

ATMOS

Pipette Accuracy Tester

Operation Manual



www.unipix-atmos.com

sales@unipix-atmos.com

Imprint

Information in this document is subject to change without notice. No part of this document may be reproduced or transmitted without the express written permission of UniPix GmbH.

While every precaution has been taken in the preparation of this document, the publisher and the author assume no responsibility for errors or missions, or for damages resulting from the use of information contained in this document or from the use of programs and source code that may accompany it.

In no event shall the publisher and the author be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

© 2023 UniPix GmbH. All rights reserved.

Printed: 28.06.2023

UniPix GmbH
Eisenbahnstrasse 63
72072 Tübingen
Germany

Phone +49-7071-777 2818
sales@unipix-atmos.com
www.unipix-atmos.com

Contents

Imprint	2
General Information	5
About ATMOS.....	5
Using ATMOS	6
Turning on ATMOS	6
ATMOS Functions	7
Accuracy Function	7
Pipette size selection screen.....	7
Measurement screen.....	7
Measurement Procedure.....	8
Results Screen.....	10
Statistics Screen	11
Molarity Function	12
Dilution Function.....	13
Serial Dilution Function	14
Calculator Function	15
Settings Screen	16
“ReadATMOS” program.....	19
ATMOS Technical Specifications.....	21
Technical Specifications	21
Troubleshooting	22
Further Information.....	23
Warranty	23
Disposal	23

Disclaimer

- The Pipette Accuracy Tester ATMOS is designed for the specific use of testing and calibrating air displacement laboratory pipettes and no other use is recommended.
- The user must read and understand this manual before operation.
- This instrument should only be used in a laboratory environment.
- Do not open or attempt to repair the instrument without expressed and explicit instructions from UniPix.
- Do not use the instrument in an atmosphere with a danger of explosion.
- Do not allow unauthorized and/or untrained operators to use this device.
- Do not recharge the instrument in a liquid or humid environment.
- Any misuse will be the sole responsibility of the user/owner and UniPix assumes no implied or inferred liability for direct or consequential damages from this instrument if it is operated or used in any way other than for which it was designed.

General Information

About ATMOS

The UniPix ATMOS Pipette Accuracy Tester is an instrument for precise measurement of air displacement pipettes, without need of liquid. It is based on **comparison** with a **calibrated internal reference cavity** in the instrument. It also measures the leak rate of pipettes.



**Never use the instrument with liquid in the pipette tip.
This will permanently damage the instrument (no repair is possible)!**



**Allow the internal temperature to stabilize during at least 30 minutes after
unpacking or moving the instrument from another room.**

- It is recommended to verify that the instrument battery is well charged or to use the instrument with the external power supply connected via the USB cable.
- The instrument is powered by an internal Lithium-Polymer battery which allows continuous operation for more than **3 hours** and several weeks with short daily testing sessions.

Using ATMOS

Turning on ATMOS

- Press the **main switch** on the front of the instrument to power on.
- After powering on, the instrument runs a self-test procedure for about 10 seconds.
- The home screen then shows all available functions:



- Accuracy: Precise measurement of air displacement pipettes, in absence of liquid.
 - Molarity: Calculator for molar concentration for your customizable values.
 - Dilution: Calculator for dilution of your solution.
 - Serial dilution: Calculator for serial dilution by pre-defined or customized factors.
 - Calculator: Standard calculator.
 - Settings (gear symbol): See/change basic settings like version/serial number, date/time.
- Select the function you want to use by touching the respective button on the screen. For detailed description on each function, please see below.
 - When not operated, the instrument automatically turns OFF after 5 minutes.
 - To shut down manually, press the main switch on the front of the instrument.

ATMOS Functions

The ATMOS device offers various functions for daily laboratory work.

Apart from the pipette accuracy measurement, it can also support the user with molarity/dilution/serial dilution calculations and offers a standard calculator.

All functions are described below.

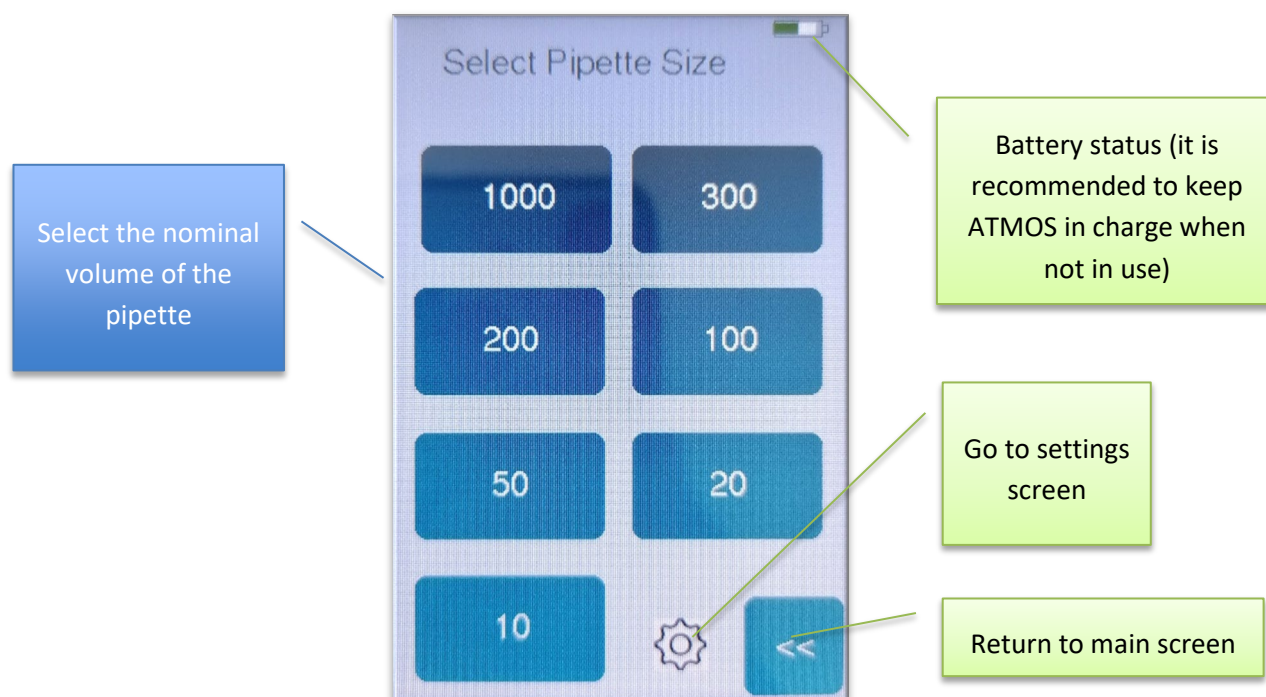
Accuracy Function

The accuracy function will measure the accuracy of your pipette.

