EDP1™

Electronic Pipette

10 pipettes for volume ranges from 0.5 µL to 20 mL

200 µL EDP1 shown
Contents

Section 1 Description ...........................................................................1
Section 2 Unpacking and Set-up ...........................................................1
Section 3 Basic Operation ....................................................................4
Section 4 Optional Settings.................................................................12
Section 5 Setting Speed ......................................................................13
Section 6 Advanced Operation ............................................................14
Section 7 Proper Pipetting Technique ...................................................18
Section 8 Removing the Tip Ejector ......................................................19
Section 9 Changing Liquid Ends .........................................................19
Section 10 Care and Maintenance.........................................................22
Section 11 Troubleshooting ..................................................................24
Section 12 Specifications .....................................................................25
Appendix A Recharging the Battery Pack.................................................26
Appendix B Service and Replacement Parts .............................................27

FIGURES AND TABLES
Figure 1-1 EDP1 Controls and Indicators.................................................1
Figure 2-1 Display after Initialization Sequence ........................................2
Figure 2-2 Installing the Battery Pack ......................................................3
Figure 3-1 EDP1 Keyboard .................................................................4
Figure 3-2 Resuming Operation after Auto Shut-Off .................................5
Figure 8-1 Removing the Tip Ejector ....................................................19
Figure 9-1 Removing the Liquid End ......................................................20
Figure 9-2 Removing the Encoder Plug ................................................20
Figure 9-3 Replacing the Liquid End ......................................................21
Figure 9-4 Replacing the Encoder Plug ................................................21
Figure 9-5 Display after Initialization Sequence ....................................21
Figure 10-1 Detail View of Liquid End (200 µL shown) .............................22
Figure 10-2 Piston Seal Assembly (200 µL shown) ................................23
Figure A-1 Connecting Wall Power Supply .........................................26
Figure A-2 Rapid Charge Stand Accessory .........................................26
Figure B-1 Line drawings of EDP1 Models .............................................29

Table 3.1 Basic Operation ..................................................................4
Table 5.1 Programmable Speeds .........................................................13
Table 6.1 Advanced Functions ............................................................14
Table 11.1 Troubleshooting Table .......................................................25
Table 12.1 Specifications ..................................................................25

This device (EDP1) is intended for use only as an electronic pipette for pipetting liquids as described in this manual. It is not intended for any other use.

Pipette specifications and other information in this manual may be changed without prior notice.

Rainin, EDP1, EDP, LTS, and LiteTouch are trademarks of Rainin Instrument, LLC. EDP1 Pipettes are manufactured under U.S. Patent No. 4,671,123; 4,779,467; 4,905,526; 5,187,990; 5,614,153. LTS LiteTouch Tip Ejection System is protected by U.S. Patent No. 6,168,761; 6,171,553; 6,967,004. Other US patents pending. Other national patents issued and pending.

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Description

EDP1 Electronic Pipettes use a motorized linear actuator to move the piston. The linear actuator, controlled by a miniature onboard computer, moves the piston the correct distance, at the correct speed, every time. Piston strokes are consistent and reproducible.

Each complete EDP1 pipette includes a control module, battery pack, a wall power supply, and a liquid end for the volume range ordered. The control module is the same for all volume ranges; an encoder plug informs the control module which liquid end is attached. For volumes up to 2000 µL, interchangeable liquid ends with encoders can be purchased separately.

A stainless steel piston is moved by an electronic linear actuator. The piston displaces a column of air which picks up or dispenses liquid through a disposable polypropylene tip. This tip is the only part of the instrument that touches the liquid. A mechanical tip ejector allows tips on all volume pipettes to be ejected easily without hand contact, avoiding sample carryover and contamination.

You enter mode, volume, and speed settings into the EDP1 via a keyboard. Operational status and settings are shown on an easy-to-read display. Audible tones signal completion of piston strokes and error conditions. Pickup and dispense are performed by pressing the trigger.

Power can be supplied to the EDP1 pipette in either of two ways: with a cord attached to a wall power supply, or with a rechargeable Battery Pack for maximum convenience and freedom of movement.

With a fully-charged Battery Pack installed, the EDP1 will operate for more than 1000 full-stroke cycles before recharging is needed.

Unpacking and Set-up

In addition to this manual, the EDP1 package should contain:
1. EDP1 Electronic Pipette
2. Battery Pack
3. Wall Power Supply
4. Performance Check Report/Warranty card

Before using your EDP1, inspect each component for damage sustained in transit. If you find damage, file a claim immediately with the shipping carrier. Save the shipping container until any damage claim is resolved and the instrument is checked and operates properly.
WARRANTY

Complete and return the Warranty Registration Card. EDP1 Electronic Pipettes carry a one year warranty against defects in materials and workmanship. Physical and chemical abuse are not covered. For information regarding the warranty or repair of any instrument, please call RAININ at 800-543-4030, e-mail: pipets@rainin.com.

Outside the U.S.A., local warranty conditions may apply. Contact your RAININ distributor: see www.rainin-global.com or e-mail global@rainin.com.

NOTE: If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

Warranty returns are only accepted with prior authorization.

SET-UP

Connect the wall power supply to a power outlet matching the line voltage printed on the label. Then plug the cord from the power supply into the socket on the back of the control module.

The EDP1 pipette will execute its initialization routine. After about 5 seconds the instrument will be in PIPETTE mode and the display should be as shown in Figure 2-1. If not, refer to the Troubleshooting Guide in Section 11 of this manual.

NOTE: EDP1 can be used without a power cord when the Battery Pack is installed. However, before installing the Battery Pack, it is a good idea to test operation with the wall power supply, to see that the pipette works correctly.

Your EDP1 pipette is now ready for use, but the Battery Pack is not yet installed. Install the Battery Pack into the control module as described in the following pages.

WARNING:

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.
INSTALLING THE BATTERY PACK

The Battery Pack compartment is at the rear of the control module. Slide the battery compartment cover left to remove it. Carefully pull the male connector clear, shown below.

Align the male and female connectors, noting the pin arrangement: one pin, space, two pins. Fasten the connectors together, but do not force them. Insert the Battery Pack into the control module as indicated on the label. Replace the compartment cover.

If the pipette does not initialize when the Battery pack is installed, but worked normally when connected to the wall power supply, the Battery Pack may have discharged in transit. See Appendix A – Charging the Battery Pack.

---

**FIGURE 2-2 INSTALLING THE BATTERY PACK**

A

Connect the male connector to the female connector on the new battery pack, and rotate the battery pack into the control module as shown by the arrow.

B

Push the battery pack into the control module as far as possible, as shown at left. Push the wires to the right of the battery as shown at right. Replace the battery door and slide it closed.

