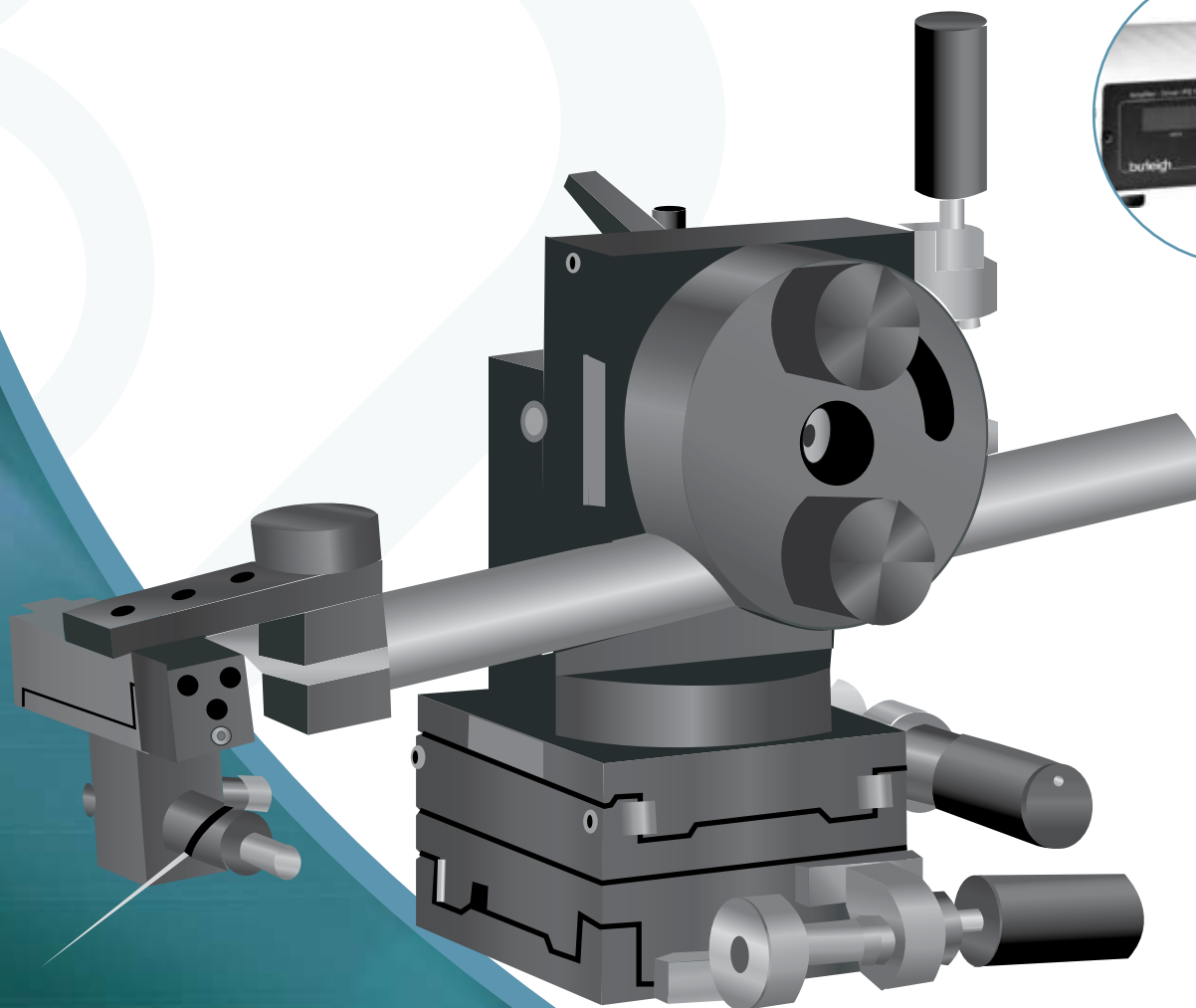
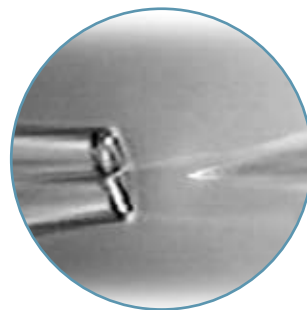
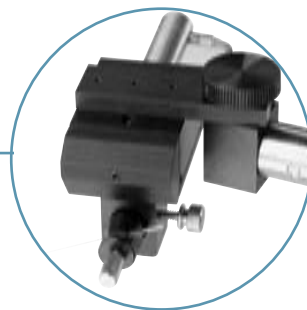


