INSTRUCTION MANUAL

BEV-1000

Micropipette Beveler

www.wpiinc.com
031226

CONTENTS

ABOUT THIS MANUAL 1
INTRODUCTION 2
- Features 2
- Notes and Warnings 2
- Parts List 3
- Unpacking 3

INSTRUMENT DESCRIPTION 4
- Monitor Description 10
- Mounting Head Descriptions 11
- Reticle Description 12
- Setting Up the Beveler 13
  - Installing the Mounting Head 13
  - Attaching the LCD Screen 14
  - Connecting the Camera and Power Cables 15
  - Powering On the Beveler 16

OPERATING INSTRUCTIONS 17
- Configuring Your System to Bevel Glass 17
- Removing Debris from the Micropipette Tip 20

MAINTENANCE 22
- Cleaning 22
- Cleaning out the Debris Catcher 22
- Repositioning the Debris Catcher 23

ACCESSORIES 24
TROUBLESHOOTING 25
SPECIFICATIONS 28
WARRANTY 29
- Claims and Returns 29
- Repairs 29

ABOUT THIS MANUAL

The following symbols are used in this guide:

This symbol indicates a CAUTION. Cautions warn against actions that can cause damage to equipment. Please read these carefully.

This symbol indicates a WARNING. Warnings alert you to actions that can cause personal injury or pose a physical threat. Please read these carefully.

NOTES and TIPS contain helpful information.

Fig. 1—The BEV-1000 makes accurate micropipette beveling and polishing a breeze.

INTRODUCTION

BEV-1000 is a micropipette beveler designed to fabricate pre-pulled glass micropipettes with precision for cellular microinjection, recordings, and package leak testing.

Pulled glass tips naturally vary in shape and diameter. When applications require consistent tip geometry and dimensions, a secondary finishing step such as beveling or polishing is often necessary.

The **BEV-1000** uses a proprietary abrasive diamond wheel to bevel glass tips to desired dimensions **without the need to change grinding papers.** An LCD monitor with an integrated scale reticle makes it easy to measure tip size and bevel angle, eliminating the need to repeatedly check beveling progress through small microscope eyepieces during extended use.

Features

The **BEV-1000** combines high-magnification imaging and precise mechanical control to support accurate beveling across a wide range of glass capillary sizes, as outlined below:

- Total magnification (optical + digital): 230×
- 9″ TFT panel display resolution: 1024 × 768
- Beveling operation speed: 0 - 3,000 RPM
- Flat diamond wheel with a surface variance of <2 µm/cm ensure you get a clean bevel with less tip breakage
- Compatible with range of glass capillary sizes, up to 3 mm outer diameter
- Excellent flexibility and control over the finished beveled angle

Notes and Warnings

CAUTION: Gloves are recommended when handling glass capillaries.

CAUTION: Use of the beveler shield is HIGHLY recommended to avoid risk of glass debris contact, and excess high-LUX light exposure during operation.

Parts List

After unpacking, verify that there is no visible damage to the unit. Verify that all items are included:

(1) **BEV-1000** Beveler

(1) **BEV-1000-KIT** Startup Kit for **BEV-1000**, including:
- **13156** Female Luer Fitting, 1/16 PE, package of 10
- **3744** Syringe, 10 CC without a needle, package of 10
- **503122** Tubing, 1.0 × 1.0 with stops, package of 5

(1) **97936** Beveler Shield

(1) LCD Display Kit, including:
(1) LCD Display
(1) Mounting Head
(2) Mounting Screws
(1) Hex Key

(1) Power Supply Cable

(1) Instruction Manual is available online at www.wpiinc.com/manuals.

Unpacking

Upon receipt of this instrument, make a thorough inspection of the contents and check for possible damage. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed damage should be reported at once to the carrier and an inspection requested. Please read the section entitled "Claims and Returns" on page 29 of this manual. Please contact WPI Customer Service if any parts are missing at (941) 371-1003 or customerservice@wpiinc.com.

Returns: Do not return any goods to WPI without obtaining prior approval (RMA # required) and instructions from WPI's Returns Department. Goods returned (unauthorized) by collect freight may be refused. If a return shipment is necessary, use the original container, if possible. If the original container is not available, use a suitable substitute that is rigid and of adequate size. Wrap the instrument in paper or plastic surrounded with at least 100 mm (four inches) of shock absorbing material. For further details, please read the section entitled "Claims and Returns" on page 29 of this manual.

INSTRUMENT DESCRIPTION

Fig. 2— The front view of the Beveler.

Beveler Operational Controls:

Start Button – Press the *Start* button to power on the abrasive diamond wheel. When this is powered on, the button illuminates and the wheel begins to spin (Fig. 3).

Direction Button (F/R) – Use this *F/R* (forward/reverse) toggle button to set the direction (clockwise/counter clockwise) that the abrasive diamond wheel spins. When there is power to the diamond wheel, this switch is illuminated (Fig. 3).

