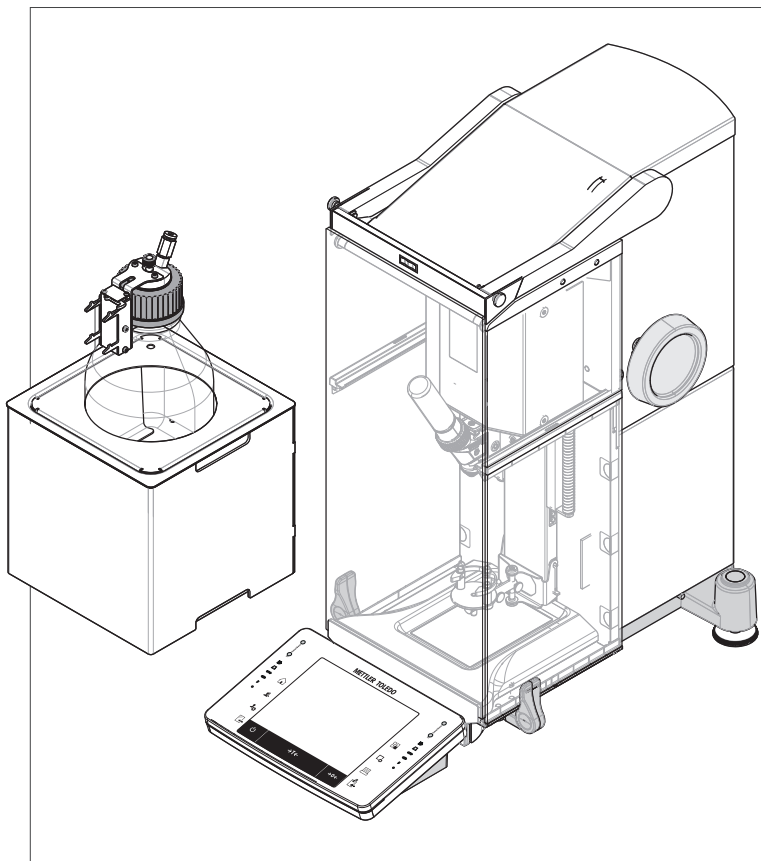


# Quantos Automated Dosing Powder Module

## Powder Module



**METTLER TOLEDO**



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# 1 Introduction

Thank you for purchasing the Quantos dosing system.

Quantos is based on the renowned and reliable XPE series balances from METTLER TOLEDO. Besides the highly accurate dosing capabilities and ease of use, the Quantos provides connectivity to a variety of peripheral devices (e.g. barcode readers, label printers), and to a host computer.

This chapter contains basic information about the Quantos. Please read this chapter carefully, even if you already have experience with dosing systems or analytical balances.

## Firmware version


The operating instructions are based on the initially installed terminal firmware (software) version V 2.00.

## Finding more information

► [www.mt.com/quantos](http://www.mt.com/quantos)

## 1.1 Conventions and symbols used in these operating instructions

For better readability the **Quantos Dosing System** is further referred to as **instrument**.

Key designations are indicated by a picture or text in square brackets (e.g.  or [**Printer**]).

These symbols indicate an instruction:

- prerequisites
- 1 steps
- 2 ...
- ⇒ results

## 2 Safety Information

### 2.1 Definition of warnings and symbols

#### Signal Words

<b>WARNING</b>	for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
<b>CAUTION</b>	for a hazardous situation with low risk, resulting in damage to the device or the property or in loss of data, or minor or medium injuries if not avoided.
<b>Attention</b>	(no symbol) for important information about the product.
<b>Note</b>	(no symbol) for useful information about the product.

#### Symbols



General hazard



Electrical shock



Inflammable or explosive substance



Explosion

### 2.2 Product specific safety notes

Always operate and use your instrument only in accordance with the instructions contained in this manual. The instructions for setting up your new instrument must be strictly observed.

**If the instrument is not used according to these Operating Instructions, protection of the instrument may be impaired and METTLER TOLEDO assumes no liability.**

#### Intended Use

Your Dosing System is used for weighing and dosing powder or liquid samples. Use the instrument exclusively for this purpose. Any other type of use and operation beyond the limits of technical specifications without written consent from Mettler-Toledo AG, is considered as not intended.



