PIPETMAN® *Ultra*

ENGLISH

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

GILSON®
SOLUTIONS AT WORK FOR YOU

CONTENTS **page**

1 - INTRODUCTION

Congratulations on acquiring your new Pipetman Ultra. Enjoy the following features.

Ease 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-handed users,
- light, balanced, low ejection force,
- simple to maintain and adjust,
- other GLP features.

Performance:

- accurate and precise,
- unbeatable results with Gilson Diamond® tips.

Applications:

- for any type of laboratory,
- suitable for most liquids.

2 - PARTS CHECK LIST

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

- Pipetman Ultra,
- User's Guide,
- Sample pack of tips,
- Safety bag,
- Calibration tool,
- Tube of lubricant (except for U2 and U10),
- Name-tags (5 different colors),
- Tip-ejector extension (U2 and U10 only),
- Certificate of conformity (including bar-code sticker).

3 - DESCRIPTION

Legend to figures.

① Push-button for switching on, setting the volume, aspirating, and dispensing. *(Button is color coded with the volume range engraved 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 for upper part (contains piston) of removable tip-holder.

⑦ Tip-ejector stroke adjustment-wheel.

⑧ Tip-ejector.

⑨ Tip-holder; removable for cleaning and/or autoclaving.

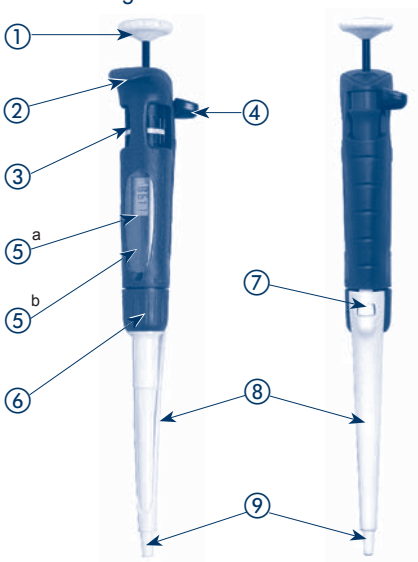


Table - Operating Ranges

Model	Range	Color Code	Reference
U2	0.2 - 2 µL	Orange	F21021
U10	1 - 10 µL	Red	F21022
U20	2 - 20 µL	Clear yellow	F21023
U100	20 - 100 µL	Peach	F21024
U200	20 - 200 µL	Yellow	F21025
U1000	200 - 1000 µL	Blue	F21026
U5000	1 - 5 mL	Purple	F21027
U10 ml	1 - 10 mL	Clear blue	F21028

4 - SWITCHING ON

Press the push-button to the first stop 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).

☞ *Pipetman Ultra turns itself off after 3 min of inactivity – just press the push-button to reactivate the pipette.*

5 - VOLUME INDICATOR - LCD WINDOW

What you normally see ...

① Volume setting.

② Units (mL or µL).

③ Volume status (locked or unlocked).

What could 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.

Cycle Counters:

You will see the counters at the right-hand side of an otherwise blank screen.

a) Since the last volume setting - holding down the push-button for 7 seconds displays this information (maximum 199); for example 126 cycles.

b) Since the pipette was made - holding down the push-button for 10 seconds displays this information (maximum 999999); for example 285396 cycles.

☞ *Refer to "Troubleshooting" for possible error messages.*

6 - SETTING THE VOLUME

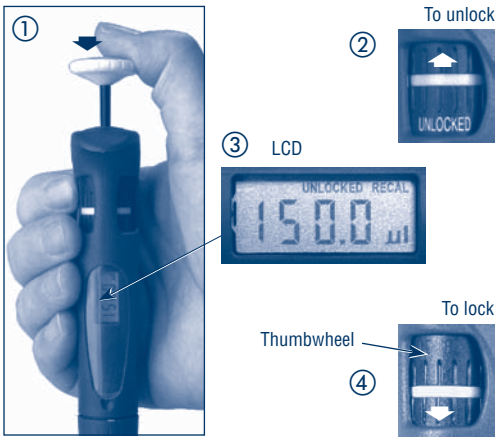
You must perform the following steps:

① Switch on: press the push-button to the first 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 cannot 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 Pipetman Ultra.