Click the button “Accuracy” on the main screen.

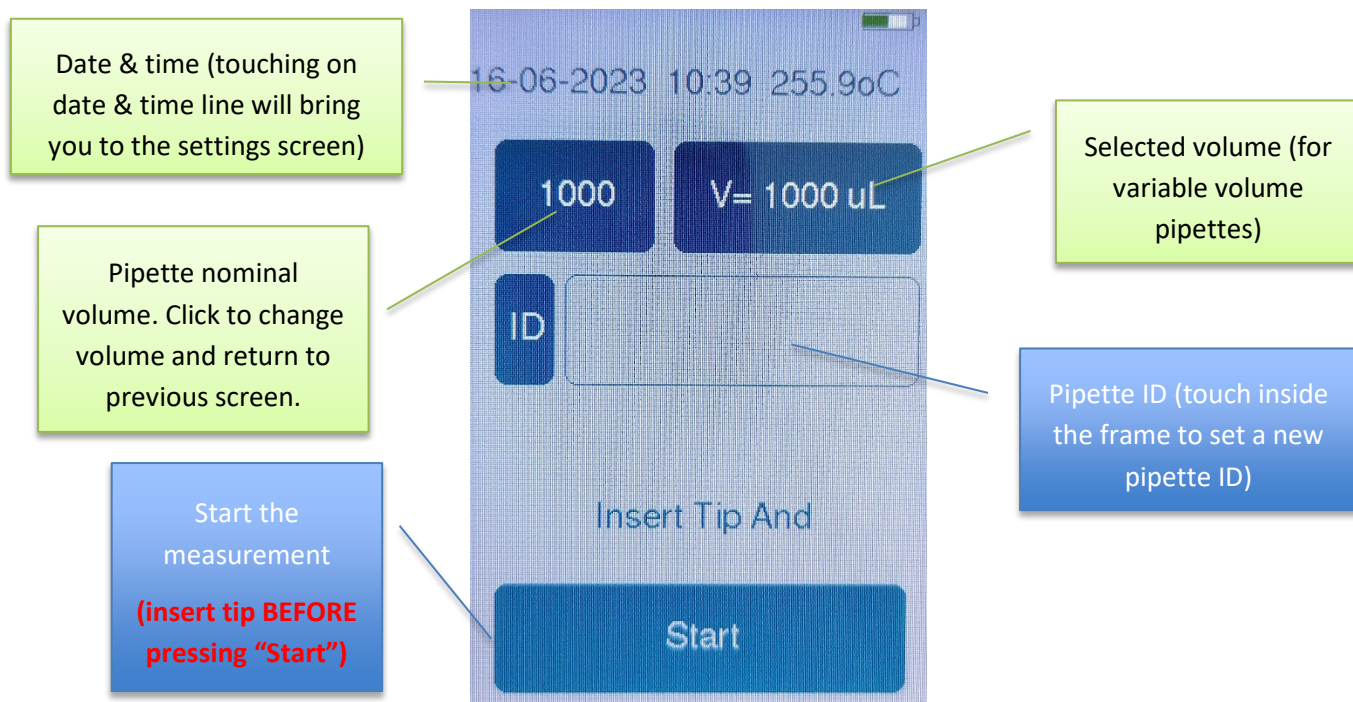
Pipette Size Selection Screen

Select the pipette size you are testing:



Measurement screen

After pipette selection or after measurements, you will see the measurement screen.



From this screen, you can reach the following functions:

- The **Start** button will initiate the measurement procedure. Please insert the tip (WITHOUT LIQUID) and be ready to actuate the piston BEFORE touching the button.
- The **Pipette size** button allows you to select a new pipette model. It will bring you back to the selection screen.
- The **Pipette ID** button allows you to enter a numeric ID that will be stored with the measured data.
- The **Volume** button allows the selection of sub-volumes of the pipette in the case of variable volume pipettes.

Measurement Procedure

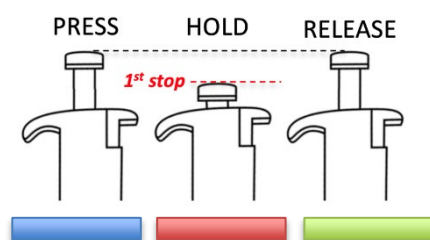
1. Insert the pipette tip firmly in the center port. Hold the pipette vertically and steady.

NO LIQUID IN THE PIPETTE TIP! *(liquid will permanently damage the instrument)*

2. Press the **Start** button, without moving the pipette.



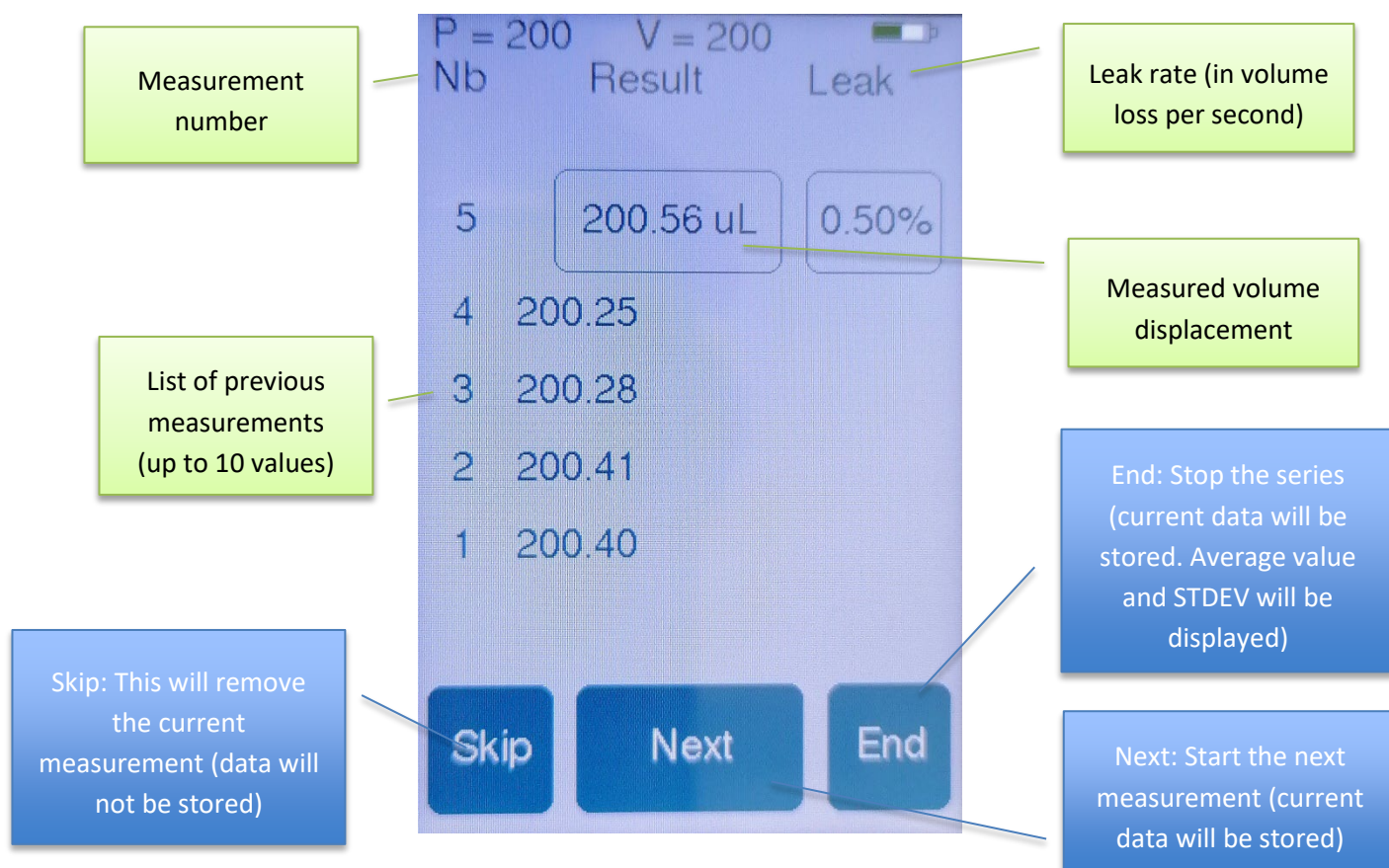
3. **Push the piston** to the first stop, while firmly keeping the tip inserted in the port. Movement should be done during the **BLUE** phase of progress bar.