It is not permitted to use the instrument in explosive atmosphere of gases, steam, fog, dust and flammable dust (hazardous environments).



#### **CAUTION**

##### **Damage of device**

- For use only in dry interior rooms.
- Do not open the instrument: It does not contain any parts which can be maintained, repaired, or replaced by the user. If you ever have problems with your instrument, contact your METTLER TOLEDO dealer.
- Use only instrument accessories and peripheral devices from METTLER TOLEDO; they are optimally adapted to your instrument.

**CAUTION****Damage of Device**

Use only the original universal AC adapter delivered with your instrument.

**Certain samples require special care!**

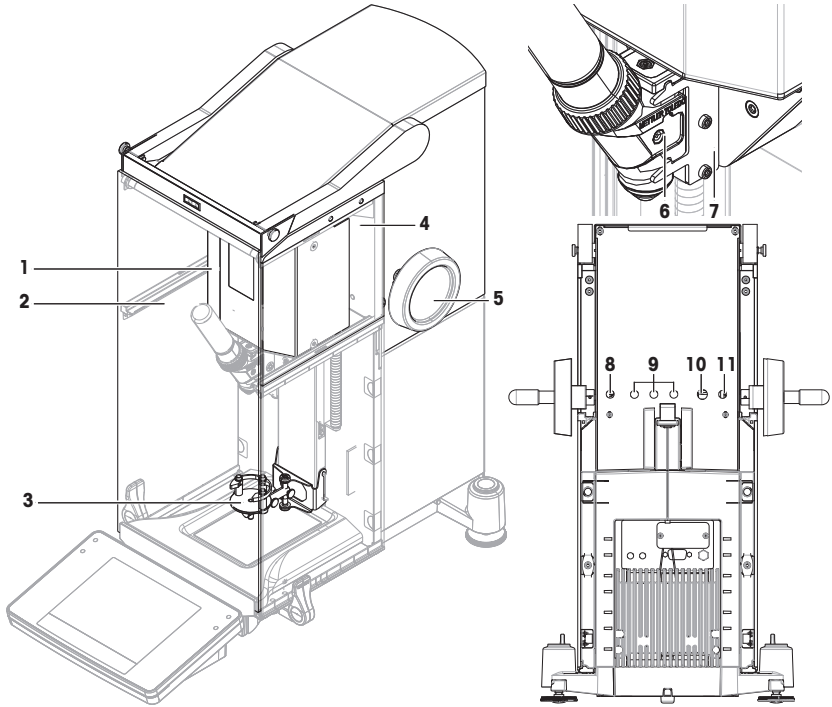
With certain types of samples, there is a possibility of danger to personnel or damage of property. Please note that the user always has the responsibility and liability for damage caused by use of any types of samples!

**CAUTION — Fire or Explosion**

- Flammable or explosive substances.
  - Substances containing solvents.
1. In cases of doubt, perform a careful risk analysis.
  2. Working temperature that is low enough to prevent the formation of flames or an explosion.
  3. Wear protective glasses.

