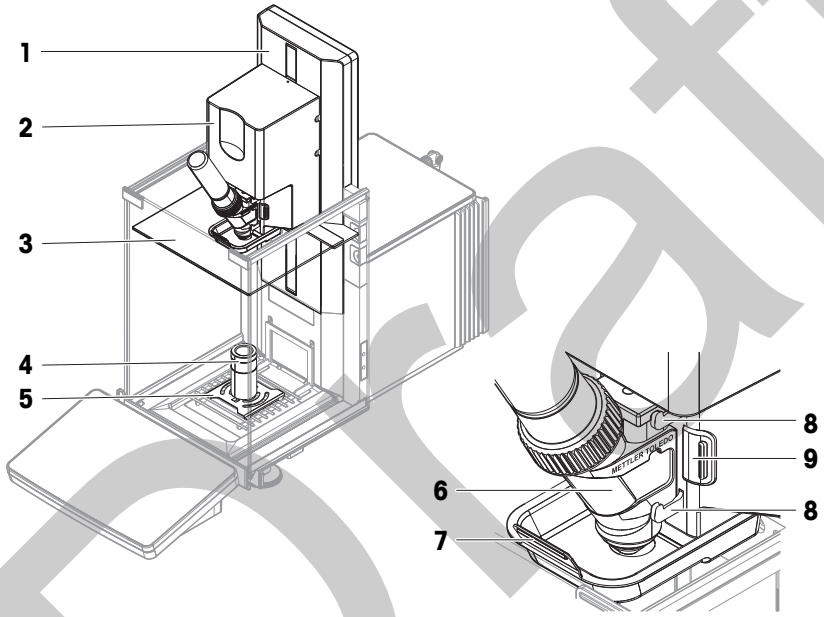
3 Design and Function

3.1 Function description

The **Q3 dosing module** can be added to any **XPR analytical balance** to perform automatic dosing of powders and/or liquids. The powder or liquid dosing head is attached to the dosing module and stays outside of the weighing chamber during the whole dosing procedure. The top door of the balance is replaced by a top panel with an opening through which the powder or liquid is dosed. The top panel moves down with the dosing module and the dosing head until the distance to the sample vessel is appropriate for dosing. The weighing chamber is therefore closed during the whole dosing procedure, providing the best possible dosing performances.

When liquid is dosed, the **QL3 pump** and **QLL kit for bottle** are used together with the **Q3 dosing module**. The **QL3 pump** is used to build pressure in the bottle. When the pressure is high enough, the micro dispensing valve in the liquid dosing head opens and liquid can ascend the liquid tube. Several pumps can be connected to the balance simultaneously.

3.2 Overview



1	Dosing lift	**6**	Powder dosing head
2	Dosing module	**7**	Sealing insert
3	Top panel	**8**	Dosing head holder
4	Vial adapter	**9**	Dosing head release button
5	ErgoClip adapter holder		

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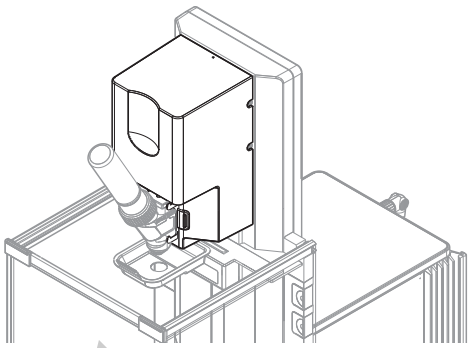
3.3 Components description

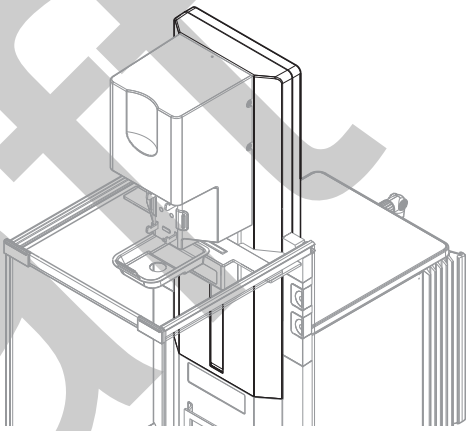
Dosing module

The dosing module is designed to hold the dosing head and can automatically move up and down during the dosing procedure.



Dosing lift

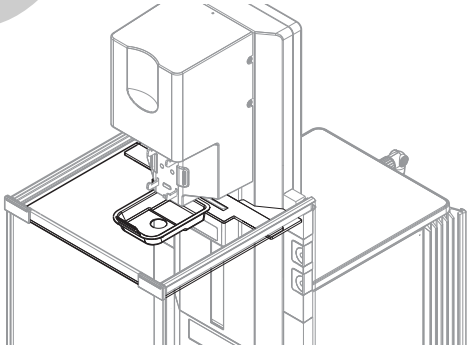
The dosing lift is fixed to the back of the weighing chamber. It contains the mechanism that moved the dosing module up and down during the dosing procedure and is controlled through the terminal.



Top panel

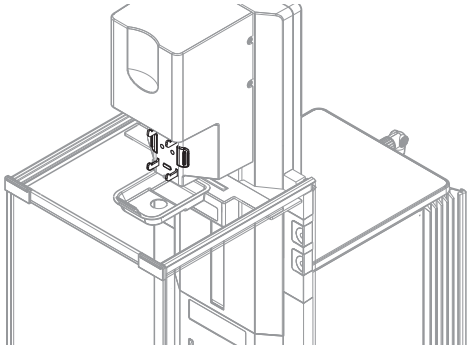
The Q3 dosing module includes a top panel especially designed to minimize the influence of the environment on the dosing process. An opening in the top panel allows the tip of the dosing head to penetrate the weighing chamber while dosing. The top panel is attached to the bottom part of the dosing module, moving up and down together with it.

While the dosing module is at its uppermost position, other weighing methods and accessories can be used normally.



Dosing head holder

The dosing head holder consists of four pins that hold the dosing head in place. Once installed, the dosing head is secured and can only be released by pressing the release buttons on either side of the holder. This holder includes an RFID reader to easily identify the attached dosing head.



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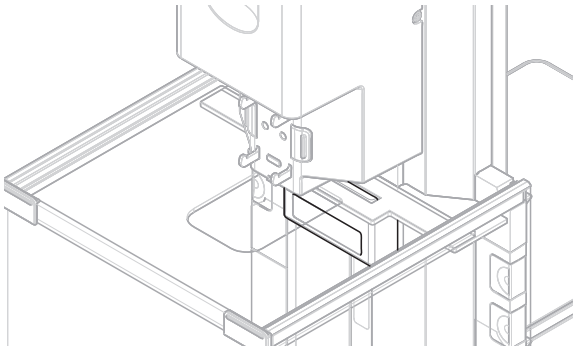
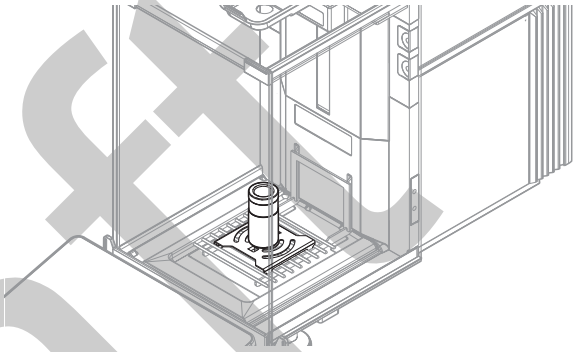
Optical sensor for vial detection

The dosing module is equipped with an optical sensor to detect the position of the vial opening. This allows automatic vertical positioning of the dosing module for fast and safe dosing.



ErgoClip adapter holder and adapters

The Q3 dosing module includes an adapter holder that can be placed on the SmartGrid weighing pan. It can hold adapters of various sizes allowing perfect positioning of different sample vessels. Additional adapters are available as accessories.



See also

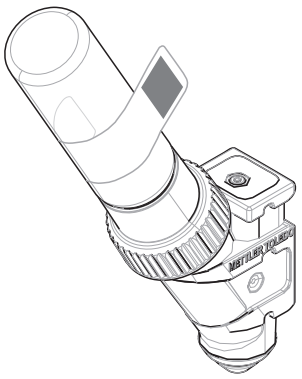
Accessories ▸ Page 42

3.4 Dosing heads and equipment

Powder dosing head

Powder dosing heads are used for automatic powder dosing. If only a small quantity of powder is required, the dosing head can be used without a vial attached to it. In this case, the opening can then be closed using the spare cap included in the delivery. The dosing heads can be stored in appropriate storage containers. Vials and storage containers need to be purchased separately.

If a printer is connected, you can use a pre-defined template to print a label with the dosing-head data from the RFID tag and affix this label to the dosing head.



Powder test head

The powder test head is used to test a powder dosing system. The dosing head is filled with calcium carbonate ($CaCO_3$) and uses a predefined test program to check the dosing functionality of the system. The powder test head is programmed to perform 15 tests. Each test weighs 10 doses of a pre-defined amount of powder. If your instrument fails the tests, inform a METTLER TOLEDO service technician.

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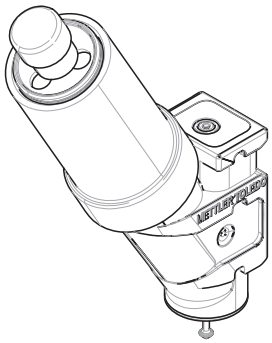
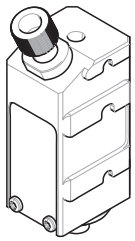
Weight test head

The weight test head performs an automated repeatability test by placing a test weight on given tare weights. The repeatability of the system is determined based on 10 consecutive measurements of the test weight. If your instrument fails the tests, inform a METTLER TOLEDO service technician.



Liquid dosing head

Liquid dosing heads areused for automatic liquid dosing. They are used together with a pump and bottle. The liquid dosing head contains an RFID tag which stores information about the dosing head and the used substance.

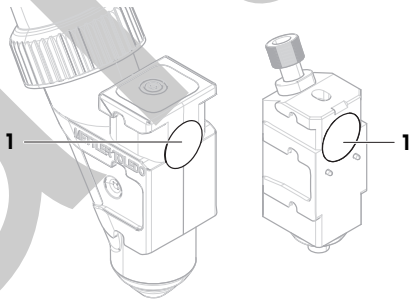


3.5 Dosing head RFID tag

Each powder and liquid dosing head is equipped with an integrated RFID tag (**1**) that stores and exchanges data with the instrument.

Various data is stored in the RFID tag of the dosing heads, such as the substance name, lot ID, filling date, expiry date, etc. It can also include customized data fields.

This data can be edited on the terminal and should be set before using a new dosing head for the first time to have the data available for reports and labels.



For powder dosing heads, the counter for the remaining powder dosing cycles is based on the lifetime limit of the dosing head, which can be defined by the customer. With every dosing cycle started, the counter is decreased by 1. If the counter drops to zero, consider replacing the dosing head. If the vial of the old dosing head still contains a considerable amount of powder, you may remove the vial from the old dosing head and screw it onto the new dosing head. Copy the user data and the powder content value from the old dosing head to the new dosing head.

The quantity of powder added to the dosing head can be stored in the RFID tag during the filling procedure. The RFID information is updated after each dosing operation such that the powder quantity in the dosing head is up to date. If the remaining quantity of powder is insufficient for the next dosing cycle, a warning message will appear.

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4 Installation and Putting into Operation

This instrument must be installed by a METTLER TOLEDO service technician.

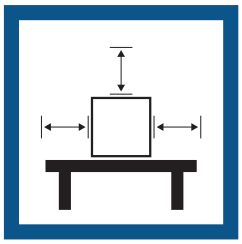
4.1 Selecting the location

A balance is a sensitive precision instrument. The location where it is placed will have a profound effect on the accuracy of the weighing results.

