

Bibby Sterilin

Digital Burette



Assembly and
operating instructions

For capacities of
30ml & 50ml

General Safety Instructions

Careful safety precautions must apply when dispensing corrosive, radioactive or hazardous chemicals.

- Always observe general safety regulations (eg. wear comfortable eye, face, hand and general protection).
- Follow this operating instruction manual.
- When using the instrument, take into consideration the chemical compatibility of the materials in contact with the liquid.
- Always check the Digital Burette for leaks. Make sure that the suction and dispense nozzle are firmly in position before starting to use the instrument.
- Never carry the instrument while holding onto its dispensing barrel or electronic head. Always support the bottle with one hand under its reservoir and the other hand around the threaded platform base (10) of the dispenser in order to stabilise the unit.
- Avoid contact with the dispense nozzle (12).
- When dispensing make sure that anti-drip valve is open.
- NEVER use force! Breakage of any part may lead to the operator and/or other persons being exposed to hazardous substances.
- Do not use the instrument where flammable fumes may exist.
- Use only original spare parts and original accessories.
- NEVER use damaged or deformed components.
- If in doubt, consult your safety officer.

Restrictions of Use

NEVER use the Digital Burette with:

- Liquids which are not compatible with PTFE, PVDF, Borosilicate glass, Alumina Ceramic, FEP or might attack Platinum-Iridium
- Hydrofluoric acid
- Liquids which contain solid particles
- Temperature limits of the Digital Burette and reagent are 15 to 40°C

Before Using the Digital Burette

Check that the instrument has not been damaged in transit.

Do not grip the electronic head casing (2) when screwing, unscrewing or adjusting the instrument.

The Digital Burette is fitted with a non-rechargeable Lithium battery. The battery life is greater than 60,000 three minute titrations. (Low battery is indicated with an icon on the display).

The battery should be changed only by Bibby Sterilin or a suitably trained person.

The Lithium battery should be disposed of correctly, on no account should it be incinerated.

Assembly

The Digital Burette is packed with the dispense nozzle attached and the inlet feed tube removed. The 300mm length of PTFE inlet tube provided should be trimmed to fit your particular container. The bottom end should be cut diagonally at a length that is close to the bottom of the container when the Digital Burette is assembled to the container. Longer lengths of inlet tube are available on request.

Four adaptors are available as accessories to suit containers with a 33mm, 38mm, 40mm or 45mm screw neck. The threaded platform base of the Digital Burette has a 30mm screw thread for use with containers of this size.

It is recommended that you use a squat anti-tip reservoir with safety side fill neck, of 2.5 litre capacity. Fill the reservoir to approximately 50mm below side neck aperture.

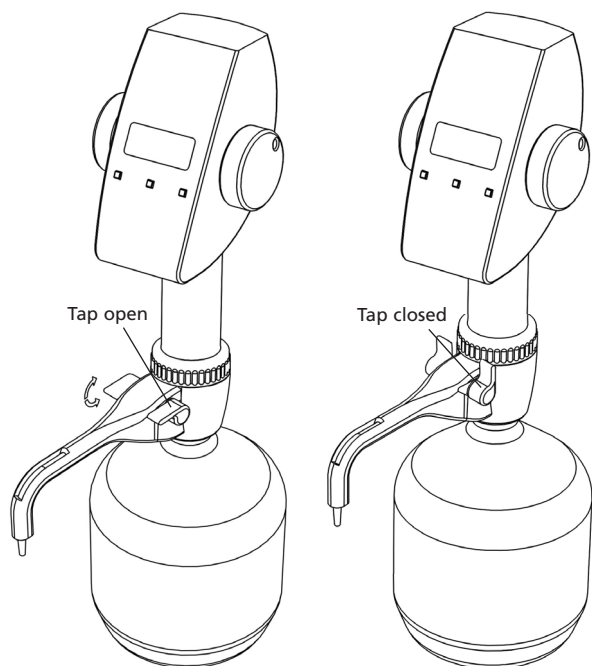
The assembled Digital Burette is screwed to the reservoir using gentle hand torque applied to the threaded platform base (10) only. Removal should also be by means of hand torque applied to the threaded platform base only.

Do not operate the titrate wheels (1) until the unit is safely and fully mounted onto the reservoir!

Operating instructions

Four momentary action push buttons

- 1 'On' - switches the unit on and displays the last reading (15).
- 2 'Reset' - reverts display to 00.00 (18).
- 3 'CAL' - user custom calibration - pen point access (17).
- 4 'Mode' - toggles between aspirate or titrate on the LCD display (16).



