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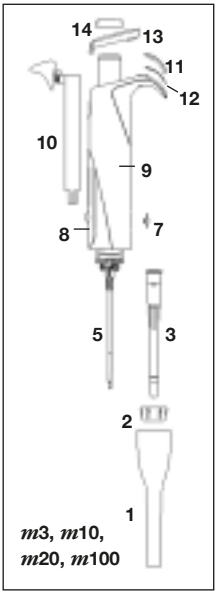
Instruction Manual
Bedienungsanleitung
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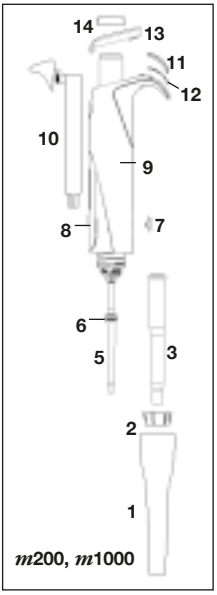


BIOHIT

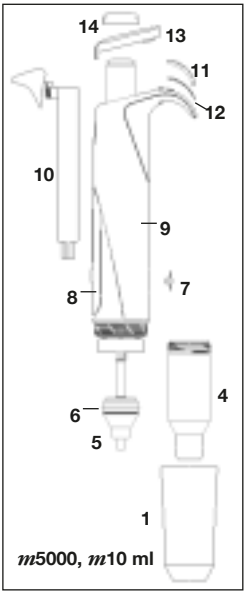
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*m*3, *m*10, *m*20, *m*100



*m*200, *m*1000

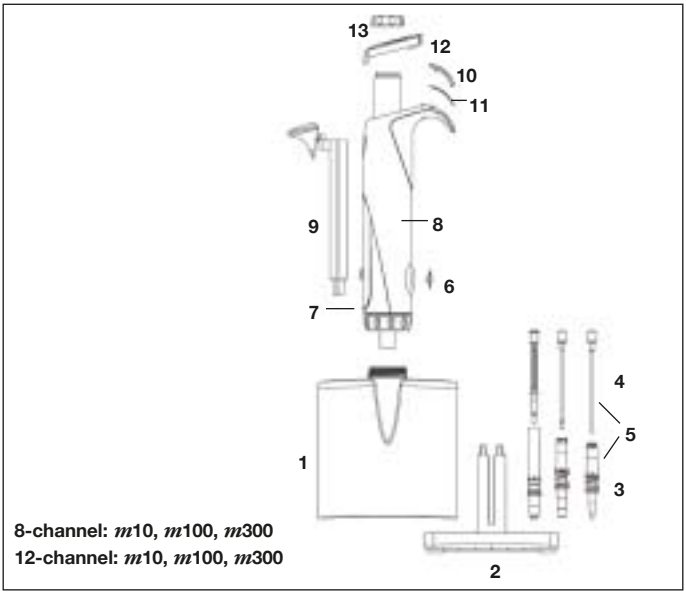


*m*5000, *m*10 ml

	Spare Parts	Ersatzteile	Piéces détachées	Repuestos	Parti di ricambio	Запасная часть
1	Tip ejector collar	Spitzenabwurf	Tube d'éjection	Expulsor de puntas	Collare dell'espulsore puntale	Сбрасыватель наконечников
2	Tip cone holder	Konusfilterhalter	Bague de retenue	Anillo soporte de puntas	Contenitore cono	Муфта крепления посадочного конуса
3	Tip cone complete	Spitzenkonus	Porte-cône complet	Soporte de puntas completo	Cono ancoraggio puntali completo	Посадочный конус в сборе
4	Tip cone cylinder	Konuszylinder	Cylindre	Cilindro del soporte de puntas	Cilindro cono	Посадочный конус
5	Piston	Kolben	Piston	Pistón	Pistone	Поршень
6	Piston seal	Kolbenstempel	Joint de piston	Junta de pistón	Sigilla pistone	Уплотнительная манжета
7	Calibration nut cover	Abdeckung Kalibrierschraube	Dessus d'écrou	Tapa del mecanismo de calibración	Copri dado di calibrazione	Узел калибровки
8	Display	Display	Affichage	Display	Display	Крышка дисплея
9	Handle	Handgriff	Ejecteur	Empuñadura	Impugnatura	Рукоять
10	Tip ejector	Spitzenabwerfer	Corps de pipette	Sistema expulsor de puntas	Espulsore puntali	Сбрасыватель наконечников
11	ID window	ID Fenster	Corps d'identification	Visor ID	Finestra ID	Прозрачная защитная пластинка
12	ID tag	ID Aufkleber	Clip d'identification	Etiqueta de identificación	Etichetta ID	Идентификационный вкладыш
13	Handle collar	Griffhalter	Poignet	Cubierta de la empuñadura	Collare dell'impugnatura	Воротник рукояти
14	Cap (set of 5 colours)	Abdeckungen (5 Farben Set)	Bouchons (5 couleurs)	Tapas (set de 5 colores)	Cappuccio (set di 5 colori)	Декоративный съемный колпачок (5 цветов)