Requirements of the location

Place indoors on stable table

Ensure sufficient spacing

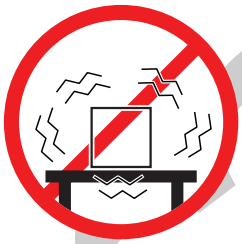


Level the instrument

Provide adequate lighting

Avoid direct sunlight

Avoid vibrations



Avoid strong drafts

Avoid temperature fluctuations

Sufficient spacing for balances: > 15 cm all around the instrument

Take into account the environmental conditions. See "Technical Data."

Note

The powder delivery mechanism of the Q3 dosing module might cause the instrument to vibrate. Do not place on the same working surface as other instruments that are sensitive to vibrations.

4.2 Scope of delivery

Q3 dosing module

- Dosing module
- Dosing lift
- Top door dosing module
- Sealing inserts, 5 pcs
- Powder dosing head
- ErgoClip adapter holder
- Various vial adapters, 4 pcs
- Declaration of conformity
- User Manual

Recommended options

- EasyHub USB
- Antistatic kit

The scopes of delivery for the **QL3 pump** and the **QLL kit for bottles** are in the documentation delivered with these products.

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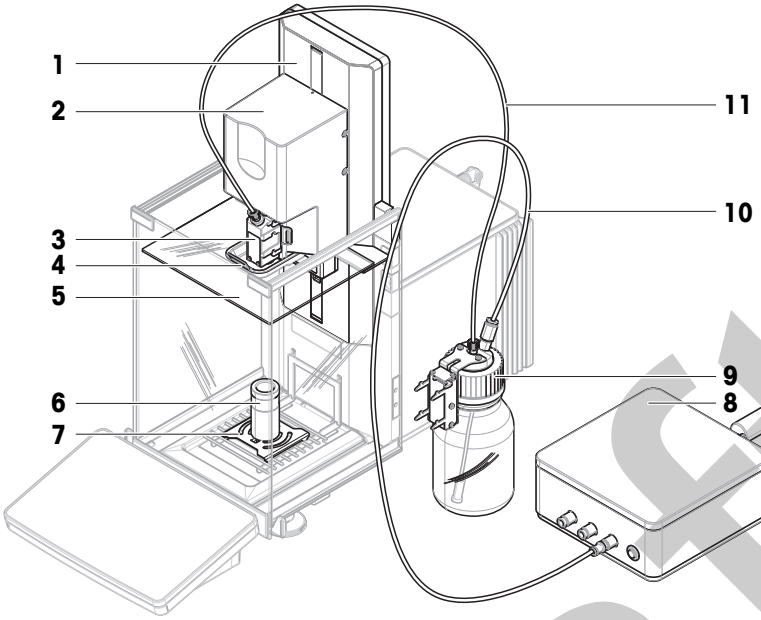
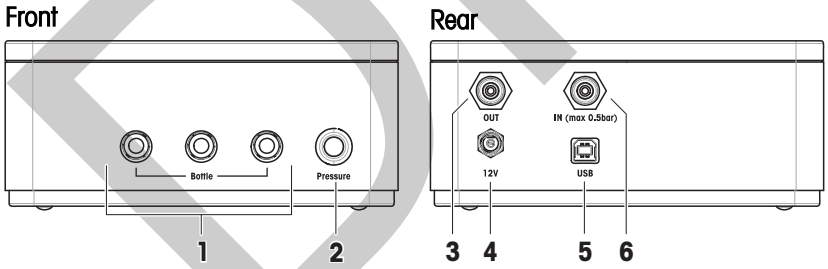
4.3 Setting up the liquid dosing configuration

4.3.1 Overview



1	Dosing lift	**7**	ErgoClip adapter holder
2	Dosing module	**8**	QLL kit for bottles (available separately)
3	Liquid dosing head	**9**	QL3 pump (available separately)
4	Sealing insert	**10**	Air tube (included in QLL kit for bottles)
5	Top panel	**11**	Liquid tube (included in QLL kit for bottles)
6	Vial adapter		

4.3.2 Interface of the pump



1	Air outlets to bottle	**4**	Socket for AC/DC adapter
2	Pressure release button and indicator light	**5**	USB port
3	Air exhaust outlet	**6**	Air inlet

4.3.3 Wiring the pump

The instrument is supplied with an AC/DC adapter and a country-specific power cable. The AC/DC adapter is suitable for use with:

100 – 240 V AC, 50/60 Hz.

1 Install the cables in such a way that they cannot be damaged or interfere with operation.

2 Insert the plug of the AC/DC adapter in the power inlet of the pump.

3 Secure the plug by firmly tightening the knurled nut.

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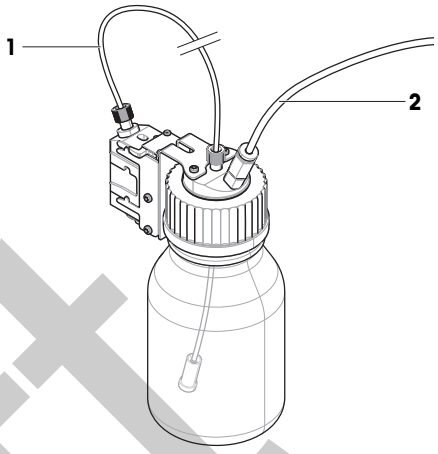
4 Insert the plug of the power cable into a grounded power outlet that is easily accessible.

5 Using the USB cable, connect the USB port of the pump to the USB device port of the balance.

4.3.4 Connecting the tubes

Tubes definition

The liquid tube is the thinner tube (**1**) used for transporting liquid from the bottle to the liquid dosing head. The air tube is the slightly bigger tube (**2**) used for pumping air into the bottle. By adding air through the air tube, pressure rises in the bottle. When the pressure reaches the configured target pressure, between 0.3 and 0.5 bar (4.4 to 7.2 psi), the micro dispensing valve in the dosing head opens and liquid can ascend the liquid tube. .



1 Liquid tube
2 Air tube

Preparing the liquid tube

⚠ CAUTION

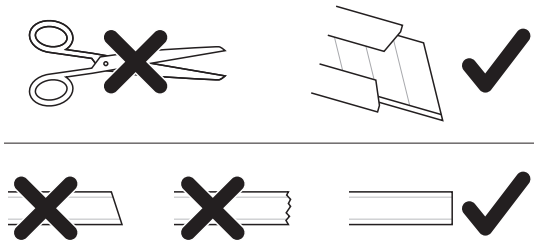
Injury due to leaking liquids

Wrongly cut tubing can result in leaking connections.

– Cut the tubes with a tube cutter or a sharp knife.

- The liquid dosing head is inserted in the liquid dosing head support of the bottle.

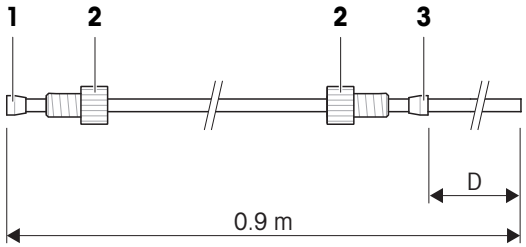
1 Using a tube cutter or a sharp knife, cut a sufficient amount of tubing. The appropriate length mainly depends on the distance between the bottle and the dosing module while dosing.
Recommended length: about 0.9 m



2 Place the sealing ring (**1**) on a flat stable surface, e.g., a table or a workbench, with the wider end downwards.

3 Take the end of the liquid tube and press it into the sealing ring.

⇨ This is the dosing-head end of the tube. The opposite end is the bottle end.



4 Thread the fastening nuts (**2**), paying attention to the orientation.

5 Thread the sealing ring (**3**) from the bottle end of the tube. Pay attention to the orientation.

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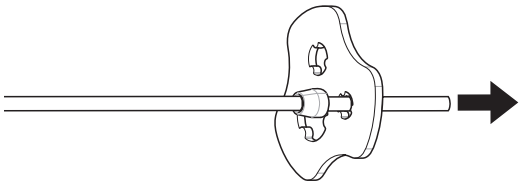
6 Using the micro dosing valve tool, slide the sealing ring until the distance (D) is enough for the tube to reach the bottom of the bottle. Recommended distances for typical bottle volumes are listed next.

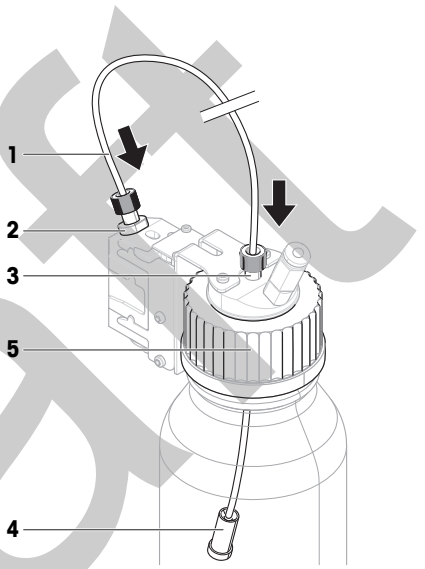


Typical distances (D) between the sealing ring and the bottle-end of the tube

Thread	Bottle volume	Distance (D)
GL45	1000 ml	220 mm
	500 ml	170 mm
	250 ml	135 mm
GL25	25 ml	90 mm

Connecting the liquid tube

1 Insert the dosing-head end of the tube (**1**) in the dosing head (**2**).
2 Tightly fasten the fastening nut to the dosing head.
3 Insert the bottle end of the tube through the corresponding hole in the bottle cap (**3**). The tube should reach the bottom of the bottle.
4 If needed, attach the suction filter (**4**) to the bottle end of the tube.
5 Tightly fasten the fastening nut to the bottle cap.
6 Screw the cap to the bottle (**5**).



The suction filter is used to ensure that no particles or impurities are carried through the liquid dosing head. Using the suction filter will extend the life time of the dosing head. However, when dosing solutions, molecules of one of the substances might be absorbed by the suction filter, altering the concentration of the solution. The suction filter should only be used when dosing pure solvents.

Connecting the air tube

⚠ WARNING

Injury and/or damage due to reacting substances

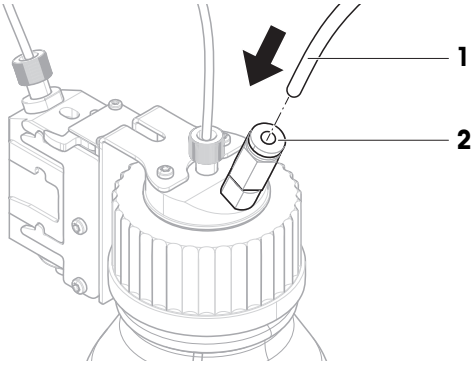
When pressure is released from the bottle, the air/gas in the bottle moves back towards the pump. The air/gas coming from the coupled outlets mixes in the pump. Molecules of the substances in the various bottles can get in contact through this contaminated air/gas.

1 Do not connect bottles with incompatible liquids to the same pump simultaneously.
2 Before connecting a second, incompatible liquid to the pump, disconnect the first bottle and purge the pump cavity with clean air/gas.

Draft

1 Using a tube cutter or a sharp knife, cut a sufficient amount of tubing. The appropriate length mainly depends on the distance between the bottle and the pump while dosing.
Recommended length: about 0.7 m

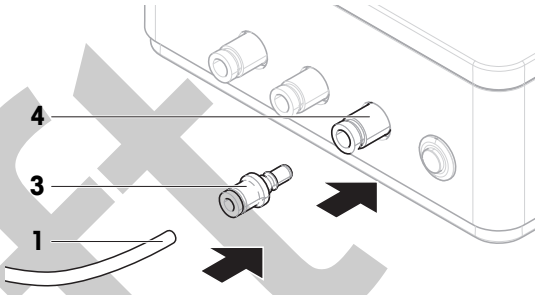
2 Connect the air tube (**1**) to the air inlet of the bottle (**2**)



3 Insert the other end of the air tube (**1**) in a tube adapter (**3**) and press firmly.

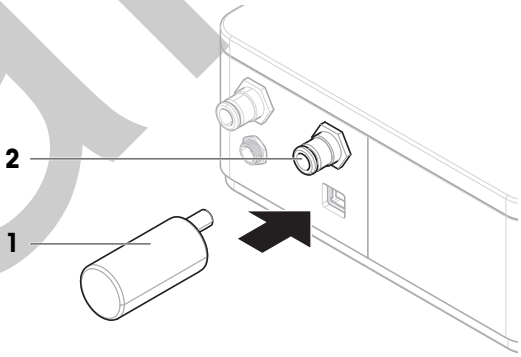
4 Connect the tube adapter (**3**) to one of the air outlets (**4**) of the pump. Press until you hear a click.

