BIOHIT

Innovating for Health

Liquid Handling Products Catalog 2008

The hummingbird

The sensitive and precise qualities of the hummingbird symbolize Biohit's product groups of liquid handling, diagnostic products, and analysis systems. Biohit's liquid handling products based on the company's innovations and technologies are characterized by versatility, flexibility, power, speed, light weight, quality, robustness and well-engineered design, ergonomics, accuracy, and precision as well as safety in delicate operations.

Biohit Liquid Handling Products

BIOHIT
Innovating for Health

Liquid handling products for safe, accurate and ergonomic laboratory applications

Made in Finland

Founded in Finland in 1988, Biohit has established its position in the world market with its innovative, high technology liquid handling products. The company's liquid handling range is currently the widest in the world. Biohit continuously develops its products and processes in order to meet and often exceed the demands of regulatory authorities, environmental bodies and most important, its customers.

Biohit's products are developed and manufactured in Finland according to the requirements of the ISO 9001, ISO 13485, and ISO 14001 quality and environment standards. Biohit also offers accredited pipettor calibration according to ISO 17025. All products are CE/IVD marked and supplied with individual QC certificates.

In the liquid handling business, Biohit focuses on

- Improving ergonomics of pipettor design and usability to reduce the risk of work related upper limb disorders, such as RSI (Repetitive Strain Injury). Biohit is the global market leader in electronic pipettors, which combine performance and ergonomics to provide accurate, reproducible and safe pipetting in the most demanding liquid handling applications.

- Enhancing safety at work – by protecting laboratory workers and the sample to obtain accurate and reliable results. Biohit guarantees the precision and accuracy of its pipettors when the customer uses tips developed and manufactured by Biohit.

- Making no compromise on quality in product development, raw materials, manufacturing processes and after-sales services. The highly skilled, innovative and experienced personnel and strict quality control according to international standards have attributed to the proven track record of Biohit. Global market leaders such as 3M, bioMérieux and Johnson & Johnson Group companies have chosen Biohit to supply tailored, high-quality liquid handling solutions with their systems.

- Providing solutions that bring higher added value to different customer segments, through ergonomic and user-friendly products, cost-efficient product features and service contracts. Furthermore, the low lifetime cost of the products, warranty periods and environmentally friendly products allow for high return on investment.

- Offering high-quality after-sales services, which enable customers to meet tightening quality control requirements and help extend the life-time of their liquid handling devices. The service concept includes Preventative maintenance and repair services, standard and accredited calibration, and training services, provided through the extensive subsidiary and distributor network, and the global customer service network of OEM and private-label customers of Biohit.

ISO 9001 • ISO 13485 • ISO 14001 • ISO 17025


BIOHIT
PROLINE
50-1200µl
BIOHIT
BIOHIT
300
30-300µl
e300
m300

BIOHIT
Innovating for Health

mLINE®

3 YEARS WARRANTY

ERGONOMICALLY DESIGNED ed

Optiload
Effortless Tip Loading & Ejection

121°C
Fully autoclavable

CE
IVD

Made in Finland

Effortless accuracy – meet the mLINE® mechanical pipettors family!

Biohit's new mechanical pipettor family – the mLINE – offers a unique combination of novel & patented features for mechanical pipetting. Excellent performance, smooth ergonomics, and perfect safety make the mLINE the ideal liquid handling instrument. mLINE pipettors cover the full volume range of 0.1µl to 10ml.

mLINE mechanical pipettors offer

- Extremely light pipetting and tip ejection
- Unique safety features
- Stepless volume adjustment and patented volume locking system
- Thermal insulation of internal components to improve accuracy
- Full autoclavability without disassembling
- Easy cleaning, maintenance and calibration
- ID tag and color-coded caps
- Safe-Cone Filters and unique filter ejection
- For fixed volume Proline options see page 19

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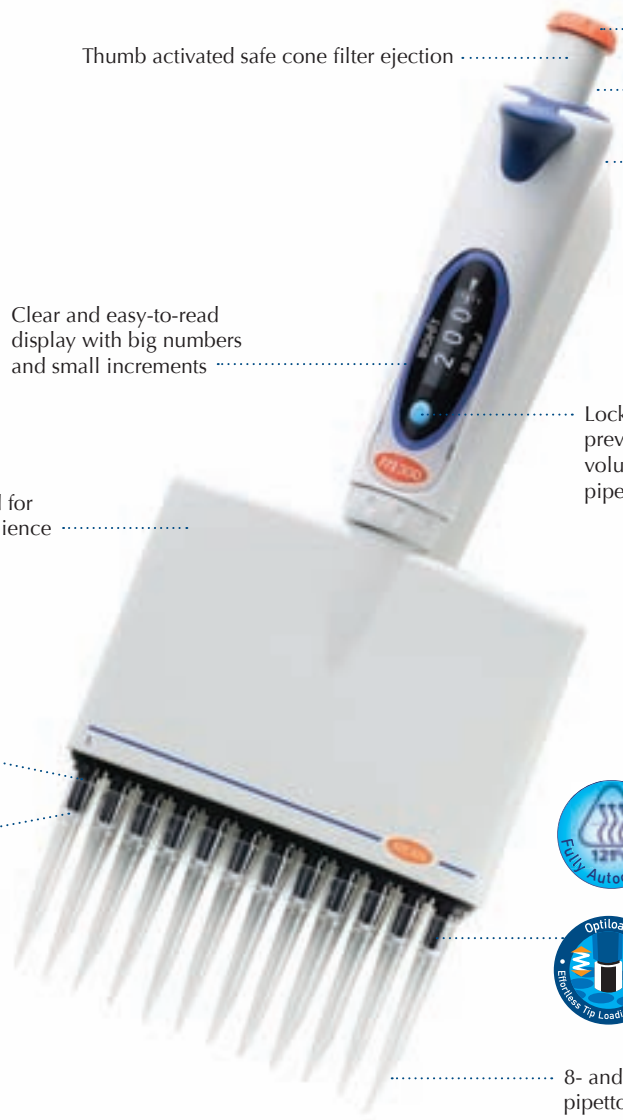
mLINE Single-Channel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Plus	Tip ID
725010 New!	1-channel	0.1-3 µl	0.002	3 1.5 0.3	1.30 % 2.40 % 10.00 %	0.80 % 1.60 % 6.00 %	-	-	A, L, M
725020	1-channel	0.5-10 µl	0.01	10 5 1	1.00 % 1.50 % 2.50 %	0.60 % 1.00 % 1.50 %	-	-	A, L, M
725030	1-channel	2-20 µl	0.02	20 10 2	0.90 % 1.20 % 3.00 %	0.40 % 1.00 % 2.00 %	721014	-	C, N
725050	1-channel	10-100 µl	0.10	100 50 10	0.80 % 1.00 % 2.00 %	0.15 % 0.40 % 1.00 %	721008	721018	C, D, O, V
725060	1-channel	20-200 µl	0.20	200 100 20	0.60 % 0.80 % 2.00 %	0.15 % 0.30 % 0.80 %	721007	721017	C, D, P, Q
725070	1-channel	100-1000 µl	1.00	1000 500 100	0.60 % 0.60 % 1.00 %	0.20 % 0.20 % 0.40 %	721006	721016	E, G, S
725080	1-channel	500-5000 µl	10.0	5000 2500 500	0.50 % 0.60 % 2.00 %	0.20 % 0.30 % 0.60 %	721005	721015	J
725090 New!	1-channel	1-10ml	20.0	1000 5000 10000	3.00% 1.20% 0.60%	0.60% 0.30% 0.20%	721005	721015	U

The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice.
FINAS Accredited Calibration Certificate (ISO 17025) available for new pipettors



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mLINE Multichannel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Safe-Cone Filters Plus	Tip ID
725120	8-channel	0.5-10 µl	0.01	10 5 1	1.50 % 2.50 % 4.00 %	1.00 % 2.50 % 4.00 %	-	-	A, L, M
725130	8-channel	5-100 µl	0.10	100 50 10	0.70 % 1.00 % 3.00 %	0.25 % 0.70 % 1.50 %	721008	721018	C, D, O, V
725140	8-channel	30-300 µl	0.20	300 150 30	0.60 % 1.00 % 2.00 %	0.25 % 0.50 % 1.00 %	721007	721017	D, Q
725220	12-channel	0.5-10 µl	0.01	10 5 1	1.50 % 2.50 % 4.00 %	1.00 % 2.50 % 4.00 %	-	-	A, L, M
725230	12-channel	5-100 µl	0.10	100 50 10	0.70 % 1.00 % 3.00 %	0.25 % 0.70 % 1.50 %	721008	721018	C, D, O, V
725240	12-channel	30-300 µl	0.20	300 150 30	0.60 % 1.00 % 2.00 %	0.25 % 0.50 % 1.00 %	721007	721017	D, Q

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Optiload tip loading and perfect tip sealing

All mLINE pipettors are equipped with unique spring loaded tip cones – the Optiload mechanism that

- Allows tips to be loaded with constant force
- Enables even and safe tip sealing to the tip cone(s) with minimum force
- Makes tip ejection light and easy
- Optiload is an advantage in multichannel models, in particular, where even tip sealing is essential.

Unique protection with Safe-Cone Filters

To prevent contamination of the pipettor and the sample, the mLINE pipettors feature replaceable Safe-Cone Filters. The unique Safe-Cone Filter ejection of mLINE means that the filters can be easily and safely removed by pressing the plunger button. Safe-Cone Filters are available for both single- and multichannel models > 10 µl.

Filters on page 57

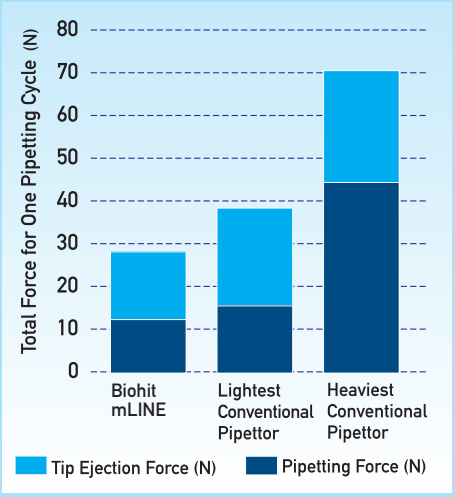
"The qualities that really convinced me to switch to Biohit mLINE are its light weight, lowest pipetting and tip ejection forces, easy to read display, locking mechanism to prevent accidental volume changes and finally, its compatibility to tips currently used at our company."

Richard R. , Preclinical Development,
a Seattle based biotechnology company, USA

Unique spring mechanism for lighter pipetting

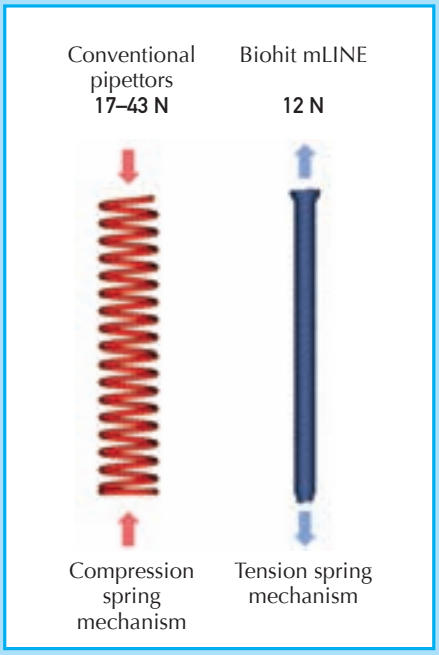
The mLINE pipettor has a patented spring mechanism (plunger technology) resulting in the lowest pipetting forces on the market. This together with light tip ejection force and ergonomic design of the handle reduces the risk of Repetitive Strain Injury (RSI).

Conventional pipettors use compression spring mechanism resulting in heavy pipetting force. The tension spring mechanism used in Biohit mLINE pipettors makes pipetting force almost 4 times lighter. Moreover, thanks to the unique mechanism starting force is always constant regardless of the volume.



Pipetting and tip ejection force comparison of mLINE and other mechanical pipettors. The mLINE provides significantly lighter pipetting and tip ejection forces than any other mechanical pipettor, making the total force for one pipetting cycle (pipetting to tip ejection) the lightest on the market.

Ergonomics on page 68



Uniquely Biohit!

Throughout the catalog this symbol indicates a Biohit product or service that incorporates breakthrough design, innovation, and patented process.

Easy maintenance and calibration

The mLINE can be easily calibrated using the elegant calibration tool. The tool also acts as a tube cap opener.

The mLINE has been designed for easy cleaning and maintenance without any opening tool. Only 3–4 parts need to be cleaned.

The mLINE should, like any other pipettor, be stored in an upright position. There are several different stand options for mLINE:

- Handy holder that is included with each mLINE pipettor
- Carousel stand for six pipettors
- Stylish linear stand that allows the pipettor to be placed on both sides of the stand

Stands & Accessories

Cat. No.	Item
725600	mLINE Carousel Stand for 6 pipettors
725610	mLINE Pipettor Holder for one pipettor
725620	Linear Stand
726203	Calibration tool/Tube opener

Get started with mLINE Starter Kit

mLINE® mechanical pipettors Starter Kit

Biohit mLINE Starter Kits offer an opportunity to test and get started with mLINE. You can choose between two Starter Kits with three single-channel mLINE pipettors. Both kits also include color coded tip racks for every pipettor and many useful accessories such as pipettor holder, color coding caps and a calibration tool, which also acts as a tube opener. All this is packaged into the durable Biohit bag.

Biohit mLINE Starter Kit 1 - Cat. No. 725651	
• mLINE 0.5-10 µl • mLINE 10-100 µl • mLINE 100-1000 µl • Pipettor Holder x 3 • Color Coding Caps • Biohit Bag • Biohit Pen	• Biohit Tip 0.2 –10 µl, Single Tray • Biohit Tip 0.5-300 µl, Single Tray • Biohit Tip 10-1000 µl, Single Tray • Calibration Tool/Tube Opener • mLINE Article • mLINE Brochure • Biohit Liquid Handling Catalogue

Biohit mLINE Starter Kit 2 - Cat. No. 725652	
• mLINE 2-20 µl • mLINE 20-200 µl • mLINE 100-1000 µl • Pipettor Holder x 3 • Color Coding Caps • Biohit Bag • Biohit Pen	• Biohit Tip 0.5-300 µl, Single Tray x 2 • Biohit Tip 10-1000 µl, Single Tray • Calibration Tool/Tube Opener • mLINE Article • mLINE Brochure • Biohit Liquid Handling Catalogue

Also available are the brand new Biohit mLINE “Micro” and “Macro” kits. Both include two single-channel mLINEs along with a selection of tips.

New!

Biohit mLINE Micro Starter Kit - Cat. No. 725930	
• Single Channel mLINEs (0.1-3ul & 0.5-10ul)	• 2 racks of 10ul tips

Biohit mLINE Macro Starter Kit - Cat. No. 725940	
• Single Channel mLINEs (500-5000ul & 1-10ml)	• 10/ea of 5ml tips & 10/ea of 10ml tips

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Proline® Plus

3 YEARS WARRANTY

ERGONOMICALLY DESIGNED

121°C

Fully autoclavable

CE

IVD

Made in Finland

Proline Plus – the classic Biohit Proline reborn

In the new Proline Plus, the experienced R&D personnel of Biohit have combined the innovative ideas from the early years with new, modern pipette design and technology. Particular emphasis has been put on safety, ergonomics, and efficiency in pipetting, as well as on the high quality of the device.

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Proline®Plus Single Channel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Plus	Tip (µl)
728010	1-channel	0.1-3 µl	0.002	3 1.5 0.3	1.30 % 2.40 % 10.00 %	0.80 % 1.60 % 6.00 %	-	-	10
728020	1-channel	0.5-10 µl	0.01	10 5 1 0.5	1.00 % 1.50 % 2.50 % 5.00 %	0.60 % 1.00 % 1.50 % 4.00 %	-	-	10
728030	1-channel	2-20 µl	0.02	20 10 2	0.90 % 1.20 % 3.00 %	0.40 % 1.00 % 2.00 %	721014	-	300
728050	1-channel	10-100 µl	0.10	100 50 10	0.80 % 1.00 % 2.00 %	0.15 % 0.40 % 1.00 %	721008	721018	300, 350
728060	1-channel	20-200 µl	0.20	200 100 20	0.60 % 0.80 % 2.00 %	0.15 % 0.30 % 0.80 %	721007	721017	300, 350
728070	1-channel	100-1000 µl	1.00	1000 500 100	0.60 % 0.60 % 1.00 %	0.20 % 0.20 % 0.40 %	721006	721016	1000
728080	1-channel	500-5000 µl	10.00	5000 2500 500	0.50 % 0.60 % 2.00 %	0.20 % 0.30 % 0.60 %	721005	721015	5000
728090	1-channel	1-10 ml	20.0	10000 5000 1000	0.60 % 1.20 % 3.00 %	0.20 % 0.30 % 0.60 %	721005	721015	10000

New for 2008!

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FINAS Accredited Calibration Certificate (ISO 17025) available for new pipettors

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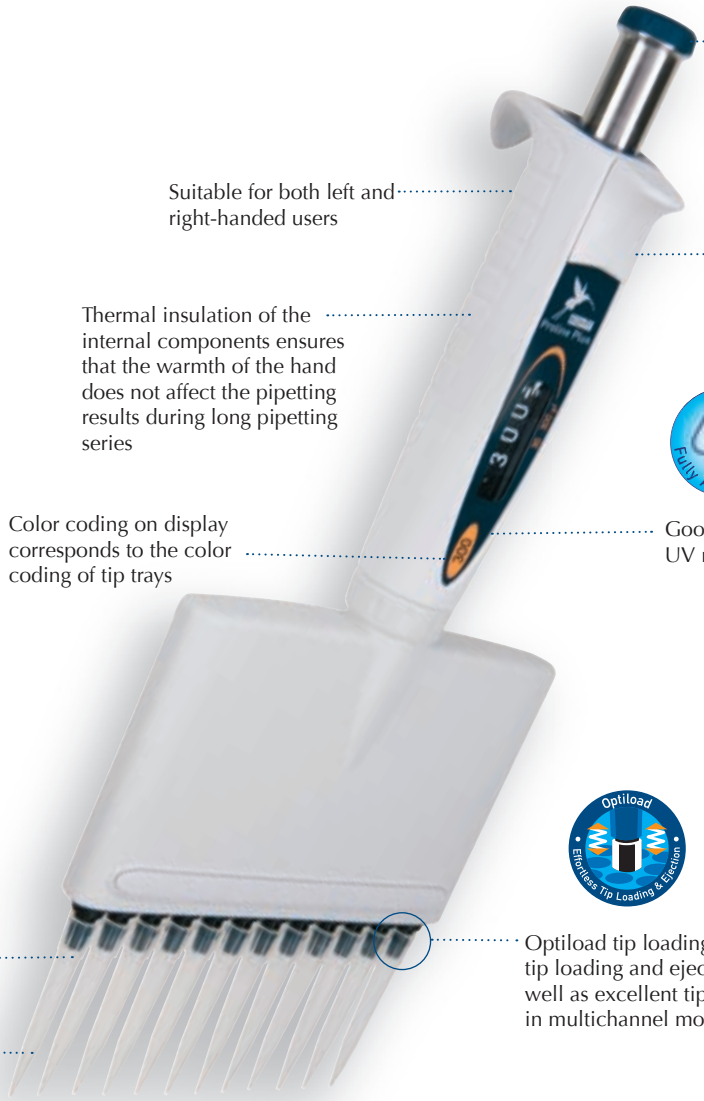

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Proline® Plus Multichannel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Plus	Tip (µl)
728120	8-channel	0.5-10 µl	0.01	10 5 1	1.50 % 2.50 % 4.00 %	1.00 % 2.50 % 4.00 %	-	-	10
728130	8-channel	10-100 µl	0.10	100 50 10	0.70 % 1.00 % 3.00 %	0.25 % 0.70 % 1.50 %	721008	721018	300, 350
728140	8-channel	30-300 µl	0.20	300 150 30	0.60 % 1.00 % 2.00 %	0.25 % 0.50 % 1.00 %	721007	721017	350
728220	12-channel	0.5-10 µl	0.01	10 5 1	1.50 % 2.50 % 4.00 %	1.00 % 2.50 % 4.00 %	-	-	10
728230	12-channel	10-100 µl	0.10	100 50 10	0.70 % 1.00 % 3.00 %	0.25 % 0.70 % 1.50 %	721008	721018	300, 350
728240	12-channel	30-300 µl	0.20	300 150 30	0.60 % 1.00 % 2.00 %	0.25 % 0.50 % 1.00 %	721007	721017	350

New for 2008!

