

AutoRep S

User Manual



METTLER TOLEDO

	Page
Safety Instructions	5
Function and Limitations of Use	6
Operating and Control Elements	7
Inserting the Encode Syringe	8
Setting the Volume	9
Filling the Encode Syringe	10
Repetitive Dispensing	11
Ejecting the Encode Syringe	12
Checking the Volume	13
Accuracy Table	15
Servicing and Cleaning	16
Ordering Information · Accessories	17
Troubleshooting	18
Repairs, Calibration Service	19
Warranty Information	20
Disposal	20

Please read the following carefully!

This instrument may sometimes be used with hazardous materials, operations, and equipment. It is beyond the scope of this manual to address all of the potential safety risks associated with such applications. It is the responsibility of the user of this pipette to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

- 1.** Every user must read and understand this operating manual prior to using the instrument and observe these instructions during use.
- 2.** Follow general instructions for hazard prevention and safety instructions; e.g., wear protective clothing, eye protection and gloves.
When working with infectious or other hazardous samples, all appropriate regulations and precautions must be followed.
- 3.** Observe the reagent manufacturers' information.
- 4.** Only use the instrument for dispensing liquids that conform to the specifications defined in the limitations of use and operating limitations. Observe operating exclusions (see page 6).
If in doubt, contact the manufacturer or supplier.
- 5.** Always use the instrument in such a way that neither the user nor any other person is endangered. Avoid splashes. Use only suitable vessels.
- 6.** Avoid touching the syringe orifices when working with hazardous samples.
- 7.** Never use force on the instrument!
- 8.** Do not attempt to make any technical alterations. Do not dismantle the instrument.
- 9.** Before use, check the instrument for visible damages. If there is a sign of a potential malfunction, immediately stop dispensing. Consult the 'Troubleshooting' section of this manual (see page 18), and contact Rainin or METTLER TOLEDO if needed.

Function and Limitations of Use

The AutoRep™ S is a repetitive pipette for quick and simple repetitive dispensing of liquids. Volumes from 2 μL to 5 mL can be dispensed with the highest precision and accuracy through combinations of the syringe size used and adjustment of the stroke setting on the stroke-setting wheel.

Limitations of Use

This instrument is designed for dispensing samples, observing the following limits:

- 59°F to 104°F (+15°C to +40°C)
(of instrument and reagents – other temperatures on request)
- vapor pressure up to 500 mbar
- viscosity: 20 mPa s with 50 mL syringes
260 mPa s with 5 mL syringes
977 mPa s with 1 mL syringes

Operating Exclusions

During proper operation, the dispensed sample only comes in contact with the syringe and not with the AutoRep™ S.

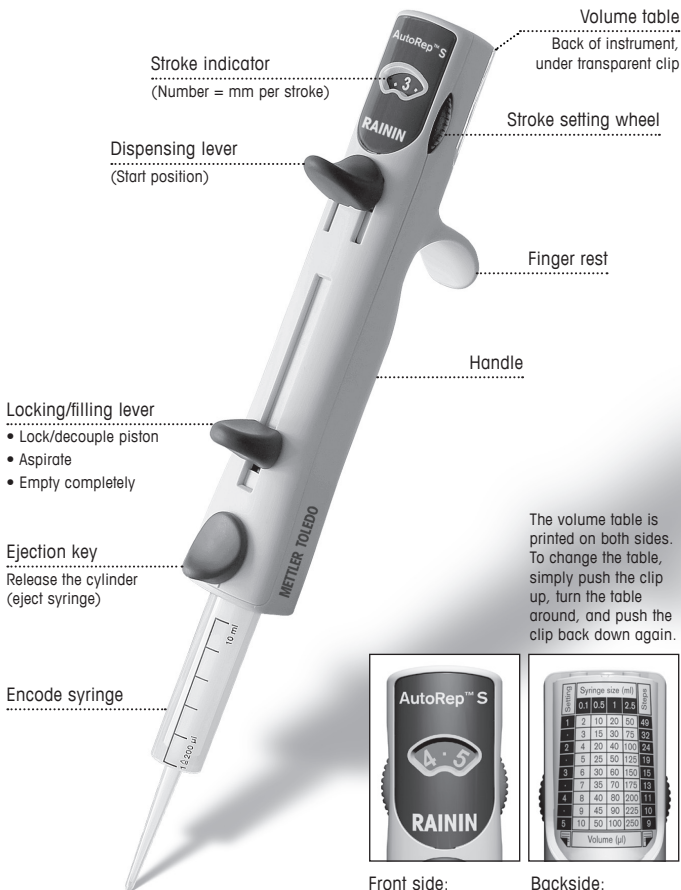
The user has to ensure the compatibility of the instrument with the intended application. In case of third-party dispenser syringes, the user must check their compatibility and perform a function and volume test before use.

