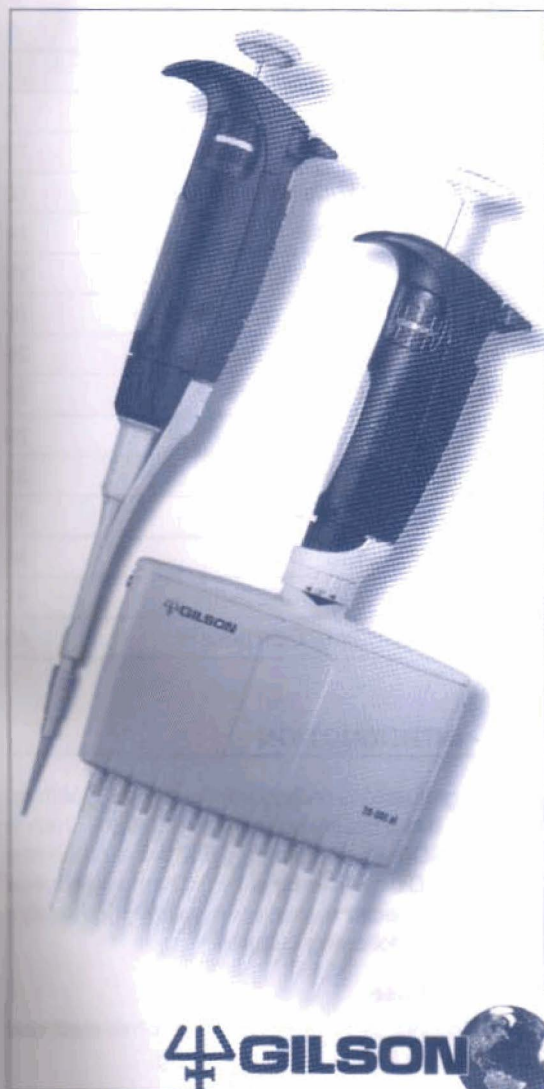


PIPETMAN[®] *Ultra*

ENGLISH

*Other languages available on
our website: www.gilson.com.*



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CONTENTS	page
1 - INTRODUCTION	2
2 - PARTS CHECK LIST	3
3 - DESCRIPTION	4
4 - SWITCHING ON	5
5 - VOLUME INDICATOR - LCD WINDOW	6
6 - SETTING THE VOLUME	7
7 - GILSON DIAMOND® TIPS	8
8 - PIPETTING	10
9 - PERSONALIZING YOUR PIPETTE	12
10 - GLP FEATURES	14
11 - TROUBLESHOOTING	15
12 - MAINTENANCE	16
13 - CLEANING AND DECONTAMINATION	26
14 - LEAK TEST	28
15 - USER ADJUSTMENT	29
16 - SPECIFICATIONS	31
17 - EQUIPMENT DISPOSAL	33
18 - SPARE PARTS	34
APPENDIX - RESET PROCEDURE	41
EC DECLARATION OF CONFORMITY	43

1 - INTRODUCTION

Congratulations on acquiring your new Pipetman Ultra. It is a quality product from Gilson, which is fully ISO8655 compliant, CE labeled (conforms to the EC directives on *in vitro* diagnostic medical devices, electromagnetic compatibility and safety). Enjoy the following features.

Easy of use:

- Continuously-adjustable parallax-free electronic display for easy volume setting,

- Flashing indicators if volume set is out of range,
- Ergonomic design, maximum comfort for left or right-hand users,
- Low tip-ejection force, light, balanced,
- Simple to maintain and adjust,
- Other GLP features.

Performance:

- Accurate and precise,
- Unbeatable results with Gilson Diamond Tips,
- Easy and secure tip loading from Gilson Tipacks,
- New auto-shut off system to maximize battery life.

Applications:

- For any type of lab.
- Suitable for most liquids.
- Molecular studies, kinetic studies, DNA sequencing, enzyme-assays, and the measurement and transfer of general aqueous solutions.

2 - PARTS CHECK LIST

Just take a moment to verify that the following items are present:

- Pipetman Ultra pipette,
- Certificate of conformity (including bar-code sticker),
- User's Guide,
- Identity tags (5 different colors),
- Safety bag,
- Recalibration (user adjustment) tool,
- Tip-holder reassembly tool (Multichannel models only),
- Lubricant tube (except for U2 and U10).
- Tip ejector extension (U2 and U10 only).
- Sample pack of tips.

3 - DESCRIPTION

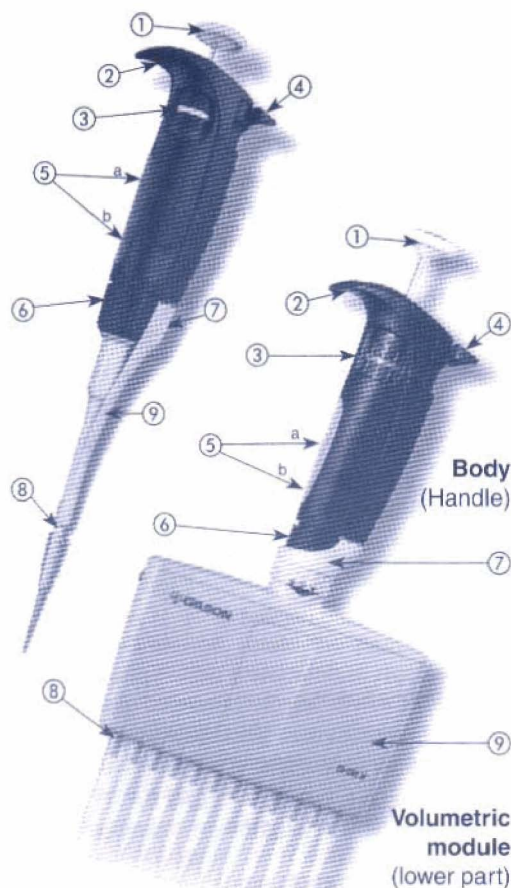
☞ See below the legends to the opposite figure.

- ① Push-button for switching on, setting the volume, aspirating, and dispensing (button is color coded with the volume range printed on the top).
- ② Ergonomic stabilizer, to make the pipette more comfortable to use, and to reduce fatigue.
- ③ Thumbwheel, to set and lock the volume.
- ④ Tip-ejector button, can be positioned for left or right-handed operation.
- ⑤a Liquid Crystal Display (LCD) window for volume-setting and status indicators.
- ⑤b Identity-tag window (see "GLP features").
- ⑥ Connecting nut.
- ⑦ Tip-ejector stroke adjustment-wheel.
- ⑧ Tip-holders – removable for cleaning and servicing.
- ⑨ Ejector: removable to access piston assemblies and tip-holders.

Table - Operating Ranges

Model	Reference	Range	Color code
U2	F21021	0.2 - 2 µL	Orange
U10	F21022	1 - 10 µL	Red
U20	F21023	2 - 20 µL	Pale yellow
U100	F21024	20 - 100 µL	Peach
U200	F21025	20 - 200 µL	Yellow
U1000	F21026	200 - 1000 µL	Blue
U5000	F21027	1 - 5 mL	Purple
U10ml	F21028	1 - 10 mL	Clear blue
8x20	F21040	1 µL to 20 µL	Pale yellow
12x20	F21041	1 µL to 20 µL	Pale yellow
8x300	F21042	20 µL to 300 µL	Green
12x300	F21043	20 µL to 300 µL	Green

☞ Pipetman Ultra specifications are only valid with the use of Diamond tips.



