Fig. 5 *– Calibration adjustment ring, located under push button.*

4. If the volume is different from that on the Digital Volume Indicator, using the M4 hex wrench provided, loosen the three set screws on the calibration wheel. (***Caution:*** the Calibration Wheel is the upper half of the Volume Adjustment Wheel; ***do not loosen set screws on the lower locking wheel.***) Turn the adjustment ring (Fig. 5) clockwise to reduce the volume and counter-clockwise to increase the volume.

5. Repeat Steps 1, 2, 3 and 4 until the volume measured is within the percentage of accuracy expected as shown in the Specifications. If this cannot be achieved, the pipetter should be serviced by a qualified calibration service.

$$Accuracy\ (\%error) = \frac{100 * Expected\ Volume - Measured\ Volume}{Expected\ Volume}$$

6. Tighten the three set screws on the calibration wheel after calibration.

SPECIFICATIONS

Model	Volume Range	Volume	Accuracy	Repeatability
E2	0.2-2 µL	0.2 µL	±12% (±0.024 µL)	±6.0% (±0.012 µL)
		1.0 µL	±2.7% (±0.027 µL)	±1.3% (±0.013 µL)
		2 µL	±1.5% (±0.03 µL)	±0.7% (±0.014 µL)
E10	0.5-10 µL	1 µL	±2.5% (±0.025 µL)	±1.3% (±0.0125 µL)
		5 µL	±1.5% (±0.075 µL)	±0.6% (±0.03 µL)
		10 µL	±1.0% (±0.1 µL)	±0.4% (±0.04 µL)
E20	2-20 µL	2 µL	±7.5% (±0.15 µL)	±2.0% (±0.04 µL)
		5 µL	±5.0% (±0.25 µL)	±1.5% (±0.075 µL)
		10 µL	±3.0% (±0.3 µL)	±1.0% (±0.1 µL)
		20 µL	±3.0% (±0.6 µL)	±0.8% (±0.16 µL)
E100	20-100 µL	20 µL	±3.0% (±0.6 µL)	±1.0% (±0.02 µL)
		50 µL	±2.0% (±1 µL)	±0.5% (±0.25 µL)
		100 µL	±1.5% (±1.5 µL)	±0.3% (±0.3 µL)
E200	50-200 µL	50 µL	±3.0% (±1.5 µL)	±1.0% (±0.5 µL)
		100 µL	±1.3% (±1.3 µL)	±0.7% (±0.7 µL)
		200 µL	±1.3% (±2.6 µL)	±0.5% (±1 µL)
E1000	100-1000 µL	100 µL	±2.0% (±2 µL)	±0.8% (±0.8 µL)
		500 µL	±1.0% (±5 µL)	±0.4% (±2 µL)
		1000 µL	±1.0% (±10 µL)	±0.3% (±2.8 µL)
E5000	1000-5000 µL	1000 µL	±1.3% (±13 µL)	±0.4% (±4 µL)
		2500 µL	±0.8% (±22.5 µL)	±0.3% (±7.5 µL)
		5000 µL	±0.8% (±40 µL)	±0.2% (±10 µL)

ACCESSORIES

E2-OS	Replacement O-Ring, Seal
E10-OS	Replacement O-Ring, Seal
E20-OS	Replacement O-Ring, Seal
E100-OS	Replacement O-Ring, Seal
E200-OS	Replacement O-Ring, Seal
E1000-OS	Replacement O-Ring, Seal
E5000-OS	Replacement O-Ring, Seal
500801	Filter for model E5000 (Bag of 100)
14239	Eagle Pipetter Stand

WPI Universal Pipetter Tips are ultra-clear and certified RNase/DNase-free, available in sterile racks and non-sterile racks and bulk packs. Contact WPI for prices.

Warranty

WPI (World Precision Instruments, Inc.) warrants to the original purchaser that this equipment, including its components and parts, shall be free from defects in material and workmanship for a period of one year* from the date of receipt. WPI's obligation under this warranty shall be limited to repair or replacement, at WPI's option, of the equipment or defective components or parts upon receipt thereof f.o.b. WPI, Sarasota, Florida U.S.A. Return of a repaired instrument shall be f.o.b. Sarasota.

The above warranty is contingent upon normal usage and does not cover products which have been modified without WPI's approval or which have been subjected to unusual physical or electrical stress or on which the original identification marks have been removed or altered. The above warranty will not apply if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electric power, air conditioning, humidity control, or causes other than normal and ordinary usage.