The instrument should not be used for dispensing liquids that attack polypropylene (e.g., syringe cylinder), polyethylene (syringe piston), LCP (syringe piston 0.1 mL), or PC/PBT and polycarbonate.

Note:

Instrument and syringe are not autoclavable (sterile Encode syringe, see page 17). Syringes are disposable. For decontamination of the instrument you may use commercially available solutions as long as they do not attack PC/PBT and PC.

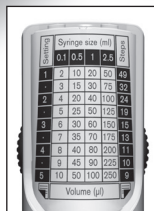
Operating and Control Elements



The volume table is printed on both sides. To change the table, simply push the clip up, turn the table around, and push the clip back down again.



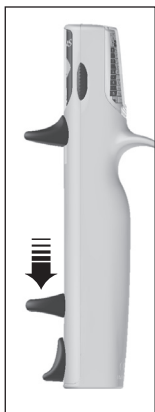
Front side:
stroke settings



Backside:
volume table

Inserting the Encode Syringe

Use of the 25 mL and 50 mL Encode syringes requires the reusable adapter supplied. This is coupled to the syringes with a bayonet lock, and can be detached after use.



- 1.** Push the locking/filling lever to the lower stop.



- 2.** Swing out the locking/filling lever.



- 3.** Insert Encode syringe straight and upright from below.



- 4.** Swing back the locking/filling lever.



Adapter

Setting the Volume

The possible dispensing volumes of the AutoRep™ S are listed in tables. These are found beneath the transparent clip on the back of the instrument. There are 9 stroke setting positions, from 1 to 5.

1. Look for the desired dispensing volume (Volume) in the table.
2. Use the stroke setting wheel to set to the proper stroke number (Setting) for the volume that corresponds to the syringe size.
3. Dispensing steps: depending on the syringe capacity (mL), the same desired dispensing volume per step can be delivered a different number of times (see example below). The smaller the number of steps, the higher the accuracy of the dispensed volume.

Example:

Desired dispensing volume per step: **200 µL**

Syringe sizes to use:

2.5 mL = stroke setting **4** = max. **11** dispensing steps

5 mL = stroke setting **2** = max. **24** dispensing steps

10 mL = stroke setting **1** = max. **49** dispensing steps

Setting	Syringe size (ml)				Steps
	0.1	0.5	1	2.5	
1	2	10	20	50	49
·	3	15	30	75	32
2	4	20	40	100	24
·	5	25	50	125	19
3	6	30	60	150	15
·	7	35	70	175	13
4	8	40	80	200	11
·	9	45	90	225	10
5	10	50	100	250	9
Volume (µl)					

Setting	Syringe size (ml)				Steps
	5	10	25	50	
1	100	200	500	1000	49
·	150	300	750	1500	32
2	200	400	1000	2000	24
·	250	500	1250	2500	19
3	300	600	1500	3000	15
·	350	700	1750	3500	13
4	400	800	2000	4000	11
·	450	900	2250	4500	10
5	500	1000	2500	5000	9
Volume (µl)					

Important!

The volumes listed in the table are the only options available. Since the first dispensing step must be discarded, the number given in the table is always 1 step less.