4 - SWITCHING ON

Press the push-button to the second stop (purge) to switch on the pipette. The information displayed in the LCD window depends on the status of the pipette and the volume currently set (see below).

☞ When the volume is locked, Pipetman Ultra turns itself off after 3 min of inactivity – just press the push-button to the second stop (or unlock the thumbwheel) to reactivate the pipette.

If the volume is unlocked for 15 sec, you will see LOCKED/UNLOCKED flashing during 10 min to warn you to lock the thumbwheel.



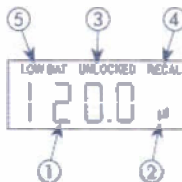
! If you have not locked the pipette, Pipetman Ultra turns itself off after 10 min of inactivity. Just lock the thumbwheel (volume setting) and "Init 1" will appear. Follow the instructions of Appendix to reset the pipette.



5 - VOLUME INDICATOR - LCD WINDOW

What you normally see...

- ① Volume setting
- ② Units (μ L or mL)
- ③ Volume status (locked or unlocked)



What may appear...

- ④ Calibration status: "RECAL" this means that your pipette has been readjusted.
- ⑤ Battery status: failing - "LOW BATT" here, or failed - "BATT" in place of volume setting.

Electronic counters:

Holding down the push button to the second stop for 5 seconds, successively displays counters at the right-hand side of an otherwise blank screen. Are displayed in order:

a) Cycle counter since the last volume setting - the counter indicates the number of pipetting cycles (max. 199); for example 126



b) Cycle counter since the pipette was made - the counter indicates the number of pipetting cycles

(maximum 999,999); for example 285,396 cycles.



- c) Readjustment counter since the pipette was made - the counter indicates the number of times the pipette has been readjusted (maximum 99); for example 03 readjustment operations.

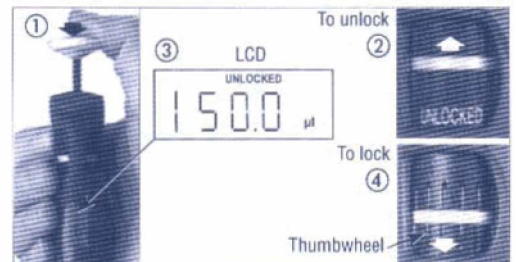


! Refer to "Troubleshooting" for possible error messages.

6 - SETTING THE VOLUME

You must perform the following steps:

- ① Switch on: press the push-button to the second stop. LCD shows the volume currently set.
- ② Unlock: push the thumbwheel upwards. LCD shows UNLOCKED (also visible on the thumbwheel).
- ③ Set the volume: rotate the thumbwheel or the push-button (clockwise to decrease the volume, counterclockwise to increase):
 - when **decreasing** the volume, reach the required setting slowly, making sure not to overshoot the mark.
 - when **increasing** the volume, pass the required value by 1/3 of a turn, then decrease the volume slowly, making sure not to overshoot the mark.
- ④ Lock the volume: push the thumbwheel downwards. LCD shows LOCKED.





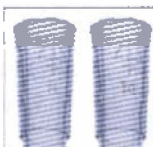
To reduce battery consumption, lock the volume before storing Pipetman Ultra.

- You are strongly advised to lock the volume, to avoid accidentally changing the setting when pipetting.
- The units indicator flashes, if you set a volume below 90 % of the minimum recommended; you can dispense an aspirated volume below the minimum recommended. However, in this case, the specifications cannot be guaranteed.
- The volume indicator flashes, if you try to set a volume above the maximum permitted; you must not try to pipette a volume that is greater than the maximum permitted.

7 - GILSON DIAMOND TIPS

Gilson Diamond Tips are made to the highest specifications; strict quality control is maintained throughout the manufacturing process.

Diamond Tips are used to calibrate Pipetman Ultra, therefore for optimum performance, you are strongly advised to use Gilson's Diamond Tips with your pipette. Diamond Tips have the Gilson logo engraved on their collar, ensuring that you have a genuine Gilson product.



To ensure accuracy and precision, Gilson's Quality Assurance System focuses on the following critical parameters.

- Diamond Tips are made from pure polypropylene (virgin, metal-free, to avoid the possibility of contamination). They are available sterilized and with filters.
- They may be autoclaved at 121 °C for 20 minutes at 0.1 MPa.
- Gilson's sterilized Diamond Tips are certified free of detectable RNases, DNases, DNA, RNA, and pyrogens.

- Optimized shape (revised collar for optimum sealing, thin walls, and fine point), making them easier to mount, more flexible, with no vortexing, and improved precision.
- Mold and cavity references are marked on the collar, ensuring the traceability for quality assurance purposes, batch numbers appear on all packages (bags and boxes).
- They form an air-tight seal with the tip-holder, preventing the leaks that cause poor accuracy and a lack of precision.

Tipack - Rocky Rack

Diamond Tips are best fitted from a Rocky Rack (patented). Rocky Rack is the dome-shaped part of the pack that contains the tips. Rocky Rack makes it easy to securely fit the tips to a multichannel pipette, ensuring an airtight seal on all channels without the need to use undue pressure or to touch the tips.

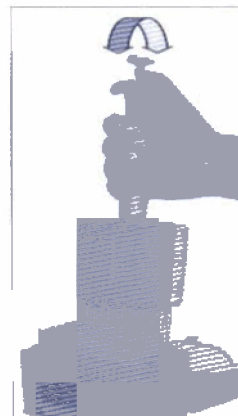


Table - Tips to use for best results


Pipette	Diamond Tips	Volume (Range)
U2	D10, DL10	0.2 µL to 2 µL
U10	D10, DL10	1 µL to 10 µL
U20	D200	2 µL to 20 µL
8X20	DL10, D200	1 µL to 20 µL
12X20	DL10, D200	1 µL to 20 µL
U100	D200	20 µL to 100 µL
U200	D200	20 µL to 200 µL
8X300	D200, D300	20 µL to 300 µL
12X300	D200, D300	20 µL to 300 µL
U1000	D1000	200 µL to 1 mL
U5000	D5000	1 mL to 5 mL
U10 ml	D10 ml	1 mL to 10 mL

8 - PIPETTING

Operating procedure

- 1) Optionally, for Ultra Multichannel set the head to any position that is comfortable and practicable for your application. To do this, simply turn the head to the desired position.

- 2) Fit new Diamond Tips.

 You must fit tips to your pipette before aspirating and dispensing any liquid. Plastic tips are for a single application – they must not be cleaned for reuse.

- 3) Pre-rinse the tips.

Some liquids (e.g. protein-containing solutions and organic solvents) can leave a film of liquid on the inside the wall of the tip; pre-rinse the tip to minimize any errors that may be related to this phenomenon. Pre-rinsing consists of aspirating the first volume of liquid and then dispensing it back into the same vessels (or to waste). Subsequent volumes that you pipette will have levels of accuracy and precision within specifications.

- 4) Aspirate.

