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1. YOUR NEW BIOHIT PROLINE ELECTRONIC PIPETTOR

Your new Biohit Proline Electronic pipettor has been designed for maximum performance and accuracy with ergonomic and user-friendly operation. The microprocessor controlled system reduces the possibility for human error and instrument contamination by controlling all piston movements. Also selected models offer replaceable tip cone filters to help prevent contamination and damage.

Its light-weight and ergonomic controls take the effort out of pipetting to help reduce the risk of repetitive strain injuries (RSI) that are frequent in manual pipetting. All Biohit Proline Electronic pipettors operate on the air displacement principle and use disposable tips.

1.1. Biohit Proline single-channel electronic pipettors

Cat.No.	Volume Range	Increment	Tip
710520	0.2 -10 μ l	0.1 μ l	10 μ l
710010	5 - 100 μ l	1 μ l	300 μ l, 350 μ l
710030	10 - 250 μ l	5 μ l	300 μ l, 350 μ l
710100	10 - 500 μ l	5 μ l	1000 μ l
710020	50 - 1000 μ l	10 μ l	1000 μ l
710040	50 - 1200 μ l	5 μ l	1200 μ l
710500	100 - 5000 μ l	50 μ l	5000 μ l

1.2. Biohit Proline multichannel electronic pipettors

Cat.No.	Volume Range	Increment	Tip
710410	4 ch 5 -100 μ l	1 μ l	300 μ l, 350 μ l
710420	4 ch 25 - 250 μ l	5 μ l	350 μ l
710200	8 ch 0.2 - 10 μ l	0.1 μ l	10 μ l
710210	8 ch 5 - 100 μ l	1 μ l	300 μ l, 350 μ l
710220	8 ch 25 - 250 μ l	5 μ l	350 μ l
710800	8 ch 50 - 1200 μ l	10 μ l	1200 μ l
710300	12 ch 0.2 - 10 μ l	0.1 μ l	10 μ l
710310	12 ch 5 - 100 μ l	1 μ l	300 μ l, 350 μ l
710320	12 ch 25 - 250 μ l	5 μ l	350 μ l
710810	12 ch 50 - 1200 μ l	10 μ l	1200 μ l

1.3. H-sign

All Biohit Proline pipettors have been quality tested according to ISO 8655 and have received the H-sign (Konformitätsbescheinigung, DIN 12600) printed on each pipettor. The quality control according to ISO 8655 involves gravimetric testing of each pipettor with distilled water (quality 3, ISO 3696) at 22°C using the manufacturer's original tips.

1.4. Biohit tips

The full range of Biohit tips are recommended for use with Biohit pipettors. These detachable, disposable tips are made of natural colour polypropylene. Biohit tips are available with or without filters. Biohit also offers a full range of filter tips. Biohit standard tips are available as bulk packages, space saving refill systems and autoclavable (121°C, 20 min, 1 atm) trays. Pre-sterilized tips in trays are also available. (Fig. 1).



Fig. 1

Note: Never pipette liquid without attaching a tip to the pipettor.

2. UNPACKING & PREPARING THE PIPETTOR FOR USE

The Biohit Proline Electronic pipettor package contains the following items:

- Pipettor
- Grease
- Filters and filter forceps (selected models, see page 8)
- Instructions for use
- Quick reference card
- Performance certificate in accordance with ISO 8655-6

Make sure that all items are included and that no damage has occurred during shipment.

Note: The pipettor can only be charged with the Biohit Proline charging stand or carousel (Fig. 2 and 3).

2.1. Biohit Proline Charging Stands and Carousels

Cat. No.	Product
51000X	Biohit Proline Charging Stand
51160X	Biohit Proline Charging Carousel

X: 1=Euro, 2=U.S., 3=U.K., 4=Jpn



Fig. 2



Fig. 3

2.2. Charging of the Pipettor


The charging stand or carousel operates via a contactless system which is free from maintenance and sensitive metal contacts. The pipettor features an ON/OFF switch located at the top of the grip of the pipettor (Fig. 4). This switch protects the battery from discharging during long storage periods.



Fig. 4



Fig. 5

1. Switch the pipettor ON (the far left position) (Fig. 4).
2. Place the pipettor into the charging stand. The top of the pipettor will fit snugly into the head of the charging stand or carousel. The magnetic mount will lock the pipettor into the proper charging position (Fig. 5).
3. If the pipettor is new or the battery is low keep the pipettor in the stand for 12 hours to fully charge the pipettor before continuing use.
4. Display shows . Press the START button twice and the pipettor is ready for the default pipetting at maximum volume or for program changes.