4. The **progress bar** at the bottom indicates that the instrument is measuring. **The pipette and the piston should be kept steady when the progress bar is RED.**
5. Release the piston, when the progress bar is **GREEN**.

Results Screen

1-channel version



The result screen shows the following data:

Nb: Measurement number. Up to 10 measurements can be shown.

RESULT: Measured volume displacement of each measurement.

Leak rate: Expressed in volume loss per second. A leak above 0.5%/sec of test volume indicates a leaky pipette, or leaky tip connection (or a bad insertion of the tip into ATMOS port).

The following actions are possible:

SKIP: This will remove the current measurement. It will not be stored in the memory.

NEXT: This will start the next measurement. The current measurement will be stored in the memory.

END: This will stop the series and display statistics (possible only after 3 measurements). Usually, 3 measurements are enough to get a good estimate of pipette performance.

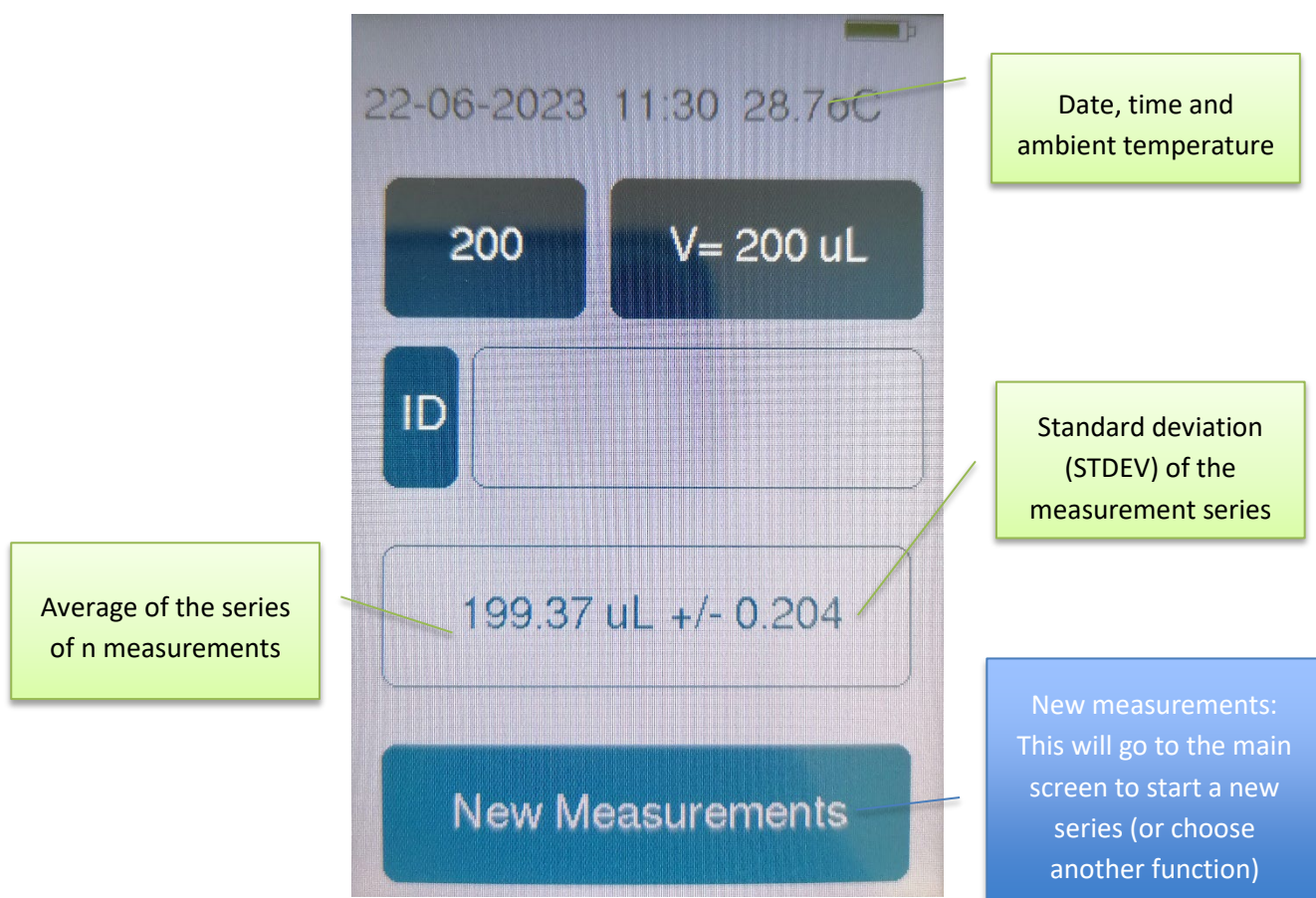
The reasons for bad results can be:

- Bad insertion of the tip into the port.
- User not following instructions during the calibration process.
- A totally non-functional pipette.
- A very leaky pipette or tip connection.

Statistics Screen

1-channel version

This screen is shown after clicking the “END” button after min. 3 measurements.



