Eppendorf Research® pro
Instruction Manual · Mode d'emploi · Manual de Instrucciones
Inhalt / Contents / Sommaire / Índice / Índice

Teil A / Part A / Section A / Parte A / Parte A
Instruction Manual .......................................................................................................................... 3
Mode d’emploi ................................................................................................................................ 33
Manual de Instrucciones .................................................................................................................. 63

Part B / Teil B
Programming / Programas ............................................................................................................. 93
Ordering Information / Programa de ventas .................................................................................. 109

Evaluate the quality of our operating manuals on www.eppendorf.com/manualfeedback
Evaluer nos manuels d’utilisation sur www.eppendorf.fr/manualfeedback!
¡Díganos que opina de nuestras instrucciones de manejo en
www.eppendorf.es/manualfeedback!

eppendorf and eppendorf Research are registered trademarks.
Registered trademarks are not marked in all cases with ™ or ® in this manual.

Research pro pipettes are manufactured under
U.S. Patent No. 4,671,123; 4,905,526; 5,187,990; 6,199,435; 6,499,365

No part of this publication may be reproduced without the prior permission of the copyright owner
Copyright© 2000 Eppendorf AG, Hamburg
This operating manual is valid as of software version V.1.56 and data record 2.
Software version and data record appear in the display after the battery pack has been inserted
(see Sec. 3.3).

### Part A – Contents

This operating manual is valid as of software version V.1.56 and data record 2.
Software version and data record appear in the display after the battery pack has been inserted
(see Sec. 3.3).

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Safety precautions and applicational limitations</td>
<td>4</td>
</tr>
<tr>
<td>2 Technical data</td>
<td>5</td>
</tr>
<tr>
<td>3 Startup</td>
<td>6</td>
</tr>
<tr>
<td>4 Operating principle</td>
<td>7</td>
</tr>
<tr>
<td>5 Operation</td>
<td>6</td>
</tr>
<tr>
<td>6 Care, sterilization and maintenance</td>
<td>27</td>
</tr>
<tr>
<td>7 Troubleshooting</td>
<td>30</td>
</tr>
</tbody>
</table>

Program notes only for program version prior to V. 1.56
Safety precautions and applicational limitations

Intended use

The Research pro is a lab device intended for dispensing liquids in the volume range from 0.5 µL to 5 mL, in combination with matching pipette tips.

In vivo applications (applications in or on the human body) are not permitted.

The Research pro may only be operated by trained specialist staff. All users must have read the operating manual carefully and familiarized themselves with the device’s mode of operation.

To guarantee problem-free, safe operation of the pipette, it is essential to observe the following points:

Handling

- Use the Research pro only when a pipette tip is attached.
- Pipette tips are solely designed for disposable usage.
- Do not lay down the Research pro when a filled pipette tip is attached.
- After liquid has been aspirated, press the Actuate key only when you are sure that the liquid shall be dispensed correctly.
- When the pipette is switched on and when the Reset key is pressed, the piston may move. Please ensure beforehand that the liquid in the pipette tip shall be dispensed correctly.
- Emergency stop: A moving piston can be stopped by pressing the Reset key.
- When using infectious, radioactive, toxic and other solutions which may pose health risks, please observe the safety precautions laid down for your country.
- Do not use the Research pro in a potentially explosive environment or with potentially explosive chemicals.
- When using organic solvents and aggressive chemicals or their vapors, please check their compatibility with the pipette tip (PP) and pipette.
- When using solutions with physical data which deviates greatly from those of water, carry out the procedure for checking the dispensing volume, as described in Sec. 5.11.1.
- Operate the Research pro at temperatures between 15 °C and 40 °C only and at a humidity of max. 80 % at a temperature up to 31 °C.
- When using Filtertips or 200 µL tips with the 300 µL pipette, observe the volume restriction (see Sec. 5.11).

Care and maintenance

- Do not clean the display or any of the labeling using acetone or aggressive solutions.
- Do not allow any liquid to enter the device.
- Repairs may be carried out by authorized service personnel only.
- Use original spare parts and accessories (battery, pipette tips) only.

Battery

- Charge up the battery before operating the device for the first time (see Sec 3).
- Charge the battery in the pipette only, using the charging adapter or the charging stand and the original power unit.
- If a flashing battery symbol appears in the display, stop dispensing and charge the battery.
- When changing the battery, do not allow the battery to come into contact with any metallic surfaces.
- Dispose of used batteries as special waste, in accordance with legal stipulations to this effect. **Batteries may not be disposed of together with household waste!**
- If rechargeable batteries are damaged, avoid touching them with the hands.
- Never charge the Research pro without a battery.
- Before storing the Research pro for a long period, be sure to remove the charged battery.
- When the Research pro is stored for a long time, charge the batteries approximately every six months.
The technical data is valid only when the Research pro is used with Eppendorf pipette tips. The multi-channel data is valid for eight- and twelve-channel pipettes. The 50 – 1,200 model is available as an eight-channel version only.

Test conditions in accordance with ISO 8655 for piston-stroke pipettes with an air cushion by means of a standardized fine balance with a moisture trap. Number of determinations: 10 pipettings; degassed distilled water, 20 °C – 25 °C ± 0.5 °C; maximum speed; PIP in standard mode of operation (Sec. 5.3); prewetted pipette tip; dispensing onto inside of tube.

If the place where the pipette is used is at extremely high altitude, an adjustment must be made in line with the ambient air pressure.

Battery
Nickel-metal hydride battery pack, 1,200 mAh / 2.4 V reversible overcurrent and over-temperature protection. Overcharging protection when connected to Research pro.
Charging time: approx. 9.5 hours for a fully discharged battery.

Power unit
Input voltage, country-specific: 230 V ± 10 %, 50/60 Hz; 120 V ± 10 %, 60 Hz;
100 V ± 10 %, 50/60 Hz; 240 V ± 10 %, 50 Hz
Output voltage: 9 V DC; 200 mA (1.8 VA)
Technical specifications subject to change!

<table>
<thead>
<tr>
<th>Volume range</th>
<th>Step size</th>
<th>Color code</th>
<th>Pipette tip code</th>
<th>Volume</th>
<th>Max. permissible error</th>
</tr>
</thead>
<tbody>
<tr>
<td>µL</td>
<td>µL</td>
<td></td>
<td></td>
<td></td>
<td>systematic</td>
</tr>
<tr>
<td>0.5 – 10</td>
<td>0.01</td>
<td>light gray</td>
<td>epT.I.P.S.</td>
<td>20 µL</td>
<td>± 2.5</td>
</tr>
<tr>
<td>5 – 100</td>
<td>0.1</td>
<td>yellow</td>
<td>200 µL</td>
<td>10</td>
<td>± 2.0</td>
</tr>
<tr>
<td>20 – 300</td>
<td>0.5</td>
<td>orange</td>
<td>300 µL</td>
<td>150</td>
<td>± 2.5</td>
</tr>
<tr>
<td>50 – 1,000</td>
<td>1</td>
<td>blue</td>
<td>1,000 µL</td>
<td>500</td>
<td>± 1.0</td>
</tr>
<tr>
<td>100 – 5,000</td>
<td>10</td>
<td>violet</td>
<td>5 mL</td>
<td>2,500</td>
<td>± 1.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume range</th>
<th>Step size</th>
<th>Color code</th>
<th>Pipette tip code</th>
<th>Volume</th>
<th>Max. permissible error</th>
</tr>
</thead>
<tbody>
<tr>
<td>µL</td>
<td>µL</td>
<td></td>
<td></td>
<td></td>
<td>systematic</td>
</tr>
<tr>
<td>0.5 – 10</td>
<td>0.01</td>
<td>light gray</td>
<td>20 µL</td>
<td>1</td>
<td>± 5.0</td>
</tr>
<tr>
<td>5 – 100</td>
<td>0.1</td>
<td>yellow</td>
<td>200 µL</td>
<td>10</td>
<td>± 3.0</td>
</tr>
<tr>
<td>20 – 300</td>
<td>0.5</td>
<td>orange</td>
<td>300 µL</td>
<td>150</td>
<td>± 2.5</td>
</tr>
<tr>
<td>50 – 1,200</td>
<td>5</td>
<td>green</td>
<td>1,250 µL</td>
<td>120</td>
<td>± 1.2</td>
</tr>
<tr>
<td>100 – 5,000</td>
<td>10</td>
<td>violet</td>
<td>5 mL</td>
<td>2,500</td>
<td>± 1.2</td>
</tr>
</tbody>
</table>
### 3 Startup

#### 3.1 Delivery package

The Research pro is supplied as a single-channel, eight-channel or twelve-channel pipette for different volume ranges. The pipette is delivered with or without a charging adapter, depending on the order number. If the pipette is ordered without an adapter, a charging stand for one or four pipettes is required. If this charging stand is not already available in the lab, it must be ordered separately. According to the type of order, the delivery package contains the following:

- Charging adapter with connected power unit or, if necessary, charging stand with separate power unit
- Special tool(s) according to the pipette type
- Operating manual with measuring protocol and EC conformity assurance document
- Ni-MH battery pack
- Tube of silicone grease
- For multi-channel pipettes: Reagent reservoir for liquid aspiration

#### 3.2 Inserting the battery

Using your thumb and forefinger, take hold of the lid of the battery compartment on the rear of the pipette and remove it by tilting it to the side and pulling it upwards. Insert the battery pack (see diagram). Close the lid of the battery compartment. If the battery has been inserted incorrectly, the lid cannot be closed properly. The positive and negative poles of the battery should not come into contact with any metallic objects outside the pipette. When the battery is inserted, the Research pro carries out a test routine (e.g. for the display of pipette type, software version, data record). The battery must be fully charged before the device is used for the first time.

#### 3.3 Charging the battery

The battery is charged in the pipette. Charging may only be carried out using the charging adapter supplied or the charging stand with the original power unit. A pipette which does not contain a battery must not be recharged! A new battery does not attain its full capacity until two or three complete charging/discharging cycles have been completed.

Before recharging, please compare your voltage requirements with the voltage specifications on the plug-in unit.

For charging purposes, the charging adapter is placed upon the Research pro. Alternatively, the Research pro can be placed in the charging stand.

During the start and termination of the charging process, “CON” appears briefly on the left-hand side of the display. The display is switched on during the charging process. The battery symbol appears in a rolling form. During charging, the Dispensing function is frozen. When the charging process has finished, the battery symbol appears in the display without moving. When the pipette has been charged, it may remain in the charging stand. To increase the charging capacity, the battery should occasionally be discharged until the flashing battery symbol appears. To avoid a total discharge, the fully charged battery should be removed from the Research pro before extended periods of non-use (e.g. several months). In this case, all data remains stored. In order to avoid a total discharge, the battery that has been removed should be re-charged every six months. Dispose of used batteries according to legal regulations.
4 Operating principle

4.1 Display and keypad

- **Display and Keypad**: The display shows the current mode and options, and the keypad allows for selecting different functions and adjusting settings.

- **Operating System**: The operating system includes options for Speed, Volume, and Program.

- **Speed and Volume**: Speed can be adjusted by pressing the appropriate keys, and Volume can be changed using the rocker switch.

- **Program**: Double-clicking the Program button opens the program level, where users can select different programs for pipetting, dispensing, and fixed-volume operations.

- **Options**: For PIP and FIX, options include Display blank, BLOW, RINSE, REVERSE PIPETTING, and Manual.

- **Select Rocker**: This switch can be pressed upwards or downwards to select basic modes such as PIP, DIS, and FIX.

- **Actuate Key**: Used for aspirating and dispensing liquid.

- **Ejector**: For pipette tips.

- **RESET Key**: Used during editing of programs. Liquid can be dispensed during a Reset.

- **Emergency Stop**: Appears when the piston is moving.

- **Battery Symbol**: Flashes when the battery is low.

To switch on: Press any key firmly.
To switch off: Automatically after 10 min of non-use.
4 Operating principle

4.2 Function units

The Research pro is a microprocessor-controlled pipette which executes the piston movement with the aid of a stepper motor. The power supply is a rechargeable nickel-metal hydride battery.

Dispensing and Reverse Pipetting require a different basic position than that for Pipetting. The request to change the basic position is indicated in the display by 📣.

Ejector with extension

The force translation of the ejector for pipette tips ensures that tips are ejected very easily. The extension can be individually adjusted to accommodate left- and right-handed users as well as different hand sizes. Select the desired setting by simply sliding the extension into the position as required.

Hook on the hand rest

Loosening the screw enables the hook on the rear of the pipette to be adjusted to suit all hand sizes.

Contact surface on the rear of the pipette

Both upper surfaces are required for charging the nickel-metal hydride battery. The lower surfaces are the data interfaces for the Service Department.

The contact to the charging adapter or the charging stand cannot be confused with any other contacts.

Acoustic signals

Certain signals assist the user for different operations:

- Short signal to acknowledge that the keypad has been pressed.
- Slightly higher tone to indicate that the function for which the key has been pressed cannot be executed.
- Louder tone to indicate that a piston movement has ended.
- Longer tone to indicate that a specific sequence of steps (e.g. Dispensing) has ended.
- Louder tone to indicate an error message.