C

If you have any questions regarding this procedure, call Technical Support: 800-543-4030.
Basic Operation

EDP1 can operate in five modes:

<table>
<thead>
<tr>
<th>MODE</th>
<th>KEY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>P: PIPETTE</td>
<td>F 1</td>
<td>A single volume is picked up and dispensed.</td>
</tr>
<tr>
<td>M: MULTIPLE DISPENSE</td>
<td>F 2</td>
<td>A single volume is picked up and multiple volumes dispensed stepwise.</td>
</tr>
<tr>
<td>T: TITRATE</td>
<td>F 3</td>
<td>A single volume is picked up and partially dispensed under trigger control.</td>
</tr>
<tr>
<td>D: DILUTE</td>
<td>F 4</td>
<td>Diluent, an air gap, and sample are picked up separately and dispensed together.</td>
</tr>
<tr>
<td>MEAS: MEASURE</td>
<td>F 5</td>
<td>A sample is picked up under trigger control and its volume is displayed.</td>
</tr>
</tbody>
</table>

**Table 3.1 – EDP1 Basic Operation**

Modes are selected in EDP1 by pressing the F key and a number key as shown in the table above. The keyboard shows the name or initial of the mode. See Figure 3-2:

The instrument powers up in PIPETTE mode.

You can change modes when:

1. The piston is in the HOME position and KB is displayed. (If necessary, press the FUNCTION key F and then 0 to clear the current operation and move the piston to HOME. KB should then appear on the display.)

2. The keyboard is not locked. (Press F 9 to unlock.)

To change modes press F then the appropriate number key. For example, to open TITRATE mode press F 3. For MULTIPLE DISPENSE mode, press F 2.

The EDP1 pipette has been designed to be easy to use whether you are right- or left-handed. The balance, weight, comfortable "feel", and light touch of EDP1 make it ideal for continuous use.

Hold EDP1 loosely in either hand – you do not need to grip the pipette tightly during operation. Operate the trigger with your index finger and the tip ejector button with your thumb. Because there is no need for thumb pressure during pick up, dispense, and blowout, operator fatigue and the risk of repetitive strain injury are greatly reduced compared to manual pipettes.
**AUTO SHUT-OFF**

The EDP1 pipette shuts itself off automatically if none of the keys or the trigger are pressed for three minutes. If the display is blank and the trigger does not work while power is supplied, EDP1 is shut off. Press any of the top row keys or E to turn on the instrument.

FIGURE 3-2  RESUMING OPERATION AFTER AUTO SHUT-OFF

EDP1 remembers current operational settings when "shut-off", and will resume operation at the same point and with the same settings as when last used, as long as power to the instrument has not been interrupted.

The AUTO SHUT OFF feature is provided to extend the life of the Battery Pack.

**BASIC OPERATION**

The examples used in this manual show the display for E-1000 (EDP1 with 1000 µL nominal volume). Your instrument will operate in the same way, but volumes shown will be different if your pipette has a different nominal volume.

Attach a disposable tip by pressing the liquid end shaft firmly into the tip. Use water as your sample until you are familiar with the EDP1 pipette.

**QUICK REFERENCE:  PIPETTE MODE**
**PIPETTE MODE**  
**F 1**

When power is supplied, EDP1 executes a five-second initialization sequence and opens in PIPETTE mode. The display will show the nominal volume.

**SETTINGS**

Press number keys then the E (Enter) key to change the volume. The display will flash on and off. If you make a mistake, set a new volume then press E.

**OPERATION**

1. Press and release the trigger* to pick up the displayed volume. You will hear a “beep” at the end of the piston stroke. See diagram on previous page.

2. Press and release the trigger again to dispense the liquid.

The piston moves to HOME, then rapidly executes a blowout stroke. You will hear a beep at the end of the blowout. After a one-second delay the piston returns to HOME ready for the next pickup. This is signalled by two beeps**.

The one-second delay is to give you time to remove the tip from the dispense vessel before the piston returns to HOME position. You can extend the delay by holding in the trigger as the sample is dispensed.

When EDP1 is in any other mode, open PIPETTE mode as follows:

**a.** Press F0. This action will clear the current operation and move the piston to HOME position. KB will show on the display, indicating the piston is HOME. (Check that the keyboard is not locked. If locked, press F9 to unlock it.)

**b.** Press F1 to open PIPETTE mode.

The display will show the nominal volume unless you have previously set a volume in PIPETTE mode. (In all modes, any previously entered volume is remembered by EDP1 as long as power is supplied continuously.)

---

* Holding in the trigger postpones the next step in all modes except TITRATE, MEASURE, and MIX.
** Each piston stroke is signalled by a short beep when the tone generator is turned on. End-of-stroke beeps will not be included in the following descriptions.
QUICK REFERENCE: MULTIPLE DISPENSE MODE

MULTIPLE DISPENSE MODE  F 2

Make sure the piston is at the HOME position (KB shows on display) and the keyboard is not locked. Open MULTIPLE DISPENSE mode by pressing F 2.

1. The nominal pickup volume (or previously stored value) is displayed. Press E to check or change the dispense volume.

2. Press number keys to set or change the dispense volume. While pressing keys, the entry flashes until E is pressed. See DISPENSE VOLUME, below.

3. The instrument calculates and flashes the largest number of whole aliquots which will divide into the nominal volume. You can accept this aliquot number by pressing E, or you can change to a smaller number by pressing number keys, then E.

PICKUP  MULTI
KB  1000µl

MULTIPLE DISPENSE NOMINAL VOLUME

SETTINGS

MULTI  DISPENSE
KB  235µl

DISPENSE VOLUME

MULTI
KB  4

NUMBER OF ALIQUOTS (FLASHING)
4. The instrument calculates and displays the volume needed to pick up all aliquots.

OPERATION

1. Press and release the trigger to pick up the displayed volume.

2. Press and release the trigger again to dispense the first aliquot. Continue pressing and releasing the trigger until all aliquots are dispensed. The word CLEAR will appear on the display.

3. Press 0 to clear the instrument, discarding the residual volume left in the tip.

After the dispense volume is entered, EDP1 calculates the pickup volume:

**Pickup Volume = (Number of Aliquots x Dispense Volume) + Residual Volume**

When the calculated volume is picked up, the piston slightly overshoots and then returns to its proper pickup position, to ensure accuracy of the first aliquot dispensed. To ensure that the last aliquot will be accurate, the fixed residual volume remains in the tip after all aliquots have been dispensed and must be discarded by pressing 0 before making the next pickup stroke.

QUICK REFERENCE: TITRATE MODE
**TITRATE MODE F 3**

Make sure the piston is at the HOME position (KB shows on display) and the keyboard is not locked.

Open TITRATE mode by pressing F 3.