When a tube is connected to the air outlet of the pump, the valve of the air outlet opens. Never leave a tube that is connected to the air outlet unconnected at the other end because pressure can not be built up.
You can connect up to 3 bottles to each pump.



Connecting the muffler

– Insert the muffler (**1**) into the air inlet (**2**) to absorb the noise.



Removing the air tube

NOTICE

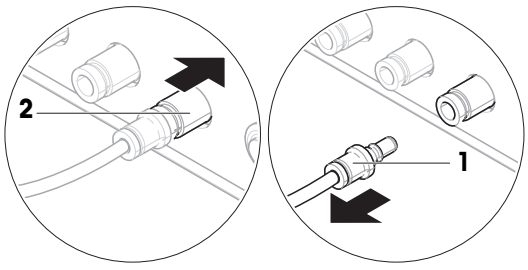
Damage to tube connectors due to mishandling

If the tubes are not removed correctly, the connectors of the pump and the bottle cap can be damaged.

– To remove the tubes, press down the ring on the connector and pull out the tube carefully.

1 Remove the tube adapter (**1**) from the pump by pushing the connector (**2**) of the air outlet towards the pump.

⇨ The adapter is released and can be removed.



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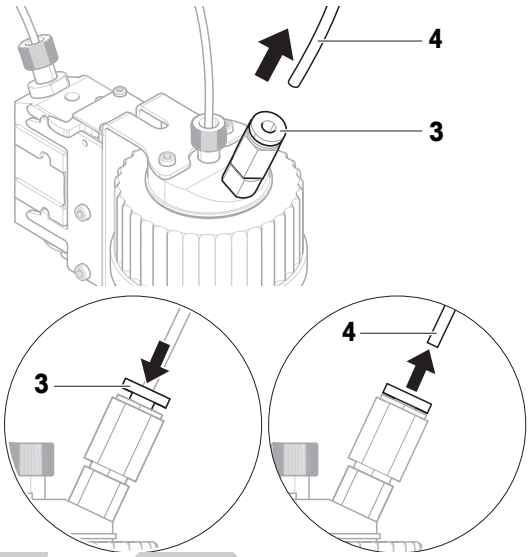
2 Remove the air tube from the bottle by firmly pressing down the ring (**3**) and pulling the tube (**4**) simultaneously.

3 If necessary, e.g., for maintenance purposes, use the same procedure to remove the air tube from the tube adapter: firmly press the ring and pull the tube simultaneously.



Using the pump with external gas

The liquid can be protected by feeding an external gas, e.g., nitrogen, to the pump. Make sure that the pressure of the external gas does not exceed 0.5 bar (7.2 psi).

⚠ WARNING

Injury and damage to pump or bottle due to high pressure

High pressure from external gas can damage the pump or the bottle.

1 Use a regulator on the external gas line.

2 Ensure that the pressure of the external gas does not exceed 0.5 bar (7.2 psi).

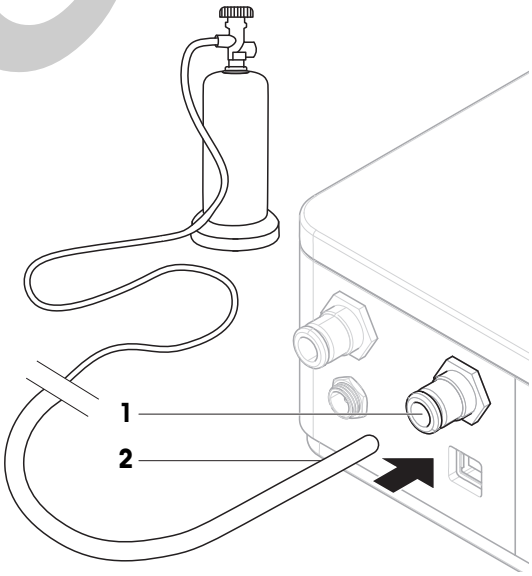
- A regulator is connected to the external gas line.

1 Remove the muffler from the air inlet (**1**).

2 Connect the tube of external gas (**2**) to the air inlet (**1**).

Note

Outer tube diameter: 6 mm
Pressure in external gas line: The pressure must be at least0.1 bar (1.5 psi) The pressure must not exceed the configured dosing pressure set on the terminal.
The external gas tube is not provided by METTLER TOLEDO.



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Collecting contaminated air

⚠ WARNING

Injury or death due to toxic substances

If you use toxic, explosive, or flammable liquids with the pump, the exhaust air will be contaminated.

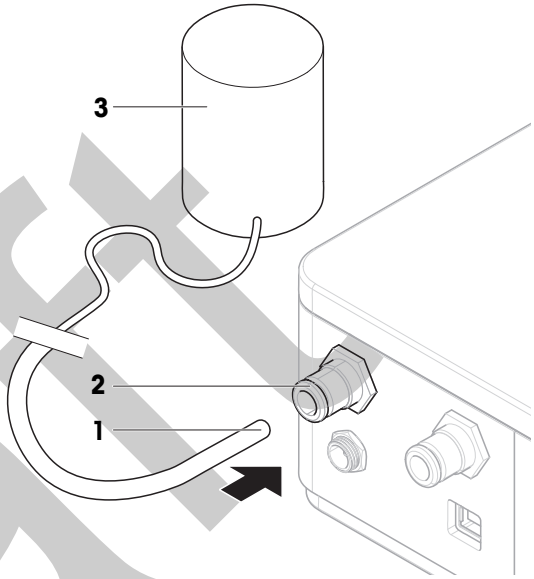
– Connect a tube to the exhaust air outlet to collect the contaminated air.

– Connect a tube (**1**) to the exhaust air outlet (**2**) to collect the contaminated air into a safe container (**3**).

Note

Outer tube diameter: 6 mm

The exhaust air tube is not provided by METTLER TOLEDO.



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5 Operation

For further information, consult the XPR Reference Manual (RM).

▶ www.mt.com/XPR-analytical-RM

5.1 Installing and removing the dosing head

When the dosing module is in its upper-most position, the dosing head is unlocked. That means that it can be released by pressing the release buttons of the holder. During dosing, the dosing head is locked and cannot be removed until it returns to its upper-most position.

Installing the dosing head

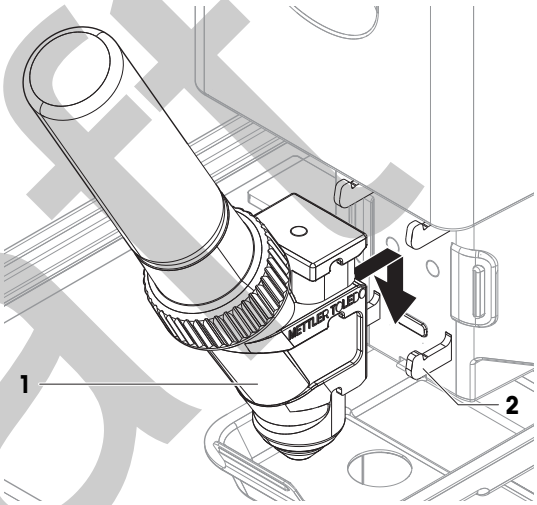
- The dosing module is in the upper-most position.

1 Slide the dosing head (**1**) onto the dosing head holder (**2**) until it comes to a stop.

2 Slightly press down the dosing head until it properly sits in the dosing head holder (**2**).

⇨ The dosing head is locked in the holder. Check that it is secured by slightly pulling on it.

⇨ The dosing head is ready to dose.

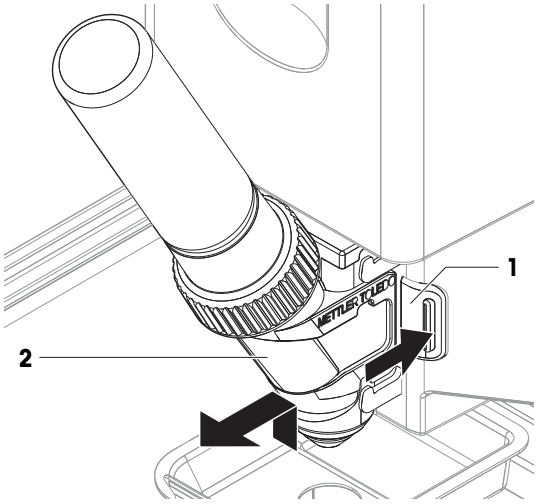


Removing the dosing head

- The dosing module is in the upper-most position.

1 Press the release button (**1**) on either side of the dosing head holder to release the dosing head (**2**).

2 Simultaneously, pull the dosing head (**2**) up and outwards.



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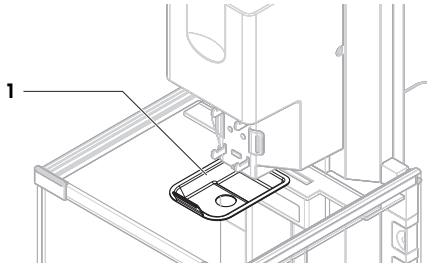
5.2 Installing the sealing insert

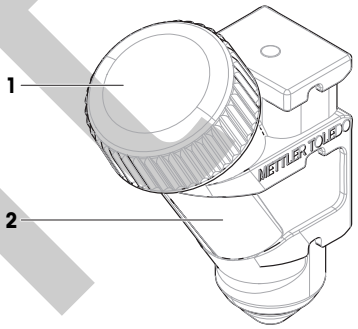
Always install a sealing insert (**1**) to avoid air drafts in the weighing chamber.



5.3 Powder dosing

5.3.1 Using dosing heads without a vial

Most powder dosing heads can be used with or without a vial, since the neck of the dosing head can accommodate a certain amount of powder. Using dosing heads without vials is particularly relevant when dosing very small quantities. In this case, they need to be closed using the provided spare cap (**1**). The neck (**2**) of the QH002, QH008, QH010, and QH012 dosing heads have a capacity of 2 ml, 8 ml, 10 ml, and 12 ml, respectively.



5.3.2 Refilling the vial of a powder dosing head

Software functions to easily refill the dosing head are available through the terminal of the balance. Consult the Reference Manual (RM) of the balance for more information.

- The dosing head is removed.

1 Turn the dosing head upside down.

2 Gently tap on it to let the remaining powder flow back into the vial.

3 ⚠ **WARNING: Injury or contamination from hazardous substances. Take the appropriate measures to avoid injuries and contamination.**
Unscrew the vial.

4 Place the vial on the weighing pan.

5 Press →T← to tare the balance.

6 Fill the vial with the desired amount of the appropriate substance.

7 Note down the weight of added substance or tap the corresponding button on the terminal.

8 Remove the vial from the weighing pan.

9 Holding the vial upright and the dosing head upside down, screw the dosing head onto the vial.

10 Turn the dosing head upright and install on the dosing module.

11 On the terminal, edit the settings of the dosing head to include the added amount of powder.

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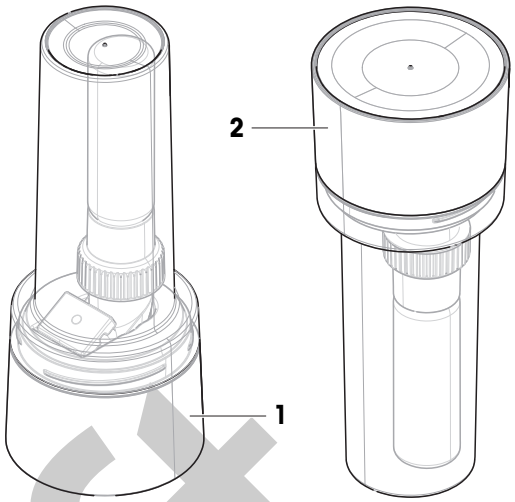
5.3.3 Storing powder dosing heads

For short-term and long-term storage of the powder dosing heads, METTLER TOLEDO recommends using storage containers to:

- reduce the risk of contamination
- reduce the quantity of humidity absorbed by the powder

You can store the dosing heads right-side up (**1**) or upside-down (**2**).



