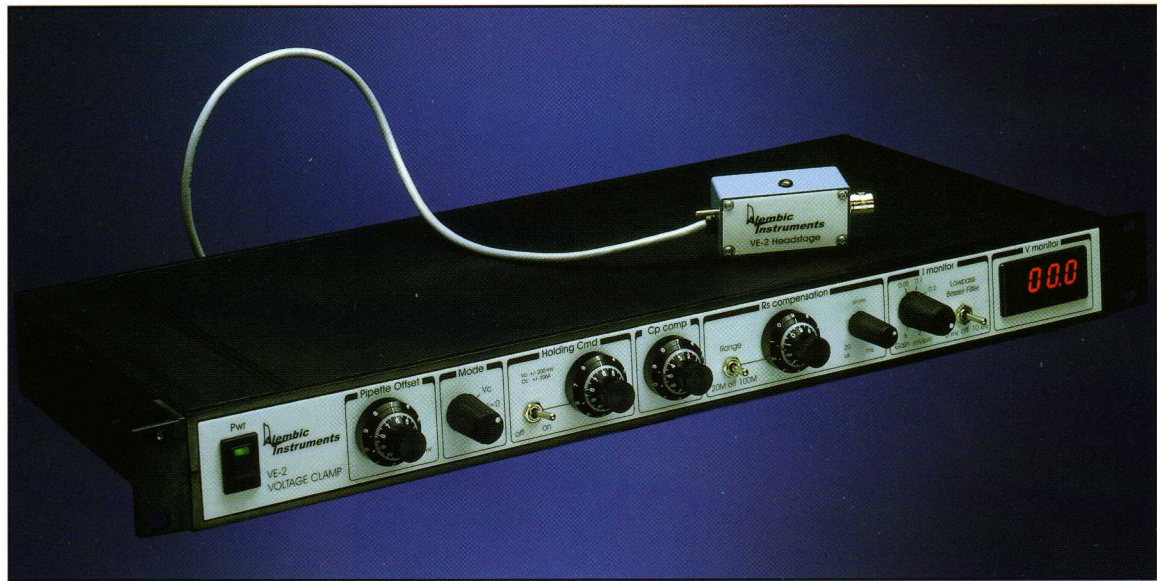


VE-2

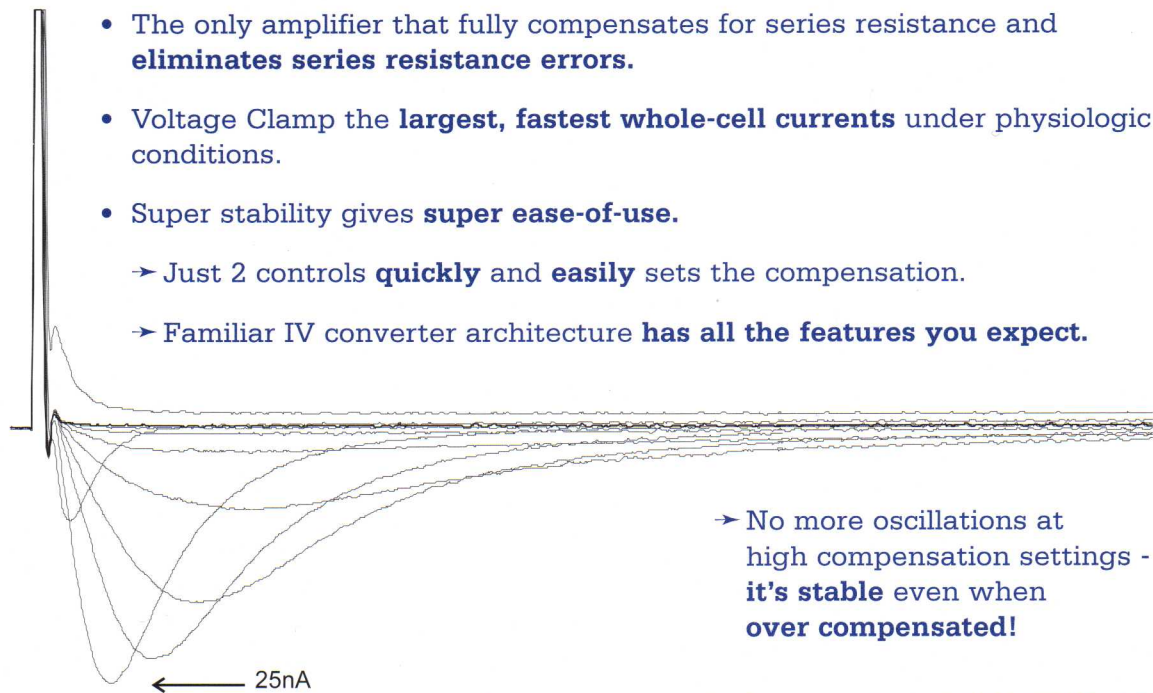
Patch Clamp
Amplifier

Whole-cell Patch Clamp Amplifier...



...eliminates series resistance errors!

For the fastest, largest ionic currents,
you need the VE-2



**Alembic
Instruments**

Sodium currents recorded from Guinea pig Ventricular myocytes using the VE-2.
Dr. Normand Leblanc, Montreal Heart Institute.

VE-2

Patch Clamp Amplifier

The series resistance challenge

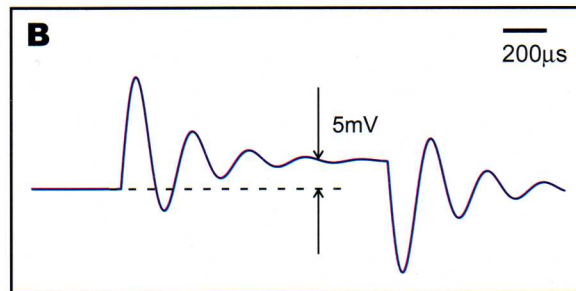
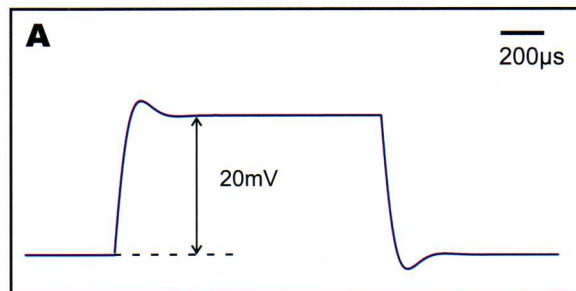
Other amplifiers can only compensate ~ 90% of series resistance (R_s).

In demanding applications, R_s voltage errors of only a few millivolts cause uncontrolled current activation and loss of the voltage clamp.

(Eg. I_{Na} in neurons or cardiac myocytes)

Other amplifiers can partially compensate for R_s (A), but become unstable when pushed too far (B).

With other amplifiers, even 95% R_s compensation is insufficient to voltage clamp and measure large ionic currents.