	*m*3	*m*10	*m*20	*m*100	*m*200	*m*1000	*m*5000	*m*10 ml
1	726051	726051	726052	726052	726052	726056	726054	726055
2	726041	726041	726041	726041	726041	726042	N/A	N/A
3	726044	731084	726083	726042	726039	726048	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A	726038	726047
5	726032	731076	726084	726034	726035	726036	726037	726031
6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	726006	726006	726006	726006	726006	726006	726006	726006
8	726021	726022	726082	726026	726027	726028	726029	726012
9	726012	726012	726012	726012	726012	726012	726012	726012
10	726005	726005	726005	726005	726005	726005	726005	726005
11	726004	726004	726004	726004	726004	726004	726004	726004
12	726003	726003	726003	726003	726003	726003	726003	726003
13	726002	726002	726002	726002	726002	726002	726002	726002
14	726001	726001	726001	726001	726001	726001	726001	726001

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8-channel: *m*10, *m*100, *m*300
12-channel: *m*10, *m*100, *m*300

	Spare Parts	Ersatzteile	Piéces détachées	Repuestos	Parti di ricambio	Запасная часть
1	Tip cone housing	Spitzenkonus-gehäuse	Module porte-cônes	Carcasa del Soporte de puntas	Alloggiamento del cono di ancorag-gio del puntale	Корпус поршневой части
2	Tip ejector bar	Spitzenabwurfs-balken	Barre d'éjection	Expulsor de puntas	Barra di espul-sione del puntale	Сбрасыватель наконечника
3	Tip cone complete	Spitzenkonus	Porte-cône complet	Soporte de puntas completo	Cono ancoraggio puntali completo	Посадочный конус
4	Piston	Kolben	Piston	Pistón	Pistone	Поршень
5	Piston assembly	Kolbenzu-sammensetzung	Piston assemblé	Conjunto de pistón	Assemblaggio del pistone	Поршень системы в сборе
6	Calibration nut cover	Abdeckung Kalibrierschraube	Dessus d'écrou	Tapa del mecanismo de calibración	Copri dado di calibrazione	Узел калибровки
7	Display	Display	Affichage	Display	Display	Крышка дисплея
8	Handle	Handgriff	Ejecteur	Empuñadura	Impugnatura	Рукоять
9	Tip ejector	Spitzenabwerfer	Corps de pipette	Sistema expulsor de puntas	Espulsore puntali	Сбрасыватель наконечников
10	ID window	ID Fenster	Corps d'identification	Visor ID	Finestra ID	Прозрачная защитная пластинка
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12	Handle collar	Griffhalter	Poignet	Cubierta de la empuñadura	Collare dell'impugnatura	Воротник рукояти
13	Cap (set of 5 colours)	Abdeckungen (5 Farben Set)	Bouchons (5 couleurs)	Tapas (set de 5 colores)	Cappuccio (set di 5 colori)	Декоративный съемный колпачок (5 цветов)

	*m*10/8	*m*100/8	*m*300/8	*m*10/12	*m*100/12	*m*300/12
1	726131	726132	726133	726134	726135	726136
2	726137	726138	726138	726139	726140	726140
3	726149	726150	726151	726149	726150	726151
4	726146	726147	726148	726146	726147	726148
5	726152	726153	726154	726152	726153	726154
6	726006	726006	726006	726006	726006	726006
7	726022	726141	726142	726022	726141	726142
8	726012	726012	726012	726012	726012	726012
9	726005	726005	726005	726005	726005	726005
10	726004	726004	726004	726004	726004	726004
11	726003	726003	726003	726003	726003	726003
12	726002	726002	726002	726002	726002	726002
13	726001	726001	726001	726001	726001	726001

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BIOHIT *m*LINE®

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1. INTENDED USE

This liquid handling device is designed and manufactured to be used with the IVD-product as an IVD-accessory and as a stand alone laboratory equipment.

