

# 807 Dosing Unit



Manual  
8.807.8002EN





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# **807 Dosing Unit**

## **Manual**

Technical Communication  
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# 1 Introduction

## 1.1 Instrument description

The 807 Dosing Unit is a versatile buret unit which can be operated with a 700 Dosino or 800 Dosino dosing drive. The 807 Dosing Unit is suitable for precise dosings, titrations, pipetting procedures, sample transfers, etc.

The four inputs and outputs (ports) are designed for flexible use (presuming the presence of a suitable control device).

Thanks to the transparent housing of the 807 Dosing Unit, piston movements and stopcock rotations are visible. This means that even complex liquid handling applications are easy to monitor. The unobstructed view into the dosing cylinder also ensures that solutions can be monitored with respect to the absence of bubbles and the leak-tightness of the cylinder unit.

Specifications concerning the dosing unit and the reagent can be stored in the integrated data chip. This data can be extracted and updated by a suitable control device.

## 1.2 Model versions

The 807 Dosing Unit is available with cylinder sizes of 2 mL, 5 mL, 10 mL, 20 mL and 50 mL. In addition to glass cylinders, plastic cylinders (ETFE) specially manufactured for alkali and other aggressive solutions are also available.

*Table 1 807 Dosing Unit with glass cylinder*

Volume	Order number
2 mL	6.3032.120
5 mL	6.3032.150
10 mL	6.3032.210
20 mL	6.3032.220
50 mL	6.3032.250

*Table 2 807 Dosing Unit with ETFE cylinder*

Volume	Order number
2 mL	6.1575.120



Volume	Order number
5 mL	6.1575.150
10 mL	6.1575.210
20 mL	6.1575.220
50 mL	6.1575.250

## 1.3 About the documentation





### CAUTION

Please read through this documentation carefully before putting the instrument into operation. The documentation contains information and warnings which the user must follow in order to ensure safe operation of the instrument.

### 1.3.1 Symbols and conventions

The following symbols and styles are used in this documentation:

(5-12)	<p><b>Cross-reference to figure legend</b></p> <p>The first number refers to the figure number, the second to the instrument part in the figure.</p>
<b>1</b>	<p><b>Instruction step</b></p> <p>Carry out these steps in the sequence shown.</p>
	<p><b>Warning</b></p> <p>This symbol draws attention to a possible life hazard or risk of injury.</p>
	<p><b>Warning</b></p> <p>This symbol draws attention to a possible hazard due to electrical current.</p>
	<p><b>Warning</b></p> <p>This symbol draws attention to a possible hazard due to heat or hot instrument parts.</p>
	<p><b>Warning</b></p> <p>This symbol draws attention to a possible biological hazard.</p>

	<p><b>Caution</b></p> <p>This symbol draws attention to a possible damage of instruments or instrument parts.</p>
	<p><b>Note</b></p> <p>This symbol marks additional information and tips.</p>

## 1.4 Safety instructions

### 1.4.1 Tubing and capillary connections



#### CAUTION

Leaks in tubing and capillary connections are a safety risk. Tighten all connections well by hand. Avoid applying excessive force to tubing connections. Damaged tubing ends lead to leakage. Appropriate tools can be used to loosen connections.

Check the connections regularly for leakage. If the instrument is used mainly in unattended operation, then weekly inspections are mandatory.

### 1.4.2 Flammable solvents and chemicals



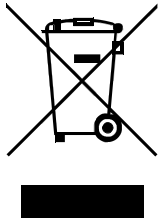
#### WARNING

All relevant safety measures are to be observed when working with flammable solvents and chemicals.

- Set up the instrument in a well-ventilated location.
- Keep all sources of flame far from the workplace.
- Clean up spilled fluids and solids immediately.
- Follow the safety instructions of the chemical manufacturer.



## 1.5 Recycling and disposal



This product is covered by European Directive 2012/19/EU, WEEE – Waste Electrical and Electronic Equipment.

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

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

## 2 Construction of the 807 Dosing Unit

### 2.1 Total view

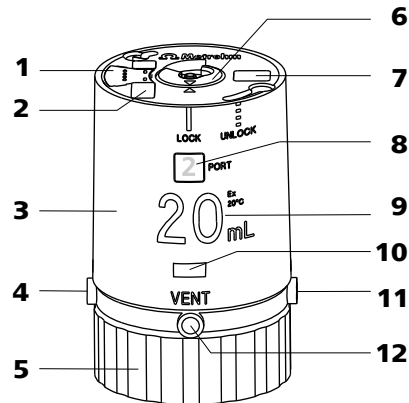


Figure 1 807 Dosing Unit

<p><b>1 Data chip</b> Contains all specifications for the dosing unit.</p>	<p><b>2 Coding magnet</b> For automatic recognition of the volume of the dosing unit.</p>
<p><b>3 Housing</b> With data chip, coding magnets, locking button and specifications concerning the dosing unit.</p>	<p><b>4 Port 1</b> Dosing port 1. Dosing output for solution.</p>
<p><b>5 Fixing ring</b> For fastening the dosing unit onto a reagent bottle.</p>	<p><b>6 Centering tube</b> Is actuated by Dosino and rotates the entire inner cylinder unit, together with dosing cylinder, cylinder base and the integrated valve disc.</p>
<p><b>7 Serial number, order number and barcode</b></p>	<p><b>8 Port display</b> Displays the port currently opened.</p>
<p><b>9 Nominal volume</b> Volume of the dosing cylinder.</p>	<p><b>10 Locking button</b> For locking and unlocking the housing.</p>
<p><b>11 Port 3</b> Dosing port 2. Dosing output for solution.</p>	<p><b>12 VENT port</b> For deaerating the reagent bottle.</p>



## 2.2 Components of the 807 Dosing Unit

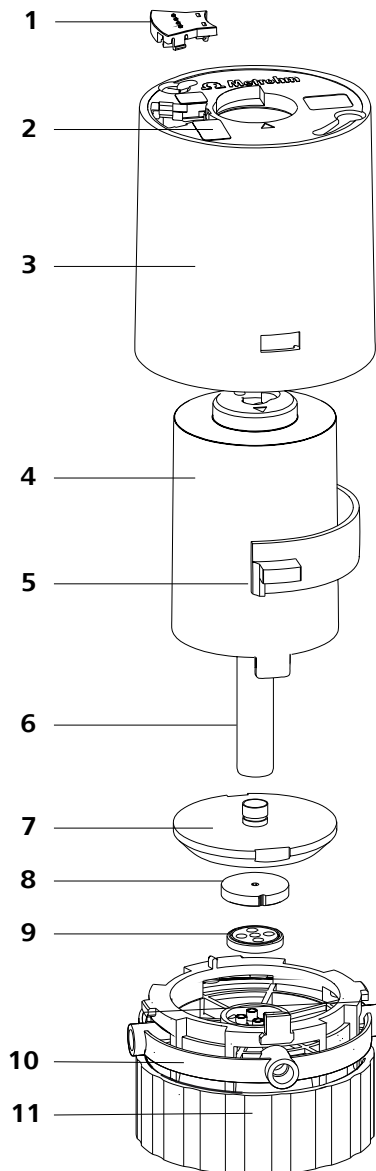


Figure 2 807 Dosing Unit - Components

**1 Data chip**

Contains all specifications for the dosing unit.

**2 Coding magnet(s)**

For automatic recognition of the volume of the dosing unit.