Note: The pipettor will charge in both the ON and OFF positions. Leave the pipettor ON in the charging stand to retain user-selected settings as switching OFF will reset the unit to default settings.

Note: If the pipettor is left in the ON position uncharged for several days the display will be empty and there will be no response from the keyboard, or START button, as the battery voltage will be below the operating level.

2.3. Electrical Specifications

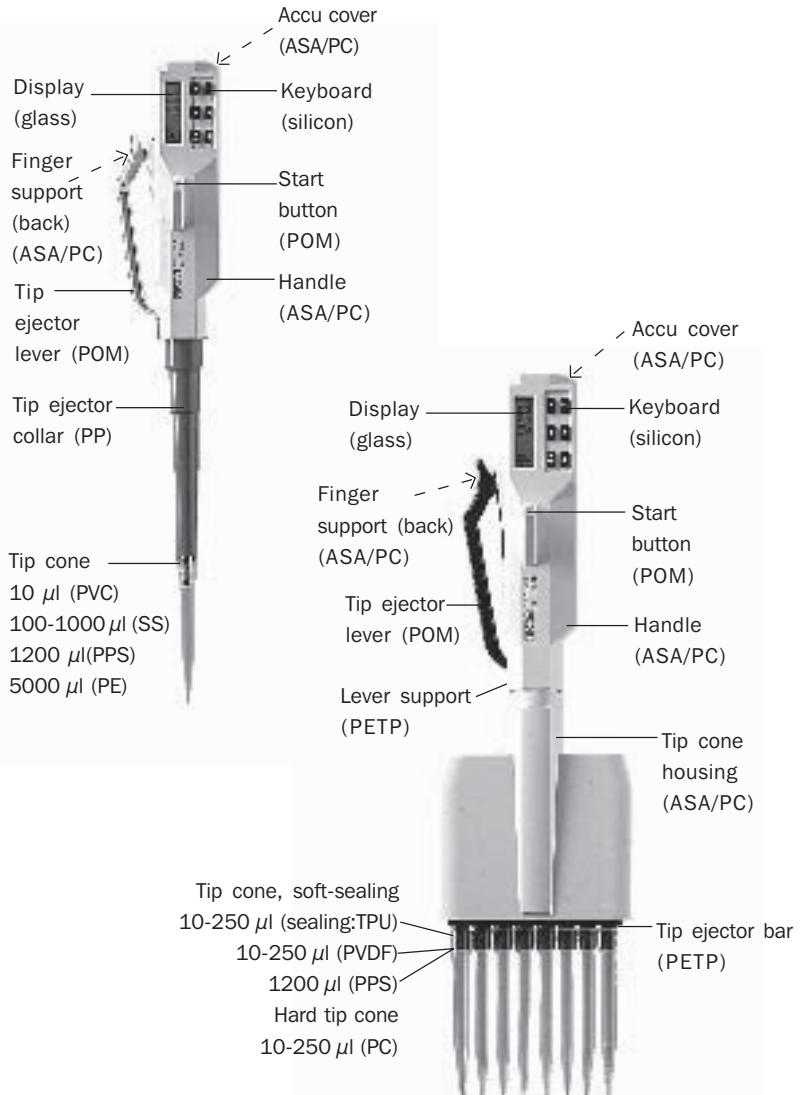
Battery

- Rechargeable NiMH battery
- Charging time max 12 hours for empty battery

AC-Adaptor

- Input voltage and main plug according to local requirements
- Output voltage 9 VDC

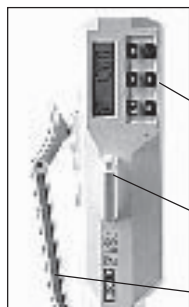
3. PIPETTOR MATERIALS



4. PIPETTOR DESCRIPTION

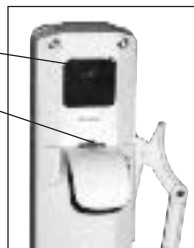
The control and programming of the Proline electronic pipettor are done using the keyboard and display shown in detail below.

4.1. Controls



- S▶** Changes speeds
- M** Moves to Next Mode
- ▲** Increases volume or speed
- ▼** Decreases volume or speed
- E** Confirms setting changes
- *** Switches Mixing on - off

Battery Compartment
Power Switch



START BUTTON Triggers all mechanical operations

TIP EJECTOR LEVER Squeezed to remove pipette tip(s)

4.2. START Button

The START button triggers the aspiration and dispensing operations according to selected operating mode. Only a quick click is required to operate the button. If the START button is kept down, the piston will stop in the lowest position until the button is released. This feature is applicable to all modes of operation, except for multiple dispensing (d).