### 3 Design and Function

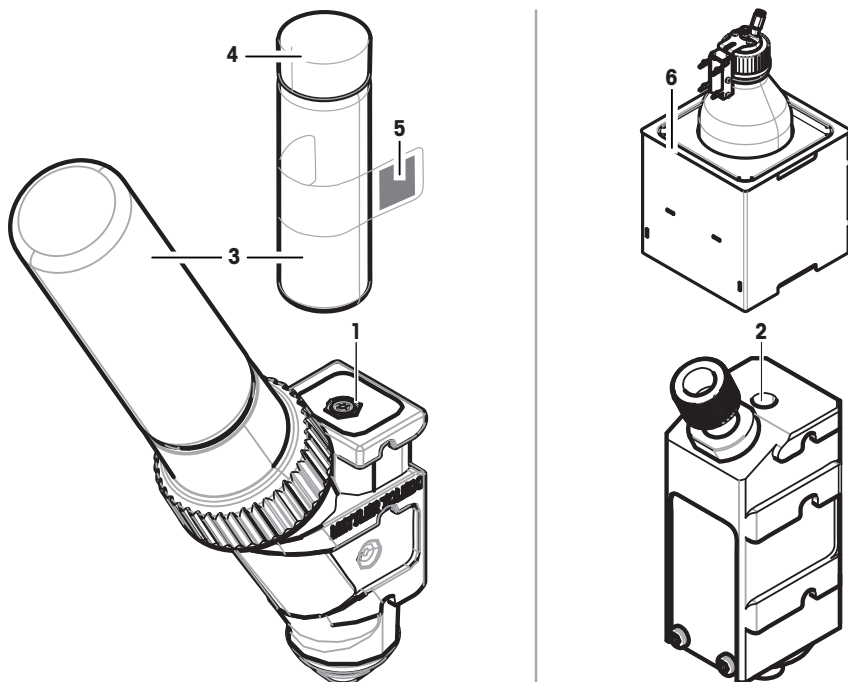
#### 3.1 Overview



Powder module		Dosing head and backside	
1	Drive unit	6	Dosing head
2	Front door	7	Dosing head support
3	ErgoClip Quantos	8	Power supply cable (from AC adapter)
4	Upper side glass	9	Connector for autosampler and CAN devices
5	Head height adjustment handle	10	RS232C interface - cable to balance
		11	Power supply cable from powder module to balance



## 3.2 Dosing heads and equipment



1	<b>Powder dosing head (QH008-BNMW)</b> This head is equipped with a powder storage container. This is the standard head for powder dosing.		
2	<b>Liquid dosing head (QL001)</b> This is the standard head for liquid dosing. It is used together with pump module and bottle (6).		
3	Sample vessel	5	Label containing the substance data
4	Cap for sample vessel	6	Pump module (QL2) with liquid bottle (QLL 1000)

### Powder dosing head

The dosing head is supplied in a plastic container. We recommend using this container when shipping a dosing head. The spare cap (4) included in the delivery may be used to seal the powder container (3) if you want to store it away from the head.

You can print a label (5) containing the powder data stored in the dosing head, affix this label to the powder container (3).

### Manual dosing head

This head has no powder container and the user has to dispense the powder manually. It is reduced to a tag equipped with a RFID chip that allows to enter substance data and to print respective data. The head has no lifetime limit because it has no dosing mechanism.

### Powder test head

This head is equipped with a powder storage container filled with  $\text{CaCO}_3$  and a RFID with a test function. It dispenses automatically 10 times a certain mass and reports the results. Check the results of the typical values > **Repeatability (sd), fine range** automated operation and dosing time. If your instrument didn't pass the tests, inform a METTLER Service Technician.

### MinWeigh dosing head

The MinWeigh dosing head performs a MinWeigh test automatically by placing a test weight on given tare weights. The procedure will be repeated 10 times to define the **MinWeigh**.

### Functional description

As soon as a head is inserted, the instrument automatically reads the data of the head. In addition, the instrument performs automatic adjustments concerning the **Dosing steps**, automatic door operation and other instrument settings.

When no dosing head is installed the instrument will replace head-specific information with factory settings.

### 3.3 Data stored in the dosing head's RFID

Every dosing head is equipped with a Radio Frequency Identification chip (RFID) (1) that can store and exchange data with the instrument.

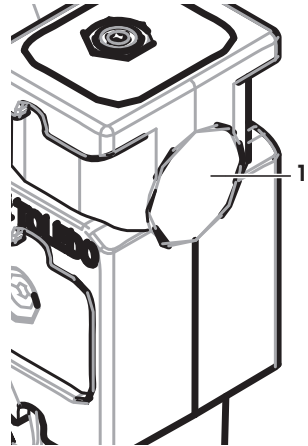
The following data is stored in the RFID of the head:

- **User data**

This block holds information about the substance such as the name of the substance, the filling and expiry dates, the quantity, etc. This data can be edited by the user at any time and it should be entered before using a new head for the first time to ensure proper functioning of the instrument's internal monitoring routines, and to have the data available for reports and labels.

- **Internal data**

This block holds information about the remaining amount of substance left in the container. This block of data cannot be modified by the user.