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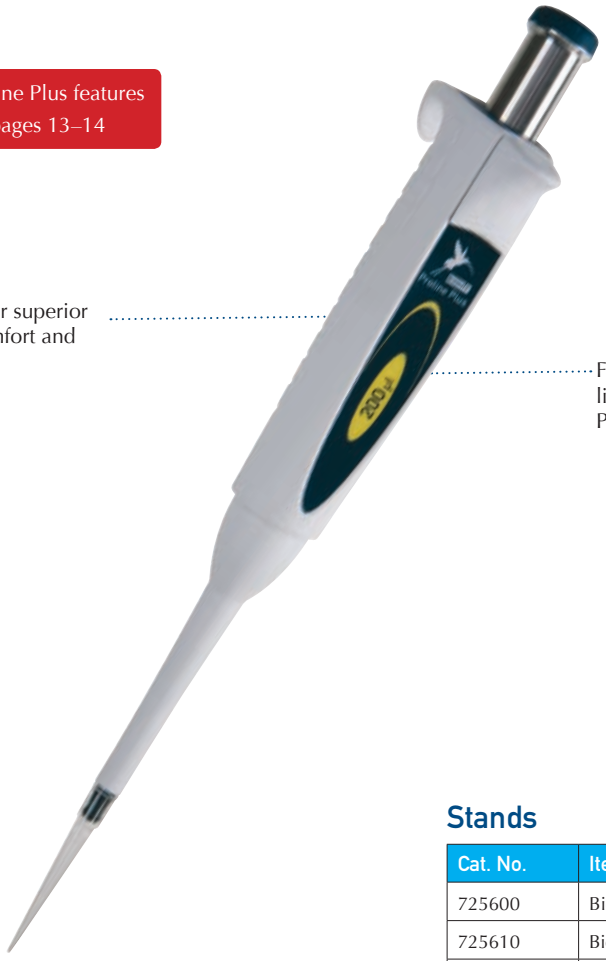
Gives the user superior pipetting comfort and performance



Fixed volume pipettors feature the same lightweight design and basic features as the Proline Plus Adjustable Volume pipettors

Stands

Cat. No.	Item
725600	Biohit Carousel Stand for 6 pipettors
725610	Biohit Pipettor Holder for one ProlinePlus/mLINE pipettor
725620	Linear Stand for all Biohit pipettors

Proline Plus Single-Channel FIXED Volume Performance Specifications and Ordering Details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Plus	Tip (µl)
728515	1-channel	5 µl	-	5	1.30 %	1.20 %	-	-	10
728520	1-channel	10 µl	-	10	0.80 %	0.80 %	-	-	10
728530	1-channel	20 µl	-	20	0.60 %	0.50 %	721014	-	300, 350
728535	1-channel	25 µl	-	25	0.50 %	0.30 %	721008	721018	300, 350
728545	1-channel	50 µl	-	50	0.50 %	0.30 %	721008	721018	300, 350
728550	1-channel	100 µl	-	100	0.50 %	0.30 %	721008	721018	300, 350
728560	1-channel	200 µl	-	200	0.40 %	0.20 %	721007	721017	300, 350
728565	1-channel	250 µl	-	250	0.40 %	0.20 %	721006	721016	1000
728567	1-channel	500 µl	-	500	0.30 %	0.20 %	721006	721016	1000
728570	1-channel	1000 µl	-	1000	0.30 %	0.20 %	721006	721016	1000
728575	1-channel	2000 µl	-	2000	0.30 %	0.15 %	721005	721015	5000
728580	1-channel	5000 µl	-	5000	0.30 %	0.15 %	721005	721015	5000
728590	1-channel	10 ml	-	10000	0.60 %	0.20 %	721005	721015	10000

New for 2008!

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FINAS Accredited Calibration Certificate (ISO 17025) available for new pipettors.

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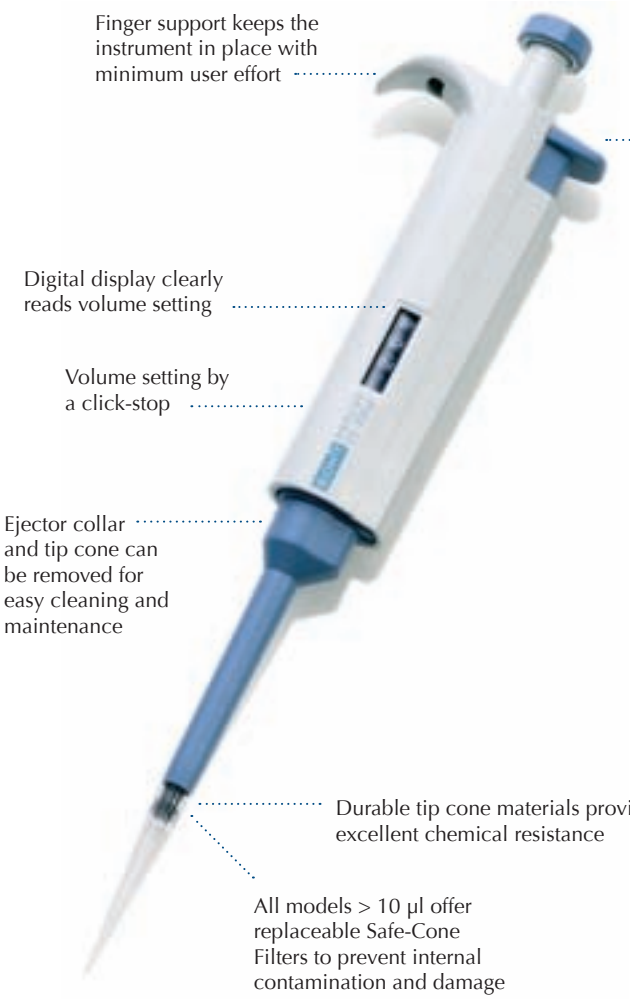
Proline®

The original Biohit mechanical pipettor

Almost 15 years in the top of the world of pipettors. In that time Proline pipettors have become a synonym for high quality. Working with Proline, you will get many years of reliable service. The Proline pipettors cover the volume range 0.1 µl to 5000 µl with 8 different single-channel adjustable volume models. The Proline range is also available in fixed volume and 8 multichannel models.

Proline mechanical pipettors offer

- Lightweight ergonomic design
- Easy calibration and maintenance, low number of parts
- Volume setting by a click-stop
- Full documentation, warranties and certificates
- Safe-Cone Filters to prevent internal contamination and damage



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Proline Single-Channel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Safe-Cone Filters Plus	Tip ID
720005	1-channel	0.1-2.5 µl	0.05	2.5 1.25 0.25	2.50 % 3.00 % 12.00 %	2.00 % 3.00 % 6.00 %	-	-	A, L, M
720000	1-channel	0.5-10 µl	0.10	10 5 1	1.00 % 1.50 % 2.50 %	0.80 % 1.50 % 1.50 %	-	-	A, C, L, M, N
720080	1-channel	2-20 µl	0.50	20 10 2	0.90 % 1.20 % 3.00 %	0.40 % 1.00 % 2.00 %	721008	721018	C, N, O
720020	1-channel	5-50 µl	0.50	50 25 5	0.60 % 0.90 % 2.00 %	0.30 % 0.60 % 2.00 %	721008	721018	C, D, O
720050	1-channel	10-100 µl	1.00	100 50 10	0.80 % 1.00 % 3.00 %	0.20 % 0.40 % 1.00 %	721007	721017	C, D, O, V, P, Q
720070	1-channel	20-200 µl	1.00	200 100 20	0.60 % 0.80 % 2.50 %	0.20 % 0.30 % 0.80 %	721007	721017	C, D, P, Q
720060	1-channel	100-1000 µl	5.00	1000 500 100	0.60 % 0.70 % 2.00 %	0.20 % 0.25 % 0.70 %	721006	721016	E, G, S
720110	1-channel	1000-5000 µl	50.0	5000 2500 1000	0.50 % 0.60 % 0.70 %	0.20 % 0.30 % 0.30 %	721005	721015	J

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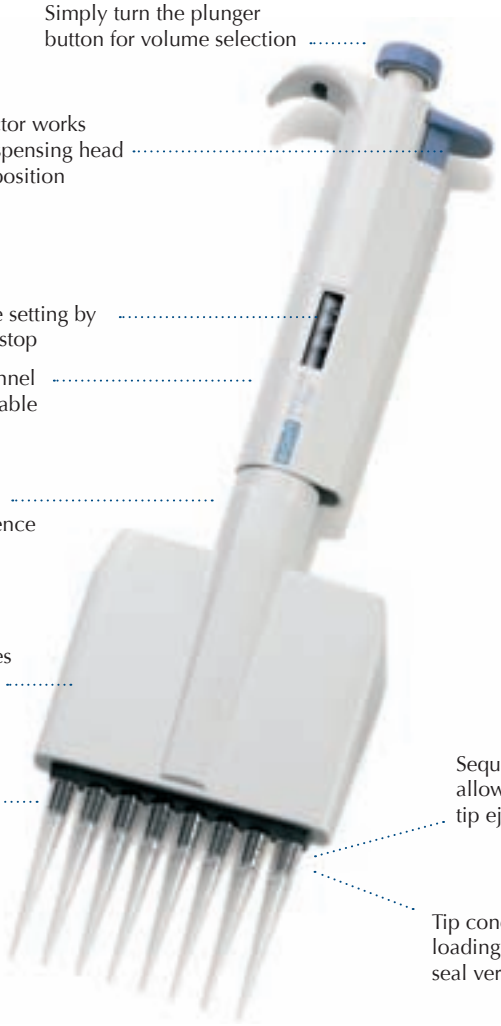

Convenient pipettor holder included with each pipettor

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Proline Multichannel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Plus	Tip ID
720120	4-channel	5-50 µl	0.50	50 25 5	1.00 % 1.50 % 3.00 %	0.50 % 1.00 % 2.00 %	721014	-	C, D, O, V, P, Q
720130	4-channel	50-250 µl	5.00	250 125 50	0.70 % 1.00 % 1.50 %	0.25 % 0.50 % 0.80 %	721014	-	C, D, Q
720210	8-channel	0.5-10 µl	0.10	10 5 1	1.50 % 2.50 % 4.00 %	1.50 % 2.50 % 4.00 %	-	-	A, L, M
720220	8-channel	5-50 µl	0.50	50 25 5	1.00 % 1.50 % 3.00 %	0.50 % 1.00 % 2.00 %	721014	-	C, D, O, V, P, Q
720240	8-channel	50-300 µl	5.00	300 150 50	0.70 % 1.00 % 1.50 %	0.25 % 0.50 % 0.80 %	721014	-	D, Q
720310	12-channel	0.5-10 µl	0.10	10 5 1	1.50 % 2.50 % 4.00 %	1.50 % 2.50 % 4.00 %	-	-	A, L, M
720320	12-channel	5-50 µl	0.50	50 25 5	1.00 % 1.50 % 3.00 %	0.50 % 1.00 % 2.00 %	721014	-	C, D, O, V, P, Q
720340	12-channel	50-300 µl	5.00	300 150 50	0.70 % 1.00 % 1.50 %	0.25 % 0.50 % 0.80 %	721014	-	D, Q

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See Proline features on pages 13–14

Fixed volume pipettor has white display to differentiate it from adjustable volume Proline pipettors

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Proline fixed volume pipettors

- Designed for many different types of routine laboratory work
- The same lightweight design and basic features as in the Proline Adjustable Volume range
- Gives the user superior pipetting comfort and performance

Stands & Accessories

Cat. No.	Item
721000	Proline Carousel Stand for 5 mechanical pipettors
725620	Linear Stand
721259	Proline Pipettor Holder for 1 pipettor
721234	Color coding caps, 6 pcs

Proline Single-Channel FIXED Volume Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Plus	Tip ID
722001	1-channel	5 µl	-	5	1.30 %	1.20 %	-	-	A, C, L, M, N
722004	1-channel	10 µl	-	10	0.80 %	0.80 %	-	-	A, C, L, M, N
722010	1-channel	20 µl	-	20	0.60 %	0.50 %	721008	721018	C, D, N, O
722015	1-channel	25 µl	-	25	0.50 %	0.30 %	721008	721018	C, D, O
722020	1-channel	50 µl	-	50	0.50 %	0.30 %	721008	721018	C, D, O
722025	1-channel	100 µl	-	100	0.50 %	0.30 %	721007	721017	C, D, O, V, P, Q
722030	1-channel	200 µl	-	200	0.40 %	0.20 %	721007	721017	C, D, P, Q
722035	1-channel	250 µl	-	250	0.40 %	0.20 %	721006	721016	E, G, R, S
722040	1-channel	500 µl	-	500	0.30 %	0.20 %	721006	721016	E, G, R, S
722045	1-channel	1000 µl	-	1000	0.30 %	0.20 %	721006	721016	E, G, S
722050	1-channel	2000 µl	-	2000	0.30 %	0.15 %	721005	721015	J
722055	1-channel	5000 µl	-	5000	0.30 %	0.15 %	721005	721015	J

The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice.
FINAS Accredited Calibration Certificate (ISO 17025) available for new pipettors.

BIOHIT
Innovating for Health

eLINE®

2 years warranty

Ergonomically designed

121°C
Autoclavable lower parts

CE
IVD

Made in Finland

Leader in performance & ergonomics – eLINE® electronic pipettors

When you want to do it electronically – your choice is the eLINE electronic pipettor. This honorary mentioned (Pro Finnish Design 2001) pipettor takes analytical performance and ergonomic innovation to totally new levels! Its fully electronic operation – including tip ejection – gives you the chance to concentrate the work-effort to where it's needed the most. eLINE pipettors cover the full volume range of 0.2 to 5000 µl.

Tips on pages 52-53
Filters on page 57
Pipettor selection guide on page 72
Ergonomics on page 68
Autoclaving instructions on page 77
Stand options available on page 23
Ergomate on page 40

eLINE electronic pipettors offer

- Outstanding ergonomics
- Unique electronic tip ejection mechanism
- Unbeatable accuracy & precision thanks to the patented DC-motor and optical feedback concept
- Extra wide volume ranges in both single- and multichannel models – fewer models needed
- Comprehensive range of liquid handling protocols with easy programming
- Memory settings to store your own routine pipetting protocols
- 9 speeds for aspiration and dispensing
- Optiload tip loading in multichannel pipettors
- Autoclavable lower parts

eLINE Single-Channel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Plus	Tip ID
730020 730022	1-channel	0.2-10 µl	0.05	10 5 1 0.2	0.90 % 1.00 % 2.50 % 12.00 %	0.40 % 0.70 % 1.50 % 10.00 %	-	-	A, L, M
730040 730042	1-channel	5-120 µl	0.50	120 60 12 5	0.40 % 0.60 % 2.00 % 3.50 %	0.15 % 0.20 % 1.00 % 1.50 %	721008	721018	C, D, V
730060 730062	1-channel	10-300 µl	1.00	300 150 30 10	0.40 % 0.60 % 1.50 % 3.50 %	0.15 % 0.20 % 0.80 % 2.00 %	721007	721017	D, Q *1
730080 730082	1-channel	50-1000 µl	5.00	1000 500 100 50	0.40 % 0.60 % 1.50 % 2.00 %	0.15 % 0.20 % 0.50 % 1.00 %	721006	721016	E, G, S
730100 730102	1-channel	100-5000 µl *2	10.0	5000 2500 500	0.50 % 0.80 % 1.00 %	0.15 % 0.20 % 0.40 %	721006	721016	J

■ Catalog numbers ending with "0" do not include AC adapter ■ Catalog numbers ending with "2" include AC adapter
*1 Note: Maximum volume 300 µl. In the d-mode the total displayed volume can not exceed 270 µl. *2 Note: Minimum volume in P-mode is 500 µl. The 100 µl is possible in d-mode.
The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice.
FINAS Accredited Calibration Certificate (ISO 17025) available for new pipettors – see page 59 for details

BIOHIT
Innovating for Health

Autoclavable dispensing head (excl. 1200 µl 8/12 models)

Optiload tip loading

The eLINE multichannel pipettors are equipped with special spring loaded tip cones – the Optiload mechanism. This allows tip loading with an equal constant force to every channel. As a result tips are perfectly sealed to every individual tip cone with minimum force. Furthermore, for fast and easy service and maintenance the tip cones are individually detachable without any tool.

eLINE Multichannel Performance specifications and ordering details

Tips on pages 52-53
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Stand options available on page 23
Ergomate on page 40

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Safe-Cone Filters Plus	Tip ID
730320 730322	8-channel	0.2-10 µl	0.05	10 5 1	0.90 % 1.50 % 4.00 %	0.50 % 0.80 % 3.00 %	-	-	A, L, M
730340 730342	8-channel	5-120 µl	0.50	120 60 12	0.50 % 0.70 % 2.00 %	0.20 % 0.30 % 1.50 %	721008	721018	C, D, V
730360 730362	8-channel	10-300 µl	1.00	300 150 30	0.50 % 0.70 % 2.00 %	0.20 % 0.30 % 1.00 %	721007	721017	D, Q *[1]
730390 730392	8-channel	50-1200 µl	5.00	1200 600 120	0.50 % 1.00 % 2.50 %	0.20 % 0.30 % 1.00 %	721006	721016	H, T, Z
730420 730422	12-channel	0.2-10 µl	0.05	10 5 1	0.90 % 1.50 % 4.00 %	0.50 % 0.80 % 3.00 %	-	-	A, L, M
730440 730442	12-channel	5-120 µl	0.50	120 60 12	0.50 % 0.70 % 2.00 %	0.20 % 0.30 % 1.50 %	721008	721018	C, D, V
730460 730460	12-channel	10-300 µl	1.00	300 150 30	0.50 % 0.70 % 2.00 %	0.20 % 0.30 % 1.00 %	721007	721017	D, Q *[1]
730460 730462	12-channel	50-1200 µl	5.00	1200 600 120	0.50 % 1.00 % 2.50 %	0.20 % 0.30 % 1.00 %	721006	721016	H, T, Z

■ Catalog numbers ending with "0" do not include AC adapter ■ Catalog numbers ending with "2" include AC adapter
*[1] Note: Maximum volume 300 µl. In the d-mode the total displayed volume can not exceed 270 µl. *[2] Note: Minimum volume in P-mode is 500 µl. The 100 µl is possible in d-mode.
The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice.
FINAS Accredited Calibration Certificate (ISO 17025) available for new pipettors.

eLINE charging options

- 1-Place Charging Stand
- 4-Place Charging Carousel
- AC-adaptor

The eLINE electronic pipettors and eLINE dispensers can be charged with a 1-place charging stand, a 4-place charging carousel or a direct charging AC-adaptor. The variety of charging options has been designed for optimal utility and all charging options are delivered with the AC-adaptor of choice. It is possible to continue pipetting while the eLINE is charged through the AC-adaptor. The compact design of the 4-pipettor charging carousel is ideal for saving bench space in the laboratory and allows the pipettor to be rested between dispensing routines with a tip attached. The 4-place rotating head provides easy access to the desired unit.

eLINE operation modes

- Pipetting
- Reverse Pipetting
- Pipetting with Mixing
- Pipetting with Cycle Counter
- Manual Pipetting [*1]
- Multiple Dispensing
- Diluting
- Diluting with Mixing
- Sequential Dispensing
- Multi-Aspirating
- Automatic Multiple Dispensing

For pipetting modes, please go to page 73.

[*1] Note: Not available in eLINE multichannel models.

Cat. No.	Item
730982	eLINE Charging Stand for one pipettor, with AC-adaptor
730992	eLINE Charging Carousel for 4 pipettors, with AC-adaptor
725620	Linear Stand
731001	eLINE Replacement Battery

"eLINE is the perfect pipettor taking care of both the work and the person using it"

Lisbeth Lemmetti, Development Analyst, Biomedicine
Blood Centre at Sahlgrenska University Hospital, Sweden

Direct charging feature allows pipetting while charging

Uniquely Biohit!

Unique one-touch electronic tip ejection

Tip ejection can be laborious and at worst a contributing factor to Repetitive Strain Injury (RSI). With the eLINE this is no longer the case, as the unique electronic tip ejection system allows tip removal at the light touch of a button.

The eLINE is the only pipettor in the market that offers electronic tip ejection. The feature has been designed for both left- and right-handed operation.

Uniquely Biohit!

Patented Biohit DC-motor concept

- Improved accuracy and precision
- User-independent pipetting action
- High reliability with optical feedback system and error control

The patented DC-motor – solenoid brake concept is a unique Biohit innovation that enables over 10 times more precise positioning of the piston compared to a stepper motor driven system. This means superior accuracy and precision, especially in dispensing (d) mode (see also page 73).

