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Innovative laboratory solutions

ATMOS

Pipette Accuracy Tester

Operation Manual for V5.1

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Imprint

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Contents

Disclaimer

- The Pipette Accuracy Tester ATMOS is designed for the specific use of testing 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.
- Do not use with liquid in the pipette tip. Liquid will permanently damage the instrument.
- 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)!

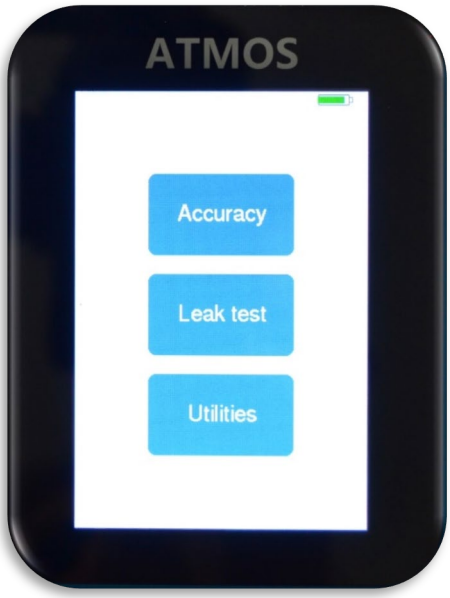
Allow the internal temperature to stabilize during at least 30 minutes after unpacking or moving the instrument from another room.

- 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 **6 hours** or 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 categories:



On the top right, you see the charging status of the battery.

The little dot next to the battery indicates, if a printer is connected (white dot → no printer detected, red dot → printed detected)

- Accuracy: Precise measurement of the displaced air volume, in absence of liquid. Shows the exact measured volume in µL.
- Leak test: Quick leak test to preclude leaking pipettes.
- Utilities: Various supporting features and settings.

- On most screens, **swiping from right to left** will bring you back to the main screen. You can also use the button "<<" where available.
- Select the function you want to use by touching the respective button on the screen. For detailed description on each function, please see below.
- If you plan to **print** your results immediately, please make sure that your printer is connected before turning on ATMOS. You cannot connect your printer during the measurement procedure. For information on printers, please see chapter Print Function.
- When not operated, the instrument automatically turns OFF after 15 minutes (duration can be adjusted in settings).
- 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.

Please note: In this manual, you see the pictures for the 1-channel version of ATMOS. Everything works the same for the **8-channel version**. The only difference is that you get the results for each individual channel (information on volume and leakage, pass/fail in color bars etc), so the screens for results and statistics include more information.

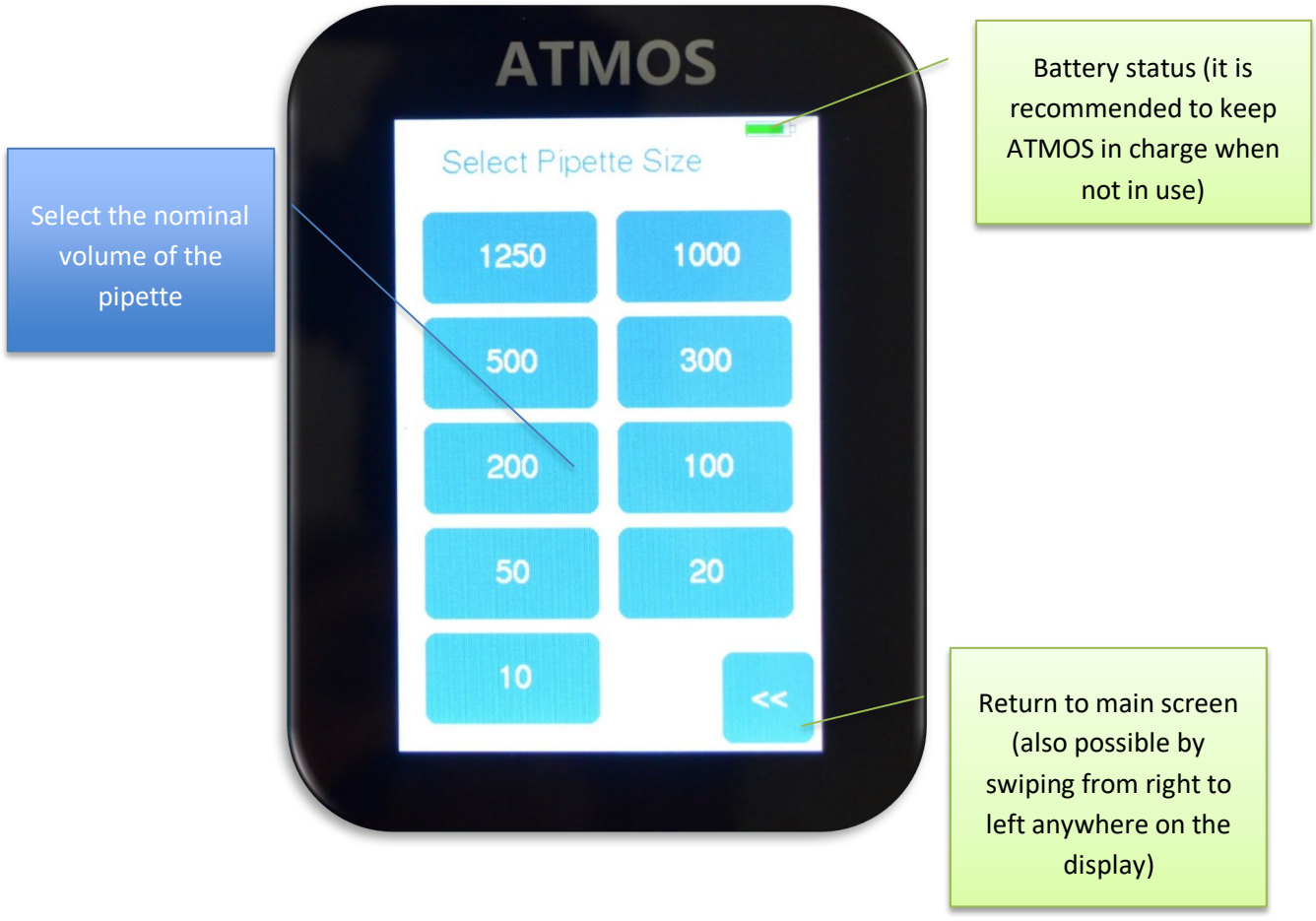
Accuracy Function

The accuracy function will measure the accuracy of your pipette.

Click the button “Accuracy” on the main screen.