2. PRODUCT DESCRIPTION

Your new Biohit ***m***LINE is an autoclavable air displacement pipette. The attractive and ergonomical design of the ***m***LINE pipette together with its very low pipetting forces reduce the risk of repetitive strain injuries (RSI)[1]. The pipette is designed for both right- and left-handeduse

The special tip cone design of the pipette offers the possibility to use replaceable Safe-Cone filters to help prevent the contamination and damage of the pipette. The operating button of the ***m***LINE allows safe and easy filter ejection. The pipette uses disposable tips.

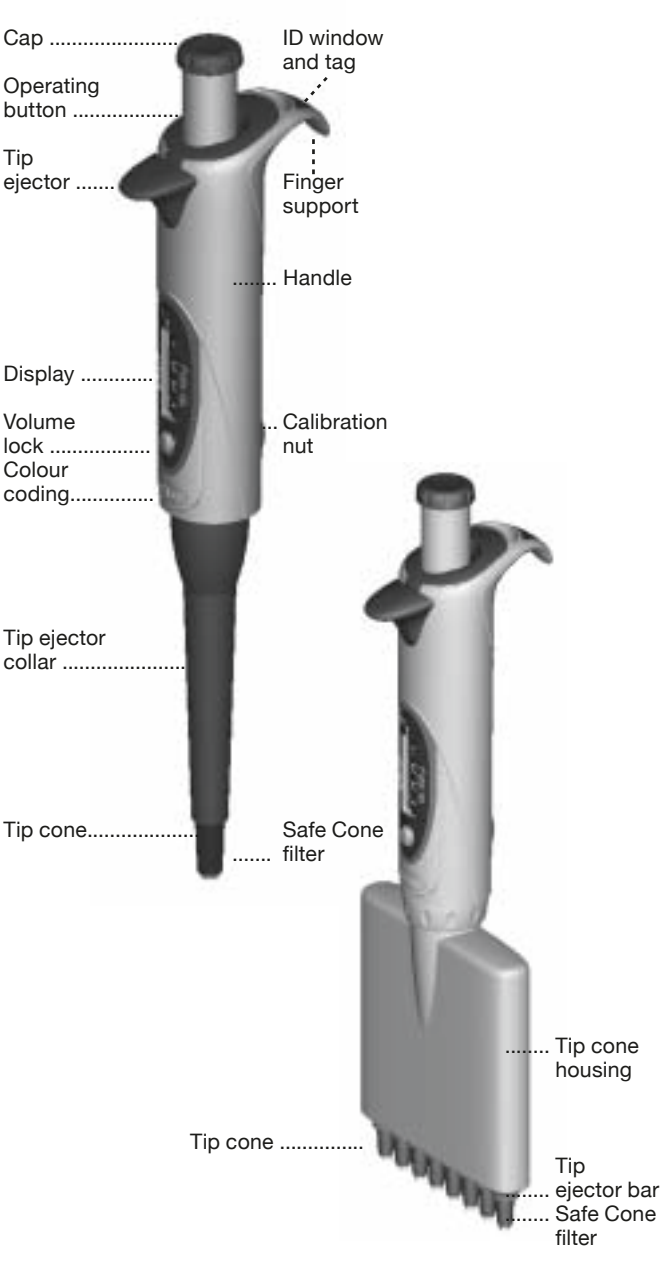
Biohit *m*LINE single- and multichannel pipettes

Cat. No.	Colour Code	Channels	Volume Range	Increment	Tip	Safe Cone filters 50 pcs/bag Standard	Plus
725010	Grey	1-ch	0.1 - 3 µl	0.002 µl	10	N/A	N/A
725020	Grey	1-ch	0.5 - 10 µl	0.01 µl	10	N/A	N/A
725030	Yellow	1-ch	2 - 20 µl	0.02 µl	300	721014	N/A
725050	Yellow	1-ch	10 - 100 µl	0.1 µl	300, 350	721008	721018
725060	Yellow	1-ch	20 - 200 µl	0.2 µl	300, 350	721007	721017
725070	Blue	1-ch	100 - 1000 µl	1 µl	1000	721006	721016
725080	Green	1-ch	500 - 5000 µl	10 µl	5000	721005	721015
725090	Red	1-ch	1 - 10 ml	20 µl	10 ml	721005	721015
725120	Grey	8-ch	0.5 - 10 µl	0.01 µl	10	N/A	N/A
725130	Yellow	8-ch	5 - 100 µl	0.1 µl	300, 350	721008	721018
725140	Orange	8-ch	30 - 300 µl	0.2 µl	350	721007	721017
725220	Grey	12-ch	0.5 - 10 µl	0.01 µl	10	N/A	N/A
725230	Yellow	12-ch	5 - 100 µl	0.1µl	300, 350	721008	721018
725240	Orange	12-ch	30 - 300 µl	0.2 µl	350	721007	721017

1. **Note:** It is knowledge that prolonged pipetting can cause RSI. The manufacturer is not responsible for RSI or any related diseases caused by prolonged pipetting.