---

**SETTINGS**

1. The display shows the nominal pickup volume. To change the pickup volume, enter a new initial pickup volume with the number keys and press E.

2. To set an initial dispense volume, press number keys then press E. (To set an initial dispense volume without changing the initial pickup volume, press E first. Enter the volume with number keys. Then press E again.)

---

**OPERATION**

1. Press and release the trigger to pick up the initial volume.

2. To begin titration, press and hold the trigger to dispense liquid first slowly, then at an increasing rate. The longer the trigger is held, the faster the liquid is dispensed. Release and hold in the trigger again to restart dispensing at the slowest rate. To dispense one increment at a time, tap the trigger.

3. When the desired endpoint is reached, read and record the dispensed volume from the display. Then clear the instrument by pressing F 0. This will discard the remainder in the tip and return EDP1 to its starting position.

If the entire volume is titrated, press the 0 key when the beep sounds and the display reads “CLEAR”. This action will execute the blowout stroke and empty the residual volume from the tip.

In TITRATE mode, a small residual volume is left in the tip after the entire volume has been titrated. The residual volume ensures that the volume titrated is accurate.

The residual volume is not part of the titrated volume and must be discarded by pressing F 0.
QUICK REFERENCE: DILUTE MODE

**DILUTE MODE F 4**

Make sure the piston is at the HOME position (KB shows on display) and the keyboard is not locked. Press **F 4** to open DILUTE mode. The display will show the default diluent volume, which is 90% of nominal volume. (The default sample volume is 10% of nominal volume, for 10:1 dilution.)

**SETTINGS**

1. Set the diluent volume \( (V_1) \) by pressing number keys then **E**.

   ![DILUENT VOLUME](KB 500µl)

2. Set the sample volume \( (V_2) \) in the same way.

   ![SAMPLE VOLUME](KB 100µl)

**OPERATION**

1. Press and release the trigger to pick up the diluent.

   ![PICK UP DILUENT VOLUME](KB 500µl)
2. Press and release the trigger to pick up an air gap*.

3. Press and release the trigger a third time to pick up the sample.

4. A three-part tone sounds, indicating that diluent and sample are separated by the air gap, ready to be dispensed. Press and release the trigger to dispense diluent and sample.

5. The display shows the diluent volume, ready for the next cycle.

* When using DILUTE mode with the 5 mL, 10mL, and 20 mL EDP1 models, the air gap will probably rise through the diluent and allow diluent and sample to mix in the sample reservoir. To avoid this, you can use VOLUME SEQUENCING in DILUTE mode. Then set a smaller air gap, or no gap, as desired. See Section 6 — Advanced Operation: VOLUME SEQUENCING.

QUICK REFERENCE: MEASURE MODE

NOTES:
1. An initial pickup volume can be set.
2. Piston direction can be changed by pressing 0 , even while the trigger is pressed.
3. At full stroke (or at zero) the trigger must be released. Then either press F 0 to clear the pipette, or press the trigger again to reverse piston direction.
MEASURE MODE  F  5

Make sure the piston is at the HOME position (KB shows on display) and the keyboard is not locked. Press  F 5  to open MEASURE mode.

SETTINGS

The display reads "0µl" (or any previously entered initial pickup volume). You can enter an initial pickup volume if you wish by pressing number keys then  E  .

OPERATION

1. Press and hold the trigger to pick up. Pickup speed increases until it reaches the maximum. Release the trigger and press it again to restart at the slowest rate. To pick up one increment at a time, tap the trigger. (Any initial pickup volume is picked up at the first trigger press. Hold the trigger in to continue measurement.)

When the desired volume of liquid has been picked up, ensure the lower level of the liquid is flush with the tip orifice (no air has been included) and read the volume on the display.

The piston direction can be reversed at any time by pressing  0  . (This is useful if an air bubble is picked up; pressing  0  reverses the flow, expelling the bubble. Pressing  0  again reverses flow and continues measurement.) The display always shows the current volume in the tip as well as the piston direction, either PICKUP or DISPENSE.

2. At full- or zero-scale, the display reads “CLEAR” and the trigger must be released.

Press the trigger again to reverse direction automatically. (The pipette may be cleared and the tip contents dispensed by pressing  F 0  ; this is useful if the volume of liquid to be picked up exceeds the full-scale volume of the instrument.)

Optional Settings

TONE GENERATOR CONTROL  F  8

A tone generator in the EDP1 signals operational status or error conditions as follows:

<table>
<thead>
<tr>
<th>Status</th>
<th>Tone sound</th>
<th>Tone description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initialization</td>
<td>BEEP-BEEP</td>
<td>Two short beeps</td>
</tr>
<tr>
<td>Key press</td>
<td>BIP</td>
<td>One very short beep</td>
</tr>
<tr>
<td>End of pickup stroke</td>
<td>BEEP</td>
<td>One short beep</td>
</tr>
<tr>
<td>End of dispense stroke</td>
<td>BEEP</td>
<td>One short beep (lower tone)</td>
</tr>
<tr>
<td>Piston at HOME</td>
<td>BEEP-BEEP</td>
<td>Two short beeps</td>
</tr>
<tr>
<td>End of pickup in DILUTE mode</td>
<td>BEEP-BEEP-BEEP</td>
<td>Two short, one long beep</td>
</tr>
<tr>
<td>Error condition/Low battery*</td>
<td>DEE-DAH-DEE-DAH</td>
<td>High warble</td>
</tr>
</tbody>
</table>

* Works even when tone generator is OFF

Tones are automatically switched on when the instrument is powered up. To switch off the tones, press  F 8  . Pressing  F 8  again turns the tone generator back on.
The EDP1 keyboard can be locked if desired. This feature is for protection. Locking the keyboard prevents unwanted volume or mode changes when the EDP1 is used for the same task over an extended period.

To lock the keyboard, press F9 when the keyboard is active (when KB is displayed). Press F9 again to unlock the keyboard. When the keyboard is locked, all keystrokes are ignored except F0 (clear), F8 (tone generator control), and F9 (keyboard lock/unlock). The trigger operates whether the keyboard is locked or unlocked.

**Setting Speed**

**PROGRAMMABLE SPEED F •**

You can program the pickup and dispense speed of the EDP1 pipette to accommodate almost any liquid, including moderately dense or viscous liquids.

The default speed setting for EDP1 pipettes is 8*. This fast setting is optimized for liquids with similar physical properties to water. However, you may wish to set a higher speed for even faster operation or a slower speed for more dense or viscous liquids.

To reset the speed, press F• (decimal point) then press a number between 0 and 9, then press E. The display reverts to show volume after speed has been set. The table below shows cycle component times for available speed settings.