It shows:

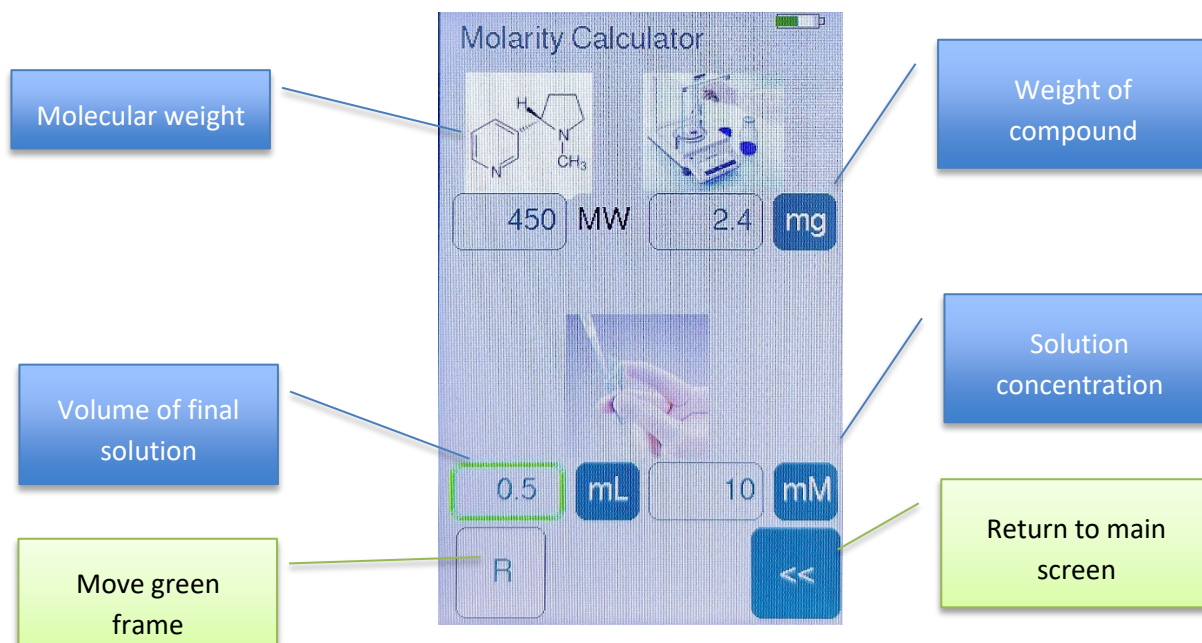
- Current date, time, and ambient temperature
- Information on the pipette (P and volume) pre-defined by user
- ID: numeric ID pre-defined by user
- Average volume of the series of n measurements and standard deviation (STDEV) of the measurement series

The **New measurements** button will go back to the main screen and you can start a new series of measurements or select another function of ATMOS (molarity, dilution, serial dilution or calculator).

Molarity Function

This tool is designed to support you in calculating the molar concentration of your solution.

Click on the button “Molarity” on the main screen to start a calculation.



To enter the desired values, click in the field and type in your numbers (a number keyboard is displayed).

Please note: the “Enter” button is: <<.

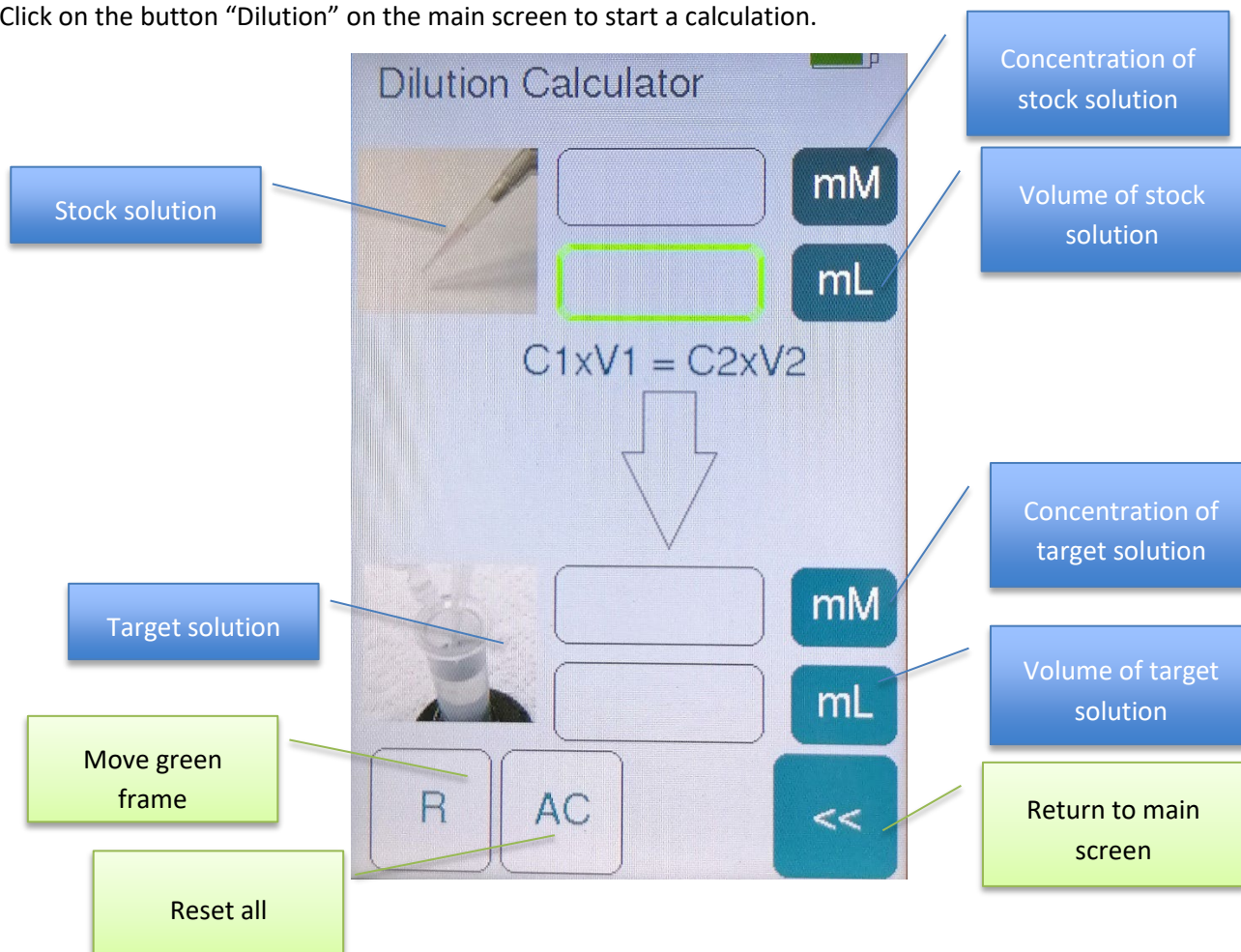
The **green frame** indicates the value that is calculated. To move it (and change the value you want to calculate), press the button “R” on the lower left side of the screen.