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Pipette Description



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3. BIOHIT OPTIFIT TIPS

The full range of Biohit pipette tips are recommended for use with Biohit *m*LINE pipettes. Biohit standard tips are made of virgin polypropylene. Biohit also offers a full range of Safetyspace 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.



4. UNPACKING

The Biohit *m*LINE pipette package contains the following items:

1. Pipette
2. Tip
3. Caps for colour coding
4. Calibration tool (also tube and ID window opener)
5. Pipette holder
6. Identification tags
7. Safe-Cone filters (pipettors >10 µl)
8. Grease
9. Instruction manual
10. Performance certification in accordance with ISO 8655-6

Please check that all items are included and that no damage has occurred during shipment.

5. PERSONAL IDENTIFICATION

Each Biohit *m*LINE pipette can be identified with a tag located underthe ID window which is placed on the finger support.

1. Remove the ID window by using the calibration tool (Chapter 7.).
2. Remove the tag and mark the identifying information on it.
3. Position the tag on place and clip the window back into place.

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6. PIPETTE HOLDER AND CAROUSEL STAND

For convenience and safety always keep the pipette vertically on its own holder, carousel or linear stand when not in use.

Cat.No.	Product
725600	Biohit *m*LINE Carousel
725610	Biohit *m*LINE Pipette Holder

6.1. Installing the pipette holder

1. Clean the shelf surface with ethanol.
2. Remove the protective paper from the adhesive tape.
3. Install the holder by pressing it against the edge of the shelf (Fig. 2).
4. Place the pipette onto the holder.

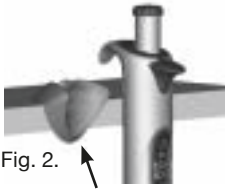


Fig. 2.

6.2. Carousel stand

A convenient and ergonomical Carousel Stand (Fig. 3) for six Biohit *m*LINE pipettes is also available



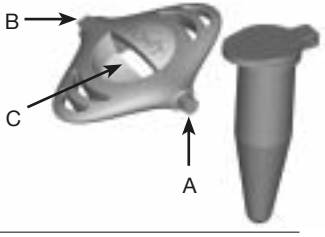
Fig. 3.

7. CALIBRATION TOOL (also tube and ID window opener)

The calibration tool is designed for the following purposes (Fig. 4):

1. Tool for recalibration (A).
2. Opening tool for the ID window and lid of the calibration nut (B).
3. Opening tool for the tubes (C).

Fig. 4.



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8. OPERATING THE PIPETTE

8.1. Setting the volume

The volume of the pipette is clearly shown through the display. The volume setting is carried out with the following steps (Fig. 5):

1. Press the volume lock and hold it down.
2. Set the volume by rotating the operating button (clockwise to decrease the volume and counterclockwise to increase).
3. Release the volume lock.

Fig. 5. Volume Lock



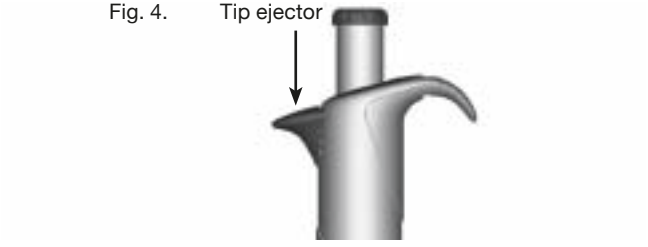
Note: Do not rotate the operating button without pressing down the volume lock. Do not rotate the operating button outside the volume range of the pipette (Chapter. 1.)

8.2. Sealing and ejecting tips

To ensure the maximum accuracy and precision Biohit tips are recommended to be used with ***m***LINE pipettes. Before fitting a tip ensure that the pipette tip cone is clean. Press the tip on the tip cone of the pipette. The pipette is provided with a spring loaded tip conefor optimal sealing.

Eject the tip by pressing the tip ejector with your thumb (Fig. 6). Make sure that the tip is disposed into a suitable waste container.

Fig. 4. Tip ejector



Note: If the tip is pressed too hard the tip cone yields and, as a result, the counter and operating button moves.

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8.3. Protective tip cone filters

The tip cone design of the Biohit ***m***LINE pipettes (>10 µl) allows the use of Biohit Safe-Cone filters in the tip cones. These removable filters prevent liquids and aerosols from entering the pipette and, thus, protects the pipette from contamination and damage.