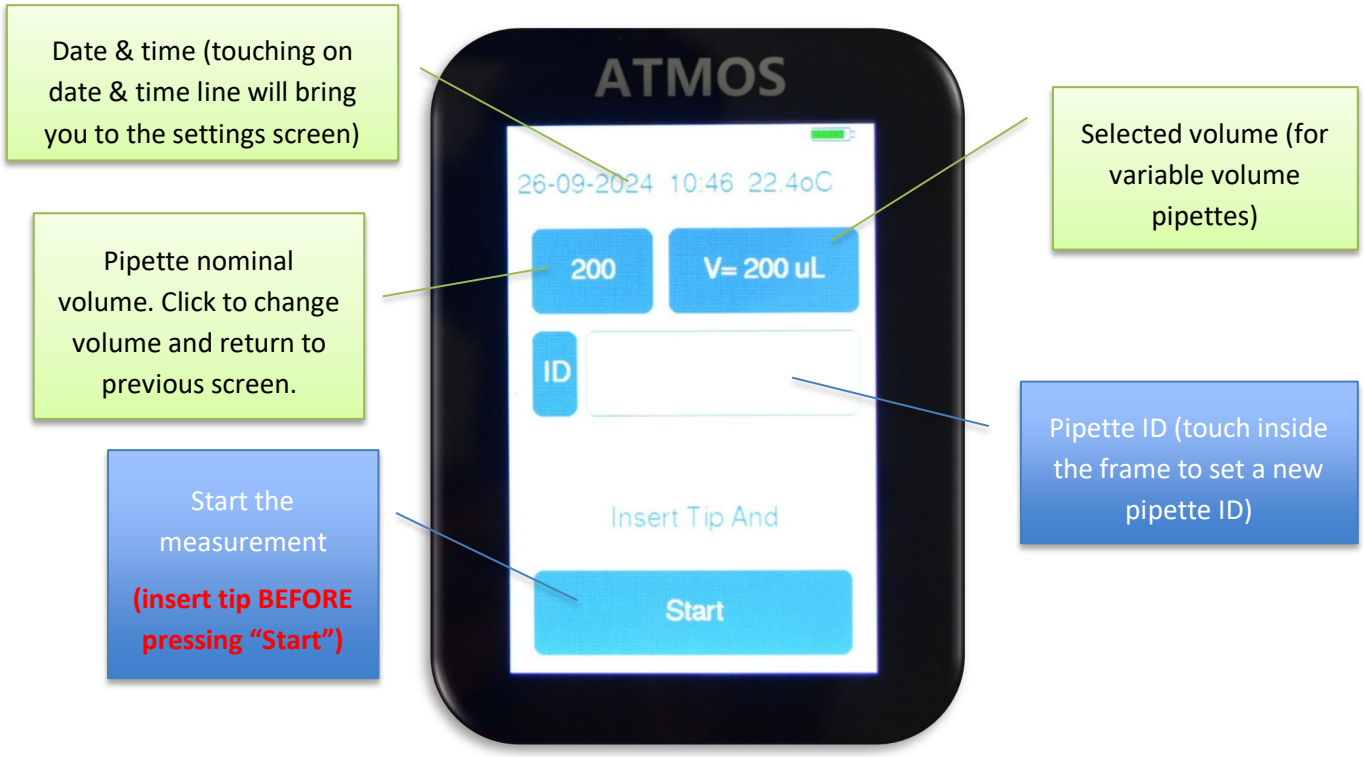
Pipette Size Selection Screen

Select the pipette size you are testing (important: select the nominal volume of your pipette!):



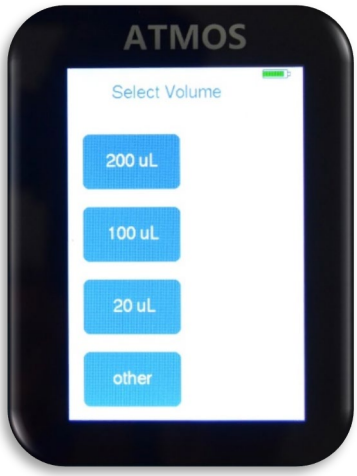
Measurement screen

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. You can get started immediately, if you work with a fixed volume pipette or with the max. volume of a variable pipette. Please insert the tip (WITHOUT LIQUID) and be ready to actuate the piston BEFORE touching the button.
- The **Pipette size** button (here "200") allows you to select a new pipette model. It will bring you back to the selection screen.
- The **Selected volume** button (here "V=200uL") allows you to select the volume you are actually testing (using a variable volume pipette). The following screen will show up, offering default values and the option for custom values (via "other").



- The **Pipette ID** button allows you to enter an ID that will be stored with the measured data.

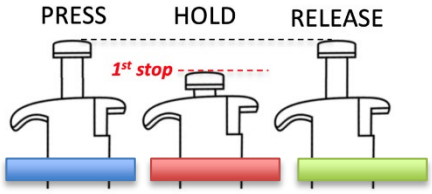
Measurement Procedure

1. Insert the pipette tip firmly in the center port. Hold the pipette vertically and steady, but do not press down the piston.

   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 keeping the tip inserted in the port. Movement of the piston should be done **quickly,** max. during **the BLUE phase of progress bar**, better quicker.



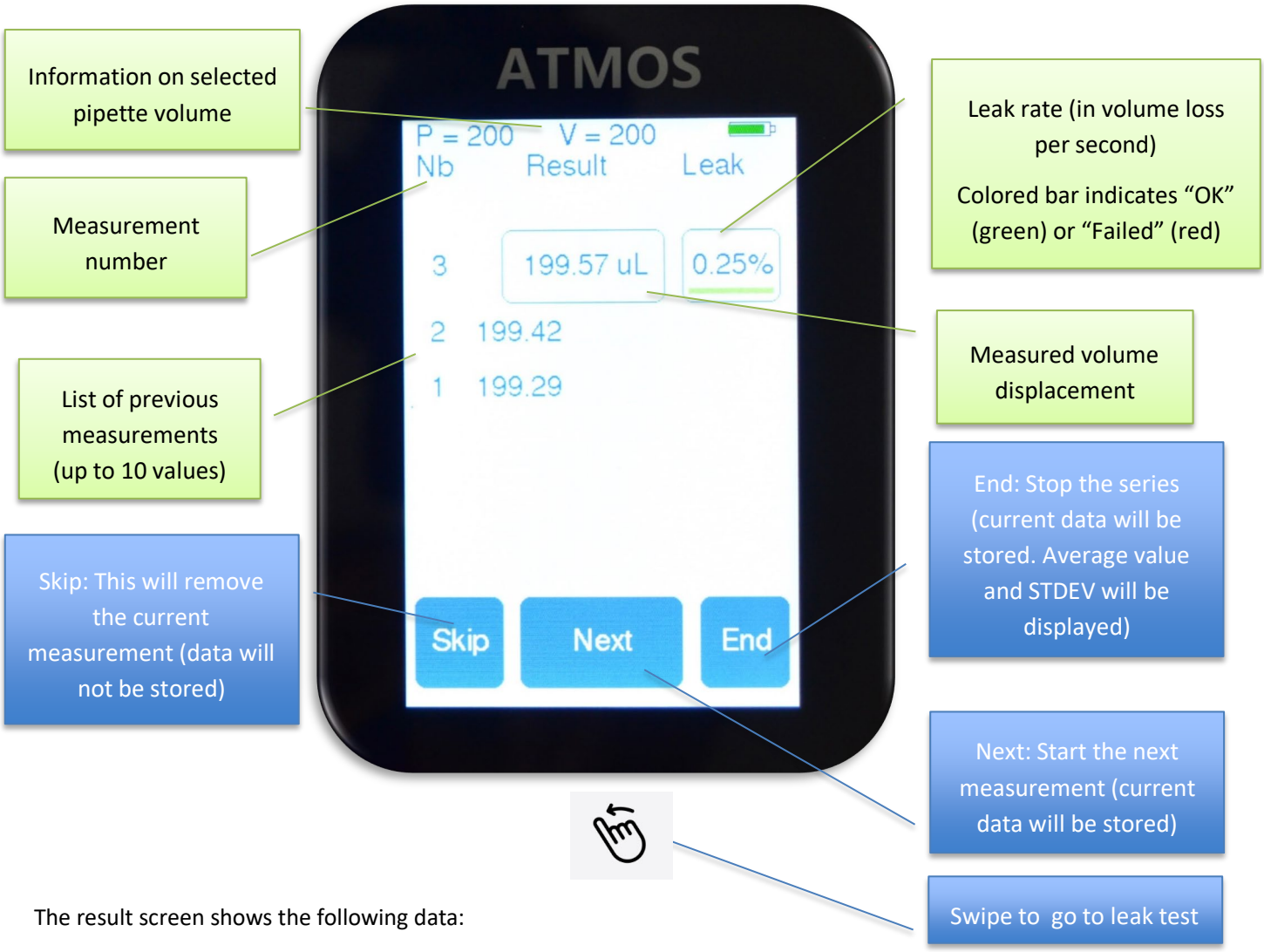
4. The **progress bar** at the bottom indicates that the instrument is measuring. **The pipette and the piston should be kept steady when the progress bar is RED**.

5. Release the piston when the progress bar is **GREEN.**

! ATTENTION FOR 8-CHANNEL-VERSION!

Make sure that you hold the pipette horizontally, so that all tips are inserted in the ports equally.

Results Screen



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 1%/sec of test volume indicates a leaky pipette, or leaky tip connection (or a bad insertion of the tip into ATMOS port). The green bar indicates "OK" (max. 1% leak), a red bar indicates "failed" (above 1% leak)