The acoustic signals are a great help when you are familiarizing yourself with the operating procedure of the Research pro. They can also be switched off if required (see Sec. 5.11).
5 Operation

5.1 Mode of operation

The Research pro is switched on by pressing any key. Attach an Eppendorf pipette tip to the Research pro. The color coding of the Actuate key corresponds to the color code of the racks for pipette tips. The dispensing liquid is aspirated into the pipette tip. When the 200 µL tips are used together with the 300 µL pipette and when Filtertips are used, the volume restriction option must be activated in the device parameters (Sec. 5.11).

The liquid which is to be aspirated is taken from a suitable vessel. When multi-channel pipettes are used, the “Reagent reservoir” vessel is recommended. Before commencing pipetting activities with multi-channel pipettes, turn the adapter in the required direction. In addition to the description found in the subsequent sections 5.3 – 5.11, the following general procedure takes place:
Attach the pipette from the rack. Slight force may be used if necessary.

When aspirating liquid, immerse the pipette vertically – and as little as possible – into the liquid. Following aspiration, remove the pipette tip from the liquid after the acoustic signal has been emitted. If air bubbles have been aspirated, this process must be repeated.

Never lay the pipette down when the tip is filled!

If necessary, carefully remove any external wetting from the pipette tip.
To dispense liquid, position the pipette tip in the aspirating vessel, as shown in the illustration. Depending on the type of problem (carryover, contamination), discard the pipette tip after that by pressing the Eject key, attach a new tip and reaspirate liquid.

5.2 Essential operating information

The following sections contain step-by-step explanations of the operating procedure. It is essential to work through these sections with the pipette in your hand. The volume shown in the display information contained in the operating manual does not necessarily correspond to the volume range of your pipette.
As a supplement to this manual, an interactive demonstration is available to familiarize users with the operation of the Research pro – see our home page www.eppendorfnl.com

Reset If a Reset is requested in the display, this Reset is always accompanied by a piston movement. For this reason, please ensure that any residual liquid in the pipette tip is dispensed beforehand! A Reset can also be used to empty the pipette tip and to end an operating process. If you quit an input field during programming (e.g. changing the speed) using Reset, the changes which have been made are not stored.
If is pressed during the piston movement, this functions as an emergency brake.
Pressing again empties the pipette tip.
## 5 Operation

### Motor-reset

If [Motor-reset] is held down until a piston movement begins, a motor reset is effected. This reset routine lasts roughly 10 seconds. The accuracy of the piston movement is ascertained with the motor reset.

### Program

The Research pro has two operating levels. The basic modes for pipetting (PIP and FIX) and dispensing (DIS) are accessed in the first level by pressing the Select rocker. PROG appears in the display by double-clicking the "Program" key. You are now in the second level (program level). Using the Select rocker, select from the programs (Sec. 5.10). This level can be quit by pressing the "Program" key briefly once. PROG disappears from the display.

Please note the following descriptions of the symbols used in the program sequence:

- An Actuate key which has been pressed briefly is light.
- An Actuate key which has been held down is dark.

If the piston movements appear in the display without any volumes, this indicates a process which is not connected to liquid aspiration or dispensing.

### Aspirating and dispensing speeds

The selected speed can be viewed by pressing the Speed key several times. The speed is changed as follows:

<table>
<thead>
<tr>
<th>Sequence for pressing keys</th>
<th>Magnifying glass indicates important display information</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>Speed</td>
<td>Display and selection of aspirating speed.</td>
</tr>
<tr>
<td>Select</td>
<td>Speed</td>
<td>Display and selection of dispensing speed.</td>
</tr>
</tbody>
</table>

* This procedure does not necessarily have to be completed using the Speed key. Any key – with the exception of Reset – may be used. If a key other than the Speed key is used to complete the procedure, the function of this key is also executed at the same time.

The direction of the arrow for speed flashes in this input field.

The speed can be altered before every dispensing or aspiration.

Different speeds can already be stored for the three basic modes (PIP, DIS, FIX).

**Important!** High speeds have a much lower current consumption than low speeds.

### Loading gels

With the 10 µL and 100 µL Research pro, the lowest speeds for liquid dispensing are ideal for loading gels. To enable users to work rapidly and with a low electricity consumption, the highest possible speed for liquid aspirating should be used. Depending on the task at hand, gels can be loaded in the Standard mode (Sec. 5.3) or by using the BLO (Sec. 5.4) or MAN (Sec. 5.7) options. Using the BLO option makes it possible to discharge the blowout outside of the gel pouch, thus preventing turbulence in the gel pouch.
5.3 Pipetting in the standard mode

In the Standard mode, blow-out is executed automatically when liquid is dispensed. The standard mode is recommended for rapid series pipetting with aqueous solutions.

Programming

If PROG appears in the display: Press the PROG key briefly until PROG disappears.

Activate the selection rocker until 'PIP' appears in the left side of the display.

Volume selection (here: 800 µL). The volume rocker has two pressure points for fast or slow volume adjustment for up and down.

If necessary, press the Option key several times. In the Standard mode, the display remains blank in this case.

Pipetting procedure

If appears in the display: Press the key briefly.

Liquid is aspirated.

Liquid is dispensed with blow-out.

Alternative pipetting procedure

If the Actuate key is held down when liquid is dispensed, the device returns ↑ to the basic position when the key is released.

Note: Necessary when dispensing into existing liquid: Before releasing the key, remove the pipette tip from the solution in order to prevent any solution from being aspirated unintentionally.

The pipette is now once again ready to aspirate.
5 Operation

5.4 Pipetting with separate blow-out (Blow = BLO)

BLO is recommended for use with liquids with a high wetting power or with liquids which are prone to the formation of foam (e.g. solutions containing protein). The residual liquid is dispensed by pressing the Actuate key separately.

Programming

Select

If PROG appears in the display: Press the Program key briefly until PROG disappears.

Volume

Volume selection (here: 800 µL). The volume rocker has two pressure points for fast or slow volume adjustment for up and down.

Option

If necessary, press the Option key several times until BLO appears in the display. BLO is selected for blow-out.

Procedure

If BLO appears in the display: Press the key briefly.

Liquid is aspirated.

Liquid is dispensed.

Blow-out: Delayed dispensing of residual liquid.

Alternative blow-out procedure

If the Actuate key is held down during the blow-out, the return does not take place until the key has been released.

The pipette is now once again ready to aspirate.
5 Operation

5.5 Pipetting with separate rinsing (Rinse = RNS)

Rinsing (RNS) is recommended for volumes below 10 µL. RNS is suitable for mixing the dispensing volume and the specimen liquid when large volumes are used. It is strongly recommended to use the "max. speed" setting.

Programming

If PROG appears in the display: Press the PROG key briefly until PROG disappears.

Select "PIP" for pipetting.

Volume selection (here: 5 µL).

The volume rocker has two pressure points for fast or slow volume adjustment for up and down.

If necessary, press the Option key several times until RNS appears in the display. RNS is selected for rinsing.

Procedure

If  appears in the display: Press the  key briefly.

Liquid is aspirated.

Rinsing/mixing takes place three times after liquid has been dispensed. Mixing volume results from dispensing volume and the volume of the blow-out step (BLO).

If the Actuate key is held down when liquid is dispensed, mixing takes place until the key is released.

Return to basic position by pressing the key when device is not immersed in the liquid.

The pipette is now once again ready to aspirate.
5 Operation

5.6 Reverse Pipetting (RP)

RP is recommended for solutions with a high viscosity or with a slightly higher vapor pressure. "Reverse Pipetting" is liquid aspiration with a blow-out. The liquid is dispensed without a blow-out. If Filtertips are used, please observe the volume restriction (Sec. 5.11).

Programming

If PROG appears in the display: Press the PROG key briefly until PROG disappears.

Select "PIP" for pipetting.

Volume selection (here: 800 µL). The volume rocker has two pressure points for fast or slow volume adjustment for up and down.

If necessary, press the Option key several times, until RP appears in the display. RP is selected.

Procedure

If R appears in the display: Press the R key briefly.

Aspiration of liquid with blow-out.

Liquid is dispensed.

Blow-out is discarded. If necessary, replace the tip.

Pipette is once again ready to aspirate liquid with blow-out.

Alternative procedure for dispensing and aspirating

If the Actuate key is held down when liquid is dispensed, the next liquid aspiration without blow-out takes place when the key is released. The liquid from the blow-out may continue to be used.
5 Operation

5.7 Pipetting with the MAN option

Note: The MAN (manual) option is the equivalent of operation with a mechanical piston-stroke pipette. Liquid is aspirated and dispensed only when the Actuate key is held down. The volume display increases the number of applications available in comparison to a mechanical pipette:

1. Aspirating: Measuring a small, unknown amount of liquid via aspiration into the pipette tip. The volume of aspirated liquid appears in the display. If necessary, dilute the liquid to the defined end volume by aspirating additional liquids. Liquids can be separated by aspirating air bubbles. The display shows the total volume.

2. Dispensing: Titration is carried out. The amount of liquid dispensed appears in the display. There is no blow-out.

Setting lower speeds is strongly recommended.

Programming

Carrying out liquid aspiration

If PROG appears in the display: Press the Option key briefly until PROG disappears.

Select "PIP" for pipetting.

Volume selection (here: 1,000 µL). The volume rocker has two pressure points for fast or slow volume adjustment for up and down.

If necessary, press the Option key several times, until MAN appears in the display. MAN is selected.

Select Program Volume Option Option Option

If R appears in the display: Press the R key briefly.

Liquid is aspirated. The aspirated liquid appears in the display.

The direction is changed using the volume rocker.

Volume correction, e.g. for removing an air bubble.
5 Operation

Carrying out dispensing/titration

Volume

The direction is changed again using the volume rocker. This change of direction can be repeated without restriction.

A defined end volume has been reached. A special acoustic signal is emitted. Dispensing is carried out by pressing the key again.

Note: We recommend low speed for dispensing. The speed can also be reduced between individual dispensing steps (see Ch. 5.2, "Speed for aspiration and discharge").

Aspirate the defined total volume by holding down the Actuate key.

When the key is pressed briefly:
The amount of liquid dispensed appears in the display.

Press key again:
Total of dispensed liquid is displayed.

Total amount of liquid is dispensed. A special acoustic signal is emitted. Blow-out is not executed. Blow-out can be actuated by pressing the key.

Press the key again to aspirate liquid.

Note:
The direction can also be changed after partial dispensing. The volume display changes after the Actuate key has been pressed. No additional projection of the volume occurs following the repetition of the procedure. The display starts at 0.
5.8 Pipetting with a preselected fixed volume (FIX)

FIX is used to rapidly set five frequently used pipetting volumes. Five FIX volumes are predefined in the pipette. FIX volumes can be changed via programming.

Programming FIX fixed volumes

1. **Select**

   - If **PROG** appears in the display: Press the **Program** key briefly until **PROG** disappears.

   - Select "FIX" for fixed volume.

2. **Program**

   - Hold down the Program key until EDIT appears. The volume flashes.

3. **Select**

   - Using the Volume rocker, select the volume for the memory slot (here: 5).

4. **Select**

   - Select the memory slot using the Select rocker.

5. **Volume**

   - Define the next volume (here: memory slot 3).

6. **Program**

   - The program is ended by pressing the **Program** key. EDIT and the flashing volume disappear from the display.

   - Or

   - If **R** appears in the display: Press the **R** key briefly.

   - The selected volume is aspirated. Programming is ended. EDIT and the flashing volume disappear from the display.
5 Operation

Selecting a fixed volume (with option and speed)

- If **PROG** appears in the display, press the **PROG** key briefly until it disappears.
- Select "FIX" for fixed volumes.
- Select from the five FIX volumes.
- Press the Option key repeatedly until the desired option appears.
- Display and selection of aspirating speed.
- Display and selection of dispensing speed.

Note: The option and speeds selected are applicable for all fixed volumes. It is possible to store the pipetting volume with speed and option by using **Prog** (Sec. 5.10).

Procedure
The procedure depends on the option selected. Information on the procedure according to the option selected is contained in Sections 5.3 to 5.7.
5 Operation

5.9 Dispensing (DIS)

During this procedure, the aspirated liquid is dispensed in defined partial steps. As with “Reverse Pipetting”, slightly more liquid is aspirated than is necessary for the sum of the dispensing steps.

The use of filter tips is not particularly recommended! If Filtertips are used, please observe the volume restriction (Sec. 5.11).

Programming

If PROG appears in the display: Press the key briefly.

Select “DIS” for dispensing (multi-dispensing).

Select the volume per dispensing step (here: 50 µL).

In the right-hand side: max. dispensing steps per filling of the pipette tip (here: 20 steps; 1,000 µL pipette).

If necessary, minimize the dispensing steps. The dispensing steps flash with Select.

Display and selection of aspirating speed.

Display and selection of dispensing speed.

Procedure

If  appears in the display: Press the key briefly.

Aspiration of total amount of liquid (here: > 600 µL).

Changed procedure as of software version V.1.56!

Activation of the return stroke. This is not a dispensing step! Dispensing of liquid into the sampling tube.
Free jet dispensing
Free jet dispensing is possible at volumes greater than ≥ 20 µL. The small drop that forms after each free jet dispensing of a partial volume in the dispensing mode is part of the following partial volume.

For greater precision and accuracy:
- Activate return stroke (see procedure) in the free jet for free jet dispensing.
- Activate return stroke with the pipette tip against the tube wall for wall dispensing.
5 Operation

5.10 Notes on the programs

To reach the programming level, the [PROG] key must be double-clicked.

PROG appears in the display together with a memory slot number from 1 – 5.