RPM Dial – The *RPM* (revolutions per minute) dial controls the speed of the diamond wheel. Always start at lower speeds and increase it, as needed. It can run from 1 to 3,000 RPMs (Fig. 3).

Fig. 3—These three controls are located on the front of the Beveler.

NOTE: The diamond wheel will not spin if the RPM dial is set to zero (0).

Monitor – The 9" LCD monitor is attached to the monitor mounting arm of the Beveler. It connects to and moves with the camera. A reticle on the screen allows you to accurately measure the size and angle of the pipette tip. When the unit is powered up with the main power switch on the back of the Beveler, the monitor, the camera and the LED illuminator are powered on.

Camera – The integrated camera and lens has a magnification greater than 200×, a focal length of more than 12 mm, and a field of view of more than 0.8 mm.

Beveler Shield - Use of this tinted shield is HIGHLY recommended to avoid the risk of glass debris contact, and excess high-LUX light exposure.

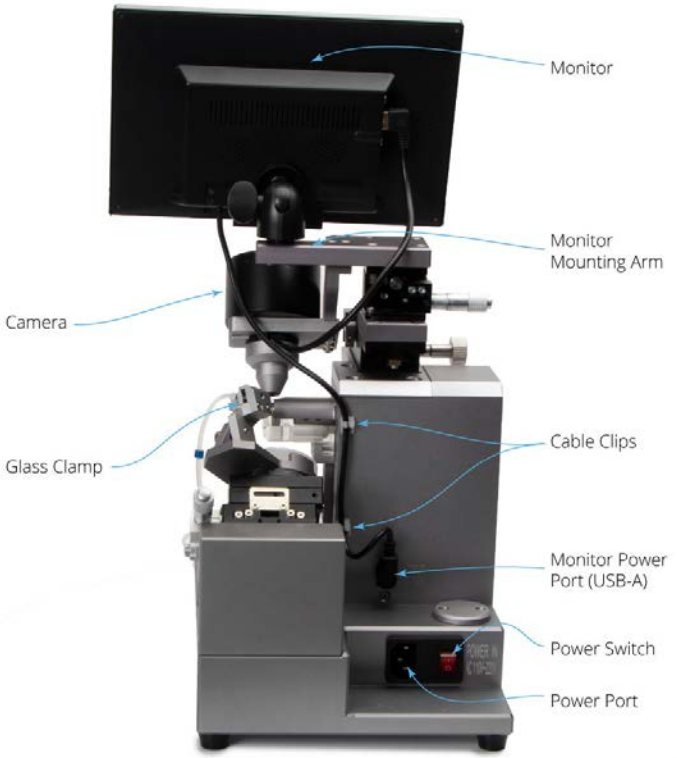

Fig. 4—The back view of the Beveler

Monitor Mounting Arm – The monitor is attached to the mounting arm using two mounting screws and a mounting head.

Cable Clips – These two clips hold the USB cable that runs from the monitor to the camera power port. The cable snaps in place, keeping the cable safely away from all moving parts.

Monitor Power Port – Plug the USB type B connector from the LCD screen into this port to power the monitor.

Power Switch – This is the main power switch. It illuminates when the unit has power. When you switch it on, the LED illuminator, camera and monitor turn on (Fig. 5).

Power Port – Connect one end of the Beveler power cord to this port, and connect the other end to a wall outlet (Fig. 5).

Fig. 5—The power port and switch are on the back side of the Beveler.

Fig. 6—Left side view of the Beveler showing the camera positioning knobs.

Camera Positioning Knobs – Use the two knobs to properly position the camera/monitor. The rear control (Z-Axis Camera Positioning Knob) is a rotary micrometer knob used to raise and lower the camera/monitor. The front control is an adjustment knob (Y-Axis Camera Positioning Knob) that moves the camera/monitor forward and backward and includes a linear vernier scale.

Fig. 7—These controls are used to position the camera lens.

NOTE: The movement of the camera does NOT affect the physical position of the glass held against the diamond wheel. The movement of the camera does affect the field of view and clarity of the image on the LCD monitor.