See also

Accessories ▸ Page 42

5.3.4 Avoiding electrostatic charges

When preparing sample vessels, electrostatic charge may build up. Electrostatic charges may make correct dosing impossible or adversely affect the dosing result.

Factors increasing the amount of electric charges:

- using sample vessels made of plastic
- wearing latex gloves

The integrable antistatic kit is used to remove electrostatic charges from sample vessels. This antistatic kit is especially designed for dosing purposes and consists of two ionizing electrodes, one placed on each side of the weighing chamber. The electrodes can be activated automatically when dosing or tapping **Start**. Using those two electrodes helps removing electrostatic charges from sample vessels.

Make sure to install a dosing head before placing the sample vessel on the weighing pan. This way, ionizing is active while placing the sample vessel on the weighing pan and electric charges are neutralized. In addition, try not to touch the upper edge of the sample vessel, e.g., close to a vial opening, when handling it.

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Make sure to install a dosing head before placing the sample vessel on the weighing pan. This way, ionizing is active while placing the sample vessel on the weighing pan and electric charges are neutralized. In addition, try not to touch the upper edge of the sample vessel, e.g., close to a vial opening, when handling it.

If the problem persists, try increasing the humidity in the weighing chamber.

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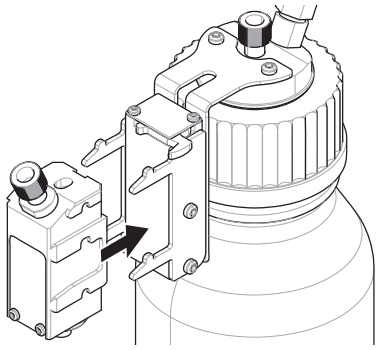
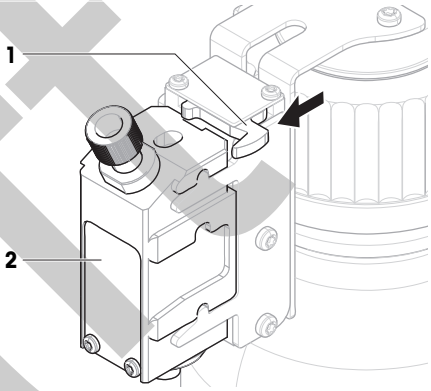
5.4 Liquid dosing

5.4.1 Attaching the dosing head to the bottle cap

1 Insert the liquid dosing head in the liquid dosing head support.



2 To remove the liquid dosing head from the liquid dosing head support, pull the lever (**1**) towards the dosing head and remove the liquid dosing head (**2**).



5.4.2 Handling the bottle

⚠ CAUTION

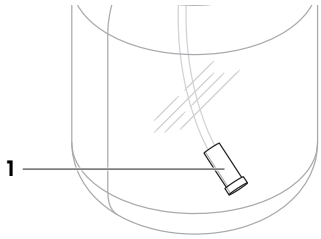
Injury due to splashing liquids

If the pressure in the bottle is not released, liquid might splash when removing the micro dosing valve, opening the bottle, or removing the liquid tube.

– Always release pressure before removing the micro dosing valve, opening the bottle, or removing the liquid tube.

Filling the bottle

The suction filter (**1**) has to be covered with liquid at all times.
Before the suction filter gets dry, refill the bottle.



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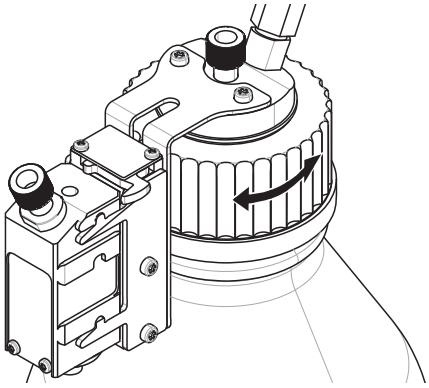
- Pressure is released.

1 Unscrew the cap.

2 Fill in the liquid. (max. is shown on bottle, e.g., 1000 ml).
Do not exceed the maximum. The air above the liquid is necessary for dosing.

3 Screw cap on.

4 Check that the cap is tight.



Changing the liquid of the bottle

This procedure is used if you have a single cap with dosing head and want to change the liquid.

- Pressure is released.

1 Unplug the air tube.

2 Unscrew the cap.

3 Remove the suction filter, if applicable.

4 If the cap needs to be cleaned, remove the air tube.
Unscrew the fastening nuts from the cap.
Rinse the cap with the appropriate solvent or liquid.
Insert the liquid tube into the cap.

5 If the liquid tube needs to be cleaned with a solvent, fill the bottle with the appropriate solvent.
Screw the cap on the bottle.
Insert the air tube on the cap.
Purge using the **Purge** function.
Unscrew the cap.
Dispose of the remainder of the solvent.

6 Attach a new suction filter, if applicable.

7 Screw the cap on the bottle containing the new liquid.

8 Check that the cap is tight.

9 Connect the air tube to the new bottle.

10 Purge using the **Purge** function.

Changing the bottle

If you have more than one bottle equipped with cap and dosing head:

- Pressure is released.

1 Install the dosing head on the dosing head support of the bottle.

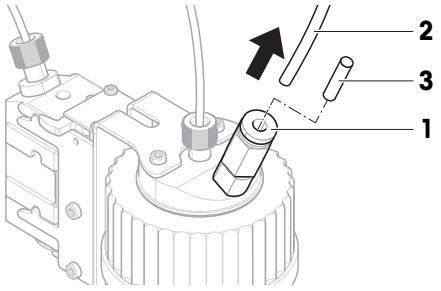
2 Unplug the air tube by pressing down the ring (**1**) and simultaneously pulling out the tube (**2**).

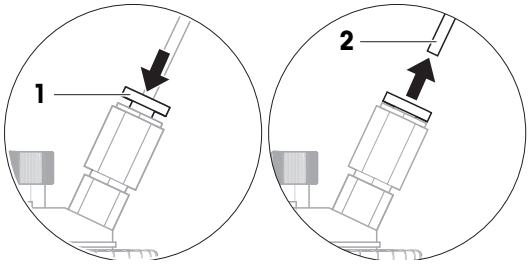
3 To seal the bottle, insert the pin delivered with the QLL kit (**3**) into the air tube connector.

4 Take the new bottle.

5 Connect the air tube to the new bottle.

6 To continue dosing with the new bottle, install the dosing head.





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5.4.3 Using the QL3 pump

Pressure indicator light

The pressure indicator light displays the status of the pump:

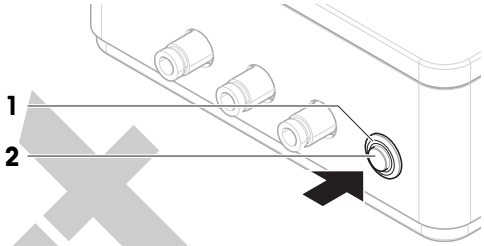
- Light on: pressure is building up or pressure is established
- Light off: there is no pressure and no pressure is building up
- Light blinking: pump error and/or warning

Releasing the pressure

- The pressure indicator light (**1**) is on.

– Press the pressure release button (**2**) to release the pressure.

⇨ The status light (**1**) turns off when pressure is released.



Purging the pump cavity

- A dosing head is attached to the dosing or liquid module. This dosing head is not connected to any pump.
- A method Dosing is running on the terminal.

1 Disconnect all tube adapters from the pump.

2 Connect an empty tube adapter to the right-most air outlet of the pump.

⇨ The pump is trying to build pressure and air flows through the cavity of the pump.

⇨ The pump cavity has been purged and bottles can be re-connected to the air outlets.

5.5 Using other weighing methods

To use other methods with the balance, move the dosing module to its uppermost position.

For further information, consult the XPR Reference Manual (RM).

▶ www.mt.com/XPR-analytical-RM

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6 Maintenance

Please contact your METTLER TOLEDO representative for details about the available service options. Regular servicing by an authorized service technician ensures constant accuracy for years to come and prolongs the service life of your instrument.

For further information, consult the XPR Reference Manual (RM).

▶ www.mt.com/XPR-analytical-RM

6.1 Cleaning

⚠ WARNING

Risk of electric shock

1 The power cable must be disconnected prior to cleaning and maintenance.
2 Use only the power cable from METTLER TOLEDO, if it needs replacing.
3 Ensure that no liquid comes into contact with the terminal or the AC adapter.
4 Never open the instrument housing, terminal, or AC adapter – they contain no components that can be cleaned, repaired, or replaced by the user.

NOTICE

Damage to the instrument due to inappropriate cleaning methods

The instrument can be damaged by certain cleaning agents, solvents, or abrasives. If liquids enter the housing, they can damage the instrument.

1 Only use a wet cloth with water and a mild detergent to clean the instrument or terminal.
2 Wipe off any spills immediately.
3 Make sure that no liquid penetrates the instrument.

The appropriate maintenance interval depends on your standard operating procedure (SOP).

6.1.1 Cleaning the housing

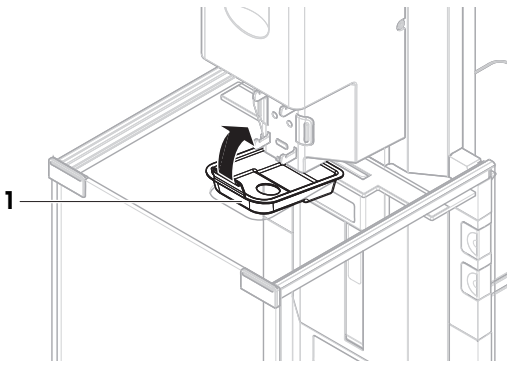
The housing of the dosing module, dosing lift, and liquid module is the same as the one of the balance. All surfaces can therefore be cleaned with a commercially available, mild cleaning agent.

6.1.2 Cleaning the sealing insert

The sealing insert is located right under the tip of the dosing head. It is therefore the element that is the most likely to be contaminated by the substances dosed with the dosing module. Clean or replace the sealing insert regularly, depending on the substances used and your Standard Operating Procedures (SOP).

- The dosing module is in the upper-most position.

1 Remove the sealing insert (**1**).
2 Clean and install the sealing insert or install a new one.



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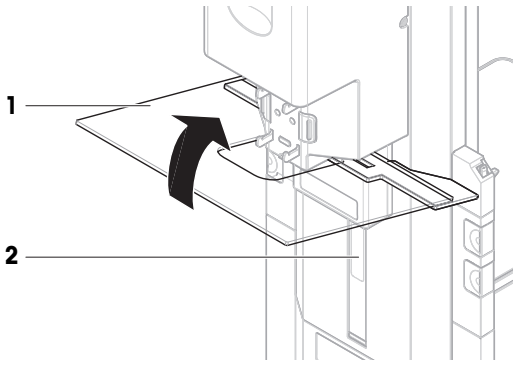
6.1.3 Cleaning the weighing chamber

- The dosing module is in the upper-most position.
- The dosing head is removed.
- The sealing insert is removed.
- The draft shield is removed.



1 Tilt the top panel (**1**) upwards and remove.

2 Remove any adapter holder or ErgoClip, the weighing pan, and the drip tray.

3 Clean the weighing chamber.

⇨ ⚠ **WARNING: Damage to the covering strip. The covering strip is delicate and must be handled with care.**
Wipe the covering strip (**2**) gently using vertical movements.