With the aid of the rocker, five programs can be shown in the left-hand side of the display.

To program the five memory slots, it is possible to select from seven different program sequences:

**PIP = Pipetting**

As per PIP outside the program level. The complete sequence with volume, option and speeds is programmed in one memory slot. After programming has been completed, the procedure can no longer be changed by repeatedly pressing the keys or the volume rocker. This is also applicable for the other program sequences.

**SP = Sequential Pipetting**

Up to ten different pipettings can be linked up to each other. Volume, option and speeds are defined for each pipetting sequence.

The MAN option is not available here.

**DIS = Dispensing**

As per DIS outside the program level. The complete procedure is programmed in one memory slot with dispensing volume, dispensing steps and speeds.

The use of filter tips is not particularly recommended!

**SD = Sequential Dispensing**

Up to 20 dispensing steps can be defined. Each dispensing step may have a different partial volume. The total volume may exceed the filling level of a pipette tip.

This means that new liquid for the pipette tip must be aspirated during the dispensing procedure. Only one aspirating and dispensing speed is defined for all dispensing steps.

The use of filter tips is not particularly recommended!

**ADS = Automatic Dispensing**

With the Actuate key held down, all dispensings are executed automatically with the same volume and in a user-defined rhythm (0.1 – 10.0 seconds). Automatic dispensing may be interrupted by releasing the Actuate key. Apart from this, the procedure is identical to that of DIS. The use of filter tips is not particularly recommended!

**DIL = Diluting**

During the diluting process, a diluent, then an air bubble and finally a sample are aspirated into the pipette tip. The diluent volume and the sample volume are defined by the user. The air bubble is dependent on the sample volume and is always specified specimen by the program.

The entire contents of the pipette tip can be dispensed by selecting a pipetting option.

Depending on the pipette used, the dilution ratio is between approximately 1+1 and 1+48 (applies as of V.1.56 and data set 2).
5 Operation

SDI = Serial Diluting
For serial diluting, a defined volume of liquid is aspirated into the pipette tip. This liquid is
dispensed and then mixed with a specific liquid volume by means of a programmable mixing
process (volume, mixing cycles). The mixing procedure (MIX) is started by pressing the Actuate
key separately.

ASP = Aspirate (multiple aspiration of one volume)
In this program, a defined volume can be aspirated several times. If multiple aspiration of a
volume is complete, the filled pipette tip is emptied. This procedure is the equivalent to a
“reverse dispensing”. The program may be used for exchanging nutrient solutions.

EDIT
If PROG is in the display, the programming level can be opened by holding down the Program
key. The Program key must be held down until the word EDIT appears in the display in front of
PROG 1 – 5. Step-by-step programming is explained in the following sub-section.
If the programming of a program sequence is quit by pressing RESET, the entries for the
program sequence are not stored.
The same program sequence – with, for example, different volumes or options – can be stored
in several memory slots. It would therefore be possible for different pipetting sequences to be
stored permanently in the program level.
Program sequences can be overwritten at any time under EDIT (Hold down the Program key).
During the programming process, the entry which is to be defined flashes in the display.
Selections are made using the Select rocker. Volumes are selected using the Volume rocker.
Data is stored by pressing the Actuate key (ENTER function).
Options and speeds can be selected in the programming level by using the Select rocker or by
using the Option or Speed key. Descriptions of how to use the Option and Speed keys can be
found in Secs. 5.2 – 5.9. We recommend that you read these sections before you start
programming. The following section on programming for pipetting contains only a description of
operation using the rockers. Programming and execution of the other programs is contained in
Part B of this manual, which is printed in English and Spanish.
### 5 Operation

#### 5.10.1 Example for programming pipetting in the program level

**Programming**

<table>
<thead>
<tr>
<th>Program</th>
<th>Double-click the key until PROG appears in the display.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select</td>
<td>Select the memory slot.</td>
</tr>
<tr>
<td>Program</td>
<td>Hold down the key until EDIT appears.</td>
</tr>
<tr>
<td>Select</td>
<td>The input field flashes. Select PIP. Press the Actuate key.</td>
</tr>
<tr>
<td>or</td>
<td>The input field flashes. Select the volume and store.</td>
</tr>
<tr>
<td>Volume</td>
<td>Select the aspirating and dispensing speed, and store.</td>
</tr>
<tr>
<td>Select</td>
<td>The option is selected and stored. (The magnifying glass shows the standard mode.)</td>
</tr>
</tbody>
</table>

Programming can be ended prematurely and then stored by pressing the `Prog` key. EDIT disappears from the display. If EDIT is ended with the `Actuate` key before completion of programming for the memory slot, the changes are not transferred (emergency exit).

**Procedure**

The procedure depends on the pipetting option selected. Depending on the option, procedure is identical to Sections 5.3 to 5.7.

When Prog. 1 – 5 are carried out, the Option and Speed keys as well as the Volume rocker are all disabled.
Device parameters may be changed only after thorough inspection and only by persons who are trained to do so!

Device parameters are made up of the following:

**BE 1:** To switch on/off the acoustic signal for the keypad (short beep).

**BE 2:** To switch on/off the second acoustic signal for the end position of the dispensing piston, for warning and for confirmation (different beeps).

**CAL:** Display of calibration data µL, axle section (b) and gradient (m).

**VOL:** Volume restriction for using the 200 µL tips on the 300 µL pipette.

**INI:** To initialize the original pipette data upon delivery.

The device parameters can all be found on one list. The Actuate key functions as an Enter key. After Enter has been pressed, the next line appears in the display.

If a device parameter is quit using Reset, the setting which was made prior to change is valid.

Device parameters are called up as follows:

- **With the pipette switched on,** press both keys **briefly at the same time.**

- To switch off/on acoustic signal for keypad.

- To switch on/off (on), second acoustic signal.

- To view calibration data here: standard values, thus no CAL appears in the display. For changes, see Sec. 5.11.1.

- Display and change of maximum volume for aspiration and dispensing. A reduction to 20 % of the pipetting volume is possible. A recommendation for Filtertips can be found on the next page.

- After changes have been made down to the smaller volume, a reminder to make the necessary changes for volume programming is also issued by means of the error message VOL.

- To exit the device parameters. For information on the INI procedure, see 5.11.2.
The Research pro must be calibrated only for solutions with a density, viscosity, surface tension and vapor pressure that are greatly different to that of water. If the density of an aqueous solution changes (e.g. due to a different salt concentration) by roughly \( \pm 10\% \), the volume changes by approximately \( \pm 0.2\% \). This does not apply when other relevant sizes change as well.

The actual volume can be checked via weighing (see Sec. 2, “Technical data”):

- If the volume selected (display volume) is the same as the actual volume, no correction is necessary.
- If there is a significant difference between the actual volume and the display volume, the following points must be answered “Yes” before calibration is modified:
  - the pipette is leaktight. The aspirated liquid does not drip straight out of the pipette following aspiration.
  - there is no difference in temperature between the pipette and the solution.
  - the optimum pipetting option was selected for the liquid.
  - the precision scale has not been subjected to shocks, draughts etc.
  - the correct numerical value for “dense liquid at weighing temperature” was selected for the calculation according to (1).
  - the check was made with epT.I.P.S. and the correct size of epT.I.P.S. (see Sec. 2 “Technical data”).

If the place where the pipette is used is at extremely high altitude, an adjustment must be made in line with the ambient air pressure. At 1,000 m above sea level, there is a volume error of approx. \(-0.4\%\)

The internal volume correction of the Research pro uses the following formula:

\[
\text{Actual volume} = m \times \text{Mean value of weighings} + b \quad (1)
\]

\(m\) is the definition of the gradient and \(b\) is the definition of the axis section of this equation (2).

When the device is delivered, \(m = 1,000\) and \(b = 0.0\ \mu L\). If this data is changed, the CAL symbol appears in the bottom right of the display. If the device is reset to the original values, the CAL symbol disappears.

5.11.1 Changing the calibration (CAL)

The Research pro must be calibrated only for solutions with a density, viscosity, surface tension and vapor pressure that are greatly different to that of water. If the density of an aqueous solution changes (e.g. due to a different salt concentration) by roughly \( \pm 10\% \), the volume changes by approximately \( \pm 0.2\% \). This does not apply when other relevant sizes change as well.

The actual volume can be checked via weighing (see Sec. 2, “Technical data”):

- If the volume selected (display volume) is the same as the actual volume, no correction is necessary.
- If there is a significant difference between the actual volume and the display volume, the following points must be answered “Yes” before calibration is modified:
  - the pipette is leaktight. The aspirated liquid does not drip straight out of the pipette following aspiration.
  - there is no difference in temperature between the pipette and the solution.
  - the optimum pipetting option was selected for the liquid.
  - the precision scale has not been subjected to shocks, draughts etc.
  - the correct numerical value for “dense liquid at weighing temperature” was selected for the calculation according to (1).
  - the check was made with epT.I.P.S. and the correct size of epT.I.P.S. (see Sec. 2 “Technical data”).

If the place where the pipette is used is at extremely high altitude, an adjustment must be made in line with the ambient air pressure. At 1,000 m above sea level, there is a volume error of approx. \(-0.4\%\)

The internal volume correction of the Research pro uses the following formula:

\[
\text{Actual volume} = m \times \text{Mean value of weighings} + b \quad (1)
\]

\(m\) is the definition of the gradient and \(b\) is the definition of the axis section of this equation (2).

When the device is delivered, \(m = 1,000\) and \(b = 0.0\ \mu L\). If this data is changed, the CAL symbol appears in the bottom right of the display. If the device is reset to the original values, the CAL symbol disappears.

If the CAL symbol appears in the display, the “stroke movement” which is selected or displayed is converted by the pipette using the user-defined \(m\) and/or \(b\) in order to ensure that the actual volume of the liquid used corresponds to the display volume.

\[\text{Actual volume} = m \times \text{”Stroke movement”} + b \quad (2)\]

It is essential to inform all users of the changes made to the calibration data! We recommend labeling the pipette as follows (example only):

Pipette calibrated only for use of “xy” with option “ZZZ”.

5 Operation

<table>
<thead>
<tr>
<th>Type of ep Dualfilter T.I.P.S</th>
<th>Volume restriction for RP and DIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 µL</td>
<td>9 µL</td>
</tr>
<tr>
<td>20 µL</td>
<td>17 µL</td>
</tr>
<tr>
<td>100 µL</td>
<td>100 µL</td>
</tr>
<tr>
<td>300 µL</td>
<td>280 µL</td>
</tr>
<tr>
<td>1000 µL</td>
<td>970 µL</td>
</tr>
<tr>
<td>5000 µL</td>
<td>4700 µL</td>
</tr>
</tbody>
</table>

Type of ep Dualfilter T.I.P.S. | Volume restriction for RP and DIS |
5 Operation

Examples and notes for volume correction (balance in mg; density in mg/µL = g/mL).

1. An actual volume of 98 µL was calculated using formula (1).

   The display volume is 100 µL.
   In this case, the following formula should be used:

   \[
   \text{Display volume} = 100 \mu L \\
   \text{Actual volume} = 98 \mu L \\
   \]

   The value 1.02 is entered under "m". This means that, although 100 µL appears in the
display, the piston makes a stroke movement which is larger by a factor of 1.02, so that
100 µL of this liquid can be aspirated.

   If only 100 µL of this liquid is dispensed in every case or if the same factor is produced when
other volumes are tested, a correction of "m" only is sufficient.

2. If greatly differing factors are produced for different volumes, it is advisable to carry out a
correction of axis section "b" and gradient "b". This requires a calculator with the "linear
regression" statistics function \[y=mx+b\]. The data for "m" and "b" are calculated by entering
the actual volume (x) and the display volume (y). The actual volume (x) and the display
volume (y) must consist of at least two pairs of different volumes, each of which differ
greatly.. Linear regression can also be carried out using PICASO II.

   Following programming, the calculated data must then be checked via weighing
and by using formula (1).

   Note: In the case of mechanical pipettes, only axis section "b" can be corrected.

   The calibration data can be changed as follows:
   – Call up the device parameters (see 5.11).
   – Proceed using "ENTER" until "CAL 0.0 µL b" is entered.
   – Hold down the "Program" key until the number flashes.
   – Set the desired number using the "Volume" or "Select" key.
      The CAL symbol appears when \(b \neq 0.0\).
   – Confirm the number selected by pressing "ENTER".
   – The entry for "m" flashes. This can also be changed by pressing "Volume" or "Select".
      Entries are stored by pressing "ENTER".
   – The ranges for "m" and "b" differ slightly according to the volume size of the pipette.

5.11.2 Information on initialization (INI)

If the Research pro is to be used at another workstation and if all volumes and programs
defined by the user should no longer be used, the pipette can be initialized as per delivery
package by means of INI.

   Following initialization all user settings and programs are deleted!

Initialization is carried out as follows:
   – Using "ENTER", access "INI" in the device parameters.
   – Hold down the "Program" key.
   – Initialization is completed when the device parameter "INI" disappears from the display.
6 Care, sterilization and maintenance

6.1 Care

The outside of the pipette can be wiped with a moist cloth. The use of water with cleaning wetting agent is also permitted.

⚠️ Do not allow any liquid to enter the pipette!

After that, the lower part only of the pipette should be rinsed with distilled water and dried. The pipette may be carefully wiped clean with isopropanol. The procedure for replacing defective O-rings (when the pipette tips fit incorrectly) is described in Sec. 6.3.