Measurement unit of any of the values can be adjusted by clicking on the respective unit (e.g. click on “mL” to change to “ μ L”).

Dilution Function

The dilution function will support you in calculating the values for diluting a solution.

Click on the button “Dilution” on the main screen to start a calculation.



In the example on the screen above, you want to compute the required volume of your stock solution.

Click in the field you want to modify. A number keyboard opens, and you can insert your numbers.

Please note: the button "<<" is "Enter".

The green frame indicates the value that is calculated. To change the value you want to calculate, press the button "R" on the lower left side of the display.

The button "AC" will reset all values.

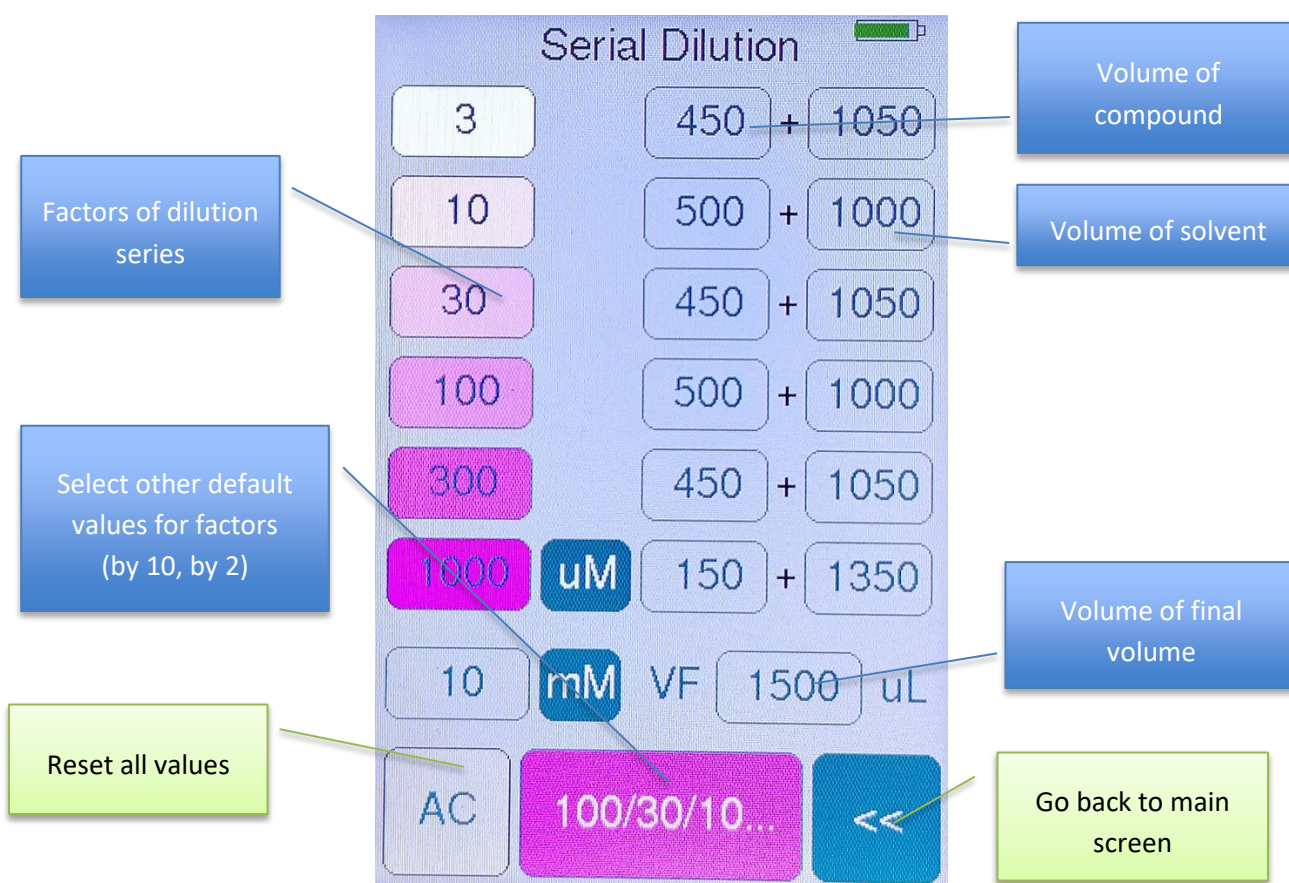
The button "<<" returns to main screen.

You can change the measurement unit of all 4 values by clicking on the unit (e.g. click on "mL" to change to "μL").

Serial Dilution Function

This function is designed to simplify the preparation of a serial dilution.

Click on the button “Serial Dilution” on the main screen to start a calculation.



The serial dilution calculator helps you calculate up to 6 concentrations.

The left, pink column shows the dilution factors. On the right, you see the volumes of compound + solvent.

The default final volume is 1500µL. To change this value, click in the number (“1500”). A number keyboard opens and you can insert your custom volume.

Please note: the button << is “Enter”.

The default calculation is a dilution by 3. By clicking on the pink button on the bottom of the display, you can select other default factors (by 10 or by 2). If you want to use customized values, click on the pink numbers in the left column. A number keyboard will show up and you can overwrite the default values.