4 Reassemble the balance.

5 Commission the balance.

For more details about cleaning and commissioning the balance, see "Maintenance" in the Reference Manual (RM) of the balance.

6.1.4 Cleaning powder dosing heads

Powder dosing heads are designed to be used with a unique substance. METTLER TOLEDO does not recommend cleaning them. When dosing a different powder, use a new dosing head to avoid contamination.

6.1.5 Cleaning the liquid dosing elements

Cleaning the suction filter

1 **Once a week**, check visually that the suction filter is clean. If necessary, rinse the suction filter with solvent using the **Purge** function or replace it.

2 At least **once a year**, change suction filter. Maintenance interval depends on the liquid used.

Cleaning the liquid dosing head

The liquid dosing head can be rinsed/purged by letting a large quantity of solvent (or another liquid) run through it. Use the **Purge** function. See the Reference Manual (RM) of the XPR balance.

If purging is not enough, clean the liquid dosing head as follows.

⚠ CAUTION

Injury due to splashing liquids

If the pressure in the bottle is not released, liquid might splash when removing the micro dosing valve, opening the bottle, or removing the liquid tube.

– Always release pressure before removing the micro dosing valve, opening the bottle, or removing the liquid tube.

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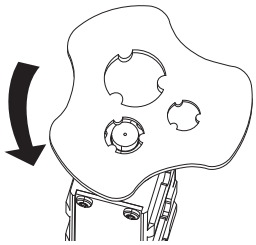
- The liquid dosing head is installed on the dosing or liquid module.
- A sample vessel is on the weighing pan, big enough for the quantity of liquid in the liquid tube.

1 Empty the liquid tube by replacing the bottle by an empty bottle and using the **Purge** function.
   ⇨ The liquid tube is empty.
2 Release pressure.
3 Remove the dosing head from the dosing or liquid module.



4 ⚠ **WARNING: Injury or contamination from hazardous substances. Be aware of any liquid draining from the tubing and the valve.**
   Open the dosing head with the micro dosing valve tool.
5 Take out the micro dosing valve and clean it, e.g., in an ultrasonic bath.
6 After the cleaning, reinstall the micro dosing valve and refill/replace the bottle.

6.2 Replacing the sealing ring and fastening nut on the liquid tube

⚠ CAUTION

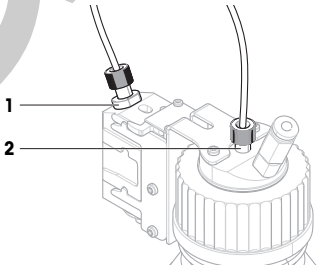
Injury due to splashing liquids

If the pressure in the bottle is not released, liquid might splash when removing the micro dosing valve, opening the bottle, or removing the liquid tube.

– Always release pressure before removing the micro dosing valve, opening the bottle, or removing the liquid tube.

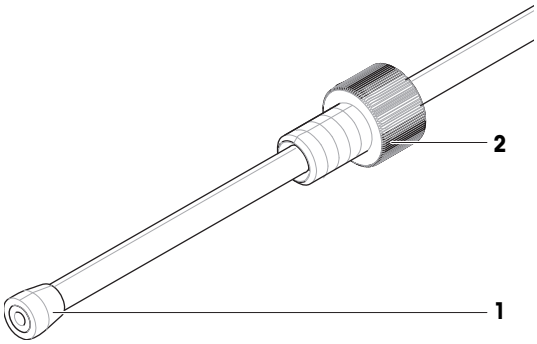
Removing the sealing ring and the fastening nut

If liquid is leaking from the dosing head nut, replace the sealing ring and fastening nut at the dosing head (**1**). If pressure cannot be built in the bottle, replace the sealing ring and fastening nut at the bottle cap (**2**).



- Pressure is released.

1 Unscrew the fastening nut at the dosing head or the bottle cap.
2 To access the sealing ring (**1**), slide back the fastening nut (**2**).
3 If changing the nut and ring at the bottle cap, remove the suction filter and slide the sealing ring all the way to the bottle-end of the tube.
4 Cut off the tube above sealing ring (**1**). Check that the end of the tube is straight.
5 Remove the fastening nut.



Reconnecting the liquid tube

Insert the new sealing ring and fastening nut and reconnect the liquid tube.

See also

Connecting the tubes ▸ Page 15

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7 Troubleshooting

For further information, consult the XPR Reference Manual (RM).

▶ www.mt.com/XPR-analytical-RM

7.1 Error symptoms

Error symptoms	Possible cause	Diagnostic	Remedy
The powder dosing head does not dispense any powder.	The powder does not reach the dispensing mechanism of the dosing head.	Check through the transparent dosing head.	Remove the dosing head and shake it to loosen the powder.
The liquid dosing head does not dispense any liquid.	The suction filter is clogged.	Check if there is liquid in the liquid tube.	Clean or replace the suction filter.
	The dosing head is not installed properly.	Check if there is a gap between the dosing head and the dosing head holder.	Slightly press the dosing head down.
Liquid drips from the bottle cap and/or the dosing head.	The sealing ring and/or fastening nut are damaged.	–	Change sealing ring and fastening nuts at the bottle cap and/or the dosing head. See [Replacing the sealing ring and fastening nut on the liquid tube ▸ Page 28] Make sure that the end of the tube is cut straight.
The pump is not listed as a device connected to the balance.	The pump is not properly connected to the balance.	Check that the USB cables are not damaged and are connected properly.	Connect the USB cables properly. Replace the USB cables.
	The pump is disconnected from power.	Disconnect the AC/DC adapter from the pump. Reconnect it. The indicator light should blink once when the device is connected to power. Check that the AC/DC adapter and the power cable are not damaged.	Exchange the AC/DC adapter and power cable.
	The USB device port on the balance is damaged.	Disconnect the pump from the USB port on the balance. Connect a USB mouse to the same USB socket. Verify that a pointer (arrow) appears on the terminal and can be moved by moving the mouse.	If the mouse pointer does not appear, contact your METTLER TOLEDO service representative.
	The pump is damaged or malfunctioning.		Contact your METTLER TOLEDO service representative.

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Error symptoms	Possible cause	Diagnostic	Remedy
The value on the display is unstable when dosing powders.	The weighing sample is electrostatically charged.	Check if the weighing result is stable when using a test weight.	Increase the air humidity in the weighing chamber. Use an antistatic kit. See "Accessories" in the Reference Manual (RM).

See also

Replacing the sealing ring and fastening nut on the liquid tube ▶ Page 28

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8 Technical Data

8.1 General data

Dosing lift, weight:	1000 g
Dosing module, weight:	440 g

Power consumption

Dosing lift:	12 V DC ± 6%, 1 A
Dosing module:	12 V DC ± 6%, 1 A

Protection and standards

Overvoltage category:	II
Degree of pollution:	2
Range of application:	Use only indoors in dry locations

Environmental conditions

Height above mean sea level:	Up to 5000 m
Ambient temperature:	+5 – +40 °C
Relative air humidity:	20 – 80 %, non-condensing

Storage conditions (in packaging)

Ambient temperature:	-25 – +70 °C
Relative air humidity:	10 – 90 %, non-condensing

Draft

8.2 Model-specific data

Liquid dosing heads

	QL001	QL002	QL003
Dosing properties			
Suitable liquids: max. viscosity	20 mPa·s	20 cP	20 mPa·s
Typical values			
Dosing quantity, offset [1)]	1 mg	20 mg	2.5 mg
Dosing quantity, repeatability (sd) [1)]	1 mg	10 mg	2 mg
Dosing time [1)]	30 s	12 s	20 s

[1)] Liquid; quantity = H_2O; 5 g
1 mPa·s = 1 cP = 1 cSt = 1 mm^2/s

Tubing

	Outer Diameter	Inner Diameter	Recommended length
Liquid tube, for GL45 bottles (dosing head to bottle)	3.2 mm	1.6 mm	0.9 m
Liquid tube, for GL25 bottles (dosing head to bottle)	1.6 mm	0.8 mm	0.9 m
Air tube (pump to bottle)	4.0 mm	2.4 mm	0.7 m
Tube for exhaust air	6 mm	–	–
Tube for external gas	6 mm	–	–

Suction filter

Tubing outer diameter	3.2 mm
Filter pore size	10 µm

Bottle

Pressure resistance, min. [1)]	1.5 bar
Burst pressure, min.	3 bar
Volume, max.	2 l

[1)] According to DIN EN 1595: Pressure Equipment made from Borosilicate Glass 3.3 – General Rules for Design, Manufacture and Testing

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8.3 Material specifications

Materials in contact with the substance to be dosed. Please note that traces of all contact material could be transferred to the sample.

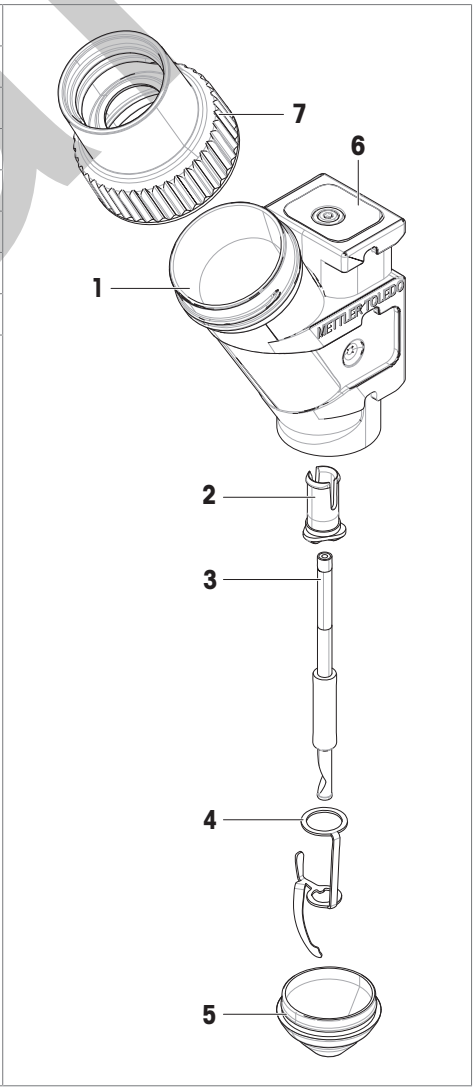
8.3.1 Glossary of material acronyms

Acronyms defined in ISO 1043: Plastics – Symbols and abbreviated terms.