If the pipette is severely contaminated or if very aggressive chemicals are dispensed, the lower half of the Research pro should be disassembled (see Sec. 6.2 for the single-channel model and Part B: "Ordering information" for the multi-channel model). The individual parts are rinsed in distilled water and then dried. The piston is then lightly lubricated using silicone grease.

Prior to assembling the pipette, check that the piston is positioned correctly. Following reassembly, a motor reset must take place. This is effected by holding down the Reset key until a 🔄 appears in the display and the motor starts.

6.2 Sterilization

Only the lower half of the pipette can be steam-autoclaved (121 °C, 1 bar* overpressure, 20 minutes). The autoclaved parts must be allowed to dry at room temperature. The entire lower part of the multi-channel model can be autoclaved as one unit. With the single-channel model, the individual parts of the lower part must be autoclaved separately.

Lower part of multi-channel model

Disassembly:

Hold down ejector.

Then rotate lower part clockwise until the lower part separates from the pipette.

Piston

Opening for metal pin

To loosen the lower part of the multi-channel pipette, rotate it in the arrow direction which is normally not permitted.

Pull the lower part downwards slowly. The multi-channel piston, which is held in place magnetically, jerks sharply and then comes off.

* (1 bar = 100 kPa = 14.5 psi)
6 Care, sterilization and maintenance

Assembly:
- Hold down the ejector.
- Position the lower part in such a way as to enable the metal pin on the ejector to enter the corresponding opening on the lower part. The pistons of the lower parts must be in the highest position. If the pistons are not in the highest position, they can be moved upwards by banging the thread side firmly against a soft surface. If this proves to be unsuccessful, the lower part is most probably dirty! The lower part must be opened and cleaned. A detailed description of how to do so is contained in the “Ordering information” section of Part B of this manual.
- The magnetic coupling of the piston of the upper and lower part is indicated by a clicking noise.
- Do not hold down the ejector any longer and push the lower part firmly onto the metal pin of the ejector.
- Rotate the lower part counterclockwise. When the lower part is rotated, a low “click” indicates that the safety coupling has connected and the lower part is firmly in place.
- Following reassembly, check that the ejector is functioning correctly.
- Following reassembly, trigger a motor reset by holding down the Reset key.
- Check that the dispensing function of the pipette is working correctly.

Lower part of single-channel model

All volumes except 5,000 µL:
- Hold down the ejector and pull off the ejector sleeve (1). Force may be required.
- Unscrew the lower part (2) using the key (3).
- Make sure that the piston is not damaged.
- Unscrew the piston (4). If necessary, first loosen the piston at the upper end using the flat-nose pliers. The piston is moved into its lowest position

For 5,000 µL:
- Hold down the ejector and pull off the ejector sleeve (1). Force may be required.
- Unscrew the cylinder (2). The piston (3) is held in place magnetically.
- Pull the piston (3) out of the upper part.
- Using the disassembly tool in the accessories package (4), unscrew the cylinder bearing.
- During removal, the spigots of the disassembly tool are inserted into the openings on the cylinder bearing.

Assemble in reverse order.
- Check the magnetic coupling of the 5,000 µL piston.
- Trigger a motor reset by holding down the Reset key.
- Check that the dispensing function of the pipette is working correctly.
Care, sterilization and maintenance

6.3 Maintenance
Apart from general care and occasional discharging (when the battery symbol starts flashing) and recharging of the pipette, no special maintenance is necessary if the pipette is used correctly. For information on charging the battery pack when the pipette is stored for a long period, see Sec. 3.3. The lower part of the pipette may be replaced completely. (see Sec. 6.2.) The process for replacing the seals in the lower part is described in Part B: “Ordering information/service parts”. Maintenance on the Research pro may be carried out by the Service Department. If you require maintenance work, send your pipette to your authorized distributor. The current addresses of our marketing partners can be found on our home page at http://www.eppendorf.com.

In the case of the lower parts of the eight- and twelve-channel models, it is necessary to replace the O-rings (seals for pipette tips), which means that the lower part must be unscrewed. A tool for replacing the O-rings is contained in the accessories package:

- Press opening A of the tool over the nose cone. The sharp edge in the opening of the tool fits together with the O-ring.
- To cut the O-ring, press the tool heavily against the nose cone. The tool and the O-ring are then removed.
- Put the assembly aid (a shortened pipette tip) onto the nose cone and slide the new O-ring onto the nose cone.

With the 1,200 µL version, the O-ring is severed by pressing the tool firmly onto the nose cone. The O-ring is removed. The new O-ring can be attached without any assembly aids.

Information: Only O-rings made of red silicone are now available for the Research Pipettes. The force required for fitting or ejecting pipette tips has been further reduced with these red O-rings – in comparison with the previous black O-rings. Uniform alignment of the pipette tips on the lower part of the multi-channel model has also been improved. It is no longer necessary to relubricate the red O-rings.

6.4 Decontamination prior to dispatch

If the Research pro is to be checked, repaired or calibrated by Eppendorf AG or another service partner, it must be free of hazardous substances and clean!
A form called “Decontamination certificate for return of goods” and general notes about decontamination are available on our home page: www.eppendorf.com
A signed decontamination certificate must be enclosed with the pipette when it is returned. The serial number of the Research pro must be entered on the decontamination certificate. The serial number becomes visible on the housing of the Research pro when the ejector is operated.
The bottom part of the Research pro can be decontaminated of potentially infectious substances by being steam-autoclaved (see Sec. 6.2). The surfaces of the pipette can be disinfected with alcohol (ethanol, propanol) or with a disinfectant containing alcohol.
# 7 Troubleshooting

<table>
<thead>
<tr>
<th>Display information</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle segment flashes.</td>
<td>The battery is run down.</td>
<td>Complete pipetting and recharge the battery (see Sec. 3.3).</td>
</tr>
<tr>
<td>All segments flash.</td>
<td>The battery is severely run down.</td>
<td>Stop pipetting <strong>immediately</strong> and recharge the battery (see Sec. 3.3).</td>
</tr>
<tr>
<td>Segments roll through the display.</td>
<td>The charging process is underway. All dispensing functions are blocked.</td>
<td>Charge the pipette until the battery symbol appears in the display without moving.</td>
</tr>
<tr>
<td>Segments appear in the display without moving.</td>
<td>Charging process is finished.</td>
<td>Pipette is ready to use again.</td>
</tr>
</tbody>
</table>

**BAT Error 11**

- The pipette does not contain a battery!

**CON**

- Pipette was inserted into, or removed from, the charging adapter or the charging stand.

**Display is dark**

- Pipette is in the Sleep mode.
- The pipette does not contain a battery.
- The battery is completely run down (the battery discharges even when it is not used).

**DMM**

- The piston movement was stopped by pressing the key (emergency stop). A request to reset appears in the display.

**R**

- The piston in the pipette must be moved to the basic position requested.

**VOL**

- Appears when Actuate key is pressed.
- The volume cannot be aspirated because volume restriction is active.

Any other error message which appear in the display is only for error diagnosis by the Service Department. If the error message does not disappear after a motor reset or after the battery has been removed and reinserted (see Sec. 3.2), please contact the Service Department.
## 7 Troubleshooting

<table>
<thead>
<tr>
<th>Error</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
</table>
| Pipette is dripping; the volume dispensed is incorrect. | - The tip may be loose.  
- There may be foreign matter between the pipette and the tip.  
- The piston, nose cone and cylinder may be damaged or contaminated.  
- The lower part may be loose.  
- For multi-channel model: The O-ring may be damaged. | - Attach the tip firmly. Make sure that an Eppendorf tip is used.  
- Wipe the pipette. Ensure that the tip is protected from dust.  
- Treat the lower half of the pipette as described in Sec. 6 and Part B "Ordering Information/service parts". |
| Residual liquid is in the tip; dispensing is incomplete. | - See above.  
- The dispensing speed may be too high.  
- The incorrect pipetting option may have been selected. | - See above.  
- The procedure for checking the function is described in Sec. 5, "Operation". |
| Motor stops during the dispensing procedure. | - The battery may be run down.  
- The pipette may be heavily contaminated. | - Discard the dispensing as it is incorrect. Recharge the battery (Sec. 3.3) or treat the pipette as described in Sec. 6. |
| Multi-channel: Pipette doesn’t aspirate liquid. | The magnetic coupling on the multi-channel lower part no longer works.  
In the case of the Research pro Pipette 4860, strong impact stress can result in a separation of the magnetic connection between the spindle and the piston actuator. As a result of this separation, the pipette no longer aspirates liquid, despite movement of the motor. | In order to reestablish the connection, proceed as follows:  
- Separate the ejector from the lower part.  
- To do this, press the lower part against a surface until it springs in. Simultaneously press the stop clutch inward with side “B” of the universal tool. The ejector cover panel springs up. |
If there is doubt that dispensing data are correct
To avoid dispensing errors, the precision and accuracy of the Research pro need to be checked regularly. The PICASO II software program (see ordering information) is available to determine permitted systematic and random measuring deviation (see Section 2 "Technical data"). An SOP (Standard Operating Procedure) for checking pipettes can be called up from our home page www.eppendorf.com.

For liquids whose physical data deviate significantly from those of water, calibration needs to be changed in accordance with Section 5.11.1. Calibration will also need to be changed if the pipette is being used at a very high altitude.

Program notes only for program version prior to V. 1.56

<table>
<thead>
<tr>
<th>Error</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The program level cannot be opened.</td>
<td>Programm version of the pipette does not match the description.</td>
<td>With the old program version, the program level was opened by pressing the key once.</td>
</tr>
<tr>
<td>The ASP program cannot be found.</td>
<td>Programm version of the pipette does not match the description.</td>
<td>With the old program version, the ASP program did not exist.</td>
</tr>
<tr>
<td>VOL was not found among device parameters.</td>
<td>Programm version of the pipette does not match the description.</td>
<td>With the old program version, the parameter was called OPT; A choice between two volumes can be made by using Select.</td>
</tr>
</tbody>
</table>
Part B Contents / Parte B Índice

Programs................................................................................................................................... 93
I. Introduction................................................................................................................................. 94
II. SP = Sequential Pipetting..................................................................................................... 94
III. DIS = Dispensing as a program ........................................................................................... 96
IV. SD = Sequential Dispensing............................................................................................... 97
V. ADS = Automatic Dispensing............................................................................................... 100
VI. DIL = Diluting....................................................................................................................... 103
VII. SDI = Serial Diluting........................................................................................................... 105
VIII. ASP = Aspirate (from program version V.1.56 upwards).................................................... 107

Ordering information.................................................................................................................. 109
Research pro ............................................................................................................................... 109
Pipette tips ................................................................................................................................. 110
Additional accessories .............................................................................................................. 112
Charging unit as replacement part ............................................................................................ 112
Spare parts for single-channel pipettes .................................................................................... 113
Change Service parts (single-channel) ..................................................................................... 114
Spare parts for multi-channel model ......................................................................................... 115
Change volume unit 50 – 1200 µL.............................................................................................. 115
Important notes regarding ordering information .................................................................... 115
Change Service parts (multi-channel) ....................................................................................... 116

Programas................................................................................................................................... 93
I. Introducción............................................................................................................................... 94
II. SP = Pipeteo secuencial....................................................................................................... 94
III. DIS = Dispensar como programa ....................................................................................... 96
IV. SD = Dispensación secuencial ........................................................................................... 97
V. ADS = Dispensación automática........................................................................................ 100
VI. DIL = Diluir......................................................................................................................... 103
VII. SDI = Diluir en serie ......................................................................................................... 105
VIII. ASP = Aspiración múltiple (a partir de la versión de programa V.1.56)............................ 107

Información para pedidos.......................................................................................................... 109
Research pro .............................................................................................................................. 109
Puntas de pipeta ....................................................................................................................... 110
Otros accesorios ....................................................................................................................... 112
Adaptador cargador como pieza de repuesto ............................................................................ 112
Piezas de repuesto para pipetas monocanal ........................................................................... 113
Cambio piezas de servicio (monocanal) .................................................................................. 114
Piezas de repuesto para pipetas multicanal ............................................................................ 115
Cambio unidad de volumen 50 – 1200 µL................................................................................ 115
Avisos importantes a las informaciones para pedido ............................................................... 115
Cambio piezas de servicio (multicanal) .................................................................................... 116
This section contains a complete description of the additional seven program sequences (see Sec. 5.10).

During programming (EDIT and PROG in display), the Speed and Option keys and the Volume rocker can also be used. This enables users to skip backwards and forwards during the program sequence.

When the programs are executed (only PROG is in the display), the Speed and Option keys and the Volume rocker are blocked.

If only parts of the program have to be changed, programming can be ended prematurely by pressing the Program key briefly.

If a memory slot is quit using Reset before programming has been completed, the changes which have been carried out for this memory slot are not carried out. EDIT disappears from the display.

This program is suitable for sequences in which different volumes have to be pipetted consecutively on a regular basis. It is possible to program up to ten volumes with option and speed.

The MAN option may not be used for this program!

Estado de las instrucciones de manejo contiene una descripción completa de los otros siete desarrollos de programa adicionales (ver cap. 5.10).

Durante la programación (EDIT y PROG en el visualizador), pueden utilizarse también las teclas Speed y Option y el selector de volumen. Esto permite a los usuarios saltar hacia delante y atrás durante la secuencia de programa.