#### Note for powder

The counter for the remaining powder dosing cycles is based on the lifetime limit of the dosing head. With every dosing cycle started, the counter is decreased by 1. If the counter drops to zero, the head must be replaced. If the powder container of the old head still contains a considerable amount of powder, you may remove the powder container from the old head and screw it onto the new one. Just copy the user data and the powder content value from the old head to the new one.

If the remaining quantity of powder is insufficient for the next dosing cycle, a warning message will appear. You can unscrew and refill the powder container. Don't forget to update the user data that the instrument works correctly.

## 4 Installation and Putting into Operation

### Installation

#### Note

The instrument is installed by METTLER TOLEDO service engineers. This includes the wiring as well as the configuration of the interfaces and peripherals.

### 4.1 Scope of delivery

#### Powder module

- Powder module
- Front door (electro conductive inside)
- Set of upper side glasses for powder module
- Set of bolts for upper side glasses
- ErgoClip Quantos
- Front cover
- Type label (standard or approved balance), to be affixed to the powder module
- Dosing head starter kit

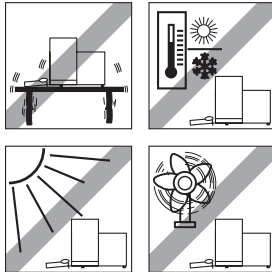
#### Recommended Options

- Ethernet Option
- Ethernet / RS232 (Netcom kit)
- AntiStatic kit
- Cable box

### 4.2 Location

#### 4.2.1 Selecting the location

Select a stable, vibration-free position that is as horizontal as possible. The surface must be able to safely carry the weight of a fully loaded instrument.



Observe ambient conditions.

Avoid the following:

- Vibrations
- Excessive temperature fluctuations
- Direct sunlight
- Powerful drafts (e.g. from fans or air conditioners)



### 4.3 Assembling powder module

#### Note

The instrument is mounted and installed by a MT Service Technician.

## 4.4 Installing and removing dosing head

### Installing dosing head

- 1 To open the front door, press key .
- 2 To open the side doors, press key .

#### Note

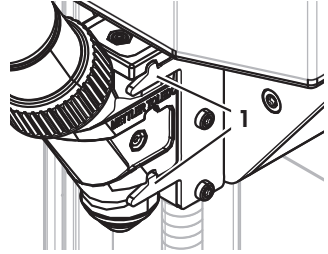
If you have an autosampler installed, these keys may have a different function. **See** Quantos Autosampler Operating Instructions for further information on the function of the keys.

- 3 Slide dosing head onto the dosing head support until it comes to a stop.
- 4 Press it down slightly until it is properly seated in the holding pins (1).

#### Note

The dosing head will be locked automatically, as soon as first dosing starts.

⇒ The dosing head is ready to dose.



### Removing dosing head

Once the dosing head has been locked, you have to unlock the head before removing it.

- Function key **Un/Lock** must be active.
- 1 Tap **Un/Lock**.
    - ⇒ The dosing head is being unlocked.
  - 2 Remove dosing head by pulling it outwards carefully.

## 4.5 Assembling pump module and bottle



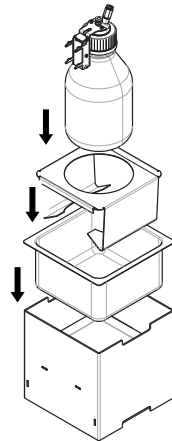
### CAUTION

#### Damage of Bottle because of high pressure!

If the bottle has to resist higher pressure than 1.5 bar (21 psi) it might get damaged.

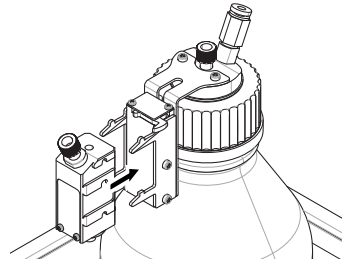
- a) Do not allow pressure higher than 1.5 bar (21 psi) in the bottle.
- b) Wear protective glasses when working with the bottle.

- Mount pump module and bottle according to figure.

