

Instruction Manual Bedienungsanleitung



pipet4u® pro

Micro Volume Pipette



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General information - The **pipet4u® pro** pipettes are piston-operating pipettes for accurate and precise sampling and dispensing of liquid volumes in the range from 0.1 µL to 10 mL. They operate according to the air displacement principle and are produced and tested according to EN ISO 8655. The **pipet4u® pro** pipettes are available as single channel pipettes with variable and fixed volume and multi channel pipettes with variable volume.

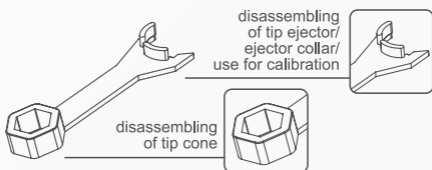
Intended use - The **pipet4u® pro** pipettes are general laboratory pipettes.

Safety - Before using the device, the instruction manual must be read. Follow the safety instruction, wear protective equipment while using the device, especially when working with infectious and dangerous samples. Work in such a way that neither user nor other persons are endangered. Only use the pipette with conform tips. Check the proper condition of the device before each use.

Delivery Package

1 pc. Pipette
1 pc. Calibration / disassembling tool
1 pc. Tool to remove colour-coding drop
1 pc. Silicone grease
1 bag Drop for colour coding
1 bag Sample tips
1 bag O-rings (available for multi channel pipettes)
1 pc. Instruction manual
1 pc. Warranty card
1 pc. Calibration report according to EN ISO 8655

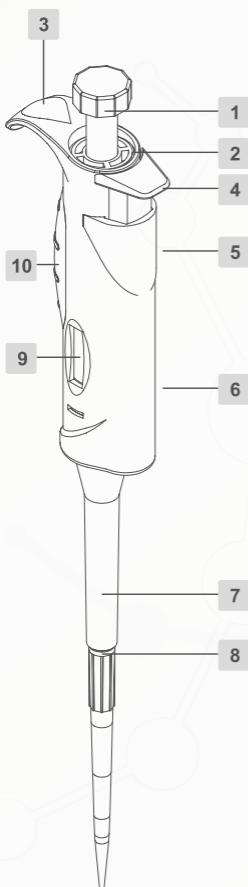
Calibration/disassembling tool - The enclosed tool is designed for easy and quick maintenance and calibration of the pipette.



Pipette identification - Each **pipet4u® pro** pipette can be individually colour coded, using the included tool for drop removing.



Instruction Manual



Pipette Description

pipet4u®pro

Single channel pipette

1 Push button

Used to aspirate and dispense the liquid and to set the volume (variable volume pipettes)

2 Top closure

Used to adjust the calibration with the help of the calibration tool

3 Drop

The drop is colour-coded as per the volume of the pipette for easy identification

4 Tip ejector

Tip ejector moves the ejector collar and ejects the pipette tip

5 Volume print

Indicates the volume of the pipette

6 Main body

7 Ejector collar

Used to eject the pipette tip

8 Tip cone

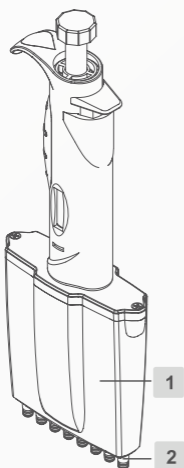
The part where the pipette tip is fitted

9 Volume display

Shows the volume set with the push button (variable volume pipettes) and the nominal volume of fixed volume pipette

10 Body Grip

Prevents transfer of body heat to internal components to ensure accurate pipette operation and also provides proper grip while holding the pipette



pipet4u®pro

Multi channel pipette

Upper part of the multi channel pipette corresponds to the single channel pipette as described above.