Diamond Tips have the Gilson emblem 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).
- 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.
- Diamond Tips are free from defects, especially at the orifice. All surfaces are smooth and hydrophobic, thereby avoiding the excessive retention of liquids that causes poor accuracy and a lack of 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 Tipacks™).
- They form an air-tight seal with the tip-holder, preventing the leaks that cause poor accuracy and a lack of precision.
- They may be autoclaved at 121°C for 20 minutes at 0.1 MPa.

Diamond Filter Tips

Filter tips are used when sample-to-sample, sample-to-pipette, or sample-to-operator contamination must be avoided.

Because of there unique construction, Diamond Filter (DF) Tips may be autoclaved, without risk of damage to the filters. Gilson's sterilized Diamond Filter Tips are certified free of detectable RNases, DNases, DNA, RNA, and proteases.

Table - Tips to Use for Best Results

Pipette	Diamond Tips	Volume (Range)
U2	D10, DL10, DF10, DFL10	0.2 µL to 2 µL
U10	D10, DL10, DF10, DFL10	1 µL to 10 µL
U20	D200, DF30	2 µL to 20 µL
U100	DF30	20 µL to 30 µL
	D200, DF100	20 µL to 100 µL
U200	DF100	20 µL to 100 µL
	D200, DF200	20 µL to 200 µL
U1000	D1000, DF1000	200 µL to 1 mL
U5000	D5000	1 mL to 5 mL
U10 ml	D10 ml	1 mL to 10 mL

8 - PIPETTING

1) Fit a new tip (Gilson Diamond Tips give the best results, see “Specifications”). Plastic tips are for a single application - they must not be cleaned for reuse.

   Push the tip-holder into the tip using a slight twisting motion to ensure a firm and airtight seal.

2) Pre-rinse the tip.

   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 vessel (or to waste).

   Subsequent volumes that you pipette will have levels of accuracy and precision within specifications.

3) Aspirate.

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

Hold the pipette vertically 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 (time depends on model, see table), then with-draw the pipette-tip from the liquid.

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**.

4) Dispense.

Place the end of the tip against the inside wall of the recipient vessel (at an angle of 10° to 40°).

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

Wait for at least one second then press the push-button to the **second stop** to expel any residual liquid from the tip.

Keep the push-button pressed fully down and (while removing the pipette) draw the tip along the inside surface of the vessel.

Release the push-button, smoothly.

Table - Immersion Depth and Wait Time

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

5) Eject the tip by pressing firmly on the tip ejector button.

General Guidelines for Good Pipetting

1) Make sure that you operate the push-button slowly and smoothly.
2) When aspirating, keep the tip at a constant depth below the surface of the liquid (refer to the table “Immersion Depth and Wait Time”).
3) Change the tip before aspirating a different liquid, sample, or reagent.
4) Change the tip if a droplet remains at the end of the tip from the previous pipetting operation.
5) Each new tip should be pre-rinsed with the liquid to be pipetted.
6) Liquid should never enter the tip holder. 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 “Carousel™” or “Trio™” is recommended to store pipettes in the vertical position.
7) When pipetting liquids with temperatures different to the ambient temperature, pre-rinse the tip 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.

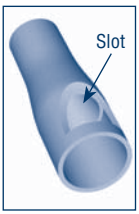
1) Position the tip-ejector button. Simply rotate, the tip ejector button to the most comfortable position: left, right, or middle.

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.

The tip ejector is adjustable in height to allow for different types of tip, where (for example) the length of the collar is different. Also, tip ejector extensions are supplied for U2 and U10 pipettes.

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.

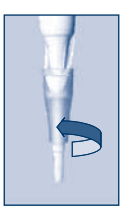
☞ *The tip-ejector extension which is made of PVDF (polyvinylidene Fluoride), is autoclavable.*

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).

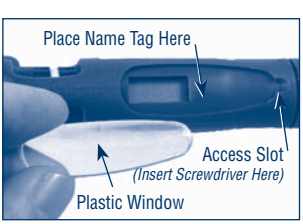
To remove a tip-ejector extension (see opposite):

- 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.



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

These are as follows:

- Locked volume.
- Serial Number is engraved on the body of the pipette and encoded in the bar-code.
- Bar Code: on the box and with the certificate (can be transferred).
- Name Tag (Application or User).
- Cycle counters (see Chapter 5):
  - 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.
- Indicator when pipette has been readjusted (see Chapter 15).
- Useful volume-range is printed on the push-button.