- 3 Housing**  
With data chip, coding magnets, locking button and specifications concerning the dosing unit.  
Material: PETG or PVDF
- 5 Spring clip**  
Material: PETG or PVDF
- 7 Cylinder base**  
Seals the dosing cylinder and contains the valve disc.  
Material: PTFE / Graphite
- 9 Distributor disc**  
The four holes in the distributor disc each set up a connection with one of the four ports (input/output) of the dosing unit.  
Material: Al<sub>2</sub>O<sub>3</sub> ceramic
- 11 Fixing ring**  
For fastening the dosing unit onto a reagent bottle.  
Material: PVDF

- 4 Centering tube**  
Is actuated by Dosino and rotates the entire inner cylinder unit, together with dosing cylinder, cylinder base and the integrated valve disc.  
Material: PETG or PVDF
- 6 Dosing cylinder**  
Contains the solution for dosing. Volume 2 mL , 5 mL , 10 mL , 20 mL or 50 mL .  
Material: Borosilicate 3.3 or ETFE
- 8 Valve disc**  
A hole in the valve disc guides the solution into one (of four) selected openings in the distributor disc.  
Material: Silicone carbide ceramic
- 10 Distributor**  
Contains four ports (input/output) for solutions. The ports are actuated by the distributor disc in the distributor and the valve disc in the base of the cylinder.  
Material: ETFE



## 2.3 Cylinder unit

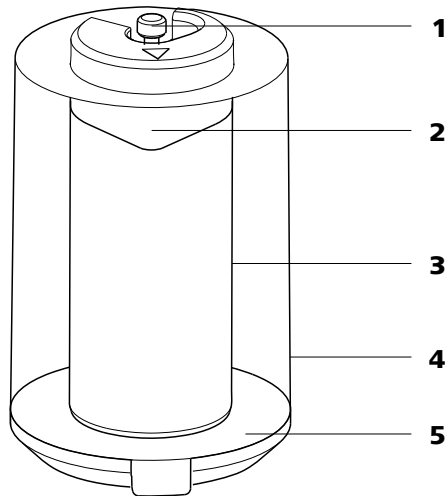


Figure 3 Cylinder unit

**1 Piston stopper**

Coupling for the piston rod of the Dosino.

**2 Dosing piston**

For ejecting and aspirating a solution.

Material: ETFE

**3 Dosing cylinder (Glass: 6.1574.XXX, ETFE: 6.1575.XXX)**

Contains the solution for dosing. Volume 2 mL , 5 mL, 10 mL, 20 mL or 50 mL.

Material: Borosilicate 3.3 or ETFE

**4 Centering tube**

Is actuated by Dosino and rotates the entire inner cylinder unit, together with dosing cylinder, cylinder base and the valve disc mounted within.

Material: PETG or PVDF

**5 Cylinder base**

Seals the dosing cylinder and contains the valve disc.

Material: PTFE / Graphite



## 2.4 Connectors (ports) of the 807 Dosing Unit

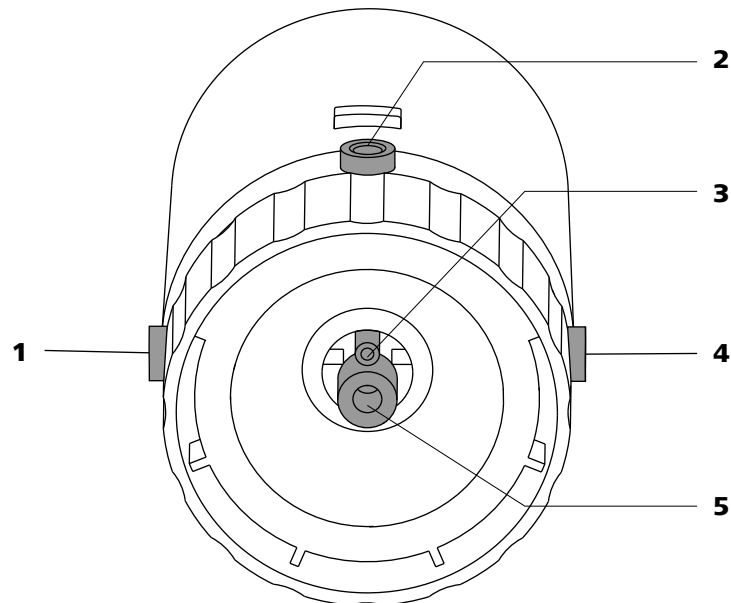


Figure 4 807 Dosing Unit - Ports

**1 Port 1**  
Connector (M6) for the dosing tubing.

**3 Port 4**  
Special port, waste port or recycling port.

**5 Port 2**  
Connector (M6) for the filling tubing.

**2 VENT**  
Deaeration, connection (M6) for adsorber tube.

**4 Port 3**  
Connector (M6) for a second dosing tubing.



### WARNING

Port 2 is the fill port in the default configuration. Take care to ensure that the tubing is firmly screwed in place in order that no air bubbles will be able to enter during aspiration of the reagent solution. Always use the 6.2739.000 wrench provided for tightening and unscrewing tubing connections.

## 3 Installation

### 3.1 Greasing the dosing unit

We recommend that the upper side of the centering tube and interior edges of the upper side of the housing be greased with paraffin grease 6.2803.010 before the dosing unit is used for the first time. This measure will reduce friction resistance when the centering tube is rotated.

#### Removing the housing

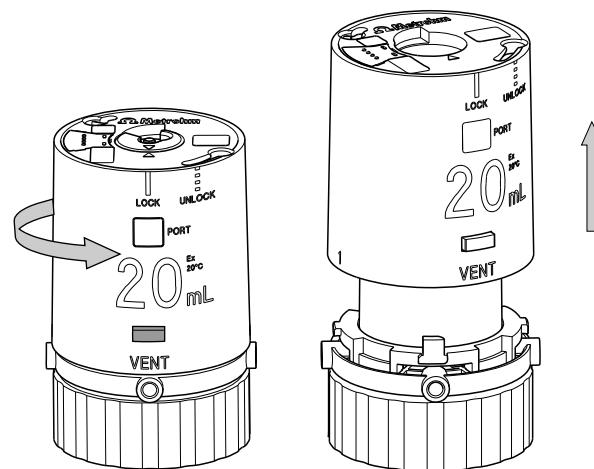


Figure 5 Removing the housing

Remove the housing of the dosing unit as follows:

- 1 Place the dosing unit on a flat, level surface so that the lettering of the volume specification faces towards the front.
- 2 Keep the locking button pressed down.
- 3 Rotate the housing of the dosing unit by ca. 1 cm to the right (in counterclockwise direction).
- 4 Release the locking button.
- 5 Carefully raise the housing upward.

When removing the housing, take care to ensure that the spring clip on the interior side of the housing does not slide out of place.

### Greasing the centering tube and housing

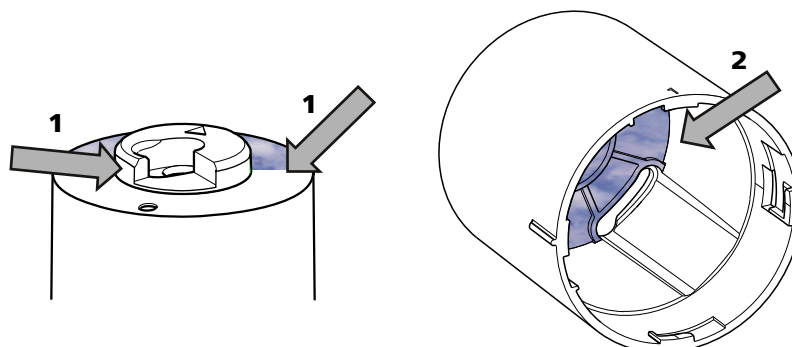


Figure 6 Greasing the centering tube and interior edges of the housing

Grease the centering tube and housing as follows:

- 1** Grease the sliding surfaces on the upper side of the centering tube with paraffin grease 6.2803.010.
- 2** Grease the sliding surfaces on the interior edge of the housing with paraffin grease 6.2803.010.

## 3.2 Mounting the storage vessel and the holder

The dosing unit comes equipped with a storage vessel 6.2008.030 with holder 6.2008.050 for the storage of the buret tip. It should be mounted when the device is started up for the first time.

The storage vessel serves as a storage container for the buret tip when the dosing unit is not in use.

The associated holder is used at the same time for mounting a name plate with the designation of the reagent in the dosing unit. Name plates can be reordered under the order number 6.2244.020 from any Metrohm agent.