The Safe-Cone filters are available as Standard or Plus versions. It is recommended to use the Standard filter for general applications and the Plus filter for more demanding applications such as cell culture, bacterial and virological work and molecular biology. Filters need to be changed regularly. The interval for filter changing is application dependant but the recommendation is to change the filter daily (after 50 - 250 pipetting cycles) and always in case of over-aspiration. (See Chapter 2 for ordering information.)

The Safe-Cone filters can be removed with the unique filter ejector without touching the filters by hand. Remove the operating button cap and eject the filter by pressing the operating button down (Fig. 7). Make sure that the filter is disposed into a suitable waste container. Clean the tip cone if needed and put the new filter in place.

Fig. 7.



9. PIPETTING TECHNIQUES

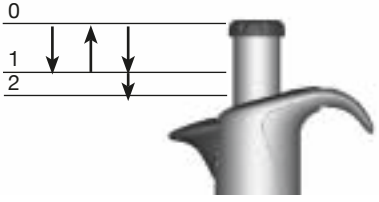
Two basic pipetting techniques, forward and reverse pipetting, are associated with ***m***LINE pipettes. **Forward pipetting** is the most common used pipetting technique. The technique employs the blow-out function ensuring complete delivery of the liquid. **Reverse pipetting** is recommended for highly viscous, biological or foaming liquids, or very small volumes of liquid. A selected volume plus an excess is aspirated into the tip. The delivery is done without blow-out, and, thus, the excess volume remains in the tip. The reverse technique also facilitates the **repeated delivery** of the same volume. If reverse pipetting technique is used the pipette might need recalibration.

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9.1. Forward pipetting (Fig. 5)

1. Fit the tip onto the pipette tip cone.
2. Press the operating button to the first stop.
3. Place the tip just under the surface of the liquid (2-3 mm) and smoothly release the operating button up to the starting position.Wait one second. Carefully withdraw the tip from the liquid, touching against the edge of the container to remove excess fromthe outside of the tip.
4. Dispense the liquid by pressing the operating button to the first stop. After a short delay press the operating button to the second stop. This action will empty the tip.

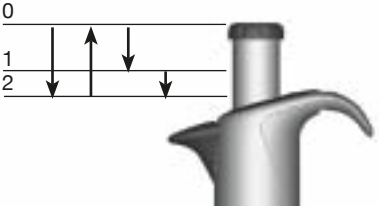
Fig. 8.



9.2. Reverse pipetting (Fig. 9)

1. Fit the tip onto the pipette tip cone.
2. Press the operating button all the way to the second stop.
3. Place the tip just under the surface of the liquid (2-3 mm) and smoothly release the operating button up to the starting position.
4. Withdraw the tip from the liquid touching against the edge of the container to remove excess.
5. Press the operating button smoothly to the first stop to deliver the present volume. Hold the operating button at the first stop. The liquid that remains in the tip should not be included in the delivery.
6. Discard the remaining liquid by pressing the operating button to the second stop.

Fig. 9.



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9.3. Repetitive reverse technique

1. Follow the reverse technique steps 1 to 5.
2. Continue pipetting by repeating steps 3 to 5 as long as needed.
3. Finally discard the remaining liquid by pressing the operating button to the second stop.

10. RECOMMENDATIONS FOR GOOD PIPETTING

- Make sure that the tip is firmly attached to the tip cone.
- Hold the pipettor vertically when aspirating the liquid and place the tip only a few millimeters into the liquid.
- Always control the operating button slowly and smoothly.
- 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).
- Check that the pipette, tip and liquid are at the same temperature.
- When pipetting liquids with temperatures different to the ambient temperature change the tip after each pipetting. Do not pre-rinse the tip.
- To avoid contamination, do not rest the pipette on its side especially with the tip attached.
- Change the tip cone filter regularly (recommendation after 50 -250 pipetting cycles).
- Never strike the tip cone against the tip tray when mounting the tip as this can damage the pipette.
- Avoid rough handling and do not drop the pipette.
- Avoid exposing the unit to extreme temperature changes, humidity and dust (operating temperature from 15°C to 40°C).

11. MAINTENANCE

Biohit ***m***LINE pipettes have been designed for easy in-house service. If the pipette is used daily it is recommended to clean/ decontaminate and check the performance of the pipette every three months. Biohit also provides complete repair and recalibration service for your pipette including a service report and performance certificate.

Note: Please make sure that the pipette has been decontaminated before you send it to us or your local representative. Please advise if any hazardous material has been used with your pipette.