11 - TROUBLESHOOTING

☞ *If you see "RECAL" flashing in the top-right of the LCD, you must readjust the pipette. After user adjustment you will see "RECAL" but not flashing, unless there is a problem with the pipette, in which case you should contact your Gilson supplier.*

Before returning any pipette, ensure that it is completely free of chemical, biological, or radioactive contamination.

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	Worn O-ring.	17
Pipette won't aspirate	Worn O-ring.	17
	Unscrewed lower part of tip holder.	16-17
	Damaged or corroded piston.	18-19
	Damaged tip holder.	16-17
	Improper repair or assembly.	16-21
	Connecting nut is loose.	18-19
Noisy operation	Piston needs lubricating.	20
Pipette is inaccurate	Improper repair or assembly.	16-21
	Unscrewed lower part of tip-holder.	16-17
	Pipette is out of adjustment.	25-27
	Connecting nut is loose.	18-19
Pipette is not precise	Unscrewed lower part of tip-holder.	16-17
	Volume setting not locked.	6-7
	Incorrect operator technique.	9-12
	Worn O-ring.	17-18
	Connecting nut is loose.	18-19
	Damaged or corroded piston.	18-19
	Damaged tip-holder.	16-17
Tips fall off or don't fit	Low quality tips.	7-9
	Damaged tip-holder.	16-17
	Damaged tip-ejector.	16-17
No LCD display	Pipette is not switched on.	5
	Battery has failed.	5, 20-21
ERR1/RECAL flashing on display	Battery was changed when the pipette was in the unlocked position.	20-21
	Volume was not set to the correct calibration volume when the calibration tool was plugged in.	25-27

Other Error Messages

If any of the following occur, contact your Gilson distributor.

Message	Cause
ERR2	Setting problems.
ERR3	Electronic problems (microchip).

12 - MAINTENANCE

You may perform the following operations:

- clean or autoclave the parts specified under “Cleaning and Decontamination”,
- replace the parts specified under “Spare Parts”,
- lubricate the piston,
- change the battery,
- recalibrate the pipette.

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

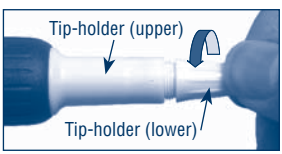
1) Keep the tip-ejector button depressed and grip the top of the tip-ejector with the other hand.
2) Gently rotate the tip-ejector counterclockwise and separate its connector from the activating rod.
3) Pull the tip-ejector away from the body of the pipette.
4) Clean or autoclave the tip-ejector and refit it (or a new one) by reversing the procedure.

Changing the Tip-holder (lower part)

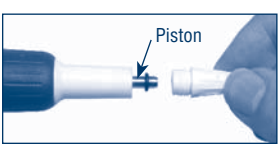
After removing the tip-ejector, you may remove

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 counterclockwise 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 O-ring (or seal for U2 and U10)

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.

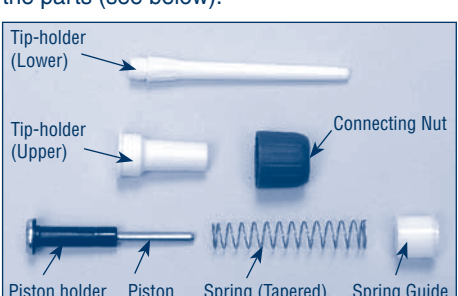
The specifications of the pipette must be checked after changing the piston (see Chapter 15).

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).



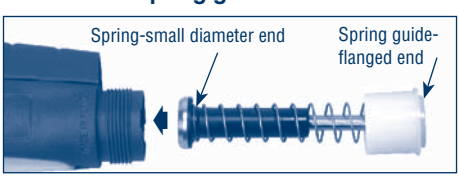
☞ *For U5000 and U10 ml, the connecting nut is combined with the upper part of the tip-holder (see "Spare Parts").*

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").

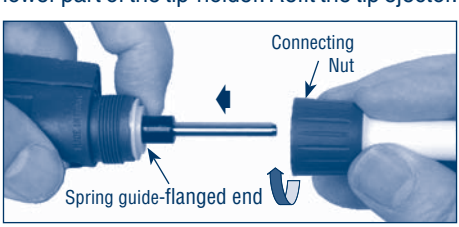
6) Lubricate the piston, see next page.