4.3. Direction Symbols

These symbols indicate the direction in which the piston moves upon pressing the START button. The small RIGHT ARROW in the display means that the next function is to aspirate the liquid. The small LEFT ARROW in turn indicates the dispensing function in accordance to the selected operating mode.

4.4. Display

The left display is the status indicator. It informs the user about parameters to be programmed, functions to be performed and the number of dispensings available.

The right display is used for programming and displaying the various volumes needed in different operating modes.

4.5. Sealing and Ejecting tips

Biohit Proline tips are recommended for use with Proline pipettors. Before fitting a tip make sure that the pipettor tip cone is clean. Press the tip onto the cone of the pipettor firmly to ensure an airtight seal. The seal is tight when a visible sealing ring forms between the tip and the tip cone (Fig. 6).

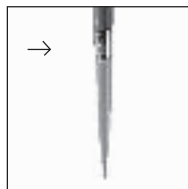


Fig. 6

Biohit Proline Electronic pipettors are designed for simple and light attachment and ejection of the tips. To eject the tip, simply place the pipettor over the discard container and squeeze the tip ejector lever (Fig. 7).



Fig. 7

4.6. Optional Filters

The new tip cones of selected Biohit Proline Electronic pipettors allow the use of a removable filter as an option. The filter prevents liquids and liquid vapours from entering the pipettor. The filter does not affect the calibration of the pipettor. Biohit filter forceps should be used to avoid touching the dirty filters by hand. (Fig. 8.)



Fig. 8

Cat.No.	Channels	Volume Range	Standard Filter	Plus Filter
710520	1-ch	0.2 - 10 μ l	N/A	N/A
710010	1-ch	5 - 100 μ l	N/A	N/A
710030	1-ch	10 - 250 μ l	N/A	N/A
710100	1-ch	10 - 500 μ l	721006	721016
710020	1-ch	50 - 1000 μ l	721006	721016
710040	1-ch	50 - 1200 μ l	721006	721016
710500	1-ch	100 - 5000 μ l	721006	721016
710410	4-ch	5 - 100 μ l	721014	N/A
710420	4-ch	25 - 250 μ l	721014	N/A
710200	8-ch	0.2 - 10 μ l	N/A	N/A
710210	8-ch	5 - 100 μ l	721014	N/A
710220	8-ch	25 - 250 μ l	721014	N/A
710800	8-ch	50 - 1200 μ l	721006	721016
710300	12-ch	0.2 - 10 μ l	N/A	N/A
710310	12-ch	5 - 100 μ l	721014	N/A
710320	12-ch	25 - 250 μ l	721014	N/A
710810	12-ch	50 - 1200 μ l	721006	721016

N/A =
Not available

5. PROGRAMMING THE PIPETTOR

Programming is done using the six-button keyboard and the LC-display. There are four to six different operating modes, offering special functions and varying speeds for your selection.

5.1. Mode Selection and Mode Recall

1. Press **M** repeatedly to view the available modes of the pipettor.
2. Press **E** when the desired mode is displayed. The pipettor is ready for use in the mode selected.

Note: Mode can only be activated when the piston is in its home position (arrow right sign is lit), not in the middle of aspiration or dispensing actions.

5.2. Setting Speeds

(all models)

1. Press **S▶** to display the current aspiration speed.
2. Press **▲** or **▼** until desired aspiration speed is displayed ("5" Fast and "1" Slow).
3. Press **E** to confirm speed selection. Display shows the current dispense speed.
4. Press **▲** or **▼** until desired dispense speed is displayed ("5" being Fast and "1" Slow).
5. Press **E** to confirm speed selection.

Note: The speed may not be changed in the middle of the aspiration or dispensing cycles.

Note: The default speed is 3 for all speed settings.

5.3. Pipetting Mode (P)

(all models)

The pipettor performs ordinary pipetting with blow-out.

1. Press **M** to display **P**.
2. Press **E** to confirm the mode change.
3. Select the desired pipetting volume by using **▲** to increase, and **▼** to decrease.

Note: when holding down **▲** or **▼**, the volume display starts to scroll faster.

4. Press **E** to confirm selection.
5. Position the tip to aspirate and press the START button.
6. Position the tip to dispense. Press the START button. The tip is emptied with a blow-out and is ready for next pipetting.



Step 5.



Step 6.

5.4. Reverse Pipetting Mode (rP)

(all models, except 710500, 710040, 710800 and 710810)

A selected volume plus an excess is aspirated into the tip. After delivery, the excess volume remains in the tip and is discarded.