To the extent that any of its equipment is furnished by a manufacturer other than WPI, the foregoing warranty shall be applicable only to the extent of the warranty furnished by such other manufacturer. This warranty will not apply to appearance terms, such as knobs, handles, dials or the like.

WPI makes no warranty of any kind, express or implied or statutory, including without limitation any warranties of merchantability and/or fitness for a particular purpose. WPI shall not be liable for any damages, whether direct, indirect, special or consequential arising from a failure of this product to operate in the manner desired by the user. WPI shall not be liable for any damage to data or property that may be caused directly or indirectly by use of this product.

Claims and Returns

- Inspect all shipments upon receipt. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed loss or damage should be reported at once to the carrier and an inspection requested. All claims for shortage or damage must be made within 10 days after receipt of shipment. Claims for lost shipments must be made within 30 days of invoice or other notification of shipment. Please save damaged or pilfered cartons until claim settles. In some instances, photographic documentation may be required. Some items are time sensitive; WPI assumes no extended warranty or any liability for use beyond the date specified on the container.
- WPI cannot be held responsible for items damaged in shipment en route to us. Please enclose merchandise in its original shipping container to avoid damage from handling. We recommend that you insure merchandise when shipping. The customer is responsible for paying shipping expenses including adequate insurance on all items returned.
- Do not return any goods to WPI without obtaining prior approval and instructions (RMA#) from our returns department. Goods returned unauthorized or by collect freight may be refused. The RMA# must be clearly displayed on the outside of the box, or the package will not be accepted. Please contact the RMA department for a request form.
- Goods returned for repair must be reasonably clean and free of hazardous materials.
- A handling fee is charged for goods returned for exchange or credit. This fee may add up to 25% of the sale price depending on the condition of the item. Goods ordered in error are also subject to the handling fee.
- Equipment which was built as a special order cannot be returned.
- Always refer to the RMA# when contacting WPI to obtain a status of your returned item.
- For any other issues regarding a claim or return, please contact the RMA department

Warning: This equipment is not designed or intended for use on humans.

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Eagle™ Adjustable Pipetters

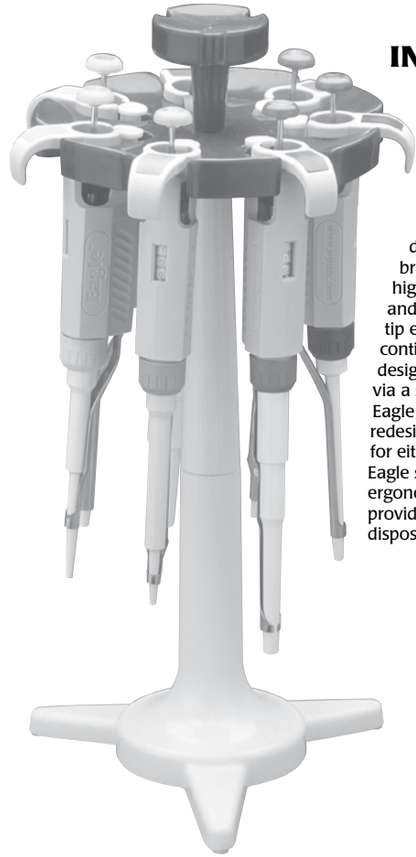

Fig. 1 *– Pipetter Stand #14239, included free with custom sets of five or more pipetters, holds seven pipetters.*

INTRODUCTION

Seven new and improved color-coded Eagle Pipetters cover a volume range from 0.2 µL to 5,000 µL. These Eagle Pipetters are a third-generation WPI product incorporating a novel seal (Models E20 through E5000) comprised of a material at least five times more durable than is currently available in other brands. The Eagle pipetters are made of high quality materials that are UV radiation and solvent resistant, autoclavable (shaft and tip ejector arm) and scratch resistant. The continuously adjustable volume function is designed to provide precision and accuracy via a self-locking micro-counting mechanism. Eagle Pipetters are easily user-calibrated. The redesigned digital indicator permits easy reading for either right- or left-handed use. The new Eagle series also incorporates an improved ergonomic design. A tip ejection button is provided for the quick, easy and safe removal of disposable tips (all Models except E5000).