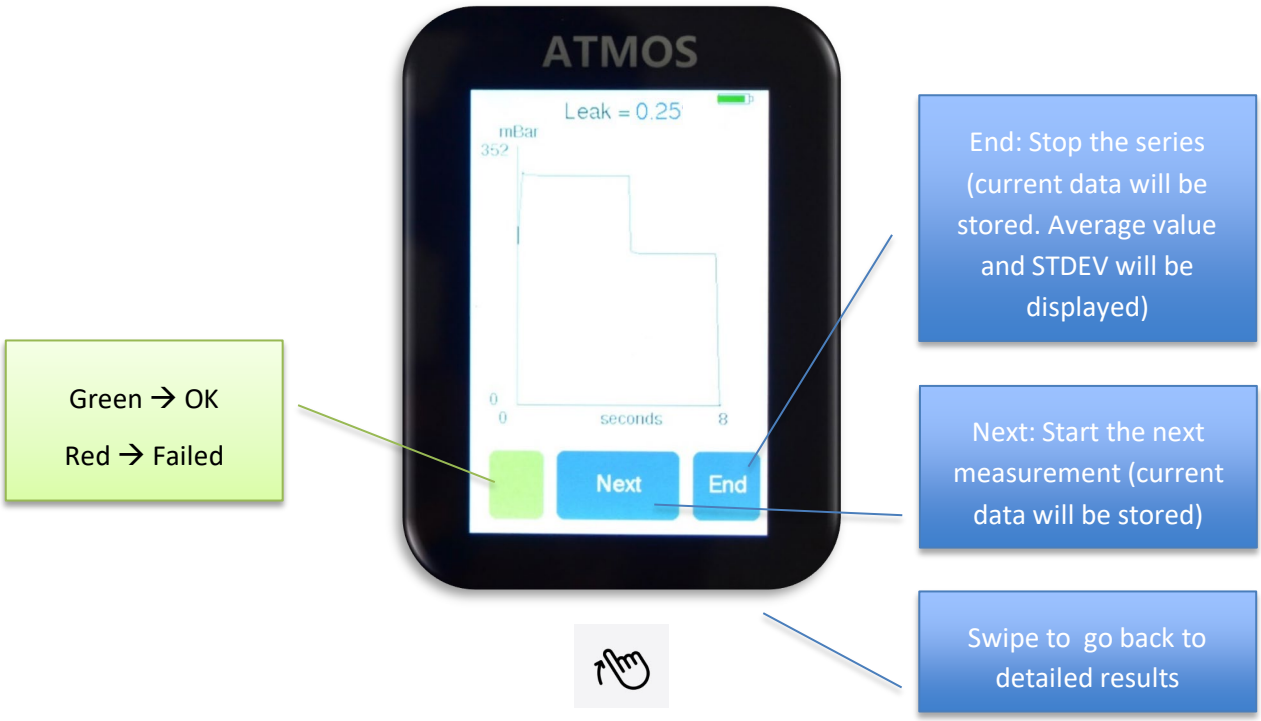
The following actions are possible:

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 a minimum of 3 measurements). Usually, 3 measurements are enough to get a good estimate of pipette performance.

SWIPE: Swiping from right to left will bring you to a detailed view on the leakage for the current measurement.



Swipe to go back to detailed results

Swiping from left to right will bring you back to the results screen with all measurements and the detailed measured volume. This way, you can switch back and forth between the display modes.

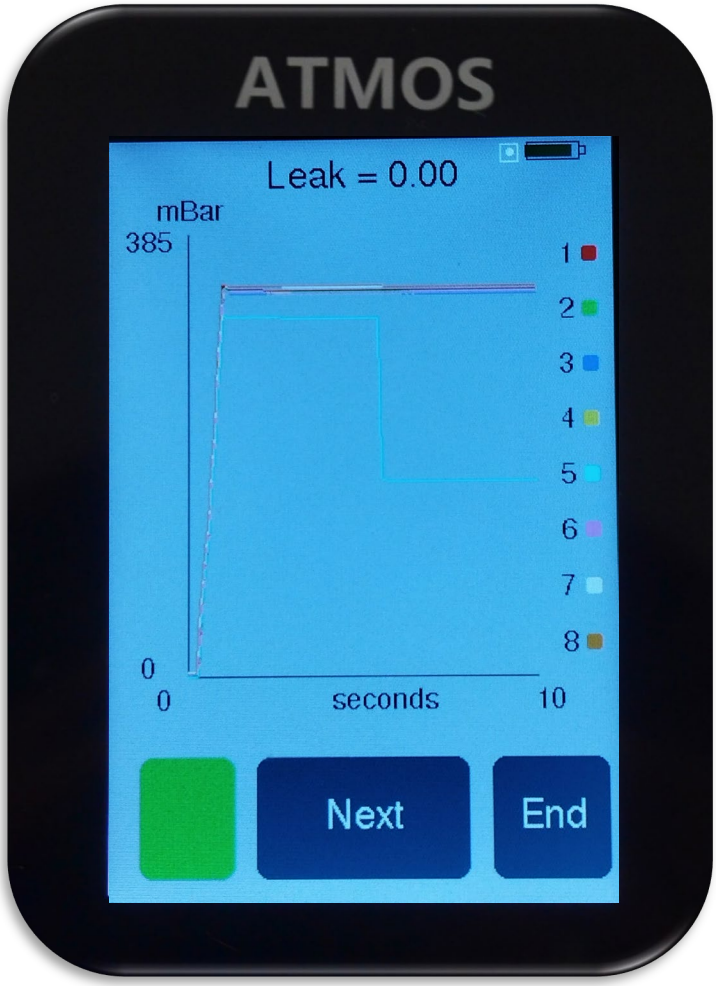
You see the increase of pressure during the push down of the button (very beginning of the graph) and after that a constant pressure until the end of the measurement. The decay in pressure is below 1%, thus the rectangular in the left corner is green.

8-channel ATMOS – Leak test

With the 8-channel-ATMOS, you will see a graph with 8 lines (one per channel). Channel 1-4 and channel 6-8 should be very similar to each other.

Channel 5 is different, because it has a higher inside volume, thus the pressure is a little lower than the rest of the channels. Similar to 1-channel-version.

A successful leak test with the 8-channel-ATMOS will look like this:



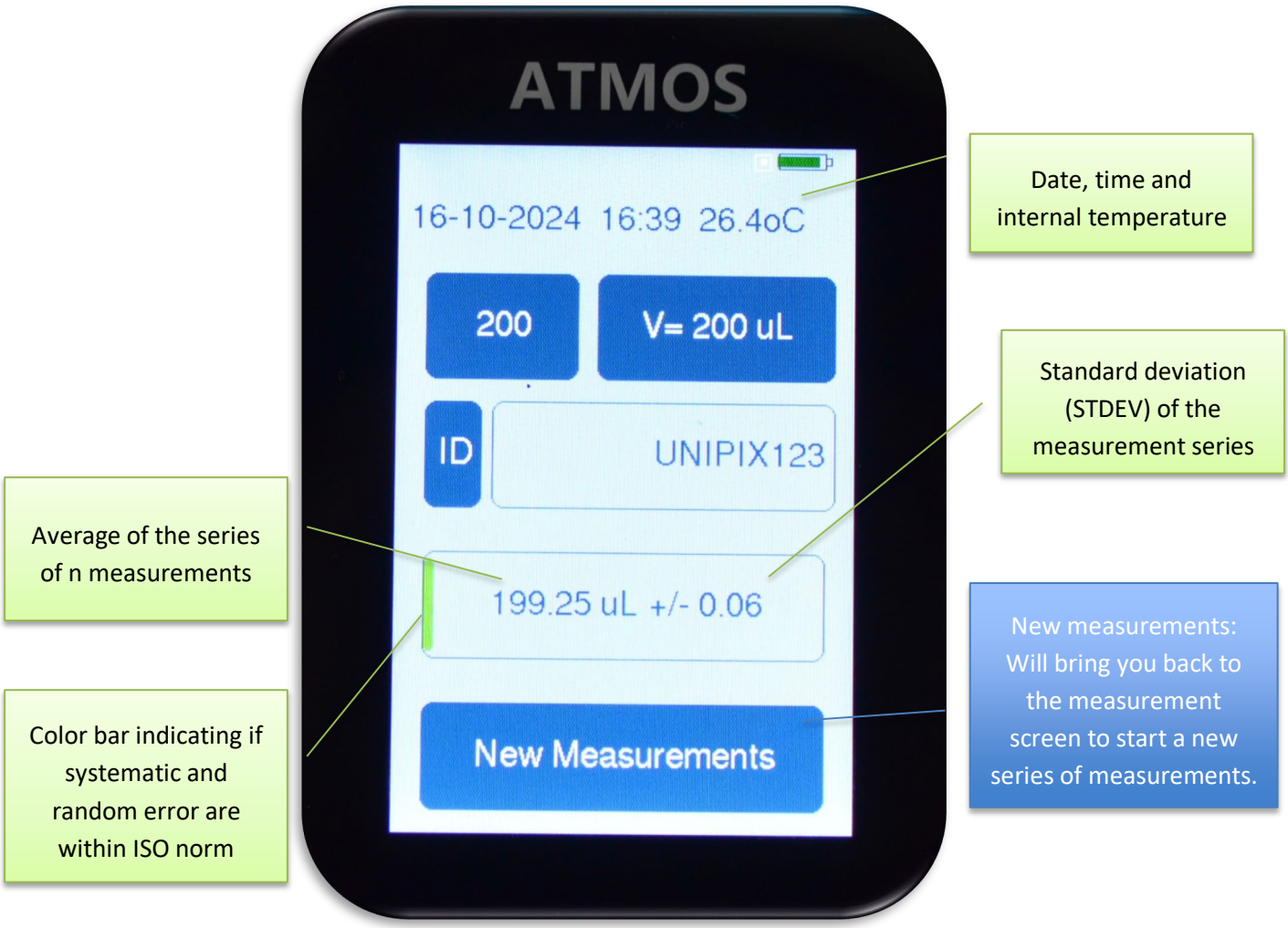
The reasons for bad results can be:

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

Statistics Screen

Without printer

This screen is shown after clicking the “END” button after min. 3 measurements **without a connected printer**.