The dosing unit housing must be removed in order to assemble the storage vessel holder (see "Removing the housing", page 10).

### Mounting the storage vessel and the holder

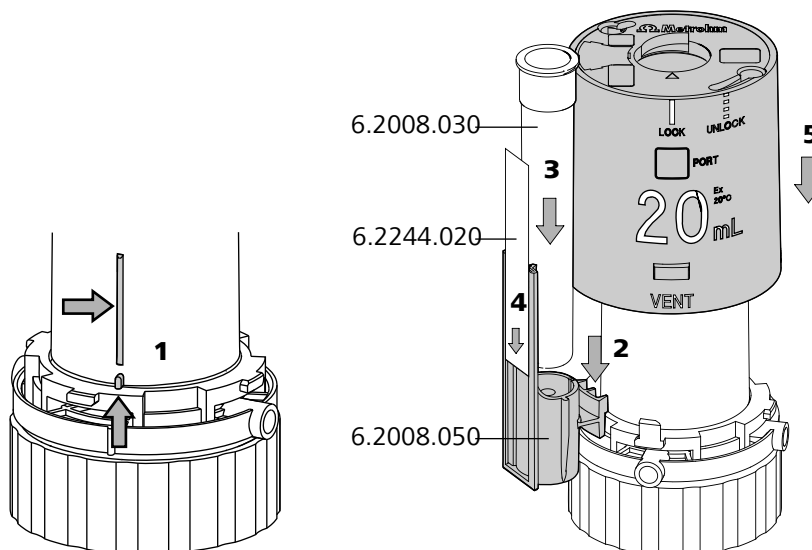


Figure 7 Mounting the storage vessel and the holder

Mount the storage vessel and the holder on the dosing unit as follows:

- 1** Rotate the centering tube on the distributor in such a way that the marking rib on the centering tube is lined up with the marking rib on the edge of the distributor.
- 2** Place the holder 6.2008.050 on the edge of the distributor.
- 3** Place the storage vessel 6.2008.030 for the buret tip in the holder.  
In order to ensure perfect seating, the rib on the storage vessel must be guided into the groove on the holder and pushed downward.  
The holder can be placed at any one of four positions on the ring of the distributor.
- 4** Slide the name plate 6.2244.020, which has the designation of the reagent in the dosing unit, into the holder.
- 5** Slide the housing of the dosing unit onto the centering tube.  
The centering tube with the cylinder unit must be in correct position when the housing is attached. You will find a positioning aid on the rear side of the dosing unit.

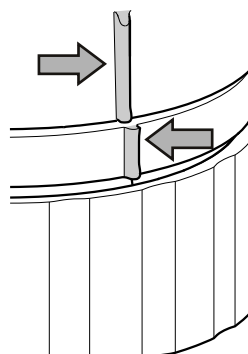


Figure 8 Marking rib on housing and distributor

### Locking the housing

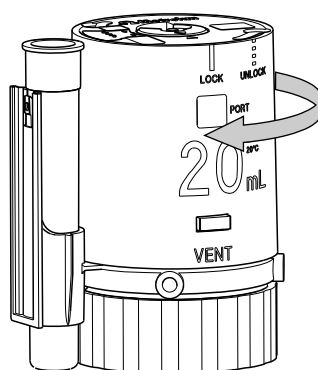


Figure 9 Locking the housing

Lock the housing as follows:

- 1 Hold the distributor in place.
- 2 Rotate the housing to the left (in clockwise direction).

Once all the parts are lined up with one another, the housing will snap into place.

### 3.3 Mounting the adsorber tube

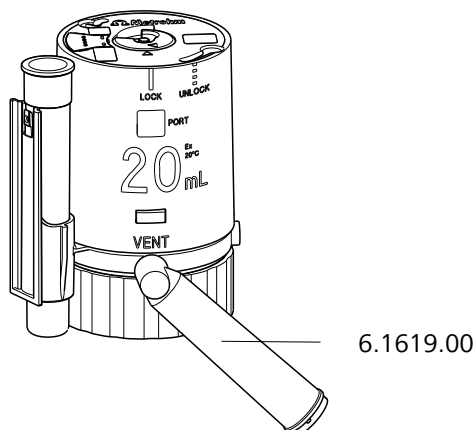


Figure 10 Mounting the adsorber tube

Mount the adsorber tube as follows:

- 1 Fill the adsorber tube 6.1619.000 with an adsorption material required for the reagent.
  - Molecular sieve for moisture-sensitive solutions ( e.g. KF solutions).
  - Soda lime for sodium hydroxide solution ( $\text{CO}_2$  adsorption)

- 2 Seal the adsorber tube with the appropriate cover.  
A minimum pressure compensation remains ensured.

- 3 Screw the adsorber tube to the deaeration port (**VENT**) of the dosing unit.

The adsorber tube should be screwed on a bottle in hanging position after the assembly of the dosing unit.

The **VENT** connector deaerates the reagent bottle. It should never be entirely sealed off. If no adsorber material is required, then the adsorber tube can be filled with cotton and used as a dust filter.

## 3.4 Mounting filling tubes

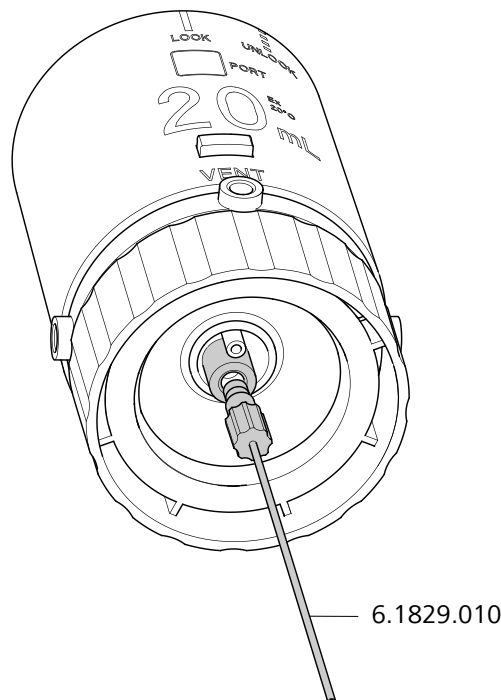


Figure 11 Mounting filling tubes

Mount the tubing as follows:

- 1 Screw the aspiration tubing 6.1829.010 onto the connector with inner thread (Port 2) on the underside of the dosing unit.

## 3.5 Mounting the dosing unit onto the bottle

### 3.5.1 Mounting the dosing unit onto the bottle

A variety of different bottles can be used as storage containers. Amber glass bottles 6.1608.023, clear glass bottles 6.1608.030 or PE bottles 6.1608.040 of 1 liter volume and GL45 thread.

Suitable thread adapters are available for bottles with other threads (*see chapter 7, page 43*).



#### WARNING

The lip of the bottle should have a plastic decanting ring. Do not use any mechanical aids for mounting the dosing unit. The upper part of the housing should still be easy to turn by hand.

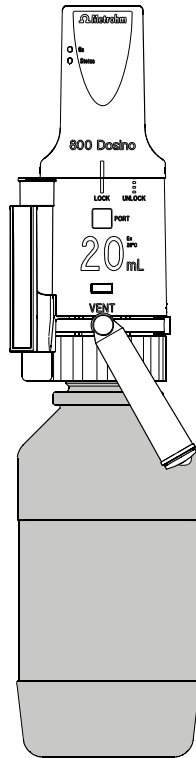


Figure 12 Dosing unit on the reagent bottle

Mount the dosing unit as follows:

- 1** Rotate the adsorber tube upward.
- 2** Fasten the dosing unit onto the filled reagent bottle.
- 3** After the dosing unit has been screwed tight, rotate the adsorber tube back into hanging position.