LSS-3000

ULTRA-FAST POSITIONING SYSTEMS

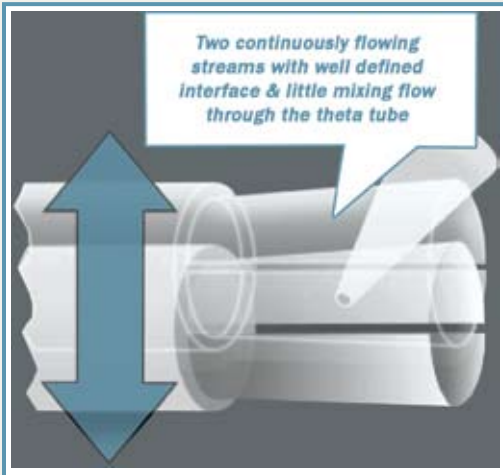
A POSITIONING SYSTEM WITH A PIEZOELECTRIC ACTUATOR TO SWITCH SOLUTIONS WITH THE HIGHEST SPEED AND PRECISION

- Ideal for single channel excised patch recordings
- One-way (off-on) solution switching in less than 100 microseconds
- Two-way (off-on-off) solution pulses in less than one millisecond
- Simple electronic integration with patch clamp instrumentation
- Universal angle theta tube mounting system
- 105 or 300 micrometer PZT travel for easy fine alignment of theta tube
- Integrated manual stages and adjustments for easy coarse alignment
- Excellent for whole cell localized perfusion
- 2 Year Warranty

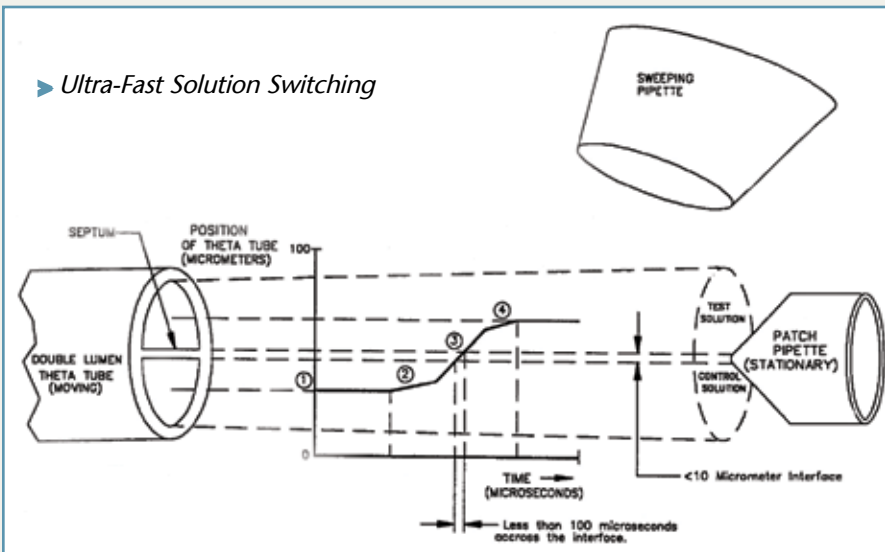


Burleigh LSS-3000

MOVING THETA TUBING IN ULTRA-FAST SOLUTION SWITCHING SYSTEMS



Many electrophysiology researchers need to control the chemical environment of their whole cell or excised patch while patch clamp recording. When fast ion channel kinetics are being studied, the perfusion stream chemistry must be controlled with submillisecond resolution. High speed is needed to simulate the naturally occurring conditions at the synapse and to allow the direct measurement of ion channel rise and decay times as well as the effects of saturation and desensitization.