Note: The use of the tip cone filters may prolong the interval of the service. Change the filters regularly.

Note: It is recommended to always use gloves when cleaning the pipette.

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11.1. Daily cleaning of the outer surface of the pipette

Your Biohit *m*LINE pipette should be checked every day for cleanliness. To clean and decontaminate the outer surface of your pipette use Biohit Proline Biocontrol (Cat.no. 724004, 5 litres) and a soft lint-free cloth. It is also possible to use ethanol (70%), isopropanol (60%) or a mild detergent as a cleaning agent.

Gently clean the surface of the pipette with moistened cloth and wipe dry. Pay special attention to the tip cone. Change the tip cone filter if needed (Chapter 8.3.)

11.2. Cleaning and decontaminating the lower part of the pipette

If your pipette is in daily use it is recommended to clean/ decontaminate and grease the pipette every three months. It is recommended to send the multichannel pipettes to your local Biohit service representative for cleaning and greasing. To clean and decontaminate the lower parts of the single channel pipette, follow these steps:

Disassembling and cleaning
(see the pictures under the cover page):

1. Eject the tip cone filter (if fitted, Chapter 8.3.)
2. Unscrew the tip ejector collar (1) counterclockwise and remove it.
3. Pipettes *m*3, *m*10, *m*20, *m*100, *m*200, *m*1000:
   Unscrew the tip cone holder (2) counterclockwise and carefully remove it with the tip cone (3).
   Pipettes *m*5000 and *m*10 000:
   Unscrew the tip cone cylinder (4) counterclockwise and remove it.
4. Clean the tip ejector collar, the tip cone holder, the tip cone (cylinder) and the piston (5) with Biohit Proline Biocontrol, ethanol (70%), isopropanol (60%) or mild detergent and soft lint-free cloth.
5. Clean the interior of the tip ejector collar and the tip cone (cylinder) with a cotton swab. Be careful with the pipettes *m*3, *m*10, *m*20 and *m*100 so that the seal inside the tip cone will not damage.
6. Rinse the parts with distilled water if needed and let the parts dry.
7. Pipettes *m*3, *m*10, *m*20 and *m*100:
   Put a thin layer of grease on the piston (5).
   Pipettes *m*200 and *m*1000:
   Put a thin layer of grease around the seal (6).
   Pipettes *m*5000 and *m*10 000:
   Put a thin layer of grease on the seal (6) and the interior of the tip cone cylinder (4).

Note: Avoid excess grease. Use only the grease provided with the pipette.

Note: Before reassembling check that no lint or particles are on the surface of the piston.

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Decontamination:
For complete decontamination of the lower parts place the tip ejector collar (1), tip cone holder (2), tip cone (3) and tip cone cylinder (4) (only the models ***m***5000 and ***m***10 000) into a beaker containing Biohit Proline, Biocontrol and leave for at least 30 minutes. Wipe the piston with Biohit Proline, Biocontrol and the lint-free cloth. Rinse the parts with distilled or sterile water. Let the parts dry. Grease the piston and seal according to the instructions given earlier in this chapter.

Reassembling:

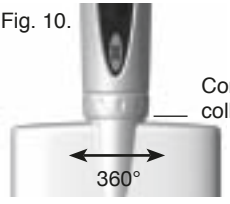
1. Pipettes ***m***3, ***m***10, ***m***20, ***m***100, ***m***200, ***m***1000:
   Carefully place the tip cone (3) on the piston and attach it by screwing the tip cone holder (2) clockwise.
   Pipettes ***m***5000 and ***m***10 000:
   Carefully place the tip cone cylinder (4) on the piston and screw clockwise. Make sure that the tip cone (cylinder) is properly tightened. Avoid over tightening.
2. Attach the tip ejector collar (1) by screwing it clockwise.
3. Place the new tip cone filter on its place.
4. Press the operating button several times to ensure that the grease has spread evenly.
5. Check the performance of the pipette.

Note: It is always necessary to check the performance of the pipette after in-house service or maintenance.

11.3. Sterilization of the pipette



Fig. 10.



The entire ***m***LINE pipette can be sterilized by steam autoclaving at 121°C, (252°F), 1 atm for 20 minutes. Remove the tip cone filter (if fitted, Chapter 8.3). The single channel pipettes can be autoclaved without special preparations. **Unscrew the lower part of the multichannel pipettes by holding the connecting collar and turning the lower part 360° counterclockwise (Fig. 10).** Put the pipette into the sterilization bag and place it into the autoclave. After autoclaving the pipette must be cooled down and left to dry overnight before use. Screw the lower part of the multichannel pipettes by holding the connecting collar and turning the lower part 360° clockwise. Make sure that the lower part is properly tightened. It is recommended to check the performance of the pipette after every autoclaving. It is also recommended to grease the piston/seal of the pipette after every 10 autoclaving.

