Multipette® /Repeater® E3/E3x

Product presentation, Diana Hübler

Hamburg, April 2015

eppendorf

Contents

Increased accuracy when working with problematic liquids

Working with “ problematic liquids”

All pipettes are adjusted with distilled or de-ionized, degassed water at 20˚C.

Liquids whose physical properties deviate considerably from the values for water have an impact on the pipettes accuracy. These liquids are so called “problematic liquids”.

Working with “ problematic liquids”

Problematic liquids are:

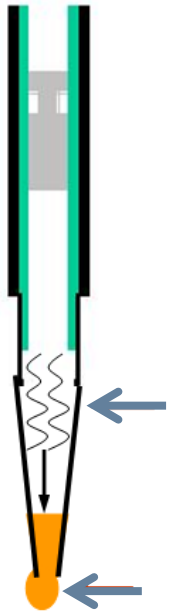
- Liquids with high vapor pressure (e.g. ethanol)
- Liquids with high viscosity (e.g. engine oil)
- High density liquids (e.g. sulfuric acid)
- Detergent-containing liquids
- Hot or cold liquids

> **Positive displacement instruments guarantee for high accuracy and precision when working with “problematic liquids”**

Let’s see how

Liquids with high vapor pressure

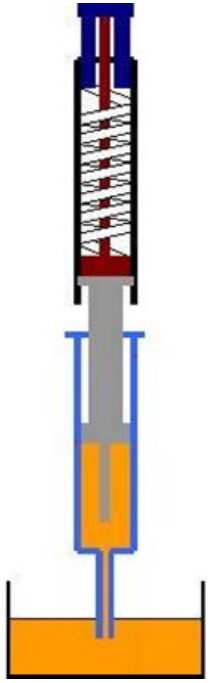
Air-cushion instruments



Liquid evaporates
pressure builds up

Liquid drips

Positive displacement instruments



Absence of air-cushion

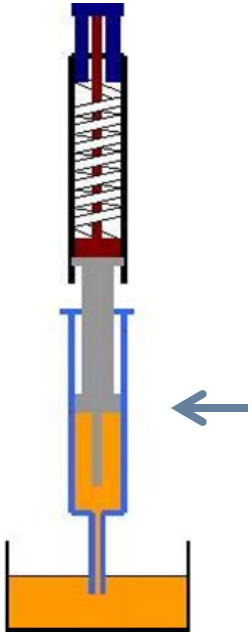
No liquid dripping

Liquids with high viscosity

Air-cushion instruments

Large amount of liquid remains in the tip

Positive displacement instruments

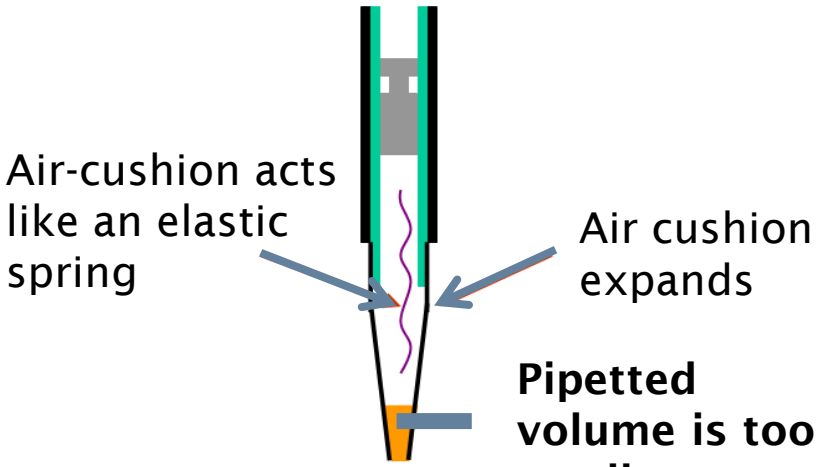