**Table 5.1 – EDP1 Programmable Speeds**

<table>
<thead>
<tr>
<th>Speed Setting</th>
<th>Full-Scale Pickup</th>
<th>Full-Scale Dispense</th>
<th>Delay before Blowout</th>
<th>Blowout duration</th>
<th>Dwell Time (constant)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1.3 sec.</td>
<td>1.3 sec.</td>
<td>0.0 sec.</td>
<td>0.13 sec.</td>
<td>1.0 sec.</td>
</tr>
<tr>
<td>8</td>
<td>1.3 sec.</td>
<td>1.3 sec.</td>
<td>0.5 sec.</td>
<td>0.13 sec.</td>
<td>1.0 sec.</td>
</tr>
<tr>
<td>7</td>
<td>1.3 sec.</td>
<td>1.3 sec.</td>
<td>1.0 sec.</td>
<td>0.13 sec.</td>
<td>1.0 sec.</td>
</tr>
<tr>
<td>6</td>
<td>2.2 sec.</td>
<td>2.2 sec.</td>
<td>0.5 sec.</td>
<td>0.22 sec.</td>
<td>1.0 sec.</td>
</tr>
<tr>
<td>5</td>
<td>2.2 sec.</td>
<td>2.2 sec.</td>
<td>1.0 sec.</td>
<td>0.22 sec.</td>
<td>1.0 sec.</td>
</tr>
<tr>
<td>4</td>
<td>2.2 sec.</td>
<td>2.2 sec.</td>
<td>1.5 sec.</td>
<td>0.22 sec.</td>
<td>1.0 sec.</td>
</tr>
<tr>
<td>3</td>
<td>2.2 sec.</td>
<td>2.2 sec.</td>
<td>2.0 sec.</td>
<td>0.22 sec.</td>
<td>1.0 sec.</td>
</tr>
<tr>
<td>2</td>
<td>4.4 sec.</td>
<td>4.4 sec.</td>
<td>0.5 sec.</td>
<td>0.44 sec.</td>
<td>1.0 sec.</td>
</tr>
<tr>
<td>1</td>
<td>4.4 sec.</td>
<td>4.4 sec.</td>
<td>1.0 sec.</td>
<td>0.44 sec.</td>
<td>1.0 sec.</td>
</tr>
<tr>
<td>0</td>
<td>4.4 sec.</td>
<td>4.4 sec.</td>
<td>2.0 sec.</td>
<td>0.44 sec.</td>
<td>1.0 sec.</td>
</tr>
</tbody>
</table>

This table does not apply to trigger-controlled actions in TITRATE and MEASURE modes.

* Default speed setting for EDP1 10 mL, 20 mL models is 5. Speed range is 0 – 6.
Table 6.1 – EDP1 Advanced Functions

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>KEY</th>
<th>DESCRIPTION</th>
<th>APPLICABLE MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIX</td>
<td>F 6</td>
<td>Mixes by repeated up-and-down piston motion while trigger is held in</td>
<td>P – PIPETTE, D – DILUTE</td>
</tr>
<tr>
<td>VOLUME SEQUENCING</td>
<td>F 7</td>
<td>PIPETTE: up to 12 distinct volumes can be picked up and dispensed sequentially.</td>
<td>P – PIPETTE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MULTIPLE DISPENSE: up to 12 distinct volumes can be dispensed sequentially from a single pickup volume.</td>
<td>M – MULTIPLE DISPENSE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DILUTE: up to 12 distinct volumes can be picked up sequentially and dispensed together.</td>
<td>D – DILUTE</td>
</tr>
</tbody>
</table>

**MIX F 6** Available in PIPETTE and DILUTE modes only.

**SETTINGS**

1. Open the MIX function by pressing F 6.

2. The display prompts you for a mix volume*. Enter this volume and press E.

**OPERATION**

**IN PIPETTE MODE:** 1. Press and release the trigger to aspirate the pickup volume. Press the trigger again to dispense.

**IN DILUTE MODE:** 1. Press and release the trigger to pick up the diluent. Press and release the trigger to pick up an air gap, and again to pick up the sample. When the three-part tone sounds, press the trigger once more to dispense diluent and sample together.

* The mix volume may be larger than the pickup or diluent/sample volumes.
2. Hold the trigger (either during or after the dispense stroke) to start mixing. Mixing will continue as long as the trigger is held in. The display alternates between PICKUP and DISPENSE while mixing is in progress.

3. Release the trigger. Mixing stops and a normal blowout stroke occurs. The display shows the pickup or diluent volume, ready for another cycle.

4. To close the MIX function press F 6.

VOLUME SEQUENCING F 7 in PIPETTE, MULTIPLE DISPENSE, and DILUTE modes.

VOLUME SEQUENCING: PIPETTE MODE

In PIPETTE mode, up to twelve distinct volumes can be picked up and dispensed sequentially with VOLUME SEQUENCING.

When using this function, you are not restricted to the fixed sequence: by pressing the F 0 keys you can go back and repeat the previous volume, or by pressing E you can skip over the next volume. The sequencing cycle can be started at any point. Open the VOLUME SEQUENCING function by pressing F 7.

SETTINGS

Display flashes “0µl” (or the volume last set). Set the first pickup / dispense volume (V1) by pressing number keys followed by E. Continue setting sequential pickup/dispense volumes. Press 0 E to end the sequence. If you enter all twelve volumes, you do not have to press 0 to end the sequence. Sequential volumes are numbered as follows: V1–9, then VA (10), Vb (11), & VC (12).

OPERATION

1. Press and release the trigger to pick up the current volume.
2. Press and release the trigger to dispense the current volume.

3. Press and release the trigger to pick up the next sequential volume.

4. Press and release the trigger to dispense the next sequential volume. Continue in this way until all volumes are picked up and dispensed.

5. After the last volume in the sequence is dispensed, the first volume is displayed again, ready for pickup.

6. To close the VOLUME SEQUENCING function, press F 7.

VOLUME SEQUENCING: MULTIPLE DISPENSE MODE

In MULTIPLE DISPENSE mode with VOLUME SEQUENCING, up to 12 distinct volumes can be dispensed sequentially from one pickup volume. Open the VOLUME SEQUENCING feature by pressing F 7.

SETTINGS

1. The display flashes "0µl" (or the volume last set). Enter the first volume (V1) with the number keys and press E.

2. The display flashes "0µl" again, prompting you for the next volume. Enter the second volume (V2) and continue in the same way for each entry, finishing each entry with E and the last entry with 0 E. Sequential volumes are numbered as follows: V1–9, then VA (10), Vb (11), & VC (12).

3. The EDP1 pipette calculates and displays the number of cycles, or the largest number of times the sum of the volumes will divide into the nominal volume of the instrument. Accept the number of cycles by pressing E, or set a smaller number and press E. (Setting a larger number will sound an error alarm.)