ACHIEVING ULTRA-FAST SOLUTION SWITCHING

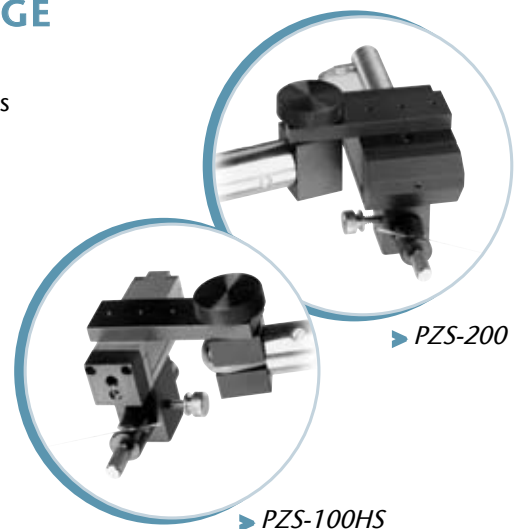
1. Move patch to the middle of control solution stream a few seconds before start of recording.
2. Start moving the theta tube by applying a high voltage ramp to the PZS Microstage. The first part of the ramp should have a lower velocity to avoid ringing and resonance.
3. Increase the velocity of the ramp to the PZS Microstage to achieve maximum theta tube velocity. At maximum velocity the transition between the solution flows occurs with minimum time.

PZT ACTUATOR/PZS-100HS & PZS-200 MICROSTAGE

The PZS-100HS and PZS-200 MicroStages are PZT actuated flexure stage assemblies that generate straight, vibration-free motion in a small and robust package.

The PZS-100 HS MicroStage (included with the LSS-3100) provides 105 micrometers of travel in one millisecond and solution switching in $<1\mu\text{m}$ for working with isolated patches or smaller whole cells. The PZS-200 (included with the LSS-3200) provides 300 micrometers of travel for applications where more travel is desired.

The PZS-100HS and the PZS-200 MicroStages are attached to the LS-10 mounting system to provide a convenient method of positioning pipettes and theta tubes.





LS-10 MOUNTING SYSTEM & CP-300 MANUAL STAGE ASSEMBLY

The LS-10 mounting system and CP-300 manual stage assembly combine to provide a very stable yet flexible universal mounting system for integration with virtually any microscope. The LS-10 has a universal holder to accept up to 3 millimeter diameter pipettes and theta tubes that can be mounted perpendicular or parallel to the direction of PZT motion. Either the PZS-100HS or the PZS-200 MicroStages can be installed parallel or perpendicular to the 0.75 inch diameter mounting rod that is attached to the CP-300 manual stage assembly with a rotation mount. The CP-300 has one inch travel in three dimensions with additional rotation mechanism to achieve easy access to the glassware during an experiment.