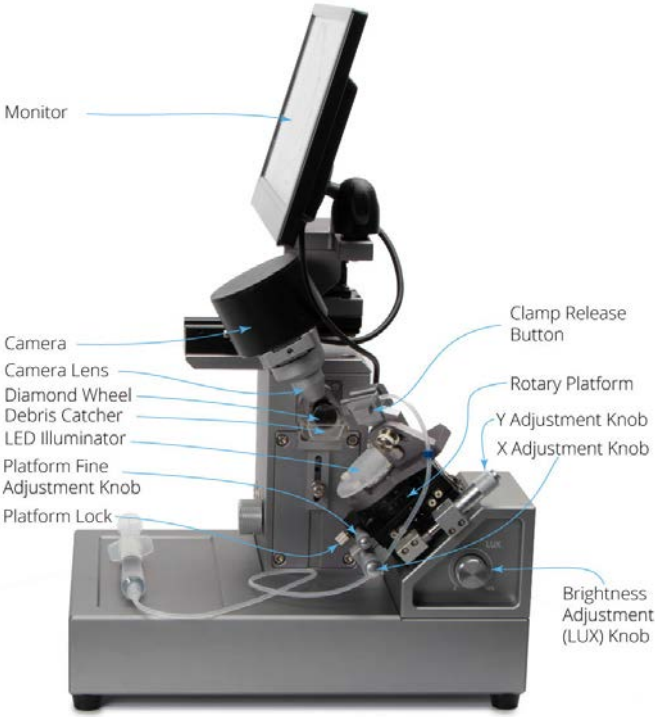

Fig. 8—Right side view of the Beveler showing many of the controls.

Diamond Wheel – A micropipette is placed up next to this proprietary abrasive diamond wheel, and as the wheel spins, it shapes and polishes the tip of the micropipette (Fig. 9).

Debris Catcher – This acrylic cup is designed to catch water and any beveling dust. See "Cleaning out the Debris Catcher" on page 22 for more information.

LED Illuminator – This light is adjustable using the brightness adjustment knob on the right side of the unit. It is labeled *LUX* (Fig. 9, Fig. 14).

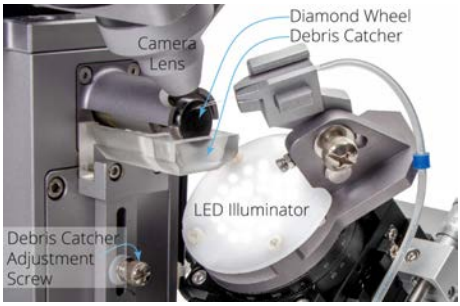

Fig. 9—The pipette is positioned so that the tip touches the diamond wheel.

Platform Fine Adjustment Knob – To adjust the rotary platform (and the angle of the micropipette), loosen the platform lock screw, and then adjust this micrometer to fine tune the angle of the platform. This micrometer allows for about 5° of adjustment (Fig. 10).

Platform Lock – This thumb screw is used to secure the platform fine adjustment knob when the rotary platform angle is properly set (Fig. 10).

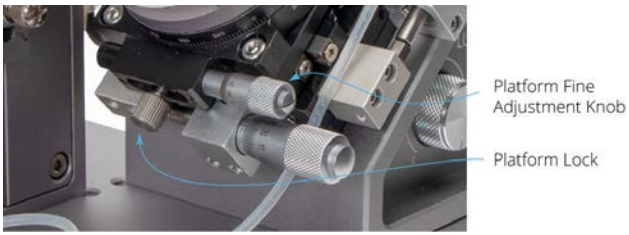

Fig. 10—Adjust the fine tuning on the rotational platform and twist the platform lock to secure the position.

Glass Clamp – This spring loaded clamp securely holds your micropipettes with a diameter from 1 to 3 µm OD (Fig. 11).

Clamp Release Button – Press and hold the clamp release button to open the glass clamp for installation and removal of your micropipette (Fig. 11).

Fig. 11—Press and hold the clamp release button to install or remove a micropipette.

Rotary Platform – This platform may be rotated to adjust the angle of the pipette relative to the diamond wheel. Use the vernier scale on the side of the platform to do the coarse adjustment. When the angle is close, you can use the fine platform adjustment knob to dial it in exactly. Use this to set the beveling angle from 15° ~ 60° (Fig. 12).

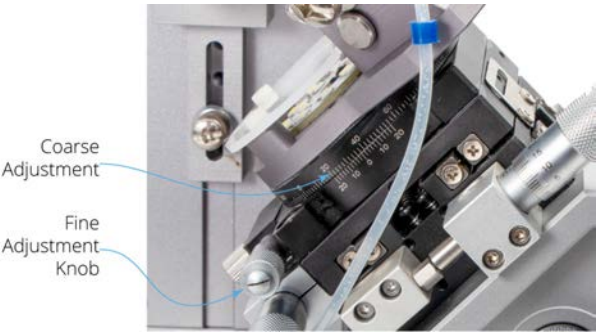

Fig. 12—The black rotary platform may be tuned to precisely set the beveling angle.

X/Y Adjustment Knobs – These micrometers are used to fine tune the position of the micropipette in the X (left/right) plane and Y (up/down) plane (Fig. 13).