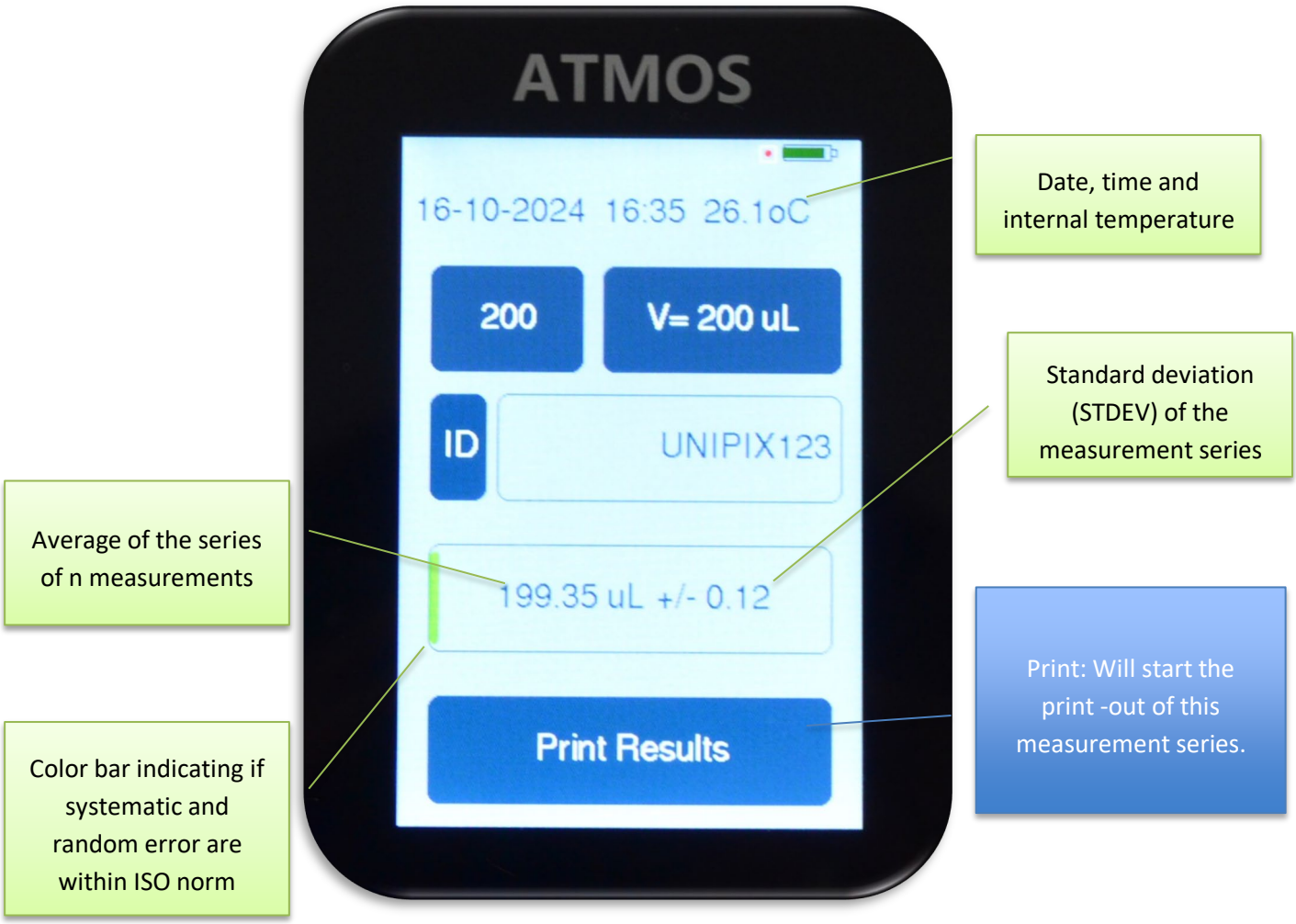
It shows:

- Current date, time, and ambient temperature
- Information on the pipette (nominal and selected volume) pre-defined by user
- ID: pipette ID pre-defined by user
- Colored bar summarizing results (ISO norm 8655-2 for Piston-operated volumetric apparatus – Piston Pipettes):
    - GREEN when both systematic and random error are OK
    - YELLOW if systematic error is OK but random error is too large
    - ORANGE if systematic error is too large but random error is OK
    - RED if both systematic and random error are bad
- Average volume of the series of n measurements and standard deviation (STDEV) of the measurement series

The **New measurements** button will bring you back to the measurement screen, where you can start a new series of measurements.

With printer

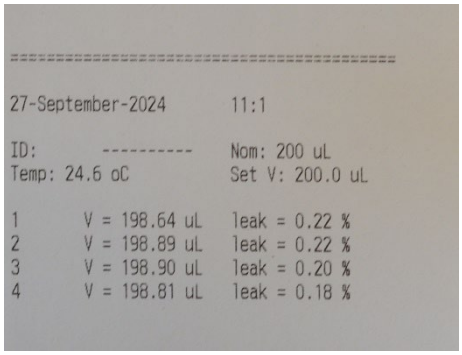
This screen is shown after clicking the “END” button after min. 3 measurements **with a connected printer**.



It shows:

- Current date, time, and ambient temperature
- Information on the pipette (nominal and selected volume) pre-defined by user
- ID: numeric ID pre-defined by user
- Colored bar summarizing results (ISO norm 8655-2 for Piston-operated volumetric apparatus – Piston Pipettes):
    - GREEN when both systematic and random error are OK
    - YELLOW if systematic error is OK but random error is too large
    - ORANGE if systematic error is too large but random error is OK
    - RED if both systematic and random error are bad
- Average volume of the series of n measurements and standard deviation (STDEV) of the measurement series

The **Print Results** button will send the results to the printer. Your printout will look like this:

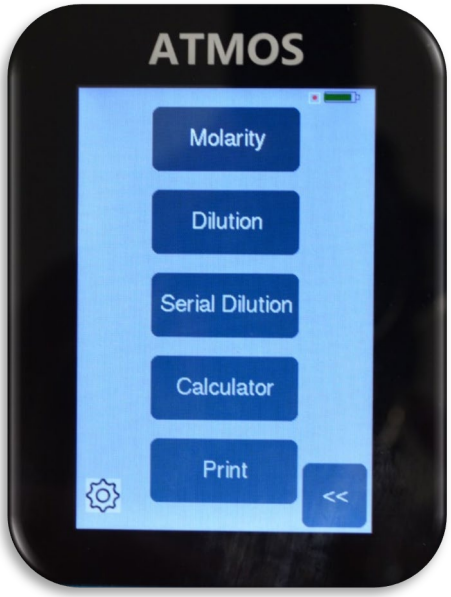


After printing, ATMOS will automatically go back to the measurement screen, where you can start a new series of measurements.

If you have a printer connected, but do not want to print your results, you need to click the volume button (here "200) and then the "<<" button to return to the main screen.