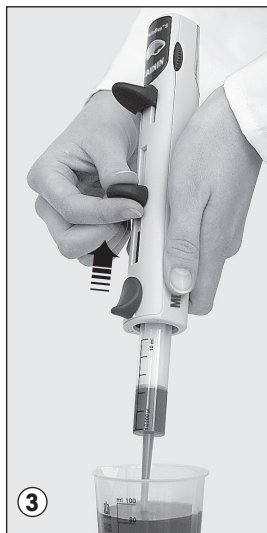
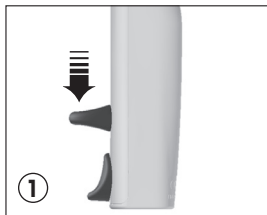
Filling the Encode Syringe

Aspirating Liquid

1. Push the locking/filling lever to the lower stop.
2. Immerse the orifice of the Encode syringe vertically into the liquid to a depth of 3–10 mm.
3. Raise the locking/filling lever slowly to the upper stop to avoid the formation of air bubbles.

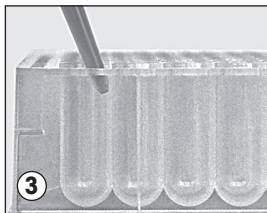
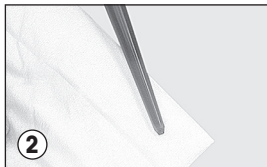
Note:

Any small air bubble near the piston can be ignored since a locking mechanism prevents the residual volume from being dispensed inadvertently after the final complete dispensing step.



Dispensing Operation

1. Check the volume setting once again (compare with the settings in the volume table).
2. Wipe off any liquid adhering to the outside of the Encode syringe orifice with a lint-free tissue.
3. Place the orifice of the syringe against the wall of the vessel.
4. Dispense the liquid by pressing down the dispensing lever completely, then let it slide all the way back up.
5. Take care to dispense smoothly and evenly.



Important!

The first dispensing step must be discarded!

Ejecting the Encode syringe

Operation

1. Hold the AutoRep™ S over a vessel.
2. Empty the syringe by pushing the locking/filling lever to its lower stop.
3. Swing out the locking/filling lever (the piston will then be decoupled).
4. Hold the AutoRep™ S over the waste container. Press the ejection key down, releasing the cylinder. The syringe will be ejected.

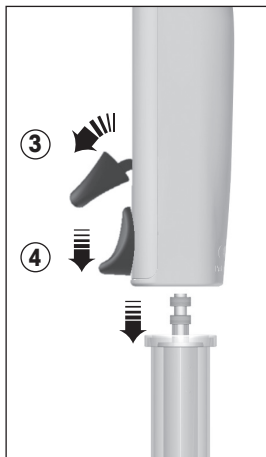


Warning!

Residues of the medium might be present on the syringe orifice. The syringe should only be ejected in a manner that does not pose a hazard to the user or other persons.

Note:

The tightness of the seal of the syringes is not guaranteed for repeated dispensing of high viscosity media.



Depending on use, we recommend that gravimetric testing of the instrument be carried out every 3-12 months. This time frame should be adjusted to individual requirements. Gravimetric volume testing according to DIN EN ISO 8655-5 is performed as follows:

1. Preparation of the instrument

Fitting tip. This test can be carried out with Encode syringes of any size. However, the 5 mL size is most commonly used for this purpose.

2. Carry out the test

- a) Adjust the stroke setting of AutoRep™ S to Step 5 (10% of nominal volume).
- b) Fill the Encode syringe by immersing it vertically into the testing liquid.
- c) Discard the first step; it only serves to align the internal mechanism.
- d) Place the weighing vessel (containing a small amount of deionized water) on a balance and tare the balance.
- e) Dispense the second step into the weighing vessel. For this, push down the dispensing lever at a steady rate to the stop and hold it there. Then wipe the syringe on the vessel wall over a distance of approx. 10 mm.
- f) Enter weighed value into the test record.
- g) Repeat points D to F 10x.
(For the 10th volume test, the 5 mL Encode syringe with a stroke setting of 5 has to be filled a second time – steps A through C.)
- h) Repeat the same testing procedure at stroke settings 3 (6% of nominal volume) and 1 (2% of nominal volume).
- i) This results in a total of the 30 weighed values needed.