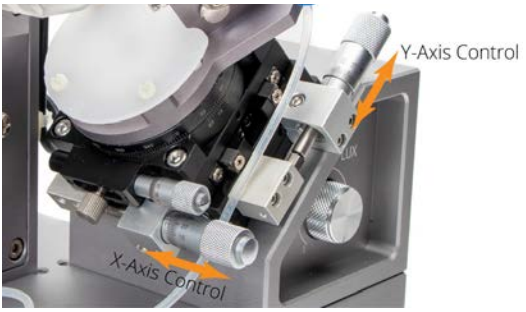

Fig. 13—(Left) The X-and Y-Axis Adjustment Knobs control the position of the micropipette.
Fig. 14—(Right) Rotate the Lux knob to adjust the light intensity.

Brightness Adjustment Knob (LUX) – Rotate this knob counter clockwise to dim the light and clockwise to brighten it (Fig. 14),

Monitor Description

Fig. 15—The front and back of the monitor are labeled, along with the mounting components.

LCD Screen – This 9″ screen is connected to the camera so you can see the pipette as you shape it. The reticle is integral to the LCD screen so you can accurately measure the pipette tip and the beveled angle.

Mounting Screws – Two mounting screws are inserted through the mounting arm of the Beveler and into the mounting head to secure the mounting head on the Beveler.

Hex Key – Use the hex key to securely tighten the mounting screws into the mounting head.

Mounting Head – This component attaches to the Beveler mounting arm and securely holds the monitor.

Power Cord with USB (Type B) Connector – This cord plugs into the monitor power port on the back side of the Beveler to power the LCD screen.

Receptacle for Metal Attachment Insert – The metal attachment insert on the mounting head slides into the slot to connect the LCD screen to the mounting head.

USB Camera Port (Type A) – A USB port (not visible) is accessible on the side of the LCD screen. The USB cable from the camera plugs into this port.

Mounting Head Descriptions

Fig. 16—The mounting head elements are labeled.

Metal Attachment Insert – This insert slides into the receptacle on the back of the monitor.

Tightening Wheel – After positioning the monitor on the mounting head, rotate this wheel clockwise to tighten it and secure the monitor in place.

Main Body – The main body sits on the Beveler's mounting arm. It supports the LCD screen.

Angle Adjustment Knob – Loosen this knob and re-position the monitor. Tighten the knob to stabilize the monitor.

Mounting Screw Holes – Two mounting screw holes are visible on the bottom side of the main body. They line up with the holes in the Beveler's mounting arm, and the two mounting screws fit into these holes.

Reticle Description

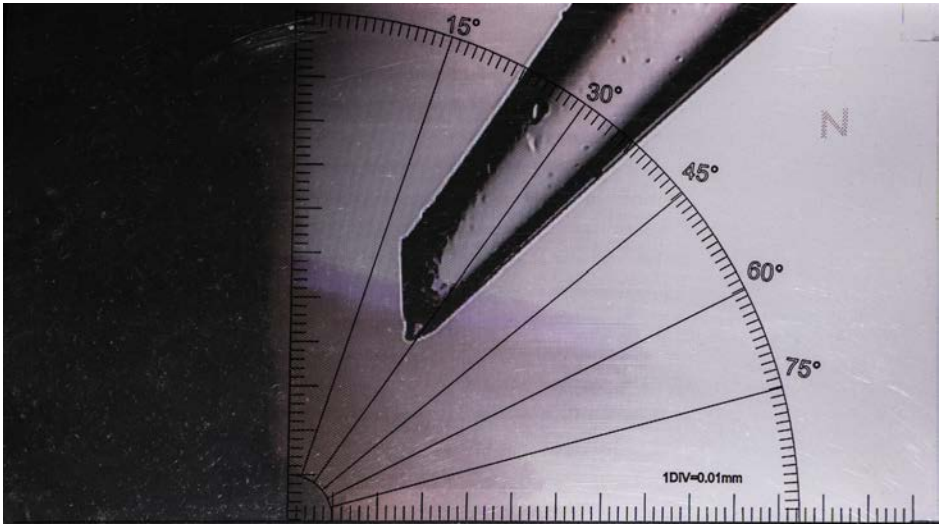

Fig. 17—The Reticle is integrated into the monitor.

Scale/Division of LCD display:

The total on-screen magnification is 230×, which includes both optical and digital zoom. The Reticle includes a graduated linear scale along the baseline and left side, plus a 0–90° degree scale with radial reference lines, allowing quick measurement of both the diameter and angle of the pipette tip.

- Linear Scale: 1 DIV ≈ 8 µm (or 0.008 mm).
- Angular Scale: 1 DIV ≈ 1° (from 15° to 60°)

NOTE: A pipette cannot be beveled at a full 90° angle without a special fixture. The system is designed to bevel at an angle.

Setting Up the Beveler

To setup your Beveler, you must mount the monitor.