Utilities

Under the section "Utilities" on the main screen, you find the following options:

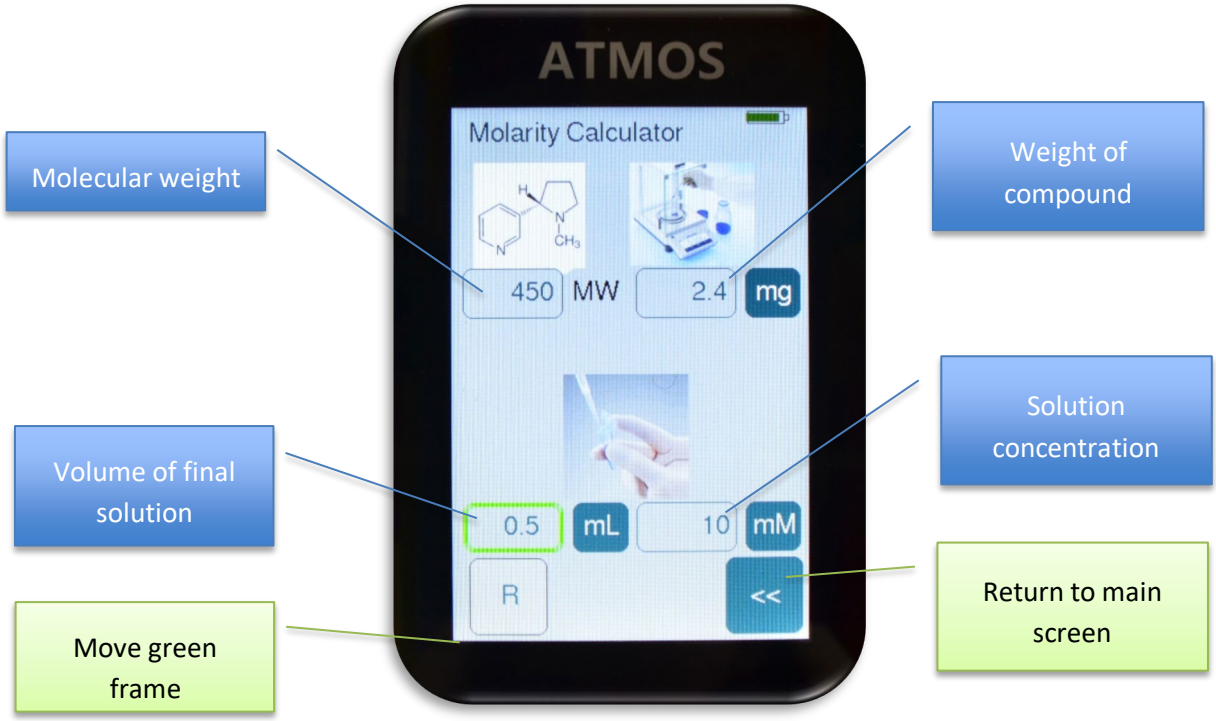


- Molarity: Calculator for molar concentration for your customizable values.
- Dilution: Calculator for dilution of your solution.
- Serial dilution: Calculator for serial dilution by pre-defined or customized factors.
- Calculator: Standard calculator.
- Print: Allows you to print your results if printer is connected (indicated by red dot in the top right corner)
- Settings (gear symbol): See/change basic settings like version/serial number, date/time, duration until sleep.

Molarity Function

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

Click on the button “Molarity” on the utilities 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.

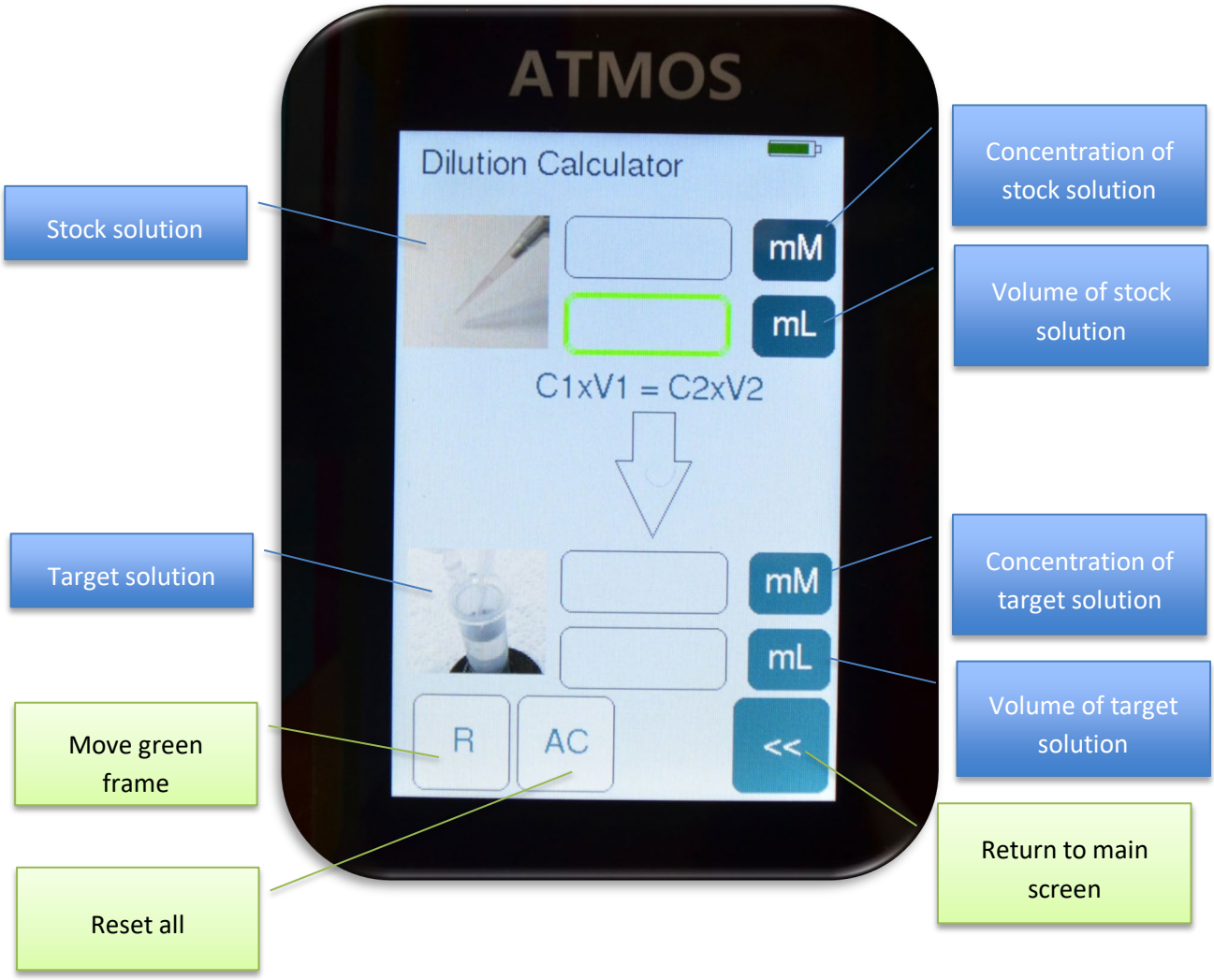
Measurement unit of any of the values can be adjusted by clicking on the respective unit (e.g., click on “mL” to change to “µL”).

The button “<<” will bring you back to the main screen.

Dilution Function

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

Click on the button “Dilution” on the utilities 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.

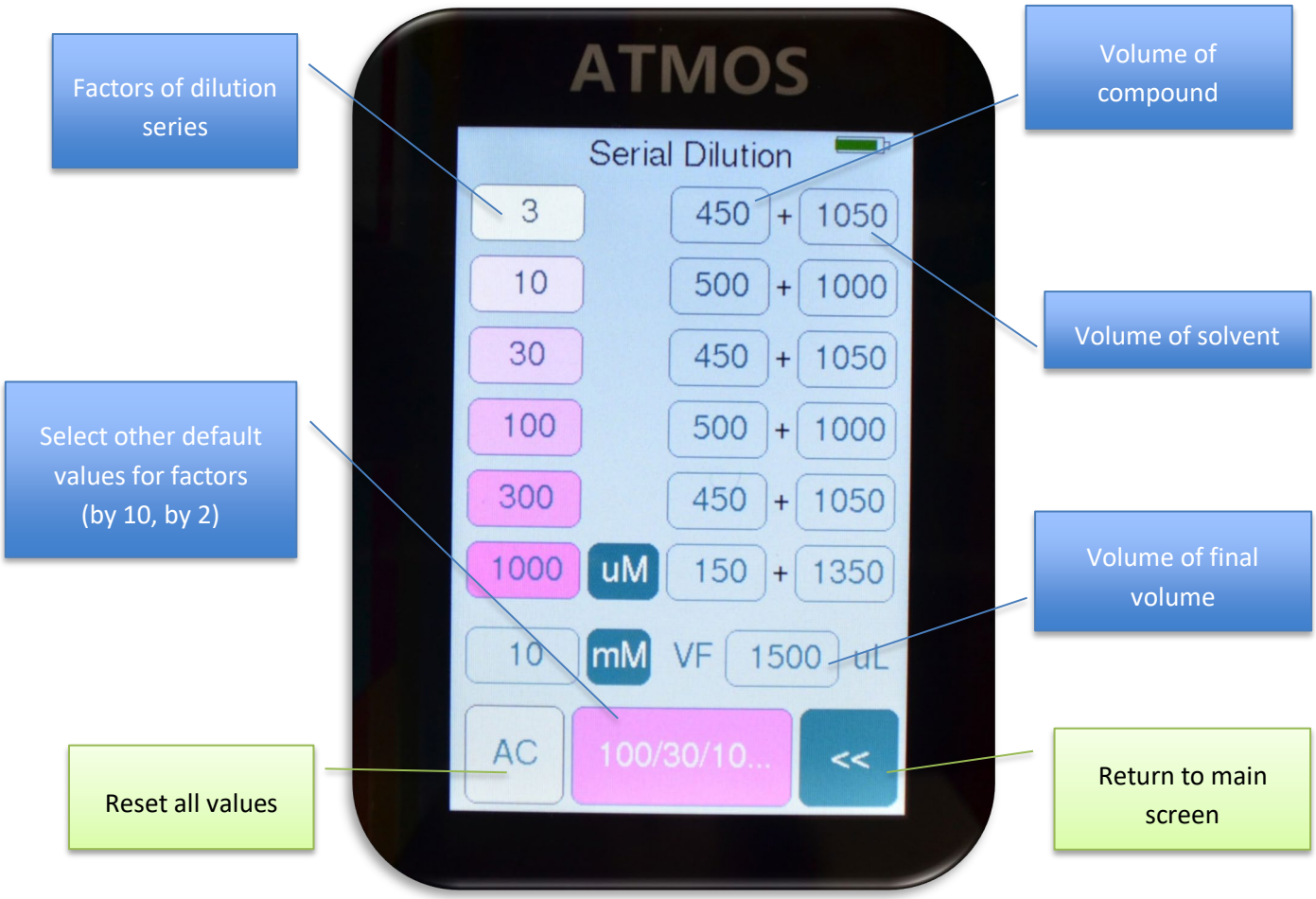
The button “<<” will bring you back to the main screen.