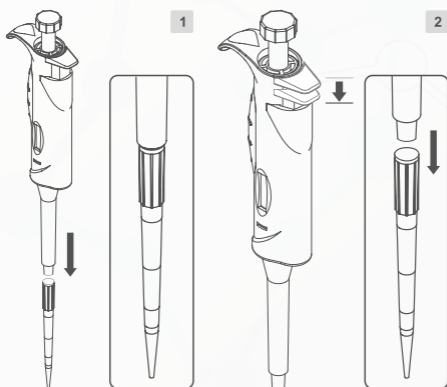
1 Ejector collar

Used to eject the pipette tips

2 Tip cone

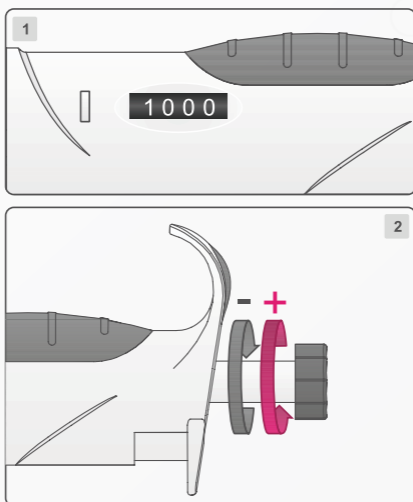
The part where the pipette tips are fitted

Sealing and ejecting tips



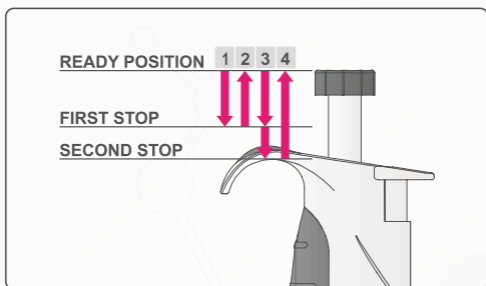
Before fitting the tip(s) make sure that the tip cone(s) is/are clean. Use the correct tip according to the volume range or the colour code. Press the tip(s) firmly onto the tip cone(s) to ensure an airtight seal **1**. The pipettes are equipped with a tip ejector to help remove the tip(s) and to avoid safety hazards associated with contamination. The tip ejector needs to be pressed downwards to ensure proper tip ejection **2**. (For 10000 μ L and 2000-10000 μ L pipettes tip ejection function is not available).

Volume setting



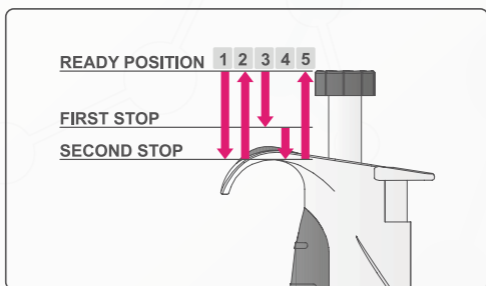
The volume of the **pipet4u[®]pro** pipette is shown through the hand-grip window **1**. For variable pipettes, the desired volume is set by turning the push button clockwise or anticlockwise **2**. Using excessive force to turn the push button outside the range may jam the mechanism and damage the pipette.

Forward pipetting



Press the push button to the first stop **1**. Dip the tip(s) attached to the pipette vertically 2-3 mm into the liquid and smoothly release the push button **2**. Withdraw the tip(s) slowly from the liquid, touching against the wall of the vessel to remove any remaining liquid. Place the tip(s) on the wall of the vessel at an angle. Dispense the liquid into the receiving vessel by gently pressing the push button to the first stop **3**. After a short delay press the push button to the second stop **3**. This blow-out will empty the tip(s) completely and ensure accurate pipetting. Release the push button to the ready position **4**.

Reverse pipetting



Reverse pipetting is recommended for viscous solutions, i.e. solutions which have a tendency to foam, or for dispensing very small volumes. Press the push button to the second stop **1**. Dip the tip(s) attached to the pipette vertically 2-3 mm into the liquid and smoothly release the push button **2**. This will fill the tip(s) with a additional volume larger than the set volume. Withdraw the tip(s) slowly from the liquid, touching against the wall of the vessel to remove any excess liquid. Dispense the liquid into the receiving vessel by gently pressing the push button to the first stop **3**. This volume is equal to the set volume. Hold the push button in this position. The liquid that remains in the tip should not be dispensed. The remaining liquid can be discarded with the tip or delivered back into the vessel with the original solution **4**. Release the push button to the ready position **5**.

