



High-throughput pipetting with the programmable Pipetman Concept®

The first-of-its-kind Pipetman Concept® takes advantage of a PC-to-pipette connection to outperform traditional motorized pipettes for high-throughput manual pipetting tasks.

Pipettes are a staple of most laboratories, yet few offer such a comprehensive functional package as the new Pipetman Concept electronic pipette (Fig. 1) from Gilson. Pipetman Concept allows users to create pipetting protocols on their PC and transfer these to their pipette. Conceived with simplicity and flexibility in mind, Pipetman Concept offers exclusive multifunction characteristics housed in a traditional Gilson design. Here we will briefly outline how these unique features can simplify science and speed the pace of research.

PC-to-pipette connection

Electronic pipettes are required for high-throughput applications, such as assays relying on 96- or 384-well plates. Positioned in-between manual pipettors and semi-automated liquid handling instruments, the Pipetman Concept not only delivers the traditional features scientists would expect from any electronic pipette, it goes one step further. A unique PC-to-pipette connection via USB allows users to create and exchange an unlimited number of custom pipetting protocols. Protocols can be created in no time from preprogrammed tasks and can be exchanged on the Internet within the community of Pipetman Concept users. Preprogrammed tasks include aspiration, dispensing, dilution, mixing, repetitive dispensing and many more. A few minutes is all it takes to build a protocol on any laptop, using the Utility software (Fig. 2).

Once the program is uploaded onto the pipette, a simple click on the sensitive actuator button activates the different job sequences, providing unmatched user comfort, ease of use and faster pipetting. Using the Utility software to elaborate a complex pipetting protocol spares the user the tedious task of twiddling buttons and offers the flexibility of computer-based applications. Another outright benefit of loading protocols onto the pipette is that the operator only needs to follow the indications displayed on the pipette's screen to trigger the next action. In addition to convenience and ease of use, this innovation prevents possible errors that may result from glancing back and forth at the protocol sheet.

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Figure 1 | The Gilson Pipetman Concept electronic pipette.

Quality control

Researchers walk a fine line between the ideal world of rigorously controlled laboratory conditions they hope to achieve, and the real world of variable conditions and the potential for botched experiments. The Utility software was conceived to help reconcile these two worlds, and brings a clear enhancement to record keeping and quality compliance issues (for example, good laboratory practices, good manufacturing practices) by giving the user control of maintenance programs. Utility software reads data from and exports data to the Pipetman Concept. It stores and organizes maintenance reports, including pipette serial numbers and calibration data for traceability. All environmental conditions (for example, temperature, pressure, humidity) balance identifier and other useful information can also be recorded each time the pipette is calibrated.

As with all precision instruments, the Pipetman Concept needs to be adjusted to maintain its performance. Not only does it permit multi-point user adjustment at the three calibration points recommended by the ISO8655, but the Pipetman Concept also allows the user to input a fourth adjustment point to maximize performance at a specific volume. Maintenance intervals and alerts may also be set to prompt the user when it is time to service the pipette.

APPLICATION NOTES

Step / Description

- WAIT(start not pushed; Wait [start])

Wait for pushing start button

- DILUTION(vol1=10; speed1=5; name1=DNA 10 μ L; vol_AIR=15; speed_AIR=2; vol2=30; speed2=5; name2=Buffer 30 μ L)

Dilution of DNA with a buffer solution

- MIX(vol=30; speed_asp=5; speed_disp=5; n° mix.=3; name=3 x Mix)

Mixing of the dilution

- PURGE(with stop)

Purge with a stop at the lower position to avoid re-aspirating the dispensed liquid

- ALARM(duration=short; type=double)

Beep to indicate the end of the dilution and mixing steps

- WAIT(start not pushed; Wait [start])

- ASPIRATE(vol=30; speed=5; name=Aspirate DNA)

- WAIT(start not pushed; Wait [start])

- REPET_DISP(aliquot=10; speed=5; n° aliq.=3; name=Disp DNA 10 μ L)

Repetitive dispensing of 10 μ L DNA into the 3 tubes

- WAIT(start not pushed; Wait [start])

- PURGE(with stop)

- ALARM(duration=short; type=double)

Beep to indicate the end of the DNA dispense into 3 tubes

- ASPIRATE(vol=10; speed=5; name=Asp 5' probe)

Aspirate the 5' probe

- WAIT(start not pushed; Wait [start])

- DISPENSE(vol=10; speed=5; name=Disp 5' probe)

Dispense the 5' probe to the first tube

- PURGE(with stop)

- ALARM(duration=short; type=single)

Beep to indicate the end of the 5' dispense

- WAIT(start not pushed; Wait [start])

- ASPIRATE(vol=10; speed=5; name=Asp 3' probe)

Aspirate the 3' probe

- WAIT(start not pushed; Wait [start])

- DISPENSE(vol=10; speed=5; name=Disp 3' probe)

Dispense the 3' probe to the second tube

- PURGE(with stop)



Figure 2 | Example of an experimental protocol to prepare DNA solutions in three tubes.

Blending ergonomics and pipetting

The Pipetman Concept features several ergonomics enhancements that address the concerns about strain-related injuries (**Fig. 3**). Streamlined ergonomic design with selectable menus and straightforward navigation make both routine and complex tasks easy to perform. Each component may be independently adjusted in response to the user's hand anatomy, thus greatly alleviating the inevitable strain induced by prolonged pipetting work. The adjustable rest hook guarantees best fit in



Figure 3 | Elements of the Pipetman Concept. (a) Adjustable tip-ejector button. (b) Adjustable tip-ejector stroke and position. (c) Adjustable hook. (d) 'Mouse-like' navigation thumbwheel.

all users' hands, and the patented three-position tip-ejector button may be set for left- or right-handed users to provide natural accessibility. Finally, the patented adjustable tip-ejector stroke and position provides maximum compatibility with tips and low ejection force.

In contrast to manual pipettes, the Pipetman Concept achieves improved accuracy and precision by eliminating operator-to-operator variability as well as reducing errors caused by any one operator. Furthermore, by moving the operator's attention and energy away from driving the plunger, Pipetman Concept allows a shift of concentration to where it is needed most. The benefit of motorized pipetting, however, should not be offset by an awkwardly designed user interface, and one of the major benefits of the Pipetman Concept lies in its interface. The patented multifunctional 'mouse-like' thumbwheel makes it incredibly easy to use: users just have to scroll and click to select a menu option. Navigation is straightforward and intuitive, and buttons offer direct access to the most frequently used functions, such as aspiration speed and mode selection.

Conclusion

In summary, the Pipetman Concept offers a combination of quality, usability and comfort. It handles simple pipetting tasks and complex protocols equally well, making both routine and comprehensive tasks easy to perform. This new concept of motorized pipette provides the missing link between manual and automated liquid handling. The Utility software dramatically increases the standard Pipetman Concept features, making it a genuinely multifunctional precision instrument. Fourteen models cover the full range of volumes from 0.5–10 ml, with both single and multichannel pipetting models available. Additional information is available on our company website (<http://www.gilson.com>).

This article was submitted to *Nature Methods* by a commercial organization and has not been peer reviewed. *Nature Methods* takes no responsibility for the accuracy or otherwise of the information provided.