With the DC-motor concept pipetting results are always reproducible independent on experience, as hand fatigue is totally eliminated. All Biohit's electronic pipettors include the patented system.

Built-in error control for more reliable results

Even the best pipettor may occasionally make errors. It is important to be able to notice them.

Biohit electronic pipettors feature a built-in error control. The pipettor notices if an error occurs while pipetting, and notifies the user, thus allowing for more reliable results.

BIOHIT
Innovating for Health

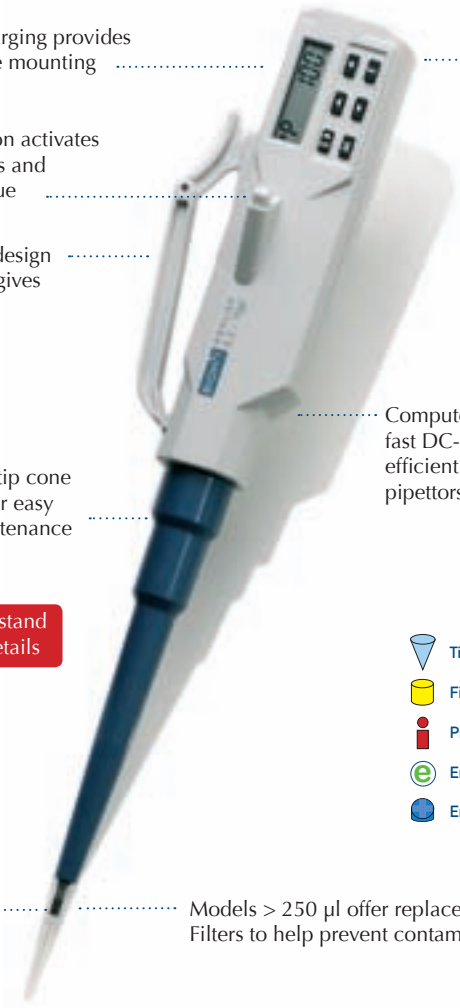
Proline®

The original electronic for all pipetting needs

In 1991 Biohit delivered its first electronic pipettors. Since then, Biohit Proline electronic pipettors have offered effortless and rapid pipetting with high levels of accuracy and precision. The Proline range offers complete solutions for all pipetting needs. Proline pipettors are ergonomically designed and the tip ejection is easily operated with four fingers to avoid strain and fatigue during pipetting.

Proline electronic pipettors offer

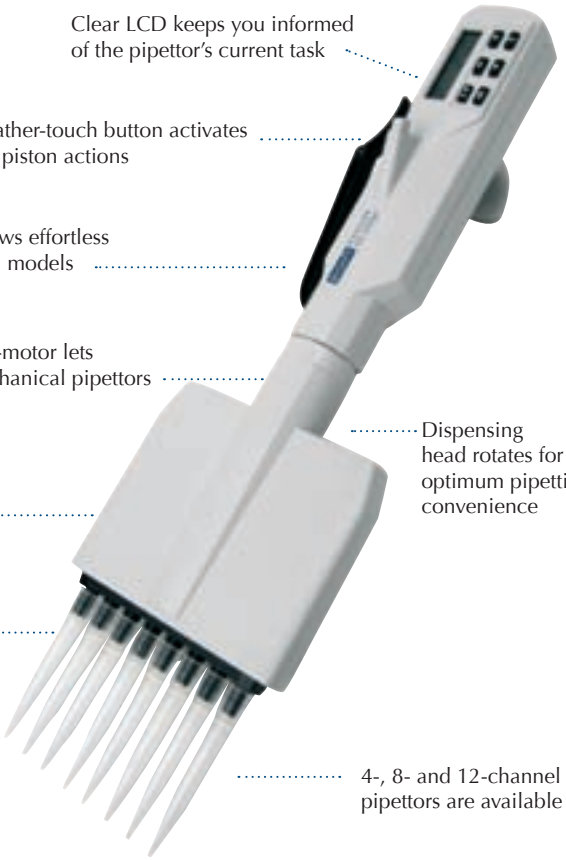
- Lightweight ergonomic design
- Single point calibration
- 5 speeds for aspiration and dispensing
- Wide volume range
- Design that helps prevent Repetitive Strain Injury (RSI)
- Option of single- or 4-place carousel charging stands (either needed for operation)
- Comprehensive range of all most important liquid handling protocols



Proline Single-Channel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Safe-Cone Filters Plus	Tip ID
710520	1-channel	0.2-10 µl	0.10	10 5 1 0.2	0.90 % 1.00 % 2.50 % 12.00 %	0.50 % 0.80 % 1.80 % 10.00 %	-	-	A, L, M
710010	1-channel	5-100 µl	1.00	100 50 10 5	0.40 % 0.70 % 2.00 % 2.50 %	0.15 % 0.30 % 1.00 % 1.80 %	-	-	C, O, V
710030	1-channel	10-250 µl	5.00	250 125 25 10	0.40 % 0.60 % 2.00 % 2.00 %	0.15 % 0.20 % 1.00 % 1.00 %	-	-	C, D, Q
710100	1-channel	10-500 µl	5.00	500 250 50 10	0.40 % 0.70 % 1.50 % 9.00 %	0.15 % 0.20 % 0.80 % 2.00 %	721006	721016	E, G, R
710020	1-channel	50-1000 µl	10.0	1000 500 100 50	0.60 % 0.80 % 2.00 % 2.00 %	0.15 % 0.20 % 0.60 % 1.00 %	721006	721016	E, G, S
710040	1-channel	50-1200 µl	5.00	1200 600 120 50	0.40 % 0.70 % 2.00 % 2.00 %	0.15 % 0.20 % 0.60 % 1.00 %	721006	721016	H, T, Z
710500	1-channel	100-5000 µl *1	50.0	5000 2500 500	0.50 % 0.80 % 0.80 %	0.15 % 0.25 % 0.60 %	721006	721016	J

The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice.
FINAS Accredited Calibration Certificate (ISO 17025) available for new pipettors.
*1 Note: Minimum volume in P-mode is 500 µl. The 100 µl is possible in d-mode.
Note: Proline electronic pipettor needs a charging stand for operation.



Requires charging stand
see page 27 for details

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Filters on page 57
Pipettor selection guide on page 72
Ergonomics on page 68
Ergomate on page 40

Proline Multichannel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone filters Standard	Plus	Tip ID
710410	4-channel	5-100 µl	1.00	100 50 10 5	0.50 % 0.80 % 2.50 % 4.00 %	0.20 % 0.30 % 1.50 % 2.50 %	721014	-	C, D, P, O, Q, V
710420	4-channel	25-250 µl	5.00	250 125 25	0.40 % 0.70 % 1.50 %	0.15 % 0.20 % 1.00 %	721014	-	D, Q
710200	8-channel	0.2-10 µl	0.10	10 5 1	0.90 % 1.50 % 4.00 %	0.50 % 0.80 % 4.00 %	-	-	A, L, M
710210	8-channel	5-100 µl	1.00	100 50 10 5	0.50 % 0.70 % 2.50 % 4.00 %	0.20 % 0.30 % 1.50 % 2.50 %	721014	-	C, D, O, P, Q, V
710220	8-channel	25-250 µl	5.00	250 125 25	0.40 % 0.60 % 1.50 %	0.15 % 0.20 % 1.00 %	721014	-	D, Q
710800	8-channel	50-1200 µl	10.0	1200 600 120 50	0.50 % 1.00 % 3.00 % 8.00 %	0.15 % 0.20 % 1.20 % 1.50 %	721006	721016	H, T, Z
710300	12-channel	0.2-10 µl	0.10	10 5 1	0.90 % 1.50 % 4.00 %	0.50 % 0.80 % 4.00 %	-	-	A, L, M
710310	12-channel	5-100 µl	1.00	100 50 10 5	0.50 % 0.80 % 2.50 % 4.00 %	0.20 % 0.40 % 1.50 % 2.50 %	721014	-	C, D, O, P, Q, V
710320	12-channel	25-250 µl	5.00	250 125 25	0.40 % 0.60 % 1.50 %	0.15 % 0.20 % 1.00 %	721014	-	D, Q
710810	12-channel	50-1200 µl	10.0	1200 600 120 50	0.80 % 1.00 % 3.00 % 8.00 %	0.15 % 0.20 % 1.20 % 1.50 %	721006	721016	H, T, Z

The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice.
Note: Proline electronic pipettor needs a charging stand for operation.

Stands & Accessories

Cat. No.	Item
510002	Proline Charging Stand for one pipettor
511602	Proline Charging Carousel for 4 pipettors
711002	Proline Replacement Battery

Proline charging options

- 1-Place Charging Stand
- 4-Place Charging Carousel

The Proline electronic pipettors can be charged with a 1-place charging stand or a 4-place charging carousel. The compact design of the 4-place charging carousel is ideal for saving bench space in the laboratory and allows the pipettor to be rested between dispensing routines. The 4-place rotating head provides easy access to the desired unit.

Proline operation modes

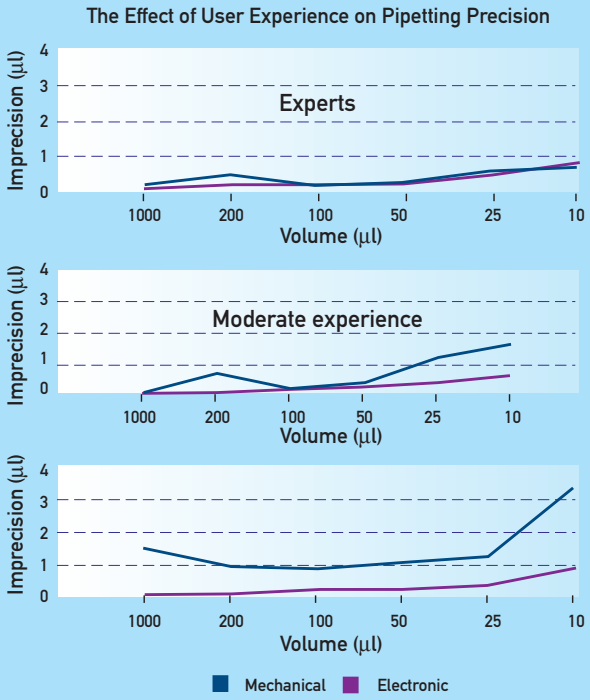
- Pipetting
- Pipetting with mixing
- Reverse Pipetting (excl. BPE 5000, 1200)
- Multiple Dispensing
- Diluting (excl. mcp 1200)
- Diluting with mixing (excl. mcp 1200)
- Sequential Dispensing (only BPE 5000, 1200)
- Multi-Aspirating (only BPE 1200)

For pipetting modes, please go to page 73.

User-independent accuracy with Biohit electronic pipettors

While experience and good pipetting practice are essential for reproducible results with mechanical pipettors, the electronic pipettors produce precise results independent of user experience.

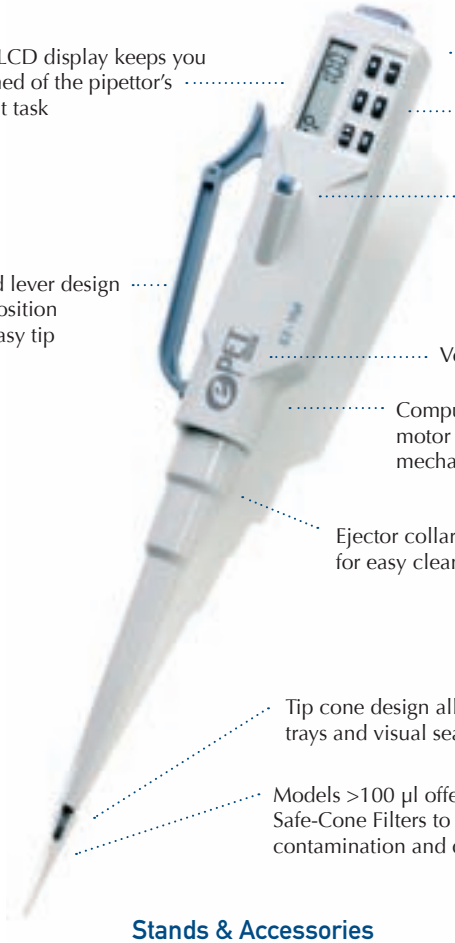
Proline, like all other Biohit's electronic pipettors, features the patented DC-motor concept, which enables more precise and smooth piston movement compared to mechanical pipetting. This means superior accuracy and precision, in all pipetting actions. Results are always reproducible even with small volumes independent on experience, as hand control is totally eliminated.



BIOHIT
Innovating for Health

The compact and economical alternative – ePET®

Biohit ePET electronic pipettors offer an easy and affordable access to electronic pipetting. By using a direct charging system which requires no charging stand, ePET is a very cost-effective alternative for electronic pipetting! The ePET is available in single-channel models covering the volume range of 0.2 to 5000 µl and multichannel models for 0.2 to 1200 µl.



Clear LCD display keeps you informed of the pipettor's current task

Direct charging using AC-adaptor

Simple keypad allows easy, error free selection of liquid handling modes, volumes and speeds

Feather-touch button activates all piston actions

Compound lever design and side position provides easy tip ejection

Volume range color coding

Computerized drive system with fast DC-motor lets you work more efficiently than with mechanical pipettors

Ejector collar and tip cone can be removed for easy cleaning and maintenance

Tip cone design allows easy tip mounting from trays and visual seal verification

Models >100 µl offer replaceable Safe-Cone Filters to help prevent contamination and damage

ePET operation modes:

- Pipetting
- Pipetting with Mixing
- Multi Dispensing
- Diluting
- Diluting with Mixing

Direct charging makes the ePET a cost-effective alternative for electronic pipetting

Requires no charging stand

Tips on pages 52-53
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Stands & Accessories

Cat. No.	Item
710999	ePET Stand for one pipettor
710990	ePET Carousel for 5 pipettors
725620	Linear Stand
711002	ePET Replacement Battery

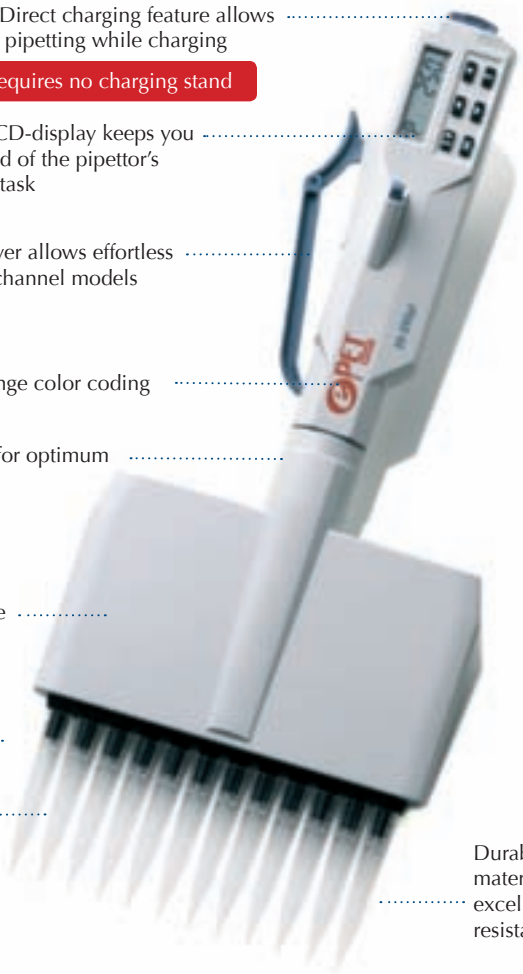
Linear Stand

ePET Single-Channel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Plus	Tip ID
710522ET	1-channel	0.2-10 µl	0.10	10 5 1 0.2	0.90 % 1.00 % 2.50 % 12.00 %	0.50 % 0.80 % 1.80 % 10.00 %	-	-	A, L, M
710012ET	1-channel	5-100 µl	1.00	100 50 10 5	0.40 % 0.70 % 2.00 % 2.50 %	0.15 % 0.30 % 1.00 % 1.80 %	-	-	C, O, V
710022ET	1-channel	50-1000 µl	5.00	1000 500 100 50	0.40 % 0.70 % 1.50 % 2.00 %	0.15 % 0.20 % 0.50 % 1.00 %	721006	721016	E, G, S
710042ET	1-channel	50-1200 µl	5.00	1200 600 120 50	0.40 % 0.70 % 2.00 % 2.00 %	0.15 % 0.20 % 0.60 % 1.00 %	721006	721016	H, T, Z
710502ET	1-channel	100-5000 µl *1	50.0	5000 2500 500	0.50 % 0.80 % 0.80 %	0.15 % 0.20 % 0.30 %	721006	721016	J

The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice.
FINAS Accredited Calibration Certificate (ISO 17025) available for new pipettors
*1 Note: Minimum volume in P-mode is 500 µl. The 100 µl is possible in d-mode.

ePET® Electronic Multichannel Pipettors



ePET multichannel pipettor family

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ePET Multichannel Performance specifications and ordering details

Cat. No.	Channels	Volume Range (µl)	Increment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone filters Standard	Safe-Cone filters Plus	Tip ID
710202ET	8-channel	0.2-10 µl	0.10	10 5 1	0.90 % 1.50 % 4.00 %	0.50 % 0.80 % 4.00 %	-	-	A, L, M
710212ET	8-channel	5-100 µl	1.00	100 50 10 5	0.50 % 0.70 % 2.50 % 4.00 %	0.20 % 0.30 % 1.50 % 2.50 %	721014	-	C, D, O, P, Q, V
710222ET	8-channel	25-250 µl	5.00	250 125 25	0.40 % 0.60 % 1.50 %	0.15 % 0.20 % 1.00 %	721014	-	D, Q
710802ET	8-channel	50-1200 µl	10.0	1200 600 120 50	0.50 % 1.00 % 3.00 % 8.00 %	0.15 % 0.20 % 1,20 % 1.50 %	721006	721016	H, T, Z
710302ET	12-channel	0.2-10 µl	0.10	10 5 1	0.90 % 1.50 % 4.00 %	0.50 % 0.80 % 4.00 %	-	-	A, L, M
710312ET	12-channel	5-100 µl	1.00	100 50 10 5	0.50 % 0.80 % 2.50 % 4.00 %	0.20 % 0.40 % 1.50 % 2.50 %	721014	-	C, D, O, P, Q, V
710322ET	12-channel	25-250 µl	5.00	250 125 25	0.40 % 0.60 % 1.50 %	0.15 % 0.20 % 1.00 %	721014	-	D, Q
710812ET	12-channel	50-1200 µl	10.0	1200 600 120 50	0.80 % 1.00 % 3.00 % 8.00 %	0.15 % 0.20 % 1.20 % 1.50 %	721006	721016	H, T, Z

The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice.


5ml

BIOHIT
Innovating for Health

eLINE®

A single innovation makes all the difference

eLINE Dispenser hands you the most convenient and ergonomic approach to multiple dispensing. The automated liquid handling operation offers accurate and repetitive dispensing also with viscous, infectious and high vapor pressure liquids. The unique TipGuide selects and displays the most suitable tip size which saves time and eliminates the possibility of an incorrect tip selection. Additionally, a smart feature included in the whole eLINE product range is the unique electronic tip ejection, which reduces the risk of RSI (Repetitive Strain Injury).

eLINE Dispenser offers

- TipGuide – automatic guide for correct tip selection
- Outstanding ergonomics – dispensing with minimum force
- Unique electronic feather light tip ejection
- Comprehensive range of liquid handling protocols with easy programming
- Contamination-free dispensing with positive displacement principle
- Volume range from 1 µl to 50 ml
- 5 speeds for aspiration and dispensing
- Charging indicator
- Direct charging option enabling dispensing while charging
- Compatibility with eLINE charging stand and carousel
- Compatibility with other dispenser tip brands

eLINE Dispenser operating modes

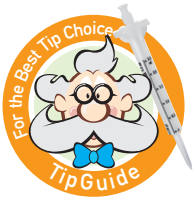
- Multiple Dispensing (d)
- Pipetting (P)
- Diluting (dd)
- Sequential Dispensing (Sd)
- Automatic Multiple Dispensing (Ad)
- Multi-Aspirating (SA)
- Custom mode (CST)
  - GL (select service intervals)
  - Sr (select the desired tip range)
  - SET (returns default settings)

eLINE Dispenser Ordering details

All eLINE Pipettors and dispensers share the same convenient charging options.