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).

Changing the Battery

The battery is a silver-oxide plated 1.5V generic code 386 (size 11.6 x 4.2 mm).

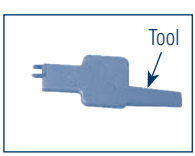
☞ *1) Remember that locking your pipette when not in use will maximize the life of the battery.*

2) Although changing the battery does not affect the calibration, you may wish to take this opportunity to perform a user adjustment (recalibration) of the pipette.

If you need to change it, proceed as follows:

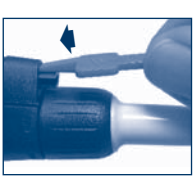
1) Ensure the pipette is in the locked position, remove the tip-ejector,

2) Remove the battery compartment cover *(the calibration key is equipped with a tool for opening the battery compartment cover)*.



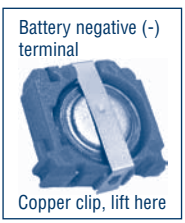
Then perform the following steps, with reference to the photographs:

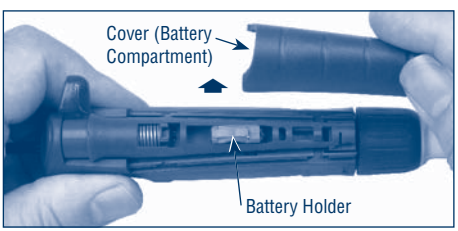
- maintain the tip-ejector holder in the fully extended position by holding down the tip-ejector button,
- insert the tool (side marked “UP” facing you) into the space between the cover and the tip-ejector holder,



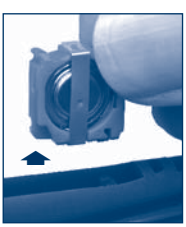
- push firmly in the direction shown by the arrow, then gently lever the cover upwards from the pipette.

3) Pull-out the battery holder (red plastic).
4) Lift up and remove the copper clip (refer to Figure).
5) Lever-out the old battery and put it in a secure bin for recycling.





6) Insert a new battery (see "Spare Parts") into the battery holder.
7) Refit the copper clip.
8) Reinsert the battery holder into the battery compartment cover.



9) Refit the battery compartment cover.

Take care that the negative terminal of the battery is uppermost (i.e. facing you).

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: stainless steel, POM (Polyoxymethylene), PVDF (Polyvinylidene Fluoride) and PC (Polycarbonate).

Cleaning

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

External

1) Remove the tip-ejector (see "Changing the Tip-ejector").
2) Wipe the tip-ejector with a soft-cloth or lint-free tissue impregnated with soap solution.
3) 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.
4) Wipe the entire pipette and the tip-ejector with a soft cloth or lint-free tissue impregnated with distilled water.

Internal

The following components **only** can be immersed in a cleaning solution: tip-ejector, tip-holder (both parts), connecting nut, piston (including holder), return spring, and spring guide.

1) Disassemble the pipette as described in "Maintenance".
2) Set aside the upper part in a dry and secure location.
3) Clean the individual components of the lower part of the pipette using an ultrasonic bath

(20 minutes at 50°C) or with a soft-cloth and brushes. Small round brushes with soft plastic bristles may be used to clean the interior of the tip-holder.

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. **Only** the following parts may be autoclaved: tip-ejector, tip-holder (both parts), connecting nut, piston (including holder), return spring and spring guide. The O-ring is **not** autoclavable; it should be replaced with the one specified in "Spare Parts".

1) Clean the parts to be autoclaved, especially the tip-holder.
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 re-assembling 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 above).

Non-immersible Parts

1) Wipe the body (handle) of the pipette with a soft-cloth or lint-free tissue impregnated with

the chosen decontaminant.

2) Wipe the body of the pipette with a soft-cloth or lint-free tissue impregnated with distilled water or sterile water.

Immersible Parts

The following components **only** can be immersed in a decontaminant solution: tip-ejector, tip-holder (both parts), connecting nut, piston (including holder), return spring, and spring guide.