Installing the Mounting Head

1. On the monitor mounting arm of the Beveler, locate the two mounting holes.

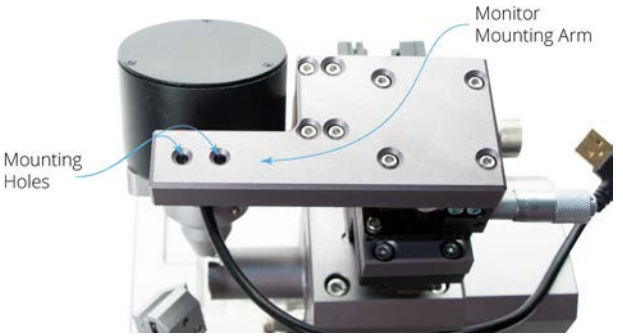

Fig. 18—The mounting holes are located on the monitor mounting arm. They are seen here in this top view.

2. Insert the first mounting screw up through the bottom of the monitor mounting arm and align it with the matching hole on the mounting head (Fig. 19). Install the second screw the same way. Use the hex key to tighten both screws securely (Fig. 20).

Fig. 19—Insert the first mounting screw through the bottom of the mounting arm and into the corresponding hole in the mounting head.
Fig. 20—Use the hex key to tighten the screws.

Attaching the LCD Screen

1. Position the LCD screen so you can slide the metal attachment insert into the receptacle on the back of the monitor.

Fig. 21—Position the monitor so that the metal attachment insert aligns with the receptacle on the back of the monitor.

2. Tighten the tightening wheel to secure it in place.

Fig. 22—Rotate the tightening wheel clockwise to secure it.

3. If needed, loosen the angle adjustment knob to adjust the screen position. Once it's positioned correctly, tighten the knob again.

Fig. 23—Rotate the knob counter clockwise to loosen it. Then position the angle of the monitor as desired. Rotate the knob clockwise to secure the monitor angle.

Connecting the Camera and Power Cables

1. Plug the USB Type A camera connector into the USB port on the rear panel of the LCD screen.

Fig. 24—Plug the USB type A connector from the camera into the port on the side of the monitor.

2. Plug the USB type B connector from the LCD screen into the port located on the back of the Beveler near the bottom.

Fig. 25—Plug in the power cable from the monitor into the USB (type B) port on the back of the Beveler.

3. Route the cable along the cable holders and snap it into place on the back of the Beveler.

Fig. 26—Snap the cable into the two cable holders on the back of the Beveler to keep them out of the way during operations.

Powering On the Beveler

1. Plug the Beveler power cord into the power port on the back panel, then plug the other end into a wall outlet.

Fig. 27—Plug the power cord into the port on the back of the Beveler.

2. Turn on the main power switch located on the back of the Beveler.

Fig. 28—Turn on the power switch on the back of the Beveler.

Now you're ready to adjust your settings and camera view to begin beveling.

OPERATING INSTRUCTIONS

Configuring Your System to Bevel Glass

1. Adjust the position of the monitor so that the angle is comfortable for viewing. Loosen the angle adjustment knob on the mounting head, position the monitor as desired and tighten the knob to hold the monitor in position.
2. Power on the system using the power switch on the back panel. The LED illuminator, camera, and monitor turn on.
3. Mount a pulled pipette in the glass clamp. Pinch and hold the clamp release button and carefully position the glass in the clamp so that it is close to the diamond wheel, but not touching it. Release the button.

Fig. 29—Pinch and hold the release button and install the glass.

CAUTION: The pipette tip is extremely fragile. Handle it gently. Do NOT bump it as you are installing it.

4. Set the bevel angle using the rotary platform. Use the vernier scale on the side of the platform to do the coarse adjustment. Rotate the platform to dial in the appropriate angle. When the angle is close, use the fine platform adjustment knob to position it exactly. Set the beveling angle from 15° ~ 60° (Fig. 30). Use the monitor to see the adjustments in relation to the tip of the micropipette.

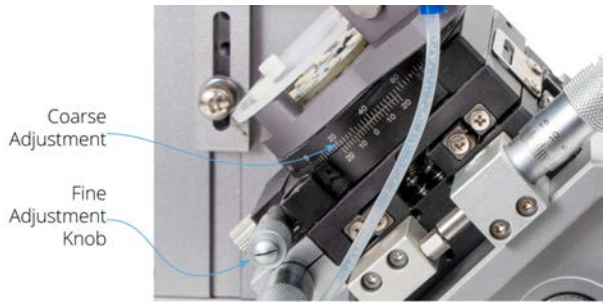

Fig. 30—The black rotary platform may be tuned to precisely set the beveling angle.

Fig. 31—Here you see 30° on the rotary platform and 30° on the monitor's angular scale.

Fig. 32—Here you see 45° on rotary platform and 45° on the monitor's angular scale.

5. On the monitor, you must be able to see the micropipette tip in the field of view including the surface of abrasive diamond wheel. If the camera needs to be repositioned, use the camera positioning knobs on the left side of the Beveler. You can control the front to back (Y) position with the knob in the front and the up and down (Z) position with the smaller micrometer control in the back (Fig. 33).

   TIP: Use the scale on display to measure the expected angle of glass tip to be beveled.