OPERATION

1. The display will show the volume to be picked up; press and release the trigger to pick up that volume.
2. Press and release the trigger again to dispense the first sequential volume. Press and release the trigger again to dispense the second sequential volume, and so on.

3. After all sequential volumes in the first cycle have been dispensed, press the trigger to begin the second cycle. Continue until all cycles are complete.

4. The display will read “CLEAR” after the last dispense volume in the last cycle. Press 0 to clear the instrument.

5. To close the VOLUME SEQUENCING function, press F 7.

**VOLUME SEQUENCING: DILUTE MODE**

In DILUTE mode with VOLUME SEQUENCING, up to twelve distinct volumes can be picked up sequentially and dispensed together. Open VOLUME SEQUENCING by pressing F 7.

**SETTINGS**

1. Display flashes “0µl” (or volume last set). Press number keys then E to set the first sequential volume (V1).

2. Display flashes “0µl” (or volume last set). Press number keys followed by E to set the next volume (V2). Sequential volumes are numbered as follows: V1–9, then VA(10), VB(11), & VC(12).

3. Continue in this way until all volumes are set. Press 0 E to end the sequence.

**OPERATION**

1. The display shows the first pickup volume. Press and release the trigger to pick up the first volume (V1).

2. Press and release the trigger again to pick up the next volume (V2). Air gaps are not automatically added when VOLUME SEQUENCING. If you wish, air gaps can be set as volume entries.*

3. Continue in this way until all volumes are picked up.

4. A three-part tone sounds. Press the trigger to dispense the total volume all at once.

5. The display shows the first pickup volume again. Press and release the trigger to pick up volume V1 and restart the cycle.

6. To close the VOLUME SEQUENCING function, press F 7.

* This is a good way to avoid the potential problem when using DILUTE mode with the 5 mL, 10mL, and 20 mL EDP1 models — where the air gap can rise through the diluent, allowing diluent and sample to mix in the sample reservoir. You can set a smaller air gap which will stay in place between the diluent and sample, or no gap at all. See Section 3 — Basic Operation, DILUTE mode.
Proper Pipetting Technique

Use RAININ tips
EDP1 pipettes are designed for use with RAININ-manufactured disposable tips. Specified performance of EDP1 pipettes is guaranteed only when RAININ disposable tips are used. RAININ cannot accept responsibility for damage to EDP1 pipettes or for poor performance resulting from the use of other than RAININ disposable tips.

RAININ molds its own disposable tips from premium-grade virgin polypropylene plastic in an advanced clean-room environment. Molds are inspected and maintained frequently to assure high-quality tip production. Samples from each lot of tips are inspected microscopically to assure that every lot meets these high standards. To order tips for EDP1 pipettes, please refer to the publication RAININ Pipetting Solutions; call 800-543-4030 for a free copy of these publications. or go to the website: www.rainin.com. You can also view or download a PDF version online: http://www.rainin.com/lit_prodlit.asp

Pipetting techniques
EDP1 pipettes are designed to deliver accurate and precise measurements under the following conditions:

1. The liquid pipetted is water or liquid with density, viscosity, and vapor pressure similar to water. The temperature of the room, the EDP1, and the liquid, are all in the range 21.5°C ± 1°C. The EDP1 pipette is kept vertical while pipetting or within 20° of vertical.

2. The end of the disposable tip is immersed beneath the sample surface as follows:
   - 2 to 3 mm – volumes up to 100 µL.
   - 2 to 4 mm – volumes from 100 µL to 1000 µL.
   - 3 to 6 mm – volumes from 1000 - 5000 µL.
   - 6 to 10 mm – volumes over 5000 µL

3. There is no significant adherence of liquid to the surfaces of the tip. (Each tip should be pre-rinsed twice before pipetting to assure the best reproducibility).

4. When dispensing, the tip is touched to the sidewall of the receiving vessel. At the end of each dispense cycle, the tip is moved along the wall to remove any excess sample from the outside of the tip. A consistent rhythm is maintained from sample to sample when pipetting.

Viscous liquids, such as serum or plasma, can be measured accurately with a slow speed. See Table 5.1 – Programmable Speeds. You can further improve accuracy with viscous solutions by using MULTIPLE DISPENSE mode with the number of aliquots set to 1 and using a slow speed. This method simulates “reverse-mode” pipetting in manual pipettes. In MULTIPLE DISPENSE mode, the volume picked up includes an extra residual volume and the volume of the dispensed aliquot is accurate.

You can measure warm or cold liquids with good precision by using a consistent pipetting rhythm. A consistent rhythm will help minimize any differences in heating or cooling effects within the pipette. Use a new disposable tip each time for best accuracy and precision when measuring samples with temperatures greatly different from ambient, and do not pre-rinse.

As with any air-displacement pipette, best results will be obtained if there is no delay between picking up the sample and dispensing it.
Removing the Tip Ejector Arm 8

**REMOVING THE TIP EJECTOR**

The tip ejector should be removed to change the liquid end on models up to 2000 µL (see Section 9 below). It can also be removed if you wish to load and remove tips manually for pipetting into deep narrow vessels, especially on the larger-volume models. Three types of tip ejector are used and all are removed with minimum effort—do not use force.

For models up to 2000 µL, press in the quick-release tabs on the ejector arm and pull the ejector down. For 5000 µL & 10 mL models, twist the end of the ejector arm and pull downward. For 20 mL models, pull the lower part of the tip ejector away from the upper part (do not remove the upper part).

To replace the ejector arm (after changing the liquid end) on all models except 20 mL, insert the shaft through the large opening, align the top with the tip ejector pushrod, and push until the ejector arm snaps in place. For 20 mL models, place the large opening over the shaft and align the rod in the lower part of the tip ejector with the hole in the upper part and press firmly.

**Changing Liquid Ends** 9

The liquid ends for models up to 2000 µL are interchangeable. Liquid ends are not interchangeable on 5000 µL, 10 mL and 20 mL models.

When changing a liquid end, you must also change the encoder plug on the control module, to signal the liquid end volume to the software. Both the encoder plug and the shaft are marked with the nominal volume. LTS shafts are used with encoder plugs marked LTS and the nominal volume. Traditional shafts are used with encoder plugs marked with the nominal volume only.

Before removing the liquid end, bring the piston to HOME by pressing F 0 . The letters KB should appear on the display. If the keyboard is locked, unlock it (press F 9 ).
TO REMOVE THE LIQUID END

1. Referring to Figure 9-1A, loosen the shaft coupling by rotating it counter-clockwise.

2. When the shaft coupling is free of the threads, remove the shaft coupling. The motor shaft is connected to the piston assembly by a ball-joint. This ball-joint must be disconnected before proceeding, as follows:
   
   a. pull the liquid end away from the control module enough to reveal the end of the motor shaft – see Figure 9-1B. The spring and clear plastic spring holder can be left in place: they will not interfere with this procedure.
   
   b. angle the liquid end and ease the ball-joint out of the socket – see Figure 9-1C.