1) Disassemble the pipette as described in "Maintenance".
2) Immerse the components in the de-contaminant solution or wipe them according 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

After servicing or repair and before calibration, you are advised to perform a leak test, as follows.

U2 to U200

- fit a Gilson Diamond Tip,
- set the pipette to the nominal volume given in the specifications,
- pre-rinse the tip, then aspirate the set volume from a beaker of distilled 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”),
- if you see no droplet, re-immerse 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 U10 ml

- 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 “Verification Procedure for Accuracy and Precision”. For more details, you can download the procedure on the Gilson website (www.gilson.com) or contact your Gilson distributor, who can help you to implement these pipette checking procedures or to build up your own procedures.

User 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 is designed with GLP in mind, you may read the cycle counters after switching on the pipette.

Procedure (Gravimetric Test)

Take 10 measurements, using distilled water, at the specified readjustment volume (see below). Use a balance, which must be more accurate than the pipette, to calculate the mean of the 10 measurements.

Model	Readjustment Volume (µl)	Balance sensitivity (g)
U2	0.5	10^{-6}
U10	1	10^{-6}
U20	2	10^{-6}
U100	20	10^{-5}
U200	50	10^{-5}
U1000	200	10^{-4}
U5000	1000	10^{-4}
U10 ml	1000	10^{-4}

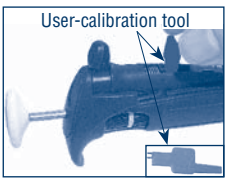
For example, for an Ultra U200 the readjustment volume is 50 µL. You set the LCD to show 50 µL, but you calculate a mean volume of 48 µL; a mean error of - 2 µL. Reset the pipette to show: Readjustment Volume *minus* Mean Error, in this example 50 - (- 2) = 52 µL.

Open the battery compartment, and plug in the user-calibration tool (as shown) to reset the displayed volume to 50 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

Gilson Maximum Permissible Errors

Model (Reference)	Volume	(µL)	Maximum Permissible Errors Gilson Systematic error (µL)	Gilson Random error (µL)	ISO 8655 Systematic error (µL)	ISO 8655 Random error (µL)
	Min	0.2	± 0.024	⩽ 0.012	± 0.08	⩽ 0.04
U2		0.5	± 0.025	⩽ 0.012	± 0.08	⩽ 0.04
(F21021)	Max.	2	± 0.030	⩽ 0.014	± 0.08	⩽ 0.04
	Min.	1	± 0.025	⩽ 0.012	± 0.12	⩽ 0.08
U10		5	± 0.075	⩽ 0.030	± 0.12	⩽ 0.08
(F21022)	Max	10	± 0.100	⩽ 0.040	± 0.12	⩽ 0.08
	Min.	2	± 0.10	⩽ 0.03	± 0.20	⩽ 0.10
U20		5	± 0.10	⩽ 0.04	± 0.20	⩽ 0.10
(F21023)		10	± 0.10	⩽ 0.05	± 0.20	⩽ 0.10
	Max.	20	± 0.20	⩽ 0.06	± 0.20	⩽ 0.10
	Min.	20	± 0.35	⩽ 0.10	± 0.80	⩽ 0.30
U100		50	± 0.40	⩽ 0.12	± 0.80	⩽ 0.30
(F21024)	Max.	100	± 0.80	⩽ 0.15	± 0.80	⩽ 0.30
	Min.	20	± 0.50	⩽ 0.20	± 1.60	⩽ 0.60
U200		50	± 0.50	⩽ 0.20	± 1.60	⩽ 0.60
(F21025)		100	± 0.80	⩽ 0.25	± 1.60	⩽ 0.60
	Max.	200	± 1.60	⩽ 0.30	± 1.60	⩽ 0.60
	Min.	200	± 3	⩽ 0.6	± 8	⩽ 3.0
U1000		500	± 4	⩽ 1.0	± 8	⩽ 3.0
(F21026)	Max.	1000	± 8	⩽ 1.5	± 8	⩽ 3.0
	Min.	1000	± 12	⩽ 3	± 40	⩽ 15
U5000		2000	± 12	⩽ 5	± 40	⩽ 15
(F21027)	Max.	5000	± 30	⩽ 8	± 40	⩽ 15
	Min.	1 mL	± 30	⩽ 6	± 60	⩽ 30
U10ml		2 mL	± 30	⩽ 6	± 60	⩽ 30
(F21028)		5 mL	± 40	⩽ 10	± 60	⩽ 30
	Max.	10 mL	± 60	⩽ 16	± 60	⩽ 30

☞ *The data given in the table conform to the ISO 8655-2 Standard.*

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.