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 utilities 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 on the number (“1500”). A number keyboard opens, and you can insert your custom volume.

Please note: the button << is “Enter” and will bring you back to the main screen.

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 “<<” will bring you back to the main screen.

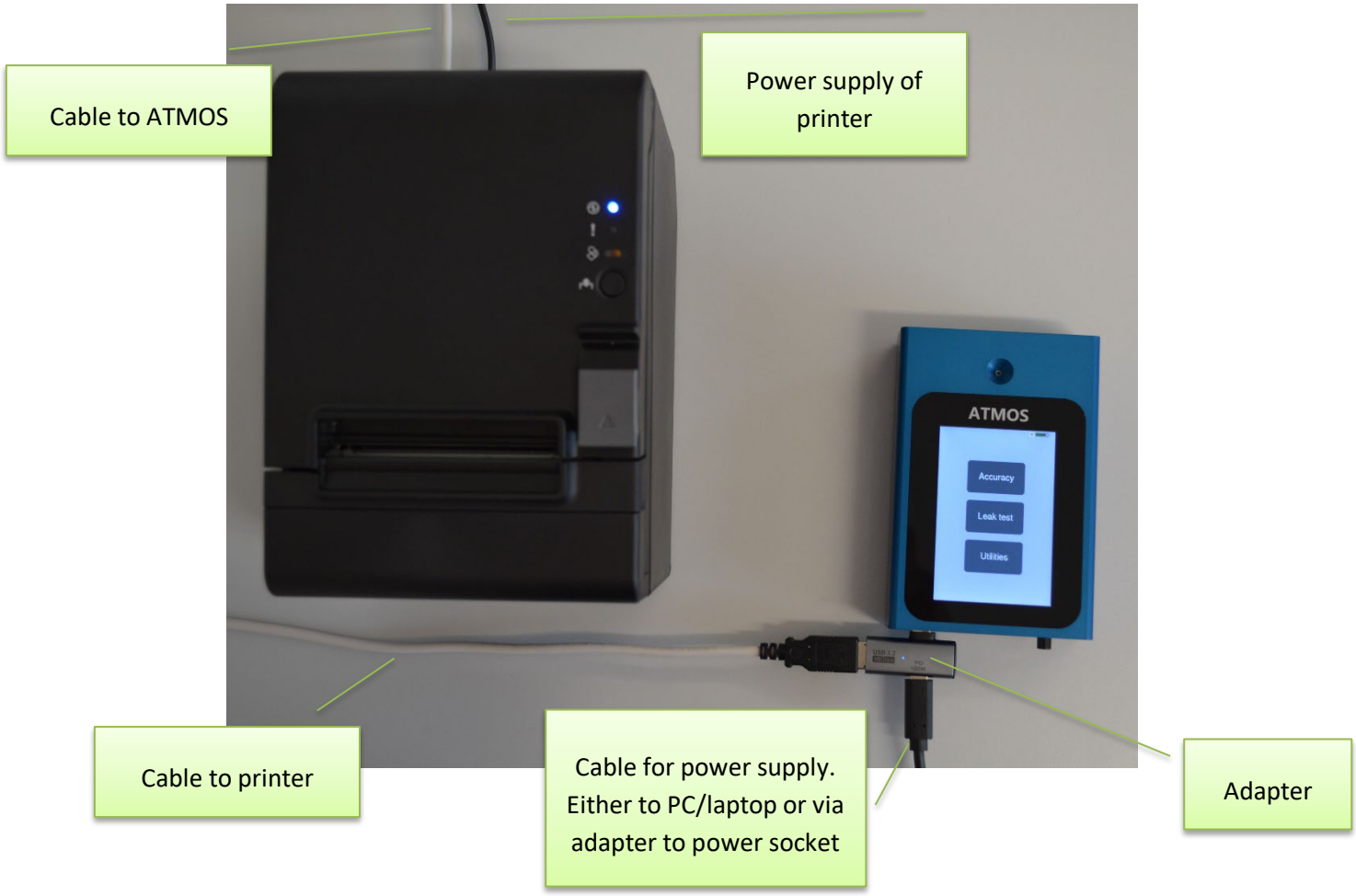
Print Function

ATMOS works with printers from EPSON with a USB connection. We recommend the following models:

- EPSON TM-U220IIB (needle printer: + long lasting print; - noisy printer, - higher investment)
- EPSON TM-T20III (thermo printer: + low budget, + quiet; - print might fade after 6-8 months)

or connecting the printer, you need a USB-adapter for power supply (e.g. Seminer USB C OTG Adapter, Typ C 100W).

The devices (ATMOS, printer and adapter) must be connected like shown in the picture:



Ideally, you switch on the printer first, then turn on ATMOS. ATMOS will search for the printer when starting. You will see the successful connection indicated by the red dot in the top right corner.

You can also connect the printer later via “Utilities” → “Print”. ATMOS will show “Printer connected” in blue letters after successful detection.

Printing your results is possible in 2 ways:

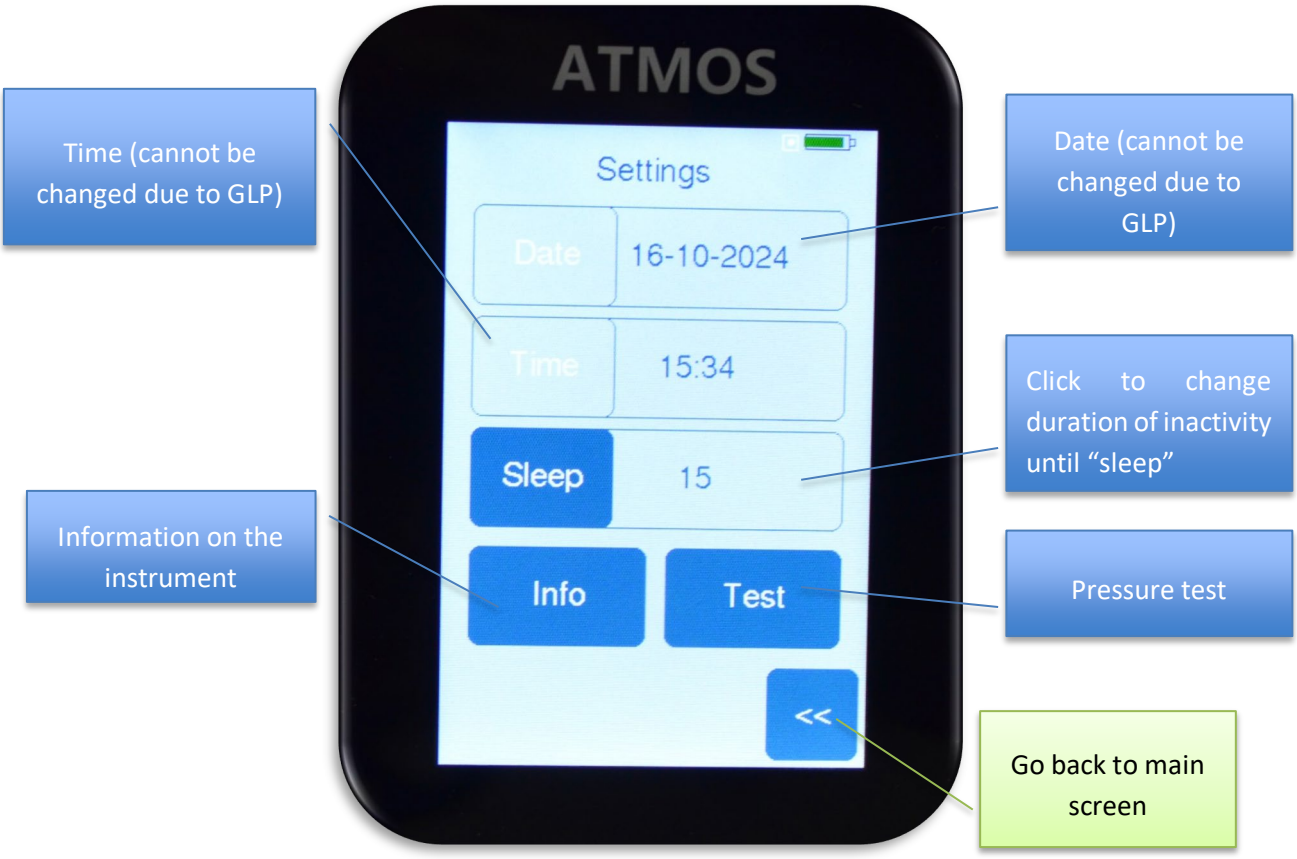
1. Directly after testing your pipette (see chapter “Statistics Screen”)
2. Via “Utilities” → “Print”: Here, you can filter by date (standard: Print all results from today) or by pipette ID.