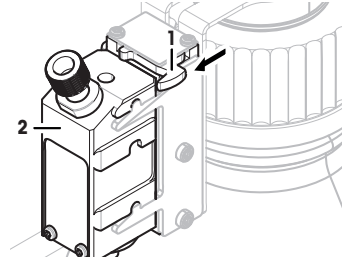


## Inserting and removing liquid dosing head in and from the liquid dosing head support

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

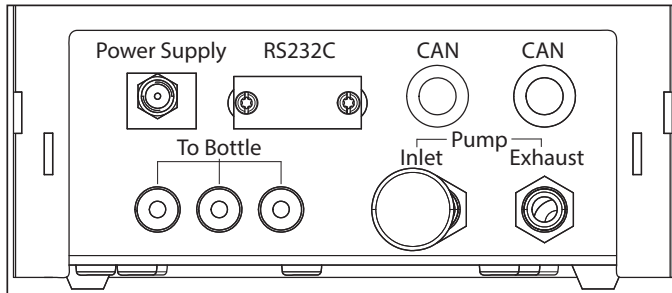


- 2 To remove liquid dosing head from the liquid dosing head support, pull the catch (1) to the front and remove liquid dosing head (2).



## 4.6 Connecting the tubes

### Connectors of pump module



### **CAUTION**

#### **Dangerous liquids!**

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

- a) Use a tube for the exhaust air outlet.



### **CAUTION**

#### **High pressure!**

If you feed pump with a protective gas with pressure higher than 0.2 bar (2.9 psi), the pump module might get damaged.

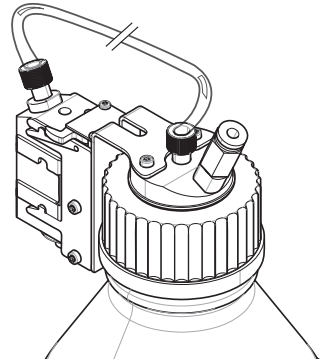
- a) Make sure the protective gas does not exceed the pressure range of 0.2 bar (2.9 psi).
- b) Wear protective glasses when handling the protective gas.

**Note**

The thinner tube is used for transporting liquid from the bottle to the liquid dosing head. The slightly bigger tube is used for pumping air into the bottle. By adding air, pressure rises in the bottle. When pressure reaches min. 0.3 to max 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. The two tubes are further referred to as liquid tube and air tube.

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

1 Connect liquid tube at bottle and at liquid dosing head.

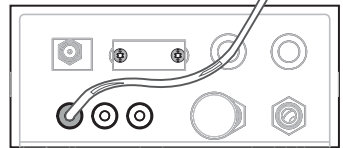
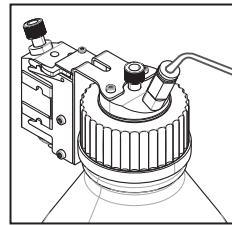


2 Connect air tube at bottle and at pump module.

**Note**

A tube in the air outlet to bottle opens the valve of the air outlet. Never leave a tube which 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 the pump module. The instrument uses the liquid of the bottle, which is inserted in the pump module.



3 Insert muffle (1) into air inlet to absorb noise.

4 **WARNING Explosion hazard!**

If you need to feed the pump with protective gas, e.g. nitrogen, make sure it does not exceed the pressure range of 0.2 bar (2.9 psi).

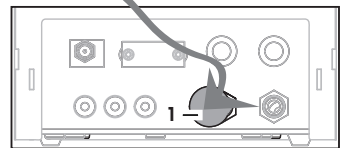
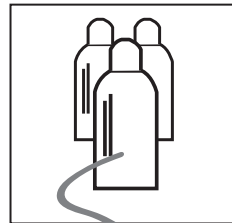
Wear protective glasses.

Do not insert muffle (1) but instead connect a tube to the air inlet.

**Note**

Outer tube diameter: 6 mm

Pressure range: 0.1 ... 0.2 bar (1.5 ... 2.9 psi)

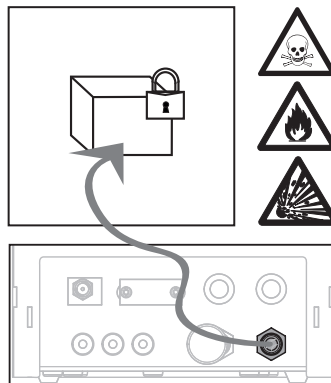


5 **WARNING Contaminated air!**

If you use toxic, explosive or flammable liquids, the exhaust air will be contaminated and the device can get damaged. Connect a tube to exhaust air outlet to absorb the air into a safe container.