World Precision Instruments

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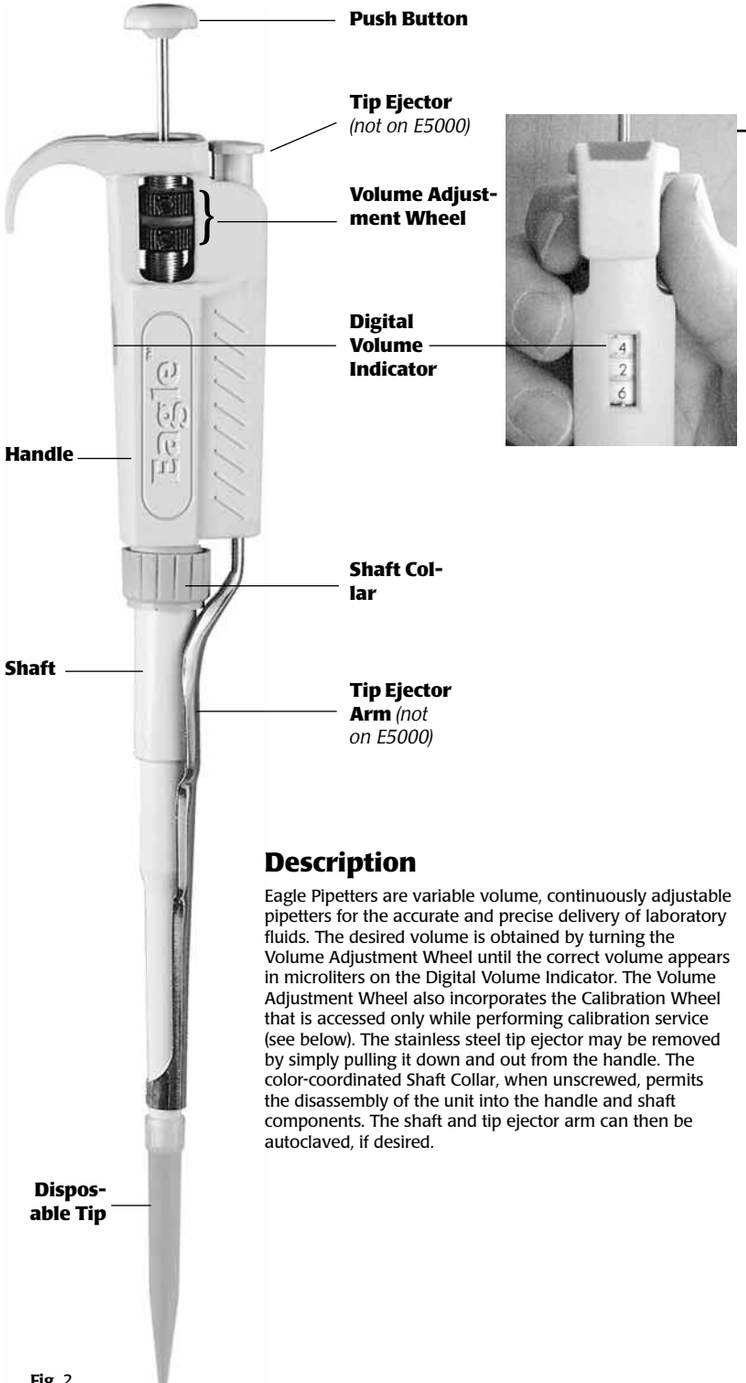

Fig. 2

Description

Eagle Pipetters are variable volume, continuously adjustable pipetters for the accurate and precise delivery of laboratory fluids. The desired volume is obtained by turning the Volume Adjustment Wheel until the correct volume appears in microliters on the Digital Volume Indicator. The Volume Adjustment Wheel also incorporates the Calibration Wheel that is accessed only while performing calibration service (see below). The stainless steel tip ejector may be removed by simply pulling it down and out from the handle. The color-coordinated Shaft Collar, when unscrewed, permits the disassembly of the unit into the handle and shaft components. The shaft and tip ejector arm can then be autoclaved, if desired.

*To ensure specified accuracy and precision, use **WPI Universal Pipetter Tips**.*

OPERATION

***CAUTION:** To prevent liquid from flowing into the internal cavity of the pipetter, never place a pipetter upside down or lay it down horizontally if it is fitted with a fluid-filled pipette tip.*

Autoclaving

The shaft and tip ejector arm may be disassembled from the pipetter and are autoclavable at 120° C (15 PSI/1 bar) for 15 minutes. Recalibration is typically not required.

Filter Barrier

Eagle Pipetter E5000 incorporates a replaceable filter barrier to help prevent fluid from reaching the piston should accidental aspiration into the shaft occur. If the filter becomes wet or contaminated, remove it and insert a replacement, gently pushing it up until it stops.