### 3.5.2 Mounting the dosing tubing and buret tips

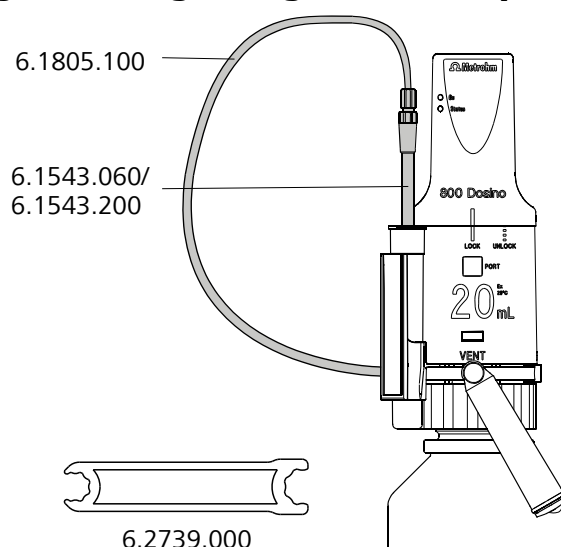


Figure 13 Mounting the tubing and the buret tip

Mount the tubing and the buret tip as follows:

- 1 Screw the dosing tubing 6.1805.100 (40 cm) on the left-hand side to Port 1 of the dosing unit.
- 2 Tighten the connection nipple with the wrench 6.2739.000.
- 3 Screw the open dosing tip 6.1543.060 or the antidiffusion tip 6.1543.200 onto the dosing tubing.

The link stopper 6.1446.030 included in the scope of delivery can be used to fix the tip in place in a ground-joint opening SGJ 14/15.

- 4 Insert the buret tip into the storage vessel provided for this purpose.

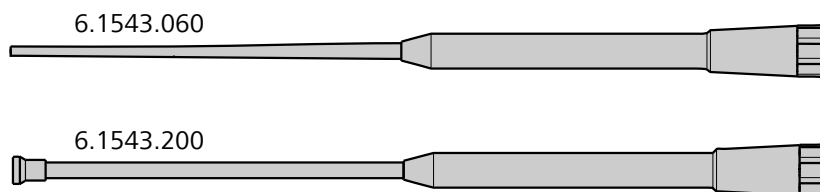
Details concerning the selection of the buret tip (*see chapter 3.5.3, page 18*).

The first-time filling of the dosing unit requires no special measures. Each Metrohm control device (e.g. Titrando, Titrino or Sample Processor) is equipped with a **PREP/Preparing** function with which the filling of the dosing cylinder and the rinsing of the dosing unit tubing can be readily accomplished in an automated sequence.



### 3.5.3 Buret tips

The following buret tips are included in the standard equipment of the dosing unit:



#### Open dosing tip 6.1543.060

For tasks during which the tip is not immersed, e.g. dosings.

The buret tip can be stored in the same solvent as the one contained in the reagent in order to prevent reagent crystallization.

We recommend that the storage vessel be filled with solvent and that the buret tip be placed inside it. In the event that KF reagent is used as the titrant, use methanol or ethanol for storing the dosing tip.

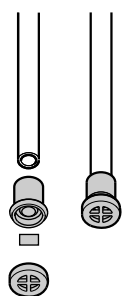
#### Antidiffusion tip 6.1543.200

It is used for work requiring the immersion of the tip, e.g. titrations.

This tip prevents the diffusion of liquids into the buret tip.

The pressure of the surrounding liquid and the internal stress of the membrane press on the tubing end, thus sealing off the opening.

The backpressure of the dosed liquid is overcome during the dosing process. The membrane opens up the tubing end. The tubing end is sealed off again automatically after the dosing is completed.



#### CAUTION

Do not disassemble the antidiffusion tip.

## 3.6 Avoiding air bubbles

Air bubbles could collect in the dosing cylinder as the result of leaking tubing connections or the degassing of air released in the liquid to be dosed.

Make sure that the tubing connections are always leak-proof. Check to make sure that the ends of the tubing are not damaged before assembly. Always pull the screw nipple tight with the wrench 6.2739.000. Take care to ensure however that you do not damage the tubing ends while doing so.

All Metrohm devices which support Dosinos as dosing drives offer a **PREP/Preparing** function. This function is a preparatory step which automatically fills cylinders and tubing with liquid.

The specification of length and diameter of all of the connected filling and dosing tubing is required in order for the control device to be able to calculate the necessary rinsing volume correctly. This is accomplished in the configuration of the dosing units of the respective device. The data is stored in the data chip of the dosing unit.



### CAUTION

Apply the **PREP/Preparing** function in each case prior to the first use of a dosing unit. This means that whenever you begin a new sample series (at least once per day), first execute the **PREP** function. You will find more detailed information in this connection in the manual for your Metrohm device.



### NOTICE

The contents present in the cylinder will be expelled completely during the **PREP/Preparing** function. The piston moves past the regular end position and is pressed against the base of the cylinder. The contour of the base of the cylinder will however never be able to be filled out completely by the piston, which means that a small air bubble might still remain in place.



### CAUTION

A small air bubble will also always be present on the piston after a PREP-Preparing step. It will however not be expelled during the dosing. An air bubble of that small size will not have any effect on the precision of a dosing! (see figure 14, page 20)

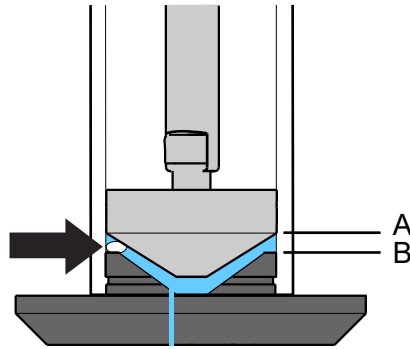


Figure 14 Air bubbles in the cylinder

The end position A (end volume) will never be exceeded by the piston during dosing procedures. It is only with the **PREP** function that the piston will be moved all the way to the stop (PREP Position B).

A dead volume will always remain after dosing which is greater in size than any air bubble which might remain following the execution of the **PREP/Preparing** function (see arrow). This means that the latter cannot exit into the tubing system and impair the precision of the dosing. The air bubble remains in the dosing cylinder.

### Conclusion

The design and mode of operation of the dosing unit is constructed in such a way that air bubbles which could possibly arise in the system will not be able to escape unchecked. They can be expelled efficiently prior to the dosing with the PREP function. Any small air bubbles which might form will be held back in a bubble trap. They exercise no influence over the dosing.

## 3.7 Disassembling the dosing unit

Generally speaking, it is not necessary to disassemble the dosing unit when reagents are replaced. Thanks to the low exchange volume of only a few microliters, and thanks to the **EMPTY/Emptying** and **PREP/Preparing** functions, which every control unit for the Dosino has, a reagent in a dosing unit can be replaced readily and without any large loss of reagent.

We recommend that inspections of pistons and cylinders be carried out regularly for each dosing unit (e.g. every six months). If alkali, corrosive or highly concentrated reagents are used, then shorter (possibly weekly) intervals will be called for. The glass cylinder itself could become corroded by aggressive alkalis, or solids could crystallize out of the solution. In the case of alkali reagents, the use of dosing units with ETFE cylinders is to be recommended.

### 3.7.1 Disassembling the dosing unit

#### Dismantling the dosing system

- 1 Empty the dosing cylinder with the **EMPTY/Emptying** function of the control device.
- 2 Rotate the Dosino on the dosing unit to the right all the way to the **UNLOCK** marking.
- 3 Lift the Dosino.
- 4 Loosen the dosing unit on the bottle.
- 5 Remove the filling tubing.
- 6 Remove the storage vessel and the holder.