**Note**

Outer tube diameter: 6 mm



**NOTICE**

**Damage on tube connectors because of mishandling!**

If the tubes are not removed correctly, the connectors and therefore the pump module can get damaged.

- a) To remove tubes, press down ring on connector and pull out tube carefully.






## 5 Operation

### 5.1 Powder dosing

#### 5.1.1 Basic operation settings

##### Note

If you dose powder for the first time, or after a master reset, check following settings:

- Dosing must be chosen as application: [  ] > [Dosing]
- Powder module must be defined as mounted: [  ] > Powder module... [Define] > [Mounted]
- RS232 device must be activated: [  ] > [System] > [Peripherals] > RFID / Quantos... [RS232 built-in] > [RS232 built-in]
- If front door is used, front door must be defined as mounted: [  ] > Powder module... [Define] > Mounted... [Define] > Front door... [Define] > Front door... [Mounted]
- If liquid module is mounted, liquid module must be defined as mounted: [  ] > Liquid module... [Define] > [Mounted]

Configure your settings in the following menu:


**Navigation:** [  ] > Powder module... [Define] > Mounted... [Define]

##### Note




Refer to your XPE Operating Instructions for further information on settings and parameters.

#### 5.1.2 Working with powder module

If you touch [Start] with the liquid module, you get these options:

	[Solution]	To prepare a solution with defined concentration solid/liquid in mg/g.	<b>See</b> Dosing solution
	[Solid dosing]	To dose a powder.	<b>See</b> Manual dosing
	[Liquid dosing]	To dose a liquid.	<b>See</b> Dosing liquid
	[Cancel]	To return.	

##### See also

-  Dosing powder [▶ 16]
-  Dosing liquid [▶ 17]
-  Dosing solution [▶ 18]

#### 5.1.3 Dosing powder

##### Note

The following procedure is described according to the standard factory settings. You can customize or disable the settings in the following menu:

[  ] > Dosing steps... [Define] > Dosing steps (solid)... [Define]

To recreate the standard factory settings, choose [STD].

##### Note

The **Dosing steps** of instruments equipped with accessories may slightly differ from the example below.

##### Note

To abort dosing procedure at any time, tap the cancel key [C].

The instrument then returns to the home screen.

- Powder dosing head is installed.
  - Weighing pan is empty.
  - ErgoClip is installed.
- 1 Tap [Start] > [Solid dosing].
  - 2 Enter **User ID** and confirm with [OK].

##### Note

The **Sample ID** is not mandatory and the instrument does not check whether or not it is unique. Enter **Sample ID** and confirm with [OK].

- 4 Enter the amount **Target quantity** [mg] required and confirm with [OK].



- 5 **Note**  
To define appropriate tolerance for your **Target quantity**, see Target Quantities and Tolerances.  
Entering 1% results in a tolerance range of +1%/–1%. For other possibilities see XPE Operating Instructions.  
Enter the **Tolerance** in percent and confirm with **[OK]**.
- 6 Place sample vessel on weighing pan or ErgoClip and confirm with **[OK]**.  
⇒ The value at the bottom of the display shows the weight of the sample vessel.
- 7 **Note**  
If SafePos is selected, there is no request to lower the dosing head. It will be lowered automatically as soon as dosing starts.  
Lower the position with the head height adjustment handle until dosing head is about 0.5 mm to 1 mm above the sample vessel and confirm with **[OK]**.
- 8 **Note**  
To abort dosing during process, tap **[C]**.  
Check, if all necessary adjustments are completed:  
To abort procedure, tap **[No]**.  
To start dosing, tap **[Yes]**.  
⇒ Pressure builds up.  
⇒ Instrument doses liquid.  
⇒ The results are being displayed.
- 9 To finish dosing process, confirm with **[OK]**.