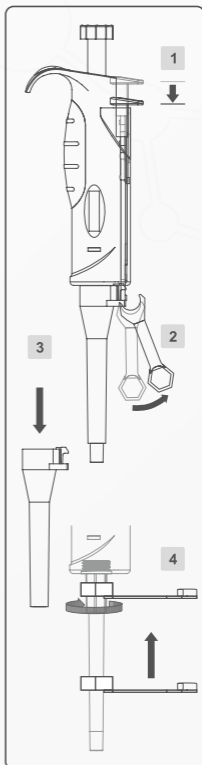
Pipetting recommendations - Only aspirate liquid into the pipette when a tip(s) is/are attached. Hold the pipette vertically when aspirating and dip the tip(s) only 2-3 mm into the liquid. Pre-rinse the tip(s) 5 times before aspiration by filling and emptying the tip(s). Always control the push button movements with the thumb for consistency. Allow liquid, tip(s) and pipette to equilibrate to the ambient temperature before use. Do not keep the pipette in your hand while not working to avoid transferring body heat, which may result in incorrect dispensing volume. Use the correct pipette tip(s) designed for the use with the particular pipette. Select the correct pipetting technique (e.g. reverse, forward pipetting) depending on the nature of the liquid. Do not lay the pipette down with a filled tip, otherwise liquid may flow into the pipette and contaminate it.

Maintenance- It is recommended to check the performance of your pipette regularly e.g. every 3 months and always after in-house service or maintenance. To maintain the best results from your pipette, each unit should be checked every day for cleanliness. Pay special attention to the tip cone(s).

Disassembling/reassembling and cleaning

To clean and decontaminate or replace the lower parts of the single channel pipette, proceed as follows:

- 1 Hold down the tip ejector.
- 2 Place the tooth of the opening tool between tip ejector and tip ejector collar to release the locking mechanism.
- 3 Carefully release the tip ejector and remove the ejector collar.
- 4 Place the wrench end of the opening tool over the tip cone and turn it clockwise.
- 5 After removing the tip cone, wipe the piston, the a-ring and the tip cone with ethanol and a lint free cloth. (cleaning step)
- 6 Before replacing the tip cone grease the piston slightly using the silicon grease provided. (cleaning step)
- 7 After reassembling use the pipette several times to make sure that the grease is spread evenly.
- 8 Check the calibration of the pipette.



It is recommended to send the multi channel pipettes to your supplier or manufacturer for cleaning and greasing.

Autoclaving - The **pipet4u® pro** pipettes are fully autoclavable by steam at 121°C, 1.05 bar for 15 min. Autoclave the complete pipette without any disassembling. After autoclaving under the above mentioned conditions allow the pipette to cool and dry for 6 hours before use. It is not required to re-calibrate the pipette after autoclaving. If the pipette is autoclaved frequently, the piston and springs should be greased with the lubricant supplied with each pipette to maintain smooth movement. See section "Disassembling/reassembling and cleaning".

Calibration - Each pipette calibration has been factory checked and certified according to EN ISO 8655. It is recommended to check the calibration at least once a year, for regularly used pipette.

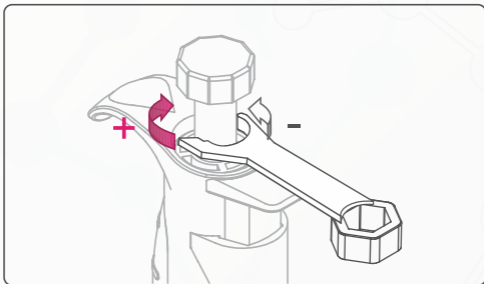
Checking calibration - Performance testing should take place in a draught-free room with stable environment with relative humidity above 50 % and constant ($\pm 0,5^{\circ}\text{C}$) temperature between 15°C and 30°C. The weighing vessel, pipette, tips and distilled water shall have stood in the room for a sufficient time, at least 2 hours, to reach equilibrium with the room conditions. Use an analytical balance with a readability of 0.01 mgs. 10 measurements for each test volume shall be carried out. The test volume for fixed volume pipettes is the nominal volume (greatest volume selectable by the user and specified by the manufacturer) and for variable volume pipettes at least three volumes shall be tested (nominal volume, 50 % of nominal volume, 10 % of nominal volume). For checking calibration of multi channel pipette, each channel should be considered as an individual pipette.