1. Press **M** until **rP** is displayed.
2. Press **E** to confirm mode change.
3. Use **▲** and **▼** to select the desired pipetting volume.
4. Press **E** to confirm selection.
5. Position the tip to aspirate and press the START button.
6. Position the tip to dispense. Press the START button.
7. Position the tip to discard excess liquid and press START twice.



Step 5.



Step 6.




Step 7.

Note: Upon delivering the programmed volume, it is also possible to continue to aspirate and dispense the same volume without the empty function. To continue, keep the START button pressed down and within one second the direction of the arrow will change. Keeping the button down, place the tip into the liquid again and the sample is aspirated into the tip by releasing the START button.

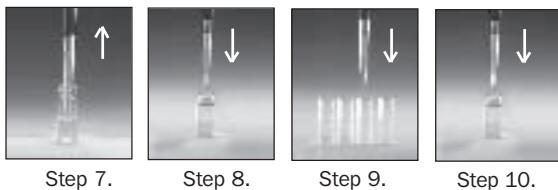
5.5. Multi-Dispensing Mode (d)

(all models)

The pipettor performs repetitive dispensings of a selected volume. During this operation, the desired volume plus an automatically selected excess volume is aspirated into the tip. The excess volume is needed to ensure equal operating conditions for each dispensing.

1. Press **M** to display .
2. Press **E** to confirm the mode change.
3. Press **▲** or **▼** until the multi-dispense volume is displayed.
4. Press **E** to confirm selection.
5. Press **▲** or **▼** until the desired number of aliquots is displayed.
6. Press **E** to confirm selection.
7. Position the tip to aspirate and press the START button. The * sign and ARROW LEFT are lit to indicate the reset function.
8. Position the tip to discard priming excess and press the START button.
9. To dispense, position the tip, press the START button and repeat until the cycle is complete.
10. Finally, position the tip to discard any remaining excess and press the START button twice.

Note: Upon delivering the programmed volume, it is also possible to continue to aspirate and dispense the same volume without the empty function (excl. 710500). To continue, keep the START button pressed down and within one second the direction of the arrow will change. Keeping the button down, place the tip into the liquid again and the sample is aspirated into the tip by releasing the START button.



5.6. Diluting Mode (dd)

(all models, except 710800 and 710810)

Two different solutions separated by an air gap are aspirated and then dispensed together with automatic blow-out. The purpose of the air gap is to avoid contamination when aspirating the second volume but it will not prevent the two liquids from mixing in the tip.

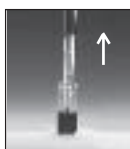
1. Press **M** to display **dd**.
2. Confirm the mode change by pressing **E**.
3. Select the desired diluent volume (volume 1) by using **▲** and **▼**.
4. Confirm by pressing **E**.
5. Press **▲** and **▼** to select the sample volume (volume 2) on the display.
6. Press **E** to confirm selection.
7. Position the tip to aspirate volume 1 and then press the START button.
8. With the tip in the air press the START button again to aspirate an air gap.
9. Position the tip to aspirate volume 2 and press the START button.
10. Finally, position the tip to dispense and press the START button.



Step 7.



Step 8.



Step 9.



Step 10.




5.7. Mixing Mode with Pipetting or Diluting (*)

(all models)







The piston is automatically moved up and down to mix the liquid in the delivery vessel. The mixing time is controlled by the START button.

1. Use **M** to select either **P** or **dd** onto the display.
2. Press ***** to switch on mixing. The display should read either **P*** or **dd***. Please note that selecting ***** will alternately switch mixing on and off.
3. Confirm the mode change by pressing the **E** button.

For Pipetting:

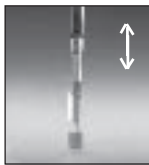
1. Press  to increase, and  to decrease.
2. Press  to confirm selection.
3. Position the tip to aspirate and press START button.
4. Position to dispense and press the START button .

For Diluting:

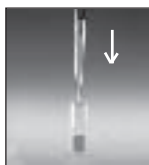
1. Select the desired diluent volume (volume 1) by using  and  .
2. Confirm selection by pressing  .
3. Press  and  to select the sample volume (volume 2).
4. Confirm selection by pressing  .
5. Position the tip to aspirate volume 1 and then press the START button.
6. With the tip in the air, press the START button to aspirate an air gap.
7. Position the tip to aspirate volume 2 and press the START button.
8. Finally, position the tip to dispense and press the START button.