Integrated piston wipes down along the cylinder wall during dispensing

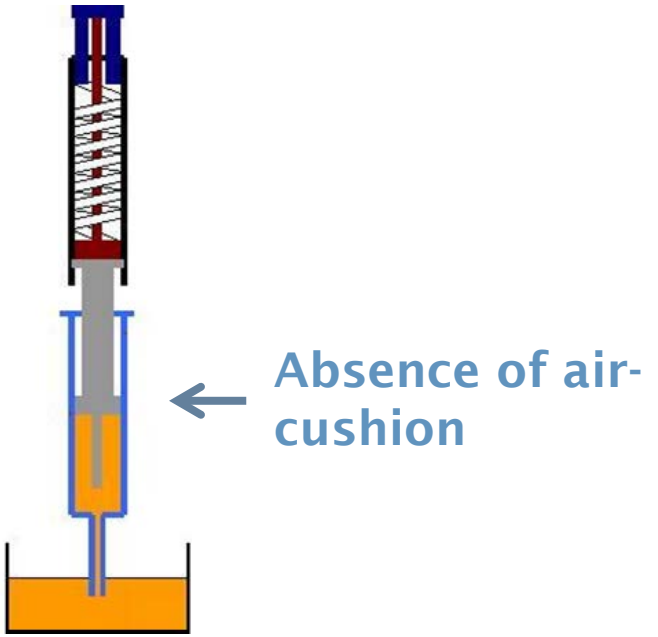
Minimal residual liquid in the tip

High density liquids

Air-cushion instruments



Positive displacement instruments



No influence on the pipetted volume

Detergent-containing liquids

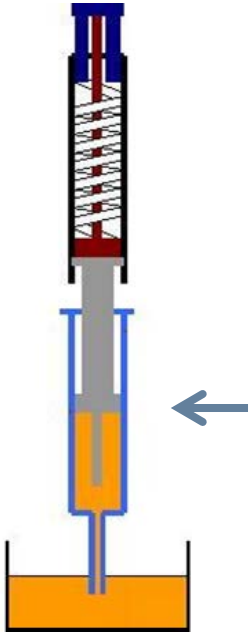
Air cushion instruments

Standard tip

LoRetention tip

A liquid film remains on the inner surface of the standard tip

Positive displacement instruments



Integrated piston wipes down along the cylinder wall during dispensing

Minimal residual liquid in the tip

Hot or cold liquids

Air cushion instruments

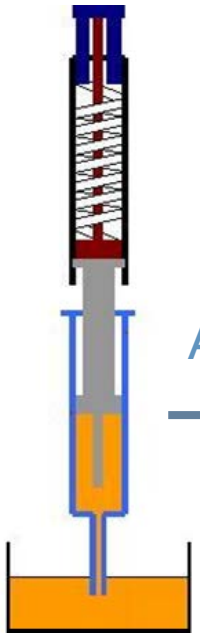
Cold liquids

- Air cushion cools down while tip is immersed into the liquid
  - → Air cushion contracts
  - → Increased liquid uptake
  - → Pipetted volume too big

Hot liquids

- Air cushion heats up while tip is immersed into the liquid
  - → Air cushion expands
  - → Decreased liquid uptake
  - → Pipetted volume too low

Positive displacement instruments



Absence of air-cushion

→ No thermally induced changes of the air cushion volume

Accurate and precise pipetting results

Contamination-free working

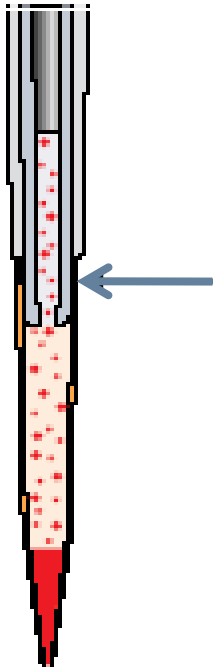
Contamination-free working

Especially important when working with:

- "Biohazard" materials
- For example, Radioimmunoassay (RIA): working with radioactive markers
- Toxic materials
- Pathogenic materials

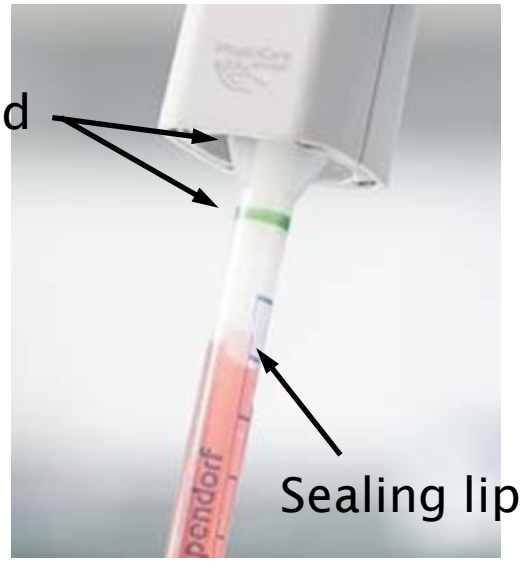
Contamination-free working

Air-cushion instruments



Aerosol contamination

Positive displacement instrument



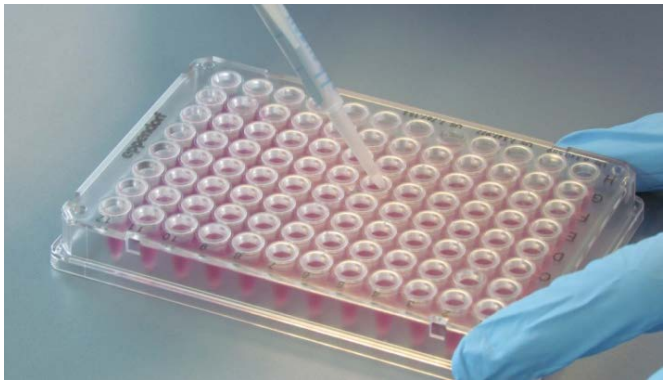
No aerosol formation

Contamination-free working

Time-saving

Time-saving

- Convenient and time-saving especially for high-throughput serial dispensing e.g. ELISA, PCR, Sequencing, Aliquoting
- The ability to conduct up to 100 dispensing steps in a single filling makes Dispenser/Repeater ideal for transferring reagents and buffers from single tubes to 96- or 384-well plates



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Contents

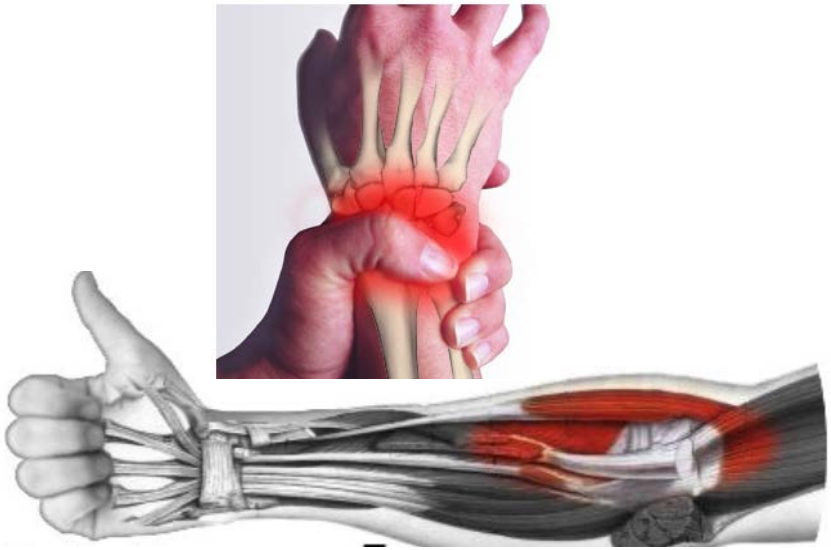
Decreased operating forces

Decreased operating forces

The operating forces of an instrument have an influence on the well-being of the user

Why is this especially important for manual liquid handling devices?