ETFE	=	Ethylene tetrafluoroethylene
FEP	=	Fluorinated ethylene propylene
FFKM	=	Perfluoroelastomer
PE	=	Polyethylene
PEEK	=	Polyetheretherketone
PMP	=	Polymethylpentene
POM	=	Polyoxymethylene
PP	=	Polypropylene
PP (ESD)	=	Polypropylene (electrostatic dissipative)
PTFE	=	Polytetrafluoroethylene

8.3.2 Powder dosing head QH008

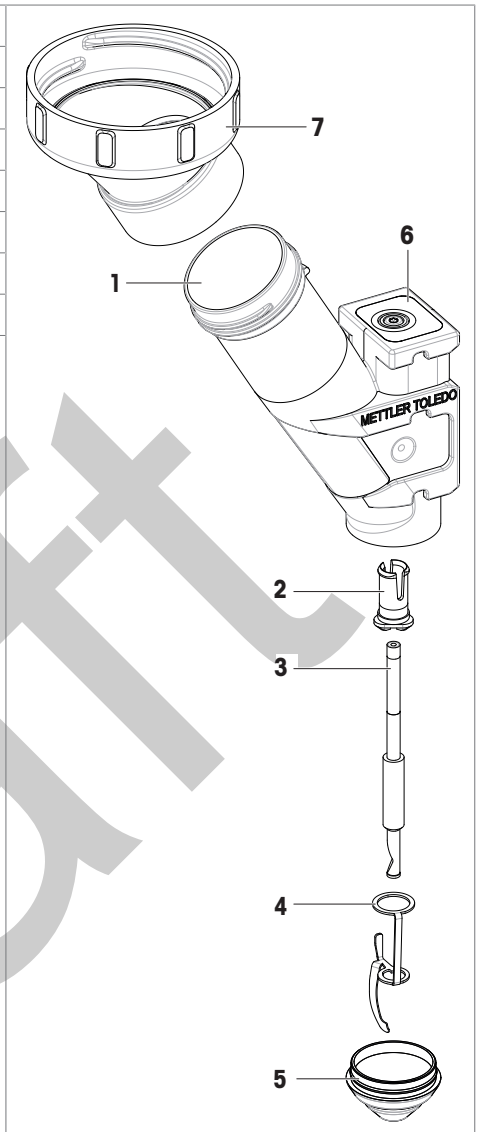
	Designation	Material
1	Dosing head body	PMP
2	Bushing	POM
3	Dosing pin	Stainless steel 1.4404
4	Scraper	Stainless steel 1.4310
5	Cone	Stainless steel 1.4404
6	Insert	POM
7	Adapter cap	POM



Draft

8.3.3 Powder dosing head QH012

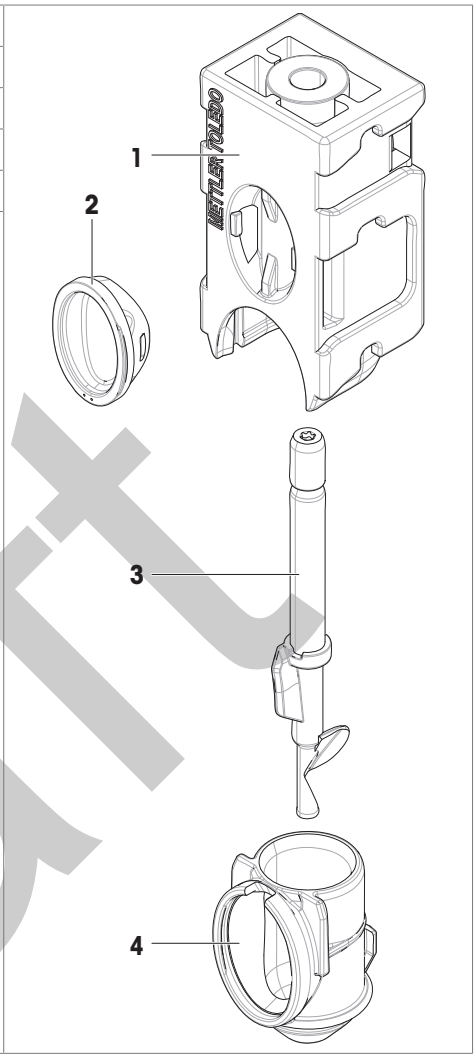
	Designation	Material
1	Dosing head body	PMP
2	Bushing	POM
3	Dosing pin	Stainless steel 1.4404
4	Scraper	Stainless steel 1.4310
5	Cone	Stainless steel 1.4404
6	Insert	POM
7	Adapter cap	POM



Draft

8.3.4 Powder dosing head QH002-CNMW

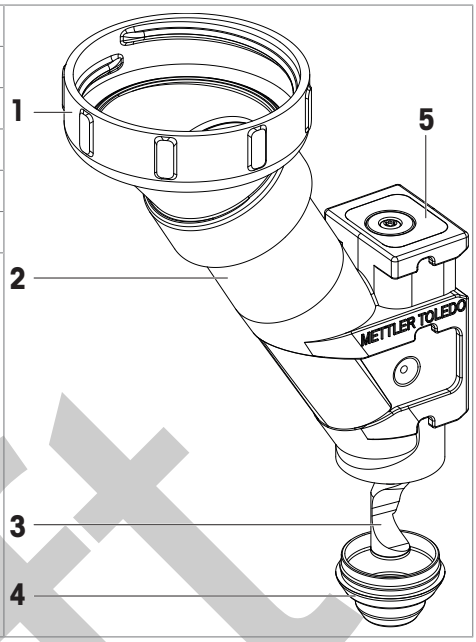
	Designation	Material
1	Body	PP
2	Closing cap	PP
3	Dosing pin	PP (ESD)
4	Cone body	PP (ESD)



Draft

8.3.5 Powder dosing head QH012-LNJW

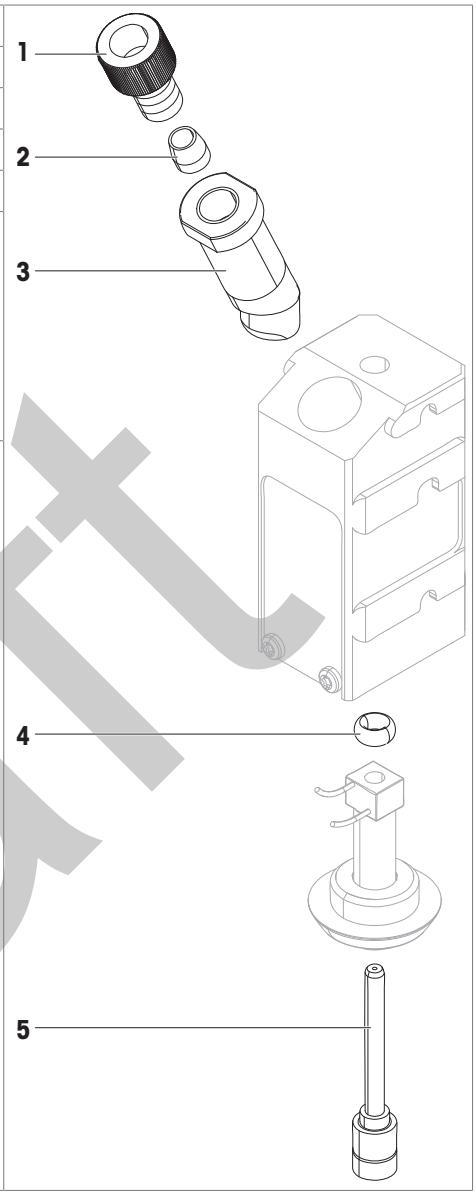
	Designation	Material
1	Adapter cap	POM
2	Dosing head body	PMP
3	Dosing pin	PP (ESD)
4	Cone body	PP (ESD)
5	Insert	POM



Draft

8.3.6 Liquid dosing head QL001

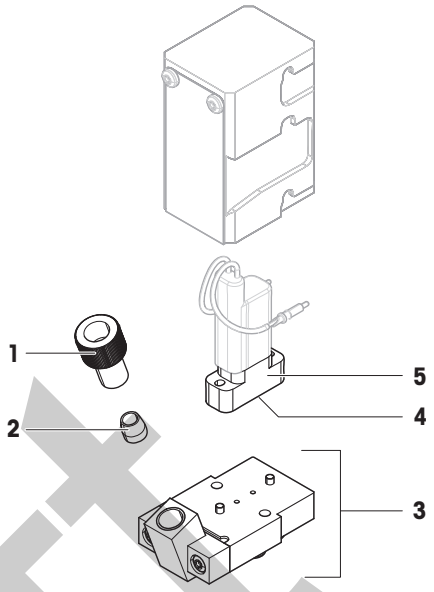
	Designation	Material
1	Fastening nut	PEEK
2	Sealing ring	ETFE
3	Tube connector	Stainless steel 1.4404
4	O-Ring	FFKM
5	Solenoid valve	PEEK Sapphire-Ruby Stainless steel 1.4105IL Stainless steel 1.14301 / 1.4306 Stainless steel 1.4305



Draft

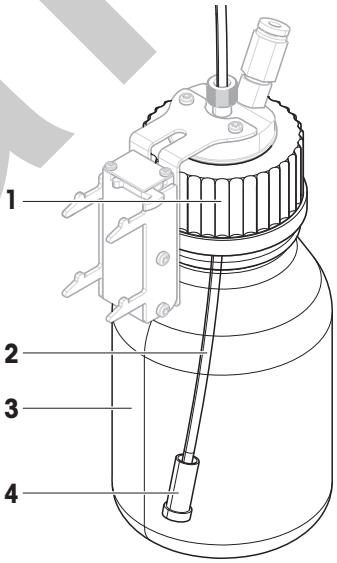
8.3.7 Liquid dosing head QL003

	Designation	Material
1	Fastening nut	PEEK
2	Sealing ring	ETFE
3	Valve block	PTFE
4	Gasket	EPDM
5	Valve	PEEK



8.3.8 QLL standard/advanced kit for (small) bottles

	Designation	Material
1	Cap insert	PE
2	Bottle	Borosilicate glass
3	Tubing	FEP
4	Suction filter	PP

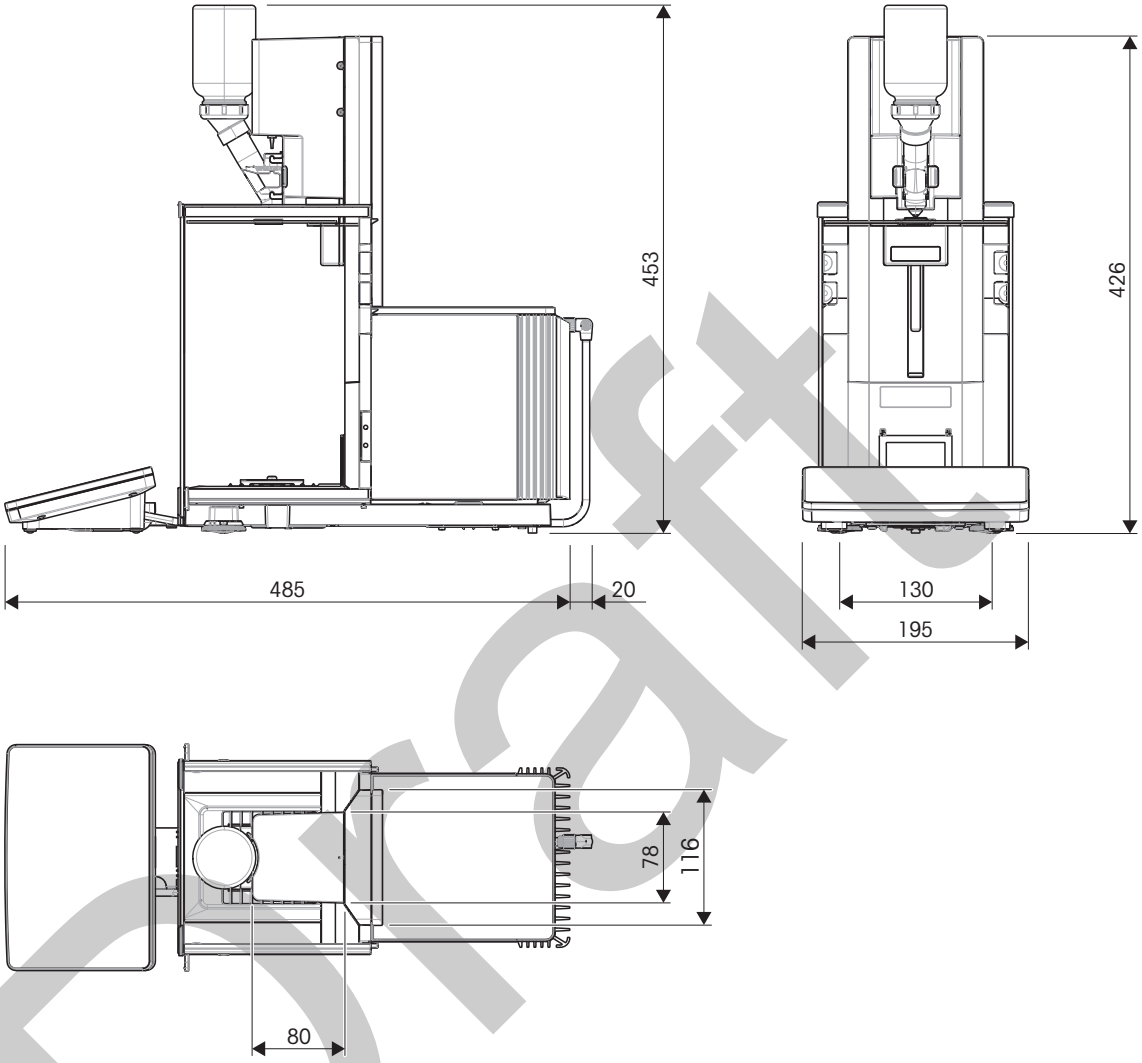


Draft

8.4 Dimensions

Q3 dosing module and XPR balance

Dimensions in mm.