To Mix:

1. Position the tip in the solution, then press and hold the START button.
The mixing is done automatically as long as the START button is held down.
2. Position the tip to dispense. Press the START button twice.



Step 1.



Step 2.

Note: The mixing is done with about 70 % of the total volume.

5.8. Sequenced Dispensing Mode (sd)

(models 710500, 710040, 710800 and 710810 only)

A series of different volumes can be delivered in any desired order.

1. Press **M** to display **SD**.
2. Confirm the mode change by pressing **E**.
3. Select the first desired dispense volume onto the display by using **▲** and **▼**.
4. Press **E** to confirm the dispense volume.
5. To select the following dispense volumes (up to 12) use **▲** and **▼** always remembering to confirm each selection by pressing **E**.
6. To confirm your final selection press *****.
7. Position the tip to aspirate and press the START button.
8. Position the tip to discard priming excess and press the START button again.
9. Position the tip to dispense and press the START button. Repeat the action until the cycle is complete.
10. Position the tip to discard any remaining excess and press the START button twice.



Step 7.



Step 8.



Step 9.



Step 10.

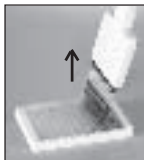
5.9. Multi-Aspirating Mode (SA)

(models 710040, 710800 and 710810)

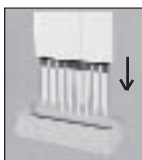
The pipettor performs consecutive aspiration operations of the programmed volume. This mode allows e.g. emptying a microwell plate and other special applications.

1. Set the display to **SA** by pressing **M**.
2. Confirm the mode change by pressing **E**.
3. Select the desired multi-aspiration volume by using **▲** or **▼**.

4. Confirm selection by pressing **E**
5. Press **▲** and **▼** to select the number of aspirations desired.
6. Confirm your selection by pressing **E**.
7. Position the tip to aspirate and press the START button, repeating the action until the cycle is complete. The total volume is displayed.
8. Position the tip to dispense and press the START button.



Step 7.



Step 8.

Note: The aspiration can be interrupted by pressing **E**. An ARROW and E appear in the display. Pressing the START button will empty the tip.

6. PIPETTING RECOMMENDATIONS

By using the different operating modes and various special functions, several different liquid handling procedures are made possible. Two of the modes (P and dd) feature an automatic blow-out and others leave an excess liquid in the tip. The user should follow the recommendations below to ensure optimal performance.

6.1. Dispensing with Blow-out

The pipetting and diluting mode have an automatic blow-out function, followed by an immediate return of the piston to the "home" position. To avoid accidental aspiration of the liquid back into the tip, it is recommended that the dispensing is always done above the liquid surface.

By holding the START button down during dispensing the piston will stop in the lowest position. This allows the tip to be placed against the bottom or the wall of the container. Once the liquid is dispensed, the tip can be removed from the container and the START button released.

6.2. Dispensing without Blow-out

The pipettor will not perform the blow-out function when using the reverse pipetting and dispensing modes. Therefore, it is recommended that dispensing is always performed with the tip set against the wall or the bottom of the container. The use of the reverse pipetting mode is especially useful when pipetting small volumes or solutions that have a tendency to foam or have a high viscosity.

6.3. Other Recommendations

- Hold the pipettor vertically when aspirating the liquid and place the tip only a few millimetres into the liquid.
- Pre-rinse the tip before aspirating the liquid by filling and emptying the tip for three to five times. This is important especially when pipetting liquids with a viscosity and density greater than water or liquids with high vapor pressure (e.g. ethanol).
- When pipetting liquids with temperatures different to the ambient temperature do not pre-rinse the tip and change the tip after each pipetting.
- Check the pipettor, tip and liquid are at room temperature.
- Avoid contaminating the tip cone, do not rest the pipettor on its side.
- Always place the pipettor in the charging stand or carousel when it is not in use.
- Never strike the tip cone against the tip tray when mounting tips as this can damage several internal components.
- Do not drop the pipettor, the charging stand, carousel or AC-adaptor as this may cause excessive shock.
- Avoid exposing the unit to extreme temperature changes, humidity and dust (operating temperature from 15°C to 40°C).
- Avoid rough handling, moderate pressure is all that is required when using the keyboard.
- Avoid leaving the pipettor on its side with liquid in the tip which might seep back into the mechanism.
- Always pipette against the inside wall of the receiving vessel. Remove the tip by drawing it up against the inside wall.
- Change the filter on the tip cone regularly (after 50 - 250 pipettings).

7. STORAGE

When not in use it is recommended that the pipettor is stored in the ON position in the Biohit Proline charging stand or carousel.