Cat. No.	Item
730702	Biohit eLINE Dispenser
730982	Biohit eLINE Charging Stand, with AC-adaptor
730992	eLINE Charging Carousel for 4 pipettors, with AC-adaptor
731001	eLINE replacement battery

Biohit has several worldwide patents and patents pending for its products.



Save your time, let the TipGuide make the tip choice for you

- No time consuming volume calculations
- Just set the desired volume and number of dispensings, the TipGuide selects and displays the suitable tip size

New member of the eLINE family!

BIOHIT
Innovating for Health

Biohit Mechanical Stepper

The Biohit Mechanical Stepper is an easy to use positive displacement dispenser which allows rapid multi-dispensing of pre-set volumes up to 48 times in succession without refilling.

The unit comes complete with an adapter for 25 ml and 50 ml tips.

Features include:

- Easy single handed operation
- Lightweight (105 g) yet robust construction
- Maintenance-free design
- Compatible with a wide range of dispenser tips
- Ideal for dispensing aqueous and viscous liquids
- Dispensing volumes from 1 µl to 5000 µl (min. volume with Biohit Dispenser Tips is 2 µl)
- Its ergonomic design and positioning of the dosage button in the upper part of the device allow single-handed volume selection, loading and dispensing.
- Choose quickly and effectively according to the requirements of your applications between the highest precision or maximum repetitions of your desired dosage volume.
- 48 dispensing steps at intervals of 1 second without the need to refill thus saving 90% of the working time required by the usual pipetting technique
- Tested according to ISO 8655-1

Biohit Mechanical Stepper and Biohit Dispenser Tip system Performance specifications

Tip volume (ml)	Dosage volume					Imprecision (%)	Inaccuracy (%)
Adjustment on dispenser	1	2	3	4	5		
Number of steps	48	23	15	11	8		
0.10	2 µl	4 µl	6 µl	8 µl	10 µl	< 1.6 %	< ± 3.0 %
0.20	4 µl	8 µl	12 µl	16 µl	20 µl	< 1.3 %	< ± 2.0 %
0.50	10 µl	20 µl	30 µl	40 µl	50 µl	< 0.5 %	< ± 0.8 %
1.00	20 µl	40 µl	60 µl	80 µl	100 µl	< 0.9 %	< ± 0.9 %
2.50	50 µl	100 µl	150 µl	200 µl	250 µl	< 0.4 %	< ± 0.8 %
5.00	100 µl	200 µl	300 µl	400 µl	500 µl	< 0.3 %	< ± 0.4 %
10.00	200 µl	400 µl	600 µl	800 µl	1000 µl	< 0.5 %	< ± 0.6 %
25.00	500 µl	1000 µl	1500 µl	2000 µl	2500 µl	< 0.3 %	< ± 0.2 %
50.00	1000 µl	2000 µl	3000 µl	4000 µl	5000 µl	< 0.2 %	< ± 0.2 %

The data for tips 0.5 and 2.5 ml are based on a measurement carried out with a 100 µl pipette tip.
The performance specifications apply to the Biohit Mechanical Stepper and Biohit Dispenser Tips (non-sterile) System.

Ordering Details

Cat. No.	Description
725700	Biohit Mechanical Stepper including adapter for 25 ml and 50 ml syringe tips

Biohit Dispenser Tips

Features:

- Function according to positive displacement principle
- Contamination free dispensing – no aerosols are formed
- Made of virgin polypropylene (tip) and polyethylene (plunger)
- 9 different tip sizes from 0.1 to 50 ml
- DNase, RNase, ATP and Pyrogen (Endotoxin) free
- Suitable for use together with eLINE Dispenser and Biohit Mechanical Stepper, as well as most other mechanical steppers

Biohit Dispenser Tip package Ordering details

Cat. No.	Volume (ml)	Package	Qty/Unit
792038	Starter Kit	Includes 20 * 0.5 ml 20 * 1.0 ml 20 * 2.5 ml 20 * 5.0 ml 20 * 10.0 ml	100
792017	0.1	Non sterile	100
792018	0.2	Non sterile	100
792019	0.5	Non sterile	100
792020	1.0	Non sterile	100
792021	2.5	Non sterile	100
792022	5.0	Non sterile	100
792023	10.0	Non sterile	100
792024	25.0*	Non sterile	25*
792025	50.0*	Non sterile	25*
792036	Adapter for 25 and 50 ml tips, 3 pcs./unit		

*Includes 1 adapter/unit

eLINE Dispenser and Biohit Dispenser Tip system Performance specifications

Tip volume (ml)	Volume min/max (µl)	Increment (µl)	Step size max (µl)	Test volume (µl)	Inacc. (%)	Impr. (%)	Number of dispensings min/max
0.1	1/100	0.2	100	10 100	1.00 % 1.00 %	2.00 % 0.50 %	1/100
0.2	2/200	0.4	200	20 200	1.70 % 1.50 %	1.00 % 0.20 %	1/100
0.5	5/500	1	500	50 500	0.80 % 0.80 %	0.80 % 0.40 %	1/100
1.0	10/1000	2	1000	100 1000	0.80 % 0.80 %	0.55 % 0.20 %	1/100
2.5	25/2500	5	2500	250 2500	0.50 % 0.50 %	0.55 % 0.20 %	1/100
5.0	50/5000	10	5000	500 5000	0.80 % 0.80 %	0.50 % 0.15 %	1/100
10.0	100/10 000	20	10 000	1000 10000	0.25 % 0.30 %	0.50 % 0.20 %	1/100
25.0	500/25 000	50	25 000	2500 25000	0.50 % 0.50 %	1.00 % 0.15 %	1/50
50.0	1000/50 000	100	50 000	5000 50000	0.40 % 0.40 %	0.80 % 0.15 %	1/50

The performance specifications apply to the eLINE Dispenser and Biohit Dispenser Tip (non sterile) System.
Due to Biohit's continuous R&D, specifications may change without prior notice.

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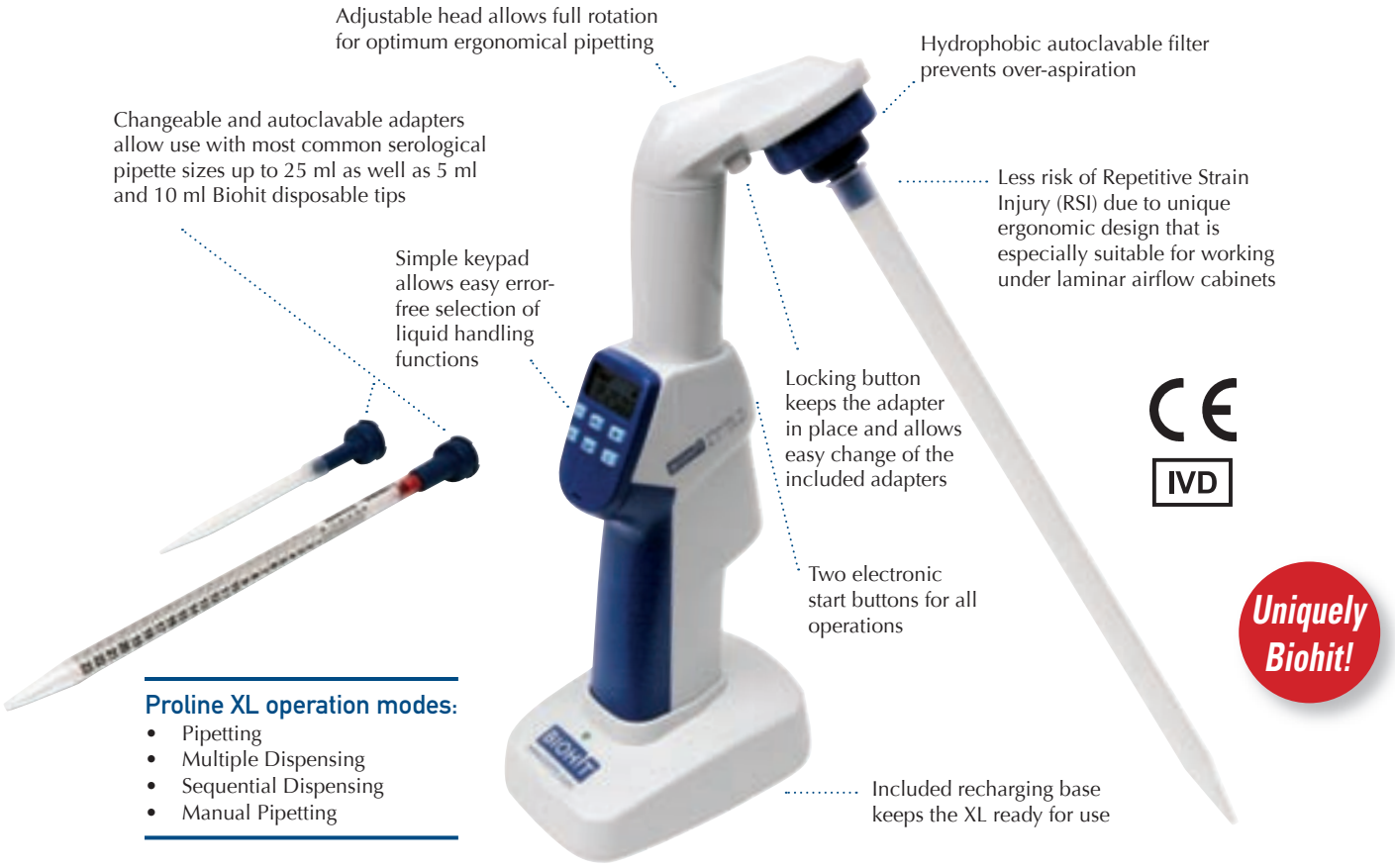
Special solutions for higher performance

Even when you handle liquids with bigger volumes, you still can do it easily and lightweight. As long as you do it with Biohit! For maxi-volume liquid handling, Biohit offers you a wide range of pipetting controllers and fillers: Biofiller is a lightweight and easy-to-use pipette filler. Midi Plus, Midi Pro and Proline XL are battery operated, rechargeable pipetting controllers. Prospenser Bottle-Top Dispenser and Biotrate Digital Burette provide hassle-free and accurate dispensing.



Proline XL operation modes:

- Pipetting
- Multiple Dispensing
- Sequential Dispensing
- Manual Pipetting

Proline XL – Excel in maxi-volumes

In addition to being a pipette controller for 1 to 25 ml serological pipettes, the Biohit Proline XL can be used as an electronic pipettor and dispenser with 5 and 10 ml disposable tips. The Proline XL can be easily programmed for exact operations with either of the buttons acting as a trigger to start the operation. For example, the XL can be programmed to automatically dispense 10 x 1 ml to fill the cell culture plate, which saves time and eliminates the need for visual control of pipetting. Moreover, the results are always reproducible.

Ergonomic design of the XL allows optimal working height even with 25 ml serological pipettes.

Proline XL offers:

- Efficient working with computerized drive system or manually
- Single-point calibration
- Possibility to handle a full volume range of 0.1 to 25 ml
- Improved precision and accuracy
- 5 speeds for aspiration and dispensing
- Easy access to bottles and tubes

Proline XL Performance specifications

Performance	Inaccuracy	Imprecision
25 ml graduated pipette: P-mode 25 ml P-mode 2 ml d-mode 10 x 2.5 ml	 0.40 % 1.40 % 1.00 %	 0.30 % 0.60 % 1.50 %
Biohit 10 ml tip: (see page 55) P-mode 10 ml P-mode 1 ml d-mode 10 x 1 ml	 0.50 % 2.40 % 1.00 %	 0.15 % 0.30 % 1.30 %
Biohit 5 ml tip: (see page 55) P-mode 5 ml P-mode 0.5 ml d-mode 10 x 0.5 ml	 1.00 % 4.20 % 1.70 %	 0.20 % 0.60 % 1.50 %
Battery: Min 500 full cycles. Weight: 260 g.		

The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice.

Proline XL Ordering details

Cat. No.	Item	Qty/Unit
710902	Proline XL	1
712912	Replacement Filter, autoclavable, 0.45 µm	5
712913	Replacement Filter, sterile, 0.45 µm	1
780300	Biohit Tip 5 ml	100
780310	Biohit Tip 10 ml	100

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Midi Plus™ & Midi Pro – The Super Controllers

Midi Plus and Midi Pro are rechargeable pipetting controllers that operate with rechargeable battery. Both instruments are suitable for all types of pipettes in the range of 1 to 100 ml. Midi Plus and Midi Pro fit the hand comfortably and are ideal for use within a laminar flow or microbiological safety cabinet. Both models include a low battery indicator, and both are CE marked.

Midi Plus™ offers:

- Optional adapters (as accessory) allowing the unit to be used also with the Biohit 5 ml and 10 ml pipettor tips
- Linear speed control allows for the aspiration and dispensing speed to be adjusted easily and precisely to suit either large or small volume pipettes
- The speed can also be fine-tuned by applying varying finger pressure to the operating buttons
- Attached support allows the unit to be rested on a table with pipette attached (not available in units sold in the United States)
- Rechargeable during use

Midi Pro offers:

- Powerful yet quiet motor to speed up large volume pipetting – fills a 25ml pipette in under 3 seconds
- Selection of high or low modes allowing variable aspirate and dispense speeds (with blowout)
- Gravity dispense mode for use with 'To Deliver' (TD) pipettes
- Rechargeable during use
- Environmentally friendly nickel metal hydride battery
- Concave finger triggers control the speed of suction and dispensing, providing a comfortable and positive grip
- Unique stand suitable for bench or wall mounting is supplied with the unit

CE
IVD

CE

Midi Plus & Accessories Ordering details

Cat. No.	Item	Qty/Unit
710932	Midi Plus Pipetting Controller with AC-adaptor	1
712912	Replacement Filter, 0.45 µm, autoclavable	5
712913	Replacement Filter, sterile, 0.45 µm	1
711015*[1]	Adapter Set for 5 ml tip	1
711016*[1]	Adapter Set for 10 ml tip	1
780300	Biohit Tip 5 ml	100
780310	Biohit Tip 10 ml	100

*1 Note: Adapter set includes both the nose cone (PVDF) and the silicon adapter.

Midi Pro & Accessories Ordering details

Cat. No.	Item	Qty/Unit
710912	Midi Pro Pipetting Controller with AC-adaptor	1
721962	Replacement Filter, 0.45 µm	5
721965	Replacement Filter, 0.2 µm	5
721966	Replacement Filter, sterile, 0.2 µm	1
721963	Replacement Silicone Pipette Holder	1

The Midi Pro is fitted with a 0.45µm filter and supplied complete with charger, two spare hydrophobic filters (1x 0.45µm and 1x 0.2µm), bench stand and instruction manual.

Midi Plus & Midi Pro Technical specifications

Feature	Midi Plus	Midi Pro
Batteries	AA, 3 x 1.2 V, 270 mAh, NiCd	2 x 1.2V NiMH
Charging Batteries	14 hours for completely empty battery	14 hours for completely empty battery
Battery Service Life (from empty)	Approx. 7 hours service life when fully charged	500 – 1000 cycles
AC-adaptor	Output voltage 9 V DC	Output 75/10 mA DC
Overall Weight	207 g	180 g without stand/wall bracket
Filters	Hydrophobic 0.45 µm	Hydrophobic 0.45 µm or 0,2 µm
Case Material	ASA + PC	ASA
Nose Cone Material	PVDF (autoclavable)	ASA
Pipette Holder	Silicone (autoclavable)	Silicone (autoclavable)
Pipette Types	Plastic or Glass 1-100 ml Pasteur pipettes 5 ml and 10 ml Biohit pipettor tips (page 52-53)	Plastic or Glass 1-100 ml Pasteur pipettes

Biofiller
- Basic pipetting at its best

Biofiller is a uniquely designed, lightweight and easy-to-use pipette filler with an ultra-squeezable bulb to provide smooth, manual pipetting control in both aspirating and dispensing, using 1 ml to 100 ml pipettes.

Simply squeeze the large silicone bulb, and the thumb lever controls both the aspirating and dispensing modes, with a button to blow-out residual contents of pipette if required.

Biofiller offers:

- Comfortable and simple to use
- Precise pipetting control
- Robust and lightweight
- Large capacity bulb
- Compatible with blow-out pipettes
- Simple thumb button operation
- Uses integral 0.45 µm, replaceable membrane filter to ensure liquid is not accidentally drawn into the unit
- Autoclavable silicone pipette holder

Biofiller Ordering details

Cat. No.	Item	Qty/Unit
723039	Biofiller Pipette Filler with integral 0.45 µm filter	1
721963	Replacement Silicone Pipette Holder	1
721962	Replacement Filter, 0.45 µm	5
721965	Replacement Filter, 0.2 µm	5
721966	Replacement Filter, sterile, 0.2 µm	1

ViscoPet
– Electronic pipettor for viscous liquids

ViscoPet features special long reach viscotip capillaries

Suitable for

- Food laboratories
- Blood banking
- Petrochemical industry

Operation modes:

- Pipetting
- Multiple Dispensing
- Diluting
- Mixing
- Special Aspiration
- Sequential Dispensing

The Biohit ViscoPet electronic pipettor has been specifically designed for pipetting viscous liquids. ViscoPet features the most important liquid handling operations and the same ergonomic design as the Biohit Proline electronic pipettor. The wide volume range of 50 to 1200 µl makes the pipettor suitable for laboratories that need high levels of accuracy while pipetting viscous liquids.

CE IVD

ViscoPet uses the same charging options as the Proline electronic pipettor.

See Proline features on page 25

Tips on pages 52-53
Filters on page 57
Ergonomics on page 68

Viscopet Performance specifications and ordering details

Cat. No.	Chan-nels	Volume Range (µl)	Incre-ment (µl)	Test Volume (µl)	Inacc. (%)	Impr. (%)	Safe-Cone Filters Standard	Plus
710830	1	50-1200	5.00	1200 600 100	2.00 % 3.00 % 8.00 %	0.30 % 0.40 % 1.80 %	721008	721018

Cat. No.	Item	Qty / Unit
782042	190 mm (1 ml) ViscoTip Capillaries (pp), sterile	1000 (40 packs of 25)
782043	240 mm (1 ml) ViscoTip Capillaries (pp), sterile	1000 (40 packs of 25)
711002	Proline Replacement Battery	1
510002	Proline Charging Stand for one pipettor	1
511601	Proline Charging Carousel for 4 pipettor	1

The specifications are type test specifications achieved under strictly controlled conditions (ISO 8655). Due to Biohit's continuous R&D, specifications may change without prior notice. Note: requires a charging stand.

Uniquely Biohit!

ERGONOMICALLY DESIGNED

Ergo-Mate – Ergonomic Pipetting System

When pipetting, ISO 8655 recommends touching off samples on the wall of receiving vessels, especially with small volumes. The new Biohit Ergo-Mate removes the need to hold the plate at any specific angle and allows for safe dispensing, resulting in easier, safer, and more precise pipetting.

Ergonomic angle for proper positioning of wrist and hand for comfortable pipetting.

Uniquely Biohit!

Micro plate grids for quick identification and sample management

Double-sided. Reverse side featuring numbering from 1-12.

When reversed plate holder creates an ideal aerosol barrier for use in hoods or on bench top surfaces

Micro Plate Grids

Plate holder can be reversed and used for flat surface pipetting or as an incubation station with lid

Ideal for safe transporting of plates

ERGONOMICALLY DESIGNED

Cat. No.	Item
MK1001	Ergo-Mate Starter Kit, includes 1 Ergo-Mate Plate holder, Pack of 30 grids and 1 Anti-Skid mouse pad
MK1020B	Ergo-Mate Plate Holders Pack of 3
MK3001	Ergo-Mate Micro Plate Grids double-sided pack of 50

*Bottle Not Included

Prospenser Bottle-Top Dispenser

The easy-to-use Prospenser delivers trouble-free and reliable dispensing of liquids including strong acids, alkalis and solvents.

- All models are fitted with an anti-drip safety valve, a feature which guards against drips when the Prospenser is not in use.
- A fine adjustment mechanism allows for even greater reproducibility for repeat dispensing.
- Unlike other bottle-top dispensers, the Prospenser's glass barrel can be disassembled from the pedestal for thorough cleaning. This also ensures that in the unlikely event of damage, you can replace the glass barrel as a spare part rather than have to buy a new dispenser.
- The head can be conveniently rotated 360° for operator safety and comfort.
- Wide range of adapters are included to fit the most common bottle sizes.
- Optional extendable delivery jet allows fast and safe dispensing even to narrow tubes.