Fig. 33—These controls are used to position the camera lens.

NOTE: The movement of the camera does NOT affect the physical position of the glass held against the diamond wheel. The movement of the camera does affect the field of view and clarity of the image on the LCD monitor.

6. Push the *Start* button on the front of the Beveler to start the rotation of the diamond wheel. Both buttons (*Start* and *F/R*) illuminate.
7. Verify that the abrasive diamond wheel rotates counterclockwise. If not, press the *F/R* button to toggle it so that it rotates in the opposite direction. Verify that the angle between the glass and the diamond wheel is between 15° and 60°.
8. Gently adjust the pre-pulled glass tip so it is very close to surface of the wheel but NOT touching it (Fig. 35). Use the X- and Y-Axis Adjustment Knobs. To move the glass tip toward or away from abrasive diamond wheel, use the X-axis control. To move the glass up or down, use the Y-axis control.

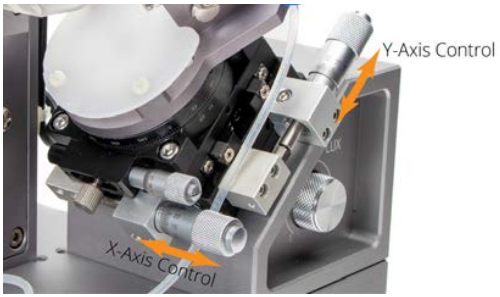

Fig. 34—The X-and Y-Axis Adjustment Knobs control the position of the micropipette.

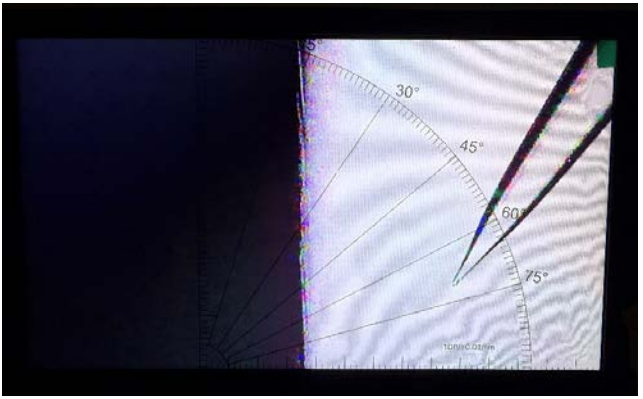

Fig. 35—The tip is close to the diamond wheel but not touching it.

8. Adjust the speed at which the diamond wheel rotates by rotating the *RPM* knob from zero up to a very low speed to avoid damage to the glass tip.
9. Gently adjust X-axis of glass manipulator again so that the pulled glass tip touches the surface of abrasive diamond wheel (Fig. 36). At this moment, the beveling process begins.

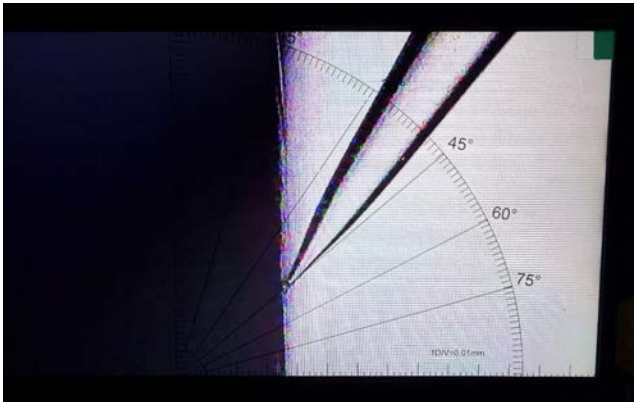

Fig. 36—The glass tip is touching the diamond wheel.

10. After the beveling process is completed, press the *Start* button to stop the diamond wheel. Carefully adjust the X axis of the manipulator counter-clockwise to move the beveled glass micropipette away from the diamond wheel. Than, while you are firmly grasping the beveled glass micropipette, press and hold the clamp release button and remove the beveled glass.

Removing Debris from the Micropipette Tip

The Beveler comes with a 10cc plastic syringe and tubing, which may be used for rinsing the tip of the micropipette during beveling.

1. Fill the syringe with distilled water.
2. Connect the tubing to the Luer tip of the syringe. Connect the other end of the tubing to the blunt end of the micropipette in the glass holder (Fig. 37).

Fig. 37—Slide the tubing on the blunt end of the pipette.

Fig. 38—The tubing fits over the blunt end of the micropipette so you can push water through the tip and into the acrylic cup below the diamond wheel.

3. During beveling, gently depress the syringe plunger to squeeze water through the micropipette tip. The water collects in the acrylic cup beneath the diamond wheel.

TIP: We highly recommended running distilled water through your pipette before, and a few times during, beveling to clear any initial/gradual buildup in the capillary. Failure to do so may result in clogging of the tip from too much debris present.