3. Remove the encoder plug from the control module (see Figure 9-2) and store it with its matching liquid end. Liquid measurements made with the EDP1 will be accurate and precise ONLY when the correct liquid end/encoder plug combination is used.

   NOTE: Before storage, disassemble the liquid end (see Section 10) and inspect for salts or residues. Clean the liquid end and store it with its encoder plug and tip ejector arm in the two tubes provided with the replacement liquid end.

   Do not touch the underside of the plug; skin oils can contaminate it, causing poor electrical contact and erratic performance. The plug can be cleaned with isopropanol.
REINSTALLING THE LIQUID END

**CAUTION:** Always attach the replacement liquid end BEFORE inserting the encoder plug.

1. The replacement liquid end is supplied in a clear plastic tube together with a second tube holding the matching tip ejector and encoder plug. Make sure you have all three components. The spring and spring guide extend from the liquid end as shown in Figure 9-3A. It is a good idea to pull back the spring and spring guide so that the ball-joint and socket connection area is clear, to help in reattaching the ball-joint to the piston shaft.

2. Bring the liquid end and the control module together so that the ball-joint aligns with the socket in the top of the piston shaft as shown in Figure 9-3B. Note the extension at the end of the ball-joint – see arrow.

3. Carefully connect the ball-joint on the motor drive into the socket on the piston shaft. You may need to maneuver the small extension downward to fully engage the two pieces, shown connected in Figure 9-3C. Once the angle is correct, the ball and socket will join together easily. **DO NOT USE FORCE.** Once the joint is made straighten the liquid end and control module then release the spring and spring guide.

4. Hold the liquid end and control module together and thread the shaft coupling onto the control module. Ensure the threads engage properly, and hand-tighten the shaft coupling onto the control module.

5. Take the replacement encoder plug. Make sure the labels on the plug and liquid end match.

6. Align the encoder plug with its slot in the head of the control module (avoid touching the bottom of the plug) and insert the plug squarely – see Figure 9-4. If power is supplied to the EDP1 and the keyboard is unlocked, the initialization sequence begins when the encoder plug is in place.

7. After the initialization sequence, look at the display. The EDP1 pipette should be in PIPETTE mode with the display reading PICKUP. The nominal volume of the liquid end is also displayed, as shown in Figure 9-5. (If your display does not show the proper nominal volume, check that the correct encoder plug is installed.)
EDP1 pipettes are designed to need very little maintenance and should give years of trouble-free service if treated with proper care and the operating recommendations in this manual are followed. Also see: RAININ Publication AB-15, Procedure for Evaluating Accuracy and Precision of RAININ Pipettes, available on the Rainin website at http://www.rainin.com/pdf/ab15.pdf

The following rules should be strictly observed to keep the mechanism dry and clean.

1. Never allow liquid to enter the shaft where it can contact the piston or seal.
2. Never pick up liquid without a disposable tip attached.
3. Never invert EDP1 or lay it on its side with liquid in the tip. Always hold it upright.
4. Never use solvents to clean EDP1. Instead, use a lint-free wipe dampened with water to clean the instrument. Keep the keyboard and encoder plug dry.

SEALING

Periodically each liquid end should be tested to ensure proper sealing, as follows:

1. Set the nominal volume and attach a disposable tip.
2. Pick up the full volume of water.
3. Hold the instrument upright and observe the tip for 30 to 45 seconds.

There should be no leaks from the tip or droplet formation at the tip orifice. If leakage does occur, sealing between the tip and the shaft may not be airtight.

SHAFT AND TIP SEALING

Use only RAININ disposable pipette tips. These tips mate exactly with the EDP1 liquid end shaft to form airtight sealing, necessary for air-displacement pipettes to operate.

PISTON SEALING

Sealing between the piston and the inside surface of the shaft is performed by a PTFE seal and a Buna O-ring. The PTFE seal extends through the O-ring, and only the PTFE seal makes contact with the piston. The O-ring compresses the PTFE seal against the piston to maintain proper sealing even after moderate wear, and also provides stationary sealing between the PTFE seal and the shaft. Figure 10.1 shows a detailed view of the liquid end, with each component separated for clarity.
A close-up detail of the 200 µL piston seal assembly is shown in Figure 10-2: the seal retainer can appear very different in other models.

Periodically you should dismantle the liquid end for inspection and cleaning, as follows:

1. Remove the liquid end from the control module as described in Section 9. Do not remove the encoder plug for this procedure.

2. Pull the piston assembly out of the liquid end. The PTFE seal and o-ring should stay attached to the piston. If they remain in the liquid end, invert the liquid end and gently tap it on the bench until the seal assembly drops out.

3. Inspect the piston, PTFE seal and o-ring, seal retainer, and inside of the shaft for any dirt and particulate contamination. Do not dismantle the piston assembly any further.

4. Remove any contamination by soaking and rinsing the piston assembly with distilled water or alcohol. The piston surface should have a high-gloss finish. If the finish is dull, scratched, or pitted, the PTFE seal may wear very rapidly, and the complete piston assembly should be replaced.

5. Blow the assembly dry with clean dry compressed nitrogen, or dry it with a very soft lint-free wipe. To avoid scoring the piston, do not use rough material such as a paper towel.

   **CAUTION:** Never apply grease to the piston or seal assembly (except on the 5 mL, 10 mL, and 20 mL models, which use a grease seal). For EDP1 pipettes with nominal volumes below 5 mL, any grease or lubricant may alter the effective diameter of the piston and cause liquid measurement errors.

**REASSEMBLY**

1. Make sure the PTFE seal and o-ring are properly positioned on the piston.

2. Follow the procedure in Section 9 to replace the liquid end.

3. Attach a disposable tip, and test for proper sealing as described in the first part of this chapter.

**AUTOCLAVING**

The autoclavable parts of EDP1 are the shaft and the tip ejector*: at a temperature of 121°C, pressure of 1 bar, for a maximum duration of 15-20 minutes.