Press the push-button to the **first stop** (this corresponds to the set volume of liquid).

Hold the pipette vertically ($\pm 20^\circ$) and immerse the tip in the liquid (see table for immersion depth).

Release the push-button slowly and smoothly (to **top** position) to aspirate the set volume of liquid.

Wait one second then withdraw the pipette-tip from the liquid.

Table - Immersion Depth and Wait Time

Model	Immersion Depth (mm)	Wait Time (seconds)
U2	1	1
U10	1	1
U20	2-3	1
8x20, 12x20	2-3	1
U100	2-4	1
U200	2-4	1
8x300, 12x300	2-3	1
U1000	2-4	2-3
U5000	3-6	4-5
U10 ml	5-7	4-5



You may wipe any droplets away from the outside of the tip using a medical wipe, however if you do so take care to avoid touching the tip's orifice.

- 5) Dispense.


Place the ends of the tips against the inside walls of the recipient vessels (at an angle of 10° to 40°).

Press the push-button slowly and smoothly to the **first stop**.

Wait for at least a second, then press the push-button to the **second stop** to expel any residual liquid from the tips. Keep the push-button pressed fully down and (while removing the pipette) draw the tips along the inside surface of the vessel.

Release the push-button, smoothly.

- 6) Eject the tips by pressing firmly on the tip ejector button.

 The tip ejector stroke can be set to allow for different types of tip, where (for example) the length of the collar is different (refer to "Personalizing Your Pipette").

General Guidelines for Good Pipetting

- 1) Make sure that you operate the push-button slowly and smoothly.
- 2) When aspirating, keep the tips at a constant depth below the surface of the liquid (refer to the table "Immersion Depth and Wait Time").
- 3) Change the tips before aspirating a different liquid, sample, or reagent.
- 4) Change the tips if droplets remain at the end of the tip from the previous pipetting operation.

- 5) The tips should be pre-rinsed with the liquid to be pipetted.
- 6) Liquid should never enter the tip-holders; to prevent this:
 - press and release the push-button slowly and smoothly,
 - never turn the pipette upside down,
 - never lay the pipette on its side when there is liquid in the tip.

 The use of a Gilson "Carrousel™", "Trio™" or "Single™" holder is recommended to store pipettes in the upright position.

- 7) When pipetting liquids with temperatures different to the ambient temperature, pre-rinse the tips several times before use.
- 8) For volatile solvents you should saturate the air-cushion of your pipette by aspirating and dispensing the solvent repeatedly before aspirating the sample.
- 9) Avoid pipetting acids or other corrosive liquids that emit vapors. Extensive contact with corrosive fumes may corrode the pistons or damage the seal and tip-holders.
- 10) The pipette can be used between +4 °C and +40 °C, but the specifications may vary (see Chapter 16 for controlled conditions of use).
- 11) Do not pipette liquids having temperatures above 70 °C or below 4 °C.



Extreme temperatures can affect accuracy and precision.

9 - PERSONALIZING YOUR PIPETTE

Comfort of Tip-ejector

Before you start to pipette you can adjust the tip-ejector button according to your preferences.

- 1) Position the tip-ejector button. Simply rotate

the tip ejector button to the most comfortable position: left, right, or middle.



- 2) Set the stroke by rotating the adjustment wheel until you find the position where it is most easy to activate the tip ejector. You may want to reset the stroke after fitting a different type or size of tip.

Tip-ejector Extension for Use with Ultra U2 and U10



In order to eject D10 tips, tip ejector extensions are supplied with U2 and U10 pipettes.

 The tip-ejector extension which is made of PVDF (polyvinylidene Fluoride), is autoclavable.

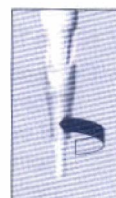
To fit a tip-ejector extension:

- hold the pipette with the LCD window uppermost,
- hold the extension with the slot uppermost,
- slide the extension over the tip-holder,
- push the extension firmly onto the end of the tip-ejector until it clicks into place (see opposite).



To remove a tip-ejector extension (see opposite):

- hold the pipette in one hand and grip the extension with the other,
- gently twist the extension (either direction) and pull it away from the pipette.



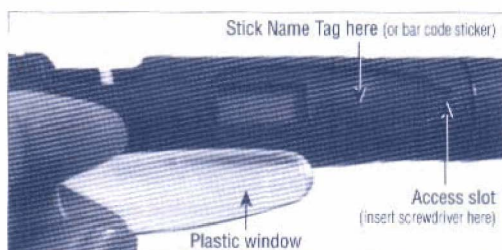
Head Position for Multichannel only

You can adjust the position of the head to suit your needs. Simply rotate the head relative to the body of the pipette. Normally, you would set the head either parallel to or at 90° to the body, but you can choose any position between the two. Remember to check that the connecting nut is tight after adjusting the head position.

Personal Label - Name Tag

You can identify your pipette with a name tag:

- 1) Pry out the window by inserting a small screwdriver in the access slot.
- 2) Position the name tag next to the LCD.
- 3) Clip the window back into place.



10 - GLP FEATURES

There are as follows:

- Locked volume.
- Serial Number: engraved on body of the pipette and is encoded in the bar-code.
- Bar Code: on the box and with the certificate (can be transferred).
- Name Tag (Application, or User).
- Cycle counters:
 - from last volume setting (to count the number of cycles in the current "run"),
 - from manufacture (to count the number of cycles for servicing purposes).

- Flashing display when volume set is out of specifications.
- Cycle counter when pipette has been readjusted (see Chapter 15).
- Channel number embossed on the head of each pipette for Multichannel.
- Useful volume-range is printed on the push-button and the cover-ejector.

11 - TROUBLESHOOTING



Before returning any pipette, ensure that it is completely free of chemical, biological, or radioactive contamination. Use the safety bag provided by Gilson.

You may be able to identify and to correct the problem by reference to the following table.

Symptom	Possible Cause	Refer to page
Pipette is leaking sample (one or more channels)	Damaged tip-holder(s)	17-19
	Worn O-ring.	17-19
Pipette won't aspirate	Worn O-ring.	17-19
	Damaged tip-holder(s).	17-19
	Connecting nut is loose.	18
	Damaged or corroded piston.	17-19
Noisy operation	Improper repair or assembly.	16-19
	Piston(s) needs lubricating.	20
Pipette is inaccurate	Improper repair or assembly.	16-19
	Pipette is out of adjustment.	29-31
	Connecting nut is loose.	18
Pipette is not precise	Connecting nut is loose.	18
	Volume setting not locked.	7
	Incorrect operator technique.	9-12
	Damaged or corroded piston(s).	17-19
	Damaged tip-holder(s).	17-19
Tips fall off or don't fit	Worn O-ring.	17-19
	Low quality tips.	8-9
	Damaged tip-holder(s).	17-19
No LCD display	Adjustment of tip-ejector stroke	12-13
	Pipette is not switched on.	5
	Battery has failed.	24-25

Symptom	Possible Cause	Refer to page
"INIT1" on display	The pipette has not been locked after 10 minutes of inactivity. Volume has not been set to the correct calibration volume when the calibration tool was plugged in.	6 29-31
"INIT 2" on display	Setting problems.	29-31
"INIT 3" on display	Battery was changed.	24-25

Other Error Message

If the following occur, contact your Gilson distributor.