### Removing the housing

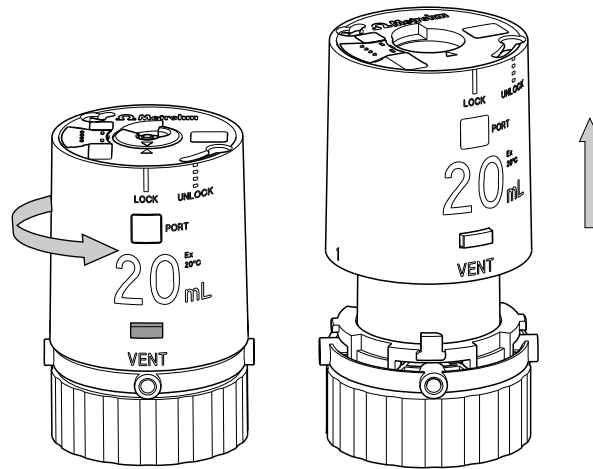


Figure 15 Removing the housing

Remove the housing of the dosing unit as follows:

- 1** Place the dosing unit on a flat, level surface.  
The lettering of the volume specification faces towards the front.
- 2** Keep the locking button of the spring clip pressed down.
- 3** Rotate the housing by approx. 1 cm to the right (in counterclockwise direction).
- 4** Release the locking button.
- 5** Carefully raise the housing upward.  
You will now see the complete cylinder unit with the transparent centering tube which rotates on the distributor with the interior dosing cylinder when the flat stopcock is switched.

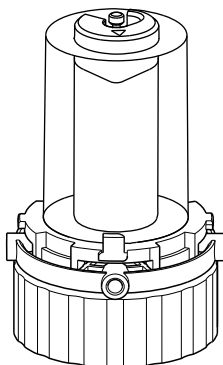


Figure 16 Cylinder unit on the distributor

### Removing the centering tube

Remove the centering tube as follows:

- 1 Remove the cylinder unit, comprised of centering tube, black cylinder base, valve disc, dosing cylinder and dosing piston, from the distributor.
- 2 Carefully pull out the centering tube on the black cylinder base in an upward direction.

You will now see the dosing cylinder on the black cylinder base with the integrated valve disk.

You can now inspect the condition of the cylinder and the piston. The glass cylinder should not exhibit any signs of corrosion. The plastic coating PTFE of the piston should not be damaged in any way.

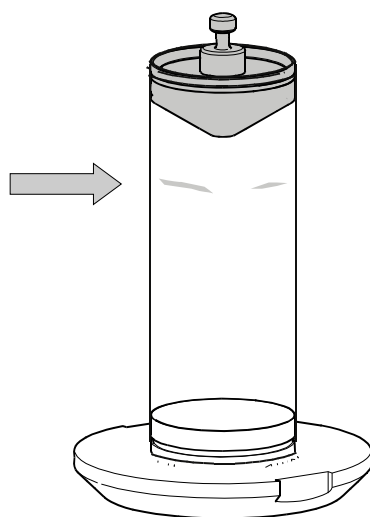
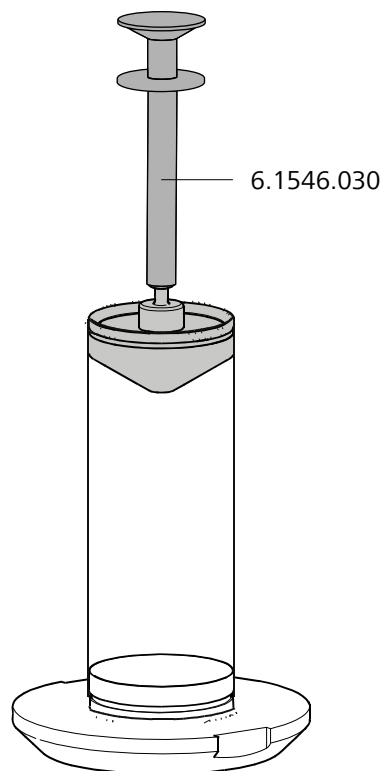


Figure 17 Dosing cylinder damaged

**CAUTION**

Do not dismantle the piston, cylinder and cylinder base any further unnecessarily. You should do that only if parts require cleaning, care or replacement. Damage to individual parts will impair the leak-tightness and accuracy of the dosing unit.

The dosing piston and the cylinder should always be replaced together. Complete cylinder units can be ordered under 6.1574.XXX or 6.1566.XXX (see chapter 7, page 43).

**Pulling out the dosing piston****NOTICE**

Use caution when handling the 2 mL cylinder! In contrast to the larger dosing cylinders, here the dosing cylinder can be pulled out completely.

Pull the dosing piston out of the cylinder as follows:

- 1 Press down on the white grip of the piston tongs 6.1546.030.



Two wire loops will appear at the tip of the piston tongs.

- 2 Arrange the piston tongs in such a way that the wire loops surround the piston stopper.
- 3 Carefully let go of the grip.  
The wire loops will snap shut.
- 4 Carefully pull out the dosing piston with the white grip, applying a certain amount of force while doing so.
- 5 Release the piston tongs by pressing on the white grip.

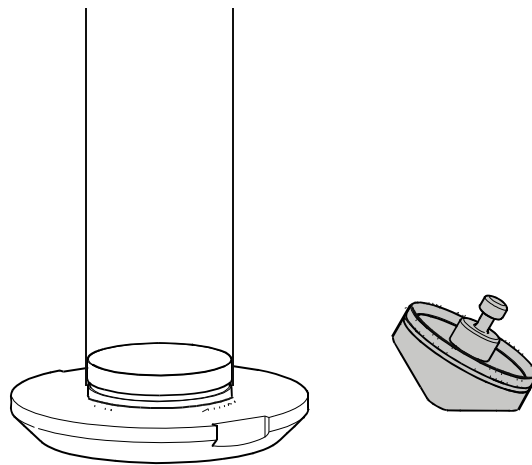


Figure 18 Dosing cylinder with dosing piston

Now the dosing cylinder and the piston can be cleaned separately (see chapter 4.1, page 31).



#### CAUTION

**Never** disconnect the dosing cylinder from the cylinder base. There is a danger of the sensitive material in the cylinder base (particularly the edges) becoming damaged when the cylinder is attached by hand.

## 3.8 Assembling the dosing unit



### CAUTION

Dosing cylinders and pistons, and in particular their sealing lips, should not be permitted to become damaged during assembly.

### 3.8.1 Inserting the dosing piston

#### Inserting the dosing piston

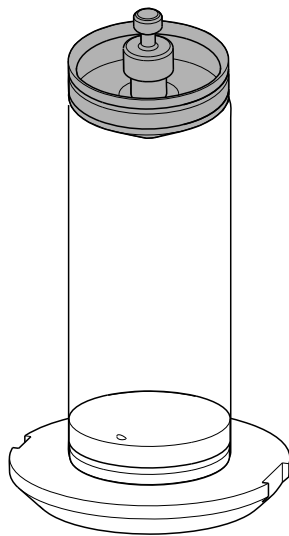


Figure 19 Inserting the dosing piston

Insert the dosing piston as follows:

- 1 Place the dosing piston horizontally on the cylinder.
- 2 Carefully press the dosing piston inward by approximately 1-2 mm.

#### Fitting the stoppers

Fit the stoppers as follows:

- 1 Place the centering tube over the dosing cylinder.
- 2 Fit the narrow and the wider guide blades on the lower edge of the centering tube into the corresponding recesses of the cylinder base.

The centering tube stopper fits into the opening of the centering tube.

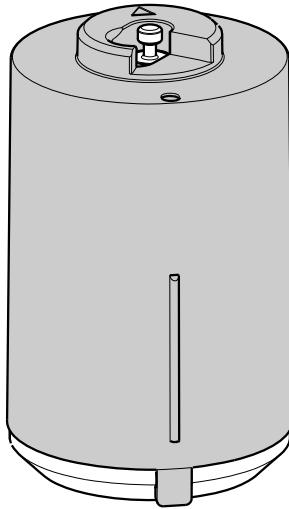


Figure 20 Centering tube on the dosing cylinder

**3** Slide the housing onto the centering tube.

**4** Press the housing onto the tabletop.

The dosing piston is pressed into the cylinder until the stopper is flush with the upper edge of the housing.