Procedure

1. Select the test volume. Do not change the setting during the test cycle of 10 measurement.
2. Fit the selected tip(s) to the pipette cone(s).
3. Fill the tip(s) with distilled water and condition the pipette before testing by aspirating and dispensing the distilled water in the tip(s) five times. Afterwards discard the tip(s).
4. Attach a new tip(s) on the pipette cone(s) of pipette and pre-wet the tip(s) once.
5. Aspirate the distilled water and pipette it into the weighing vessel (use forward pipetting technique, page 8).
6. Weigh the pipetted quantity with an analytical balance and record the weight. Repeat the test cycle until 10 measurements have been recorded.
7. Convert the recorded masses to volumes, calculate the mean volume, systematic error and random error as described in EN ISO 8655-6:2002, part 8.
8. Compare the systematic error (inaccuracy) and the random error (imprecision) with the values of specification table, page 16.

The calibration of the pipette must be set even if only one of the results falls outside the permitted range.

Recalibration



Place the calibration tool into the holes of the calibration adjustment lock (under the push button). Turn the adjustment lock anticlockwise to decrease and clockwise to increase the volume. Repeat checking calibration until the pipetting results are correct.

Warranty - Your **pipet4u® pro** pipette is warranted to be free from defects in material and workmanship for a period of 2 years from the date of purchase. Defects or damage caused by physical and/or chemical influences, consequences of normal wear and tear, as well as improper use are not covered by the warranty. The warranty is invalidated by non factory modification which will immediately terminate all liabilities on the manufacturer for the product or damages caused by its use. The buyer shall be responsible for the product or use of the product as well as any supervision required for safety. Routine cleaning and recalibration are not covered under the terms of warranty.

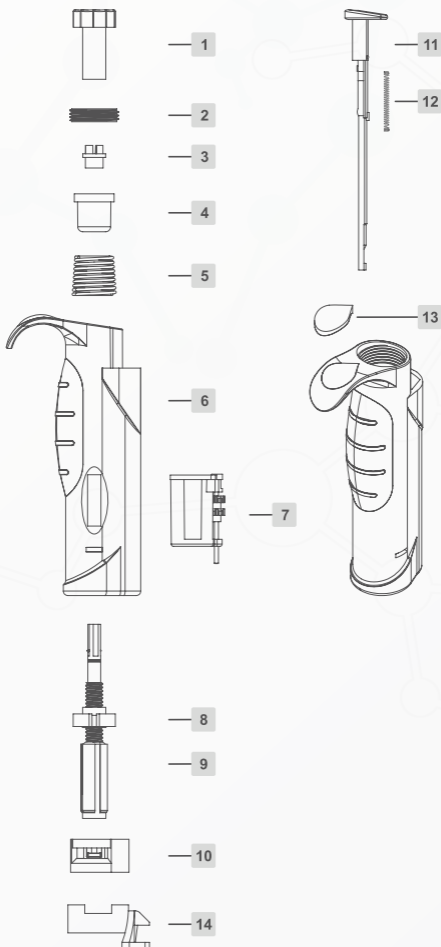
Returning - If requested the product must be returned to your supplier or manufacturer in well packed and insured manner. Before returning the pipette please make sure that the pipette is free from all contaminations. Please fill out the pipette complaint form (please ask your supplier or manufacturer for the form) and send it along with the pipette. All shipping charges must be paid by the buyer.

Trouble shooting

Trouble	Possible Reason	Correction
Droplets left inside the tip	Unsuitable tip, non-uniform wetting of the plastic	Use new tip
Leakage or pipetted volume too small	Tip holder (cone) scratched or damaged	Change the top cone
	Organic solvent as liquid	Aspirate and discard the organic solvent several times before actual pipetting by the same tip
	Tip incorrectly attached	Attached firmly
	Unsuitable tip	Use new tip
	Foreign particles between tip and tip cone	Clean the tip cone
	Insufficient amount of grease on piston and O-ring	Clean and grease O-ring and piston
	O-ring incorrectly positioned or damaged	Change the O-ring
Inaccuracies	Incorrect operation	Follow instructions carefully
	Calibration altered	Recalibrate according to instruction
	Unsuitable for the particular liquid pipetting technique	Use correct pipetting technique
	Instrument damaged	Send for repair
Push button jammed or moves erratically	Piston contaminated	Clean and grease O-ring and piston
	Penetration of solvent vapours	Clean and grease O-ring and piston
Tip Ejector jammed or moves erratically	Tip cone contaminated from outside	Remove ejector collar and clean outer surface or tip cone with ethanol
Volume setting is not properly click stopped	Click stop mechanism damaged	Send for repair
Push Button does not turn for volume setting	Use of excessive force beyond the range of pipette	Send for repair