8. CALIBRATION

Each Biohit Proline Electronic pipettor's calibration has been factory checked and certified at 22°C using distilled water according to ISO 8655-6. Pipettor specifications are guaranteed only with genuine Biohit Proline tips.

Note: Biohit offers full calibration and accredited calibration service. Please contact your local Biohit representative.

The length of the piston stroke is electronically monitored and the pipettor does not normally need recalibration. However, all models (excl. 710500) can be recalibrated in P-mode for one selected volume (one-point calibration) at a time as follows:

1. Press **M** to display **P**.
2. Confirm the mode change by pressing **E**.
3. Select the desired pipetting volume to be calibrated by using **▲** to increase and **▼** to decrease.
4. Press **E** to confirm the selection.
5. Press **E** and **▲** simultaneously to display the volume to be calibrated.

Note: When pressing both buttons the display will be blank except for the μl sign. Releasing the buttons will display the volume to be calibrated.

6. Use **▲** to increase or **▼** to decrease the steps (in one increment steps, see increments on p. 2) for the selected volume (e.g. for 1000 μl volume in display program the pipettor to give out 1010 μl or 990 μl).
7. Press **E** to confirm the selection.
8. Display will show **P** and the original volume (which is now calibrated to give out the new volume).
9. Start the pipetting.

Note: Changing the volume or mode will reset the calibration to default settings!

8.1. Testing the Performance

It is recommended to check the performance of your electronic pipettors regularly (e.g. every 3 months) and always after in-house maintenance. However, users should establish a regular testing routine for their pipettors depending upon the accuracy requirements of the application, frequency of use, number of operators using the pipettor, nature of the liquid dispensed and the acceptable maximum permissible errors established by the user. (ISO 8655-1.)

Performance test should take place in a draught-free room at 15-30°C, constant to $\pm 0.5^\circ\text{C}$ and relative humidity above 50%. The pipettor, tips and the test water should have stood in the test room a sufficient time (at least 2 hours) to reach the equilibrium with the room conditions. Use distilled or deionised water (grade 3) and analytical balance with a readability of 0.01 mgs. (ISO 8655-6.)

1. Carefully fit the tip onto the tip cone.
2. Prewet the tip with test water by pipetting the selected volume 5 times.
3. Replace the tip and and prewet the new tip once.
4. Aspirate the test water, immersing the tip only 2-3 mm below the surface of the water and keeping the pipettor vertical. Withdraw the pipettor vertically and touch the tip against the side wall of the container.
5. Pipette the water into the weighing vessel, touching the tip against the inside wall just above the liquid surface at an angle of 30° - 45° . Withdraw the pipettor by drawing the tip 8-10 mm along the inner wall. Read the weight in mgs.
6. Repeat ten times and record each result.
7. Convert the recorded masses to volumes by multiplying the mass with the correction factor Z (at 22°C and 101.3 kPa: $Z=1.0033$).

Note: Users should establish their own performance specifications based on the field of use and the accuracy requirements set on the pipettor (ISO 8655-1). This method is based on ISO 8655.

9. MAINTENANCE

Biohit Proline Electronic pipettors require regular cleaning to ensure trouble-free operation. To clean and decontaminate the pipettor lightly spray the outside of the pipettor with Biohit Proline Biocontrol (cat.no. 724004, 5l) or ethanol. Wipe dry with a soft cloth. DO NOT A UTOCLAVE. Change the tip cone filter regularly.

Note: The pipettor must be turned off prior to servicing!

9.1. Cleaning the tip cone

1. Remove the tip ejector collar: Gently twist it anti-clockwise and slide off. (Fig. 9). Remove filter if fitted.
2. Using Biohit Proline Biocontrol or ethanol and soft lint-free cloth, disinfect the tip ejector collar and the tip cone.
3. Unscrew, anti-clockwise, the nose cone and remove it, exposing the piston (Fig.10). If the piston is stuck to the tip cone remove it with a pair of tweezers.
4. To avoid scratching the surface of the piston use Biohit Proline Biocontrol or ethanol and a lint-free tissue when cleaning the piston. Let the parts dry.
5. Grease the piston thinly with the grease provided. Do not use any other grease. Check that no lint or particles are on the surface of the piston. Avoid excess grease, especially at the bottom of the piston.

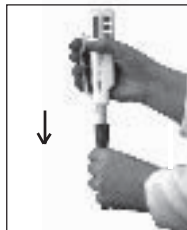


Fig. 9

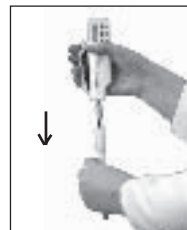


Fig. 10

Note: For complete decontamination place the tip cone, tip ejector collar, piston, O-ring and spring into a beaker containing Biohit Proline Biocontrol and leave for at least 30 minutes, rinse the parts with distilled water, then dry preferably with warm air.