**DO NOT AUTOCLAVE THE COMPLETE PIPETTE OR ANY PARTS OTHER THAN THE SHAFT AND THE TIP EJECTOR.**

* **DO NOT AUTOCLAVE THE TIP EJECTOR ON THE 20 mL MODEL**
Table 11-1 Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Suggested Remedy*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inaccurate liquid measurement</td>
<td>Bad seal between disposable tip and liquid end</td>
<td>Use RAININ disposable tips</td>
</tr>
<tr>
<td>or leaks</td>
<td>Damage shaft end</td>
<td>Replace shaft.</td>
</tr>
<tr>
<td></td>
<td>Inadequate seal on piston assembly</td>
<td>Check, clean, or replace piston seal.</td>
</tr>
<tr>
<td>“Lob” on display,</td>
<td>Insufficient charge in Battery Pack</td>
<td>Recharge Battery Pack; see Appendix B.</td>
</tr>
<tr>
<td>warbling alarm</td>
<td>EDP1 is shut off</td>
<td>Press any top row key or E to turn on instrument.</td>
</tr>
<tr>
<td></td>
<td>Depleted Battery Pack</td>
<td>Recharge Battery Pack; see Appendix B.</td>
</tr>
<tr>
<td>Blank display, no alarm</td>
<td>Wall power supply disconnected (when not using Battery Pack)</td>
<td>Reconnect cord to EDP1 pipette.</td>
</tr>
<tr>
<td>Display reads “Err”, warbling alarm</td>
<td>Illegal volume entered (will not be accepted)</td>
<td>Enter legal volume.</td>
</tr>
<tr>
<td>Keyboard will not accept</td>
<td>Keyboard locked</td>
<td>Unlock keyboard by pressing F 9.</td>
</tr>
<tr>
<td>entries, “KB locked” on LCD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* If the suggested remedy does not correct the problem, contact RAININ at 800-543-4030.

If anything confusing happens during operation of the EDP1 pipette, it can sometimes be remedied by pressing F 0 (unless the display is flashing, indicating an entry must be completed). Pressing F 0 returns the piston to HOME and activates the keyboard.

You can also reset the instrument by removing power, or removing and replacing the encoder plug. (The keyboard MUST be unlocked if you remove the encoder plug.) The pipette will restart and reinitialize. It will be in PIPETTE mode at its nominal volume after this sequence. This remedy should be used only as a last resort, since all stored information will be lost from the micro-computer and will need to be re-entered.

RAININ maintains service departments to correct any electro-mechanical problems with the EDP1 pipette, or problems resulting from physical or chemical damage. In the U.S.A. please contact Technical Service at 800-543-4030 for more information and assistance.

Outside the U.S.A. contact the RAININ distributor for your country. If you do not know the address, call International Customer Service at 001-510-564-1614, or send e-mail to global@rainin.com.

RAININ distributors are also listed by country on the web: www.rainin-global.com/list.html
Specifications

These manufacturer’s specifications should be used as guidelines when establishing your own performance specification in accordance with ISO 8655.

<table>
<thead>
<tr>
<th>EDP1 Model</th>
<th>Volume µL</th>
<th>Increment µL</th>
<th>Accuracy (Systematic Error) %</th>
<th>Precision (Random Error) µL (±)</th>
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</thead>
<tbody>
<tr>
<td>10 µL</td>
<td>1</td>
<td>0.01</td>
<td>2.5 0.025</td>
<td>1.2 0.012</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 µL</td>
<td>2</td>
<td>0.02</td>
<td>7.5 0.15</td>
<td>2.0 0.04</td>
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<tr>
<td></td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 µL</td>
<td>10</td>
<td>0.1</td>
<td>3.5 0.35</td>
<td>1.0 0.1</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
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<td>200 µL</td>
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<td>1 0.3</td>
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</tr>
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<td>1000 µL</td>
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<td>2000 µL</td>
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<td>5000 µL</td>
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<td>2.4 12</td>
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<td></td>
<td>10 mL</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>20 mL</td>
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</tr>
</tbody>
</table>

Specifications are subject to change without notice, and apply to operation in PIPETTE mode.
For ISO 8655 purposes, specifications can also be referred to as “Maximum Permissible Error”.

Electrical specifications

This device is intended for use only with the power sources with RAININ part numbers listed below. No other power sources may be used with this device.

Wall Power Supply Input:
- 6101-063 100-130 VAC 50-60 Hz (US/JAPAN)
- 6100-064UX 210-260 VAC, 50-60 Hz (UK)
- 6100-044EX 210-260 VAC, 50-60 Hz (EU)

Wall Power Supply Output:
- All P/Ns 6 VDC 100 mA Regulated Nominal

RCS Wall Transformer Supply Input:
- 6101-049 100-130 VAC 50-60 Hz (US/JAPAN)
- 6101-048UX 210-260 VAC, 50-60 Hz (UK)
- 6101-048EX 210-260 VAC, 50-60 Hz (EU)

RCS Wall Transformer Supply Output:
- All P/Ns 12 VAC 400 mA Regulated Nominal

Battery
- 6100-080 4.8 VDC Nominal 250 mAh Nominal

Explanation of symbols:
- A - Ampere, Hz - Hertz, mAh - Milliamp Hour, VAC - Volts Alternating Current, VDC - Volts Direct Current
Recharging the Battery Pack

Power is supplied to the EDP1 by either a wall power supply cord, or with a Battery Pack. A fully-charged Battery Pack will allow you to make up to 2000 full-stroke cycles before charging is needed, depending on the pipette volume range. If the Battery Pack discharges during operation, the EDP1 will sound a warning and the message “Lob” will be displayed. If this occurs, connect the EDP1 to a charger immediately after the current pipetting cycle. If you connect to the wall power supply, you can continue operation without interruption.

The Battery Pack can only be charged when installed in EDP1, in either of two ways:

**WALL POWER SUPPLY**

Connect the wall power supply cord to the connector on the back of the control module. Connect the power supply to an AC power source with the correct line voltage as specified on the power supply. The wall power supply can recharge a completely discharged Battery Pack in about 14 hours.

**RAPID CHARGE STAND**

Connect the Rapid Charge Stand to a suitable AC power source with the correct voltage (see paragraph above). Place EDP1 on the stand so that the four contact pins engage the contact slots on the stand. The display reads “F C” (Fast Charge): functions are inoperative until EDP1 is removed from the stand. The Rapid Charge Stand can recharge a Battery Pack in about 90 minutes. Current is metered precisely, and the Battery Pack temperature continually monitored via a built-in sensor probe. When the Battery Pack is fully charged, the red charge indicator light on the Rapid Charge Stand goes out.

For extended storage of the EDP1, the Battery Pack should be fully charged and removed from the instrument.