Reduced risk of Repetitive strain injuries



- **Manual liquid handling is a repetitive task which is carried out everyday**
- Carrying out repetitive tasks for extended periods can cause repetitive strain injuries (RSI) to nerves, muscles, tendons or joints of the lower arm and hand area
- Manual liquid handling is considered as a potential cause of RSI

Reduced risk of Repetitive strain injuries

- To reduce risk of developing RSI use an electronic pipette or dispenser
  - → Here the force required for aspiration and dispensing is provided by the motor of the instrument
  - → Reduced strain on the thumb and hand area

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Contents

What stays the same?

Accurate and precise dispensing of non-aqueous solutions

Contamination free handling of dangerous liquids

Large volume range: 1 µL – 50 mL

Different speed levels

Intuitive software + selection wheel

Ergonomic handrest

One button tip ejector

Number of different volumes: > 5.000

Automatic tip recognition

Long-life lithium-ion battery

2 models for various applications

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Contents

What's new?

- Integrated RFID tag
- Sleep mode
- New Combitip sensor
- Optimized speed levels
- Large color display
- 9 Languages
- New software and robust selection dial
- Two additional modes

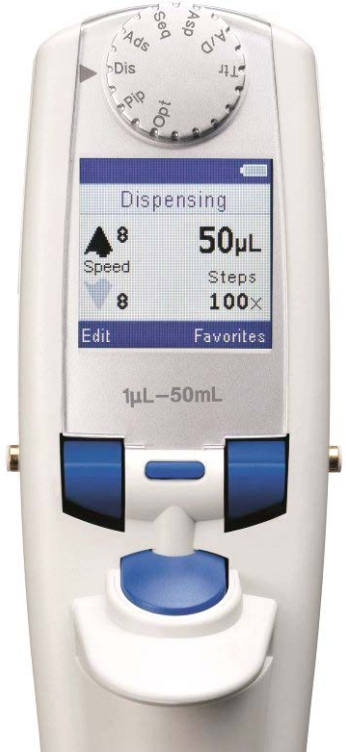
High flexibility | **Ergonomic operation** | **Safety**

Ergonomic operation

Large color display

Multipette stream/Xstream

Multipette E3/E3x



Large color display

- Clear and easy to read display
  - → Supports stress-free work
- Color display
  - → Facilitates easy handling
- All parameter settings visible on the first view
  - → Allows easy editing

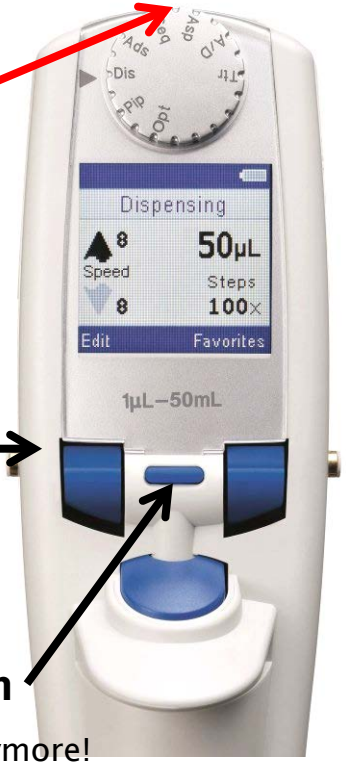
New operator guidance

Multipette stream/Xstream

Multipette E3/E3x

New meaning of operating buttons

Reset (new positioned)