Prospenser Performance specifications and ordering details

Cat. No.	Item	Increment	Max Volume	Inacc. (%)	Impr. (%)
723049	Prospenser 0.01–2.5 ml (with 38, 40 and 45 mm adaptors)	0.05 ml	2.5 ml	0.3 %	0.1 %
723050	Prospenser 0.1–5 ml (with 38, 40 and 45 mm adaptors)	0.1 ml	5 ml	0.3 %	0.1 %
723051	Prospenser 0.2–10 ml (with 38, 40 and 45 mm adaptors)	0.2 ml	10 ml	0.3 %	0.1 %
723052	Prospenser 1–30 ml (with 38, 40 and 45 mm adaptors)	1.0 ml	30 ml	0.3 %	0.1 %
723053	Prospenser 1–50 ml (with 38. 40 and 45mm adaptors)	1.0 ml	50 ml	0.3 %	0.1 %
721998	Extendable delivery jet (see picture)				

Please note that the Prospenser is not supplied with a reservoir

Biotrate Digital Burettes 0–30 and 0–50 ml

The streamlined Biotrate digital burette and dispenser delivers accurate, precise and convenient bottle-top titration, as well as optimum operator safety.

- The head can be conveniently rotated 360° for operator safety and comfort.
- See-through barrel ensures bubble-free titration.
- Automatic switch-off without losing the previous titrated volume, when left unattended
- No dripping when in static mode
- A new safety pedestal valve allows the Biotrate fluid path to be turned off manually to prevent accidental delivery. Its right-angled spout is also designed to enhance safety in use.

- Robust outer casing does not move during the priming or dispensing sequences.
- PTFE plunger and borosilicate glass barrel allow dispensing of aqueous solutions and some aggressive liquids.
- Powered by a 3.6V lithium battery giving a minimum life of 60,000 three-minute titrations. Automatic low battery voltage is indicated on the large easy-to-read LCD window.

Biotrate Performance specifications and ordering details

Cat. No.	Item	Increment	Inacc. (%)	Impr. (%)
723054	Biotrate 0–30 ml (with 33, 38 and 45mm adaptors)	0.01 ml	0.2 %	0.1 %
723055	Biotrate 0–50 ml (with 33, 38 and 45mm adaptors)	0.01 ml	0.2 %	0.1 %
721998	Extendable delivery jet (see picture page 42)			

Please note that Biotrate is not supplied with reservoir

BIOHIT
Innovating for Health

Tailored solutions for customer-specific systems

Yes, it is a true story. Biohit is a leading provider of tailor-made (OEM, Original Equipment Manufacture) solutions to customers who require a little more from their liquid handling devices. Thanks to our know-how, inventiveness and experience, we can take care of the whole process from engineering concept to dispatch. Custom-made only for you.

Biohit OEM Solutions – Safe, reliable and easy to use

In many applications, such as diagnostic test and analysis systems, the accuracy of the results and reliability of the system are mission-critical. This requires a lot from all components of the system, also the pipettor.

Biohit places a great emphasis on accuracy, precision, safety and user-friendliness of its products. Its application-specific solutions have been carefully manufactured according to the requirements of international quality standards. As a customer you can rest assured; Biohit solutions allow you to improve not only the safety and reliability, but also the ease-of-use of your system.

Custom-made for your needs

Biohit has developed different technologies that can be applied in custom-made solutions. These include both electronic and mechanical liquid handling pipettor platforms. The Start mLINE, eLINE, Proline and the new rLINE robotic dispenser module families are easy-to-adapt platforms for your system. For more specific needs, Biohit offers tailored solutions based on any of its pipettors.

To learn more about Biohit's OEM solutions, contact us at info@biohit.com.

The RS eLINE platform enables the integration of the instrument and the pipettor. A flexible cable between the instrument and the pipettor provides both the power supply and the operational control via RS 232 communication. The solution is based on the Biohit single- and multichannel eLINE electronic pipettors.

For example, Pentapharm GmbH in Germany has developed a whole blood Point-of-Care coagulation system, the ROTEM® System, with the RS eLINE as a key component. The system is designed to reduce the risk of transfusion errors in critical surgery such as liver transplant, cardiac or vascular surgery, orthopaedic or trauma surgery.

The Start mLINE is a pipettor based on any mLINE model that is equipped with an on/off switch and cable. This can be used with coagulation analyzers or any other instruments that require precise timing.

Solutions for leading-edge companies

Tailor-made solutions are a specialty of Biohit. Several leading-edge companies have for years been implementing variations of Biohit electronic and mechanical pipettors into their systems. Some of these internationally recognized companies have developed very specific applications with the R&D team of Biohit to exploit their own market niche.

The customer base includes global market leaders such as

- Pentapharm (picture)
- 3M
- bioMérieux
- Johnson & Johnson Group companies

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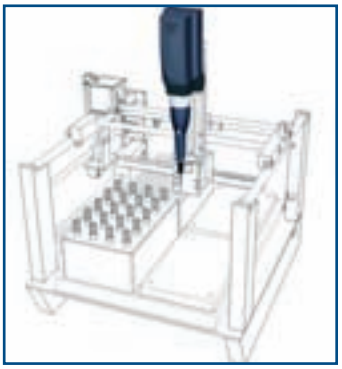

Biohit rLINE® – The ultimate OEM Dispenser Module

The unique rLINE Robotic Dispenser Module has been developed as an ideal front-end liquid handling tool for robotic sample processing. This technology platform combines numerous unique and innovative features, like electronic tip ejection and Optiload tip pick-up to improve high quality performance and functionality of sample processors and automated instrumentation.

The rLINE Robotic Dispenser Module is offered as OEM platform for tailored products ranging from 1 to 1000 µl as single-channel and 1 to 1200 µl as 8-channel. Additionally, a 250 µl single-channel version is available as off-the-shelf for evaluation and feasibility purposes. Robotic 250 µl tips in robotic racks are also available off-the-shelf.

The rLINE platform features and options:

- Compact, space-saving design
- Fast and easy installation
- Zero cross contamination
- Integrated electronic tip ejector
- Versatile serial interface (RS-232 & RS-485 & CANBUS)
- Low voltage, low current consumption
- Liquid level sensor
- Micro volume dispensing options

For more information on rLINE and other customer-specific solutions, please visit www.biohit.com or contact Biohit at info@biohit.com

BIOHIT
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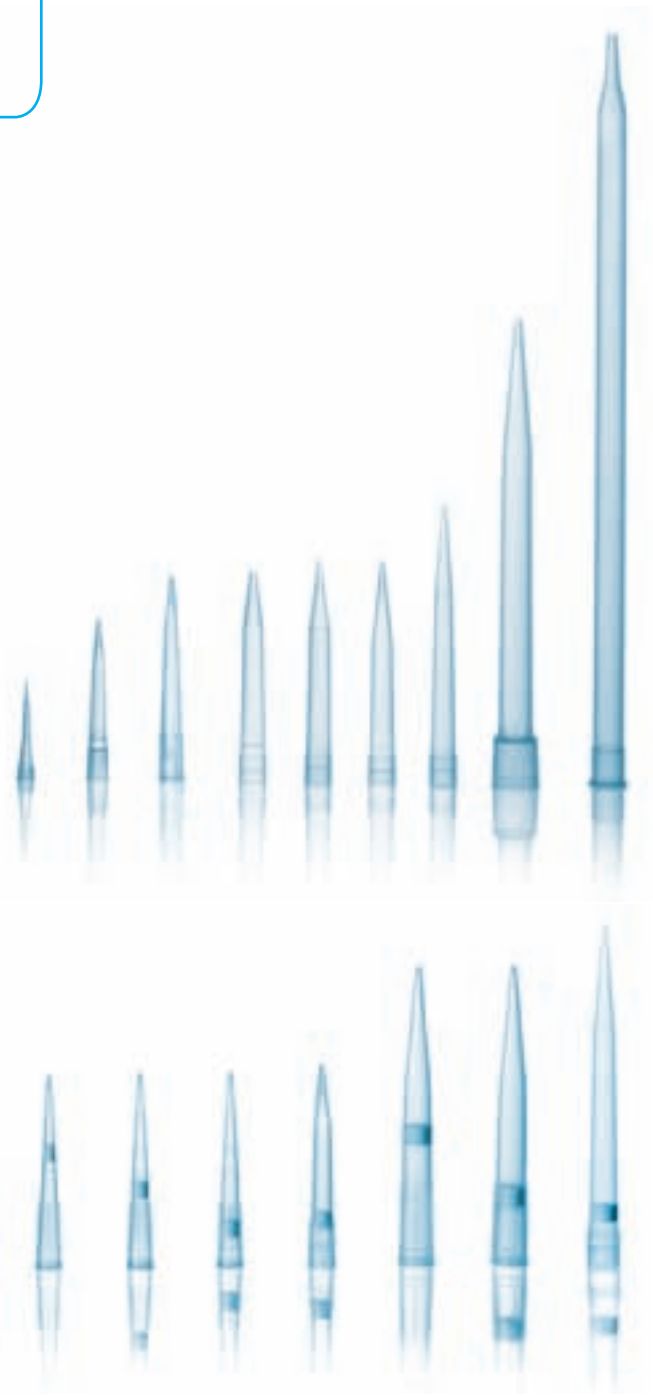
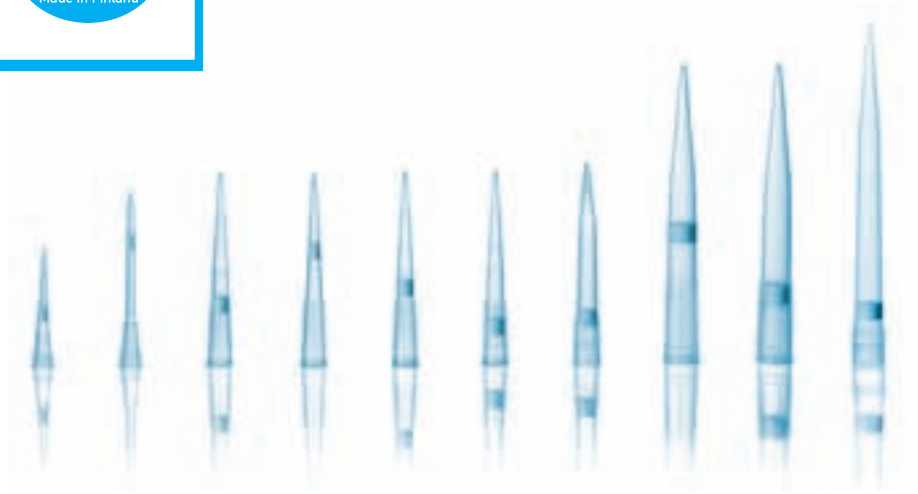
Fully autoclavable

CE
IVD

Made in Finland





Standard Tips

Biohit Standard Tips are made of premium-grade virgin polypropylene. The tips are metal-free and available in autoclavable (121°C; 20 min; 1 bar) Single Tray boxes (as certified RNase, DNase and endotoxin free), in space saving Refill System and in Bulk packages. Electron beam pre-sterilized tips in trays are also available.

Filter Tips

Biohit Filter Tips are made of virgin polypropylene and feature filter (PE) barriers to prevent aerosol and liquid contamination. This helps protect against the risk of cross-contamination and reduces maintenance requirements of the pipettor. Filter tips are tray-packed, electron beam pre-sterilized and certified as RNase, DNase and endotoxin free.

Best tip ever – premium pipettor tips from Biohit

Biohit offers you precision-made pipettor tips for use with all Biohit and most other brand pipettors providing excellent reproducibility and accuracy. All standard tips and trays are autoclavable. You can purchase these natural polypropylene tips in single trays as non-sterile or pre-sterilized, in refills and in bulk packaging. And last but not least, Biohit tips are manufactured in a protected environment, following Good Manufacturing Practices (GMP).

Single Tray boxes for safer laboratory work

The Single Tray tip boxes are a must for demanding laboratory work. The rigid and strong polypropylene boxes and trays are fully autoclavable. The tray holds 96 highest grade non-wettable virgin polypropylene tips in an 8 x 12 microplate format. The flip-top boxes can be opened and closed with a single hand. The color coding of the tip trays allows immediate tip volume recognition. Non-sterile and pre-sterilized standard tips are available in single trays as certified RNase, DNase and endotoxin free as well as metal-free.

Autoclaving instructions on page 77

Biohit tips and boxes are made of recyclable material

- Tips, trays & boxes: polypropylene (PP)
- Filters in filter tips: polyethylene (PE)

The ecological Refill System

The Refill System of Biohit is environmentally friendly with completely recyclable packaging. The tip trays are easily transferred from a space-saving Tower or Refill Pack to the Single Tray tip boxes. The Refill System range covers the five most popular standard tip sizes.

Bulk Tips – the economic option

The most economic alternative is to buy Bulk Tips that are available in boxes with 100, 400 or 1000 standard tips (depending on tip size, see ordering details). However, no compromises are made regarding the quality and the bulk tips undergo the same rigid quality control as other Biohit tips.

Instructions on how to use the Refill Tower for 10, 300 and 350 µl tips

- Remove the empty tray from the tip box.
- Lift up the upper part of the tower box.
- Take one single-tray from the refill tower.
- Put the single-tray into the empty tip box.

Instructions on how to use the Refill Pack for 1000 and 1200 µl tips

- Detach a Refill Pack.
- Open the cover film from the marked corner.
- Remove the empty tray from the tip box.
- Take the tip tray from the Refill Pack and put it into the empty tip box.

Every pipettor needs the best tip

In liquid handling, the pipettor and the tip always form a system. Biohit tips have been developed to perfectly match Biohit pipettors. By developing and producing both pipettors and tips Biohit is able to offer the best possible compatibility and pipetting results.

For example, the unique Optiload tip loading mechanism (see picture) of mLINE and eLINE pipettors allows tips to be loaded with constant force, which, in turn, secures optimal tip sealing and minimum tip ejection force.

Rigorous quality control to ensure accurate pipetting results

As the tip is an integral component of the pipetting system, its shape, material properties and fit have a considerable influence on pipetting accuracy. Variation in any of these will cause errors in the volume pipetted.

Quality is not automatically guaranteed unless the quality control (QC) process of the manufacturer is strictly controlled. All Biohit tips are fully traceable - mold cavity identification markings are printed in each tip and tip boxes are lot numbered. The quality control includes thorough in-house testing and checks. Each lot of the single tray products is also tested and certified as RNase, DNase and endotoxin free.

The quality management system follows not only ISO 9001, but also ISO 13485 (ISO standard for medical devices), which enables Biohit to give CE / IVD (*In Vitro Diagnostics*) certification for both pipettors and pipettor tips.

DNase • RNase • Endotoxin Free BIOHIT CERTIFIED

BIOHIT ISO 9001 ISO 13485 / 14001 CERTIFIED

CE IVD

121°C

All single tray products are tested and certified for purity by an independent laboratory.

Biohit pipettor tips are:

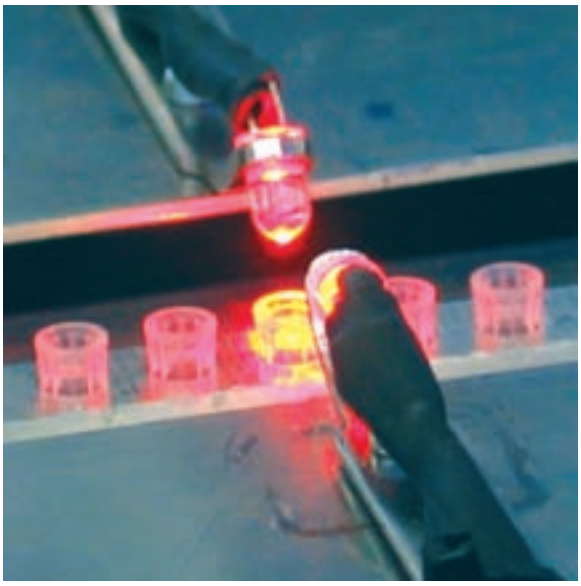
Made in Finland

- Made to match Biohit pipettors
- Made of high quality pure virgin polypropylene
- Free from dust or particles
- Certified free from metals, like cadmium
- Matched with the pipettor tip cone for secure sealing and easy tip ejection
- Highly resistant to chemicals
- Highly thermally resistant
- Autoclavable
- Packed in easy-to-use, fully recyclable and environmentally friendly (ISO 14001) packages
- CE/IVD marked and covered by ISO 13485
- Subject to tight quality control
- Traceable: Mold cavity identification markings in each tip and lot numbered tip packages

Clean room quality manufacturing

The manufacturing process and the environment in which the pipettor tips are molded and packaged are potential sources of contamination. If tips are manufactured in an open environment, they may not be contaminant free. As the tip is an integral component of the pipetting system, its shape, fit, material properties and especially manufacturing processes, have a considerable influence on the pipetting accuracy, purity and the pipetting results.

The certified Biohit pipettor tips have been carefully manufactured in a protected environment in Finland. To avoid contamination from human contact, Biohit has automated the whole manufacturing process. All Biohit tips are fully traceable from inspection of raw materials to monitoring the final product and testing each lot for contaminants after production.



The automatic camera checks each 10 µl Biohit pipettor tip thus ensuring the quality control of every individual tip.

Biohit's tip production consists of experienced personnel, high capacity injection molding technology and premium grade pure polypropylene (PP). Equally important are automated, clean production conditions, from the raw material to the final product. To minimize contamination, special particle filtration (HEPA) and positive pressure are applied to keep contaminants out of the manufacturing area. The pure polypropylene plastic material is automatically fed from silos through vacuum loaders to molding machines. The molding machines are located in closed environments with robots automatically loading the tips onto the tip trays and moving the loaded trays to packaging. All machines and robots are constantly monitored by dedicated software.

All Biohit tip trays are individually and automatically wrapped in air-tight plastic to rule out any danger of contamination. Personnel in production and packaging are highly experienced, trained and equipped with the appropriate, specially designed protective clothing, masks, hair nets and gloves to diminish the contamination risks.

Automated tip manufacturing process from handling of raw material to packaging and storage.

Made in Finland

BIOHIT
Innovating for Health

Single Tray


Refill Pack


Refill Tower

Bulk Tips

Biohit Standard Tips

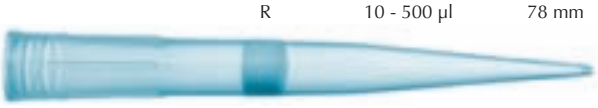
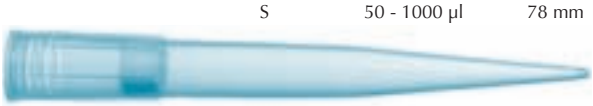
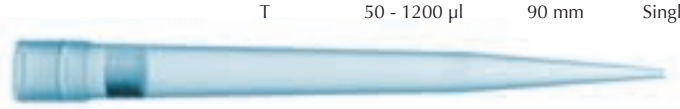
Tip	Tip ID	Volume Range	Length	Packaging	Type	Qty/Unit	Cat. No.
	A	0.1 - 10 µl	31.5 mm	Single Tray Single Tray Refill Tower Bulk in Box	Non Sterile Pre-Sterilized Non Sterile Non Sterile	10 x 96 Tips 10 x 96 Tips 10 x 96 Tips 1000 Tips	790010 790011 790012 781349
	C	0.5 - 300 µl	51 mm	Single Tray Single Tray Refill Tower Bulk in Box	Non Sterile Pre-Sterilized Non Sterile Non Sterile	10 x 96 Tips 10 x 96 Tips 10 x 96 Tips 1000 Tips	790300 790301 790302 780011
New design 	D	5 - 350 µl	54 mm	Single Tray Single Tray Refill Tower Bulk in Box	Non Sterile Pre-Sterilized Non Sterile Non Sterile	10 x 96 Tips 10 x 96 Tips 10 x 96 Tips 1000 Tips	790350 790351 790352 780033
New Refill Pack 	E	10 - 1000 µl	71.5 mm	Single Tray Single Tray Refill Pack Bulk in Box Bulk in Box	Non Sterile Pre-Sterilized Non Sterile Non Sterile Non Sterile	10 x 96 Tips 10 x 96 Tips 10 x 96 Tips 400 Tips 1000 Tips	791000 791001 791002 780021 780016
Wide Bore Tip 	G	10 - 1000 µl	68.5 mm	Single Tray Single Tray Bulk in Box	Non Sterile Pre-Sterilized Non Sterile	10 x 96 Tips 10 x 96 Tips 1000 Tips	791020 791021 780053
New Refill Pack 	H	50 - 1200 µl	71.5 mm	Single Tray Single Tray Refill Pack Bulk in Box	Non Sterile Pre-Sterilized Non Sterile Non Sterile	10 x 96 Tips 10 x 96 Tips 10 x 96 Tips 1000 Tips	791200 791201 791202 780043
Extra Long Tip 	Z	50 - 1200 µl	90 mm	Single Tray Single Tray	Non Sterile Pre-Sterilized	10 x 96 Tips 10 x 96 Tips	791210 791211
	J	100 - 5000 µl	150 mm	Single Tray Single Tray Bulk in Box Bulk in Carton	Non Sterile Pre-Sterilized Non Sterile Non Sterile	50 Tips 50 Tips 100 Tips 1000 Tips	780304 780305 780300 780308
	K	0.5 - 10 ml	242 mm	Bulk in Box	Non Sterile	100 Tips	780310

In addition to the selection above, **Gel Loading Tips** are available for the volume range of 0.5-200ul. For the non-sterile gel loading tip, reference Category No. **161120** and for the pre-sterilized gel loading tip, reference Category No. **161130**. For additional information regarding gel loading tips, please contact pipet@biohit.com or visit www.biohit.com.