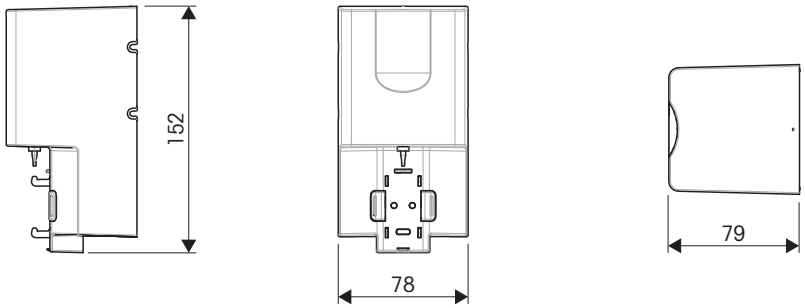
Dimensions	Q3 on XPR with tall draft shield	Q3 on XPR with short draft shield
Minimum height of sample vessel, without adapter	75 mm	75 mm
Maximum height of sample vessel, without adapter [1)]	212 mm	135 mm
Minimum opening of sample vessel (diameter)	6 mm	6 mm
Vertical range of movement of dosing module	165 mm	88 mm
Maximum height of Q3 on XPR balance with powder dosing head and 125-ml vial	453 mm	426 mm

[1)] If the vial opening is higher than the bottom of the optical sensor, the vial detection feature will be unavailable.

Draft

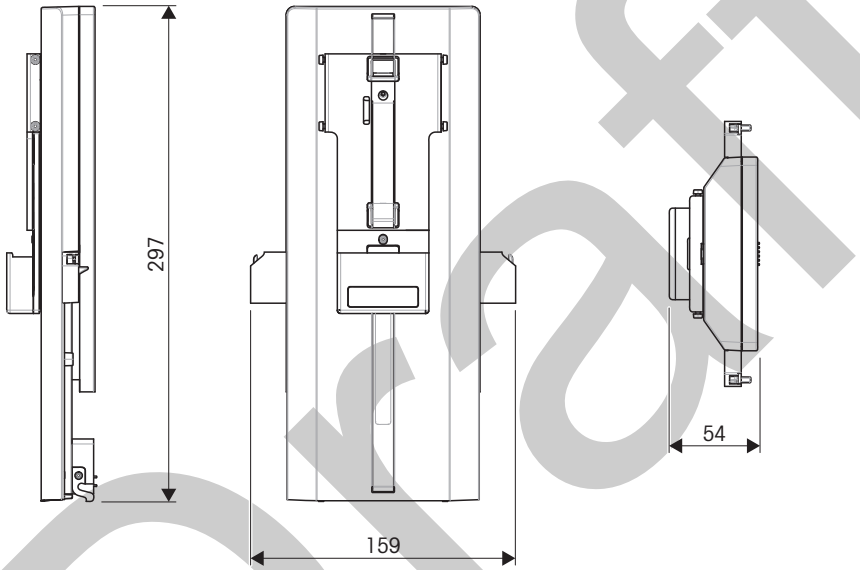
Dosing module

Dimensions in mm.



Dosing lift

Dimensions in mm.



Draft

9 Disposal

In conformance with the European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

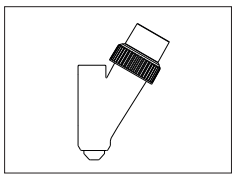
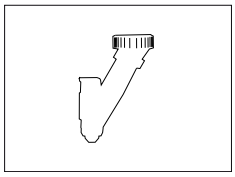
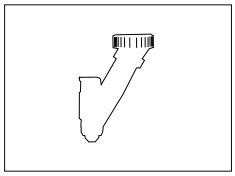
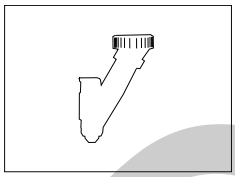
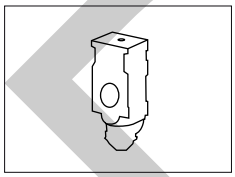
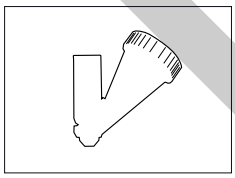
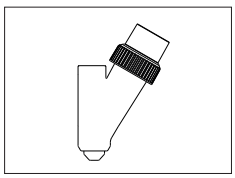
Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to other parties, the content of this regulation must also be related.

Draft

10 Accessories and Spare Parts

10.1 Accessories

Please contact your METTLER TOLEDO sales representative for more details about using accessories with your product.

	Description	Part No.
Dosing heads		
	QH008-BNMW dosing head 10 pcs.	11141533
	QH012-LNMW dosing head 10 pcs.	11141532
	QH012-LNLW dosing head 10 pcs.	11150145
	QH012-LNJW dosing head 10 pcs.	30366317
	QH002-CNMW dosing head 30 pcs. 90 pcs. 500 pcs.	 30083440 30098264 30244518
	QH010-CNMW dosing head 10 pcs. 40 pcs. 150 pcs.	 30132790 30132791 30046355
	QH008-BNMP dosing head 10 pcs.	11150120

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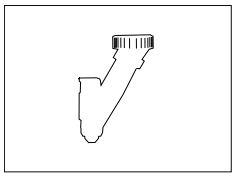
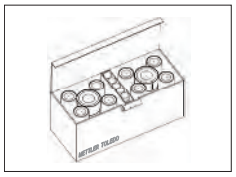
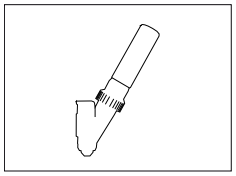


QH012-LNMP dosing head 11150118
10 pcs.

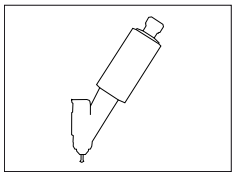


Storage containers with vials 16 ml (for QH008), 10 pcs. 30139824

Storage containers with vials 125 ml (for QH012), 10 pcs. 30036965



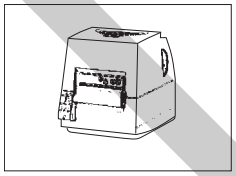
QA075-P powder test head 11141506
filled with $CaCO_3$, for 15 tests of 10 automatically dispensed doses each



QA000-W weight test head 11141507

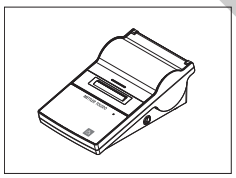
Dosing head starterkit 30132792
Set of various dosing heads.

Printers



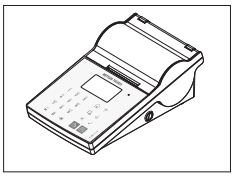
CLS-631 Label printer for Quantos (RS232C/USB-A) 11141820
Quantos label and ink ribbon kit 30004309

- NetCom Kit needed if used with XPE balance



P-52RUE dot matrix printer RS232C, USB and Ethernet connections, simple print-outs 30237290
Paper roll (length: 20 m), set of 5 pcs 00072456
Paper roll (length: 13 m), self-adhesive, set of 3 pcs 11600388
Ribbon cartridge, black, set of 2 pcs 00065975

Draft



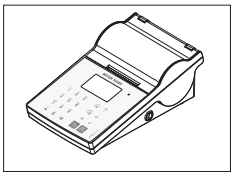
P-56RUE thermal printer with RS232, USB and ethernet connections, simple print-outs, date and time, label printing (limited) 30094673

Paper roll, white (length: 27 m), set of 10 pcs 30094723

Paper roll, white, self-adhesive (length: 13 m), set of 10 pcs 30094724

Paper roll, white, self-adhesive labels (550 labels), set of 6 pcs 30094725

Dimension of the label 56 × 18 mm



P-58RUE thermal printer with RS232, USB and ethernet connections, simple print-outs, date and time, label printing, balance applications: statistics, formulation, totaling, 30094674

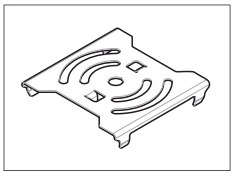
Paper roll, white (length: 27 m), set of 10 pcs 30094723

Paper roll, white, self-adhesive (length: 13 m), set of 10 pcs 30094724

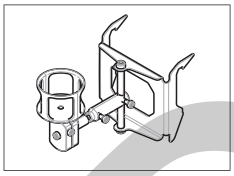
Paper roll, white, self-adhesive labels (550 labels), set of 6 pcs 30094725

Dimension of the label 56 × 18 mm

ErgoClips



ErgoClip adapter holder 30521809



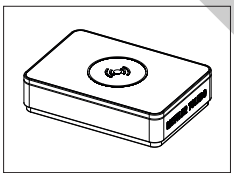
ErgoClip vial 30521808

Antistatic kits

Integrable antistatic kit standard, incl. pair of multiple-point electrodes and AC/DC adapter 30521821

Integrable antistatic kit small, incl. pair of multiple-point electrodes and AC/DC adapter 30521822

RFID readers / writers / cards



EasyScan USB 30416173

Reads and writes RFID tags.

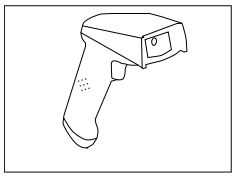
Smart Tag

Set of 50 pieces 30101517

Set of 200 pieces 30101518

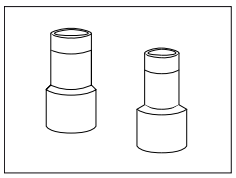
Draft

Barcode readers



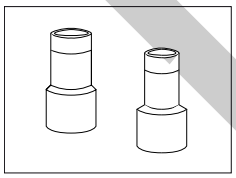
USB Barcode Reader	30417466

Adapters



Vial adapters (POM)

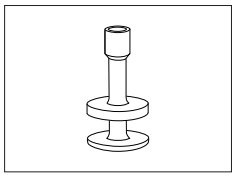
8.5 mm × 15 mm (5 pcs.)	30428901
9 mm × 25 mm (5 pcs.)	30428902
9.5 mm × 25 mm (5 pcs.)	30428903
10 mm × 25 mm (5 pcs.)	30428904
10.5 mm × 25 mm (5 pcs.)	30428905
11 mm × 30 mm (5 pcs.)	30428906
11.5 mm × 30 mm (5 pcs.)	30428907
12 mm × 20 mm (5 pcs.)	30428908
12.5 mm × 30 mm (5 pcs.)	30428909
13.5 mm × 20 mm (5 pcs.)	30428910
14.5 mm × 25 mm (5 pcs.)	30428911
15.5 mm × 25 mm (5 pcs.)	30428912
16.5 mm × 25 mm (5 pcs.)	30428913
17.5 mm × 25 mm (5 pcs.)	30428914
18.5 mm × 25 mm (5 pcs.)	30428915
19.5 mm × 25 mm (5 pcs.)	30428916
20.5 mm × 25 mm (5 pcs.)	30428917
21.5 mm × 25 mm (5 pcs.)	30428918
22.5 mm × 25 mm (5 pcs.)	30428919
23.5 mm × 25 mm (5 pcs.)	30428920
26 mm × 25 mm (5 pcs.)	30428926
27.5 mm × 25 mm (5 pcs.)	30428921
28.5 mm × 25 mm (5 pcs.)	30428922
29.5 mm × 35 mm (5 pcs.)	30428923
31.5 mm × 30 mm (5 pcs.)	30428924