Rocker: Fix function

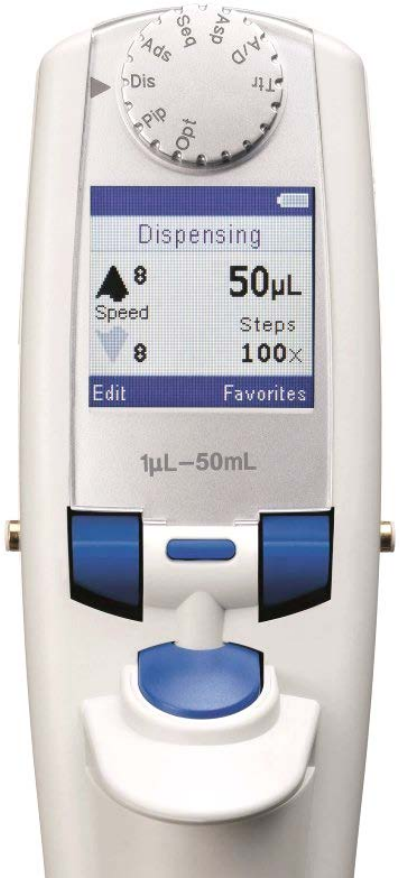
Rocker: Softkey

Abort/Reset button

Abort/Back button

No reset, therefore not red anymore!

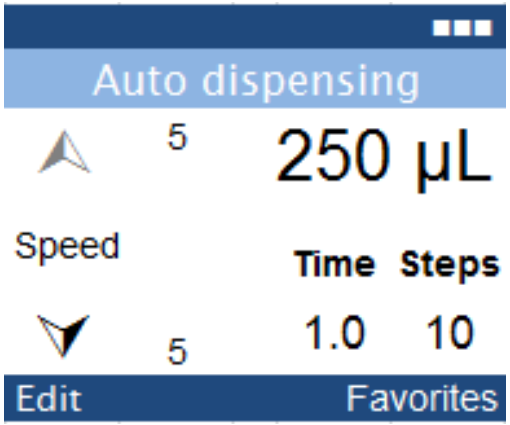
New software and selection dial



New software and selection dial

- Menu navigation as with Xplorer pipettes
  - → Proven usability
- Select all functions with the selection dial
- No submenus in all operation modes
  - → Increased intuitiveness
- Multilingual operator guidance (9 different languages selectable)
  - → Avoidance of mistakes
- Two additional modes
  - → Higher flexibility

New software



Header – Battery state, volume

Status line – Headline (mode, editing parameter)

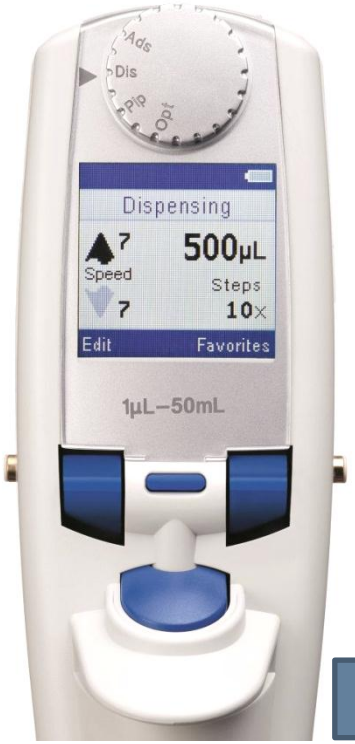
Main field – Parameters (volume, speed etc.)