Empty Tip Boxes for Refill System (tips and trays are not included)

Item	Tip ID	Tip Type (Standard Tips)	Qty/Unit	Cat. No.
Empty Tip Box for Refill System	A, C, D	10, 300, 350 µl	10	790910
Empty Tip Box for Refill System	E, H	1000, 1200 µl	10	790920

Biohit Filter Tips

Tip	Tip ID	Volume Range	Length	Packaging	Type	Qty/Unit	Cat. No.
	L	0.1 - 10 µl	32 mm	Single Tray	Pre-Sterilized	10 x 96 Tips	783200
Extended length 	M	0.1 - 10 µl	46 mm	Single Tray	Pre-Sterilized	10 x 96 Tips	783201
	N	0.5 - 20 µl	51 mm	Single Tray	Pre-Sterilized	10 x 96 Tips	783209
	O	2 - 100 µl	51 mm	Single Tray	Pre-Sterilized	10 x 96 Tips	783203
	V	2 - 120 µl	51 mm	Single Tray	Pre-Sterilized	10 x 96 Tips	783221
	P	5 - 200 µl	51 mm	Single Tray	Pre-Sterilized	10 x 96 Tips	783205
	Q	5 - 300 µl	52.5 mm	Single Tray	Pre-Sterilized	10 x 96 Tips	783207
	R	10 - 500 µl	78 mm	Single Tray	Pre-Sterilized	10 x 100 Tips	783206
	S	50 - 1000 µl	78 mm	Single Tray	Pre-Sterilized	10 x 100 Tips	783208
	T	50 - 1200 µl	90 mm	Single Tray	Pre-Sterilized	10 x 96 Tips	783222

New design

For your guidance the tips are illustrated at actual size. In addition to the selection above, a **Gel Loading Filter Tip** is available for the volume range of 0.5-100ul. For the pre-sterilized gel loading tip, reference Category No. **161131**. For additional information regarding gel loading tips, please contact pipet@biohit.com or visit www.biohit.com.

BIOHIT
Innovating for Health

Mechanical Pipettors

	Cat. #	µl	Standard Tips: A*	C	D	E	J	U	Filter Tips: L	M	N	O	V	P	Q	R	S	Special Tips: G
			10	300	350	1000	5000		10	10 Ext.	20	100	120	200	300	500	1000	1000 WB
mLINE	725010	0.1-3	●						●	●								
Single Channel	725020	0.5-10	●						●	●								
	725030	2-20		●							●							
	725050	10-100		●	●							●	●					
	725060	20-200		●	●									●	●			
	725070	100-1000				●											●	●
	725080	500-5000					●											
	725090	1-10 ml						●										
8-Channel	725120	0.5-10	●						●	●								
	725130	5-100		●	●							●	●					
	725140	30-300			●										●			
12-Channel	725220	0.5-10	●						●	●								
	725230	5-100		●	●							●	●					
	725240	30-300			●										●			
Proline Plus	728010	0.1-3	●						●	●								
Adjustable Volume	728020	0.5-10	●						●	●								
Single Channel	728030	2-20		●							●							
	728050	10-100		●	●							●	●					
	728060	20-200		●	●									●	●			
	728070	100-1000				●											●	●
	728080	500-5000					●											
	728090	1-10 ml					●	●										
	728590	10 ml						●										
8-Channel	728120	0.5-10	●						●	●								
	728130	10-100		●	●							●	●					
	728140	30-300			●										●			
12-Channel	728220	0.5-10	●						●	●								
	728230	10-100		●	●							●	●					
	728240	30-300			●										●			
Proline Plus	728515	5	●						●	●								
Fixed Volume	728520	10	●						●	●								
Single Channel	728530	20		●							●							
	728535	25		●								●	●					
	728545	50		●								●	●					
	728550	100		●	●							●	●					
	728560	200		●	●									●	●			
	728565	250				●										●	●	●
	728567	500				●										●	●	●
	728570	1000				●											●	●
	728575	2000					●											
	728580	5000					●											
	728590	10 ml						●										
Proline	720005	0.1-2.5	●						●	●								
Adjustable Volume	720000	0.5-10	●	●					●	●	●							
Single Channel	720080	2-20		●							●	●						
	720020	5-50		●	●							●						
	720050	10-100		●	●							●	●	●	●			
	720070	20-200		●	●									●	●			
	720060	100-1000				●											●	●
	720110	1000-5000					●											
8-Channel	720210	0.5-10	●						●	●								
	720220	5-50		●	●							●	●	●	●			
	720240	50-300			●										●			
12-Channel	720310	0.5-10	●						●	●								
	720320	5-50		●	●							●	●	●	●			
	720340	50-300			●										●			
Proline	722001	5	●	●					●	●	●							
Fixed Volume	722004	10	●	●					●	●	●							
Single Channel	722010	20		●	●						●	●						
	722015	25		●	●							●						
	722020	50		●	●							●						
	722025	100		●	●							●	●	●	●			
	722030	200		●	●									●	●			
	722035	250				●										●	●	●
	722040	500				●										●	●	●
	722045	1000				●											●	●
	722050	2000					●											
	722055	5000					●											

* Extended inaccuracy and imprecision of the pipettes with pre-sterilized A tips.

Biohit Pipettor-Tip Compatibility Chart

Electronic Pipettors

	Cat. No.	µl	Biohit Standard Tips: A*	C	D	E	H	J	K	Filter Tips: L	M	N	O	V	P	Q	R	S	T	Special Tips: G	Z	X	Y
eLINE	730022	0.2-10	●							●	●												
Single Channel	730042	5-120		●	●									●									
	730062	10-300			●											●							
	730082	50-1000				●												●		●			
	730102	100-5000						●															
8-Channel	730322	0.2-10	●							●	●												
	730342	5-120		●	●									●									
	730362	10-300			●											●							
	730392	50-1200					●												●		●		
12-Channel	730422	0.2-10	●							●	●												
	730442	5-120		●	●									●									
	730462	10-300			●											●							
	730492	50-1200					●												●		●		
Proline	710520	0.2-10	●							●	●												
Single Channel	710010	5-100		●									●	●									
	710030	10-250		●	●											●							
	710100	10-500				●											●				●		
	710020	50-1000				●												●		●			
	710040	50-1200					●												●		●		
	710500	100-5000						●															
4-Channel	710410	5-100		●	●								●	●	●	●							
	710420	25-250			●											●							
8-Channel	710200	0.2-10	●							●	●												
	710210	5-100		●	●								●	●	●	●							
	710220	25-250			●											●							
	710800	50-1200					●												●		●		
12-Channel	710300	0.2-10	●							●	●												
	710310	5-100		●	●								●	●	●	●							
	710320	25-250			●											●							
	710810	50-1200					●												●		●		
ePET	710522ET	0.2-10	●							●	●												
Single Channel	710012ET	5-100		●									●	●									
	710022ET	50-1000				●												●		●			
	710042ET	50-1200					●												●		●		
	710502ET	100-5000						●															
8-Channel	710202ET	0.2-10	●							●	●												
	710212ET	5-100		●	●								●	●	●	●							
	710222ET	25-250			●											●							
	710802ET	50-1200					●												●		●		
12-Channel	710302ET	0.2-10	●							●	●												
	710312ET	5-100		●	●								●	●	●	●							
	710322ET	25-250			●											●							
	710812ET	50-1200					●												●		●		
ViscoPet	710830	50-1200																				●	●
Proline XL	710902	0.1-25 ml						●	●														
Midi Plus	710932	1-100 ml						●	●														

* Extended inaccuracy and imprecision of the pipettes with pre-sterilized A tips.

BIOHIT
Innovating for Health

A unique innovation – preventing contamination

Meet the Safe-Cone Filters – a unique safety innovation introduced by Biohit. They offer an added advantage in preventing contamination of both the pipettor and the sample, thus prolonging the service life of the pipettor. Biohit Safe-Cone Filters act as an alternative barrier to provide added protection because the filter prevents liquids from entering the internal mechanism of the pipettor. Other safety improving products are the Biohit Proline Biocontrol Decontamination solution and pipettor stands. Cleanliness is safety, as we say in Biohit.

Biohit Safe-Cone Filters – an alternative to filter tips

Biohit Safe-Cone Filters

These unique and replaceable filters act as a final barrier to prevent any fluids and liquid vapors from reaching the internal components of the pipettor.

The ultimate pipettor protectors are available as Safe-Cone Standard and Safe-Cone Plus. It is recommended to use the Standard filter for general applications and the Plus filter for more demanding applications such as radioactive work, cell culture, bacterial and virological work and molecular biology. Standard filters can also be used for this type of work, but they need to be changed more frequently.

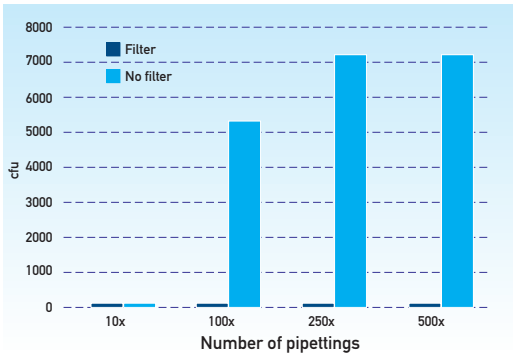
For more info, see literature on www.biohit.com and page 79.

The interval of changing the filter depends completely on the application and the sample. However, according to studies the filter is recommended to be changed daily (after 50 to 250 pipettings) and immediately in case of over-aspiration.

To ensure the safety of the user, forceps should be used to avoid touching the contaminated filters by hand. In addition, the tip cone should be cleaned regularly.

No. of Pipettings	No Filter	Safe-Cone Filter
50	-	-
100	+	-
250	++	-
500	+++	-

+: DNA (50 µl plasmid DNA 120 µg/ml) contamination in pipettor barrel.



Pipettor contamination in pipettor barrel when pipetting liquid culture of bacteria *Micrococcus Luteus*.

Uniquely Biohit!

Safe-Cone Filters Biohit pipettor compatibility and ordering details

Cat. No.	Description	Qty/Unit	mLINE	Proline Mechanical	eLINE	Proline Electronic	ePET	ViscoPet
721008	Standard ø 2.51 mm PE	50 Filters	725130, 725230, 725050	720080, 720020, 722010, 722015, 722020	730340, 730440, 730040			710830
721007	Standard ø 3.15 mm PE	50 Filters	725060, 725140, 725240	720050, 720070, 722025, 722030	730060, 730360, 730460			
721006	Standard ø 5.33 mm PE	50 Filters	725070	720060, 722035, 722040, 722045	730080, 730100, 730390, 730490	710100, 710020, 710040, 710500, 710800, 710810	710022ET, 710042ET, 710502ET, 710802ET, 710812ET	
721005	Standard ø 6.73 mm PE	50 Filters	725080	720110, 722050, 722055				
721014	Standard ø 1.83 mm PP	50 Filters	725030	720120, 720130, 720220, 720240, 720320, 720340		710410, 710420, 710210, 710220, 710310, 710320	710212ET, 710222ET, 710312ET, 710322ET	
721018	Plus ø 2.51 mm PE	50 Filters	725130, 725230, 725050	720080, 720020, 722010, 722015, 722020	730340, 730440, 730040			710830
721017	Plus ø 3.15 mm PE	50 Filters	725060, 725140, 725240	720050, 720070, 722025, 722030	730060, 730360, 730460			
721016	Plus ø 5.33 mm PE	50 Filters	725070	720060, 722035, 722040, 722045	730080, 730100, 730390, 730490	710100, 710020, 710040, 710500, 710800, 710810	710022ET, 710042ET, 710502ET, 710802ET, 710812ET	
721015	Plus ø 6.73 mm PE	50 Filters	725080	720110, 722050, 722055				

PP=polypropylene
PE=polyethylene

Pipettor Stands

When the pipettor is not in use, it should be stored in an upright position in order to avoid contamination from dirty benches. Biohit offers stands for all of its pipettors.

The stylish Biohit Linear Stand is designed for all Biohit mechanical and electronic pipettors, and especially for mLINE, Proline mechanical and ePET electronic pipettors. The stand is also compatible with a wide range of other manufacturers' pipettors.

The compact Carousel stands are available in different models, both for storage only and for charging.

Cat. No.	Item
725600	mLINE Carousel Stand for 6 pipettors
725610	mLINE Pipettor Holder for one pipettor
721000	Proline Carousel Stand for 5 mechanical pipettors
725620	Linear Stand for all Biohit pipettor models

Cat. No.	Item
730982	eLINE Charging Stand for one pipettor
730992	eLINE Charging Carousel for 4 pipettors
510002	Proline Charging Stand for one pipettor
511602	Proline Charging Carousel for 4 pipettors
710990	ePET Carousel for 5 pipettors
710999	ePET Stand for one pipettor

Reagent Vessel

- Manufactured from FDA Grade white polystyrene, which facilitates the viewing of fluid levels.
- Extra-wide base helps promote stability and eliminates the chance of accidental spillage.
- Reinforced sidewall construction makes handling easy and prevents the reservoir from collapsing when full.
- Pouring spouts on all four corners facilitates emptying fluids when pipetting is completed.
- Reservoirs are graduated to make filling and checking fluid levels accurate and easy
- Unique "nesting design" allows easy separation of bulk pack reservoirs.
- Sterile supplied reservoirs are certified Rnase, Dnase and Pyrogen Free.

Biohit Part #	Description	Qty	Capacity
7725100	Sterile & Certified	100/case	25 ml
7725200	Sterile & Certified	200/case	25 ml
7725100NS	Non-Sterile, Bulk	100/case	25 ml
7750100	Sterile & Certified	100/case	50ml
7750200	Sterile & Certified	200/case	50ml
7750100NS	Non-Sterile, Bulk	100/case	50ml
77100100	Sterile & Certified	100/case	100 ml
77100200	Sterile & Certified	200/case	100 ml
77100100NS	Non-Sterile, Bulk	100/case	100 ml

The autoclavable and durable reagent vessel is made from polypropylene and is chemically resistant to all common reagents.

Cat. No.	Qty/Unit	Capacity
783500	16	120 ml

BIOHIT
Innovating for Health

Leading edge after-sales services by Biohit

Beside pipetting, laboratories must also pay attention to the quality and performance of the tools and equipment that are used in everyday work. To ensure the continuous accuracy and precision of your liquid handling instruments we offer a wide range of high quality services, such as quality control, repair services, preventative maintenance and calibration services. And, when doing it regularly, you'll keep your pipettor in good operating condition and also help extend its life-time.

Global Network of Authorized Service Centers and Pipette MD

We provide preventative maintenance, repair, calibration and accredited calibration services through our global subsidiary and distributor network:

Technically trained service providers

Biohit service providers have been carefully trained to maintain and calibrate liquid handling devices manufactured by Biohit.

Biohit Authorized Service Centers

Biohit Authorized Service Centers (BASC) are highly qualified for technical service and calibration. These service centers are authorized and trained by Biohit to offer you the highest quality of service. They have also been tested and approved to provide traceable calibration results. The Biohit Authorized Service Centers maintain standard operating procedure for technical service and calibration. Test equipment has been set up in accordance with ISO 8655 and the personnel have been carefully trained.

Please visit **www.us.biohit.com** for your nearest Biohit Authorized Service Center.

Biohit Authorized Service Center

Through Biohit After-Sales Services you can expect:

- High quality maintenance, repair and calibration services for all Biohit pipettors
- Good operating condition and extended life-time of the pipettors thanks to scheduled preventative maintenance programs and calibration services
- Cost savings with full spare part service with original spare parts for Biohit pipettors
- Time savings through convenient and cost-efficient service contracts and fast turnaround times
- Detailed documentation on services performed

Biohit Pipette MD Service

Biohit Pipette MD Service Centers have expertise to service and calibrate pipettes of *all makes, all models, and all volumes from 0.1 ul to 100 ml.*

Pipette MD is the ultimate level of pipettor service within Biohit's after-sales services and in the world. Pipette MD includes a group of highly-trained professionals with deep technical knowledge and competence to service and calibrate more than 800 different models of pipettors. Pipette MD is practical for servicing all brands of pipettors.

Advantages are as follows:

- Professional one-stop pipettor service for all makes and models
- On-site/In-lab services for your convenience
- Easy, simple and effortless service
- Cost savings through a single service contract for all makes and models
- Please visit **www.pipettemd.com** for on-site servicing locations or in-house repair and calibration service information.

Pipette MD Preventative Maintenance and Repair Services

Liquid handling devices, such as pipettors, are precision instruments, that comprise a great variety of mechanical and electronic parts. These parts are naturally subject to wear and damage over time, for example:

- The piston surface can deteriorate, wear or corrode over time.
- Tip cones are subject to chemical corrosion and wear, especially in the tip sealing area.
- Batteries of electronic pipettors do not last forever and must be replaced regularly.

All these problems can be overcome by carrying out regular maintenance and calibration programs to ensure the functionality and performance (inaccuracy and imprecision) of the pipettor. According to extensive experience and research by Pipette MD, failure rates can be significantly reduced if a regular and scheduled preventative maintenance program is carried out on the pipettors. In addition, the pipettor life-time can easily be extended through regular service and replacement of critical components.

Pipette MD offers scheduled Preventative Maintenance Programs for service and calibration.

Pipette MD Preventative Maintenance Program

Procedure	Benefits	Suitable for
• Cleaning of the pipettor • Cleaning of the lower parts (ejector collars, piston, seal/o-ring, tip cone) • Replacement of the critical parts • Re-greasing of the piston, seal or o-ring where applicable • Pressure leakage test • Calibration and performance testing according to the customer's requirements	• Detailed service documentation: service report and calibration report • Improved pipettor reliability • Constant pipettor performance level (inaccuracy and imprecision) • Fewer failures due to unexpected malfunctions of the pipettor • Decreased pipettor downtime as a result of preventative maintenance programs • Longer lasting pipettors • Lower number of pipettors that fail "as found" testing • Less waste of time and money on exception reports	• Laboratories that have a strict quality system such as ISO 9001, ISO 17025, GLP or any other quality system imposed by local legislation, international standards or product/ service type. • Laboratories that need to prove quality of their services or products to their customers. • Laboratories following ISO 17025, - i.e. accredited laboratories • Laboratories that are working with accredited laboratories but which are not necessarily accredited themselves

Biohit Maintenance by End-User & Full Spare Part Service

Procedure	Benefits	Suitable for
• Product and technical service training is provided to customers who want to service and test their own Biohit pipettes in-house. • Biohit provides preventative maintenance packages that include the most frequently used components for pipettor service. • Your nearest Biohit distributor or Biohit Authorized Service Center also provides the full range of original Biohit spare parts ensuring fast delivery. All spare parts are described and listed in instruction manuals and dedicated Technical Service Manuals.	• Comprehensive knowledge for service of Biohit brand pipettors • Original Biohit spare parts • Cost-effective • Easy with preventative maintenance packages	• Customers who want to service and calibrate Biohit pipettors in-house: schools and universities, hospitals with technical maintenance departments etc. • Customers who do not require traceable calibration of international measurement standards

Pipette MD Repair Service

Procedure	Benefits	Suitable for
• Troubleshooting of the problem • Disassembling the pipettor: all parts are inspected for damage and wear • Components are cleaned or replaced, whenever necessary • Re-greasing of the piston and/or o-ring • Pressure leakage test • Calibration and performance testing according to the customer's requirements	• Detailed service documentation: service repair report and calibration report • Fully repaired and functional pipettor • Original or generic spare parts	• Any customers that have pipettors with damaged components or improper function and that need repair and calibration by qualified specialists

For more information about Preventative Maintenance, Repair and Calibration services, please contact your local Biohit representative or go to www.pipettemd.com.

