

# powerstat<sup>series</sup>

## High-power electrochemical systems

Ideal for educational and research laboratories

- ▶ **PowerWare** controls the **Powerstat** through a LabVIEW™ based Graphic User Interface



# powerstat

## potentiostat/galvanostat

The **Powerstat** and **Powertest** series of instruments are high performance potentiostat/galvanostat instruments capable of delivering up to 18 amps with options for full process control of the electrochemical system. These instruments are ideal for high current electrosynthesis, fuel cells, complex battery charge discharge cycling and more. The wide voltage and current ranges coupled with a powerful menu-driven interface enhances end-user methods development. Open-source LabVIEW™ instrument drivers enable integration of the **Powerstat** and **Powertest** instruments with end-user software applications.

In addition to step and triangular potential wave functions, square and sine wave forms are available. A front panel external input allows use of external function generators. Complex waveform sequences can be built through the recipe editor.

### PowerWare

**PowerWare** controls the **Powerstat** through a LabVIEW™ Graphic User Interface

### The **Powerstat** package includes:

1. User friendly **PowerWare** software
  2. Online **Powerstat** manual
  3. USB connection (up to 5 per computer)
  4. Free software upgrades
  5. Open-source LabVIEW™ drivers
- All **Powerstat** include a 3-electrode cable and **PowerWare** software with free upgrades for 3 years.
  - Additional software control modules available upon request.



### Advantages

- Cost effective
- Versatile potentiostat/galvanostat programming
- Customized software upgrades
- Additional I/O ports for control of peripheral devices

### Applications

- Corrosion studies
- Cyclic voltammetry
- Chronoamperometry
- Chronopotentiometry
- Pulse voltammetry
- Fuel cells, batteries and photoelectrochemistry