Top assembly parts - pipet4u® pro

Single and multi channel pipettes



Description	
1 Push Button	8 Washer
2 Top closure	9 Shaft
3 Spring stopper	10 Bottom closure snap fitting
4 Primary spring support	11 Tip ejector
5 Spring primary	12 Spring tip ejector
6 Main body	13 Drop
7 Counter	14 Tip ejector pusher support

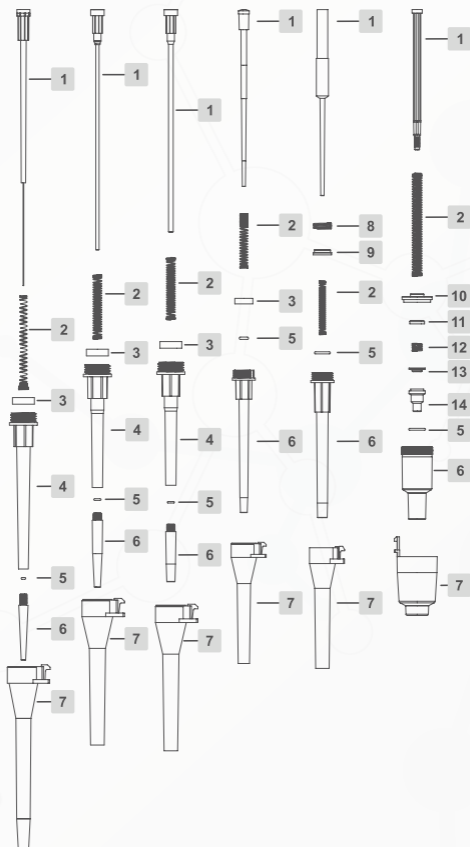
Note: Bottom closure snap fitting and tip ejector pusher are of different sizes for single and multi channel pipettes. Tip ejector pusher support is only present in multi channel pipette.

Instruction Manual

Bottom assembly parts - pipet4u® pro

Single channel pipettes

Volume (μL)					
0.1- 2.5/ 0.5-10/ 2-20	5/10/20/ 25/50 5-50	100/ 10-100	200/ 20-200/ 50-200	250/500 1000/ 100-1000 200-1000	2000/2500/ 5000/10000 500-5000 2000-10000

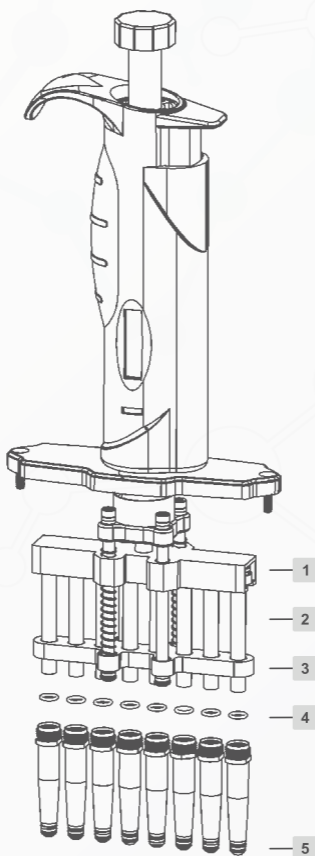


Description

1 Piston	8 Spring secondary (100-1000 μL)
2 Spring piston	9 Secondary spring support
3 Piston support	10 Washer (500-5000 μL)
4 Tip cone top	11 Washer (500-5000 μL)
5 O-ring	12 Spring (500-5000 μL)
6 Tip cone	13 Washer (500-5000 μL)
7 Ejector collar	14 O-ring holder

Note: For 10000 μL and 2000-10000 μL pipettes tip ejection function is not available. Tip cone, washer (500-5000 μL) and O-ring holder are of different sizes for volume 500-5000 μL and 2000-10000 μL.