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

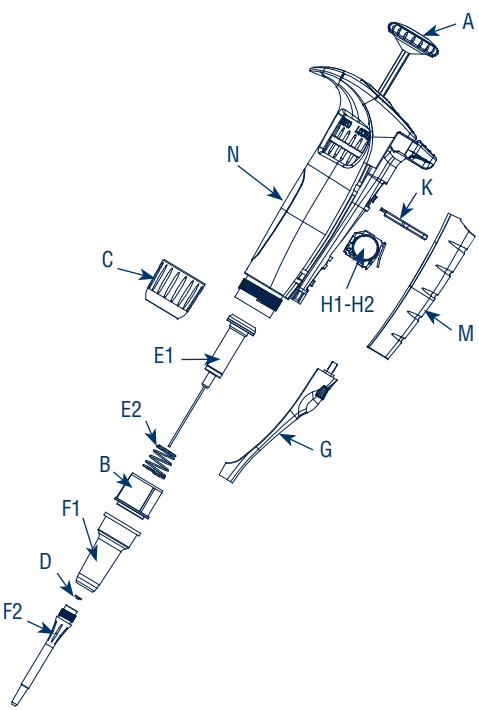
Gilson declares that its manufactured pipettes comply with the requirements of the ISO 8655 Standard, by type testing. The adjustement is carried out under strictly defined and monitored conditions (ISO 8655-6):

- 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 - SPARE PARTS

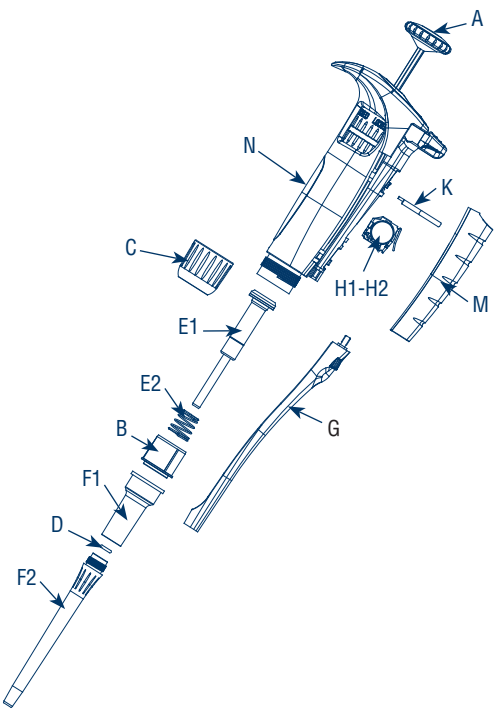
U2 (F21021) and U10 (F21022)

	Description	U2	U10
A	Push-button	F2070152	F2070252
B	Spring-guide	F20701031	F20701031
C	Connecting nut	F2072111	F2072111
D	Seal (x 5)	F161901	F161902
E1	Piston assembly	F2070160	F2070260
E2	Return spring	F2070125	F2070125
F1	Tip holder (upper)	F2070117	F2070117
F2	Tip holder (lower)	F2070118	F2070218
G	Tip ejector	F2070159	F2070159
H1	Battery Holder	F2070158	F2070158
H2	Battery	F20710	F20710
K	Recalibration Tool	F20751	F20751
M	Cover (battery compartment)	F2072107	F2072107
N	Plastic Window	F2072102	F2072102
-	Tip-ejector extension	F2070903	F2070903



U20 (F21023) and U100 (F21024)