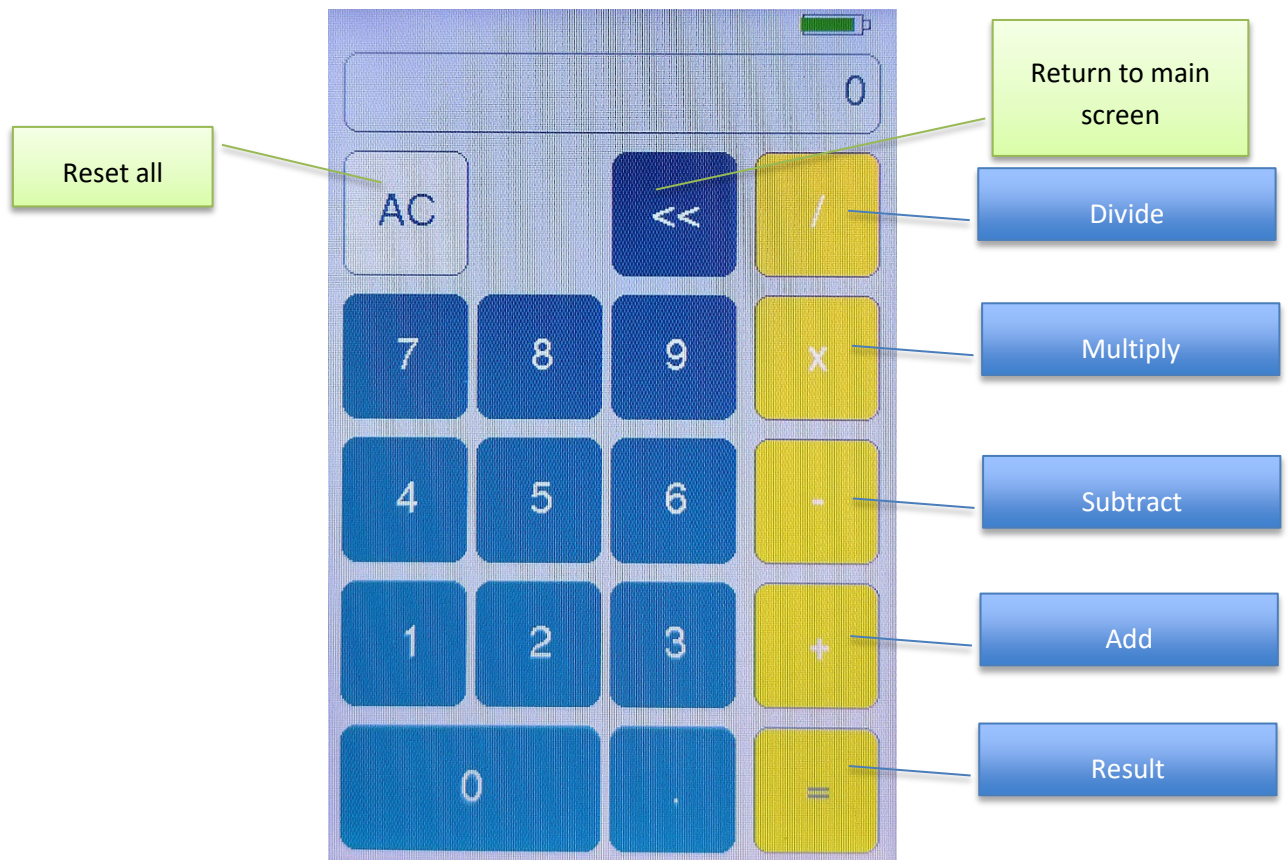
The button “AC” will reset all values.

You can change the measurement units by clicking on the unit (e.g. click on “mL” to change to “µL”).

Calculator Function

The calculator function offers a standard calculator.

Click on the button “Calculator” on the main screen to start the tool.



A standard numbers keyboard shows up and you can calculate:

/ → Divide

x → Multiply

- → Subtract

+ → Add

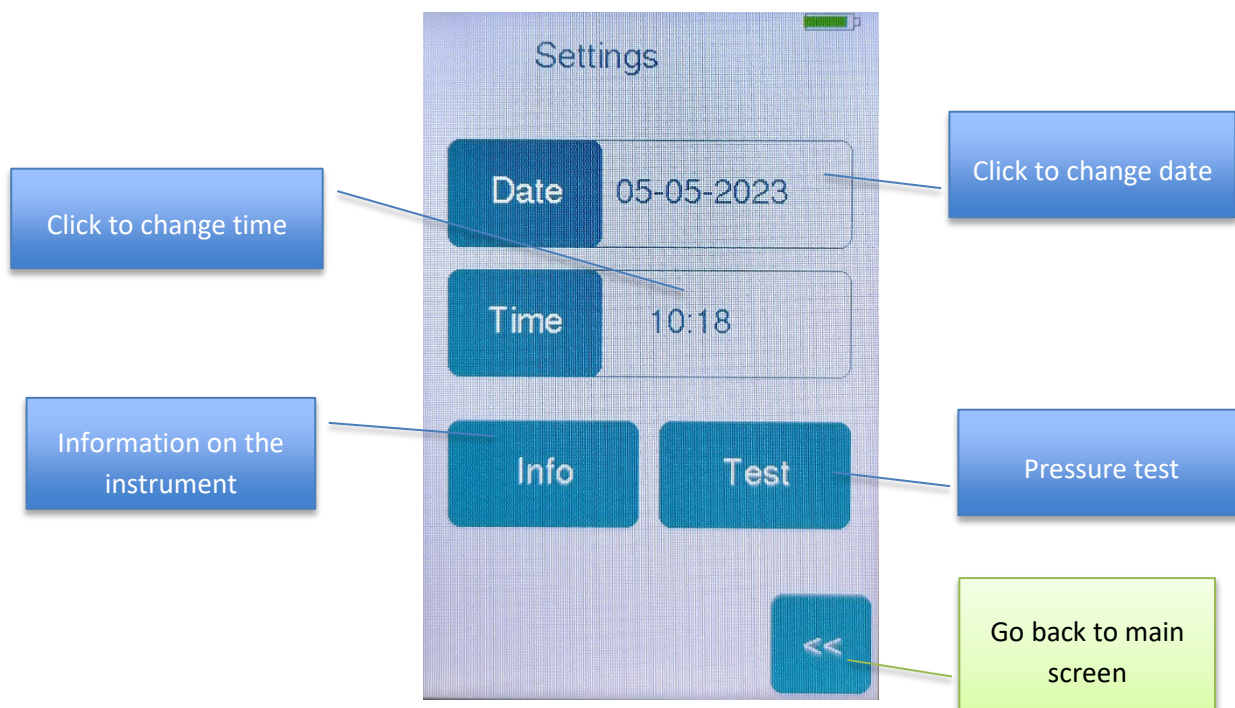
= → Result

The button “AC” resets all values.

The button “<<” returns to the main screen.

Settings Screen

The **Settings** screen can be reached by touching the **gear symbol** on the lower right corner of the main screen.



Date

To change the date, click on the button “Date”. You will be asked to type in the date in the following order:

1. Year
2. Month
3. Day

Please note: Each value has to be entered with **2 digits** (YY MM DD). There is no need to confirm the values. Typing the second digit will automatically confirm your input.

Time

To change the time, click on the button “Time”. You will be asked to type in the time in the following order:

1. Hour
2. Minute

Please note: ATMOS runs on 24h. Each value has to be entered with **2 digits** (hh mm). There is no need to confirm the values. Typing the second digit will automatically confirm your input.

Info

Clicking on the button “Info” will give you information on your instrument.

Firmware

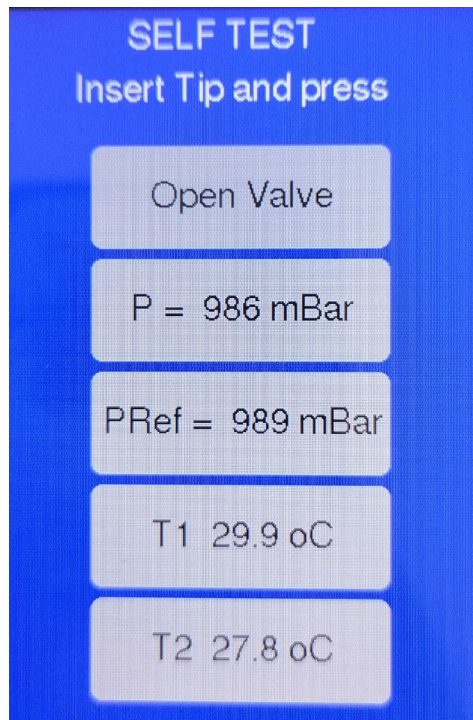
Serial Number

VRef & VInt → Calibration values (pre-defined by UniPix)

Test

To perform a self test of the instrument, please click on the button “Test”.