Footer – Softkeys

Higher flexibility

Two Models

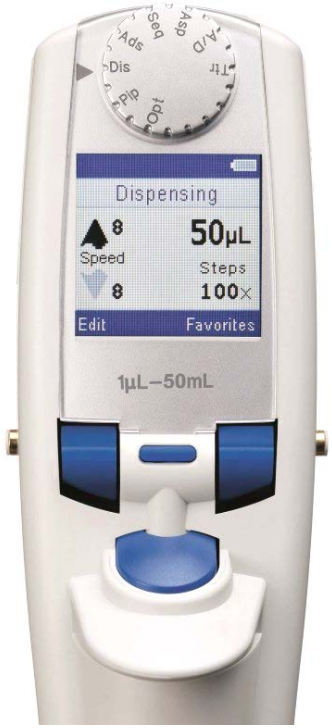
Multipette/
Repeater E3



New

✔	**Options (Opt)**	✔
✔	Pipetting (Pip)	✔
✔	Dispensing (Dis)	✔
✔	Automatic dispensing (Ads)	✔
	Sequential dispensing (Seq)	✔
	Aspiration (Asp)	✔
	Aspirate and Dispense (A/D)	✔
	Titration (Ttr)	✔

Multipette/
Repeater E3x



Two additional modes - Options

- **Keylock**
  - → Prevents stored settings and options from being changed
- NEW : **Favorites** (5 frequently used parameter settings can be stored (in all modes except A/D and Ttr))
  - → Deactivates favorites
- **Sound level**
- **Brightness**
- NEW : **Language**
- NEW : **Personalization**
  - → Label the dispenser
- **Service**
  - → Software version, NEW : initial reset, self test
- NEW : **Reminder**
  - → Set service interval (time)
- NEW : **Date and time**
- NEW : **Screen saver**
  - → Shows date, time, personalization and battery status

Two additional modes – Aspirate and Dispense

Aspirate and Dispense

- Allows for the aspiration of an unknown volume and it's subsequent dispensing in equal parts
- You aspirate by pressing the control key
- The aspirated liquid volume is calculated and displayed

Examples of use

- Potential applications for this mode exist in protein biochemistry, molecular biology, cell biology and microbiology
  - → Extraction of DNA, RNA or proteins
  - → Conditioned media
  - → Density gradient centrifugation

Two additional modes– Aspirate and Dispense

Extraction of DNA, RNA or proteins

- First step in molecular biology or protein biochemistry research
- DNA, RNA or proteins are extracted out of different sample material e.g. cells, bacteria, plants
- Different extraction protocols for DNA, RNA and proteins available
- DNA, RNA or proteins are found in the supernatant after extraction (not true for all available protocols)
- Supernatant uptake in modus A/D:
  - → Aspirated volume is displayed
  - → Dispensing volume and dispensing steps could be entered
  - → Supernatant is dispensed in equal volumes into several reaction vessels

Two additional modes– Aspirate and Dispense

Conditioned media

- Application in Cell Biology
- Media which was incubated with cells
- It contains metabolites, growth factors and extracellular matrix proteins secreted into the medium by the cultured cells
- The use of conditioned media is beneficial for hard to culture cell lines
- To remove the conditioned media from the cells and distribute it on the new cell line the Multipette E3x in A/D mode can be used

Two additional modes– Aspirate and Dispense

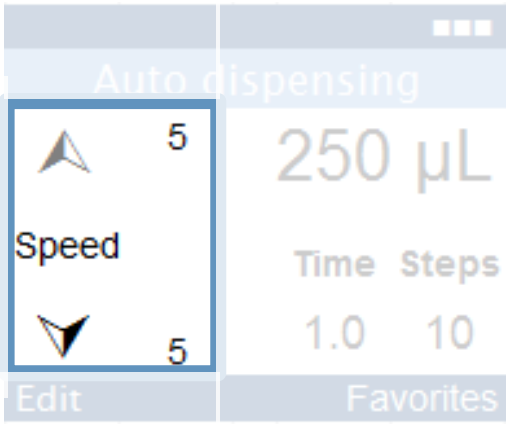
Density gradient centrifugation

- One technique for the fractionation of cells into their compartments
- A homogenate of cells or tissue is pipetted on a density gradient
- While centrifugation, the cell compartments will be enriched in their appropriate density zone
- The density gradient is normally done using highly viscous solutions e.g. sucrose