**Congratulations, you have just successfully finished your first dosing!**

## 5.2 Liquid dosing

### 5.2.1 Basic operation settings

#### Note

If you dose liquid for the first time, or after a master reset, check following settings:

- Dosing must be chosen as application: **[☐]** > **[Dosing]**
- Liquid module must be defined as mounted: **[☐]** > **Liquid module...** **[Define]** > **[Mounted]**
- Powder module must be defined as mounted: **[☐]** > **Powder module...** **[Define]** > **[Mounted]**
- RS232 device must be activated: **[☐]** > **[System]** > **[Peripherals]** > **RFID / Quantos...** **[RS232 built-in]** > **[RS232 built-in]**

Configure your settings in the following menu:

**Navigation:** **[☐]** > **Liquid module...** **[Define]** > **Mounted...** **[Define]**

See XPE Operating Instructions for further information on settings and parameters.

### 5.2.2 Dosing liquid

#### Note

The following procedure is described according to the standard factory settings. You can customize or disable the settings in the following menu:

**[☐]** > **Dosing steps...** **[Define]** > **Dosing steps (liquid)...** **[Define]**

To recreate the standard factory settings, choose **[STD]**.

#### Note

To abort dosing procedure at any time, tap the cancel key **[C]**.

The instrument then returns to the home screen.

- Liquid dosing head is installed.
- Weighing pan is empty.
- If required, ErgoClip is installed.

1 Tap **[Start]** > **[Liquid dosing]**.

2 Enter **User ID** and confirm with **[OK]**.

#### Note

The **Sample ID** is not mandatory and the instrument does not check whether or not it is unique.  
Enter **Sample ID** and confirm with **[OK]**.

4 Enter the amount **Target liquid [g]** required and confirm with **[OK]**.

5 Place sample vessel on weighing pan or ErgoClip and confirm with **[OK]**.

- 6 Lower position of dosing head until it is about 0.5 mm to 1 mm above the sample vessel and confirm with [OK].
- 7 **Note**  
 To abort dosing during process, tap [C].  
 Check, if all necessary adjustments are completed:  
 To abort procedure, tap [No].  
 To start dosing, tap [Yes].
- ⇒ Pressure builds up.
  - ⇒ Instrument doses liquid.
  - ⇒ The results are being displayed.
- 8 To finish dosing process, confirm with [OK].

**Congratulations, you have just successfully finished your first dosing!**

**Note**

- Bubbles in the tube do not impair the result, because the target result is weighed.
- If you dose liquids that might crystallize, clean the dosing head from time to time.

### 5.2.3 Dosing solution

Solution dosings work with a concentration **not** measured by volume [ml], but by weight [mg].

Concentration To calculate the concentration (C):

$$C = \text{mass of solid} / (\text{mass of solid} + \text{mass of liquid})$$

**Dosing powder manually**

If you have few solid samples you can leave the liquid dosing head installed.

**Note**

The following procedure is described according to the standard factory settings: [L5] > **Dosing steps...** [Define] > **Dosing steps (solution)...**[Define] > [STD]

- Liquid dosing head is installed.
  - Weighing pan is empty.
- 1 Tap [Start] > [Solution] > [Start manual dosing].
  - 2 Enter **Substance** and confirm with [OK].
  - 3 Enter **Lot ID** of substance and confirm with [OK].
  - 4 Enter **User ID** and confirm with [OK].
  - 5 Enter **Sample ID** and confirm with [OK].
  - 6 Enter **Concentration [mg/g]** and confirm with [OK].
  - 7 Enter **Target solution [g]** and confirm with [OK].
  - 8 Place sample vessel on weighing pan and confirm with [OK].
  - 9 Dose manually the needed powder and confirm with [OK].
    - ⇒ Dosing results are displayed.
  - 10 Confirm results with [OK].
  - 11 To start liquid dosing tap [OK].
    - ⇒ Instrument doses liquid.
  - 12 Cap vessel and confirm with [OK].
    - ⇒ Dosing results are displayed.
  - 13 Confirm results with [OK].

**Dosing solution with pre-prepared solid**

If you have sample vessels with already prepared solid e.g. a tablet you can leave the liquid dosing head installed.

**Note**

The following procedure is described according to the standard factory settings: [L5] > **Dosing steps...** [Define] > **Dosing steps (solution)...**[Define] > [STD]

- Liquid dosing head is installed.
- Mass of solid is known.
- Weighing pan is empty.