You will see the following screen:



P= measured pressure

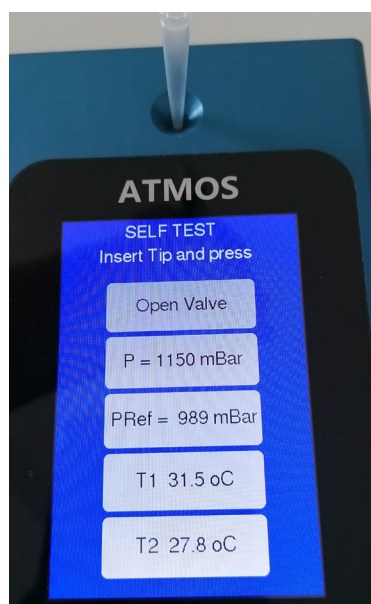
Pref= reference pressure

T1: temperature on sensor 1

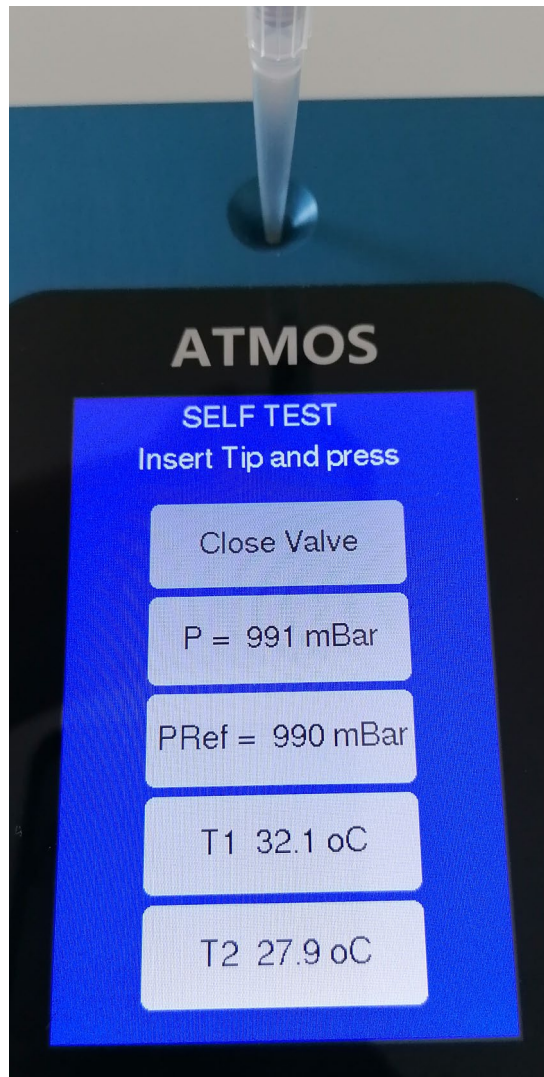
T2: temperature on sensor 2

The values of P and Pref should be similar.

Now insert a tip and press the piston to the first stop. The measured pressure will increase.



Press the button “Open Valve”. You will hear a click.



Both pressure values will approach each other again. They should be very similar. If this is the case, the self test of the device was successful and it runs correctly.

If the values differ, please run the test again, maybe with a different pipette.

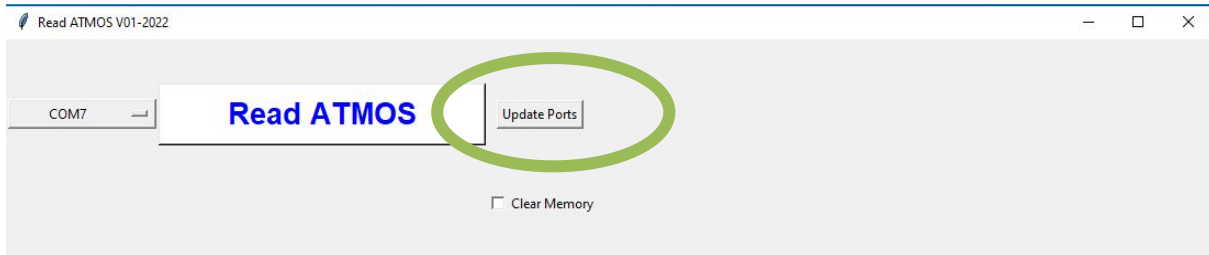
If the test is still unsuccessful, please contact UniPix or your local sales person.

“ReadATMOS” program

ReadATMOS is a program which allows downloading data from the ATMOS instrument via a USB cable.

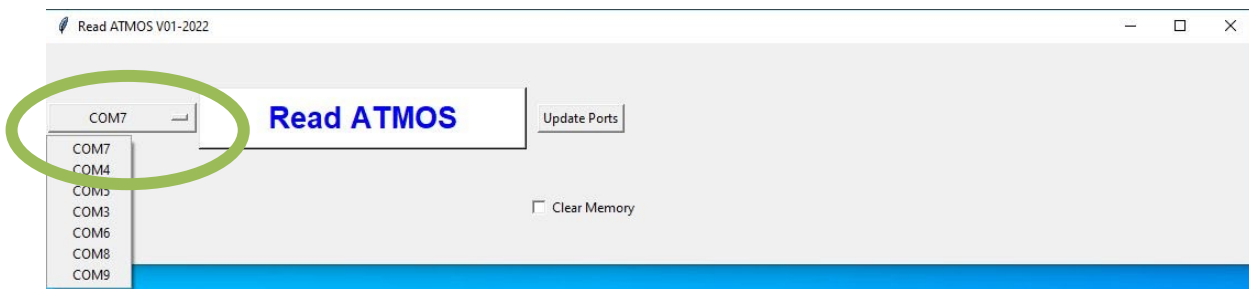
Download the “ReadATMOS” program from the website <https://www.unipix-atmos.com/atmos/downloads/>.

Verify that your ATMOS device is **connected** to the computer and **turned on**. Then start “ReadATMOS” on your computer. The following window appears.