Al ejecutar los programas (sólo PROG en el visualizador), las teclas Speed y Option y el selector de volumen están bloqueadas.

Si se deben cambiar solamente partes de un programa, la programación puede finalizarse prematuramente, pulsando brevemente la tecla Program.

Si se sale de un puesto de memoria con Reset antes de haber finalizado la programación, no se asumen los cambios realizados para este puesto de memoria. EDIT desaparece del visualizador.

This program is suitable for sequences in which different volumes have to be pipetted consecutively on a regular basis. It is possible to program up to ten volumes with option and speed.

The MAN option may not be used for this program!

Este programa es adecuado para secuencias en las que deben pipetearse de forma consecutiva diferentes volúmenes regularmente. Pueden programarse hasta 10 volúmenes con opción y velocidad.

¡La opción MAN no debe utilizarse con este programa!

Programs / Programación
Select the memory slot.
Seleción del puesto de memoria.

Hold down the key until EDIT appears.
Mantener pulsada la tecla hasta que aparezca EDIT.

Select SP.
Seleccionar SP.

Select the pipetting sequences (1 – 10).
After ENTER: Select "1" for the first sequence in the display.
Selección de las secuencias de pipeteo (1 – 10).
Tras ENTER: Seleccionar "1" para la primera secuencia en el visualizador.

Select the first volume, and store.
Seleccionar el primer volumen y memorizar.

Select the speeds.
Seleccionar las velocidades.

Select the option.
Seleccionar la opción.

Select the second volume.
Seleccionar el segundo volumen.

Programming is complete. EDIT disappears.
La programación está completa. EDIT desaparece.
Part B Programs / Parte B Programas

Procedure / Ejecución

How you now proceed depends on the pipetting option selected and on the number of sequences. The procedure carried out according to the option is identical to that described in Sec. 5.3 to Sec. 5.7.

La ejecución siguiente depende de la opción de pipeteo seleccionada y del número de secuencias. La ejecución según la opción es idéntica a la descrita en el cap. 5.3 a 5.7.

III. DIS = Dispensing as a program / DIS = Dispensar como programa

As a program, dispensing is protected from any accidental alterations. The use of filter tips is not particularly recommended!

⚠ Changed procedure as of software version V.1.56!

Como programa, la dispensación está protegida contra posibles cambios. ¡La utilización de Filertips es menos recomendable!

⚠ ¡Procedimiento modificado en su ejecución a partir de la versión de software V.1.56!

Programming / Programación

Program / Programa

Sample is aspirated. If 🔄 appears in the display, press 🔄.

Se absorbe la muestra. Si aparece 🔄 en el visualizador, pulsar 🔄.

Ⅲ. DIS =Dispensing as a program / DIS = Dispensar como programa

As a program, dispensing is protected from any accidental alterations. The use of filter tips is not particularly recommended!

⚠ Changed procedure as of software version V.1.56!

Como programa, la dispensación está protegida contra posibles cambios. ¡La utilización de Filertips es menos recomendable!

⚠ ¡Procedimiento modificado en su ejecución a partir de la versión de software V.1.56!

Programming / Programación

B

Program

Double-click:

PROG in the display.

Doble clic: PROG en el visualizador.

Select

Select the memory slot.

Seleccionar el puesto de memoria.

Program

Hold down the key until EDIT appears.

Mantener pulsada la tecla hasta que aparezca EDIT.

Select DIS.

Seleccionar DIS.
The dispensing procedure is described in Sec. 5.9.
The procedimiento de dispensación se describe en el cap. 5.9.

IV. SD = Sequential Dispensing / Dispensación secuencial
This program can be used when different volumes of a solution have to be dispensed consecutively. Up to 20 dispensing steps can be defined.
If the sum of the dispensing steps is larger than the volume of the pipette tips, the procedure for normal dispensing is applicable when a liquid is aspirated repeatedly.
The use of filter tips is not particularly recommended!

⚠ Changed procedure as of software version V.1.56!
Este programa puede usarse cuando se tienen que dispensar de forma consecutiva diferentes volúmenes de una solución. Pueden definirse hasta 20 pasos de dispensación.
Si la suma de los volúmenes de los pasos de dispensación es mayor que el volumen de las puntas de pipeta, se aplica para la aspiración repetida de un líquido el mismo procedimiento que para una dispensación normal. ¡La utilización de Filtertips es menos recomendable!

⚠ ¡Procedimiento modificado en su ejecución a partir de la versión de software V. 1.56!

Programming / Programación

Select the dispensing volume. The max. number of dispensing steps appears in the right-hand side of the display.

Seleccionar el volumen de dispensación. El número máximo de pasos de dispensación aparece a la derecha del visualizador.

Select the speeds.
Seleccionar las velocidades.

Reduction of dispensing steps.
Reducción de los pasos de dispensación.

Select

Double-click:

PROG in the display.
Doble clic: PROG en el visualizador.
**Part B Programs / Parte B Programas**

- **Select**
  - **Select the memory slot.**
  - **Seleccionar el puesto de memoria.**

- **Program**
  - **Hold down the key until EDIT appears.**
  - **Mantener pulsada la tecla hasta que aparezca EDIT.**

- **Select**
  - **Select SD.**
  - **Seleccionar SD.**

- **Select**
  - **Determine the dispensing steps 1–20.**
  - **Determinar los pasos de dispensación 1–20.**

- **Volume of the first dispensing step.**
  - **Volumen del primer paso de dispensación.**

- **Volume of the last dispensing step.**
  - **Volumen del último paso de dispensación.**

- **Select**
  - **Select the speed for all dispensings.**
  - **Seleccionar la velocidad de todas las dispensaciones.**

- **Programming is complete. EDIT disappears.**
  - **La programación está completa. EDIT desaparece.**
Procedure / Ejecución

The necessary or largest possible amount of liquid is aspirated.

If  appears in the display, press .

Aspiración de la cantidad de líquido necesario o máximo posible.

Si aparece en el visualizador, pulsar .

 Changed procedure as of software version V.1.56!

¡Procedimiento modificado en su ejecución a partir de la versión de software V. 1.56!

Activation of the return stroke.

¡Este no es un paso de dispensación!

Dispensación de líquido en el recipiente de muestra.

The first step is dispensed.

Dispensación del primer paso.

The second step is dispensed.

Dispensación del segundo paso.

Blank step with special acoustic signal.

Paso vacío con señal acústica especial.
Part B  Programs / Parte B  Programas

When microtiter plates are filled, a specific amount of liquid must often be dispensed in rapid succession. The program is recommended for this task. The use of filter tips is not particularly recommended!

\textbf{V. ADS = Automatic Dispensing / Dispensación automática}

When microtiter plates are filled, a specific amount of liquid must often be dispensed in rapid succession. The program is recommended for this task. The use of filter tips is not particularly recommended!

\textbf{Changed procedure as of software version V.1.56!}

Al llenar placas de microtitraje, tiene que dispensarse una cantidad específica de líquido en sucesión rápida. El programa se recomienda para esta aplicación.

¡La utilización de Filtertips es menos recomendable!

\textbf{¡Procedimiento modificado en su ejecución a partir de la versión de software V. 1.56!}

Programming / Programación

<table>
<thead>
<tr>
<th>Program</th>
<th>Blow-out is discarded. Not a dispensing step. Aspiration then occurs for the next dispensing steps. Descarga de la carrera excesiva. No es un paso de dispensación. A continuación, aspiración para los pasos siguientes de dispensación.</th>
</tr>
</thead>
</table>

\textbf{Part B  Programs / Parte B  Programas}

<table>
<thead>
<tr>
<th>Program</th>
<th>Double-click: PROG in the display. Doble clic: PROG en el visualizador. Select the memory slot. Seleccionar el puesto de memoria. Hold down the key until EDIT appears. Mantener pulsada la tecla hasta que aparezca EDIT.</th>
</tr>
</thead>
</table>
### Part B  Programs / Parte B  Programas

| Select | Enter | Select \( ADS \).  
|--------|-------|-----------------|
| or / o |       | Select the dispensing volume, and store.  
| Select | Volume | Seleccionar el volumen de dispensación y memorizar.  
| Select | \( 5 \) | Select the aspirating and dispensing speed.  
| Select | \( 15 \) | Reduction of the dispensing steps.  
| Select | \( 1 \) | Dispensing frequency. Delays between dispensings: 0.1 to 10 seconds.  
|        |       | Frecuencia de dispensación. Retardo entre las dispensaciones: de 0,1 a 10 segundos.  
|        |       | Programming is complete.  
|        |       | La programación está completa.  

### Procedure / Ejecución

Aspiration of liquid. If \( \text{dispense liquid} \) appears in the display, press \( \text{dispense} \).  
Aspiración de líquido. Si aparece \( \text{dispense liquid} \) en el visualizador, pulsar \( \text{dispense} \).
Part B Programs / Parte B Programas

⚠ Changed procedure as of software version V.1.56!
¡Procedimiento modificado en su ejecución a partir de la versión de software V.1.56!

Activation of the return stroke.
Dispensing of liquid into sampling tube.

Activación de la carrera de retorno.
Dispensación de líquido en el tubo de muestra.

Dispensing with Actuate key held down.
An acoustic signal is emitted after the dispensing step.

Dispensación manteniendo pulsada la tecla liberadora.
Se emite una señal acústica después del paso de dispensación.

Interruption:
Release the Actuate key.

Interrupción:
Soltar la tecla liberadora.

Dispensing is complete.
La dispensación está completa.

Blank step with special acoustic signal.
Paso vacío con señal especial acústica.

Blow-out is discarded.
Descarga de la carrera excesiva.
Part B  Programs / Parte B  Programas

VI. DIL = Diluting / Diluir

In this case, the reagent – or diluent – first and then the sample are aspirated into a pipette tip. Both liquids are initially separated by an air bubble. In the case of larger sample volumes, the air bubble can dissolve following aspiration. A pipetting option can be used for dispensing both liquids.

Aquí se aspiran el reactivo – o diluyente – en primer lugar y a continuación la muestra junto con una punta de pipeta. Ambos líquidos son separados inicialmente por medio de una burbuja de aire. En el caso de volúmenes de muestra más grandes, la burbuja de aire se puede disolver al final de la aspiración. Puede usarse una opción de pipeteo para dispensar los dos líquidos.

Programming / Programación

<table>
<thead>
<tr>
<th>Program</th>
<th>Double-click: PROG in the display.</th>
<th>Doble clic: PROG en el visualizador.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select</td>
<td>Select the memory slot.</td>
<td>Seleccionar el puesto de memoria.</td>
</tr>
<tr>
<td>Program</td>
<td>Hold down the key until EDIT appears.</td>
<td>Mantener pulsada la tecla hasta que aparezca EDIT.</td>
</tr>
<tr>
<td>Select</td>
<td>Select DIL.</td>
<td>Seleccionar DIL.</td>
</tr>
<tr>
<td>or / o</td>
<td>Sample volume: see table.</td>
<td>Volumen de muestra: ver la tabla.</td>
</tr>
<tr>
<td>Select</td>
<td>Aspirating speed for sample.</td>
<td>Velocidad de aspiración de la muestra.</td>
</tr>
<tr>
<td>or / o</td>
<td>Diluent volume: see table.</td>
<td>Volumen de diluyente: ver la tabla.</td>
</tr>
<tr>
<td>Select</td>
<td>Aspirating speed of diluent.</td>
<td>Velocidad de aspiración del diluyente.</td>
</tr>
</tbody>
</table>
Part B  Programs / Parte B  Programas

Volume table Diluting (DIL); valid after data set 2
Tabla de volúmenes Diluir (DIL); válida a partir del grupo de datos 2

<table>
<thead>
<tr>
<th>Pipette</th>
<th>Sample / Muestra * (µL)</th>
<th>Air / Aire * (µL)</th>
<th>Diluent / Diluyente * (µL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000 µL</td>
<td>100 – 2500</td>
<td>50 – 150</td>
<td>100 – 4850</td>
</tr>
<tr>
<td>1200 µL</td>
<td>50 – 600</td>
<td>12 – 36</td>
<td>48 – 1138</td>
</tr>
<tr>
<td>1000 µL</td>
<td>50 – 500</td>
<td>10 – 30</td>
<td>50 – 940</td>
</tr>
<tr>
<td>300 µL</td>
<td>20 – 150</td>
<td>3 – 9</td>
<td>18 – 277</td>
</tr>
<tr>
<td>100 µL</td>
<td>5 – 50</td>
<td>1 – 3</td>
<td>5 – 94</td>
</tr>
<tr>
<td>10 µL</td>
<td>0.5 – 5</td>
<td>0.1 – 0.3</td>
<td>0.5 – 9.4</td>
</tr>
</tbody>
</table>

* The total volume of the pipette cannot be exceeded. For example, the maximum diluent volume can only be used with the minimum sample.

* No puede sobrepasarse el volumen total de la pipeta. Por ejemplo, el volumen máximo de diluyente sólo puede utilizarse con el mínimo de muestra.

Procedure / Ejecución

Diluent is aspirated.
If appears in the display, press .
Aspiración del diluyente.
Si aparece en el visualizador, pulsar .

Air bubble is aspirated.
The volume is calculated by the program.
Se ha aspirado una burbuja de aire.
El programa calcula el volumen.