Message	Cause
ERR4	Electronic problems (microchip).

12 - MAINTENANCE

You may perform the following:

- clean or autoclave the parts specified under "Cleaning and Decontamination",
- replace the parts specified under "Spare Parts",
- lubricate the pistons,
- change the battery,
- calibrate and readjust the pipette.

Operation for Single-channel models

Tip-holder and Tip-ejector

These parts must be changed, if they are accidentally damaged or attacked chemically. You should also remove these parts for cleaning or decontamination purposes.

Changing the Tip-ejector

- 1) Keep the tip-ejector button depressed and grip the top of the tip-ejector with the other hand.



- 2) Gently rotate the tip-ejector counter-clockwise and separate its connector from the activating rod.

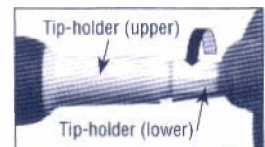


- 3) Pull the tip-ejector away from the body of the pipette.
- 4) Clean or autoclave the tip-ejector and refit it (or a new one) by reversing the procedure.

Changing the Tip-holder (lower part)

After removing the tip-ejector, you may remove the lower part of the tip-holder, which is more likely to become contaminated or damaged than the upper part. Removal of the lower part is shown below; for the upper part see "Removing the Piston" (special precautions are necessary).

- 1) Gently rotate the lower part of the tip-holder counter-clockwise to unscrew it from the upper part.



- 2) Separate the parts and remove the O-ring (see "Changing the O-ring").
- 3) Clean and if required autoclave the lower part of the tip-holder.
- 4) If required lubricate the piston (see "How to Lubricate the Piston") and fit a new O-ring.
- 5) Screw the two parts together, making sure that the two parts are fully tightened, by hand.
- 6) Refit the tip-ejector.



Changing the seal and/or O-ring (see Chapter 18)

The O-ring is contained by the two halves of the tip-holder; it must not be autoclaved, if worn or damaged in any way, it must be replaced.



To access the O-ring, remove the tip-ejector and unscrew the lower part of the tip-holder - if the O-ring is not immediately visible on the piston, set the pipette to its maximum volume, then press the push-button to the second stop. You should now be able to remove the O-ring from the piston. Sometimes, the O-ring may be found in the recess at the top-end of the lower part of the tip-holder.

If required lubricate the piston (see "How to Lubricate the Piston") then fit a new O-ring by sliding it onto the piston. Reassemble the pipette.

The dimensions of the O-ring vary according to the pipette model - refer to "Spare Parts" for details.


Servicing the Piston

You may remove the piston-assembly to clean, lubricate, or change the piston.

 **The specifications of the pipette must be checked after changing the piston (see Chapter 16).**

Removing the Piston


- 1) Set the volume to zero and lock the pipette. Do not unlock the pipette or try to reset the volume while changing the piston assembly.
- 2) Remove the tip-ejector and (optionally) the lower part of the tip-holder.

 If you remove the lower part, take care to remove the O-ring as described in "Changing the O-ring".

- 3) Unscrew the connecting-nut (turn by hand, counter-clockwise).




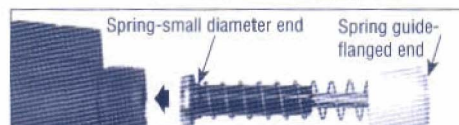
- 4) Pull on the spring guide to remove the piston assembly from the body of the pipette - separate the parts (see below).

 For U5000 and U10 ml, the connecting nut is combined with the upper part of the tip-holder (see "Spare Parts").

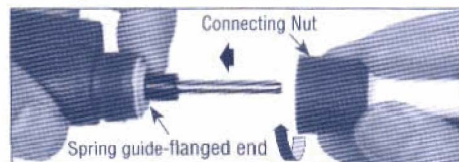



- 5) Clean and autoclave (if required) the piston and holder, together with any other parts that may need to be treated in the same way (see "Cleaning and Decontamination").
- 6) Lubricate the piston, see next page.
- 7) Reassemble the piston, spring and spring guide; then carefully insert the assembly into the body of the pipette. The spring guide should hold the piston assembly inside the body of the pipette.

 **Take care to position the small-diameter end of the spring as shown (innermost), and that the flanged end of the spring guide is outermost.**



- 8) Reassemble the upper part of the tip-holder and the connecting nut, then refit to the body of the pipette by rotating the connecting nut clockwise until it is finger tight. Fit the O-ring (or for U2 and U10, the seal) and reassemble the lower part of the tip-holder. Refit the tip ejector.



 The seals for U2 and U10 are fragile and can only be used once. So, after unscrewing the lower part of the tip-holder you must fit a new seal.

How to Lubricate the Piston (except U2 and U10)

Use only Gilson lubricant (ref: F2070902, as supplied). Squeeze a small quantity from the tube onto a clean, nonabrasive cloth. Use the cloth to transfer the lubricant to the piston. Ensure that the piston is evenly lubricated, and that you wipe away any excess - remember only a fine film of lubricant is required (over the entire piston).

Operation for Multichannel models


The two main parts of the pipette are the body (handle) and the volumetric module (lower part).

The body contains electrical and mechanical components that must not be in contact with liquids.

The volumetric module of the pipette contains the tip-holders and the piston assemblies, components that could be in contact with liquids. To service these items you must first remove the plastic ejector-cover, which also may be cleaned or replaced.


Removing the Volumetric module

The connecting nut joins the head to the body. Unless you need to separate the volumetric module from the body, you should not fully undo the connecting nut. If the connecting nut becomes loose in normal use, turn it clockwise until fully tight. This action may be necessary after adjusting the position of the head. When you need to separate the two halves of the pipette, proceed as follows.

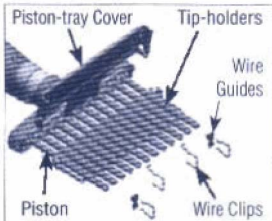
- 1) Set the volume to zero and lock the pipette.
- 2) Keep the tip-ejector button depressed and grip the ejector-clip.
- 3) Unlock the ejector-clip and separate it from the activating rod. 
- 4) Unscrew the connecting nut.
- 5) Press push-button to extract the head.

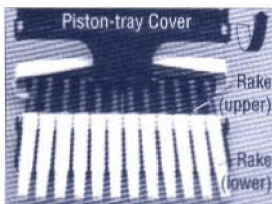
Removing the Plastic Cover, Piston Assemblies and Tip-holders

- 1) First set the pipette to its minimum volume.

- 2a) Remove the two screws, which are located at either side of the head, using a miniature screwdriver. 

- 2b) Gently pull the ejector-cover away from the head. 

- 3) Remove the wire clips and the wire guides for 12 channels from the piston tray-cover. 

- 4) Lay the pipette flat and push upwards (with your thumbs) on the catches at either side of the piston-tray cover. The cover will flip upwards to reveal piston and tip-holder assemblies. 

- 5) Lift the tip-holder upwards, away from the lower rake, then push the tip-holder back along the axis of the piston. Now, pull the piston away from the upper rake and lift it and the tip holder out of the tray, taking care not to lose or damage the piston spring.

- 6) Gently pull the piston assembly out of the tip-holder.