Checking the Volume

Calculation (for nominal volume)

x_i = Weighing results
 n = Number of weighings

Z = Correction factor
(e.g., 1.0029 $\mu\text{L}/\text{mg}$
at 20°C, 1013 hPa)

$$\text{Mean value } \bar{x} = \frac{\sum x_i}{n}$$

$$\text{Mean volume } \bar{V} = \bar{x} \cdot Z$$

Accuracy*

$$A\% = \frac{\bar{V} - V_0}{V_0} \cdot 100$$

V_0 = Nominal volume

Coefficient of Variation*

$$CV\% = \frac{100 s}{\bar{V}}$$

Standard Deviation

$$s = Z \cdot \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

*) = Calculation of accuracy (A%) and variation coefficient (CV%):
A% and CV% are calculated according to the formulas for
statistical control.

Technical Data

Encode syringes, 20°C 'Ex'

Nominal volume Encode syringe	Volume range (µl)	A* ≤ ± % Stroke setting ≈ % of nominal volume			CV* ≤ % Stroke setting ≈ % of nominal volume		
		1 ≈ 2%	3 ≈ 6%	5 ≈ 10%	1 ≈ 2%	3 ≈ 6%	5 ≈ 10%
		0.1 mL	2 – 10	4.0	2.4	1.6	6.0
0.5 mL	10 – 50	2.5	1.5	1.0	2.5	1.5	1.0
1.0 mL	20 – 100	2.5	1.5	1.0	2.0	1.2	0.8
1.25 mL	25 – 125	2.5	1.4	0.9	2.0	1.1	0.7
2.5 mL	50 – 250	1.8	1.1	0.7	1.5	0.9	0.6
5.0 mL	100 – 500	1.8	1.1	0.7	1.5	0.9	0.7
10.0 mL	200 – 1000	1.8	1.1	0.7	2.0	1.2	0.8
12.5 mL	250 – 1250	1.8	1.1	0.8	3.2	2.0	1.4
25.0 mL	500 – 2500	1.5	0.9	0.6	3.0	1.5	1.0
50.0 mL	1000 – 5000	1.5	0.8	0.5	5.0	1.8	1.2

A* = Accuracy, CV* = Coefficient of variation

Error limits refer to the partial volume set relative to the Encode syringe, obtained when instrument, syringe and distilled water are equilibrated at ambient temperature and with smooth operation. The testing is according to DIN EN ISO 8655-5.

The nominal volume is the maximum volume printed on the Encode syringe.

Important!

The AutoRep™ S can also be operated with compatible tips from other manufacturers. The user must check their compatibility and perform a function and volume test before use!

Servicing and Cleaning

AutoRep™ S is factory calibrated and maintenance-free.
The instrument must not be disassembled!

In cases of external contamination, we recommend cleaning the instrument using a wipe with water or isopropanol.
Do not immerse in water.

Important!

Avoid getting liquids inside the instrument.
If this happens, return instrument to an authorized service center. In the event that an instrument must be returned for servicing, please contact Rainin or METTLER TOLEDO for more information.



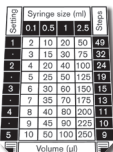
The shelf mount is provided with an adhesive strip for mounting.



AutoRep™ S

1 shelf mount, 1 volume table, 3 Encode syringes (0.1 mL, 1 mL, 10 mL).

	Pack of	Cat. No.	MT Ordering No.
AutoRep™ S	1	AR-S	17013008



Settings	Syringe size (mL)				Steps
	0.1	0.5	1	2.5	
1	2	10	20	50	49
2	3	15	30	75	32
3	4	20	40	100	24
4	5	25	50	125	19
5	6	30	60	150	15
6	7	35	70	175	13
7	8	40	80	200	11
8	9	45	90	225	10
9	10	50	100	250	9
	Volume (µl)				

Spare Parts:

	Pack of	Cat. No.	MT Ordering No.
Shelf mount	1	SM-ARS	17013009
Volume table	1	VT-ARS	17013010