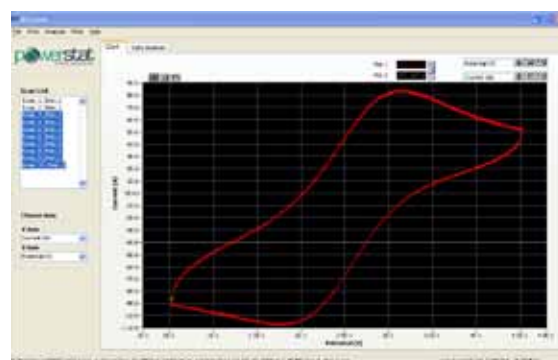
## specifications

| Instrument Name                 | Powerstat-05  | Powerstat-20   |
|---------------------------------|---|--|
| <b>Cell Control</b>             |   |  |
| Potentiostat/Galvanostat        | yes   | yes  |
| Compliance Voltage              | USA $\pm 25$ V, IEC $\pm 15$ V  | $\pm 10$ V   |
| Max Output Current              | $\pm 5$ A   | $\pm 18$ A   |
| Rise Time                       | 45 $\mu$ s for 1 Ohm load (0%-100% signal)  | 60 $\mu$ s for 0.2 Ohm load (0%-100% signal)   |
| Slew Rate                       | 0.8 V/ $\mu$ s  | 0.8 V/ $\mu$ s   |
| Bandwidth                       | 6 kHz (-3 dB, 1 Ohm load)   | 6 kHz (-3 dB, 1 Ohm load)  |
| Applied DC Potential Ranges     | 1 ( $\pm 10$ V)   | 1 ( $\pm 10$ V)  |
| Applied Potential Resolution    | 0.3 mV  | 0.3 mV   |
| Applied Potential Accuracy      | < 0.04% FSR   | < 0.04% FSR  |
| Current Autoranging             | In Galvanostat Mode   | In Galvanostat Mode  |
| Applied DC Current Ranges       | 4 ( $\pm 100$ mA, $\pm 1$ A, $\pm 3$ A, $\pm 5$ A)  | 4 ( $\pm 100$ mA, $\pm 0.8$ A, $\pm 3$ A, $\pm 18$ A)  |
| Best Applied Current Resolution | 3 $\mu$ A, 0.003% of FSR  | 15 $\mu$ A on the +/-100 mA range  |
| Applied Current Accuracy        | 0.03% of FSR  | $\pm 100$ mA: 0.10% of FSR,<br>$\pm 0.8$ A: 0.053% of FSR,<br>$\pm 3$ A: 0.037% of FSR,<br>$\pm 18$ A: 0.033% of FSR   |
| Input Bias Current              | 500 pA  | 500 pA   |
| Input Impedance                 | 250 G $\Omega$ parallel to 3 pf   | 250 G $\Omega$ parallel to 3 pf  |
| Maximum Update Rate             | 4 $\mu$ s   | 4 $\mu$ s  |
| Maximum Scan Rate               | 100 V/s   | 100 V/s  |
| IR Compensation                 | Manual, Potentiostat and Galvanostat Modes, All Ranges  | Manual, Potentiostat and Galvanostat Modes, All Ranges   |
| External Control                | 1 AO, 1 AI, 2 DO  | 1 AO, 1 AI, 2 DO   |
| <b>Potential Measurement</b>    |   |  |
| Measured DC Potential Ranges    | 2 ( $\pm 50$ mV, $\pm 10$ V) Autoranging  | 2 ( $\pm 50$ mV, $\pm 10$ V) Autoranging   |
| Resolution                      | 3 $\mu$ V, 300 $\mu$ V (0.006%, 0.003% of FSR)  | 3 $\mu$ V, 300 $\mu$ V (0.006%, 0.003% of FSR)   |
| Accuracy                        | 0.08 or 0.03% of FSR  | 0.08 or 0.03% of FSR   |
| <b>Current Measurement</b>      |   |  |
| Measured Current Ranges         | <b>Galvanostat:</b> 4 ( $\pm 100$ mA, $\pm 1$ A, $\pm 3$ A, $\pm 5$ A)<br><b>Potentiostat:</b> 4 ( $\pm 100$ mA, $\pm 1$ A, $\pm 3$ A, $\pm 5$ A) | <b>Galvanostat:</b> 4 ( $\pm 100$ mA, $\pm 0.8$ A, $\pm 3$ A, $\pm 18$ A)<br><b>Potentiostat:</b> 4 ( $\pm 100$ mA, $\pm 0.8$ A, $\pm 3$ A, $\pm 18$ A)  |
| Potentiostat Min to Max         | 1 mA to 5 A   | 1 mA to 18 A   |
| Best Resolution                 | <b>Galvanostat:</b> 3 $\mu$ A (0.003% of FSR)<br><b>Potentiostat:</b> 3 $\mu$ A (0.003% of FSR)   | <b>Galvanostat and Potentiostat are the same. (By Range)</b><br>$\pm 100$ mA: 15 $\mu$ A (0.015% of FSR),<br>$\pm 0.8$ A: 53 $\mu$ A (0.0067% of FSR),<br>$\pm 3$ A: 0.12 mA (0.0039% of FSR),<br>$\pm 18$ A: 0.56 mA (0.0031% of FSR) |
| Accuracy                        | <b>Galvanostat:</b> 0.03% of FSR<br><b>Potentiostat:</b> 0.03% of FSR   | <b>Galvanostat and Potentiostat are the same. (By Range)</b><br>$\pm 100$ mA: 0.10% of FSR,<br>$\pm 0.8$ A: 0.053% of FSR,<br>$\pm 3$ A: 0.037% of FSR,<br>$\pm 18$ A: 0.033% of FSR   |
| <b>Data Acquisition</b>         |   |  |
| Acquisition Time                | 4 $\mu$ s   | 4 $\mu$ s  |
| Acquisition Speed               | 250,000 samples/second  | 250,000 samples/second   |
| DAC Resolution                  | 16 bits   | 16 bits  |
| *FSR - Full scale range         |   |  |

## software

user friendly  
customized software upgrades

The **Powerstat** is controlled by **PowerWare**, a LabVIEW™-based software package that allows for manual or automatic control through a user friendly graphical user interface. In addition to user-defined sequencing for methods development, electro-analytical techniques such as cyclic voltammetry, chronoamperometry, chronopotentiometry and pulse voltammetry are simplified by **PowerWare** macros. Open-source LabVIEW™ drivers are included for integrating **Powerstat** control within pre-existing user applications. Software customization for unique applications is available upon request.



- Linear and cyclic voltammetry
- Staircase and linear potential sweeps
- Chronoamperometry
- Chronopotentiometry
- Battery charge discharge cycling
- Custom methods development
- Corrosion

Powered by



Free **PowerWare** Software and Updates.  
All systems are powered by National Instruments and controlled by LabVIEW™.  
VI libraries available. **new!**

# powerstat

## about us

NuVant Systems develops and licenses advanced electrochemical reactors and electrode component evaluation instrumentation. We specialize in fully automated high throughput electrochemical screening equipment and test stand assemblies for single cell analysis. Our components are designed to help drive commercialization of electrochemical reactors for energy production and electrosynthesis. We develop cost effective, innovative technologies that will assist manufacturers in bringing their products to market.

NuVant Systems licenses its technology to researchers, developers and manufacturers. NuVant offers contract research in the areas of catalyst discovery and fuel cell system prototyping. Our technology is applicable primarily to stationary power and portable power fuel cell applications, but can be modified for other electrochemical technologies.

## contact information



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### Other NuVant products & services:

- Potentiostat/galvanostats
- Multichannel potentiostats
- Bipotentiostats
- Customized potentiostats
- Single cell fuel cells
- Electrode fabrication equipment
- Combinatorial electrochemistry
- Electrode fabrication short courses
- Concept to market rapid prototyping