6. Reassemble the pipettor by screwing the piston in its place and replace the tip ejector collar allowing the ejector handle connection to snap into the attachment notch of the ejector collar. Replace new filter if fitted.
7. Test the pipettor by pressing the START-button several times. Test the tip ejector operation.

Note: Check the performance of your Biohit Proline pipettor regularly e.g. every 3 months and always after in-house service or maintenance.

9.2. Battery Replacement

If the battery does not hold a sufficient charge for proper operation of the pipettor, follow these steps for replacement of the battery.

1. Switch the unit "OFF".
2. Remove the top two screws on the back of the pipettor and remove the battery cover (Fig.11).
3. Carefully remove the battery by lifting it straight out of the holder.

4. Install the new NiMH-battery by pressing the positive (+) end against the contact spring at the bottom of the holder (Fig. 12).
5. Replace the cover and the screws. Do not overtighten the screws.
6. Dispose of battery appropriately.



Fig. 11

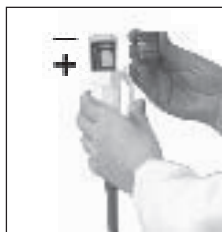


Fig. 12

10. TROUBLE-SHOOTING

Biohit Proline pipettors have a built-in monitoring program to control the performance of each pipetting action. If the error message Er1 appears on the display, this means the pipettor has been unable to perform the attempted action properly. If you receive the error message please do the following:

Note: As this procedure will empty the tip, it is recommended that you remove the tip before resetting the pipettor.

1. Place the pipettor in the charging stand for 15 minutes.
 2. Clear the error message from the display by pressing **E**.
 3. Press START button, which will set the pipettor to its home position.
- Occasional Er1 situations can be caused by electrical outlets that have been switched off or if the pipettor has been in the OFF position during charging.
 - Repeated occurrence of the the Er1 message is caused by an internal error failing to complete the execution of the pipetting. The pipettor will need to be returned to your local Biohit representative for repair.

Trouble	Possible cause	Solution
Droplets left inside the tip	Unsuitable tip	Use original tips
Leakage or pipetted volume too small.	Non-uniform wetting of the plastic Tip incorrectly attached Unsuitable tip Foreign particles between tip and cone Instrument contaminated Insufficient amount of grease on piston and O-ring. Instrument damaged	Attach new tip Attach firmly Use original tips Clean the tip cone, attach new tip Clean and grease piston and tip cone Grease accordingly Send for service
Pipettor blocked, aspirated volume too small	Liquid has penetrated tip cone and dried	Clean and grease piston and tip cone.
Tip ejector jammed or moves erratically	Tip cone contaminated	Remove ejector collar, clean with Biohit Proline Biocontrol or ethanol
Continuous error message	Instrument damaged	Send for service

11. WARRANTY INFORMATION

Biohit Proline Electronic pipettors are warranted for one year (except the battery) against defects in materials and workmanship. Should it fail to function in any period of time, please contact your local representative immediately.

ANY WARRANTY WILL, HOWEVER, BE DEEMED AS VOID IF FAULT IS FOUND TO HAVE BEEN CAUSED BY MALTREATMENT, MISUSE, UNAUTHORIZED MAINTENANCE OF SERVICE OR NEGLIGENCE OF REGULAR MAINTENANCE AND SERVICE, ACCIDENTAL DAMAGE, INCORRECT STORAGE OR USE OF THE PRODUCTS FOR OPERATIONS OUTSIDE THEIR SPECIFIED LIMITATIONS, OUTSIDE THEIR SPECIFICATIONS, CONTRARY TO THE INSTRUCTIONS GIVEN IN THIS MANUAL OR WITH OTHER THAN THE MANUFACTURER'S ORIGINAL TIPS.

Each Biohit Proline Electronic pipettor is tested before shipping by the manufacturer. The Quality Assurance Procedure is your guarantee that the Biohit Proline Electronic pipettor you have purchased is ready for use. All Biohit Proline electronic pipettors and charging stands are CE-marked, fulfilling the requirements of the EMC standards EN 55014, 1993 and EN 55104, 1995.

12. SPECIFICATIONS

Note: The manufacturer's specifications below should be used as guidelines when establishing your own performance specifications in accordance with ISO 8655.