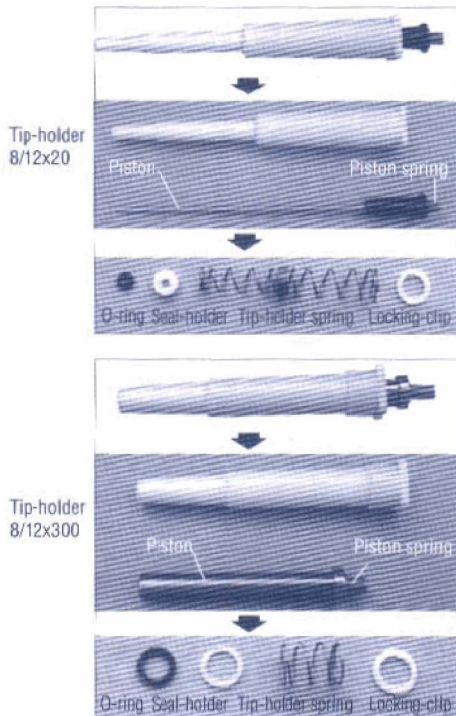
Servicing the Ejector-cover, Piston Assemblies and Tip-holders

The tip-holders and piston assemblies must be changed, if they are accidentally damaged or attacked chemically.

You should also remove them for cleaning or decontamination purposes, and to lubricate the pistons.

- 1) Examine the ejector-cover, if it is cracked or badly corroded it should be replaced with a new part. Otherwise, it should be cleaned and if necessary autoclaved.
- 2) Check the piston for damage or corrosion. Lubricate and replace as necessary.
- 3) After removing the locking clip, gently pry out each tip-holder's internal components: locking-clip, spring, O-ring and seal-holder – this can be done using the reassembly tool. Replace or clean and decontaminate these components. Replace or clean and decontaminate the tip-holder.

 *The O-ring can get trapped in tip-holder. Use a fine plastic probe to extract the O-ring.*



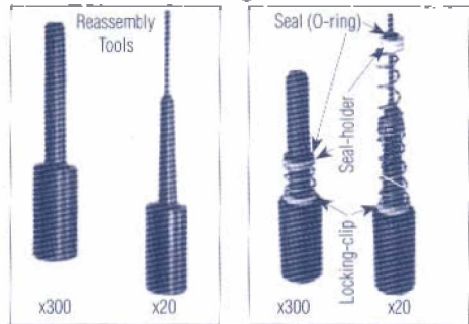
How to Lubricate Pistons

Only use Gilson lubricant (ref: F2070902, as supplied). For more details, please refer to page 20.

Reassembling the Piston Assemblies, Tip-holders, and Plastic Ejector-cover

A) Tip-holders

- 1) Use a lubricated piston to transfer a small quantity of lubricant to the O-ring.



- 2) With reference to the photo's above, place the components on the reassembly tool in the following order: locking-clip, tip-holder spring, seal-holder, O-ring – take care that the spring is the correct way up and that the flat surface of seals, rings and washers faced the spring.

- 3) Insert the components into the tip-holder with the aid of the reassembly tool.

- 4) Push on the locking-clip until it snaps into place.

B) Piston Assemblies


- 1) Lubricate the piston, as described in the section above.
- 2) Gently, slip a lubricated piston into the tip-holder, with a slight twisting motion. Avoid using too much force as this could dislodge the O-ring.

C) Closing-up

- 1) Refit each tip-holder/piston assembly so that the top of the piston and the tip-holder snap into the upper and lower rakes, respectively. To facilitate fitting a piston assembly to the upper rake, you should incline the piston assembly and compress the piston-spring against the upper rake, before pushing the assembly into place.
- 2) Close the piston tray-cover, after checking that all assemblies are correctly installed.
- 3) Refit the wire-clips and the wire guides for 12 channels.
- 4) Slide the cover-ejector back over the piston-tray and reattach using the two screws.

■ Changing the Battery

To ensure better performance and maximize battery life, a new battery block for Pipetman Ultra has been designed. The battery pack includes two silve-oxyde plated 1.55V generic code 391 (size 11.6 x 2.1 mm).

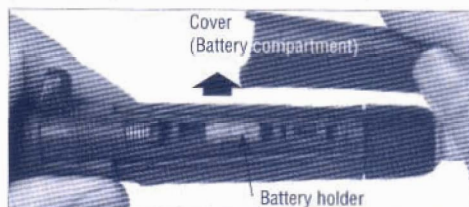
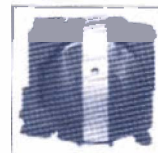
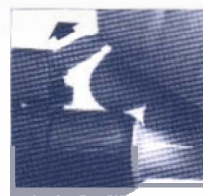
 Although changing the battery block does not affect the calibration, you may wish to take this opportunity to carry out performance check of the pipette (see chapter 15).

If you need to change the battery block, proceed as follows:

- 1) Ensure the pipette is in the locked position, remove the tip-ejector,
- 2) Remove the battery compartment cover (the calibration key is equipped with a tool for opening the battery compartment cover) by carrying out the following steps, with reference to the photographs:



- maintain the tip-ejector holder in the fully extended position by holding down the tip-ejector button,
- insert the tool (side marked "UP" facing you) into the space between the cover and the tip-ejector holder,
- push firmly in the direction shown by the arrow, then gently lever the cover upwards from the pipette.



- 3) Pull out the battery block (yellow plastic) and put in a secure bin for recycling.
- 4) Insert the new battery block into the battery compartment.
- 5) Refit the battery compartment cover.
- 6) The pipette displays "Init 3". See the Appendix for resetting the pipette.

13 - CLEANING AND DECONTAMINATION

Pipetman Ultra is designed so that the parts normally in contact with liquid contaminants, can easily be cleaned and decontaminated.



Liquid must not enter the body (handle) of the pipette.

If you use chemical solutions for decontamination or detergents for cleaning, other than specified below, you should check with your supplier that the solution or detergent used does not attack any of the following materials: PBT (Polybutylene Terephthalate), PC (Polycarbonate), POM (Polyoxymethylene), PVDF (Polyvinylidene Fluoride), or stainless steel.

Cleaning

The pipette must be cleaned, as described below, before it is decontaminated. Soap solution is recommended for cleaning Pipetman Ultra.

External

- 1) Wipe the entire pipette with a soft-cloth or lint-free tissue impregnated with soap solution, to remove all dirty marks. If the pipette is very dirty, a brush with soft plastic bristles may be used.
- 2) Wipe the entire pipette with a soft-cloth or lint-free tissue impregnated with distilled water.
- 3) For Pipetman Ultra single channel, you can remove the tip-ejector for cleaning.

Internal

The following components **only** can be immersed in a cleaning solution: ejector-cover, tip-holder, connecting nut, piston and springs.

- 1) Disassemble the pipette as described in "Maintenance".
- 2) Set aside the body (handle) in a dry and secure location.
- 3) Clean the individual components from the pipette head using an ultrasonic bath (20 minutes at 50 °C) or with a soft-cloth and brushes.
- 4) Rinse the individual components with distilled water.

- 5) Leave the parts to dry by evaporation or wipe them with a clean soft-cloth or lint-free tissue.
- 6) Lubricate the piston and reassemble the pipette according to the instructions given earlier in this chapter.

