NICHIRYO

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DISPET EX

Bottle Top Dispenser

Operating Manual

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

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Contents

1. Safety Instructions

This Manual does not purport to address every safety issue which may arise during 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.

1. Use the utmost caution when dispensing caustic, poisonous, radioactive or hazardous chemicals.
2. Observe general safety regulations (e.g., wear protective clothing, goggles and gloves).
3. Observe the Operating Manual and information from reagent manufacturers.
4. Use the instrument only for dispensing liquids, with strict regard to the defined Operating Exclusions and Limitations. If in doubt regarding the suitability of the instrument, for a particular application contact the manufacturer.
5. Before use, always verify that the instrument is in good working order, e.g., piston moves smoothly; filling and discharge tube are firmly seated and are properly attached, etc.
6. Never use force on the instrument. Use of force may result in injury to the user and other persons.
7. While dispensing, the discharge tube must always point away from the user or other persons. Avoid splashes. Only dispense into suitable vessels.
8. Never carry the mounted instrument by its upper casing.
9. Do not push down the piston while the closure cap is screwed on.
10. Clean the instrument before disassembling.
11. Use only original manufacturer's accessories and spare parts. Do not carry out any technical alterations.
12. In case of difficulty (e.g., piston difficult to move, leakage), immediately stop dispensing. Before further use, repair the instrument as described in this Manual. Contact the manufacturer if necessary.

2. Application and Operating Limitations

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

- 15 to 40 °C for instrument and reagent
- density up to 2.2 g/cm³
- vapor pressure up 500 mbar
- viscosity up to 500 mm²/s

3. Operating Exclusions

When the instrument is correctly used, the dispensed liquid comes into contact with only the following materials:
Borosilicate glass, FEP, ETFE, PFA, PTFE, Platinum-Iridium and PVDF (closure cap).

The instrument is suitable for dispensing a wide range of liquids, **excluding**:

- Liquids which attack FEP, ETFE, PFA, PTFE and PVDF;
- Solutions containing hydrofluoric acid, since they attack borosilicate glass;
- Suspensions, containing solid particles;
- Solutions which decompose and form solid particles (e.g., Biuret reagent);
- Substances which undergo catalytic transformation or react with Platinum-Iridium (e.g., H_2O_2);
- Carbon disulfide

4. Operating Limitations

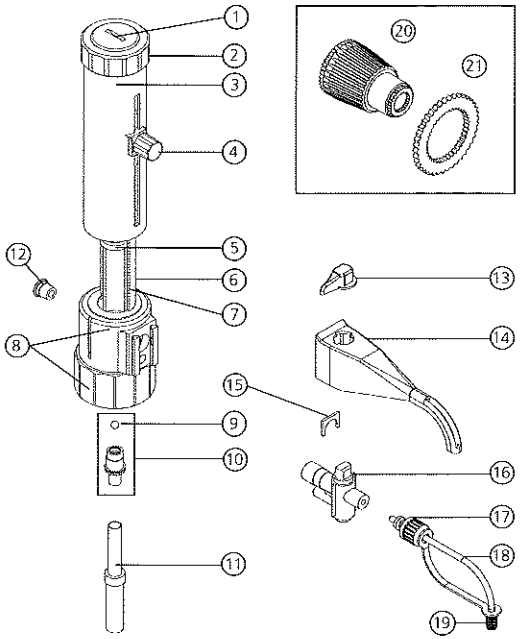
Liquids which form deposits may make the piston difficult to move or may cause jamming (e.g., crystallizing solutions or highly concentrated alkaline solutions).

When dispensing flammable media, 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 (see chapter 7) or contact the manufacturer.

Note:
Compatibility of the instrument for this special application (e.g., trace material analysis) must be checked by the user or contact the manufacturer.

5. Components



1. Adjusting mechanism
2. Piston seat
3. Outer sleeve
4. Volume selector
5. Piston
6. Cylinder sleeve
7. Glass cylinder
8. Valve head
   (Size 2.5 - 10 ml, size 25 - 100 ml)
9. Valve ball
10. Intake valve
11. Telescopic intake tube
12. Plug
13. Valve switch
14. Discharge tube support
15. Securing clip
16. Discharge/recirculation valve
17. Discharge tube securing nut
18. Discharge tube
19. Discharge tube closure cap
20. Tool (Size 2.5 - 10 ml, size 25 - 100 ml)
21. Tool adapter (size 100 ml)

6. Dispensing

6.1. Preparation for dispensing

1. Observe Operating Limitations and general safety regulations.
2. Adjust the length of the intake tube (according to the bottle to be used) and push the intake tube into the intake valve as far as it will go. Cut the lower end at an angle.
3. Mount the dispenser upon the reagent bottle and align it with the bottle label.
   In case of different bottle thread select a suitable thread adapter. Adapter of ETFE offer higher chemical resistance.
4. Place a suitable vessel below the discharge tube.