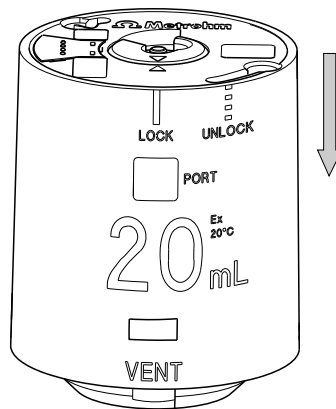


Figure 21 Stopper of the dosing piston flush with the upper edge of the housing

**5** Afterwards, remove the housing once again.



### 3.8.2 Attaching cylinder unit in distributor

Attach the cylinder unit in the distributor as follows:

- 1 Place the distributor on a flat, level surface.
- 2 Place the complete cylinder unit in the distributor.
- 3 Rotate the cylinder unit in such a way that the marking rib on the centering tube is lined up with the marking rib on the edge of the distributor.

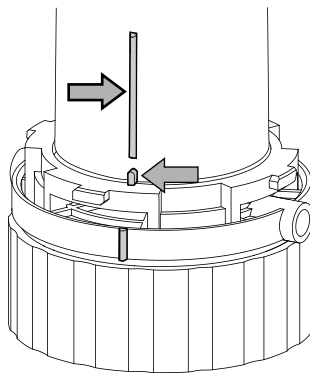


Figure 22 Marking ribs on the centering tube and edge of the distributor

The centering tube must be in correct position for the following assembly of the housing.

### 3.8.3 Attaching the housing

Attach the housing as follows:

- 1 Check whether the interior spring clip is positioned correctly in its guide groove.  
It must be able to move readily when the exterior locking button is pressed.
- 2 Slide the housing of the dosing unit onto the centering tube.  
The marking rib on the housing must be lined up with the marking rib on the edge of the distributor and the centering tube must fit into the opening on the upper side of the housing.

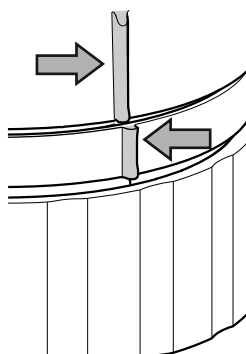


Figure 23 Marking rib on housing and distributor

- 3** Hold the distributor firmly.
- 4** Rotate the housing to the left (in clockwise direction).

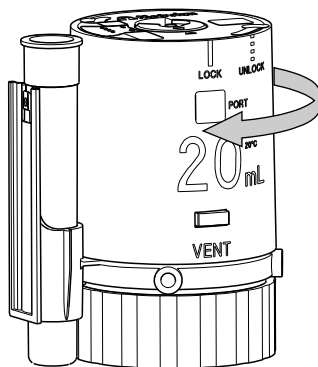


Figure 24 Locking the housing

Once all the parts are lined up with one another, the housing will snap into place.

- 5** Check the seating of the housing.
- 6** Check whether the piston and the centering tube are correctly positioned.
- 7** Press the entire dosing unit against a tabletop in upside-down position.

The piston stopper must be flush with the upper edge of the housing.

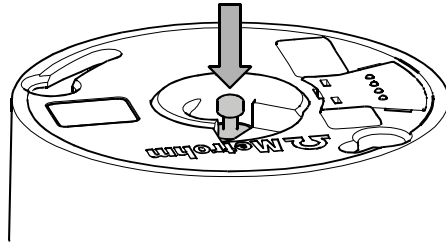


Figure 25 Piston stopper flush with the upper edge of the housing

- 8** Check the stopcock setting.
- 9** Rotate the centering tube (interior) until the two triangles on the upper side of the dosing unit are lined up with one another.

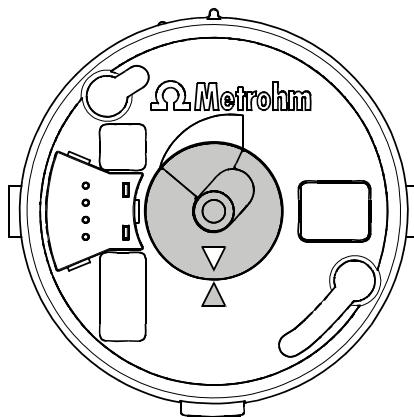


Figure 26 Triangles on the upper side of the dosing unit when the stopcock is set correctly

- 10** Screw on all tubings and the adsorber tube.

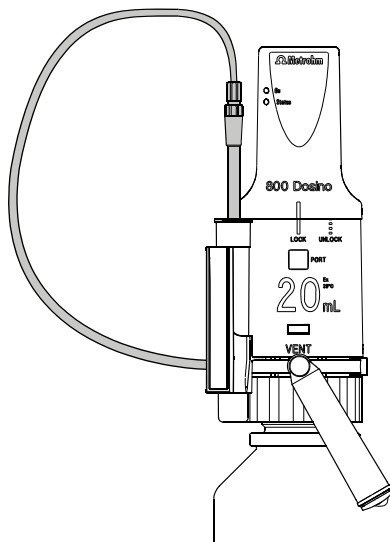


Figure 27 Dosing unit completely mounted

## 4 Handling and maintenance

### 4.1 Care and upkeep

In contrast to the Dosino drive, dosing units require regular care.

If aggressive reagents are dosed with dosing units, then such units should be rinsed with an inert solvent when not in use ( '**PREP/Preparing** function) and then subsequently emptied ( '**EMPTY/Emptying** function). In the event of that the dosing unit is not in use for > 2 days, the dosing unit should be emptied without fail, because even water can corrode the buret glass in the event of prolonged periods of disuse. Remove the dosing drive in the event of prolonged periods of disuse (longer than one week).



#### NOTICE

Dosing units require regular inspections and must be disassembled down to the cylinder unit from time to time and cleaned as necessary.



#### WARNING

Monthly or even weekly inspections are called for in the event that alkali, corrosive or high-concentration reagents are used. If non-problematic reagents are used, then the inspection intervals can be extended to between six and twelve months.

#### 4.1.1 Cleaning dosing cylinder and dosing piston



#### CAUTION

Never disconnect the cylinder from the cylinder base. Neither the cylinder nor the piston should ever be placed in a dishwasher!

- Check the leak-tightness of the dosing piston and cylinder. Inspect the dosing piston for deformations or damage to the sealing lips. The piston and the cylinder must be replaced in the event that any changes are discovered.
- Degreasing the piston and the glass cylinder are part of the cleaning procedure. Use a cloth to wipe down the piston.



- Clean the dosing cylinder and piston with a liquid cleaning agent. Do not use any abrasive cleaning powder which could scratch the cylinder. Afterwards, rinse the individual parts with plenty of deionised (or distilled) water.
- Check the piston and cylinder for any changes once more before assembling the dosing unit. If the dosing cylinder should exhibit scratches or rough areas, then it must be replaced together with the piston.
- You should grease the dosing piston lightly in order to guarantee precise dosings. Using your finger, carefully apply a trace of paraffin grease 6.2803.010 to the exterior of the sealing lips of the piston. Wipe off excess grease with a soft, lint-free cloth.

#### 4.1.2 Cleaning valve disc and distributor disc

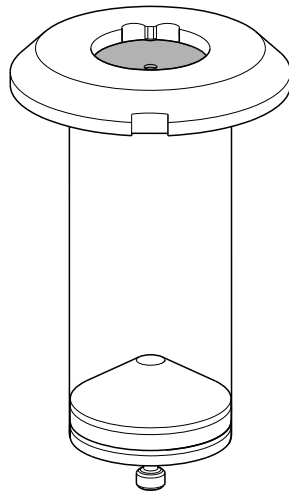


Figure 28 Valve disc in the cylinder base

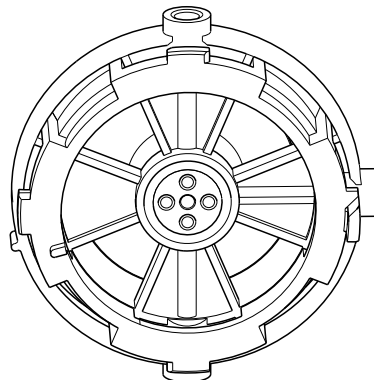


Figure 29 Distributor disc with 4 ports (in the distributor)

The valve disc and distributor disc must also be checked regularly. Blockage of the valve opening or of the outlet port is to be avoided under all circumstances.