Touch the field you want to change.

New dates have to be defined in the following format: dd mm yy. There is no need to confirm the entry. ATMOS will automatically detect that 2 digits have been typed and will continue e.g. from day to month (e.g. May 1, 2025 is 010525)

Settings Screen

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



Date and time

ATMOS saves date and time for each measurement. To avoid manipulation of results and to meet GLP requirements, date and time cannot be changed by the user. Please contact your local sales person if date and time are incorrect.

Sleep

By default, ATMOS will stay turned on for 15 minutes when not in use. To change the duration, click on the button “Sleep” and change the number. The max. duration is 60 minutes.

Info

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

Firmware

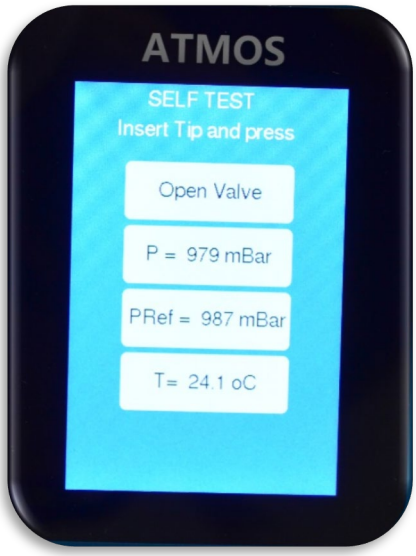
Serial Number

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:



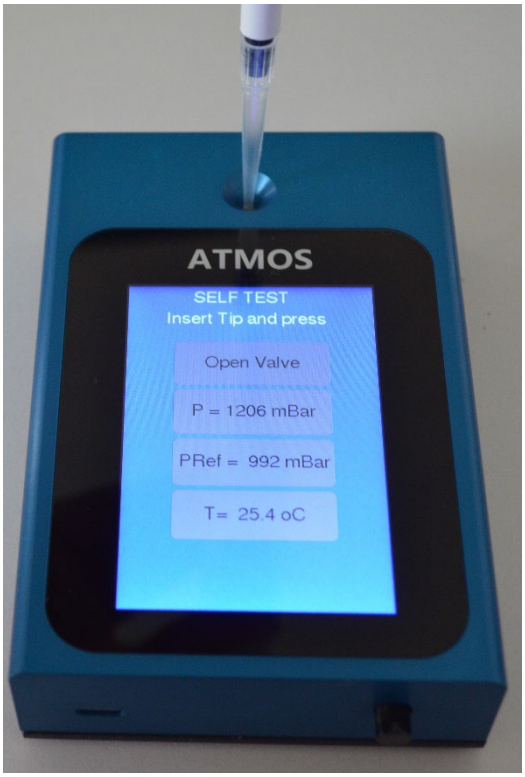
P= measured pressure

Pref= reference pressure

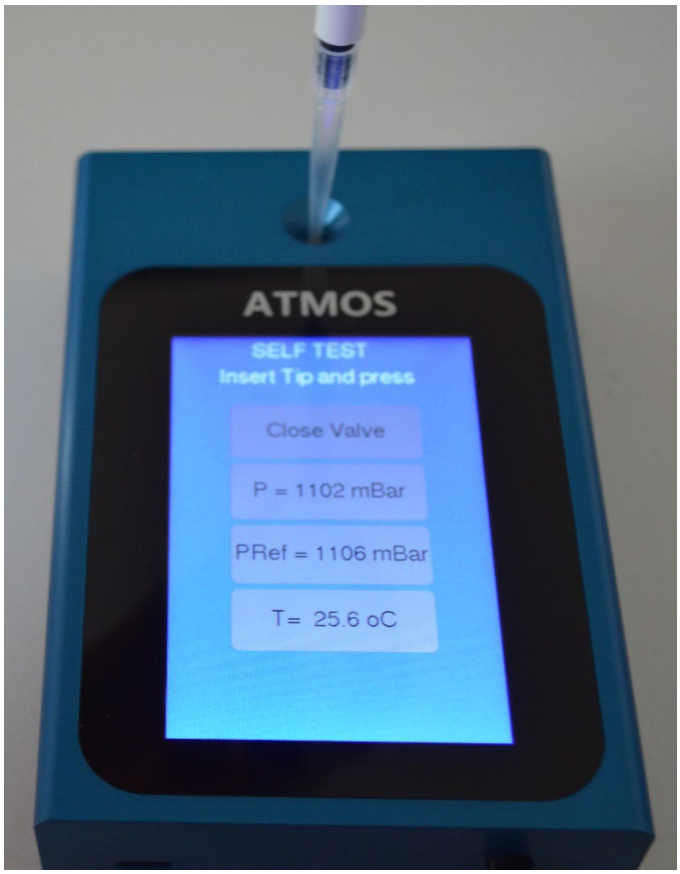
T: temperature of the device

The values of P and Pref should be similar.

Now insert a pipette 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.

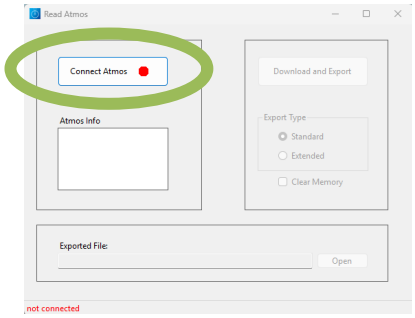
If the test is still unsuccessful, please contact UniPix or your local salesperson.

“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/ and follow the instructions to install the program. Start “ReadATMOS” on your computer. The following window appears.

Verify that your ATMOS device is **connected** to the computer and **turned on**. Wait until the **home screen** is displayed. Then select “Connect Atmos”.

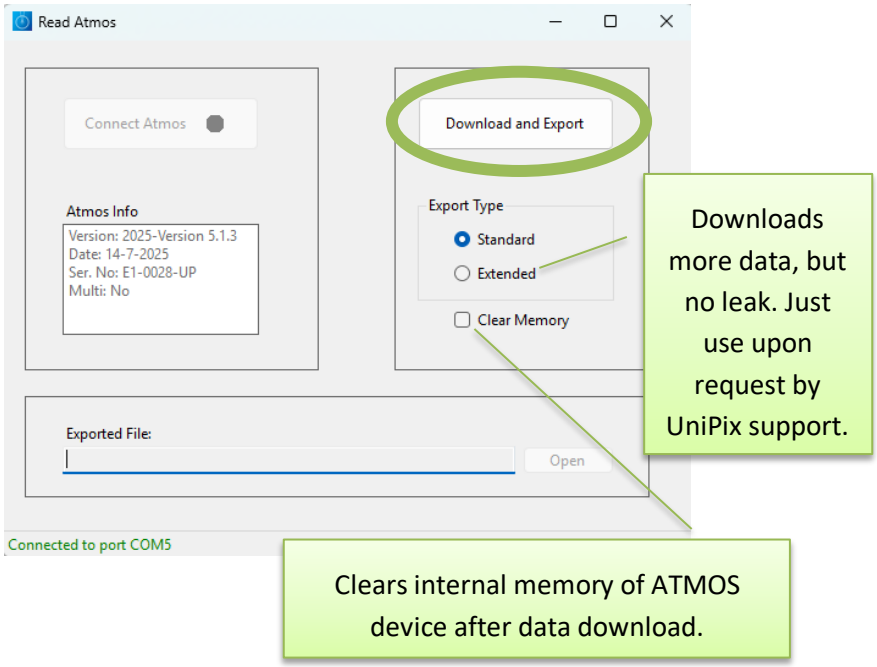


The red dot will turn green and information on your device will be displayed in the “Atmos Info” window.