Note:
If you use a Rapid Charge Stand to rest the instrument, keep the Rapid Charge Stand unplugged until you need to recharge the batteries. (Recharging takes about 1-1/2 hours with the Rapid Charge Stand.)
Service, Calibration and Repair

RAININ Pipette Repair and Calibration facilities:

**California:**
7500 Edgewater Drive, Oakland CA 94621
Tel. 800-662-7027, Fax 510-564-1683
5955 Miramar Blvd, Ste B, San Diego, CA 92121
Tel. 800-662-7027, Fax 858-320-0556

**Massachusetts:** Rainin Road, Woburn, MA 01801
Tel. 800-662-7027, Fax 781-935-7631

**Japan:** 4-1-11, Bunkyo-Ku, Tokyo 113-0033
Tel. (03) 5689-8311, Fax (03) 5689-2670

METTLER TOLEDO Pipette Repair and Calibration facilities:

**Belgium:** N.V. Mettler-Toledo s.a., B-1932 Zaventem
Tel. (02) 334 02 11, Fax (02) 334 03 34

**Germany:** Mettler-Toledo GmbH, D-35353 Giessen
Tel. (0641) 50 70, Fax (0641) 507 128

**Denmark:** Mettler-Toledo A/S, DK-2600 Glostrup
Tel. (43) 270 800, Fax (43) 270 828

**Spain:** Mettler-Toledo S.A.E., E-08038 Barcelona
Tel. (93) 223 76 00, Fax (93) 223 02 71

**France:** HTS – F28000 Chartres
Tel. (02) 37 88 31 00, Fax (02) 37 88 31 09

**Italy:** Mettler-Toledo S.p.A., I-20026 Novate Milanese
Tel. (02) 333 321, Fax (02) 356 29 73

**Netherlands:** Mettler-Toledo B.V., NL-4004 JK Tiel
Tel. (0344) 63 83 63, Fax (0344) 63 83 90

**Sweden:** Mettler-Toledo AB, S-12008 Stockholm
Tel. (08) 702 50 00, Fax (08) 642 45 62

Service is also available in many other countries through authorized RAININ distributors. See www.rainin-global.com.

It is recommended to use only genuine RAININ replacement parts such as seals and shafts. It is NOT necessary to recalibrate the pipette after changing the seal or shaft. Recalibration of the pipette is only necessary when the piston is replaced, and should be done only by qualified factory-trained personnel in one of the above-mentioned facilities.

For pipettes under warranty, please note that the warranty will be voided if the pipette has been damaged as a result of physical or chemical abuse, or if the pipette has been repaired or recalibrated by any service facility which is not authorized by Rainin.

Contact Technical Support at 800-543-4030 for further information.
Replacement Parts (Refer to drawings opposite)

A: Shaft Coupling  B: Shaft  C: Tip Ejector  D: Piston Assembly  E: Spring
F: Spring Guide  G: Seal Retainer  H: Seal  J: O-ring

Parts for E3-Series 10 µL to 2000 µL:

<table>
<thead>
<tr>
<th>A</th>
<th>E1-10</th>
<th>E1-20</th>
<th>E1-100</th>
<th>E1-200</th>
<th>E1-300</th>
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<tr>
<td>B</td>
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<td>6202-065</td>
<td>6202-066</td>
<td>6202-067</td>
<td>6202-425</td>
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Parts for SE1-Series 10 µL to 1000 µL:

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Parts for E1 and SE1 series 5000 µL to 10 mL:

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<td>F</td>
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</table>

Common parts for 5000 µL, 10 mL, and 20 mL E1 and SE1 series:

- Tube of grease: 6100-555
- Filters for 5000 µL & 10 mL: 6190-164 (pkg of 100), 6190-165 (pkg of 1000)
- Filters for 20 mL: 6190-221 (pkg of 100), 6190-222 (pkg of 500)

FIGURE B-1 (OPPOSITE PAGE): LINE DRAWINGS OF EDP1 MODELS SHOWING REPLACEMENT PARTS
Legend for EDP1 10 µL to 2000 µL Models
A: Shaft Coupling  B: Shaft  C: Tip Ejector
D: Piston Assembly  E: Spring  F: Spring Guide
G: Seal Retainer  H: Seal  J: O-ring

Legend for EDP1 5000 µL, 10 mL and 20 mL Models
A: Piston Assembly  B: Piston o-ring  C: Cylinder
D: Cylinder o-ring  E: Shaft  F: Tip Ejector Arm

Note: Tip ejector arm shown is typical for EDP1 5000 µL and 10 mL.
E1-20ML has a two-part tip ejector, shown below.

Note: 2000 µL Model does not use a shaft coupling
Limited Warranty

See the enclosed Limited Warranty and Limitations of Liability Statement. Please complete and return the Warranty Registration Card on receipt of your pipette.

RAININ pipettes are calibrated with RAININ tips. To assure excellent reproducibility and performance, use only RAININ tips as recommended in this manual. Specified performance is guaranteed only when RAININ tips are used.

Contacting RAININ

Direct Order Line: Phone: 800-472-4646
Fax: 510-564-1617
E-mail: pipets@rainin.com
Web: www.rainin.com

Pipette Service: Phone: 800-662-7027
Fax: 510-564-1683
E-mail: service@rainin.com

Technical Support: Phone: 800-543-4030
Fax: 510-564-1617
E-mail: tech.support@rainin.com

RAININ Canada:
Phone: 800-472-4646
Fax: 866-758-3991

RAININ Japan:
Phone: ++ 81 3 5689-8311
Fax: ++ 81 3 5689-2670

METTLER TOLEDO GmbH, Switzerland
Phone: ++41 1 944 45 45
Fax: ++41 1 944 45 10

To call RAININ from outside the U.S.: 001-510-564-1600
For other International Offices and Distributors: See www.rainin-global.com

E-mail: global@rainin.com Web: www.rainin-global.com (from outside the U.S.A.)

EC Declaration of Conformity

according to ISO/IEC Guide 22 and EN45014

Manufacturer's Name: Rainin Instrument, LLC.
Manufacturer's Address: 7500 Edgewater Drive, Oakland, CA 94621
declares that the following product:
Product Name: EDP1 Motorized Microliter Pipette
Model Number: EDP1
Product Options: Rapid Charge Stand, Wall Power Supply
conforms to the following Product Specifications:
Safety: EN61010-1:2001
EMC:
FCC - 47 Part 15 Class A (Unintentional Signal Radiation)
IEC 61000-4-2, Edition 2.1 (2001) including Amds. 1&2 and EN 61000-4-2: Electrostatic Discharge Immunity Test
IEC 61000-4-3, (2002) and EN 61000-4-3: Radiated Radio-Frequency Electromagnetic Field Immunity Test
IEC 61000-4-6, Edition 2.0 (2003) and EN 61000-4-6: Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields
IEC 61000-4-8, Edition 1.1 (2001) and EN 61000-4-8: Power Frequency Magnetic Field Immunity Test

Supplementary Information:
Responsible Signatory: Jim Petrek, VP of R&D
Date: March, 2004

This Declaration of Conformity applies only to products which have the CE mark attached.