Note: To ensure your repair or to follow up, request a decontamination form by emailing info@pipettemd.com

Calibration Services

The principles of Good Laboratory Practice (GLP) state that laboratory equipment should be periodically inspected, cleaned, maintained, and calibrated according to Standard Operating Procedures (SOP). Records of these activities should be maintained. Calibration should, where appropriate, be traceable to national or international standards of measurement.

Biohit is one of the few accredited pipettor calibration laboratories in the world today. To help you fulfill the GLP or quality system requirements such as ISO 9001 and ISO 17025 we offer you:

The frequency of the testing and calibration depends on

- Accuracy requirements of the application
- Frequency of use
- Number of operators using the pipettor
- Nature of the liquid dispensed
- Specifications established by the user
- Requirements from GLP or quality systems

Service Level Description

Service Level – A (GLP/GMP, FDA, ISO, NCCLS, CAP and CLIA compliant service)
Performance evaluation is conducted at three test points (10, 50, & 100%) utilizing a 6-6-6 measurement structure. This service includes Preventative Maintenance as well as both "As Found" and "After Service" data. All services are traceable to NIST and include an ISO compliant calibration report and label. Note: Multi-channels are tested at first, last & center channels only – Visual linearity check
Service Level - A+
Same as Service Level A; with 3 test points but with a 10-10-10 measurement structure and the addition of all channels being tested for multi-channel instruments. Note: Note- Multi-channels are tested at ALL channels
Service Level - B
Performance evaluation is conducted at three test points (10, 50 & 100%) utilizing a 4-4-4 measurement structure. This service includes Preventative Maintenance as well as both "As Found" and "After Service" data. All services are traceable to NIST and include an ISO compliant calibration report and label. Note: Multi-channels are tested at first, last & center channels only – Visual linearity check
Service Level - B+
Same as Service Level B; with the addition of ALL channels being tested for multi-channel instruments. Note: Multi-channels are tested at ALL channels
Service Level - C
Performance evaluation is conducted at three test points (10, 50 & 100%) utilizing a 4-4-4 measurement structure. This service includes Preventative Maintenance as well as "As Found" or "After Service" data only. All services are traceable to NIST and include an ISO compliant calibration report and label. Note: Multi-channels are tested at first, last & center channels only – Visual linearity check
Service Level - C+
Same as Service Level C; with the addition of ALL channels being tested for multi-channel instruments. Note: Multi-channels are tested at ALL channels
Service Level - D (Verification Service)
Performance evaluation is conducted at two test points (10 & 100%) utilizing a 3-3 measurement structure. This service includes Preventative Maintenance as well as "After Service" data only. All services are traceable to NIST and include a calibration report and label. Note: Multi-channels are tested at center channel only –Visual linearity check

Please note: Test volumes 100%, 50% and 10% of the nominal volume are defined by ISO 8655:2002 standard and thus these volumes are also recommended by Pipette MD.

Service Level Quick Reference Guide

SERVICE LEVEL	GLP/GMP compliant	ALL channels are tested for multis	10 readings taken per test point	6 readings taken per test point	4 readings taken per test point	3 readings taken per test point	Both "As Found" & "After Serviced" tests performed	Either "As Found" OR "After Serviced" test performed	Tested at 3 volume points	Tested at 2 volume points	Preventative Maintenance Performed	Visual linearity check performed for multis	Multi-channels tested at first, center & last channels	NIST traceable calibration report and label
A	●	●		●			●		●		●	●	●	●
A+	●	●	●				●		●		●			●
B					●		●		●		●	●	●	●
B+		●			●		●		●		●	●		●
C					●			●	●		●	●	●	●
C+		●			●			●	●		●	●		●
D						●		●		●	●	●		●

Additional Services

Multi-channel Tip Cone Cleaning

Disassembling of lower parts. Cleaning of pistons, tip cones, seals/o-rings, and housing. Re-greasing of piston along with a visual inspection for parts functionality.

Repairs

Repairs can be performed on most popular makes/models with the choice of both genuine and generic spare parts.

Note: Only genuine spare parts are used when repairing Biohit pipettes.

Level	Description	Part Number
	Services	
Level A	Single Channel	089-SLVA-01
Level A	Multi Channel	089-SLVA-02
Level A+	Single Channel	089-SLVA-03
Level A+	Multi Channel	089-SLVA-04
Level B	Single Channel	089-SLVB-01
Level B	Multi Channel	089-SLVB-02
Level B+	Multi Channel	089-SLVB-03
Level C	Single Channel	089-SLVC-01
Level C	Multi Channel	089-SLVC-02
Level C+	Multi Channel	089-SLVC-03
Level D	Single Channel	089-SLVD-01
Level D	Multi Channel	089-SLVD-02
	MCP Tip Cone Cleaning	089-MCTC-01

The accredited calibration laboratory of Biohit Oyj

- Assessed against the international ISO 17025 standard
- Accredited by FINAS since year 2000
- FINAS registration number K041/A04/2003
- Still one of the few internationally accredited pipettor calibration laboratories in the world (FINAS, COFRAC and UKAS)

FINAS – the Finnish Accreditation Service

- Operates under the Center for Metrology and Accreditation
- National accreditation body under the Ministry of Trade and Industry
- Meets the requirements stated by GLP
- Member of the European Cooperation for Accreditation (EA) and one of the signatories of all existing European Multilateral Agreements (MLAs)

Terms & Definitions

PREVENTATIVE MAINTENANCE

Preventative maintenance means renewing or replacing critical parts of a device on a regular basis to prevent malfunctions. In other words, preventative maintenance is about maintaining equipment in good operating condition. There is no point in waiting for the pipettor to fail.

PERFORMANCE TESTING

It is important to understand the difference between calibration and performance testing. Performance testing is often thought to be calibration, which is not the case. Performance testing is the verification procedure for the pipettor using a gravimetric, photometric or other test method. Performance test is carried out to check that the calibration of the pipettor is correct. In other words, the balance reading converted into volume should be in accordance with the selected volume in the display. If the results are incorrect, the pipettor will be calibrated and tested again.

CALIBRATION

According to ISO 8655-1(2002), "calibration is a set of operations that establish the relationship between the dispensed volume and the corresponding nominal or selected volume of the pipettor." In other words, calibration is the adjustment of the pipettor to give the selected volume. In practice, the length of the piston movement is adjusted so that the balance reading is in accordance with the selected volume on the display. Every pipetting operation is only as accurate as the calibration of the pipettor used.

ACCREDITED CALIBRATION

The difference between traditional calibration and accredited calibration is that an accredited calibration service can differentiate between uncertainties of the pipettor and uncertainties of the measuring process. As a result, an accredited calibration service is technically competent to release a calibration certificate where the uncertainties for the measurement involved are listed. Thereby, the customer knows exactly what uncertainty is due to the performance of the pipettor and what is due, for example, to the uncertainty of the balance used. Accredited calibration means that a customer can have full confidence in the technical competence of the body that carries out the calibration according to international standards.

ISO 17025 AND ISO 9001

ISO 9001 is a documentation of an organization's quality management system and, as such, tells very little about its competence to provide accurate and reliable test data. Nowadays, ISO 9001 is a must. However, if quality management is to be measured to determine the technical competence for the performance of testing and calibration, laboratory accreditation is also required. Calibration and testing laboratories, certification bodies and inspection bodies are accredited. The technical competence of these notified bodies is assessed against the European EN 45000 and international ISO 17000 Standards and respective ISO/IEC Guides. ISO 17025 is defined as "General Requirements for the Competence of Testing and Calibration Laboratories."

ISO 8655

ISO 8655 is a new international standard for "piston operated volumetric apparatus". ISO 8655 defines, among other things, terms and definitions regarding piston operated pipettors and their testing, requirements for test equipment and test conditions, testing procedure and maximum permissible systematic and random errors for pipettors (inaccuracy and imprecision). Biohit follows ISO 8655 and takes its requirements into account in its research and development, production, quality assurance and after sales service.

GOOD LABORATORY PRACTICE, GLP

The Good Laboratory Practice (GLP) principles were created by OECD (www.oecd.org) to internationally harmonize test methods and laboratory practices. Today "GLP compliance" is one of the key indicators of high quality laboratory services. According to the GLP, "Apparatus used in a study should be periodically inspected, cleaned, maintained, and calibrated according to Standard Operating Procedures (SOP). Records of these activities should be maintained. Calibration should, where appropriate, be traceable to national or international standards of measurement."

For more information, see **www.us.biohit.com**.


Innovating for Health

BIOHIT
Innovating for Health

"Biohit mLINE had the lightest weight of the pipettes of similar volume, was one of the shortest in length, fit both the small and large hand the best, was the easiest to read, was the easiest to adjust the volume, and for the volume we looked at had the lowest force requirements for both plunger depression and tip ejection"

Joan Erickson, MOTR/L
Ergonomics Consultant
in a comparison study

Uniquely Biohit!

To schedule an in-house pipette training or ergonomic seminar, see page 78.

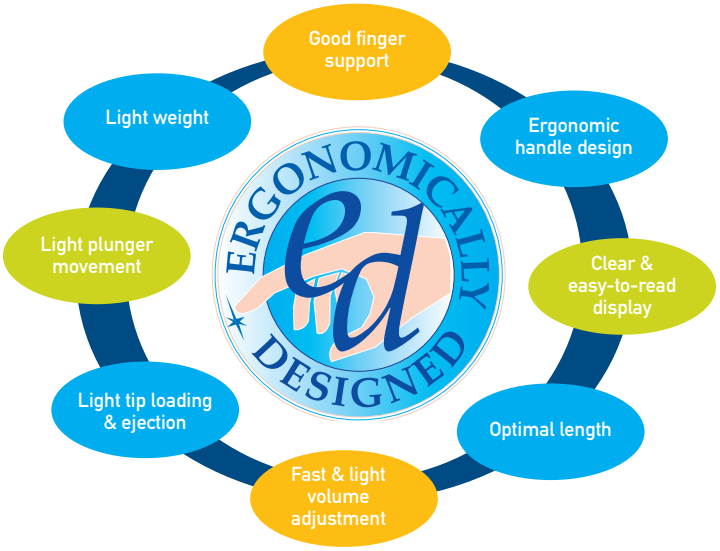
A pioneer in ergonomic design - Biohit

Working with pipettors is much more than just pressing the thumb. This is why ergonomics has been one of Biohit's main concerns in product development for over 15 years. Thanks to the company's research and development, Biohit is able to offer the most ergonomic and user-friendly liquid handling products available today.

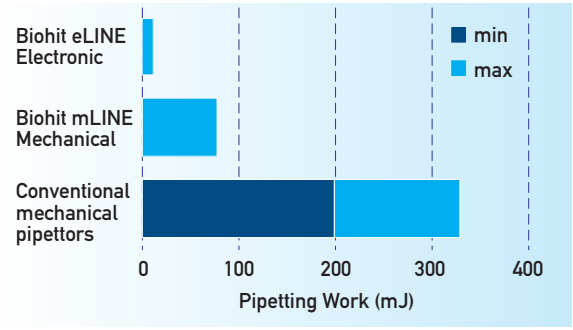
Did you know that...?

- Pipetting over 1.5 h/day (300 h/year) exposes user to RSI (Repetitive Strain Injury).
- Lab professionals have twice as much WRULD (Work Related Upper Limb Disorder) as employees in general.
- 44 % of lab professionals suffer from disorders caused by pipetting.
- Pressing the plunger button as well as ejecting tips with a conventional mechanical pipettor together require a force up to 70 N (7 kg), which corresponds to the force required to lift 2 house bricks or 7 liters of milk.

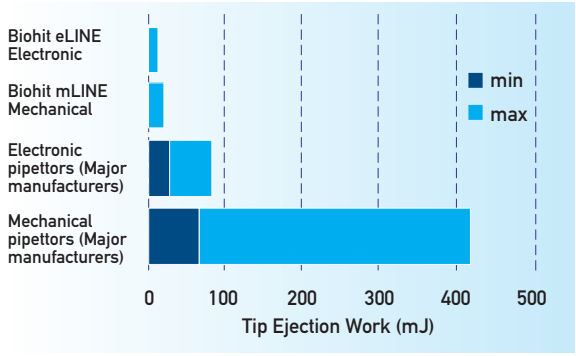
Follow the signs of the ergonomic pipettor



mLINE and eLINE offer the lightest and most ergonomic pipetting operations on the market.



Comparison of pipetting work with electronic and mechanical pipettors



Both the tip ejection force and the distance thumb has to travel to eject the tips have been measured.

mLINE®

Mechanical Pipettors

– effortless accuracy

- Light weight for easy liquid handling
- The lightest pipetting force on the market
- Tip loading and ejection require only minimum force (Optiload)
- Both left and right handed operation
- Consistent results time after time

For easy and ergonomic manual pipetting, your first choice should be mLINE – as recommended by Health & Safety Officers of leading pharmaceutical companies.

Pay attention to:

- Weight and design of the pipettor
- Your seating position
- Rest intervals
- Bench layout & lighting
- Number of repeated pipetting series

eLINE®

Electronic Pipettors

– leader in performance & ergonomics

- Fully electronic pipetting operations
- Multi-function device – a lot more pipetting modes than in a mechanical pipettor
- Less stages means time-savings especially in multi-dispensing (twice as fast as a mechanical pipettor)
- 30 times lighter pipetting than with a mechanical pipettor
- Unique electronic one touch tip ejection
- Both left and right handed operation
- User independent accuracy and precision

When you need to pipette and dispense liquids as comfortably as possible, your first choice should be eLINE. This Award Winning pipettor enables you to focus on your work instead of worrying about Repetitive Strain Injury.

Safety in pipetting

Pipetting with air displacement pipettors is one of the most common laboratory tasks and includes a number of potential risks. The risks can be divided into three defined areas:

1. Physical risk through stress (ergonomics)
2. Situations where the user is at risk of contamination through handling of infectious or toxic agents
3. Situations where the sample or specimen is at risk through contamination from other samples or environmental factors.

Cleanliness is safety - protect your pipettor and your sample from contamination

The user is often well protected by appropriate working benches, seats, clothing and shields, but the pipettor is forgotten. Modern air displacement pipettors with disposable tips enable fast and accurate pipetting, but contamination of the pipettors may increase both the possibility of unreliable results and health risks in laboratory work.

Organic and inorganic contamination can create problems for the scientist. No matter whether the particles are viral, bacterial ribonucleic or metal elements, in the testing environment they may lead to erroneous results. It is the reduction in the numbers of these particles and avoidance of cross contamination or accidental addition to the sample or the equipment being used that needs attention.

Corrosion of the pipettor piston is another threat. The number of corroded pistons that are replaced at service centers every day, and pipettors with totally contaminated inner parts is surprisingly high (see Figures A & C).

Finally, to ensure the safety, the laboratory worker should also pay attention to the ergonomics at work (pipettor and environment), take care of the proper shielding and protection (gloves, clothes) and follow good laboratory practice by pipetting slowly and carefully to minimize aerosol formation and foaming.

Literature on www.biohit.com and page 79.

Biohit safety features include

- Ergonomic pipettor design for improved occupational health
- Accurate and precise results with the appropriate tools
- Cleanliness through Safe-Cone Filters, certified tips, autoclavable pipettors and decontamination tools
- Appropriate storage with a wide range of pipettors stands
- High-quality after-sales services & accredited calibration

Fig A. Biohit mLINE features a unique tip cone filter ejection mechanism.

Fig B. The tip cone filter can be changed easily and safely with the use of forceps supplied with every Biohit pipettor.

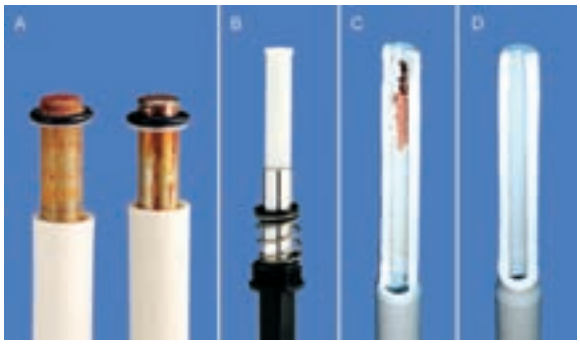


Fig A: Badly corroded and contaminated piston assemblies taken from a commonly used pipettor

Fig B: Biohit pipettor tip cone used with Biohit Safe-Cone Filter

Fig C: Tip cone taken from a commonly used brand of pipettor after over-aspiration of blood-sample

Fig D: Clean tip cone

Consistent results

One of the most common activities of laboratory workers is primary sample or reagent addition while performing a test. Some laboratory workers perform thousands of tests daily. There are a number of factors that influence the pipetting performance. For example, the quality of the products and tips, human error, pipetting techniques, and strain, as well as other factors, such as environment (temperature, air pressure, humidity), type of sample and type of application.

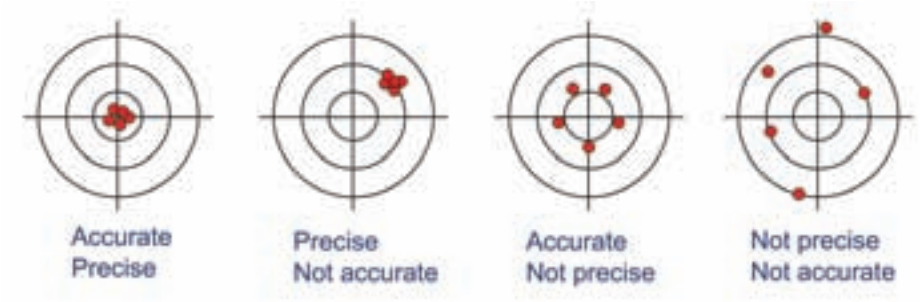
The most difficult demand for accurate and precise pipetting results is the consistent handling and continual depression of the plunger on pipettors.

Accuracy

It is possible to be very consistent, but consistently wrong. Inaccuracy is the numerical difference between the mean of a set of replicate measurements and the true value. High accuracy, i.e., small inaccuracy means very little difference between the mean sample and the true value. Accuracy is achieved by careful calibration of a precise instrument.

Precision

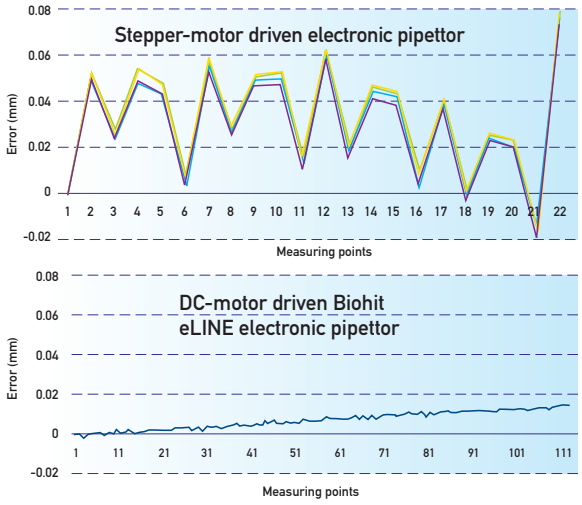
Precision is an agreement between replicate measurements. Precision has no numerical value, it is quantified by imprecision. High precision, i.e., small imprecision means very little variation between repeated measurements on the same sample. To achieve it a precision instrument is required, but also good laboratory practice must be followed.



Ten times more precise dispensing with Biohit electronic pipettors – unbeatable linearity

When comparing the stepper motor technology and the DC-motor technology for accuracy and precision, the dispensing (d) mode is the best choice.

The DC-motor driven Biohit eLINE and a stepper motor driven pipettor were tested for linearity in the d-mode. The measurement was done 5 times. The DC-motor driven Biohit electronic pipettor allows linear movement, - i.e. precise dispensing. The tested stepper motor pipettor generated a linear movement error, which is equal to over ± 1.5 µl. This even exceeds the minimum adjustable increment of the pipettors. In the d-mode, where even dosing is important, this kind of an error is significant.

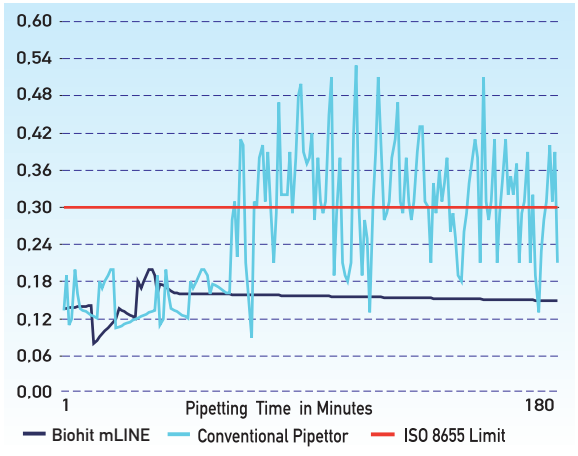


20 x 50 µl linearity measurement in d-mode.