- 1 Tap **[Start]** > **[Solution]** > **[Enter predosed quantity]**.
- 2 Enter the weight of the pre-dosed solid in **Enter predosed quantity** and confirm with **[OK]**.
- 3 Enter **Concentration [mg/g]** and confirm with **[OK]**.
- 4 Enter **Substance** and confirm with **[OK]**.
- 5 Enter **Lot ID** of substance and confirm with **[OK]**.
- 6 Enter **User ID** and confirm with **[OK]**.
- 7 Enter **Sample ID** and confirm with **[OK]**.
- 8 Place sample vessel on weighing pan and confirm with **[OK]**.
- 9 **Note**  
 To abort dosing during process, tap **[C]**  
 Check, if all necessary adjustments are completed:  
 To abort procedure, tap **[No]**.  
 To start dosing, tap **[Yes]**.  
 ⇒ Pressure builds up.  
 ⇒ Instrument doses solid.
- 10 Cap sample vessel and confirm with **[OK]**.  
 ⇒ The results are being displayed.
- 11 To finish dosing process, confirm with **[OK]**.

## 5.2.4 Releasing pressure

If you need to release the pressure in e.g. the bottle, switch off the instrument.

### Switching Off

- Press  until **Off** appears in the display.

### Note

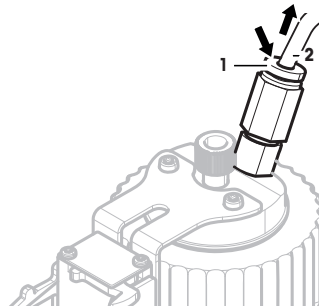
Do not disconnect the instrument from the power supply except if you will not be using the instrument for an extended period.

## 5.2.5 Handling of bottle

### Changing a bottle

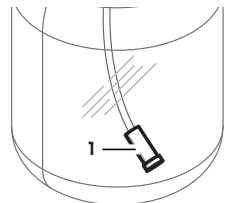
If you have more than one bottle equipped with cap and dosing head:

- Pressure is released.
- 1 Install dosing head on dosing head support at the bottle.
  - 2 Unplug air tube by pressing ring (1) down and pulling tube (2) out carefully at the same time.
  - 3 To seal the bottle, insert pin into air tube fitting.
  - 4 Take the new bottle.
  - 5 Connect air tube to new bottle.
  - 6 To continue dosing with the new bottle, install dosing head.

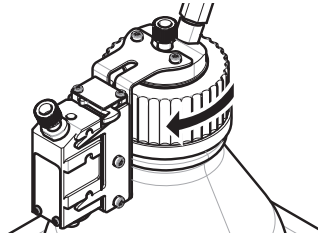


### Filling bottle

The Inline frit filter has to be covered with liquid at all times. Before the inline frit filter gets dry, refill the bottle.



- Pressure is released.
- 1 Unscrew regular cap.
  - 2 Fill in the liquid. (max. is shown on bottle e.g. 1000 ml)
- Note**  
Do not exceed the maximum. The air above the liquid is necessary for dosing.
- 3 Screw on cap.
  - 4 Check that the cap is tight.



### Changing the liquid of bottle

You have just one cap with dosing head and want to change the liquid:

- Pressure is released.
- 1 Unplug air tube.
  - 2 Unscrew regular cap.
  - 3 Unscrew inner PEEK nut.
  - 4 Change the inner tube and the inline frit filter.
  - 5 Screw the regular cap on new bottle.
  - 6 Check that the cap is tight.
  - 7 Connect air tube to new bottle.
  - 8 Purge the contaminated external tube.







# GWP®

Good Weighing Practice™

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GWP® is the global weighing standard, ensuring consistent accuracy of weighing processes, applicable to all equipment from any manufacturer. It helps to:

- Choose the appropriate balance or scale
- Calibrate and operate your weighing equipment with security
- Comply with quality and compliance standards in laboratory and manufacturing

 [www.mt.com/GWP](http://www.mt.com/GWP)

[www.mt.com/quantos](http://www.mt.com/quantos)

Further information

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