Sample is aspirated.
Se aspira la muestra.
In this program, pipetting is linked up to a specified number of mixing cycles. The program is used with a specimen liquid. The pipetting sample is mixed together with the specimen liquid.

En este programa, el pipeteo va unido a un número específico de ciclos de mezcla. El programa se usa con un líquido ya preparado. La muestra a pipetear se mezcla con el líquido ya preparado.

Programming / Programación

Sample – air – diluent are dispensed. Please observe the pipetting option!
¡Dispensación de muestra – aire – diluyente. ¡Por favor, observar la opción de pipeteo!

VII. SDI = Serial Dilution / Diluir en serie

In this program, pipetting is linked up to a specified number of mixing cycles. The program is used with a specimen liquid. The pipetting sample is mixed together with the specimen liquid.

En este programa, el pipeteo va unido a un número específico de ciclos de mezcla. El programa se usa con un líquido ya preparado. La muestra a pipetear se mezcla con el líquido ya preparado.

Programming / Programación

Double-click: PROG in the display.
Doble clic: PROG en el visualizador.

Select the memory slot.
Seleccionar el puesto de memoria.

Hold until EDIT appears.
Mantener pulsada la tecla hasta que aparezca EDIT.

Select SDI.
Seccionar SDI.

Volume of sample.
Volumen de la muestra.

Aspirating and dispensing speed. Select a high speed!
¡Velocidad de aspiración y dispensación. ¡Seleccionar una velocidad alta!
### Part B Programs / Parte B Programas

#### Procedure / Ejecución

<table>
<thead>
<tr>
<th>Select</th>
<th>Stroke for mixing. *1</th>
<th>Carrera para mezclar. *1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Select</th>
<th>Mixing cycles (max. 20). Ciclos de mezcla (max. 20).</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Select</th>
<th>BLO pipetting option or standard operation. Opción de pipeteo BLO o modo estándar.</th>
</tr>
</thead>
</table>

#### Aspiration of sample. 
Si aparece en el visualizador, pulsar la tecla .

#### Sample is dispensed. 
Dispensación de la muestra.

#### With BLO: 
Con BLO: 
Ejecución carrera excesiva.

#### Start mixing cycles (here: 6). *1 
El contador va hacia atrás. *1

#### Return to the basic position by pressing the key outside the liquid. 
Retorno a la posición básica pulsando la tecla fuera del líquido.

---

*1 Mixing volume is somewhat higher than displayed. 
*1 El volumen de mezcla es algo superior al indicado.
### Part B  Programs / Parte B  Programas

#### VIII. ASP = Aspirate / Aspiración múltiple

From program version V.1.56 onwards
With ASP, several volumes of the same size are aspirated simultaneously into a pipette tip. If the tip is filled, the entire content is dispensed. This procedure is a "reverse dispensing".

A partir de la versión del programa V.1.56
Con ASP, se aspiran simultáneamente varios volúmenes del mismo tamaño en una punta de pipeta. Si la punta está llena se dispensa todo el contenido. El procedimiento es una "dispensación inversa".

**Programming / Programación**

<table>
<thead>
<tr>
<th>Program</th>
<th>Double-click: PROG in the display. Doble clic: PROG en el visualizador.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select</td>
<td>Select the memory slot. Seleccionar el puesto de memoria.</td>
</tr>
<tr>
<td>Program</td>
<td>Hold down the key until EDIT appears. Mantener pulsada la tecla hasta que aparezca EDIT.</td>
</tr>
<tr>
<td>Enter</td>
<td>Select ASP. Seleccionar ASP.</td>
</tr>
<tr>
<td>Volume</td>
<td>Select the aspirating volume. For max. number of aspirating steps, see right-hand display. Seleccionar el volumen de aspiración. Consultar el número máximo de pasos de aspiración en el visualizador de la derecha.</td>
</tr>
<tr>
<td>Speeds</td>
<td>Select the speeds. Seleccionar las velocidades.</td>
</tr>
<tr>
<td>Steps</td>
<td>Reduction of aspirating steps. Reducción de los pasos de aspiración.</td>
</tr>
</tbody>
</table>
Part B Programs / Parte B Programas

Procedure / Ejecución

1. Volume is aspirated.
   Se aspira el primer volumen.

2. Volume is aspirated.
   Se aspira el segundo volumen.

Step-by-step aspiration is finished. Confirm by pressing Enter.
La aspiración por pasos ha finalizado. Confirmar pulsando Enter.

Next time Enter is pressed:
Dispensing of the entire aspirated liquid.
La próxima vez que se pulse Enter:
Dispensación de todo el líquido aspirado.
Part B  Ordering information / Parte B  Programa de ventas

Eppendorf Research pro, single-channel / monocanal

- incl. charging unit / con adaptador cargador *= 0.5 – 10 µL 022461303
- incl. charging unit / con adaptador cargador *= 5 – 100 µL 022461311
- incl. charging unit / con adaptador cargador *= 20 – 300 µL 022461320
- incl. charging unit / con adaptador cargador *= 50 – 1000 µL 022461338
- incl. charging unit / con adaptador cargador *= 100 – 5000 µL 022461346
- without charging unit / sin adaptador cargador *= 0.5 – 10 µL 022461354
- without charging unit / sin adaptador cargador *= 5 – 100 µL 022461362
- without charging unit / sin adaptador cargador *= 20 – 300 µL 022461371
- without charging unit / sin adaptador cargador *= 50 – 1000 µL 022461389
- without charging unit / sin adaptador cargador *= 100 – 5000 µL 022461397

Eppendorf Research pro, 8-channel / 8 canales

- incl. charging unit / con adaptador cargador *= 0.5 – 10 µL 022461401
- incl. charging unit / con adaptador cargador *= 5 – 100 µL 022461419
- incl. charging unit / con adaptador cargador *= 20 – 300 µL 022461427
- incl. charging unit / con adaptador cargador *= 50 – 1200 µL 022461435
- without charging unit / sin adaptador cargador *= 0.5 – 10 µL 022461443
- without charging unit / sin adaptador cargador *= 5 – 100 µL 022461451
- without charging unit / sin adaptador cargador *= 20 – 300 µL 022461460
- without charging unit / sin adaptador cargador *= 50 – 1200 µL 022461478

Eppendorf Research pro, 12-channel / 12 canales

- incl. charging unit / con adaptador cargador *= 0.5 – 10 µL 022461486
- incl. charging unit / con adaptador cargador *= 5 – 100 µL 022461494
- incl. charging unit / con adaptador cargador *= 20 – 300 µL 022461508
- without charging unit / sin adaptador cargador *= 0.5 – 10 µL 022461516
- without charging unit / sin adaptador cargador *= 5 – 100 µL 022461524
- without charging unit / sin adaptador cargador *= 20 – 300 µL 022461532

* Pipettes without a charging unit must be charged in the charging stand.
* Pipetas vendidas sin adaptador cargador tienen que cargarse con el cargador opcional.

Charging stand / Cargador

- for one pipette / para una pipeta *= 022461541
- for four pipettes / para cuatro pipetas *= 022461559

* If the delivery address is not in the country in which the device shall be used:
  When placing your order, please specify the country in which the device is to be used and the voltage used in that country. Only then is it possible for us to deliver the power unit of the charging unit/stand with the necessary input voltage.

  * Si la dirección de entrega no se encuentra en el país destino:
    Por favor, indícare el pedido el país destino especificando la tensión a utilizar. Sólo así podemos entregar la fuente de alimentación del adaptador cargador/cargador con la tensión de entrada necesaria.
**Part B  Ordering information / Parte B  Programa de ventas**

Pipette tips / Puntas de pipeta – epT.I.P.S.
The packing units stated represent the minimum order quantity.
Las cantidades indicadas representan la cantidad del pedido mínimo.
(Box = reusable box / caja reutilizable, Rack = disposable rack / caja desechable)

<table>
<thead>
<tr>
<th>Length / Longitud</th>
<th>Color code</th>
<th>Código de color</th>
<th>Order no. / Nº de artículo</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bulk, in bags, 2x 500 = 1000 tips / Bulk, en bolsas, 2x 500 = 1000 puntas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 10 µL</td>
<td>34 mm</td>
<td>dark gray* gris oscuro*</td>
<td>022492004</td>
</tr>
<tr>
<td>0.1 – 20 µL</td>
<td>40 mm</td>
<td>medium gray** gris**</td>
<td>022492012</td>
</tr>
<tr>
<td>0.5 – 20 µL L</td>
<td>46 mm</td>
<td>light gray gris claro</td>
<td>022492021</td>
</tr>
<tr>
<td>2 – 200 µL</td>
<td>53 mm</td>
<td>yellow amarillo</td>
<td>022492039</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>55 mm</td>
<td>orange naranja</td>
<td>022492047</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>71 mm</td>
<td>blue azul</td>
<td>022492055</td>
</tr>
<tr>
<td>50 – 1250 µL</td>
<td>76 mm</td>
<td>green verde</td>
<td>022492063</td>
</tr>
<tr>
<td>50 – 1250 µL</td>
<td>103 mm</td>
<td>dark green verde oscuro</td>
<td>022494018</td>
</tr>
<tr>
<td>100 – 5000 µL (500 tips / puntas)</td>
<td>120 mm</td>
<td>violet violeta</td>
<td>022492080</td>
</tr>
<tr>
<td><strong>Set, 1 Box, incl. 5 trays with 96 tips = 480 tips (Starter Kit)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 10 µL</td>
<td>34 mm</td>
<td>dark gray* gris oscuro*</td>
<td>022491407</td>
</tr>
<tr>
<td>0.1 – 20 µL</td>
<td>40 mm</td>
<td>medium gray** gris**</td>
<td>022491415</td>
</tr>
<tr>
<td>0.5 – 20 µL L</td>
<td>46 mm</td>
<td>light gray gris claro</td>
<td>022491423</td>
</tr>
<tr>
<td>2 – 200 µL</td>
<td>53 mm</td>
<td>yellow amarillo</td>
<td>022491431</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>55 mm</td>
<td>orange naranja</td>
<td>022491440</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>71 mm</td>
<td>blue azul</td>
<td>022491458</td>
</tr>
<tr>
<td>50 – 1250 µL</td>
<td>76 mm</td>
<td>green verde</td>
<td>022491466</td>
</tr>
<tr>
<td><strong>Reloads, 10 trays with 96 tips = 960 tips</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 10 µL (stacks)</td>
<td>34 mm</td>
<td>dark gray* gris oscuro*</td>
<td>022491504</td>
</tr>
<tr>
<td>0.1 – 20 µL</td>
<td>40 mm</td>
<td>medium gray** gris**</td>
<td>022491512</td>
</tr>
<tr>
<td>0.5 – 20 µL L</td>
<td>46 mm</td>
<td>light gray gris claro</td>
<td>022491521</td>
</tr>
<tr>
<td>2 – 200 µL (stacks)</td>
<td>53 mm</td>
<td>yellow amarillo</td>
<td>022491539</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>55 mm</td>
<td>orange naranja</td>
<td>022491547</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>71 mm</td>
<td>blue azul</td>
<td>022491555</td>
</tr>
<tr>
<td>50 – 1250 µL</td>
<td>76 mm</td>
<td>green verde</td>
<td>022491563</td>
</tr>
<tr>
<td>50 – 1250 µL L</td>
<td>103 mm</td>
<td>dark green verde oscuro</td>
<td>022494004</td>
</tr>
<tr>
<td><strong>Reloads PCR-clean, 10 trays with 96 tips = 960 tips</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 10 µL (stacks)</td>
<td>34 mm</td>
<td>dark gray* gris oscuro*</td>
<td>022491709</td>
</tr>
<tr>
<td>0.1 – 20 µL</td>
<td>40 mm</td>
<td>medium gray** gris**</td>
<td>022491717</td>
</tr>
<tr>
<td>0.5 – 20 µL L</td>
<td>46 mm</td>
<td>light gray gris claro</td>
<td>022491725</td>
</tr>
<tr>
<td>2 – 200 µL (stacks)</td>
<td>53 mm</td>
<td>yellow amarillo</td>
<td>022491733</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>55 mm</td>
<td>orange naranja</td>
<td>022491741</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>71 mm</td>
<td>blue azul</td>
<td>022491750</td>
</tr>
<tr>
<td>50 – 1250 µL</td>
<td>76 mm</td>
<td>green verde</td>
<td>022491768</td>
</tr>
<tr>
<td>50 – 1250 µL L</td>
<td>103 mm</td>
<td>dark green verde oscuro</td>
<td>022494006</td>
</tr>
</tbody>
</table>

* former name: anthracite / Nombre anterior: antracita
** former name: dark gray / Nombre anterior: gris oscuro
### Part B  Ordering information / Parte B  Programa de ventas