PZ-150M AMPLIFIER / DRIVER

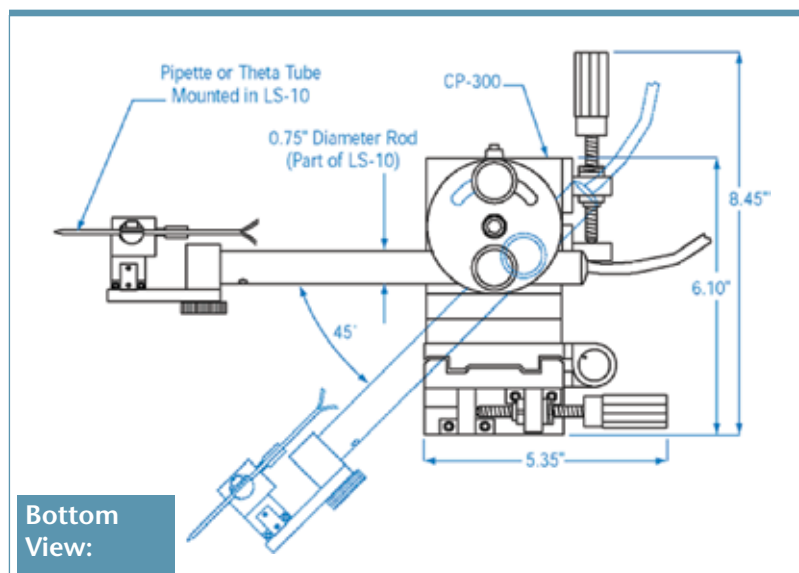
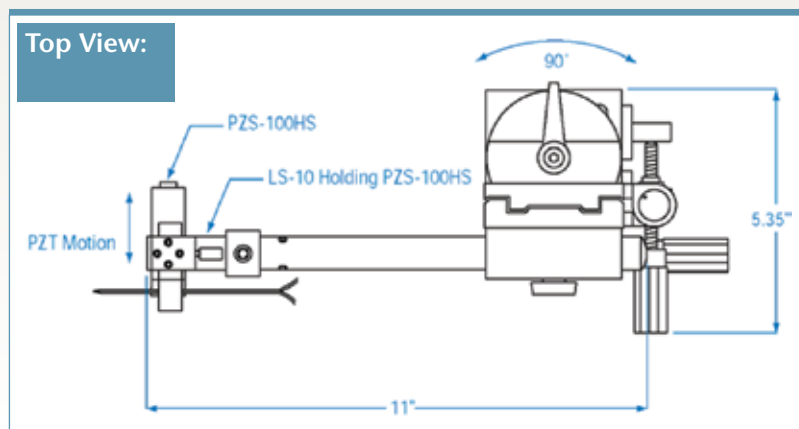
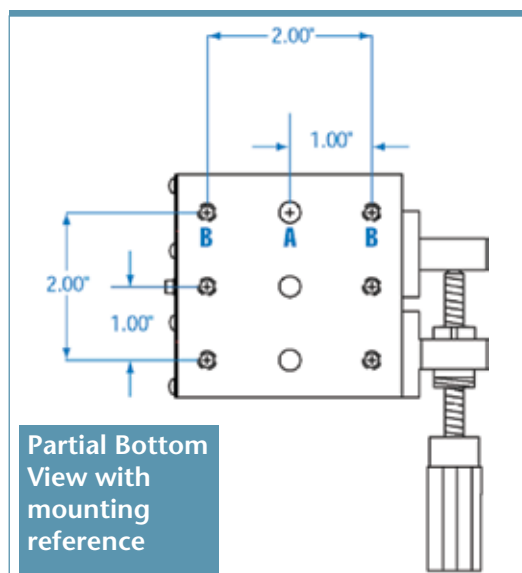
The PZ-150M amplifier / driver is an analog high-voltage power supply with sufficient power and frequency response to drive the PZS MicroStages at maximum speed. The PZ-150M is a straight amplifier, thus, the step size, shape and speed are determined by the shape of the input drive signal. Gain and DC offset of the output signal are adjusted via knobs on the front panel.



► PZ-150M Amplifier/Driver

DIMENSIONS & MOUNTING

LSS-3000 - The LSS-3000 can be mounted to a variety of platform surfaces. When mounting to a platform with tapped holes for 1/4-20 screws, attach the instrument to the mount by inserting the screws through the top of the three clearance holes (A), indicated in the drawing below. When mounting to a platform with through holes for 1/4-20 screws, attach the instrument to the mount by inserting the screws through the bottom of the mount using the six tapped holes (B), indicated in the drawing below.



SPECIFICATIONS

PARAMETER	PZS-100HS	PZS-200
Motion for 0-150 V	105	300
Minimum time to move full range of motion	Less than one millisecond	Less than one millisecond
Voltage (volts)	0 to 150	0 to 150
Non-Linearity (%)	6	6
Hysteresis (%)	20	20
Maximum load (Kg)	2.5	2.5
Capacitance (µf)	0.8	3.1
Resonant frequency with no load (Hz)	420	400
Resonant frequency with 50g load (Hz)	300	210
Housing and fixture material	Steel, nickel plated	Aluminum, black anodized

PARAMETER	PZ-150M
Output voltage	0 to 150 volts
Display	3 1/2" digital display of output voltage (0.1 volt resolution)
Interfaces	BNC analog input (± 10 volts) manual gain and DC bias knobs

WARRANTY
2 years

HOW TO ORDER:

Use this chart to order the system you need by its exact model number. Example: An LSS-3200-1 is a complete ultra-fast solution switching system for the United States, including a PZ-150M amplifier/driver, a CP-300 manual stage assembly, LS-10 mounting system for pipettes and theta tubes and a PZS-200 PZT MicroStage with 300 micrometers of PZT travel.

LSS-3 (100, 200)

LSS-3

00 -

• Power Cable Type

- ↓ PZT Travel (µm)
- 1: 105 µm
 - 2: 300 µm

- 1. USA, Japan
- 2. European Standard
- 3. UK, Hong Kong
- 4. Switzerland
- 5. Israel
- 6. India
- 7. Denmark
- 8. Australia



EXFO Photonic Solutions Inc. is certified under the ISO 9000 Quality Management System. Our global customers can trust that EXFO strives to be the best possible supplier in all aspects of our business.

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