  → The usage of positive displacement instruments is advantageous
- After centrifugation the different layers, including the different cell compartments, of the density gradient are separated
- Use the Multipette E3x in A/D mode to separate the different layers and distribute the purified cell compartments into reaction vessels

Optimized speed levels

- 8 different speed levels
- Lowest speed level decreased
  - → Compared to Multipette stream/Xstream improved aspiration and dispensing of viscous liquids
- Highest speed level increased
  - → Faster aspiration and dispensing of aqueous solutions compared to Multipette stream/Xstream
  - → Time-saving



Safety

RFID

RFID USP

Built into the Multipette/Repeater E3

Its position is marked by the inscription "RFID"

Eppendorf TrackIT

Consists of a reader and the associated Eppendorf software

RFID tag

RFID

RFID: what is it?

Abbreviation for "Radio Frequency Identification"

Consists of a transponder (e.g., built into the device or "chipping" of pets) and a reader.

> First used industrially by Siemens for the unique identification of rail cars in a paint shop.

> RFID is now increasingly used (e.g., toll systems).

Identification of instruments in the laboratory via RFID

RFID technology especially meets the requirements of customers working in regulated environments. (Simplified documentation)

New Combitip sensor

System:

- Senor and Combitip advanced are harmonized with one another
  - → Less error-messages and increased precision of dispensed volume
  - → Less force for Combitip insertion and ejection

Robustness:

- Improved corrosion protection
  - → Increased chemical resistance
- Sensor remains undamaged in case Combitip is rotated while insertion
  - → Less error-messages

Sleep mode

Sleep feature = usage interval

The display automatically turns on when a Combitip is inserted

When not used for an extended period (>2.5 mins) the sleep feature automatically turns on → prolongs the battery life

Moving the Multipette/Repeater E3/E3x (motion sensor) automatically turns on the display again with the same information

→ Intuitive and error-free operation

Summary

High flexibility

- Number of different volumes: > 5.000
- Optimized speed levels
- Two additional modes
- 2 models for various applications
- Large volume range: 1 µL – 50 mL

Ergonomic operation

- Large color display
- Ergonomic handrest
- One button tip ejector
- Intuitive software
- Optimized selection wheel
- 9 different languages selectable

Safety

- Accurate and precise dispensing of non-aqueous liquids
- Contamination free handling of dangerous liquids
- Automatic tip recognition (New Combitip sensor)
- Sleep mode
- RFID tag
- Long-life lithium-ion battery

Technical Data

Size Combitips®	Volume min.	Volume max.	Increment / Step size
0.1 mL	1 µL	100 µL	0.1 µL
0.2 mL	2 µL	200 µL	0.2 µL
0.5 mL	5 µL	500 µL	0.5 µL
1 mL	10 µL	1000 µL	1 µL
2.5 mL	25 µL	2500 µL	2.5 µL
5 mL	50 µL	5000 µL	5 µL
10 mL	0.1 mL	10 mL	10 µL
25 mL	0.25 mL	25 mL	25 µL
50 mL	0.5 mL	50 mL	50 µL

Number of different volumes possible: >5.000

Technical Data

Weight: 188g (stream/Xstream: 183g)

Battery capacity: minimum ten thousend dispensing steps or filling of hundred 96 well plates with 10 mL Combitips® advanced (equal to stream/Xstream)

Number of different volumes: >5.000 (equal to stream/Xstream)

M4 vs. E3/E3x

Dispenser	Multipette/Repeater M4	Multipette/Repeater E3/E3x
Dispensing principle	Positive displacement	
Operation	Manual	Electronic
Operation modes	One (dispensing)	Four (E3)/ eight (E3x)
Speed levels	(User control)	8
Precision (Reproducibility)	High	Higher (compensation of human error)
Volume range	1 µL – 10 mL	1 µL – 50 mL
Volume flexibility	112 different	> 5,000 different
Operating forces	Standard	Very low

Thank you for your attention!