

# SCI-Spense2 Bottletop Dispenser



## User Manual

Please read carefully before use and follow all operating and safety instructions!

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## **READ CAREFULLY BEFORE USE!**



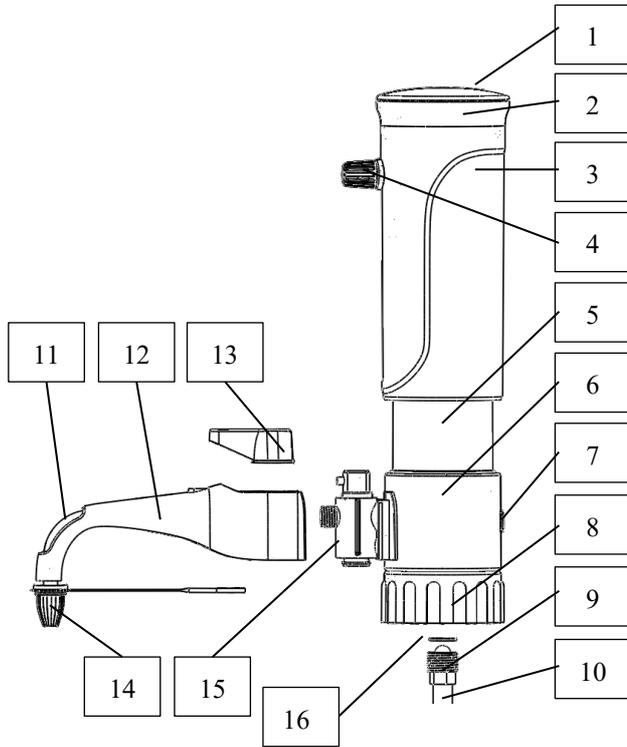
**Please read the Chemical Compatibility table carefully before use!**

### **1. Safety Instructions**

This instrument may be used with approved hazardous materials, operations, and equipment.

This manual does not purport to address all of the safety problems associated with its use. It is the responsibility of whomever uses this instrument to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

- a. Follow the general instructions for hazard prevention and safety regulations, e.g., wear protective clothing, eye protection and gloves.
- b. Observe the reagent manufacturer's information.
- c. Every user must be acquainted with this Operating Manual before operation.
- d. Use the instrument only for dispensing liquids, with strict regard to the defined Operating Exclusions and Limitations. If in doubt, contact the manufacturer or supplier.
- e. When dispensing, the discharge tube must always point away from the user or any other person. Avoid splashes. Only dispense into suitable vessels.
- f. Grasp the holding grip (6) but never the cylinder sleeve (3) to carry the mounted instrument to avoid breakage or loosening of the cylinder which may lead to personal injury from chemicals.
- g. Never press down the piston when the closure cap is pushed on.
- h. Never remove the discharge tube while the cylinder is filled.
- i. Move the piston upwards and downwards smoothly and gently.
- j. Use only original manufacturer's accessories and spare parts. Don't carry out technical modifications.
- k. Before use check the instrument visually for damages. In case of trouble (e.g., piston difficult to move, sticking valves or leakage), immediately stop dispensing. Clean the instrument according to the cleaning instructions before any further use of the instrument or contact the manufacturer.



## 2. Components

1. Piston cover
2. Piston seat
3. Cylinder sleeve
4. Volume adjustment knob
5. Piston (inside the socket)
6. Holding grip
7. Air vent cap
8. Bottle top screw seat
9. Filling valve assembly
10. Filling tube
11. Discharge tube
12. Discharge tube sleeve
13. Recovery switch
14. Closure cap
15. Recovery valve
16. Seal

### 3. Application and Design

This instrument is designed for dispensing liquids, observing the following limits:

- 15 to 40 °C of instrument and reagent
- vapor pressure up to 1000 mbar
- density up to 2.2 g/cm<sup>3</sup>

### 4. Materials

When the instrument is correctly used, the dispensed liquid comes into contact with only the following chemically resistant materials: Borosilicate glass, PFA, FEP, PTFE, PVDF, ETFE, Hastelloy; PP (closure cap).

### 5. Operating Exclusions

Never use this instrument for

- liquids attacking FEP, PFA, PTFE or Hastelloy.
- liquids attacking borosilicate glass (e.g., hydrofluoric acid)
- liquids which are decomposed catalytically by Hastelloy (e.g., H<sub>2</sub>O<sub>2</sub>)
- explosive liquids

- suspensions of solid particles which may clog or damage the instrument.

### 6. Operating Limitations

Concentrated hydrochloric acid and concentrated nitric acid, chlorinated and fluorinated hydrocarbons, or liquids which form deposits may make the piston difficult to move or may cause jamming.