<table>
<thead>
<tr>
<th>Box, 1 box plus 96 tips / 1 caja más 96 puntas</th>
<th>Length / Longitud</th>
<th>Color code</th>
<th>Código de color</th>
<th>Order no. / № de artículo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 – 10 µL</td>
<td>34 mm</td>
<td>dark gray*</td>
<td>gris oscuro*</td>
<td>022491300</td>
</tr>
<tr>
<td>0.1 – 20 µL</td>
<td>40 mm</td>
<td>medium gray**</td>
<td>gris**</td>
<td>022491318</td>
</tr>
<tr>
<td>0.5 – 20 µL L</td>
<td>46 mm</td>
<td>light gray</td>
<td>gris claro</td>
<td>022491326</td>
</tr>
<tr>
<td>2 – 200 µL</td>
<td>53 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022491334</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>55 mm</td>
<td>orange</td>
<td>naranja</td>
<td>022491342</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>71 mm</td>
<td>blue</td>
<td>azul</td>
<td>022491351</td>
</tr>
<tr>
<td>50 – 1250 µL</td>
<td>76 mm</td>
<td>green</td>
<td>verde</td>
<td>022491369</td>
</tr>
<tr>
<td>50 – 1250 µL L</td>
<td>103 mm</td>
<td>dark green</td>
<td>verde oscuro</td>
<td>022494016</td>
</tr>
<tr>
<td>100 – 5000 µL (24 tips / puntas)</td>
<td>120 mm</td>
<td>violet</td>
<td>violeta</td>
<td>022491385</td>
</tr>
</tbody>
</table>

| Racks, plus 10x96=960 tips / puntas            |                     |            |                 |                          |
| 0.1 – 10 µL                                    | 34 mm             | dark gray* | gris oscuro*    | 022491903               |
| 0.1 – 20 µL                                    | 40 mm             | medium gray** | gris**        | 022491911               |
| 0.5 – 20 µL L                                 | 46 mm             | light gray | gris claro     | 022491920               |
| 2 – 200 µL                                    | 53 mm             | yellow    | amarillo       | 022491938               |
| 20 – 300 µL                                   | 55 mm             | orange    | naranja        | 022491946               |
| 50 – 1000 µL                                  | 71 mm             | blue      | azul           | 022491954               |
| 50 – 1250 µL                                  | 76 mm             | green     | verde          | 022491962               |
| 50 – 1250 µL L (480 tips)                     | 103 mm            | dark green | verde oscuro   | 022494010               |
| 100 – 5000 µL (240 tips / puntas)             | 120 mm            | violet    | violeta        | 022491989               |

| Racks PCR-clean, plus 10x96=960 tips / puntas |                     |            |                 |                          |
| 0.1 – 10 µL                                    | 34 mm             | dark gray* | gris oscuro*    | 022491806               |
| 0.1 – 20 µL                                    | 40 mm             | medium gray** | gris**        | 022491814               |
| 0.5 – 20 µL L                                 | 46 mm             | light gray | gris claro     | 022491822               |
| 2 – 200 µL                                    | 53 mm             | yellow    | amarillo       | 022491831               |
| 20 – 300 µL                                   | 55 mm             | orange    | naranja        | 022491849               |
| 50 – 1000 µL                                  | 71 mm             | blue      | azul           | 022491857               |
| 50 – 1250 µL                                  | 76 mm             | green     | verde          | 022491865               |
| 50 – 1250 µL L (480 tips)                     | 103 mm            | dark green | verde oscuro   | 022494012               |
| 100 – 5000 µL (240 tips / puntas)             | 120 mm            | violet    | violeta        | 022491881               |

| Racks sterile, plus 10x96=960 tips / puntas   |                     |            |                 |                          |
| 0.1 – 20 µL                                    | 40 mm             | medium gray** | gris**        | 022492250               |
| 2 – 200 µL                                    | 53 mm             | yellow    | amarillo       | 022492276               |
| 20 – 300 µL                                   | 55 mm             | orange    | naranja        | 022492284               |
| 50 – 1000 µL                                  | 71 mm             | blue      | azul           | 022492292               |
| 50 – 1250 µL                                  | 76 mm             | green     | verde          | 022492306               |
| 100 – 5000 µL                                 | 120 mm            | violet    | violeta        | 022492314               |

| Racks Eppendorf Biopur. colorless, sterile, pyrogen-free, DNA-free, RNase-free, ATP-free |                     |            |                 |                          |
| Racks Eppendorf Biopur, incoloro, estéril, libre de pirógenos, ADN, RNasa y ATP |                     |            |                 |                          |
| 5x 96 = 480 tips / puntas                     |                     |            |                 |                          |
| 0.1 – 20 µL                                    | 40 mm             | medium gray** | gris**        | 022491067               |
| 2 – 200 µL                                    | 53 mm             | yellow    | amarillo       | 022491083               |
| 20 – 300 µL                                   | 55 mm             | orange    | naranja        | 022491091               |
| 50 – 1000 µL                                  | 71 mm             | blue      | azul           | 022491105               |
| 50 – 1250 µL                                  | 76 mm             | green     | verde          | 022491113               |
| 50 – 1250 µL L (480 tips)                     | 103 mm            | dark green | verde oscuro   | 022494014               |

* former name: anthracite / Nombre anterior: antracita
** former name: dark gray / Nombre anterior: gris oscuro
### Part B  Ordering information / Parte B  Programa de ventas

<table>
<thead>
<tr>
<th>Description</th>
<th>Length / Longitud</th>
<th>Color code</th>
<th>Código de color</th>
<th>Order no. / Nº de artículo</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Singles (Eppendorf Biopur)</strong>, individually wrapped, 1 set = 100 tips</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singles (Eppendorf Biopur), envasadas individualmente, 1 juego = 100 puntas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 20 µL</td>
<td>40 mm</td>
<td>medium gray** gris**</td>
<td>022491130</td>
<td></td>
</tr>
<tr>
<td>2 – 200 µL</td>
<td>53 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022491148</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>71 mm</td>
<td>blue</td>
<td>azul</td>
<td>022491156</td>
</tr>
<tr>
<td><strong>ep Dualfilter T.I.P.S., sterile, PCR-clean, in racks, 10 x 96 = 960 tips</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ep Dualfilter T.I.P.S., estéril, PCR-clean, en racks, 10 x 96 = 960 puntas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 10 µL S</td>
<td>34 mm</td>
<td>dark gray*</td>
<td>gris oscuro</td>
<td>022491202</td>
</tr>
<tr>
<td>0.1 – 10 µL M</td>
<td>40 mm</td>
<td>medium gray** gris**</td>
<td>022491211</td>
<td></td>
</tr>
<tr>
<td>0.5 – 10 µL L**</td>
<td>46 mm</td>
<td>light gray</td>
<td>gris claro</td>
<td>022491229</td>
</tr>
<tr>
<td>2 – 100 µL</td>
<td>53 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022491237</td>
</tr>
<tr>
<td>2 – 200 µL</td>
<td>55 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022491296</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>55 mm</td>
<td>orange</td>
<td>naranja</td>
<td>022491245</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>76 mm</td>
<td>blue</td>
<td>azul</td>
<td>022491253</td>
</tr>
<tr>
<td>50 – 1250 µL (480 tips)</td>
<td>103 mm</td>
<td>dark green</td>
<td>verde oscuro</td>
<td>022494002</td>
</tr>
<tr>
<td>100 – 5000 µL (5x24=120)</td>
<td>120 mm</td>
<td>violet</td>
<td>violeta</td>
<td>022492611</td>
</tr>
<tr>
<td>* former name: anthracite / Nombre anterior: antracita</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>** former name: dark gray / Nombre anterior: gris oscuro</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*** Available as a 20 µL ep Dualfilter T.I.P.S. under the same order number from the end of 2008. / Disponible como ep Dualfilter T.I.P.S. de 20 µL bajo el mismo número de pedido a partir de fines de 2008. Se suspende la producción de la versión de 10 µL.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>**epT.I.P.S. LoRetention Dualfilter, PCR clean, sterile and pyrogen-free, in racks, 10 x 96 = 960 tips</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>epT.I.P.S. LoRetention Dualfilter, PCR clean, estéril y libre de agentes pirogénicos, en racks, 10 x 96 = 960 puntas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 10 µL S</td>
<td>34 mm</td>
<td>dark gray</td>
<td>gris oscuro</td>
<td>022493000</td>
</tr>
<tr>
<td>0.5 – 20 µL L</td>
<td>46 mm</td>
<td>light gray</td>
<td>gris claro</td>
<td>022493002</td>
</tr>
<tr>
<td>2 – 100 µL</td>
<td>53 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022493006</td>
</tr>
<tr>
<td>2 – 200 µL</td>
<td>55 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022493004</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>55 mm</td>
<td>orange</td>
<td>naranja</td>
<td>022493008</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>76 mm</td>
<td>blue</td>
<td>azul</td>
<td>022493009</td>
</tr>
<tr>
<td><strong>Reloads, LoRetention, PCR clean, 10 x 96 = 960 tips</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reloads, LoRetention, PCR clean, 10 x 96 = 960 puntas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 10 µL S</td>
<td>34 mm</td>
<td>dark gray</td>
<td>gris oscuro</td>
<td>022493010</td>
</tr>
<tr>
<td>0.5 – 20 µL L</td>
<td>46 mm</td>
<td>light gray</td>
<td>gris claro</td>
<td>022493012</td>
</tr>
<tr>
<td>2 – 200 µL</td>
<td>53 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022493014</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>71 mm</td>
<td>blue</td>
<td>azul</td>
<td>022493016</td>
</tr>
<tr>
<td><strong>Reloads, LoRetention, autoclavable, 10 x 96 = 960 tips</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reloads, LoRetention, autoclavable, 10 x 96 = 960 puntas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 10 µL S</td>
<td>34 mm</td>
<td>dark gray</td>
<td>gris oscuro</td>
<td>022493018</td>
</tr>
<tr>
<td>0.5 – 20 µL L</td>
<td>46 mm</td>
<td>light gray</td>
<td>gris claro</td>
<td>022493020</td>
</tr>
<tr>
<td>2 – 200 µL</td>
<td>53 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022493022</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>71 mm</td>
<td>blue</td>
<td>azul</td>
<td>022493024</td>
</tr>
</tbody>
</table>
### Additional accessories / Otros accesorios

<table>
<thead>
<tr>
<th>Description</th>
<th>Length / Longitud</th>
<th>Color code</th>
<th>Código de color</th>
<th>Order no. / N° de artículo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Racks, LoRetention PCR clean, 10 x 96 = 960 tips</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Racks, LoRetention PCR clean, 10 x 96 = 960 puntas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 – 10 µL</td>
<td>34 mm</td>
<td>dark gray</td>
<td>gris oscuro</td>
<td>022493026</td>
</tr>
<tr>
<td>0.5 – 20 µL</td>
<td>46 mm</td>
<td>light gray</td>
<td>gris claro</td>
<td>022493028</td>
</tr>
<tr>
<td>2 – 200 µL</td>
<td>53 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022493030</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>71 mm</td>
<td>blue</td>
<td>azul</td>
<td>022493032</td>
</tr>
<tr>
<td><strong>Ordering information / Programa de ventas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional accessories / Otros accesorios</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spare Ni-MH battery, 1,200 mAh / Repuesto batería Ni-MH, 1,200 mAh</td>
<td></td>
<td></td>
<td></td>
<td>022467018</td>
</tr>
<tr>
<td>Grease for pipettes / Grasa para pipetas</td>
<td></td>
<td></td>
<td></td>
<td>022348515</td>
</tr>
<tr>
<td>“Reagent reservoir”, autoclavable multi-channel reagent attachment,</td>
<td></td>
<td></td>
<td></td>
<td>022265806</td>
</tr>
<tr>
<td>1 set (10 tubs + 10 lids)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Depósito para reactivo”, toma-reactivo autoclavable multicanal,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 set (10 tubos + 10 tapas)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lid of battery compartment / Tapa compartimento de pilas</td>
<td></td>
<td></td>
<td></td>
<td>022467026</td>
</tr>
<tr>
<td>Instruction manual / Manual de instrucciones</td>
<td></td>
<td></td>
<td></td>
<td>022476581</td>
</tr>
<tr>
<td>Wrench (not for 5,000 µL) / Llave (no para 5000 µL)</td>
<td></td>
<td></td>
<td></td>
<td>022467034</td>
</tr>
<tr>
<td>PICASO II (Pipette Calibration Software)</td>
<td></td>
<td></td>
<td></td>
<td>022467042</td>
</tr>
<tr>
<td>PICASO accessories – see eppendorf catalog / véase eppendorf catalog</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disassembly aid 5,000 µL / Ayuda para desmontaje 5000 µL</td>
<td></td>
<td></td>
<td></td>
<td>022466602</td>
</tr>
<tr>
<td>Tools for multi-channel model / Herramientas para el modelo multicanal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5 – 10 µL</td>
<td>34 mm</td>
<td>dark gray</td>
<td>gris oscuro</td>
<td>022456890</td>
</tr>
<tr>
<td>5 – 100 µL</td>
<td>46 mm</td>
<td>light gray</td>
<td>gris claro</td>
<td>022467034</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>53 mm</td>
<td>yellow</td>
<td>amarillo</td>
<td>022456911</td>
</tr>
<tr>
<td>50 – 1200 µL</td>
<td>71 mm</td>
<td>blue</td>
<td>azul</td>
<td>022467042</td>
</tr>
</tbody>
</table>
### Part B Ordering information / Parte B Programa de ventas

**Spare parts for single-channel pipettes / Piezas de repuesto para pipetas monocanal**

The disassembly procedure can be found in Sec. 6.2 / Para el desmontaje, ver cap. 6.2