MAINTENANCE

Cleaning

CAUTION: Do not use alcohol, aromatic hydrocarbons or chlorinated solvents for cleaning. They may adversely react with materials used to manufacture the instrument.

After each beveling process, rinse the beveling surface of diamond wheel with distilled water or gently wipe it with a moist Kimwipe to remove the glass debris. Blot remaining water with dry Kimwipe.

The acrylic cup may be cleaned with distilled water and blotted with a dry Kimwipe.

The exterior of this instrument may be cleaned periodically with a soft cloth dampened with distilled water.

CAUTION: Do not use abrasive cleaners.

Cleaning out the Debris Catcher

CAUTION: Where safety glasses to avoid glass dust/debris which may become airborne when you empty the debris catcher.

1. Loosen the debris catcher adjustment screw, while you support the debris catcher (Fig. 39). Then, carefully remove the debris catcher (Fig. 40).

Fig. 39—Loosen the debris catcher adjustment screw while supporting the debris catcher.
Fig. 40—The debris catcher was removed from the system.

2. Carefully wipe out any water or debris using an absorbent wipe.
3. Reposition the debris catcher under the diamond wheel and hold it in place.
4. Reinsert and tighten the adjustment screw to securely hold the debris catcher. It

should be positioned under the diamond catcher to collect water and debris, but it should not impede the rotation of the diamond wheel.

Repositioning the Debris Catcher

There are four screw holes which may be used to position the debris catcher, and the debris catcher can slide up or down relative to each hole, giving you the ability to place the debris catcher exactly where you want it.

1. Loosen the debris catcher adjustment screw and slide the debris catcher up or down as needed to reposition it. Tighten the screw finger tight to secure the debris catcher.
2. If you cannot position it correctly, you may completely remove the debris catcher as you do when you clean it. Choose a different screw hole when you re-install the debris catcher (Fig. 41), and adjust it appropriately.

Fig. 41—The debris catcher was removed, revealing the four screw holes which give you options when reinstalling the debris catcher.

ACCESSORIES

Part Number	Description
13156	Luer Fitting, Female, 1/16", PE
3744	Syringe, 10 cc, without Needle
503122	Tubing, 1.0×1.0 mm, with Stops, Pkg. of 5

TROUBLESHOOTING

Issue	Possible Cause	Solution
The pipette tip breaks easily when I mount the pipette in the glass holder	The pipette tip is placed too close to diamond wheel, particularly during the process of adjusting the angle of tip.	Set the beveling angle first. Then mount pipette in the glass holder and keep the distance between pipette tip and surface of diamond wheel around 1 or 2 mm (Fig. 35).
It takes too long to bevel the pipette tip	The rotation speed is set too low.	Try starting with 1500 RPMs and adjust speed based on the tip size.
	The pipette tip is not placed against diamond wheel with enough force.	Turn the X-axis clockwise to move the pipette tip closer to the diamond wheel to increase the friction.
Pipette tip is often broken during beveling process	The rotation speed is set too fast.	Try starting with 1500 RPMs and adjust speed based on the tip size.
	The pipette tip is not placed against diamond wheel with too much force.	Turn the X-axis counter-clockwise to move the pipette tip further away from the diamond wheel to reduce the stress.
Pipette tip break frequently during beveling process	Orientation of rotation for diamond wheel is set to clockwise.	Change the rotation from clockwise to counterclockwise by pressing direction button (Fig. 2) . *Counterclockwise is preferred for beveling protocols.
Image in LCD is vibrating	Work bench is not stable.	A vibration-free table is recommended.

Issue	Possible Cause	Solution
Which rotation speed is ideal for my pipette tips?	Rotation speed is set based on preference. For example, increase the wheel speed (RPMs) for pipettes with small size tips, or decrease if for larger size tips to avoid breaking them.	We suggest starting with 1500 RPMs (halfway on the speed adjustment dial) to begin with. Then, adjust the speed based on the pipette tip size and your preference.
There is dark debris inside and /or around the pipette tip.	This is residual glass debris from the grinding process.	Use distilled water to rinse the pipett tip during and after the beveling process. See "Removing Debris from the Micropipette Tip" on page 20.
Tip and wheel are not visible simultaneously	The wheel will always be slightly out of focus. The distance is too close for the high magnification camera (lens) versus the pipette tip.	Adjust the focus on the pipette tip only.
Can I bevel the tip to 90° (right angle)?	The glass pipette tip cannot withstand the shear stress without a special fixture.	The recommended beveling angle range is from 15–60°.
There are some particles on the surface of the diamond wheel	There is glass debris from the beveling process, and fine particles are attracted by static electricity from the ambient environment to the wheel.	Use distilled water to rinse the surface of the diamond wheel. Wipe the wet surface with a Kimwipe (optional). Moisture will not affect the outcome, even if beveling is immediately resumed.
Cannot locate the pipette tip on the monitor	The tip is out of the focus range of the camera lens.	Place the pipette tip about 2 mm from the edge of the diamond wheel and adjust the camera position, both the Y-axis and the Z-axis. See Fig. 11.