Consistent results time after time with Biohit mechanical mLINE pipettors

Performance test of Biohit mLINE (violet line) and a conventional pipettor (blue line). Pipettors were tested over a 5-hour period with sets of 5 repeat weighings of 500 microliters 180 times. The same trained operator was used. As shown, it is very hard to meet the specifications (red line, ISO 8655-2) with a force demanding pipettor after prolonged pipetting hours, whereas the light action of mLINE allows the same reproducibility over the whole period.

Literature on www.biohit.com and page 79.



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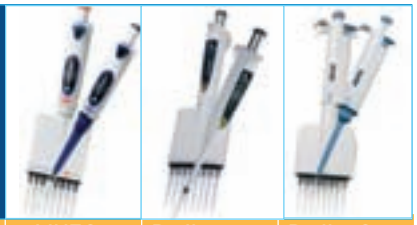
Choosing the right pipettor

Mechanical Pipettor Selection Guide



Functions	mLINE®	Proline Plus®	Proline®
Fully autoclavable	x	x	
Optiload	All models	Multi channels only	
Safe-Cone filters	x	x	x
Filter ejector	x		
Thermal insulation	x	x	
Volume locking	x	click stops	click stops
Pipetting force *2	12 N	15 N	20 N
Weight *2	77 g	82 g	84 g
Colour coding on display	x	x	
Colour coding caps	x		x*1
ID tags	x		
Biohit 6 place carousel stand	x	x	x
Proline 5 place carousel stand			x
Biohit Linear stand	x	x	x
Pipettor holder	x	x*1	x
Warranty	3 years	3 years	3 years
CE / IVD marked	x	x	x
Starter Kits available	x	x	

*1 Available as accessories
*2 1000 µl / 1- channel model

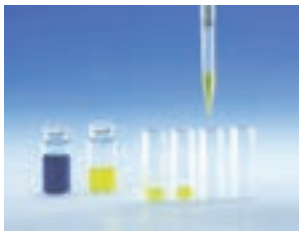
Electronic Pipettor Selection Guide

Functions	ePET®	Proline®	eLINE®
(P) Pipetting	x	x	x
(d) Multiple Dispensing	x	x	x
(dd) Diluting[1]	x	x	x
(rP) Reverse Pipetting		x	x
(Sd) Sequenced Dispensing[3]		x	x
(Pm) Manual Pipetting[4]			x
(Ad) Automated Dispensing			x
(SA) Multi-Aspirating[5]		x	x
Custom Programmability			x
Post Delivery Mixing	x	x	x
Speed Selection	5 speeds	5 speeds	9 speeds
Manual Tip Ejection	x	x	
Electronic Tip Ejection			x
Autoclavable lower part[6]			x
AC/DC Charging Adapter	Included		Optional
Charging Stand (Holds 1 pipettor)		x	x
Charging Carousel (Holds 4 pipettors)		x	x
Linear stand	x		x
Warranty	2 years	2 years	2 years
CE / IVD marked	x	x	x

Notes: * Except multichannel 1200 µl.
1 (dd) Available on all models exept the 1200 µl multichannel Proline,
2 (rP) Available on all models exept the 1200 and 5000 µl Proline el.,
3 (Sd) Only on the 1200 and 5000 µl Proline el. and all eLINEs,
4 (Pm) Available in 1-ch eLINE only,
5 (SA) Only on the 1200 µl Proline el. and all eLINEs.
6 Charging stand for Proline el. and eLINE.
7 mLINE, eLINE, Proline mech., Proline elec. multichannels and ePET multichannels: all models > 10 µl; Proline and ePET elec. 1-ch. models >250 µl.
8 For storage, not charging.

Pipetting modes for Biohit electronic pipettors

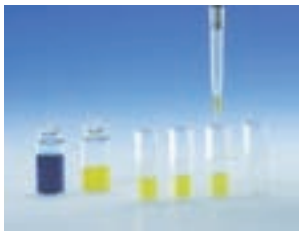
Pipetting (P)



Automatic blow-out

Pipette a selected volume with automatic blow-out with complete control of the piston movement. Post-delivery mixing may be used in conjunction with this mode.

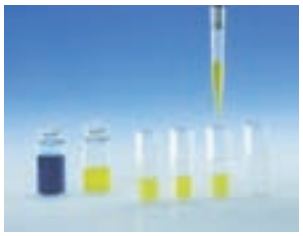
Reverse Pipetting (rP)



Optimizes performance when pipetting viscous or biological fluids

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

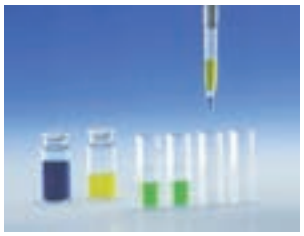
Multiple Dispensing (d)



Quickly dispenses equal volumes

Aspirate the total volume plus an excess and repetitively dispense equal volumes of liquid. The volume and number of remaining aliquots are shown on the display.

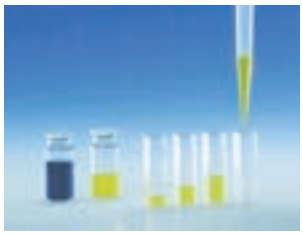
Diluting (dd)



Dilution ratios 1:2 to 1:50

Two different solutions separated by an air gap are aspirated and then dispensed together with automatic blow-out. This mode may be used also in conjunction with post-delivery mixing.

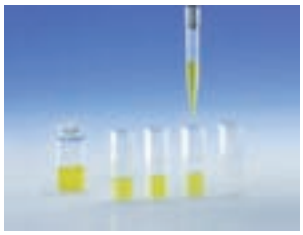
Sequential Dispensing (Sd)



Program up to 12 aliquot volumes per aspiration

A series of different volumes can be delivered in any desired order. An extremely beneficial feature when performing dilution series.

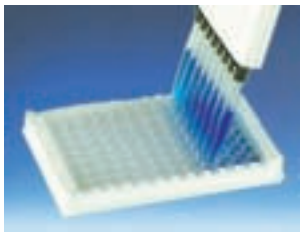
Automatic Dispensing (Ad)



Efficient automatic dispensing with user-defined pace control

This mode is similar to the multiple dispensing mode but has the additional benefit of the dispensing cycles being under automatic control at a user specified pace (0.1 – 9.9 seconds).

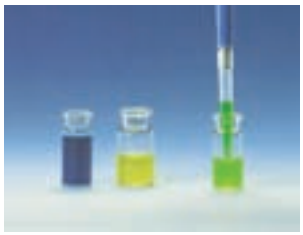
Multi-Aspirating (SA)



Manual method for washing microplate strips

Select the volume and the number of aspirations until the series is completed, then discard the full aspirated volume in a single step.

Post Delivery Mixing (* or + Mixing)



User controlled mixing time

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. The mixing function is available in the pipetting or diluting modes (P, dd).

Pipetting preparations

- Use the tip specified by the manufacturer.
- Ensure that the pipettor and tip have been tested according to ISO 8655 and the tip is seated correctly.
- Make sure pipettors have been correctly calibrated.
- Check the pipettor, tip and liquid are all at the same temperature.
- When pipetting liquids with temperatures different to the ambient temperature, do not pre-rinse the tip. Change the tip after each pipetting.
- Ensure that any fluid viscosity variations have been accounted for and the correct technique is employed, i.e. reverse pipetting.
- If handling infectious or radioactive agents make sure appropriate shielding and other precautions protect the operator.
- Use Safe-Cone Filter in the tip cone when possible.

Pipetting action

- Hold the pipettor in a vertical position. Tilting the pipettor at an angle causes a volume greater than the set volume of liquid to enter the tip.
- Pre-rinse of tip is always recommended.
- When aspirating fluid the pipettor tip should normally be immersed to a depth of 2-3 mm.
- When using a mechanical pipettor, operate piston with a smooth and consistent thumb action for repeated results without foaming or bubbles.
- It is recommended to pipette against the inside wall of the receiving vessel. Remove the tip by drawing it up against the inside wall.
- Ensure the pipettor blow out action is fully activated.
- Ensure the volume is still set at the required position. Pipettor with volume locking mechanism is recommended to avoid accidental volume change during pipetting.
- Avoid leaving the pipettor on its side with liquid in the tip, which might seep back into the mechanism.

Other cautions

- Rack the pipettor when not in use – see product pages for more information on pipettor stands. Electronic pipettors should be returned to their charging stands.
- Avoid dropping the pipettor or allowing contact with dirt or grease.
- Change the Safe-Cone Filter regularly (recommendation after 50 to 250 pipetting cycles) and always in case of over-aspiration.
- Never strike the tip cone against the tip tray when loading the tip as this can damage the pipettor.
- Avoid exposing the unit to extreme temperature changes, humidity and dust (operating temperature from 15°C to 40°C).
- Service the pipettor regularly.
- Clean the pipettor thoroughly before sending to service. Decontaminating the pipettor with Biohit Proline Biocontrol is a suitable procedure. Notify the service personnel for what purpose the instrument has been used. Postal services can refuse to deliver instruments used with hazardous materials. Make sure that a qualified person services the pipettor.

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Pipettor decontamination procedure

Mechanical pipettors (mLINE)

1. Unscrew the tip ejector collar counterclockwise and remove it.

2. Unscrew the tip cone holder counterclockwise and carefully remove it with the tip cone. Remove the Safe-Cone Filter if fitted.

3. Unscrew the piston counterclockwise from the pipettor.

4. Place the tip ejector collar, tip cone holder, tip cone and tip cone cylinder into a beaker containing Biohit Proline Biocontrol and leave for at least 30 minutes.

5. After performing the procedure described above, remove the components from the beaker and rinse them with distilled water, then dry preferably with warm air, for at least an hour.

6. Re-grease the piston as described in the instruction manual. Replace all components including new filter if fitted.

Electronic pipettors (eLINE)

1. Unscrew the tip ejector collar counterclockwise and remove it.

2. Unscrew the tip cone holder counterclockwise and carefully remove the tip cone holder, tip cone and spring. Remove the Safe-Cone Filter if fitted.

3. Unscrew the piston counterclockwise from the pipettor.

4. Place the tip cone, tip cone holder, tip ejector collar, piston and spring into a beaker containing Biohit Proline Biocontrol and leave for at least 30 minutes.

5. After performing the procedure described above, remove the components from the beaker and rinse them with distilled water, then dry preferably with warm air, for at least an hour.

6. Re-grease the piston as described in the instruction manual. Replace all components including new filter if fitted.

Note: When performing the decontamination procedure as a matter of routine, the o-ring seal should be checked for possible wear at every sixth instance, and replaced if necessary. The calibration should also be checked at the same time.

Autoclaving instructions

mLINE mechanical pipettor

The entire mLINE mechanical pipettor can be steam sterilized by autoclaving at 121°C (252°F), 1 bar (15 p.s.i.) for 20 minutes. The dispensing head of the multichannel pipettors must be unscrewed 360° counterclockwise before autoclaving.

- Remove the Safe-Cone Filter (if fitted).
- Put the pipettor into the sterilization bag and place it into the autoclave.
- After autoclaving the pipettor must be cooled down and left to dry overnight before use.

It is recommended to check the performance of the pipettor after every autoclaving, and to grease the piston/seal of the pipettor after every 10th autoclaving.

Tips and tip boxes

- Place the bulk tips into the sterilization bag and the tip tray as such in the autoclave.
- Autoclave for 20 minutes at a temperature of 121°C under 1 bar (15 p.s.i.).
- Cool down before use.

eLINE electronic pipettor, lower part

The dispensing head (tip ejector collar, tip cone holder, tip cone, spring and piston) of the single-channel and multichannel models (except for multichannel 1200µl) can be autoclaved (121°C, 1 bar for 20 minutes). These parts can be autoclaved as one unit or separately as individual parts. It is also possible to clean the parts and grease the piston prior to autoclaving.

- Remove the Safe-Cone Filter (if fitted).
- Put the dispensing head into the sterilization bag and place it into the autoclave.
- After autoclaving the parts must be cooled down and left to dry before use.

It is recommended to check the performance of the pipettor after every autoclaving, and to grease the piston/seal of the pipettor after every 10th autoclaving.

Note:

- Excessive heat or length of time can damage the products. Never put handle part of the eLINE into the autoclave.
- Lower ends of multichannel pipettors are not interchangeable between 8- and 12-channel pipettors.
- The cover of the tray should be closed during autoclaving.

Troubleshooting guide

Problem	Cause	Solution
Pipettor performance outside given specs	• Unsuitable tip	• Test with original manufacturer´s tip
	• Non-standard test conditions or calibration altered	• Perform test according to the ISO 8655 standard and recalibrate if necessary
	• Pipettor has not been maintained regularly	• Perform routine user maintenance and retest
	• Dirty Safe-Cone Filter	• Change Safe-Cone Filter
	• Pipettor is leaking	• See instructions below
Pipettor is leaking	• Unsuitable tip	• Use original manufacturer´s tip
	• Tip incorrectly attached	• Attach tip firmly
	• Worn or dirty tip cone	• Clean tip cone • Change tip cone
	• Worn or dried piston sealing	• Clean and re-grease o-ring • Change the o-ring
	• Instrument damaged	• Send for Service
Operating button jammed or moves erratically	• Liquid has penetrated tip cone and dried inside	• Clean and grease the piston/seal and the tip cone
	• Safe-Cone filter has been contaminated	• Change Safe-Cone Filter
	• Insufficient amount of grease on a piston and seal	• Grease accordingly
Pipettor blocked, aspirated volume too small	• Liquid penetrated tip cone and dried	• Clean and regrease o-ring and piston and clean tip cone
Tip ejector jammed or moves erratically	• Tip cone and/or ejector collar contaminated	• Clean with soft cloth and mild detergent, Biohit Proline Biocontrol or 70% ethanol

Biohit Academy

Working and understanding pipettors is much more than pressing the thumb.

This is why ergonomics has been one of Biohit's main concerns in product development for over 18 years!

Biohit offers a full training program designed to improve your experience working with pipettors. This on-site training seminar includes:

- Background in the development of pipettors
- The choice of the right pipettor for your work
- Good ergonomics and how to set up an ergonomic work space
- Step by step training of over 10 pipetting techniques
- How to choose the correct pipet tip for improved precision & accuracy
- How to maintain your pipettor: simple tips for improved performance including cleaning, decontamination and simple calibration
- Hands-on pipetting with pipettors

The length of the seminar is approximately 45 minutes to one hour.

Pipette MD
powered by BIOHIT!

Our Pipette MD service specialists are available for on-site or in-house services on all makes and models of pipettors to provide:

- Full calibration services
- Preventative maintenance schedule
- Repair services

For complete information on Pipette MD, see page 61 or visit www.pipettemd.com

Literature

Ergonomics

- Vaughton, R. (2006) In case of emergency – break glass! Int. Labmate. (2006)
- Mannonen, S., Nieminen, P., Kaasinen, J., Andersin, K. (2004). Multichannel pipetting – how to choose the correct pipettor? Int. Biotech. Lab. 22(6), 12-14 and Am. Biotech. Lab 22(13), 12-14
- Mannonen, S., Nieminen, P., Kaasinen, J., Andersin, K. (2003). Raising the standard of mechanical pipetting. Int. Labmate 28(5), 34-35.
- Mannonen, S., Hintikka, V. and Syrjä, K. (2002). Choosing the correct electronic pipettor. Clin Lab Int. 26(2), 29.
- Mannonen, S., Hintikka, V. and Syrjä, K. (2002). The benefits of electronic pipetting. How to choose the correct pipettor. Int. Labmate 27(4) Guide 2002/2003, 75-77.
- Mannonen, S., Hintikka, V., Kaasinen, J. and Ekholm, P. (2002). Reduced tip ejection and pipetting forces prevent repetitive strain injuries (RSI). Biomed. Prod. 4, 40-42.

- Vaughton R. (Sep. 1999). Taking the Strain Out of Pipetting. International Biotechnology Laboratory.
- Hoskins D.B., Erickson J. (1998). Laboratory Ergonomics, the Wake-Up Call: A Case Study on How One Company Relieved Stress and Strain on Its Employees, Chemical Health and Safety, January/ February.
- David G., Buckle P. (1997). A Questionnaire Survey of the Ergonomic Problems Associated with Pipettes and Their Usage with Specific Reference to Work-Related Upper Limb Disorders. Applied Ergonomics, Vol. 28, No. 4: 257-262.
- Hodgson E. (1996). Work Related Upper Limb Disorders and the Laboratory. World Directory of Environmental Testing, Monitoring and Treatment.

- Fredriksson K. (1995). Laboratory Work with Automatic Pipettes: A Study on How Pipetting Affects the Thumb, Ergonomics 38 (5): 1067-1073.
- McGlothlin J.D., Hales T.R. (1995). NIOSH (National Institute of Occupational Safety and Health) Health Hazard Evaluation Report.
- Björkstén M.G., Almby B., Jansson E.S. (1994). Hand and Shoulder Ailments among Laboratory Technicians Using Modern Plunger-Operated Pipettes. Applied Ergonomics 25: 88-94.

Safety

- Mannonen, S., Riikonen, S. (2006) In Vitro Diagnostics (IVD) compliance and what it means in practice. Am. Biotech. Lab. 24(8), 18–20.
- Mannonen, S. (2005) Use of a certified pipettor tip to protect samples. Am. Biotech Lab. 23(8), 23-24.
- Mannonen, S. (2005) Protecting your sample - Using a certified pipettor tip. Int. Biotech. Lab. 23(3), 10-12.
- Mannonen, S. (2005) Pipettor tip cone filters minimise the risk of contamination. Labasia 12(4), 24-25; and Int. Labmate 30(5), 15-16.
- Mannonen, S. and Hintikka, V. (2004). Poorly selected tips can cause major error to pipetting accuracy. Int. Labmate. 29(2), 55-56.

- Mannonen S., Syrjä K. (2000). Safety in Pipetting. International Labmate, 25(1), 39.
- Mannonen S., Tiusanen T., Suovaniemi O. (2000). Major Sources of Error of Air Displacement Pipettors. Lab Asia, 7(2), 38-39.
- Kolari M., Mannonen S., Takala T., Saris P., Suovaniemi O., Salkinoja-Salonen M.S. (1999). The Effect of Filters on Aseptic Pipetting Lifetime of Mechanical and Electronic Pipettors and Carryover during Pipetting. Letters in Applied Microbiology 29: 123-129.

Service & Maintenance

- Mannonen S., Riikonen S. (2000). Accredited Calibration and Future Demands for Pipettors. International Biotechnology Laboratory, 18(2), 48-49.

For literature see also **www.biohit.com**.

Brochures

Liquid Handling






Diagnostics








All publications can be downloaded at www.biohit.com

About Biohit

Biohit was founded 20 years ago, in 1988. The background of the company, however, stretches back to the 1970s, when Professor Osmo Suovaniemi (M.D, Ph.D.), founder of Labsystems (1971), Efl ab (1978) and Biohit (1988) together with his team developed and commercialised the first air displacement, adjustable single and multichannel pipettors that made liquid handling both more convenient and safer than before. These inventions included the first 8- and 12-channel adjustable pipettors that were designed to aid the liquid handling work in the vertical photometry based analysers, such as the very first 96-well microplate reader (the Titertek Multiskan), invented and developed by Professor Suovaniemi (and his company Labsystems).

Over the years, Biohit's liquid handling devices have taken their place in laboratories worldwide as ergonomic, safe and reliable solutions for all types of pipetting and dispensing.

Today, Biohit's mission is to enhance the well-being and quality of life of people by developing, manufacturing and marketing liquid handling products and accessories as well as diagnostic test systems for use in research, health care and industrial laboratories.

In addition to liquid handling products and accessories, Biohit also develops, manufactures and markets diagnostic test systems for the screening, prevention, and diagnosis of diseases of the gastrointestinal tract.

The company's diagnostic tests are combined with pipettors, instruments based on vertical photometry technology, and related software to provide comprehensive analysing systems for research and clinical diagnostics.

Biohit focuses on business areas in which it possesses a strong foundation in research, technology, innovations and patented products. The company's products are designed and manufactured according to the requirements of the ISO 9001, ISO 13485, and ISO 14001 quality and environment standards. Biohit also offers accredited pipettor calibration according to ISO 17025. Additionally, all products are CE/IVD marked. Biohit has several worldwide patents and patents pending for its products.

Biohit has a network of 450 distributors, including 7 subsidiaries, in 70 countries.

Further information on Biohit is available at **www.biohit.com.**

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