Instructions for Use

1. No set-up is required after unpacking. The Eagle Pipetter is ready to use without adjustment or calibration. (M4 hex wrench provided for recalibration when necessary.)
2. Choose the appropriate pipetter to use ensuring that the desired volume is within the variable volume range of the pipetter.
3. Fix the disposable pipette tip to the pipetter. Be certain that the tip is fitted securely to the pipette shaft. *To ensure specified accuracy and precision, use **WPI Universal Pipetter Tips**.*
4. Turn the Volume Adjustment Wheel until the Digital Volume Indicator displays the desired volume. See table below for volume ranges, examples of volume settings and increments for each pipetter.

MODEL	E2	E10	E20	E100	E200	E1000	E5000
Volume/Color	2 µL Pink	10 µL Light Blue	20 µL Yellow	100 µL Royal Blue	200 µL Lemon-Lime	1000 µL Ruby	5000 µL Emerald
Volume Range	0.2-2 µL	0.5-10 µL	2-20 µL	20-100 µL	50-200 µL	100-1000 µL	1000-5000 µL
100% Volume Setting	2.00 µL	10.0 µL	20.0 µL	100 µL	200 µL	1.00 mL	5.00 mL
Reading	200	100	200	100	200	100	500
10% Volume Setting	0.20 µL	1.00 µL	2.00 µL	10.0 µL	20.0 µL	0.10 mL	0.50 mL
Reading	020	010	020	010	020	010	050
Smallest Increment	0.002 µL	0.02 µL	0.02 µL	0.2 µL	0.2 µL	2 µL	2 µL
For accurate dispensing, use each pipetter for volumes within its stated volume range.							

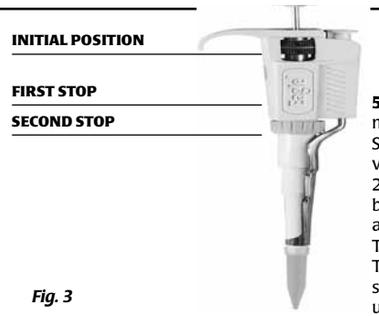

Fig. 3

5. Depress the Push Button slightly, moving it from the Initial Position to the First Stop, as shown in Fig. 3. Hold the pipetter vertically and immerse the tip to a depth of 2-4 mm for 2 to 3 seconds in the solution to be pipetted. Release the Push Button slowly and allow it to return to the Initial Position. The solution is drawn up after a brief interval. The pipetter should then be removed from the solution and maintained at a vertical angle until the liquid is dispensed.
6. Place the tip close to the inner wall of the receiving vessel and depress the Push Button to the First Stop. Continue to depress the Push Button and progress to the Second Stop. At the same time, move the tip along the inner wall of the vessel in order to fully discharge the solution. Finally, release the button completely and remove the pipetter from the vessel.
7. Depress the tip ejector button to release the tip into an appropriate waste container.

MAINTENANCE AND STORAGE

Pipetters are accurate and precise instruments and should be handled appropriately. Care needs to be taken to prevent dropping the pipetter. WPI offers a stand for convenient and safe storage. The pipetter may be wiped down with a cleaning agent such as 75% ethanol, 10% bleach or mild soap.

It is recommended that all non-routine maintenance, including replacement of internal pipetter parts, be performed by a qualified technician or calibration service.

Pipetter Calibration

The pipetter is precalibrated with distilled water before shipment. However, recalibration is needed from time to time. The frequency and use of the pipetter will determine the time between calibrations. Whenever components are replaced, calibration is recommended, with the exception of the filter for model E5000 which can be changed without requiring recalibration.

***CAUTION:** To reduce the errors due to surface characteristics of the tip, the pipette tip should first be wetted by aspirating and dispensing the water several times. To reduce error from the evaporation of water, prior to performing the calibration procedure, add some water to a container and place it in the analytical balance chamber in order to saturate the air. In calibrating volumes below 50 µL, pipette the liquid into a capillary tube instead of a container to further reduce the evaporation.*

The user can perform calibration as follows:

1. Bring all equipment and distilled water to room temperature.
2. Adjust the dial to the desired volume (see Specifications). Pipette the distilled water into a container positioned on an analytical balance.
3. Weigh the water. Calculate the pipetted volume in µL by dividing the weight in mg by the density of the distilled water at a given temperature. Correct as needed for any additional factors.

Fig. 4