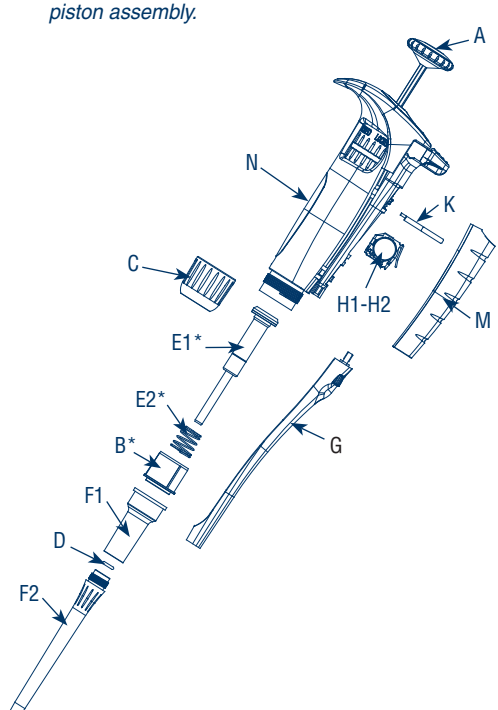
	Description	U20	U100
A	Push-button	F2070352	F2070452
B	Spring-guide	F20701031	F20701031
C	Connecting nut	F2072111	F2072111
D	O-ring (x 5)	F161903	F2070401
E1	Piston assembly	F2070360	F2070460
E2	Return spring	F2070125	F2070125
F1	Tip holder (upper)	F2070117	F2070417
F2	Tip holder (lower)	F2070318	F2070418
G	Tip ejector	F2070359	F2070459
H1	Battery Holder	F2070158	F2070158
H2	Battery	F20710	F20710
K	Recalibration Tool	F20751	F20751
L	Lubricant	F2070902	F2070902
M	Cover (battery compartment)	F2072107	F2072107
N	Plastic Window	F2072102	F2072102



U200 (F21025) and U1000 (F21026)

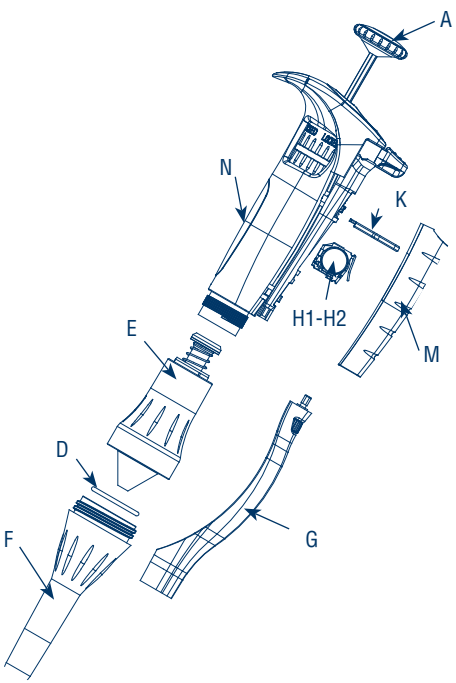
	Description	U200	U1000
A	Push-button	F2070552	F2070652
B	Spring-guide	F20701031	*
C	Connecting nut	F2072111	F2072111
D	O-ring (x 5)	F2070501	F2070601
E1	Piston assembly	F2070560	F2070664*
E2	Return spring	F2070125	*
F1	Tip holder (upper)	F2070517	F2070617
F2	Tip holder (lower)	F2070518	F2070618
G	Tip ejector	F2070559	F2070659
H1	Battery Holder	F2070158	F2070158
H2	Battery	F20710	F20710
K	Recalibration Tool	F20751	F20751
L	Lubricant	F2070902	F2070902
M	Cover (battery compartment)	F2072107	F2072107
N	Plastic Window	F2072102	F2072102

☞ ** 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
D	O-ring (x 5)	F2070701	F2070801
E	Piston assembly	F2070760	F2070860
F	Tip holder	F2070718	F2070818
G	Tip ejector	F2070759	F2070859
H1	Battery Holder	F2070158	F2070158
H2	Battery	F20710	F20710
K	Recalibration Tool	F20751	F20751
L	Lubricant	F2070902	F2070902
M	Cover (battery compartment)	F2072107	F2072107
N	Plastic Window	F2072102	F2072102



NOTES

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EC DECLARATION OF CONFORMITY

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Hereby certifies on its sole responsibility that the products listed below:

Pipetman Ultra®
U2, U10, U20, U100, U200, U1000, U5000, U10ml

comply with the requirements of the following European Directives:

98/79/EC*
on In Vitro Diagnostic Medical Devices

89/336/EEC
Electromagnetic Compatibility, EMC

** Annex III, self-declared*

Villiers-le-Bel, October 5th, 2004

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