Priming

Position an empty container under the right angle dispense nozzle (12) open anti-drip valve (11) and move the piston to the fully down position. The dispense nozzle must point away from the user at all times. Prime the unit by a few gentle up and down piston strokes, taking the piston right down and lifting about an inch or so. Repeat until a steady, bubble free flow is obtained from the dispense nozzle. Priming can be completed without switching the unit on. After priming, the piston should be left in the fully down position. When not in use turn anti-drip valve to the closed position.

Titration

To titrate, first switch the instrument on by pressing the 'ON' button. Press 'MODE' until the LCD arrow points upwards. Press 'RESET' to zero the unit. Open anti-drip valve and gently turn the titrate wheels (1) 'up' so filling the borosilicate glass barrel (8). The amount of fluid taken in should be greater than the volume required for titration and will be displayed on the LCD screen.

Note: Too fast a filling action might lead to air bubbles forming under the piston.

After each filling, compensate for backlash by turning the hand wheels slightly in the discharge direction until 1-2 drops are dispensed into an empty container.

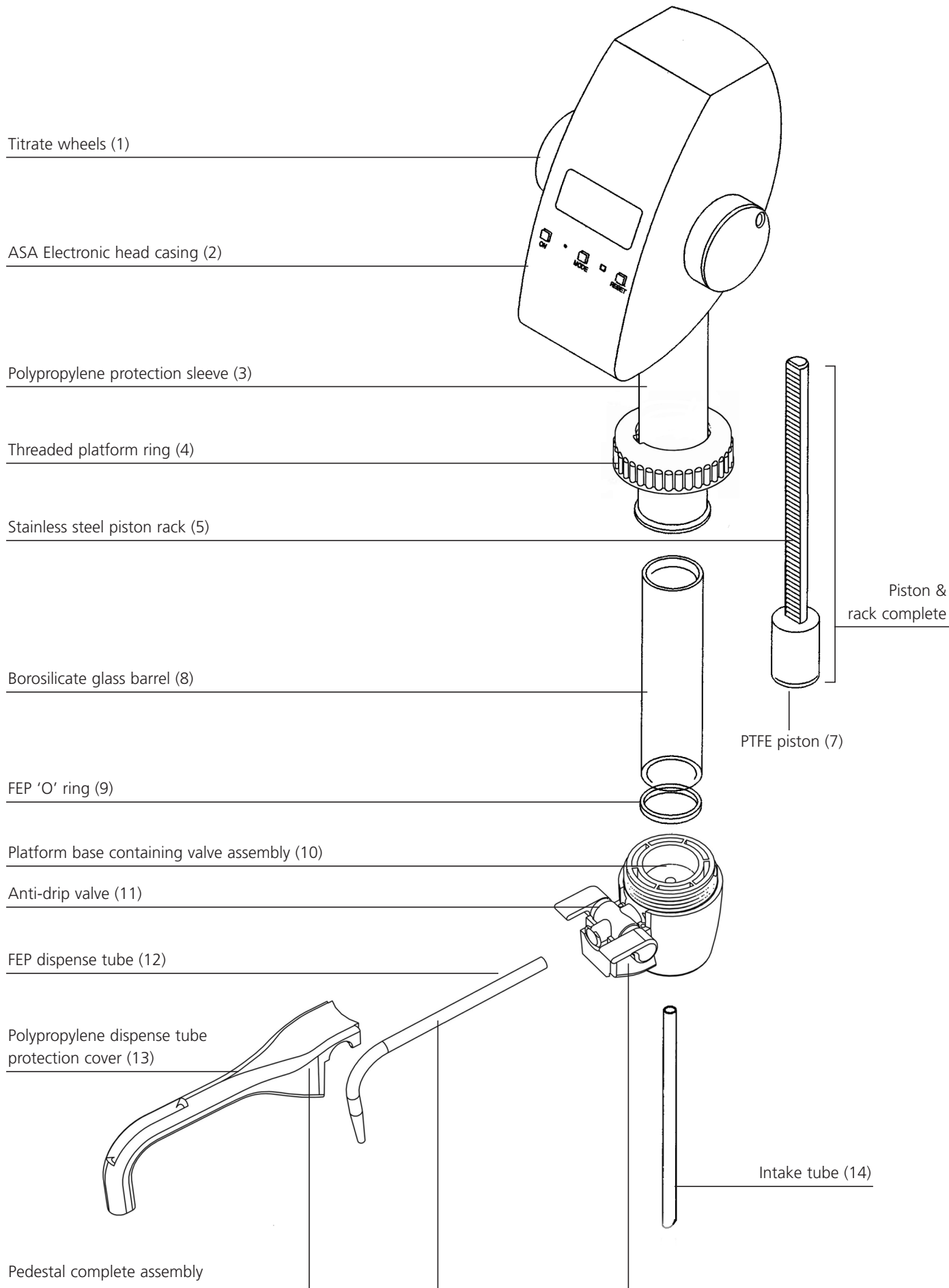
To start titration, press the 'MODE' button (16) so that the arrow points down. Press the 'RESET' button (18) to zero the display. Place a receiving vessel under the dispense nozzle (12) and gently turn the titrate wheels (1) 'down' so dispensing liquid. The dispensed volume will be shown on the display. Do not drive the piston to the bottom of its stroke, but stop a few ml short of it. If necessary, the syringe may be refilled at any time during the titration, without affecting the dispensed volume shown on the LCD using freeze count feature.