Bottle adapters (POM)

33.5 mm × 15 mm (5 pcs.)	30459921
35.5 mm × 15 mm (5 pcs.)	30459922
37.5 mm × 15 mm (5 pcs.)	30459923
40.5 mm × 15 mm (5 pcs.)	30459924
44.5 mm × 15 mm (5 pcs.)	30459925
48 mm × 15 mm (5 pcs.)	30459926
52 mm × 15 mm (5 pcs.)	30459927

Draft



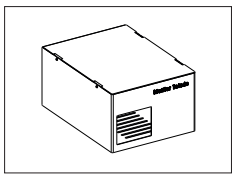
Capsule adapters (stainless steel)

size 000 (5 pcs.)	30006416
size 00 (5 pcs.)	30006417
size 0 (5 pcs.)	30006418
size 1 (5 pcs.)	30006419
size 2 (5 pcs.)	30006430
size 3 (5 pcs.)	30006431
size 4 (5 pcs.)	30006432

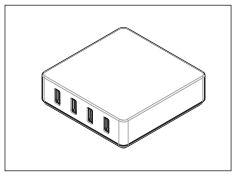
Tube adapters (POM)

Eppendorf 1.5 ml (5 pcs.)	30306209
Falcon 16.4 mm × 60 mm (5 pcs.)	30459992
Falcon 29.3 mm × 60 mm (5 pcs.)	30459991

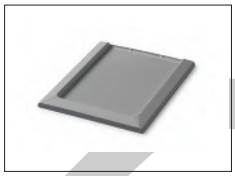
Various



Cable Box 11141845

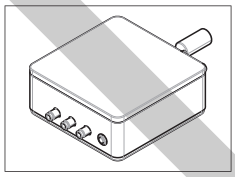


EasyHub USB 30468768



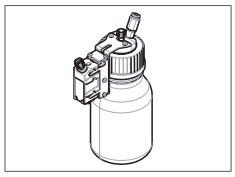
Drip pan, gray 30460856

Dosing



QL3 pump 30418660

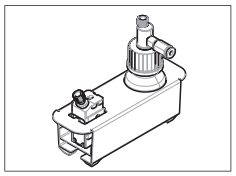
QS3 sample changer 30418662
Must be installed by a METTLER TOLEDO service technician



QLL standard kit for bottles 30008318

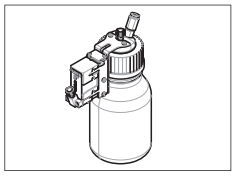
- QL001 liquid dosing head
- Bottle, pressure resistant
- Bottle cap (GL45) with tube connector and dosing head support
- Spare parts for QLL standard kit

Draft



QLL standard kit for small bottles 30237340

- QL001 liquid dosing head
- Bottle, pressure resistant
- Stand for bottle
- Bottle cap (GL25) with tube connector
- Spare parts for QLL standard kit small

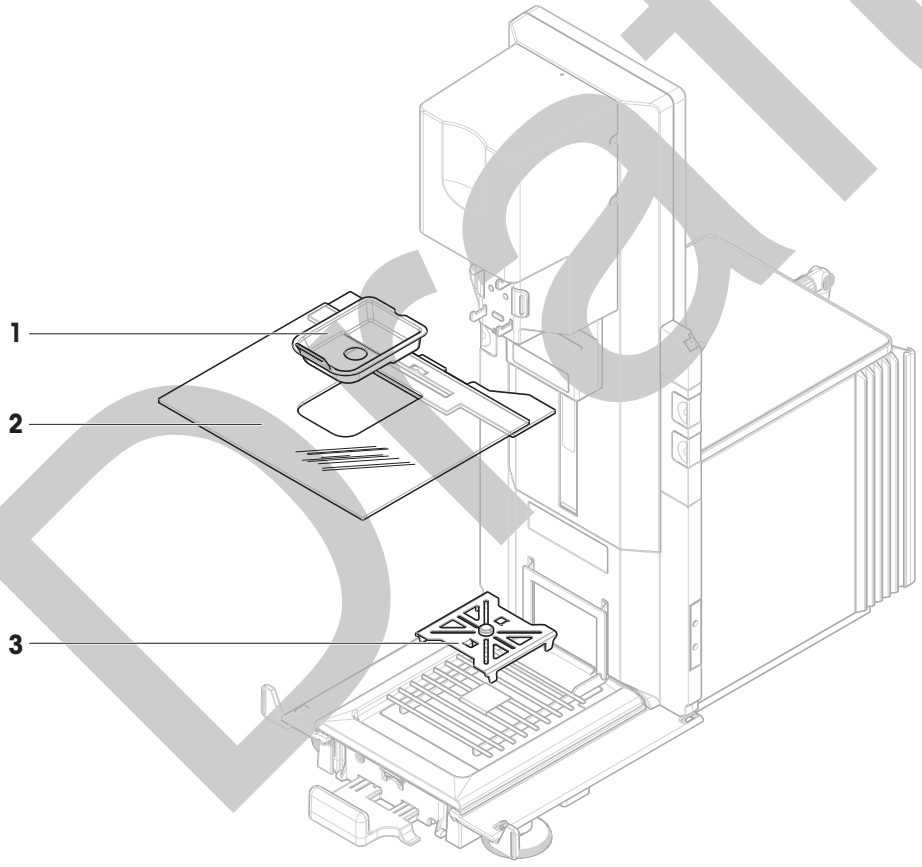


QLL advanced kit for bottles

- QL003 liquid dosing head
- Bottle, pressure resistant
- Bottle cap (GL45) with tube connector and dosing head support
- Spare parts for QLL standard kit

10.2 Spare parts

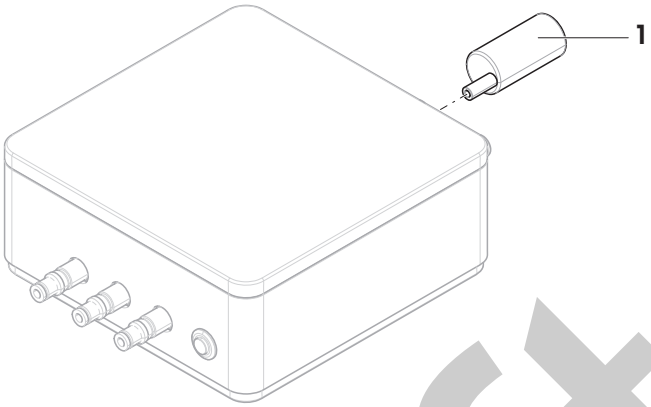
10.2.1 Q3 dosing module



	Order no.	Designation	Remarks
1	30542819	Sealing insert	Including: 5 sealing inserts
2	30525850	Panel top draft shield powder module	Material: Glass
3	30521809	ErgoClip adapter holder	–

Draft

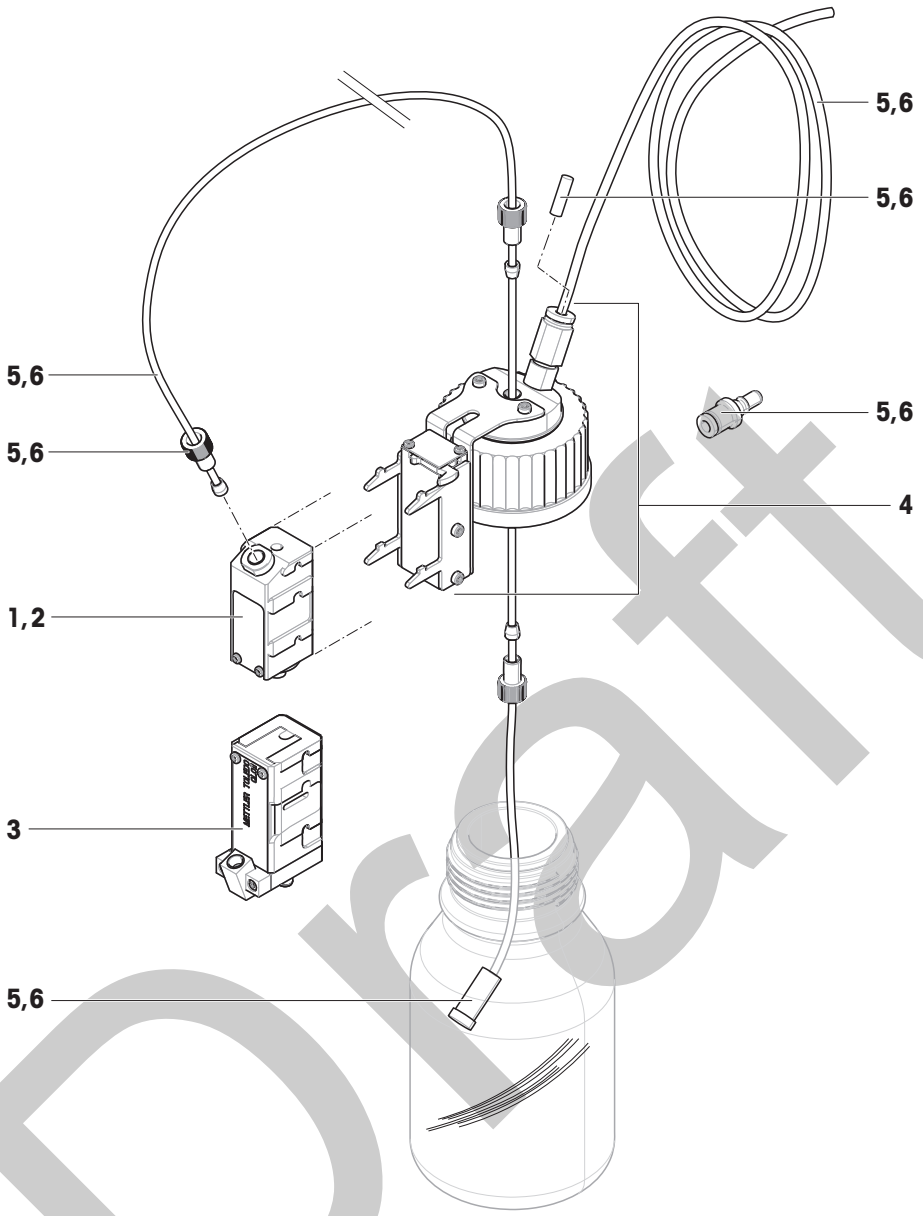
10.2.2 QL3 pump



	Order no.	Designation	Remarks
1	30378287	Muffler for pump	Including: Muffler, Adapter

Draft

10.2.3 QLL spare parts kit for (small) bottles



	Order no.	Designation	Remarks
1	30080473	Dosing head liquid QL001	–
2	30251648	Dosing head liquid QL002	–
3	30542814	Dosing head liquid QL003	–
4	30080708	Bottle cap with tube connector and support	Thread: GL45
5	30025649	Spare parts for QLL kit	Including: Tubing OD 4, ID 2.4 (2m), Tubing OD 3.2, ID 1.6 (3m), 10 Sealing ring flangeless ferrule 1/8" gb P300X, 5 Fastening nut flangeless ferrule P347X, 5 Closure pin ISO 2338 4H8x20 A1, Suction filter for 1/8" OD, Tube adapter

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	Order no.	Designation	Remarks
6	30460218	Spare parts for QLL kit small	Including: Tubing OD 4, ID 2.4 (2m), Tubing OD 1.6, ID 0.8 (3m), 10 Sealing ring flangeless ferrule 1/16" gb P200X, 5 Fastening nut flangeless ferrule P247X, 5 Closure pin ISO 2338 4H8x20 A1, Suction filter for 1/8" OD, Tube adapter

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11 Appendix

11.1 Compliance information

European Union

The instrument complies with the directives and standards listed on the EU Declaration of Conformity.

United States of America

This equipment has been tested and found to comply with the limits for a **Class A** digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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.

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

The FCC Supplier Declaration of Conformity is available online.

▶ http://www.mt.com/ComplianceSearch

Canada

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

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

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