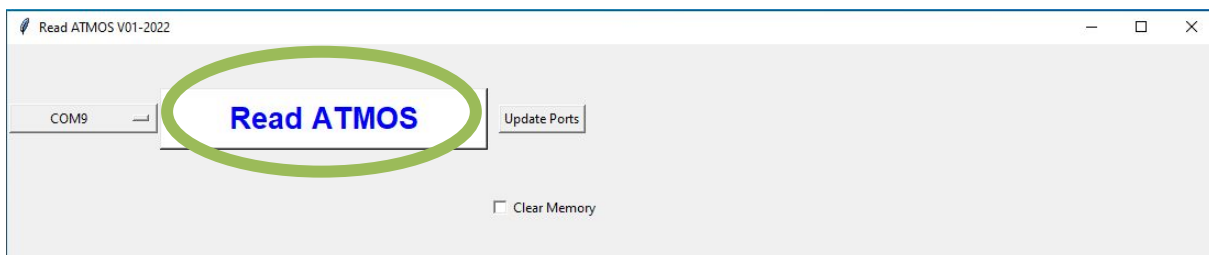


First click the button “update ports” to identify the port connected to ATMOS.

Select the appropriate COM port. Usually it is the top one in the column.

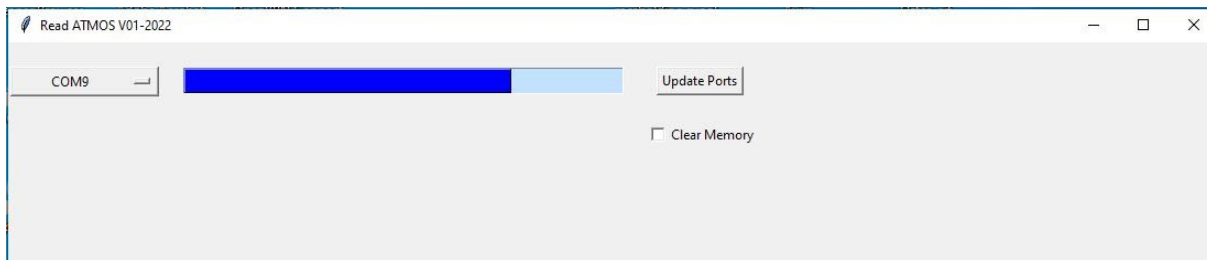


Then click “Read ATMOS” button.



A new window will show up and you will be asked for a name and location for your Excel file. Please select the storage location and enter a file name. Then click “Save”.

After pushing the “Save”.button, the “ReadATMOS”.program will download data from ATMOS. The blue bar shows the progress.



When the download is finished, you can quit the program and open the Excel sheet.

Data will be presented like the following example:

	A	B	C	D	E	F	G
1							
2	Date = 4:4 Time = 21: T = 23.0 oC						
3	Pipette	Vcal	oC	VRef	dV		
4	200	200	23	800	202,09		
5	200	200	23	800	200,8		
6	200	200	23,06	800	200,65		
7	Date = 4:4 Time = 21: T = 23.2 oC						
8	Pipette	Vcal	oC	VRef	dV		
9	200	200	23,25	800	199,95		
10	200	200	23,31	800	199,71		
11	200	200	23,38	800	199,94		
12	Date = 8:4 Time = 22: T = 22.2 oC						
13	Pipette	Vcal	oC	VRef	dV		
14	200	200	22,19	800	199,22		
15	200	200	22,31	800	199,38		
16	200	200	22,38	800	199,13		
17	Date = 9:4 Time = 16: T = 22.1 oC						
18	Pipette	Vcal	oC	VRef	dV		
19	200	200	22,06	800	199,23		
20	200	200	22,12	800	198,94		
21	200	200	22,12	800	199,31		
22							
23							
24							

ATMOS Technical Specifications

Maximum accuracy error formula: $\pm E = (4\% * dV) + 0.1 \quad [\mu l]$

<i>P = nominal pipette volume</i>		Absolute accuracy (= trueness)	Repeatability (= precision)
P=1000	1000 μl	$\pm 4 \mu l$	$\pm 1.5 \mu l$
P=200	200 μl	$\pm 0.1 \mu l$	$\pm 0.3 \mu l$
P=100	100 μl	$\pm 0.5 \mu l$	$\pm 0.15 \mu l$
P=20	20 μl	$\pm 0.18 \mu l$	$\pm 0.05 \mu l$
P=10	10 μl	$\pm 0.14 \mu l$	$\pm 0.06 \mu l$

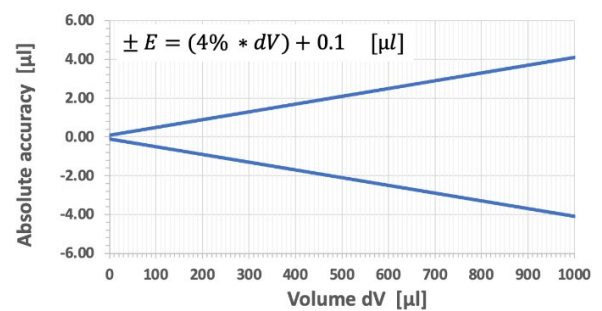
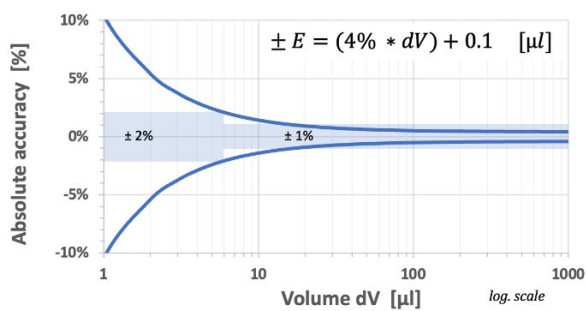


Figure: Atmos accuracy in function of tested volume displacement

Technical Specifications

Dimensions	12.5 x 8.5 x 3 cm
Weight	420 g
Power supply	5V DC, 2A
Battery	2000 mAh, Lithium-Polymer
Operational temp.	from 10 °C to 40°C
Altitude	from sea level up to 3500m

Troubleshooting

Problem	Possible cause	Solution
No power	Low battery	Connect to power supply.
	Instrument turned OFF after unused period	Press main switch.
Poor reproducibility	Bad manipulation	First check with another pipette. Refer to user manual for proper operation.
	Dirty or damaged tip port	Clean(no liquid!) or contact your sales person.
	Very bad pipette	Verify tip, and try another pipette.
Software shows error message when starting	Device is not connected or turned on	Connect ATMOS via USB cable and turn it on. Then start the software again.
Software shows error message when downloading	No data stored on device	Perform and store min. 3 measurements.

Further Information

Warranty

UniPix shall not be retained liable for any consequences of improper handling, use, servicing, operating or unauthorized repairs of the instrument or the consequences of normal wear and tear as well as the failure to follow the instructions of the operating manual. UniPix shall not be liable for damage resulting from any actions other than those described in the operating manual or following the use of non-original replacement parts.

Disposal

Storage batteries and electronic devices must be disposed of separately from household trash (mixed municipal waste) at the end of their service life.