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12. TESTING THE PERFORMANCE AND RECALIBRATION

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

12.1. Testing the performance

Performance testing should take place in a draught-free room at 15 - 30°C, constant to +/- 0.5°C and humidity above 50%. The pipette, tips and the test water should have stood in the test room a sufficient time (at least 2 hours) to reach equilibrium with the room conditions. Use distilled or deionised water (grade 3, ISO 3696). Use an analytical balance with a readability of 0.01 mgs. (ISO 8655-6.)

Weighing

1. Adjust the desired test volume V_s.
2. Carefully fit the tip onto the tip cone.
3. Fill the tip with test water and expel to waste five times to reach a humidity equilibrium in the dead air volume.
4. Replace the tip. Pre-wet the tip by filling it once with test water and expel to waste.
5. Aspirate the test water, immersing the tip only 2-3 mm below the surface of the water. Keep the pipette vertical.
6. Withdraw the pipette vertically and touch the tip against the inside wall of the test water container.
7. Pipette the water into the weighing vessel, touching the tip against the inside wall of the vessel just above the liquid surface at an angle of 30° to 45°. Withdraw the pipette by drawing the tip 8-10 mm along the inner wall of the weighing vessel.
8. Read the weight in mgs (m_i).
9. Repeat the test cycle until 10 measurements have been recorded.
10. Convert the recorded masses (m_i) to volumes (V_i)
    $V_i = m_i Z$ Z = correction factor (Table 1)
11. Calculate the mean volume ($\bar{V}$) delivered:
    $\bar{V} = (\sum V_i)/10$
12. For conformity evaluation calculate the systematic error e_s of the measurement:
    in µl: $e_s = \bar{V} - V_s$ V_s = selected test volume

    or in %: $e_s = 100 (\bar{V} - V_s)/V_s$

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13. For conformity evaluation calculate the random error of the measurement:

    as standard deviation $s = \sqrt{\frac{\sum(V_i - \bar{V})^2}{n - 1}}$ n = number of measurement (10)

    or as coefficient of variation $CV = 100s/\bar{V}$

14. Compare the systematic error (inaccuracy) and random error (imprecision) with the values in the performance specifications - (p. 49) or the specifications of your own laboratory.
    If the results fall within the specifications, the pipette is ready for use. Otherwise check both systematic and random errors and, when necessary, proceed to the recalibration procedure (Chapter 12.2).

Note: Systematic error (inaccuracy) is the difference between the dispensed volume and the selected test volume. Random error (imprecision) is the scatter of the dispensed volumes around the mean of the dispensed volume. (ISO 8655-1.)

Note: Biohit specifications are achieved in strictly controlled conditions (ISO 8655-6). The user should establish own specifications based on the field of use and the accuracy requirements placed on the pipettor (ISO8655-1).

Table 1

Z-values (µl/mg):				
Temp. (°C)	Air Pressure (kPa)			
	95	100	101.3	105
20.0	1.0028	1.0028	1.0029	1.0029
20.5	1.0029	1.0029	1.0030	1.0030
21.0	1.0030	1.0031	1.0031	1.0031
21.5	1.0031	1.0032	1.0032	1.0032
22.0	1.0032	1.0033	1.0033	1.0033
22.5	1.0033	1.0034	1.0034	1.0034
23.0	1.0034	1.0035	1.0035	1.0036
23.5	1.0036	1.0036	1.0036	1.0037

Note: This method is based on ISO 8655.

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12.2. Recalibration

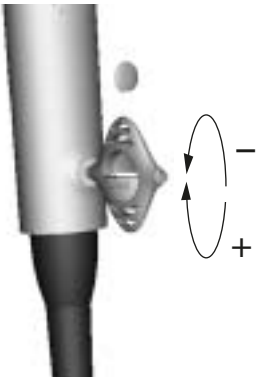
The calibration of your ***m***LINE pipette has been factory checked by using forward pipetting technique and certified at 22°C using grade 3 distilled water according to ISO 3696. The calibration is based on ISO 8655-6: Gravimetric test method for volumetric instruments. The pipette's specifications are guaranteed only with genuine Biohit tips. If you find the pipette to be inaccurate after performance testing, please follow the instructions below:

1. Remove the lid of the calibration nut, located at the backside of the handle, with the aid of the calibration tool (Fig. 11).
2. Place the hexagonal head of the calibration tool into the hole of the calibration nut.
3. Turn the adjustment lock counterclockwise to decrease and clockwise to increase the volume.
4. Repeat testing the performance procedure (Chapter 12.1.). Continue until the results are correct.