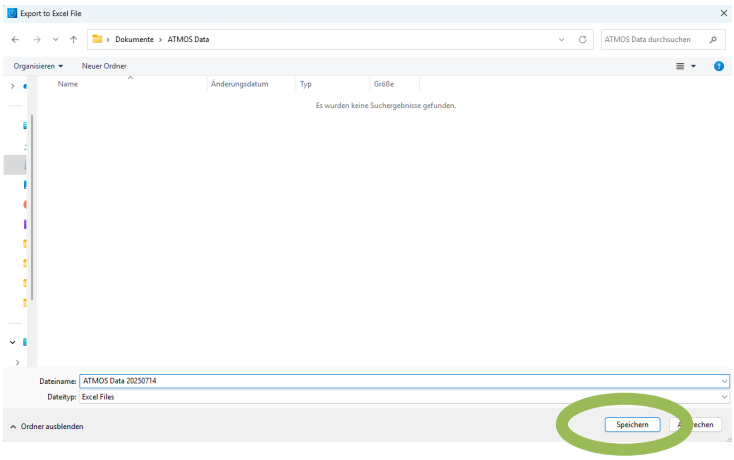
Select your download options in the right field.

- Download mode (Normal or extended): Standard setting is “Normal”. This will download all the data you normally need (measured volumes, leak, temperature). The “extended mode” will download more data, but no leak. Please only use on request by UniPix support.
- Clear memory: Selecting this box will clear the internal memory of your ATMOS device after data download. If you leave it un-checked, the data will stay on the internal memory of your device. There is no need to remove the data. ATMOS’ storage is large enough for several thousand measurements.

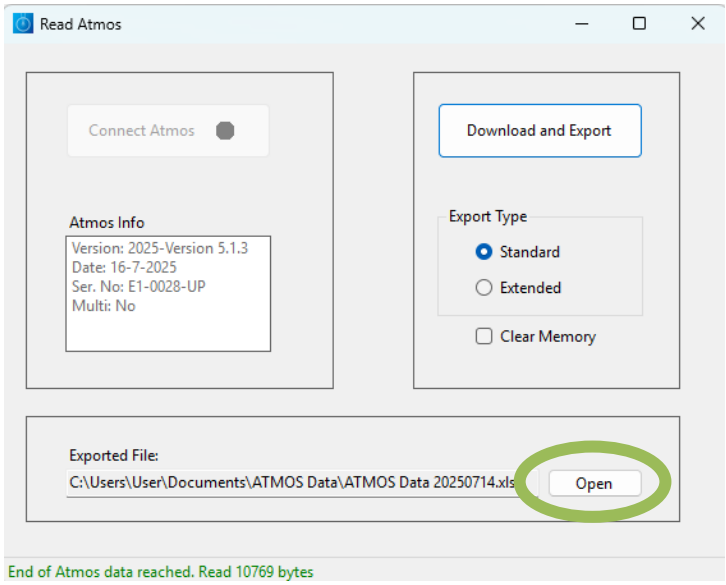
Default is “Standard Export Type” and keep your data on your device. Click on “Download and Export”.



A window to select the storage location for your file will open.



Type a file name and click “Save”. After pushing the “Save” button, the “ReadATMOS” program will download data from ATMOS.



When the download is finished, the program will show the storage location in the lower field. You can now open the Excel sheet via the button ”Open ”.

Data will be presented like the following example:

1-channel version :

	A	B	C	D	E	F
1	Date = 30:06:2025	Time = 11:57		T = 24.6 oC		
2	Pipette-ID	VCal	oC	dV	Leak %	
3	UPX-P-200	300	24,69	199,16	0,26	
4	UPX-P-200	300	24,69	199,43	0,25	
5	UPX-P-200	300	24,69	199,48	0,21	
6	UPX-P-200	300	24,75	199,68	0,18	
7	UPX-P-200	300	24,75	199,67	0,22	
8	UPX-P-200	300	24,81	199,72	0,20	
9	UPX-P-200	300	24,81	199,88	0,20	
10	UPX-P-200	300	24,81	199,86	0,23	
11	UPX-P-200	300	24,81	199,86	0,17	
12	UPX-P-200	300	24,88	199,8	0,20	
13						
14						

8-channel version :

	A	B	C	D	E	F	G	H	I	J	K	L
1	Date = 27:2:2024	Time = 11:4:5	T = 22.0 oC									
2	Pipette-ID	VCal	oC	dV	dV1	dV2	dV3	dV4	dV5	dV6	dV7	dV8
3		300	22	1422,21	300,52	299,53	300,16	299,67	299,79	299,81	299,1	299,13
4		300	22,06	1421,34	300,58	299,98	300,46	300,08	300,22	300,21	299,83	300,2
5		300	22,06	1420,37	300,6	300,19	300,59	300,22	300,38	300,4	300,12	300,52
6		300	22,19	1419,14	300,29	300	300,35	300,09	300,32	300,2	299,98	300,44
7		300	22,25	1418,25	300,51	300,32	300,64	300,38	300,59	300,52	300,4	300,85
8												

ATMOS Technical Specifications

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

P = nominal pipette volume		***Absolute accuracy (= trueness)***	***Repeatability (= precision)***
P=1000	1000 µl	±4 µl	±1.5 µl
P=200	200 µl	±0.4 µl	±0.3 µl
P=100	100 µl	±0.5 µl	±0.15µl
P=20	20 µl	±0.18 µl	±0.05µl
P=10	10µl	±0.14 µl	±0.06µl

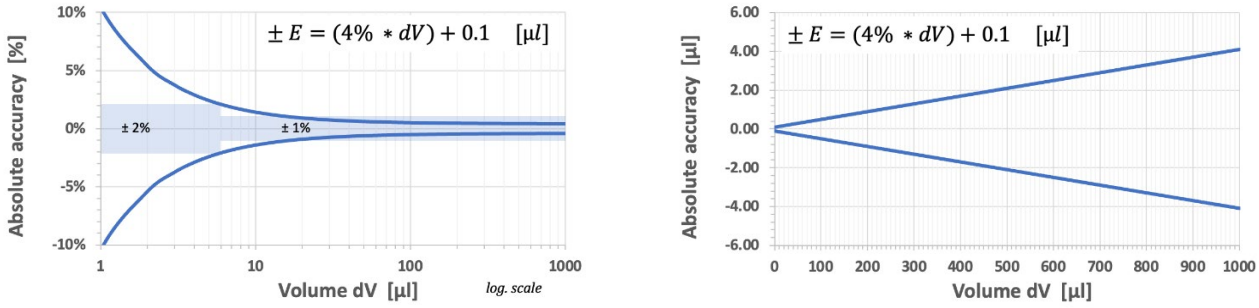


Figure: Atmos accuracy in function of tested volume displacement

Technical Specifications

Dimensions	125 x 85 x 30 mm
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.
White screen after switching on and turning any button	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 salesperson.
	Very bad pipette	Verify tip and try another pipette.
Software shows error message when starting	Device is not connected or not 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 per measurement series.

Tipps on using electronic pipettes with ATMOS

1. Set the speed at the highest level or close to it (for example the Picus 2 from Sartorius is set to 7 out of 9).
2. You push the button to move the piston up (aspiration).
3. After inserting the tip and after pushing the « start » on ATMOS' screen, you push the button on your pipette again.
4. This will push the piston down until you push the button of the pipette again, when ATMOS tells you to release.

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

This symbol means that at the end of their service life, batteries/accumulators and electronic devices must be disposed of separately from household waste (unsorted municipal waste).

Electronic devices must be disposed of in accordance with Directive 2012/19/ EU of the European Parliament and of the Council from July 04, 2012 on waste from electrical and electronic equipment and in compliance with national disposal regulations.

Both batteries and accumulators (rechargeable batteries) contain materials that can be damaging to the environment and human health. Therefore, they must be properly disposed of in accordance with Directive 2006/66/EC of the European Parliament and of the Council from September 06, 2006 on batteries and accumulators and in compliance with national disposal regulations. Only dispose fully discharged batteries and accumulators.