Warning!
Avoid splashing of reagent!

5. Hold the discharge tube support and carefully remove the closure cap.
6. The discharge tube must point away from the user at all times.

Warning!
Never push down the piston while the closure cap is mounted!

6.2. Priming

6.2.1 Dispenser without recirculation valve

1. Hold a suitable vessel below the discharge tube outlet.

Warning!
Reagent may splash!

2. Gently pull up the piston for 5-20 mm and push it down a bit quicker. Repeat this motion up to max. five times until air bubbles have disappeared from the cylinder.

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

6.2.2 Dispenser with recirculation valve

1. Hold a suitable vessel below the discharge tube outlet.
2. Set the valve switch to "recirculation".
3. Gently pull up the piston for 5-20 mm and push it down a bit quicker. Repeat this motion up to max. five times until air bubbles have disappeared from the cylinder.
4. Set the valve switch to "dispensing" and pull up piston to prime the discharge tube.

Warning!
In addition: Do only touch the outer sleeve in the lower area in order to avoid side strengths, with could course leakage.

If the piston moves stiffy or is dificult to move, stop dispensing immediately and clean the instrument (see chap. 7).

6.3. Setting the volume

Loosen the volume selector screw, set the pointer to the desired volume, and retighten the screw lightly by hand.

6.4. Dispensing

1. Verify that the closure cap is removed and set valve switch to "dispensing", if so equipped.
2. Place a suitable vessel below the discharge tube outlet.
3. Gently lift piston in a slow and steady motion, then depress piston slowly and steadily (each motion approx. 3 - 4 sec.). No bubbles should be visible during dispensing.

Warning!
During the dispensing motions please be careful and touch the stop positions gently. Otherwise you risk loss in accuracy or deformation of plastic parts.

4. After dispensing, leave the piston in the down position. Close the discharge tube with the closure cap. Set the valve switch to "recirculation", if so equipped.

Attention!
Reagent may escape from the discharge tube and the closure cap.

7. Cleaning

Instrument will only function safely if cleaned regularly. Be sure to clean instrument:

1. Immediately, if the piston moves stiffly;
2. Before changing reagents;
3. Before longer downtimes;
4. Before any maintenance and repair work;
5. Before autoclaving.

Warning!
Dispenser, intake tube and discharge tube may be filled with reagent. To prevent injury from chemicals, wear eye protection, protective clothing and protective gloves. Always point the discharge tube outlet away from the user and other people.

7.1. Emptying

1. Mount the closure cap.
2. While the dispenser is still mounted on the bottle, place it into a suitable basin.
3. Unscrew the dispenser and lift it high enough so that the intake tube (11) is no longer immersed in liquid.
4. Cautiously tap the intake tube against the inside of the bottle so that the reagent runs out.
5. Mount the dispenser on another empty bottle.
6. Select the maximum volume.
7. Pull off the closure cap.
8. Hold the discharge tube outlet over the opening of the first bottle. Empty the dispenser by repeated dispensing movements. In dispensers with recirculation valve, set the valve switch to "recirculation" and again move the piston repeatedly to empty the recirculation channel.
9. Mount the cap and unscrew the dispenser from the bottle.

7.2. Standard cleaning

1. Mount the dispenser on a bottle filled with a suitable cleaning solution.
2. Rinse the dispenser by repeated dispensing movements at maximum volume. In dispensers with recirculation valve, set the valve switch to "recirculation" and again move the piston repeatedly to empty the recirculation channel.
3. Empty the dispenser completely, as described in chapter 7.1.
4. Mount the dispenser on a bottle filled with distilled water. Rinse thoroughly, then empty, as described in chapter 7.1.

7.3. Intensive cleaning

Intensive cleaning always has to be preceded by a standard cleaning. This procedure must be followed if the piston is difficult to move, or if the dispenser is to be autoclaved. For this purpose, the dispenser must be partially disassembled.

Warning!
Before disassemble, always perform the standard cleaning procedure (see chapter 7.2.). To prevent injury from chemicals, always wear eye protection, protective clothing and protective gloves. Avoid splashing of reagent.

1. Pull off the telescopic intake tube and clean it with a soft bottle brush. Replace as necessary, especially if cracked or worn.
2. Unscrew the piston seat (2) and carefully pull out the piston (5).
3. Clean piston and cylinder with a soft bottle brush and rinse with water.
4. Re-insert the piston carefully so as not to damage the piston seal.
5. Tighten the piston seat by hand.
6. Rinse the dispenser thoroughly with dist. water, then empty as described in chapter 7.1.

8. Cleaning/replacing valves

Warning!
Before disassembly, always perform the standard cleaning procedure (see chapter 7.2.). To prevent injury from chemicals, always wear eye protection, protective clothing and protective gloves. Avoid splashing of reagent.