When dispensing flammable substances, make provisions to avoid static charging, e. g., do not dispense into plastic vessels; do not wipe instruments with a dry cloth.

Warning!

If there is a sign of a potential malfunction (e.g., piston difficult to move) never use force. Immediately stop dispensing and follow cleaning instructions or contact the manufacturer.

Note:

Check the compatibility table or contact the manufacturer for special applications (e. g., trace material analysis).

## 7. Preparing instrument for use

### **Attention!**

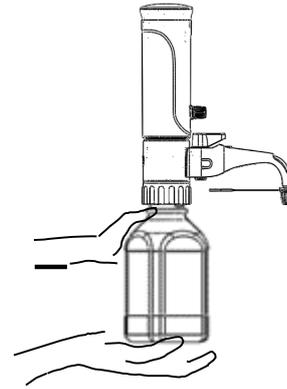
The bottle top adapters supplied with the instrument are made of polypropylene (PP), and can only be used for substance which does not attack PP.

### **Warning!**

Wear protective clothing, eye protection and gloves. Follow all Safety Instructions and observe the Operating Exclusions and Limitations.

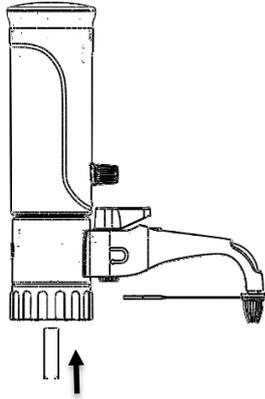
### **Warning!**

Always wear protective gloves when touching the instrument and the bottle, especially when using dangerous liquids. Carry the mounted instrument only as shown in figure.



*Figure 7-1*

## 7.1. Connecting the filling tube



*Figure 7-2*

Push the filling tube into the valve block as deep as possible.

## 7.2. Mounting instrument on bottle

The instrument can be screwed directly onto a GL 45 screw thread. For other bottles, use the accompanying adapters.

### **Attention!**

The adapters supplied with the instrument are made of polypropylene (PP), and can only be applied for substances which do not attack PP.

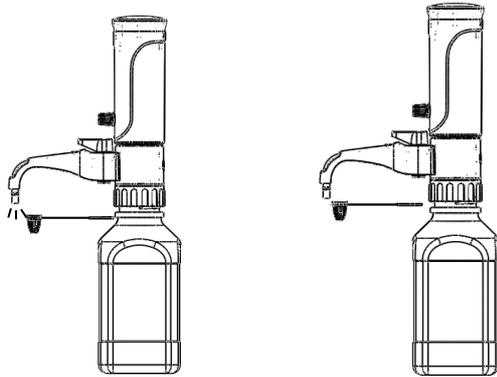
## 7.3. Priming the instrument

### **Attention!**

For small bottles use a bottle stand to prevent tipping over.

### **Warning!**

Reagent may drop off the discharge tube and the closure cap.



*Figure 7-3*

- Hold the discharge tube and carefully remove the closure cap.
- Move the closure cap backwards along the discharge tube, away from the discharge tube opening.



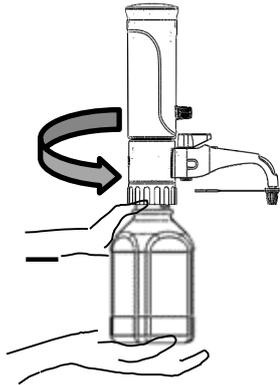
*Figure 7-4*

1. Hold an appropriate collecting vessel under the discharge tube opening.
2. Gently pull the piston up, then press it down rapidly.
3. Repeat this procedure until most of the air bubbles in the glass cylinder and discharge tube have been removed.

**Note:**

Before using the instrument for the first time, ensure it is rinsed carefully or discard first few samples dispensed.

## 8. Priming/Dispensing

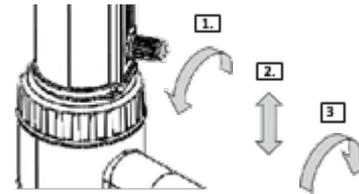


*Figure 8-1*

### **Warning!**

Follow all Safety Instructions and observe the Operating Exclusions and Limitations. The discharge tube must always point away from the user or any other person. Never press down the piston when the closure cap is pushed on. Reagent may drop off the discharge tube and closure cap.

## 8.1. Setting the volume



*Figure 8-2*

1. Rotate the volume adjustment knob counterclockwise to unlock it;
2. Move the knob along the scale to target volume;
3. Rotate the knob clockwise to lock it at the target volume.