<table>
<thead>
<tr>
<th>Ejection sleeve / Eyector</th>
<th>Order no. / N° de artículo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 – 10 µL</td>
<td>022476491</td>
</tr>
<tr>
<td>5 – 100 µL</td>
<td>022476491</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>022236237</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>022476521</td>
</tr>
<tr>
<td>100 – 5000 µL</td>
<td>022476548</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Piston / Pistón</th>
<th>Order no. / N° de artículo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 – 10 µL</td>
<td>022467051</td>
</tr>
<tr>
<td>5 – 100 µL</td>
<td>022467069</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>022467077</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>022467085</td>
</tr>
<tr>
<td>100 – 5000 µL</td>
<td>022467093</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lower part incl. seal</th>
<th>Parte inferior incl. junta</th>
<th>Order no. / N° de artículo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 – 10 µL</td>
<td>022476653</td>
<td></td>
</tr>
<tr>
<td>5 – 100 µL</td>
<td>022476693</td>
<td></td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>022467107</td>
<td></td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>022476726</td>
<td></td>
</tr>
<tr>
<td>100 – 5000 µL</td>
<td>022467115</td>
<td></td>
</tr>
<tr>
<td>(Cylinder and cylinder attachment for 100 – 5000 µL)</td>
<td>(Cilindro y toma del cilindro para 100 – 5000 µL)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sealing inside lower part</th>
<th>(Change service parts see next page)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 – 100 µL</td>
<td>022475282</td>
</tr>
<tr>
<td>20 – 300 µL</td>
<td>022476132</td>
</tr>
<tr>
<td>50 – 1000 µL</td>
<td>022476467</td>
</tr>
</tbody>
</table>

5 – Filling tube (5 pieces, 1 wire punch)  
(To change filling tube, see next page)  
5 – Tubo de carga (5 piezas, 1 mandrín expulsor)  
(Para cambiar el tubo de llenado véase pág. siguiente)  
| 5 – 100 µL               | 022476564                           |
| 20 – 300 µL              |                                       |
Change Service parts (single-channel) / Cambio piezas de servicio (monocanal)

The seals in the lower part (1) are unscrewed from the lower part (which has been separated from the pipette; see Sec. 6.2) using the wrench (2). The lower parts for 0.5 – 10 µL and 100 – 5,000 µL do not contain any seals. With the 10 – 100 µL pipette, side B of the wrench (2) is used for screwing/unscrewing. Parts of the seal are then pulled out using side C (3). With the other pipettes, the seals are unscrewed using side C of the wrench or are tapped out after having been loosened. For mounting, the sealing set (3) is placed onto the wrench (4). When screwing together, do not tighten too much. The filling tube (5) is delivered as a spare-parts pack together with a wire punch. After assembling, trigger a motor reset and check the dispensing function.

Las juntas en la parte inferior (1) se desenroscan de la parte inferior (de la que se han separado de la pipeta; ver cap. 6.2) con la llave (2). Las partes inferiores para volúmenes 0,5 – 10 µl y 100 – 5,000 µl no llevan juntas. Con la pipeta de 10 – 100 µl, se usa el lado B de la llave (2) para enroscar / desenroscar. Después se sacan las partes de la junta con el lado C (3). Con otras pipetas, las juntas se desenrosan con el lado C de la llave o golpeando hacia afuera después de haber aflojado. Para el montaje, se coloca el juego de juntas (3) en la llave (4). Al enroscar, no apretar demasiado. El tubo de carga (5) se entrega como paquete de piezas de repuesto equipado con un mandril expulsor. Después del montaje, provocar un reset de motor y controlar el funcionamiento correcto del dispositivo.
Spare parts for multi-channel model / Piezas de reuesto para modelo multicanal

The disassembly procedure can be found in Section 6.3 / Para el procedimiento de desmontaje, ver cap. 6.3.

Important notes regarding ordering information
Only parts with order numbers are available. Please only use the accessories recommended by Eppendorf. Using disposables which we have not recommended can reduce the imprecision, inaccuracy and the life of the pipette. We do not honor any warranty or accept any responsibility for damage resulting from such action.

Observaciones importantes sobre el programa de ventas
Sólo se suministran piezas dotadas de número de pedido. Por favor, usar sólo los accesorios originales de Eppendorf. La imprecisión, la incorrección y la vida de la pipeta puede verse reducida con el uso de otras piezas que no estén recomendadas por nosotros. Declinamos todo tipo de garantía y de responsabilidad por los daños que resulten de ello.
Change Service parts multi-channel up to 300 µL
Cambio piezas de servicio multicanal hasta 300 µL

1 Using the screwdriver, press in the catch and pull off the housing.

2 Using the tool, lever off the metal clips from the safety hook. This part is under spring tension. Hold the part as shown in the diagram and loosen the metal clip on both sides.

3 Pull off the tip holder (nose cones).
   It is advisable to clean the piston with isopropanol. Lightly lubricate the piston using silicone grease.

4 Loosen the pressure piece using the punch (B) on the tool. The pressure piece is under spring tension. Hold the piece using your forefinger. Pull out the springs and the sealing ring using the tool (4a). Reassemble in reverse order. The parts are placed onto the tool (4b). Move piston in upper position. After assembling, trigger a motor reset and check the dispensing function.

1 Con el destornillador, apretar en la muesca y sacar la carcasa.

2 Con la herramienta, apalancar las pinzas metálicas del gancho de seguridad. Esta pieza se encuentra bajo tensión elástica. Sujetar la pieza como se muestra en el diagrama y aflojar la pinza metálica por ambos lados.

3 Sacar el soporte de la punta (conos de trabajo).
   Se recomienda limpiar el pistón con isopropanol. A continuación, lubricar ligeramente el pistón con grasa de silicona.

4 Aflojar el pisador con el mandril (B) en la herramienta. El pisador se encuentra bajo tensión elástica. Sujetar la pieza con el dedo índice. Sacar los resortes y el anillo obturador con la herramienta (4a). Volver a montar en sentido inverso. Las piezas se colocan en la herramienta (4b). Llevar el pistón a la posición superior. Después del montaje, provocar un reset de motor y controlar la función de dispensación.
EG-Konformitätserklärung
EC Conformity Declaration

Die beabsichtigte Produktart entspricht den einschlägigen grundlegenden Anforderungen der zugehörigen EG-Richtlinien und kommt bei einer nicht übermäßig großen Anwendung des Produkts oder einer nicht bestimmungsgemäßen Anwendung vorliegenden Entwicklungsstufe nicht in Betracht.

Produktbezeichnung: Product name:
Eppendorf Research pro 4860

inkl. Ladestation und Zubehör / including charging stand and charging adapter

Produkttyp: Product type:
elektronische Pipette / electronic pipette

Einschlägige EG-Richtlinien/Normen, Relevant EC directives/standards:
2006/95/EG, EN 61010-1
2004/108/EG, EN 55011:8, EN 61036-1, EN 61000-6-1

Verantwortungsberechtigter / Authorized representative:

Verwaltungsleiter / Manager, 17.09.2009

Kunstberg, Date

Eppendorf AG - Bankenvorweg 1 - 25351 Herrenkogel - Germany
# Eppendorf Offices

<table>
<thead>
<tr>
<th>Country</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUSTRALIA / NEW ZEALAND</td>
<td>Eppendorf South Pacific Pty. Ltd. Tel. +61 2 98 89 50 00 Fax +61 2 98 89 51 11 E-Mail: <a href="mailto:info@eppendorf.com.au">info@eppendorf.com.au</a> Internet: <a href="http://www.eppendorf.com.au">www.eppendorf.com.au</a></td>
</tr>
<tr>
<td>FRANCE</td>
<td>EPPENDORF FRANCE S.A.R.L. Tel. +33 1 30 15 67 40 Fax +33 1 30 15 67 45 E-Mail: <a href="mailto:eppendorffr@eppendorf.fr">eppendorffr@eppendorf.fr</a> Internet: <a href="http://www.eppendorf.fr">www.eppendorf.fr</a></td>
</tr>
<tr>
<td>NORDIC</td>
<td>Eppendorf Nordic ApS Tel. +45 70 22 29 70 Fax +45 45 76 73 70 E-Mail: <a href="mailto:nordic@eppendorf.dk">nordic@eppendorf.dk</a> Internet: <a href="http://www.eppendorf.dk">www.eppendorf.dk</a></td>
</tr>
<tr>
<td>AUSTRIA</td>
<td>Eppendorf Austria GmbH Tel. +43 (0) 1 890 13 64 0 Fax +43 (0) 1 890 13 64 20 E-Mail: <a href="mailto:office@eppendorf.at">office@eppendorf.at</a> Internet: <a href="http://www.eppendorf.at">www.eppendorf.at</a></td>
</tr>
<tr>
<td>GERMANY</td>
<td>Eppendorf Vertrieb Deutschland GmbH Tel. +49 2232 418-0 Fax +49 2232 418-155 E-Mail: <a href="mailto:vertrieb@eppendorf.de">vertrieb@eppendorf.de</a> Internet: <a href="http://www.eppendorf.de">www.eppendorf.de</a></td>
</tr>
<tr>
<td>SOUTH &amp; SOUTHEAST ASIA</td>
<td>Eppendorf Asia Pacific Sdn. Bhd. Tel. +60 3 8023 2769 Fax +60 3 8023 3720 E-Mail: <a href="mailto:eppendorf@eppendorf.com.my">eppendorf@eppendorf.com.my</a> Internet: <a href="http://www.eppendorf.com.my">www.eppendorf.com.my</a></td>
</tr>
<tr>
<td>BRAZIL</td>
<td>Eppendorf do Brasil Ltda. Tel. +55 11 3095 9344 Fax +55 11 3095 9340 E-Mail: <a href="mailto:eppendorf@eppendorf.com.br">eppendorf@eppendorf.com.br</a> Internet: <a href="http://www.eppendorf.com.br">www.eppendorf.com.br</a></td>
</tr>
<tr>
<td>HUNGARY</td>
<td>Eppendorf Austria GmbH Tel. +43 (0) 1 890 3 64 0 Fax +43 (0) 1 890 3 64 20 E-Mail: <a href="mailto:borsez@eppendorf.at">borsez@eppendorf.at</a> Internet: <a href="http://www.eppendorf.hu">www.eppendorf.hu</a></td>
</tr>
<tr>
<td>SPAIN</td>
<td>Eppendorf Iberica S.L.U. Tel. +34 91 651 76 94 Fax +34 91 651 81 44 E-Mail: <a href="mailto:iberica@eppendorf.es">iberica@eppendorf.es</a> Internet: <a href="http://www.eppendorf.es">www.eppendorf.es</a></td>
</tr>
<tr>
<td>CANADA</td>
<td>Eppendorf Canada Ltd. Tel. +1 905 826 5525 Fax +1 905 826 5424 E-Mail: <a href="mailto:canada@eppendorf.com">canada@eppendorf.com</a> Internet: <a href="http://www.eppendorfna.com">www.eppendorfna.com</a></td>
</tr>
<tr>
<td>INDIA</td>
<td>Eppendorf India Limited Tel. +91 44 42 11 13 14 Fax +91 44 42 18 74 05 E-Mail: <a href="mailto:info@eppendorf.co.in">info@eppendorf.co.in</a> Internet: <a href="http://www.eppendorf.co.in">www.eppendorf.co.in</a></td>
</tr>
<tr>
<td>SWITZERLAND</td>
<td>Vaudaux-Eppendorf AG Tel. +41 61 482 1414 Fax +41 61 482 1419 E-Mail: <a href="mailto:vaudaux@vaudaux.ch">vaudaux@vaudaux.ch</a> Internet: <a href="http://www.eppendorf.ch">www.eppendorf.ch</a></td>
</tr>
<tr>
<td>CZECH REP. &amp; SLOVAKIA</td>
<td>EPPENDORF Czech &amp; Slovakia s.r.o. Tel. +420 323 605 454 Fax +420 323 605 454 E-Mail: <a href="mailto:eppendorf@eppendorf.cz">eppendorf@eppendorf.cz</a> Internet: eppendorf.cz Internet: eppendorfk.sk</td>
</tr>
<tr>
<td>ITALY</td>
<td>Eppendorf s.r.l. Tel. +390 2 55 404 1 Fax +390 2 58 013 438 E-Mail: <a href="mailto:eppendorf@eppendorf.it">eppendorf@eppendorf.it</a> Internet: <a href="http://www.eppendorf.it">www.eppendorf.it</a></td>
</tr>
<tr>
<td>UNITED KINGDOM</td>
<td>Eppendorf UK Limited Tel. +44 1223 200 440 Fax +44 1223 200 441 E-Mail: <a href="mailto:sales@eppendorf.co.uk">sales@eppendorf.co.uk</a> Internet: <a href="http://www.eppendorf.co.uk">www.eppendorf.co.uk</a></td>
</tr>
<tr>
<td>JAPAN</td>
<td>Eppendorf Co. Ltd. Tel. +81 3 5825 2363 Fax +81 3 5825 2365 E-Mail: <a href="mailto:info@eppendorf.jp">info@eppendorf.jp</a> Internet: <a href="http://www.eppendorf.jp">www.eppendorf.jp</a></td>
</tr>
<tr>
<td>USA</td>
<td>Eppendorf North America, Inc. Tel. +1 516 334 7500 Fax +1 516 334 7506 E-Mail: <a href="mailto:info@eppendorf.com">info@eppendorf.com</a> Internet: <a href="http://www.eppendorfn.com">www.eppendorfn.com</a></td>
</tr>
<tr>
<td>OTHER COUNTRIES</td>
<td>Internet: <a href="http://www.eppendorf.com/worldwide">www.eppendorf.com/worldwide</a></td>
</tr>
</tbody>
</table>