Disassembling the dosing unit (see chapter 3.7, page 21).



**CAUTION**

Do not under any circumstances remove the black valve disc from the cylinder base or the white distributor disc from the distributor.

**4.1.2.1 Cleaning contact surfaces****CAUTION**

Do not damage the valve disc under any circumstances. Even small scratches could lead to leakage!

- Use a liquid cleaning agent and a soft cloth for polishing the contact surfaces of the two discs. Abrasive cleaning powders are unsuitable and could scratch the valve disk.
- Rinse the discs thoroughly with plenty of water.
- Dry the discs with a soft, lint-free cloth.

**4.1.3 Discs adhere to one another**

A film of liquid must always be present between the valve disc and the distributor disc. If the dosing unit is used with solvent or pure water, it could happen that this film of liquid will dry out during prolonged periods of disuse. This could then lead to the valve disc and the distributor disc adhering to one another so strongly that the dosing unit is no longer able to function. It will no longer be possible to switch the stopcock position in such cases. The control device will announce that the dosing drive is overloaded.

**CAUTION**

Do not attempt to use excessive force to separate the cylinder from the distributor.

**Separating the valve disc and distributor discs from one another**

Proceed as follows:

- 1** Removing the housing.
- 2** Remove the centering tube.



**3** Place the dosing unit with the dosing cylinder in water (possibly with a small amount of dishwashing detergent) for a few minutes.

**4** Carefully release the cylinder base from the distributor by hand (without rotating it) in order to separate the two discs from one another.

If the discs cannot be separated this way, inform the Metrohm Service Dept.

Should it happen that the discs repeatedly adhere to one another, then the contact surfaces of the valve disc and the distributor disc can be greased with a small amount of paraffin grease 6.2803.010. This is however not to be generally recommended.

## 4.1.4 Resistance and materials

### 4.1.4.1 Solvent

Conventional reagents and media can be dosed without difficulty with the 807 Dosing Unit. The materials of the individual components (*see chapter 4.1.4, page 34*) used which come into contact with the liquid being dosed have been selected for maximum resistance to chemicals and functionality.

It can however not be assumed that all types of aggressive or high-concentration reagents can be conveyed without difficulty. It is the responsibility of the user to determine the resistance of the various individual components to specific, aggressive media.



#### WARNING

Reagents which corrode glass, e.g. hydrofluoric acid HF or strong inorganic alkalis, should be applied in diluted concentrations only. Caution is also called for with concentrated solutions which are subject to crystallization.

Many problems involving aggressive media can be prevented by regular cleaning and inspections. It is possible that frequent replacement of the cylinder unit (piston/cylinder/cylinder base with valve disc) will be required.

The temperature of the dosing material may not exceed 50°C. The dosing unit and its components cannot be autoclaved. The sterility of a germ-free dosing material cannot be guaranteed.

#### 4.1.4.2 PETG housing

In contrast to the other components of the dosing unit, the transparent housing has only limited resistance to chemicals.

Good resistance	Aqueous solutions, diluted acids, alcohols and hydrocarbons
Limited resistance	Concentrated organic acids, diluted aqueous alkalis (cold cracking), acetone, isopropanol, tetrahydrofuran, hot water
Non-resistant	Concentrated inorganic acids and bases, bromine, chlorinated solvents, phenol, water vapor >100°C

The PETG housing is not dishwasher-safe, but it can be cleaned readily with lukewarm water and a dishwashing detergent.

#### 4.1.4.3 Materials

Housing	PETG (polyethylene terephthalate, glycol-modified) or PVDF
Centering tube	PETG or PVDF
Dosing piston	PTFE (polytetrafluoroethylene)
Dosing cylinder	Borosilicate 3.3 or ETFE
Valve disc	Silicone carbide ceramic
Distributor disc	Al <sub>2</sub> O <sub>3</sub> ceramic
Distributor channels	ETFE

## 4.2 GLP - Validation

Every dosing unit manufactured by the Metrohm company is subjected to rigorous quality controls prior to shipment. Every dosing unit is issued a quality certificate attesting to conformance with the strict quality criteria of Metrohm **GLP**(**G**ood **L**aboratory **P**ractice) requires, among other things, periodic inspection of analytical measuring devices with respect to precision and correctness on the basis of standard operating procedures **Standard Operating Procedure, SOP**). This may also include an inspection of dosing accuracy.

#### Recommended literature

- Metrohm brochure "Quality management with Metrohm", detailed information concerning the principles and procedural methods of Good Laboratory Practice



The validation of burets is carried out by the Metrohm-Service with a special software.

The Metrohm agents worldwide offer the possibility of on-site inspections and certifications of dosing units and Dosinos with respect to accuracy. It is recommended that an accuracy inspection be performed when the dosing cylinders and dosing pistons of a dosing unit are replaced.

## 5 Troubleshooting

### 5.1 Problems

Problem	Cause	Remedy
<b>Adsorber tube is jammed</b>		Using your thumb or the balls of your hand, apply forceful pressure to the center of rotation of the adsorber tube, while at the same time carefully rotating it counterclockwise until the screw nipple releases.
<b>Air bubbles in the cylinder or in the dosing tubing</b>	<i>Leaking connection</i>	<ul style="list-style-type: none"> <li>Check the ends of the tubing, in particular that of the aspiration tubing.</li> <li>Tighten all of the tubing connections with the wrench 6.2739.000.</li> <li>Check the locking mechanism of the housing. Suggestion: Remove the housing and then reattach it.</li> </ul>
	<i>The reagent degasses excessively, e.g. released air forms bubbles.</i>	<ul style="list-style-type: none"> <li>Carry out <b>[PREP]</b> / <b>[Preparing]</b></li> <li>Reduce the filling rate.</li> <li>Suggestion: Degas the reagent with ultrasound, nitrogen or in a vacuum.</li> </ul>
	<i>Wear</i>	Replacing piston and cylinder.
<b>An incorrect volume is dosed</b>	<i>[PREP] / [Preparing] is not carried out or false parameters-</i>	<ul style="list-style-type: none"> <li>Carry out <b>[PREP]</b> / <b>[Preparing]</b></li> <li>Correct tubing length and diameter.</li> </ul>
	<i>Dosing unit either mounted or assembled incorrectly.</i>	<ul style="list-style-type: none"> <li>Remove the dosing unit and then reattach it.</li> <li>Check whether the nominal volume on the housing and the effective cylinder volume match one another.</li> </ul>
<b>Data of the dosing unit cannot be read.</b>	<i>Data chip of the dosing unit mechanically damaged or impaired by chemicals.</i>	<ul style="list-style-type: none"> <li>Remove the dosing drive and then reattach it.</li> <li>Clean the data chip and the contact surfaces.</li> <li>Have the data chip replaced by the Metrohm Service Dept.</li> </ul>