## 8.2. Fill and Dispense

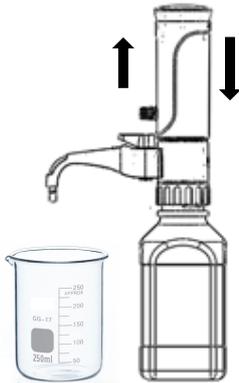


Figure 8-3

- Hold an appropriate collecting vessel under the discharge tube opening.
- Pull the piston up slowly and evenly to the upper stop to draw reagent into the glass cylinder.
- Push the piston down gently and evenly to dispense the reagent into the vessel.

### **Attention!**

After use, always leave the piston in the bottom extreme position.

## 9. Cleaning

The instrument must be cleaned in the following situations to assure correct operation:

- if the piston becomes difficult to move
- after dispensing liquids which form deposits
- before changing the reagent
- prior to long term storage
- should liquid have accumulated in the closure cap
- prior to sterilization
- before replacing the valves

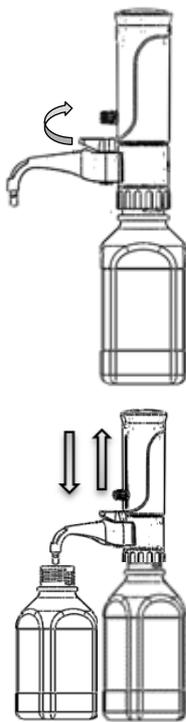
### **Warning!**

Follow all Safety Instructions. The glass cylinder, valves, filling and discharge tubes contain reagent. Wear protective clothing, eye protection and appropriate hand protection.

### **Note:**

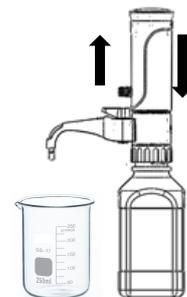
Never change the pistons of the instruments!

1. Remember to recover the reagent before cleaning the dispenser.
2. Make sure the dispenser is still properly mounted on the reagent bottle and there is plenty space in the bottle for the reagent inside the dispenser to be recovered.
3. Rotate the recovery switch clockwise by 90 degrees to the direction perpendicular to the discharge tube, and the remaining reagent inside the dispenser will flow back into the bottle underneath.
4. Turn off the recovery switch. Carefully remove the dispenser from the reagent bottle to another empty bottle. Pull and push the piston for several time to dispense the remaining reagent from the discharge tube into the reagent bottle as much as possible.



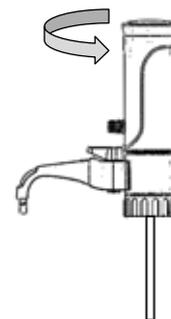
*Figure 9-1*

5. Remove the dispenser from the empty bottle to another bottle full of distilled water (or other proper wash buffer).
6. Rinse the instrument by dispensing the washing liquid into a beak again and again.
7. Empty the bottle, flush it and fill it with distilled water. Repeat step 6 to 7.
8. Empty the instrument.



*Figure 9-2*

9. Unscrew the piston seat (1).
10. Carefully pull the piston out of the glass cylinder by pulling on the piston seat only.
11. Carefully remove sediments at the edge of the glass cylinder with a screwdriver. Clean piston and cylinder with a bottle brush.
12. Carefully reassemble the instrument in the reverse order. Flush it with distilled water.



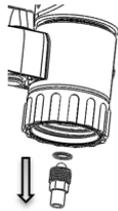
*Figure 9-3*

**Note:**

Insert the piston straight into the cylinder, not at an angle.

## 9.1. Clean/replace the filling valve

1. Follow all cleaning instructions.
2. Remove the filling tube.
3. Unscrew the filling valve using the mounting tool. Remove the valve with its seal. Make sure the seal does not remain in the valve block.
4. Rinse the filling valve in the cleaning solution, and clean with soft brush. Should valve ball become sticky, push it into the filling opening of valve with a pointed instrument, and release it.
5. Screw the cleaned/new filling valve together with its seal into the valve block and fasten it firmly using the mounting tool.



*Figure 9-4*

## 10. Autoclaving

This instrument withstands steam sterilization at 121 °C, 1 bar absolute (15 psi) for 20 minutes in accordance with general guidelines. It is the user's responsibility to ensure effective autoclaving.

### 10.1. Preparation prior to the autoclaving

1. Clean the instrument before sterilization.
2. Remove the filling tube (10) and put it on a towel. Avoid contact with hot metal surfaces.
3. Lay the dispenser with piston at the bottom extreme position on the towel.
4. Autoclave the dispenser.

**Note:**

Wait the dispenser to cool down in the closed autoclave to avoid deformation through too rapid cooling. After every autoclaving, inspect all parts for deformities or damage. If necessary, replace them. Do not reassemble the instrument until it has cooled down to room temperature (cooling time approx. 2 hours).