8.1. Cleaning/replacing the intake valve

Note:
Valve ball (9) may fall out when valve is removed.

1. Unscrew the intake valve (10) using the tool (20).
2. Clean or replace the valve.
3. To reassemble, tighten valve (10) by hand and complete using tool (20).

8.2. Cleaning/replacing the discharge/ recirculation valve

1. For dispensers with recirculation valve, set valve switch (13) to "recirculation".
2. Remove the valve switch (13), then lift the discharge tube support (14).
3. Lift the securing clip (15) with a small screwdriver.
4. Pull out the discharge/recirculation valve (16).
5. Unscrew the discharge tube securing nut (17) and pull out the discharge tube (18).
6. Clean or replace the valve.
7. To reassemble, push in the valve (16) by hand. Then insert the securing clip (15).
8. Push in the discharge tube. Tighten the securing nut (17).
9. In reverse order mount the discharge tube support (14) and recirculation valve and valve switch (13), if so equipped.

Warning!
Never use force during disassembly and assembly. Verify that all components fit tightly and securely. Subsequent to reassembly, gravimetrically check volume (see chapter 10).

9. Autoclaving

The dispenser can be autoclaved without disassembly (121 °C, 2 bar, t_{max} 20 min). It is up to the user to verify the effectiveness of the sterilization.

1. Clean the instrument thoroughly (see chapter 7).
2. Pull off the closure cap (10) and intake tube (11), and place into the autoclave on a towel, together with the instrument. Avoid contact with hot metallic surfaces.
3. The instrument can now be autoclaved without further preparation.

Attention!
After autoclaving, allow the instrument to slowly cool down to room temperature (cooling time approx. 2 hours). Check all parts for deformations, cracks and leaks.

10. Volume Check, Recalibration

10.1 Volume Check

The procedure is described in detail in DIN EN ISO 8655/6.

1. Set to nominal volume and dispense distilled water into a weighing vessel.
2. Weigh the dispensed amount of water with an analytical balance.
3. Convert the indicated weight into volume units, taking into account the temperature, density and atmospheric pressure. (The conversion factor Z is published in the standard.)
4. Carry out 10 dispensing procedures.
5. Calculate accuracy and coefficient of variation.

10.2 Recalibration

After prolonged use, or for specific appplications, instruments provided with calibration mechanism (1) can be adjusted by turning the slot of the mechanism with a coin.

1. Turning in the direction of the arrow decreases the volume.
2. Turning in the opposite direction of the arrow increases the volume.
3. Subsequently, check the volume again.

11. Troubleshooting

What to do if ...

1. **Reagent is not aspirated:**
   - Clean intake valve; replace if necessary (see chapter 8.1).
2. **Cylinder does not fill:**
   - Clean discharge valves (see chapter 8).
3. **Visible air bubbles in aspirated liquid:**
   - Check intake valve, make sure properly seated, replace if necessary
   - Check intake tube; replace if necessary.
   - Aspirate reagent more slowly.
4. **Piston movement is stiff:**
   - Clean dispenser thoroughly (see chapter 7.3)

12. Repair Service

Attention!
For safety reasons only cleaned and decontaminated instruments can be evacuated/repaired.

Clean the instrument thoroughly. If the instrument has been contaminated with infectious, genetically modified or biologically active substances, the instrument must be autoclaved in addition (see chapter 9). Return instrument to your distributor or manufacturer along with a description of the malfunction and dispensed liquids.

Return shipment is carried out at the risk and expense of the sender.

13. Warranty

We shall not be liable for the consequences of improper handling, use, servicing or unauthorized repairs of the instrument or the consequences of normal wear and tear especially of wearing parts such as pistons, seals, valves and the breakage of glass as well as the failure to follow the instructions of the operating manual. We are not liable for damage resulting from any actions not described in the operating manual or if non-original parts have been used.

14. Ordering Information

Volume range	Dispensing steps	Systematic error* A%	Random error* CV%	Cat. No.
0.25 - 2.5 ml	0.05 ml	≤ ± 0.6	≤ 0.1	DPX-25
0.5 - 5.0 ml	0.10 ml	≤ ± 0.5	≤ 0.1	DPX-50
1.0 - 10.0 ml	0.20 ml	≤ ± 0.5	≤ 0.1	DPX-100
2.5 - 25.0 ml	0.50 ml	≤ ± 0.5	≤ 0.1	DPX-250
5.0 - 50.0 ml	1.00 ml	≤ ± 0.5	≤ 0.1	DPX-500
10.0 - 100.0 ml	2.00 ml	≤ ± 0.5	≤ 0.1	DPX-1000

* Values based on nominal volume

Calibration conditions	Distilled water, delivered at 20 ± 0.5 °C
Number of testing procedures	10 according to DIN EN ISO 8655

(Technical specifications subject to change.)

Notices