Encode syringes

Capacity	Pack of	Non Sterile Cat. No.	MT Ordering No.	Sterile** Cat. No.	MT Ordering No.
0.1 mL	100	ENC-100	17007399	ENC-100S	17007400
0.5 mL	100	ENC-500	17001871	ENC-500S	17001872
1 mL	100	ENC-1000	17013004	ENC-1000S	17013002
1.25 mL	100	ENC-1250	17001873	ENC-1250S	17001874
2.5 mL	100	ENC-2500	17001877	ENC-2500S	17001878
5 mL	100	ENC-5ML	17001883	ENC-5MLS	17001884
10 mL	100	ENC-10ML	17013005	ENC-10MLS	17013003
12.5 mL	100	ENC-12ML	17001875	ENC-12MLS	17001876
25 mL*	50/25***	ENC-25ML	17001879	ENC-25MLS	17001880
50 mL*	25	ENC-50ML	17001881	ENC-50MLS	17001882

* incl. 1 adapter, ** Sterile, free of endotoxins, ATP, DNA and RNase. Single wrapped.

*** Encode syringes 25 mL: non sterile pack of 50 / sterile pack of 25

Encode syringe Set: 20 each of 0.5, 1.0, 1.25, 2.5, 5.0, 10 and 12.5 mL size

	Pack of	Cat. No.	MT Ordering No.
Syringe Set	20	ENC-SET	17001885

Adapter for 25/50 mL Encode syringes, PP, autoclavable

	Pack of	Cat. No.	MT Ordering No.
Non sterile	10	ENC-10ADP	17000546
Sterile	5	ENC-ADPS	17000547



Troubleshooting

Problem	Possible cause	Corrective action
Syringe piston cannot be locked after the Encode syringe has been inserted.	Locking/filling lever is not pushed down completely and is not swung out.	First press the ejection key and remove the Syringe, then push the locking/filling lever all the way down and swing it out completely.
Undefined dispensing volume	The stroke setting wheel is not properly engaged.	Ensure that the stroke setting wheel is securely locked into place.
Air bubble beneath the syringe piston becomes larger.	Leaking syringe	Replace syringe
A and/or CV exceed tolerances.	Leaking syringe	Replace syringe
	The dispenser syringe is difficult to move.	Replace syringe
	The dispensing lever has not been pressed completely and evenly.	Press the dispensing lever evenly to stop position.
	The first dispensing step was not discarded.	Discard the first dispensing step.
The syringe piston cannot be decoupled after emptying completely.	The syringe has been incorrectly inserted.	Press the ejection key, push down the locking/filling lever completely, and swing it out.

If a problem with the instrument's function cannot be fixed in your laboratory, please contact Rainin: tech.support@rainin.com.

For safety reasons, instruments returned for checks and repairs must be clean and decontaminated!

Return for repair

- a) Clean and decontaminate the instrument carefully.
- b) Complete the "Declaration on Absence of Health Hazards" (ask your supplier or manufacturer for the form).
- c) Send the completed form along with the instrument to Rainin or METTLER TOLEDO with an exact description of the type of malfunction and the media used.

The return transport of the instrument is at risk and cost of the sender. The customer is responsible for all shipping charges and assumes responsibility for any loss or damage during shipping.

Calibration Service

ISO 9001 and GLP guidelines require regular inspection of volumetric instruments. We recommend checking the volume every 3–12 months. The interval depends on the specific requirements on the instrument. For instruments frequently used or in use with aggressive liquids, the interval should be shorter.

Rainin offers you the possibility to have your instruments calibrated by Rainin Calibration Service.

Warranty

Rainin Instrument, LLC shall not be liable for the consequences of improper handling, use, servicing, operating or unauthorized repairs of the instrument or the consequences of normal wear and tear especially of wearing parts such as pistons, seals, valves and the breakage of glass as well as the failure to follow the instructions of the operating manual. Rainin is not liable for damage resulting from any actions not described in the operating manual or if non-original parts have been used.

Disposal

For the disposal of instruments and Encode syringes, please observe the relevant national disposal regulations.

Subject to technical modification without notice. Errors excepted.

Rainin Instrument LLC
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Subject to technical changes
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