Cell voltage during a membrane ionic current pulse using 90% (A) and 97% (B) R_s compensation found on other amplifiers. The voltage error is reduced to 5mV (B) but undamped oscillations indicate instability. $R_s=10M\Omega$, $C_m=50pF$, $I_{pulse}=20nA$, Bandwidth=50kHz.

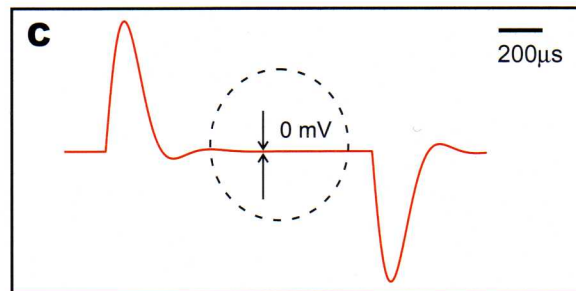
The VE-2 solution...

Only the VE-2 compensates it all

Only the VE-2 can compensate fully for R_s (C). (Sherman et. al., *Biophys. J.*, 77:2590-2601, 1999.)

There is **no voltage error after ~ 200µs** in every cell you voltage clamp, **regardless of the current amplitude!** And the VE-2 is **stable** even when over compensated.

- Record currents that were out of reach until now.
- Record from the largest cells.
- Finally, beat series resistance.



Cell voltage during a membrane ionic current pulse using VE-2 R_s compensation, showing no voltage error after ~ 200µs. (Parameters same as above.)

...gives the VE-2 advantage!

Alembic
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Think inside the box

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