Problem	Cause	Remedy
<b>Dosing cylinder does not fit into the centering tube</b>	<i>Dosing cylinder is canted or attached at an angle on the base of the cylinder.</i>	Dismantle the cylinder and reassemble the dosing unit.
<b>Dosing unit has a leak on the distributor</b>	<i>Distributor disc shows leakage.</i>	Clean valve disc and distributor disc (see chapter 4.1.2, page 32).
<b>Dosing unit recognized either not at all or incorrectly.</b>	<i>The dosing drive was not attached correctly.</i>	<ul style="list-style-type: none"> <li>▪ Remove the dosing drive and then reattach it once again.</li> <li>▪ Check whether the dosing drive is correctly seated.</li> <li>▪ Switch the control instrument off and on again.</li> <li>▪ If necessary contact Metrohm Service Dept.</li> </ul>
	<i>Dosing unit incorrectly assembled.</i>	Check whether the nominal volume on the housing and the effective cylinder volume match one another.
<b>Dosino becomes hot</b>	<i>Dosing drive is overloaded. Valve disc or dosing piston is blocked.</i>	<ul style="list-style-type: none"> <li>▪ Switch off the instrument immediately.</li> <li>▪ Disconnect dosing unit from the bottle and tighten only slightly (see "Dismantling the dosing system", page 21).</li> <li>▪ Disassemble the dosing unit and clean all of the individual parts (see chapter 3.7, page 21). Replace defective parts.</li> </ul>
<b>Fluid above the dosing piston</b>	<i>Worn-out or defective dosing piston and/or cylinder.</i>	Replace dosing piston and cylinder.
<b>Housing cannot be closed.</b>	<i>Spring clip inserted incorrectly.</i>	Remove the housing and insert the spring clip correctly.
<b>Liquid drips into the bottle</b>	<i>There is air in the cylinder.</i>	<ul style="list-style-type: none"> <li>▪ Check the ends of the tubing, in particular that of the aspiration tubing.</li> <li>▪ Tighten all of the tubing connections with the wrench 6.2739.000.</li> <li>▪ Check the locking mechanism of the housing. Suggestion: Remove the housing and then reattach it.</li> </ul>
	<i>The reagent degasses excessively, e.g. released air forms bubbles.</i>	<ul style="list-style-type: none"> <li>▪ Carry out <b>[PREP] / [Preparing]</b></li> <li>▪ Reduce the filling rate.</li> <li>▪ Suggestion: Degas the reagent with ultrasound, nitrogen or in a vacuum.</li> </ul>

<b>Problem</b>	<b>Cause</b>	<b>Remedy</b>
	<i>Wear</i>	Replace dosing piston and cylinder.
	<i>[PREP] / [Preparing] is not carried out or false parameters-</i>	<ul style="list-style-type: none"> <li>▪ Carry out <b>[PREP]</b> / <b>[Preparing]</b></li> <li>▪ Correct tubing length and diameter.</li> </ul>
<b>No dosing takes place at all</b>	<i>Tubing connections are blocked or dosing unit is not assembled correctly.</i>	<ul style="list-style-type: none"> <li>▪ Check whether the dosing tip is blocked.</li> <li>▪ Check whether the dosing tubing is connected to the correct port.</li> <li>▪ Check whether the dosing port is sealed off with a stopper.</li> <li>▪ Check whether the VENT port is sealed off with a stopper (vacuum in the supply bottle!). The VENT port must be open for pressure compensation.</li> <li>▪ Remove dosing drive and check whether the dosing piston is connected to the dosing drive. The piston stopper must be flush with the upper side of the housing.</li> <li>▪ Check whether the connection cable is attached to the dosing drive.</li> </ul>
<b>Not possible to rotate the stopcock</b>	<i>Valve disc and distributor disc stick to one another.</i>	Clean valve disc and distributor disc ( <i>see chapter 4.1.2, page 32</i> ).

## 6 Appendix

### 6.1 Buret data

The 807 Dosing Unit is equipped with a data chip which contains the specifications for the dosing unit, the tubing connections and the reagent used. The data chip can be read and overwritten by an 800 Dosino.

#### Indications on dosing unit / tubing connections

- Order number of the dosing unit
- Serial number of the dosing unit
- Serial number of the dosing cylinder
- Length and diameter of the tubings on the dosing ports
- Validation date
- etc.

#### Indications on the reagent

- Name of the reagent
- Titer of the reagent
- Concentration of the reagent
- Production and expiry date of the reagent
- etc

The 807 Dosing Unit makes it possible to read and overwrite data with the aid of a suitable device (e.g. Titrand). Consult the respective manual in order to determine whether the Metrohm device which you are using is capable of accomplishing this. The contact surfaces for data exchange with the data chip are made of titanium and are exceptionally resistant to both chemicals and abrasion.



#### **CAUTION**

---

Take care to ensure that the contact surfaces do not become contaminated. Wipe off any contaminations at once. In the event of more serious contamination, the underside of the 807 Dosing Unit can be cleaned with a moist cloth (possibly with a small amount of dishwashing detergent or ethanol).



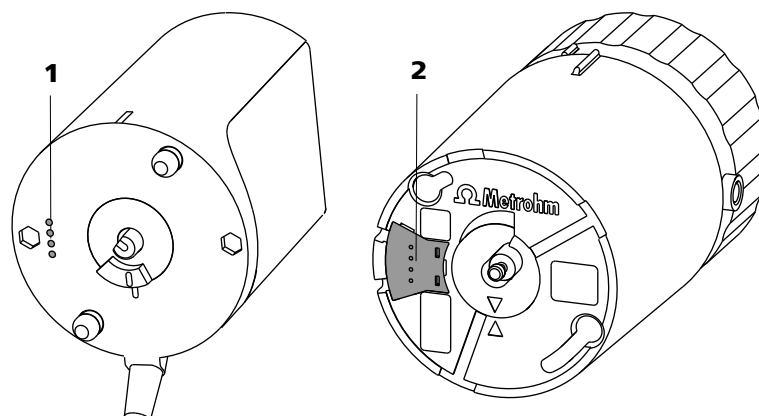


Figure 30 Data chip and contact pin

**1** Contact surfaces  
on the 800 Dosino

**2** Data chip with contact pins  
on the 807 Dosing Unit

## 6.2 Dosing accuracy

Every dosing unit is subjected to a strict quality inspection prior to shipment. Every dosing unit is issued a quality certificate attesting conformance with the quality criteria of Metrohm.

### 6.2.1 Typical measurement deviation

The accuracy of dosing units can be seen in the following table. The values listed are to be regarded as typical values which can be achieved with a 700 Dosino or an 800 Dosino.

Table 3 Typical measurement deviation of Metrohm dosing units

Cylinder volume	max. systematic deviation
2 mL	$\pm 6 \mu\text{L}$
5 mL	$\pm 15 \mu\text{L}$
10 mL	$\pm 20 \mu\text{L}$
20 mL	$\pm 30 \mu\text{L}$
50 mL	$\pm 50 \mu\text{L}$

### 6.2.2 The ISO/EN/DIN standard 8655-3

The Metrohm dosing units fulfil the requirements of the ISO/EN/DIN standard 8655-3 **Volume measurement instruments with pistons – Part 3: Piston burets**. Metrohm guarantees that its dosing units are in compliance with the following limit values at the time of shipment:



Table 4 Permissible limit values as per ISO/EN/DIN 8655-3

Cylinder volume (mL)	max. systematic Measurement deviation		max. permissible Measurement deviation	
2	± 0.5 %	± 10 µL	± 0.1 %	± 2 µL
5	± 0.3 %	± 15 µL	± 0.1 %	± 5 µL
10	± 0.2 %	± 20 µL	± 0.07 %	± 7 µL
20	± 0.2 %	± 40 µL	± 0.07 %	± 14 µL
50	± 0.2 %	± 100 µL	± 0.05 %	± 25 µL

The Metrohm agents worldwide offer the possibility of on-site dosing unit inspections and certifications with respect to accuracy. We recommend that an accuracy inspection be performed when the dosing cylinders and dosing pistons of a dosing unit are replaced.

## 7 Accessories

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

### Downloading the accessories list

- 1** Enter <https://www.metrohm.com/> into your Internet browser.
- 2** Enter the article number (e.g. **807**) into the search field.  
The search result is displayed.
- 3** Click on the product.  
Detailed information regarding the product is shown on various tabs.
- 4** On the **Included parts** tab, click on **Download the PDF**.  
The PDF file with the accessories data is created.



#### NOTICE

Once you have received your new product, we recommend downloading the accessories list from the Internet, printing it out and keeping it together with the manual for reference purposes.



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