Issue	Possible Cause	Solution
How do I know when the tip is being beveled?	It is hard to visually notice when beveling begins, since the tip is barely touching the diamond wheel during the process.	When the pipette tip touches the running diamond wheel, you can hear a weak sound OR pull the tip away from the wheel ever now and then to check the beveling progress.
System doesn't appear to be powered on	There is no power.	Verify that the power cord is properly connected and plugged into a mains outlet (Fig. 8). Make sure the power switch is turned on.
	The LUX or grinding disc speed is set too low.	Increase the LUX and/or the grinding speed (RPMs).
LCD will not power on	The cables to the monitor are not plugged in.	Verify that the monitor power cord is properly connected on the back of the unit (Fig. 25).
	The LUX intensity is set too low.	Turn the brightness adjustment (LUX) knob clockwise to increase light intensity (Fig. 8).
Too much debris in capillary while beveling	You are likely not flushed the capillary column throughout the beveling process.	See "Removing Debris from the Micropipette Tip" on page 20. Do not wait till the end of beveling to flush the tip. At that point, there will be too much buildup and clogging is possible.
Can't adjust the angle of the monitor	The screws to the monitor mount are too tight.	Slightly loosen the screws just enough that you can freely adjust the monitor angle.

NOTE: If you have a problem/issue with that falls outside the definitions of this troubleshooting section, contact the WPI Technical Support team at 941.371.1003 or technicalsupport@wpiinc.com.

SPECIFICATIONS

This unit conforms to the following specifications:

Camera Magnification.....230× (total optical and digital)
Camera Working Distance (or focal length) ..... >12 mm
Camera Field of View ..... > 0.8 mm
Manipulation of Camera:
- Y-Axis Travel Distance (front and rear) ..... 7 mm
- Z-axis Travel Distance (up and down)..... 8 mm

Speed of Abrasive Diamond Wheel ..... 0 – 3000 RPM
Abrasive Diamond Wheel Surface Flatness ..... <2 µm/cm
Adaptable Glass Tube Range..... ø1 ~ 3 mm OD
Pre-Pulled Glass Capillary Diameter Range ..... 0.5 to 100 µm*
Reticle Scale Resolution .....8 µm/division
Minimum Measurable Tip Size.....8 µm**
Minimum/Maximum Tip Beveling Range.....0.1 – 100 µm
Beveled Pre-Pulled Glass Capillary Diameter ..... <200 µm
Manipulation of Glass Tube:
- X-Axis Travel Distance (left and right).....10 mm
- Y-Axis Travel Distance (front and rear) .....10 mm
- Coarse Rotation Range.....0 to 180º
- Fine-Tuning Rotation Range ..... 0 to 15º

Sliding Track and Working Platform Inclination Angle..... 30º
Display Size/Resolution ..... 9" TFT panel / 1024 × 768
Display Screen Supply Voltage ..... 12 VDC
Backlight Voltage, Power.....12 VDC, 2 W
Mains Voltage, Frequency, Power.....110-240 VAC, 50/60 HZ, 62 W
Dimensions ..... 30 × 20 × 46cm (L × W × H)
Net Weight..... 10 kg (22 lbs.)

*__NOTE__: Very small pipette tips (sub-micron range) may be beveled, however, measurement of the tip outer diameter below 8 µm is not verifiable using the integrated scale. External high-magnification microscopy may be required for smaller measurements.

**__NOTE__: The smallest measurement distance is 2.54 µm with 10× eyepieces, and the smallest verifiable tip size using the scale division on the monitor is 8 µm.

WARRANTY

WPI (World Precision Instruments) 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 ten (10) days after receipt of shipment. Claims for lost shipments must be made within thirty (30) days of receipt of invoice or other notification of shipment. Please save damaged or pilfered cartons until claim is settled. 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

Do not return any goods to us without obtaining prior approval and instructions from our Returns Department. Goods returned (unauthorized) by collect freight may be refused. Goods accepted for restocking will be exchanged or credited to your WPI account. Goods returned which were ordered by customers in error are subject to a 25% restocking charge. Equipment which was built as a special order cannot be returned.

Repairs

Contact our Customer Service Department for assistance in the repair of apparatus. Do not return goods until instructions have been received. Returned items must be securely packed to prevent further damage in transit. The Customer is responsible for paying shipping expenses, including adequate insurance on all items returned for repairs. Identification of the item(s) by model number, name, as well as complete description of the difficulties experienced should be written on the repair purchase order and on a tag attached to the item.

** Electrodes, batteries and other consumable parts are warranted for 30 days only from the date on which the customer receives these items.*

WORLD
PRECISION
INSTRUMENTS