Cat.No.	Ch	Volume Range	Test Volume	Inaccuracy	Imprecision	Number of Dispensings
710520	1-ch	0.2 - 10 μ l	10 μ l	0.90 %	0.50 %	2 - 50
			5 μ l	1.00 %	0.70 %	
			1 μ l	2.50 %	1.50 %	
			0.2 μ l	12.00%	10.00 %	
710010	1-ch	5 - 100 μ l	100 μ l	0.40 %	0.15%	2 - 20
			50 μ l	0.70 %	0.30 %	
			10 μ l	2.00 %	1.00 %	
			5 μ l	2.50 %	1.80 %	
710030	1-ch	10 - 250 μ l	250 μ l	0.40 %	0.15 %	2 - 25
			125 μ l	0.60 %	0.20 %	
			25 μ l	1.50 %	0.80 %	
			10 μ l	2.00 %	1.00 %	
710100	1-ch	10 - 500 μ l	500 μ l	0.40 %	0.15 %	2 - 25
			250 μ l	0.70 %	0.20 %	
			50 μ l	1.50 %	0.80 %	
			10 μ l	9.00 %	2.00 %	
710020	1-ch	50 - 1000 μ l	1000 μ l	0.40 %	0.15 %	2 - 20
			500 μ l	0.60 %	0.20 %	
			100 μ l	1.50 %	0.50 %	
			50 μ l	2.00 %	1.00 %	
710040	1-ch	50-1200 μ l	1200 μ l	0.40 %	0.15 %	1 - 24
			600 μ l	0.70 %	0.20 %	
			100 μ l	1.50 %	0.50 %	
			50 μ l	2.00 %	1.00 %	
710500	1-ch	100 - 5000 μ l	5000 μ l	0.50 %	0.15 %	1 - 48
			2500 μ l	0.80 %	0.20 %	
			500 μ l	0.80 %	0.30 %	

Cat.No.	Ch	Volume Range	Test Volume	Inaccuracy	Imprecision	Number of Dispensings
710410	4-ch	5 - 100 μ l	100 μ l 50 μ l 10 μ l 5 μ l	0.50 % 0.80 % 1.50 % 4.00 %	0.20 % 0.30 % 1.50 % 2.50 %	2 - 20
710420	4-ch	25 - 250 μ l	250 μ l 125 μ l 25 μ l	0.40 % 0.70 % 1.50 %	0.15% 0.20 % 1.00 %	2 - 10
710200	8-ch	0.2 - 10 μ l	10 μ l 5 μ l 1 μ l	0.90 % 1.50 % 4.00 %	0.50 % 0.80 % 4.00 %	2 - 50
710210	8-ch	5 - 100 μ l	100 μ l 50 μ l 10 μ l 5 μ l	0.50 % 0.70 % 2.50 % 4.00 %	0.20 % 0.30 % 1.50 % 2.50 %	2 - 20
710220	8-ch	25 - 250 μ l	250 μ l 125 μ l 25 μ l	0.40 % 0.60 % 1.50 %	0.15 % 0.20 % 1.00 %	2 - 10
710800	8-ch	50 - 1200 μ l	1200 μ l 600 μ l 100 μ l 50 μ l	0.50 % 1.00 % 4.00 % 8.00 %	0.15 % 0.20 % 0.80 % 1.50 %	1 - 24
710300	12-ch	0.2 - 10 μ l	10 μ l 5 μ l 1 μ l	0.90 % 1.50 % 4.00 %	0.50 % 0.80 % 4.00 %	2 - 50
710310	12-ch	5 - 100 μ l	100 μ l 50 μ l 10 μ l 5 μ l	0.50 % 0.80 % 2.50 % 4.00 %	0.20 % 0.40 % 1.50 % 2.50 %	2 - 20
710320	12-ch	25 - 250 μ l	250 μ l 125 μ l 25 μ l	0.40 % 0.60 % 1.50 %	0.15 % 0.20 % 1.00 %	2 - 10
710810	12-ch	50 - 1200 μ l	1200 μ l 600 μ l 100 μ l 50 μ l	0.80 % 1.00 % 4.00 % 8.00 %	0.15 % 0.20 % 0.80 % 1.50 %	1 - 24

13. RECYCLING INSTRUCTION (WEEE)



In compliance with European Directive, WEEE (2002/96EC) on waste and reducing of hazardous substances in electrical and electronic equipments, this device must not be recycled as unsorted municipal waste. Instead this device must be collected separately in accordance the local recycling regulations. The solid bar used in conjunction with the crossed-out wheeled bin indicates that the product was put on the European market after 13 August 2005.