Freeze Count Feature

The Digital Burette has a unique 'Freeze Count' feature enabling the user to freeze the displayed value. This function allows backlash compensation after replenishing the barrel during titration, without affecting the value displayed. Simply press and hold 'ON' button, aspirate to refill barrel. Release 'ON' button to continue titration. It also allows the user to take a sample of the dispensed liquid during titration, just press 'ON' button to 'Freeze Count'.

Auto off

The Digital Burette will automatically switch off when it is idle for a period of more than three minutes. The instrument is switched on by pressing the 'ON' switch. When the instrument is switched on, the previous value is displayed. For subsequent titration, press the 'RESET' button (18) to zero the display.

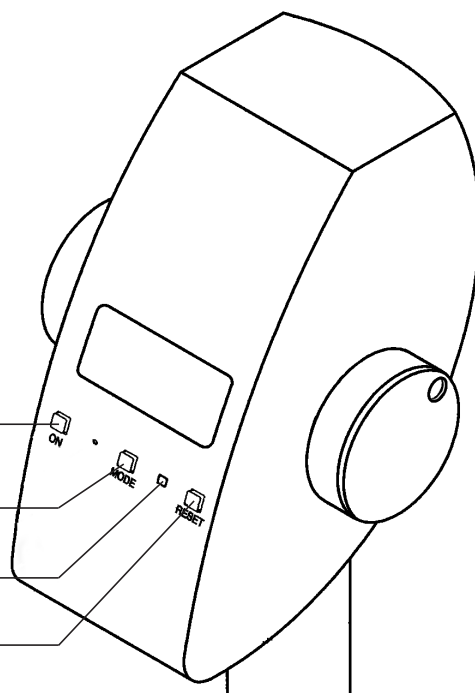


'ON' button (15)

'MODE' button (16)

User calibration switch (17)

Reset button (18)



User calibration

The user is allowed to override Factory Calibration and custom calibrate the Digital Burette.

The procedure is as follows:

- 1 Establish a mean volume of 10 dispensings of nominal volume of distilled H₂O at 20°C (30ml for the 30ml unit, 50ml for the 50ml unit), and establish the mean value gravimetrically. After each filling, remember to reset the display (18) to 00.00, only after you have compensated for any backlash.
- 2 When the mean volume, taking into account the correction factor (see formula below), has been established, turn the titrate wheels so that nominal volume is displayed i.e. 30ml for the 30ml unit, 50ml for the 50ml unit.
- 3 With the instrument turned on, press the calibration switch (17) through the right hand pen hole.
- 4 The LCD will flash 'CAL'.
- 5 Use the 'ON' button (15) as '-' and the 'Reset' button (18) as '+' to set the calculated mean volume on the display. Push once for increment of '1' – continuous push runs the numbers faster.
- 6 Store the new value by pressing the 'MODE' button (16). The word 'CAL' appears on the display from now on in order to indicate that the unit has been calibrated by the user.

Calculation (for the nominal volume)

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

x_i = results of the weighings

n = number of weighings

$$\text{Mean volume } V = \bar{x} * Z$$

Z = correction factor (eg. 1.0029 µl/mg at 20°C, 1013 hPa)

Calculate the dispensed volume by taking the temperature into account (1 ml distilled water at 20°C = 0.997g)

Factory calibration figures, however, are retained in the memory at all times.

To return to the factory calibration

- 1 Press the calibration button through the pen hole twice.
- 2 The display cancels the word 'CAL' and the unit is returned to the factory calibration.

Adjustable head

The display unit head (2) can rotate on the threaded platform base and be adjusted to suit the user.