Decontamination

Autoclaving

The body (handle) of the pipette is **not** autoclavable. However, after separation from the body, any of the internal components of the volumetric module may be autoclaved individually: ejector-cover, ejector, connecting nut, tip-holders, pistons, springs and washers (except O-rings).

- 1) Clean the parts to be autoclaved, especially the tip-holders.
- 2) Put the parts in an autoclaving sack.
- 3) Autoclave for 20 minutes at 121 °C and 0.1 MPa.
- 4) Check that the parts are dry before reassembling the pipette.
- 5) Set the pipette aside to stabilize at room temperature.

Chemical Decontamination

You may choose to decontaminate your pipette chemically, in accordance with your own procedures. Whatever decontaminant you use, check that it is compatible with the plastics used in the construction of the pipette (see page 26).

- 1) Wipe the body (upper part) of the pipette with a soft-cloth or lint-free tissue impregnated with the chosen decontaminant.
- 2) Wipe the upper part of the pipette with a soft-cloth or lint-free tissue impregnated with distilled water or sterile water.

Volumetric module (lower part)

The following components **only** can be immersed in a decontaminant solution: ejector-cover or tip ejector, connecting nut, tip-holder, piston, and springs. The O-ring, washer and washer clip should be replaced.

- 1) Disassemble the pipette as described in "Maintenance".
- 2) Immerse the components in the decontaminant solution or wipe them according to the instructions given by the manufacturer or supplier of the decontaminant.
- 3) Rinse the individual components with distilled or sterile water.
- 4) Leave the parts to dry by evaporation or wipe them with a clean lint-free tissue or soft-cloth.
- 5) Lubricate the piston and reassemble the pipette according to the instructions given earlier in this chapter.

14 - LEAK TEST

This test may be performed at any time to check that the pipette does not leak, especially after performing a maintenance or decontamination procedure. If a pipette channel fails this test you should replace the faulty part (e.g. O-ring, tip-holder...) and repeat this test, after making sure that the pipette is correctly reassembled.

U2 to U200 and Multichannels

- Fit a Gilson Diamond Tip,
- set the pipette to the nominal volume,
- pre-rinse the tips as you would in normal use (see "Pipetting"),
- aspirate the nominal volume of distilled water,
- hold the pipette in the vertical position and wait for 20 seconds,
- if a water droplet appears at the end of the tip there is a leak (see Troubleshooting),
- if you see no droplet, re-immerses the tip below the surface of water,
- the water level inside the tip should remain constant; if the level goes down there is a leak (see Troubleshooting).

U1000 to U10ml

- Fit a Gilson Diamond Tip,
- set the pipette to the nominal volume given in the specifications,
- aspirate the set volume from a beaker of water,
- maintain the pipette in the vertical position and wait for 20 seconds,
- if a water droplet appears at the end of the tip there is a leak (see Troubleshooting).

15 - USER ADJUSTMENT

The following procedure is primarily used to check the accuracy of a pipette following servicing (for example, after replacing the piston assembly). Recalibration must be carried out by trained people, under the correct conditions and using the equipment described in "Procedure for Evaluating Accuracy and Precision of Gilson Pipettes". For more details contact your Gilson distributor, who can help you to implement these pipette checking procedures or to build up your own procedures.

Users should establish a routine for testing their pipettes at regular intervals, taking into account the following factors: frequency of use (see cycle counters), the nature and accuracy requirements of the liquids being pipetted, the number of operators using the pipette, and the number of cycles performed each time the pipette is used. Because Pipetman Ultra Multichannel is designed with GLP in mind, you may read the cycle counters after switching on the pipette.

Procedure (Gravimetric Test)

Use a balance to measure the mass of the specified volume of water. The balance (which must be more accurate than the pipette) must be at the sensitivity specified in the following table:

Model	Readjustment Volume (µL)	Balance Sensitivity (g)	Diamond Tips
U2	0.5	10 ⁻⁶	DL10
U10	1	10 ⁻⁶	DL10
U20	2	10 ⁻⁶	D200
U100	20	10 ⁻⁵	D200
U200	50	10 ⁻⁵	D200
U1000	200	10 ⁻⁴	D1000
U5000	1000	10 ⁻⁴	D5000
U10 ml	1000	10 ⁻⁴	D10ml
8x20 and 12x20	2	10 ⁻⁶	DL10
8x300 and 12x300	60	10 ⁻⁶	D300

For Single-channel

Take 10 measurements using distilled water at the specified readjustment volume.


For Multichannel

Take 10 measurements from the first channel (1) and 10 from the last channel (8 or 12). Calculate the mean volume from the 20 measurements.

For example, for an Ultra 8x300 the recalibration volume is 60 µL. You set the LCD to show 60 µL, but you calculate a mean volume of 58 µL; a mean error of -2 µL. Reset the pipette to show:

Recalibration Volume *minus* Mean Error,
in this example 60 - (-2) = 62 µL.

Open the battery compartment, and plug in the user-calibration tool (as shown) to reset the displayed volume to 60 µL.

 The LCD will show **RECAL** in the volume setting window. This indicates that the factory calibration has been modified. To remove the **RECAL** sign and obtain a "factory" calibration, send the pipette back to your Gilson distributor.

Remove the user-calibration tool, close the battery compartment, and calculate the accuracy as described in "Procedure for Evaluating Accuracy and

Precision of Gilson Pipettes", which is a more exhaustive gravimetric test for determining accuracy and precision.



16 - SPECIFICATIONS


Pipetman Ultra is a high quality pipette that offers excellent accuracy and precision.

The figures given in the "Gilson Maximum Permissible Errors" table were obtained using "Gilson Diamond Tips". These figures are only guaranteed using Genuine Gilson Diamond Tips.

Gilson Maximum Permissible Errors

Model (Reference)	Volume (µL)	Maximum Permissible Errors			
		Gilson		ISO 8655	
		Systematic error (µL)	Random error (µL)	Systematic error (µL)	Random error (µL)
U2 (F21021)	Min. 0.2	± 0.024	≪ 0.012	± 0.08	≪ 0.04
	0.5	± 0.025	≪ 0.012	± 0.08	≪ 0.04
	Max. 2	± 0.030	≪ 0.014	± 0.08	≪ 0.04
U10 (F21022)	Min. 1	± 0.025	≪ 0.012	± 0.12	≪ 0.08
	5	± 0.075	≪ 0.030	± 0.12	≪ 0.08
	Max. 10	± 0.100	≪ 0.040	± 0.12	≪ 0.08
U20 (F21023)	Min. 2	± 0.10	≪ 0.03	± 0.20	≪ 0.10
	5	± 0.10	≪ 0.04	± 0.20	≪ 0.10
	Max. 20	± 0.20	≪ 0.06	± 0.20	≪ 0.10
U100 (F21024)	Min. 20	± 0.35	≪ 0.10	± 0.80	≪ 0.30
	50	± 0.40	≪ 0.12	± 0.80	≪ 0.30
	Max. 100	± 0.60	≪ 0.15	± 0.80	≪ 0.30
U200 (F21025)	Min. 20	± 0.50	≪ 0.20	± 1.60	≪ 0.60
	50	± 0.50	≪ 0.20	± 1.60	≪ 0.60
	Max. 200	± 1.60	≪ 0.30	± 1.60	≪ 0.60
U1000 (F21026)	Min. 200	± 3	≪ 0.6	± 8	≪ 3.0
	500	± 4	≪ 1.0	± 8	≪ 3.0
	Max. 1000	± 8	≪ 1.5	± 8	≪ 3.0
U5000 (F21027)	Min. 1000	± 12	≪ 3	± 40	≪ 15
	2000	± 12	≪ 5	± 40	≪ 15
	Max. 5000	± 30	≪ 8	± 40	≪ 15
U10ml (F21028)	Min. 1 ml	± 30	≪ 6	± 60	≪ 30
	2 ml	± 30	≪ 6	± 60	≪ 30
	Max. 10 ml	± 60	≪ 16	± 60	≪ 30