Mounting tool can be steam sterilized at 121 °C.

## 11. Checking the Volume

The accuracy and coefficient of variation of the instrument are determined gravimetrically as follows:

- Set to the nominal volume.
- Dispense distilled H<sub>2</sub>O.
- Weigh the dispensed quantity on an analytical balance.
- Calculate the dispensed volume taking the temperature into account.
- Perform at least 10 dispensing and weighing operations.
- Calculate the accuracy (A%) and the coefficient of variation (CV%) by means of the formula used in statistical quality control. The proceeding is described e.g., in DIN EN ISO 8655-6. Observe the operating manual of the balance manufacturer and the corresponding standards.

### 11.1. Calculations (for the nominal volume)

$$\text{Mean value: } \bar{x} = \frac{\sum x_i}{n},$$

$x_i$  = results of weighings,

$n$  = number of weighings ,

$$\text{Mean volume: } \bar{V} = \bar{x} \cdot z,$$

$z$  = correction factor

(e. g. 1.0029  $\mu\text{l}/\text{mg}$  at 20°C, 1013hPa)

$$\text{Accuracy: } A\% = \frac{\bar{V} - V_0}{V_0} \cdot 100,$$

$V_0$  = nominal volume

$$\text{Standard deviation: } s = Z \cdot \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$

$$\text{Coefficient of variation: } CV\% = \frac{100}{\bar{V}}$$

## 12. Trouble Shooting

<b>Problem</b>	<b>Possible cause</b>	<b>Corrective action</b>
Cannot move the piston	Formation of crystals and sediments	Stop dispensing immediately. Loosen piston by circular motion, but do not disassemble. Follow all cleaning instructions.
Cannot fill	Volume adjusted to minimum setting	Set to required volume.
	Sticky filling valve	Clean the filling valve. If necessary, replace the valve with seal.
Cannot dispense	The closure cap is pushed on the discharge tube opening	Pull off the closure cap from the opening.
	Discharge tube not firmly connected or damaged	Push on the closure cap. Hold the piston in place and push the discharge tube on firmly. Replace a deformed or damaged discharge tube. Only use tubes from the original manufacturer.
Air bubbles in the instrument	Reagent with high vapor pressure has been drawn in too quickly	Slowly draw in reagent.
	Seal not inserted	Double check that the seal (16) is in place
	Air not expelled from the instrument	Prime the instrument.

	Filling tube not firmly connected or damaged	Push the filling tube on firmly. If necessary, cut off approx. 1 cm of tube at the upper end and reconnect it or replace filling tube.
	Valves are dirty, not firmly installed or damaged	Cleaning procedure. Fasten the valves using the mounting tool. If necessary, replace the valves and seal.
Dispensed volume is too low	Discharge tube not firmly connected or damaged	Push the tube on firmly. Only use tubes from the original manufacturer.
	Filling tube not firmly connected or damaged	Cleaning procedure. Push the filling tube on firmly.
	Valves not firmly installed or damaged	Clean the instrument. Fasten the valves using the mounting tool. Replace the valves and sealing washers if necessary.

### 13. Technical Data



20 °C EX

Volume ml	Graduation ml	A* $\leq \pm$		CV* $\leq$	
		%	$\mu$ l	%	$\mu$ l
0.5 - 5	0.1	0.5	25	0.2	10
1 - 10	0.2	0.5	50	0.2	20
2.5 - 25	0.5	0.5	125	0.2	50
5 - 50	1.0	0.5	250	0.2	100
10-100	2.0	0.5	500	0.2	200

\* Error limits (A = Accuracy, CV = Coefficient of variation) relative to the nominal capacity (maximum volume) indicated on the instrument, obtained at equal temperature (20 °C) of instrument, ambience and distilled water, and with smooth operation.

### 13.1. Items supplied:

1 user manual, 1 discharge tube, 1 mounting tool, 1 filling tube and adapters of PP of the following sizes:

Nominal vol. tube	Adapter, PP	Filling tube
0.5 – 5	GL 25, GL 28, GL 32, GL 38, S40	300mm
1 - 10		
2.5 – 25		
5 - 50		
10-100		

### 14. Return for Repair

Attention:

For safety reasons only clean/decontaminated instruments can be checked/repared.

Therefore: Clean and decontaminate the instrument carefully.

Return shipment is at the risk and cost of the sender.

### 15. Warranty

As provided by law, any and all warranties are null and void if the product has been misused, modified or repaired by unauthorized personnel, if the defects are caused by negligence (user manual, maintenance) or by normal wear and tear. Use only original manufacturer's accessory/spare parts. For conditions and extent of warranty refer to our General Conditions of Sales.