Micromechatronics Inc.
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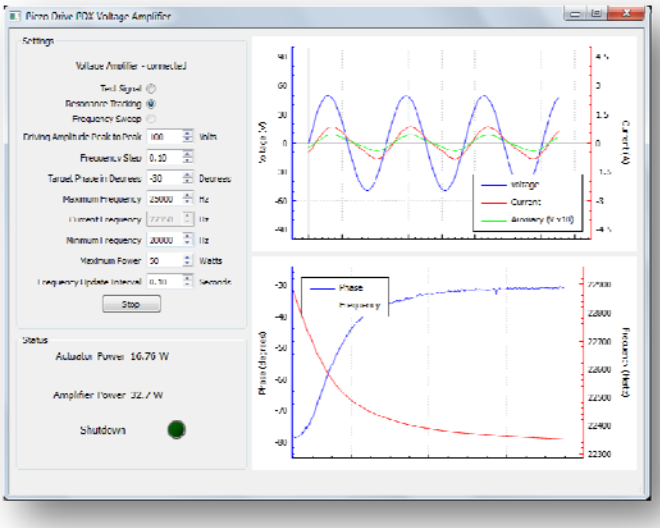
PDUS200
200W Precision Ultrasonic Driver



Software interface during resonance tracking.

The PDUS200 is a complete solution for driving precision and high-power ultrasonic actuators. An internal digital signal processor simplifies operation by actively identifying and tracking actuator resonances. Rather than maximizing the actuator current, a phase-locked loop provides precision control over the operating phase angle which allows fast and precise control with the option to operate slightly off resonance where the actuator dynamics are less sensitive to load forces. This mode is particularly useful in precision machining applications where constant resonance amplitude is desirable.

The PDUS200 generates a pure sine-wave output which avoids the excitation of secondary resonance modes by the drive harmonics.

The internal signal generator and resonance tracking is configured and monitored via a USB interface and desktop application. Functions include signal monitoring, power monitoring, resonance tracking, and frequency response analysis of the transducer impedance. A USB API provides third-party applications with comprehensive control over the amplifier and full access to all digital signals and logic.

The amplifier can also record an auxiliary signal from an accelerometer or vibrometer. This allows the impedance and mechanical frequency response of the transducer to be characterized with the built-in swept-sine analysis functions.

Electrical Specifications	
Frequency	1 to 100 kHz (Sinewave)
Output Voltage	±100 V
Output Current	±4 A
Transducer Power	200 W
Bandwidth	100 kHz
Slew Rate	35 V/us
Gain	15 V/V
Overload	Thermal and over current protection
Analog Outputs	Voltage and current monitors
Analog Inputs	Input Signal (±7.5 V) Auxiliary monitor input (±10 V)
Output Connectors	LEMO 0B Socket 4mm Banana Sockets
Environment	-40 to 60°C (-40 to 140°F) Non-condensing humidity
Power Supply	90 Vac to 250 Vac
Dimensions	212 x 304.8 x 88 mm
Weight	2 kg

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Digital Specifications	
USB	USB 2.0
Frequency Resolution	1 mHz
Phase Resolution	0.1 Degrees
Sampling Rate	1 MHz
Signals	Voltage, current, auxiliary
Amplifier Shutdown	USB or Digital (Via BNC)

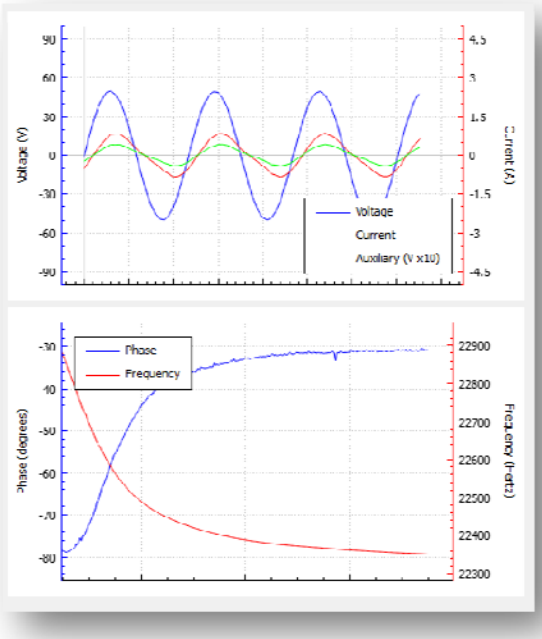
Software Functionality

Some example screen captures of the bundled software are shown on the right. In the standard operation mode, all of the signals are displayed on a dashboard along with a time history of the transducer resonance frequency and phase.

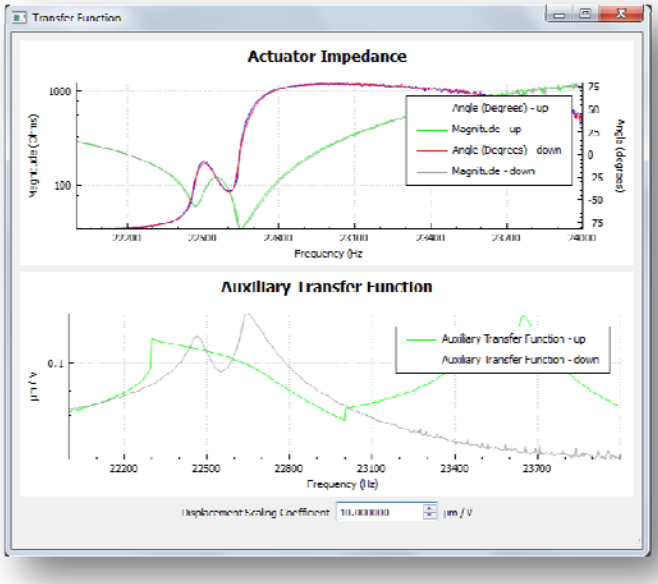
Parameters such as the operating voltage, target phase, and frequency limits, can be set though the user interface and if desired, uploaded to the amplifier for stand-alone operation.

The built-in swept-sine frequency response analyzer allows the transducers electrical and mechanical response to be characterized. This feature is particularly useful for transducer development, troubleshooting, and health monitoring in industrial machinery.

The software API allows a third party applications to detect and control the amplifier without any software installation or USB drivers. Simple function calls initialize the amplifier and check the status. The electrical and mechanical signals can also be read from the amplifier and plotted in a third-party application. Source code for the desktop application is provided to allow customization and to demonstrate the use of API function calls.



Voltage and current signals during resonance tracking with a time history of frequency and phase



Characterization of the electrical and mechanical frequency responses