Adjust the orientation of the display head (2) to the desired position, only when the Burette barrel is empty. Loosen the threaded ring (4) of the platform base by a quarter turn and rotate the display head (2) to the desired angle by holding the threaded base (10) of the Burette with one hand, while the other hand rotates the polypropylene protection sleeve (3). When the angle of the display is in its desired position, retighten the threaded ring.

Never rotate the display by holding on to the 'electronic display head casing'.

Maintenance/Cleaning

- 1 Place the instrument into a sink together with its reservoir. Unscrew the threaded platform base (10) and lift the dispenser's intake tube (14) carefully out of the reservoir, whilst tapping it against the reservoir's aperture in order to shake off any droplets from the intake tube.
- 2 Hold the dispense nozzle (12) over the aperture of the reservoir and apply gentle piston strokes in order to return the contents into the reservoir.
- 3 Flushing out with distilled water or a suitable solvent is recommended after the Digital Burette has been used with crystallising fluids. This will preserve the smooth action of the piston and free action of the inlet and outlet valves. If the inlet valve does stick and is not freed by flushing, it may be freed by gently inserting a thin rod into the inlet aperture and gently pushing the ball off its seating. Re-check unit for operation.
- 4 Empty the instrument completely after cleaning.
- 5 Note; All maintenance should be carried out wearing suitable protective clothing and eyeshield. If in doubt, consult your safety officer.

Sterilisation/Autoclaving

Note: The electronic display head cannot be sterilised or autoclaved. Chemical sterilisation will damage electronic components. Autoclaving will cause permanent damage to the electronic components and the battery may explode.

Before sterilisation or autoclaving, please follow the maintenance 'flushing out procedure'.

Sterilisation/autoclaving is carried out to 'fluid-path' components only.

Chemical sterilisation is permissible by soaking the 'fluid-path' components overnight in a dilute (1:10000) solution of Sodium Hypochloride. The Digital Burette should be rinsed well in sterile, distilled water if the latter method is used.

Autoclaving of 'fluid-path' components is permissible at 121°C, 2 bar, after the normal cleaning procedure has been carried out.

Fluid-Path disassembly procedure

Disassembly should only be undertaken AFTER the unit has been cleaned, using the standard cleaning procedure described above.

Undo the threaded platform ring (4) of the base platform and remove the electronic display head (2) together with the PTFE piston (7), piston rack (5) and polypropylene protection sleeve (3) from the platform base (10). Take care not to lose the FEP 'O' ring (9) which is mounted inside the platform recess.

Slide the glass barrel (8) off the piston (7) and lay it in a safe place. Turn the titrate wheels (1) down until the piston rack (5), together with the PTFE piston (7), disengages from the electronic display head (2) and slide them back into the glass barrel (8) from the bevelled edge end taking care not to damage the piston when inserting it into the glass barrel.

Place these components and the threaded base platform (10) (with dispense tube (12) and protection cover (13) attached)

together with PTFE inlet (14) on a suitably soft surface within the autoclave in order to avoid metal contact.

Steam sterilisation of the piston outside the glass barrel may damage it.

Do not use hard tools to scrape off residue of reagent from the piston.

Do not use force in assembly or disassembly.

Further disassembly options

To clean or replace the FEP dispense tube (12) and/or threaded platform base (10), follow these steps;

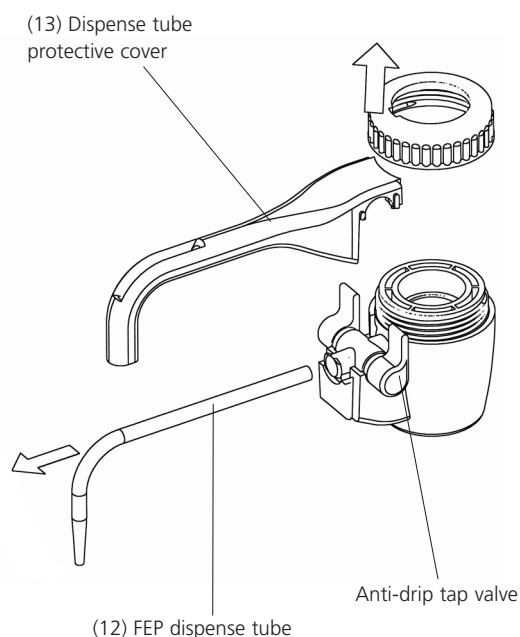
Turn the anti-drip valve to the closed position and unscrew the threaded ring (4) to separate the pedestal base from the glass barrel of the Digital Burette. Remove dispense tube protection cover (13) as shown opposite in an upward direction allowing dispense tube (12) to be pulled out of anti-drip valve assembly in direction indicated.