Model (Reference)	Volume (μL)	Maximum Permissible Errors			
		Gilson		ISO 8655	
Diamond Tip		Systematic error (μL)	Random error (μL)	Systematic error (μL)	Random error (μL)
8x20 (F21040) and	Min. 1	± 0.10	≤ 0.08	± 0.40	≤ 0.20
	2	± 0.10	≤ 0.08	± 0.40	≤ 0.20
12x20 (F21041) DL10	10	± 0.20	≤ 0.10	± 0.40	≤ 0.20
	Max. 20	± 0.40	≤ 0.20	± 0.40	≤ 0.20
8x300 (F21042) and	Min. 20	± 1.00	≤ 0.35	± 8.00	≤ 3.00
	30	± 1.00	≤ 0.35	± 8.00	≤ 3.00
12x300 (F21043) D300	150	± 1.50	≤ 0.60	± 8.00	≤ 3.00
	Max. 300	± 3.00	≤ 1.00	± 8.00	≤ 3.00

 The data given in the tables conform to the ISO 8655-2 Standard.

Each pipette is inspected and validated by qualified technicians according to the Gilson Quality System.

Gilson declares that its manufactured pipettes comply with the requirements of the ISO 8655 Standard, by type testing.

The adjustment is carried out under strictly defined and monitored conditions (ISO 8655-8):

- Basis of adjustment, Ex.
- Reference temperature, 20 °C
- Relative humidity, 50 %
- Barometric pressure, 101 kPa
- Use of distilled water grade 3 (ISO 3696)
- Ten measurements for each test volume, which are Nominal Volume, 50 % of Nominal Volume, and the minimum or 10 % of Nominal Volume.

17 - EQUIPMENT DISPOSAL



This equipment must not be disposed of with unsorted municipal waste. Instead, it is your responsibility to correctly dispose of your waste equipment by handing it over to an authorised facility for separate collection and recycling. It is also your responsibility to decontaminate the equipment in case of biological, chemical, and/or radiological contamination so as to protect from health hazards the persons involved in the disposal and recycling of equipment.

For more information about where you can drop off your waste equipment for recycling, please contact your local dealer from whom you originally purchased the product or your local council.

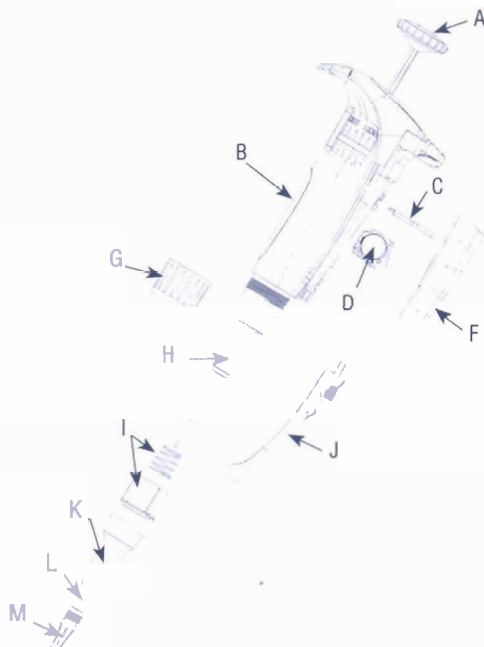
By doing so, you will help conserve natural resources and you will ensure that your waste equipment is recycled in a manner that protects human health and the environment. Thank you!

18 - SPARE PARTS

U2 (F21021) and U10 (F21022)

Description	U2	U10
A Push-button	F2070152	F2070252
B Plastic Window	F2072102	F2072102
C Recalibration Tool	F20751	F20751
D Battery block, 3.1 V*	F2070172	F2070172
F Cover (battery compartment)	F2072107	F2072107
G Connecting nut	F2072111	F2072111
H Piston assembly	F2070160	F2070260
I Spring and guide	F2070161	F2070161
J Tip ejector	F2070159	F2070159
K Tip holder (upper)	F2070117	F2070117
L Seal (x 5)	F161901	F161902
M Tip holder (lower)	F2070118	F2070218
- Tip-ejector extension	F2070903	F2070903

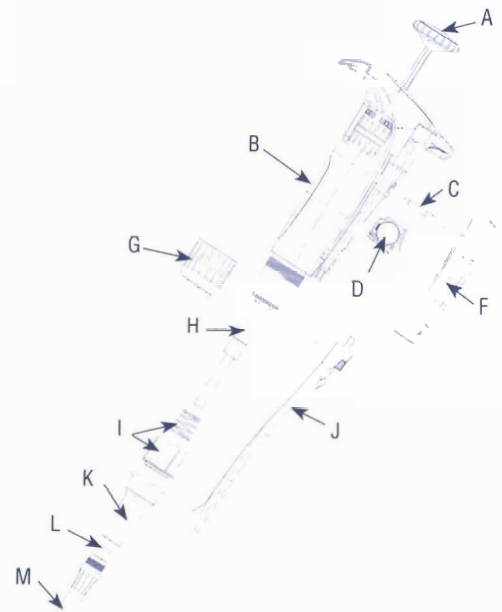
* New battery characteristics; not suitable on previous models of Pipetman Ultra (red battery holder).



U20 (F21023) and U100 (F21024)

Description	U20	U100
A Push-button	F2070352	F2070452
B Plastic Window	F2072102	F2072102
C Recalibration Tool	F20751	F20751
D Battery block, 3.1 V*	F2070172	F2070172
F1 Cover (battery compartment)	F2072107	F2072107
G Connecting nut	F2072111	F2072111
H Piston assembly	F2070360	F2070460
I Spring and guide	F2070161	F2070161
J Tip ejector	F2070359	F2070459
K Tip holder (upper)	F2070117	F2070417
L Seal and O-ring (x5)	F144863	-
O-ring (x 5)	-	F2070401
M Tip holder (lower)	F2070320	F2070418
Lubricant	F2070902	F2070902

* New battery characteristics; not suitable on previous models of Pipetman Ultra (red battery holder).