Bottom assembly parts - pipet4u® pro Multi channel pipettes



Description

- | | |
|---|------------------------|
| 1 | Piston housing |
| 2 | Steel piston |
| 3 | Tip cone housing |
| 4 | Sealing O-rings |
| 5 | Tip cone outer O-rings |

Instruction Manual

Specifications

Single channel pipettes - variable volume

Volume Range	Increments	Test Volume	Inaccuracy (±)%	Imprecision (±)%
0.1 µL - 2.5 µL	0.01 µL	0.25 µL	12.00%	6.00%
		1.25 µL	3.00%	3.00%
		2.5 µL	2.50%	1.60%
0.5 µL - 10 µL	0.1 µL	1 µL	2.50%	1.50%
		5 µL	2.00%	1.00%
		10 µL	1.00%	0.80%
2 µL - 20 µL	0.1 µL	2 µL	3.00%	2.00%
		10 µL	1.50%	1.00%
		20 µL	0.90%	0.40%
5 µL - 50 µL	0.5 µL	5 µL	2.00%	2.00%
		25 µL	0.80%	0.40%
		50 µL	0.60%	0.30%
10 µL - 100 µL	0.5 µL	10 µL	3.00%	1.50%
		50 µL	1.00%	0.50%
		100 µL	0.80%	0.15%
20 µL - 200 µL	1 µL	20 µL	2.00%	0.80%
		100 µL	0.70%	0.30%
		200 µL	0.60%	0.15%
50 µL - 200 µL	1 µL	50 µL	1.00%	0.40%
		100 µL	0.80%	0.20%
		200 µL	0.60%	0.15%
100 µL - 1000 µL	5 µL	100 µL	2.00%	0.70%
		500 µL	1.00%	0.40%
		1000 µL	0.60%	0.20%
200 µL - 1000 µL	5 µL	200 µL	0.90%	0.30%
		500 µL	0.75%	0.25%
		1000 µL	0.60%	0.20%
500 µL - 5000 µL	50 µL	500 µL	2.00%	0.60%
		2500 µL	0.60%	0.30%
		5000 µL	0.50%	0.15%
2000 µL - 10000 µL	100 µL	2000 µL	3.00%	0.60%
		5000 µL	1.20%	0.30%
		10000 µL	0.60%	0.20%

Single channel pipettes - fixed volume

Volume Range	Increments	Test Volume	Inaccuracy (±)%	Imprecision (±)%
5 µL	-	5 µL	1.30%	1.20%
10 µL	-	10 µL	0.80%	0.80%
20 µL	-	20 µL	0.60%	0.50%
25 µL	-	25 µL	0.50%	0.30%
50 µL	-	50 µL	0.50%	0.30%
100 µL	-	100 µL	0.50%	0.30%
200 µL	-	200 µL	0.40%	0.20%
250 µL	-	250 µL	0.40%	0.20%
500 µL	-	500 µL	0.30%	0.20%
1000 µL	-	1000 µL	0.30%	0.20%
2000 µL	-	2000 µL	0.30%	0.15%
2500 µL	-	2500 µL	0.30%	0.15%
5000 µL	-	5000 µL	0.30%	0.15%
10000 µL	-	10000 µL	0.60%	0.20%

8- and 12- channel pipettes - variable volume

Volume Range	Increments	Test Volume	Inaccuracy (±)%	Imprecision (±)%
0.5 µL - 10 µL	0.1 µL	1 µL	4.00%	4.00%
		5 µL	2.50%	2.50%
		10 µL	1.50%	1.50%
5 µL - 50 µL	0.5 µL	5 µL	3.00%	2.00%
		25 µL	1.50%	1.00%
		50 µL	1.00%	0.70%
10 µL - 100 µL	1 µL	10 µL	1.50%	0.75%
		50 µL	1.00%	0.50%
		100 µL	1.00%	0.25%
30 µL - 300 µL	1 µL	30 µL	1.50%	0.75%
		150 µL	1.00%	0.50%
		300 µL	0.80%	0.25%



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