Reassemble in reverse, make sure the front end of the dispense tube is clipped into the dispense tube protection cover (13) from the underside.

Reassemble the remaining components in reverse order, making sure that the FEP 'O' ring (9) is well located into its platform recess.

Note; Bevelled inside edge of barrel must be at the top end when fitted. The piston rack (5) must engage into the electronic head with the piston rack teeth pointing forward in the direction of the display.

After reassembling the instrument, prime with distilled water to ensure that assembly has been correctly followed and piston is working smoothly. Check that no leaks occur.



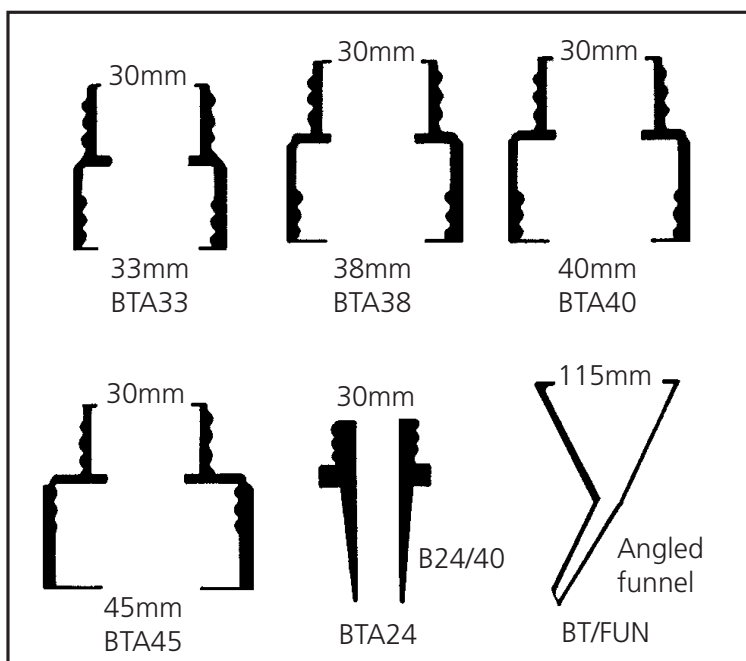
Troubleshooting

Problem	Possible Cause	Remedy
Air bubbles appear in discharge nozzle	Liquid reservoir is empty Too fast filling action Glass barrel (8) is not sealing against 'O' ring Leaking piston Leaking discharge valve	Refill reservoir and prime unit Operate titrate wheels (1) smoothly/slowly Unscrew the threaded platform ring (4) and make sure that the FEP 'O' ring (9) is properly fitted into its recess Clean PTFE piston (7). If problem persists, replace piston Clean unit by flushing through - if problem persists, replace platform base (10)
Barrel does not fill with liquid	Intake tube not fitted correctly Inlet valve stuck Glass barrel (8) is not sealing against the FEP 'O' ring (9)	Connect correctly Free inlet valve by inserting a thin rod into the inlet aperture and push gently Unscrew the threaded platform ring (4) and make sure that the FEP 'O' ring (9) is properly fitted into its recess
Titration not possible	Blocked dispense nozzle (12) Discharge valve stuck	Disassemble the dispense nozzle (12) and flush through with cleaning fluid Clean unit by immersing platform in cleaning fluid - if problem persists, replace platform base (10)
Wrong dispense volume	Instrument not calibrated Backlash not compensated for Leaking valves Titrate wheels (1) not turning uniformly	Calibrate unit Compensate for backlash Clean platform base (10) - if problem persists, replace Operate titrate wheels (1) slowly
Liquid appears between glass barrel and Polypropylene protection sleeve	Glass barrel (8) is not sealing against the FEP 'O' ring (9) Damaged FEP 'O' ring	Unscrew the threaded platform ring (4) and make sure that the FEP 'O' ring (9) is properly fitted into its recess Replace FEP 'O' ring (9)
Blank display despite 'ON' status	Empty battery Malfunctioning electronics	Send unit for battery replacement Send unit for repair

Accessories

Adaptors

A range of four adaptors for fitting your dispenser to the reservoir are available.



Reservoirs

Description	Cat. No.
1.4 litre 2-neck, amber Squat	DB1400A
2.5 litre 2-neck, amber Squat	DB2500A

Specification

Accuracy $\leq \pm 0.2\%$ on maximum delivery and a precision $\leq 0.1\% CV$ using distilled water at 20°C.

Return for Repair

Where damage to the unit necessitates return to your distributor or the manufacturer, please decontaminate the unit and complete the required decontamination certificate where appropriate. In addition, please give written details of the fault.



Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.



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Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.