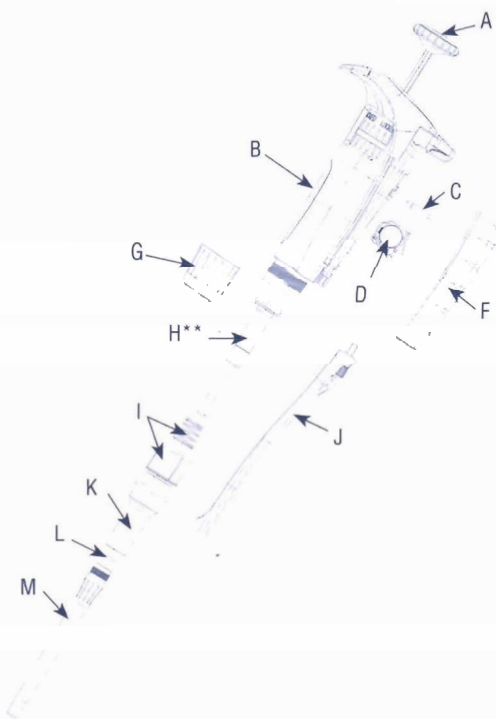


U200 (F21025) and U1000 (F21026)

Description	U200	U1000
A Push-button	F2070552	F2070652
B Plastic Window	F2072102	F2072102
C Recalibration Tool	F20751	F20751
D Battery block, 3.1 V*	F2070172	F2070172
F Cover (battery compartment)	F2072107	F2072107
G Connecting nut	F2072111	F2072111
H Piston assembly	F2070560	F2070664**
I Spring and guide	F2070161	**
J Tip ejector	F2070559	F2070659
K Tip holder (upper)	F2070517	F2070617
L O-ring (x 5)	F2070501	F2070601
M Tip holder (lower)	F2070518	F2070618
Lubricant	F2070902	F2070902

 * New battery characteristics; not suitable on previous models of Pipetman Ultra (red battery holder).

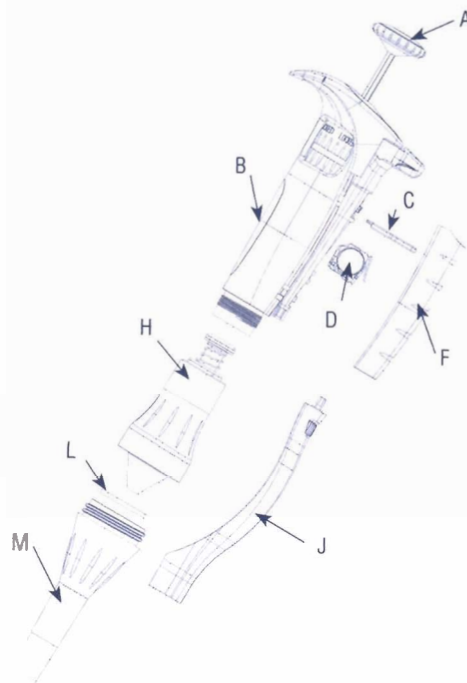
** For U1000, the piston assembly is an assembly part composed of spring guide, return spring and piston assembly.



U5000 (F21027) and U10ml (F21028)

Description	U5000	U10ml
A Push-button	F2070752	F2070852
B Plastic Window	F2072102	F2072102
C Recalibration Tool	F20751	F20751
D Battery block, 3.1 V*	F2070172	F2070172
F Cover (battery compartment)	F2072107	F2072107
H Piston assembly	F2070760	F2070861
J Tip ejector	F2070759	F2070859
L O-ring (x 5)	F2070701	F2070801
M Tip holder G-F.I.T.	F2070719	F2070819
Lubricant	F2070902	F2070902

 * New battery characteristics; not suitable on previous models of Pipetman Ultra (red battery holder).



8x20 (F21040) and 12x20 (F21041)

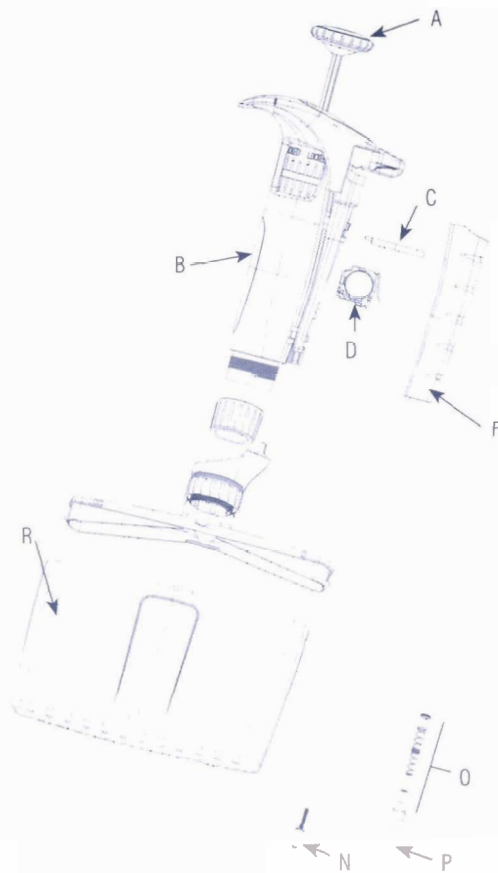
Description	8x20	12x20
A Push-button	F2073052	F2073152
B Personalization window		F2072102
C Recalibration (User Adjustment) tool		F20751
D Battery block, 3.1 V		F2070172
F Cover (battery compartment)		F2072107
N Piston assembly		F2073060
O Airtightness Kit		F2073065
P Tip-holder assembly, G-F.I.T. system		F207306306
R Ejector-cover	F2073059	F2073159
* Screws and wire clips kit	F2073261	F2073361
* Reassembly tool		F2073001
* Lubricant		F2070902
* Safety bags, batch of 100		F2073270

* Not shown.

8x300 (F21042) and 12x300 (F21043)

Description	8x300	12x300
A Push-button	F2073252	F2073352
B Personalization window		F2072102
C Recalibration (User Adjustment) tool		F20751
D Battery block, 3.1 V		F2070172
F Cover (battery compartment)		F2072107
N Piston assembly		F2073260
O Airtightness Kit		F2073265
P Tip-holder assembly, G-F.I.T. system		F207326306
R Ejector-cover	F2073259	F2073359
* Screws and wire clips kit	F2073261	F2073361
* Reassembly tool		F2073201
* Lubricant		F2070902
* Safety bags, batch of 100		F2073270

* Not shown.






- 1) The airtightness kit (O) include the following items:
 - Locking-clip,
 - Spring,
 - Seal-holder,
 - Seal (O-ring).
- 2) The tip-holder assembly (P) includes the above items fitted into the tip-holder.

NOTES

[Faint, illegible text in the notes section]

APPENDIX - RESET PROCEDURE

When "Init 1", "Init 2" or "Init 3" appears on display please follow this procedure to reset the pipette to the factory calibration settings.

- 1) Unlock or Lock/Unlock (if the init message appears in unlock position) the volume (push the thumbwheel upwards), the pipette displays "turn -".

- 2) Rotate the thumbwheel clockwise to decrease the volume to the mechanical stop (the thumbwheel will continue to turn but the display will not change).
- 3) Lock the volume (push the thumbwheel downwards), the pipette displays "turn +".

- 4) Unlock the volume.
- 5) Rotate the thumbwheel counterclockwise to increase the volume until "good" appears on display.

- 6) Lock the volume
- 7) The pipette is ready to operate (operating volume on display)

After resetting, the pipette is correctly adjusted to the factory calibration settings.