Note: Recalibration is recommended if reverse pipetting technique is used.

Note: Biohit offers accredited calibration service. Please contact your local Biohit representative for further information.

Fig. 11.



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13. TROUBLE SHOOTING

Symptom	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	Attach new tip
	Tip incorrectly attached	Attach firmly
	Unsuitable tip	Use original tips
	Foreign particles between tip and tip cone	Clean the tip cone, attach new tip
	Tip cone holder incorrectly tightened	Tighten the tip cone holder
	Pipette damaged	Return to your Biohit service representative for servicing
Pipette out of established specifications	Incorrect operation	Follow instructions
	Unsuitable tip	Use original tips
	Calibration altered	Recalibrate
Operating button or moves erratically	Liquid has penetrated tip cone and dried	Clean and grease jammed the piston /seal and the tip cone
	Safe Cone filter has been contaminated	Change filter
	Insufficient amount of grease on a piston and seal	Grease accordingly
Tip ejector jammed or moves erratically	Tip ejector collar has been contaminated	Remove and clean the ejector collar and tip cone

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14. WARRANTY INFORMATION

The Biohit ***m***LINE pipettes are covered by warranty for 3 years against defects in materials and workmanship. Should your ***m***LINE pipette fail to function at any time, please contact your local Biohit representative.

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 ***m***LINE pipette is tested before shipping by the manufacturer. The Biohit Quality Assurance Procedure guarantees that the Biohit ***m***LINE pipette you have purchased is ready for use.

Each Biohit ***m***LINE pipette is CE/IVD marked.

15. PERFORMANCE SPECIFICATIONS

The manufacturer's specifications (p. 81) are guaranteed only when the manufacturer's original tips are used. The manufacturer's specifications should be used as guidelines when establishing your own performance specifications in accordance with ISO 8655.

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Specifications

Biohit *m*LINE single-, 8- and 12-channel pipettes

Cat. No.	Channels	Volume Range	Test Volume	Inacc. (%)	Impr. (%)
725010	1	0.1 - 3 µl	3 µl 1.5 µl 0.3 µl	1.30 % 2.40 % 10.0 %	0.80 % 1.60 % 6.00 %
725020	1	0.5 - 10 µl	10 µl 5 µl 1 µl 0.5 µl	1.00 % 1.50 % 2.50 % 5.00 %	0.60 % 1.00 % 1.50 % 4.00 %
725030	1	2 - 20 µl	20 µl 10 µl 2 µl	0.90 % 1.20 % 3.00 %	0.40 % 1.00 % 2.00 %
725050	1	10 - 100 µl	100 µl 50 µl 10 µl	0.80 % 1.00 % 2.00 %	0.15 % 0.40 % 1.00 %
725060	1	20 - 200 µl	200 µl 100 µl 20 µl	0.60 % 0.80 % 2.00 %	0.15 % 0.30 % 0.80 %
725070	1	100 - 1000 µl	1000 µl 500 µl 100µl	0.60 % 0.60 % 1.00 %	0.20 % 0.20 % 0.40 %
725080	1	500 - 5000 µl	5000 µl 2500 µl 500 µl	0.50 % 0.60 % 2.00 %	0.20 % 0.30 % 0.60 %
725090	1	1 - 10 ml	10 000 µl 5000 µl 1000 µl	0,6 % 1,2 % 3,0 %	0,2 % 0,3 % 0,6 %
725120	8	0.5 - 10 µl	10 µl 5 µl 1 µl	1.50 % 2.50 % 4.00 %	1.00 % 2.50 % 4.00 %
725130	8	5 - 100 µl	100 µl 50 µl 10 µl	0.70 % 1.00 % 3.00 %	0.25 % 0.70 % 1.50 %
725140	8	30 - 300 µl	300 µl 150 µl 30 µl	0.60 % 1.00 % 2.00 %	0.25 % 0.50 % 1.00 %
725220	12	0.5 - 10 µl	10 µl 5 µl 1 µl	1.50 % 2.50 % 4.00 %	1.00 % 2.50 % 4.00 %
725230	12	5 - 100 µl	100 µl 50 µl 10 µl	0.70 % 1.00 % 3.00 %	0.25 % 0.70 % 1.50 %
725240	12	30 - 300 µl	300 µl 150 µl 30 µl	0.60 % 1.00 % 2.00 %	0.25 % 0.50 % 1.00 %

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