Battery Cycling and DC Testing System

High-performance testing solution
For more than four decades, Unico has been providing innovative DC power solutions for industry. We pioneered the first high-power electronic DC servo drives back in 1967. From the earliest stages of automotive HEV development, Unico has supplied DC power solutions for battery simulation. With the 2460, we have engineered a system specifically for battery cycling and DC testing.

The Unico 2460 battery cycling and DC testing system combines the 2460 family of single- and dual-output DC power supplies with software specifically tailored for testing HEV battery packs, ultra- and supercapacitor packs, fuel cells, power electronic converters, and other devices.

**Control Modes**
The 2460 can precisely regulate key electrical parameters such as current, power, voltage, and simulated load resistance.

**Seamless Mode Switching**
On-the-fly toggling between control modes facilitates handling changing parameter constraints.

**High-Frequency Update Rates**
Typical update rates from 1 kHz (1.0 ms) to 10 kHz (0.1 ms) allow digital control loops to accurately track constant, ramping, or otherwise varying commanded target levels.
User Programmable
Users are provided several options for programming test cycles and load profiles that suit their unique application requirements.

UEdit® Tools
The optional UEdit® tool suite provides embedded programming, data logging, and chart recording capabilities. Ladder and function-block editors define such test features as:
- Control mode selection (current, power, voltage, or resistance)
- Parameter levels
- Protection limits
- Ramp rates
- Delay and dwell times
- Cycle repeat counts

PC Controller
A fully featured PC controller option is available with the user programming capabilities of widely recognized software packages such as Simulink and LabView.

Preprogrammed
Rather than program their own test profiles, users can instead select from and execute existing test programs previously developed by Unico. Data logging and test report generation can also be provided. Available test programs, which are part of the LabView test suite, include:
- Constant current discharge cycling
- Constant and peak power testing
- Variable-power testing
- Federal Urban Driving Schedule (FUDS) and similar test regimes
- Dynamic stress test (DST)
- Partial discharge testing
- Hill climb testing
- Thermal performance testing
- Fast charge testing
- Life cycle testing

Protection
The 2460 system incorporates features that protect test articles from over-stressing, including:
- Reverse voltage clamp
- Programmable current, voltage, and power overstress protection
- Voltage equalization circuit to limit inrush currents on power-up
- Output filters protect from potentially harmful ripple voltage and current
- Optional user-defined alarm thresholds including temperature and cell voltage monitoring

For testing of
- HEV battery packs
- Ultra- and supercapacitor packs
- Fuel cells
- Power electronic converters

Additional Options
- Battery simulation
- Series/parallel operation
- Line regeneration
- Common bus energy sharing
- Arc flash compliant data port
- Isolated outputs
Specifications

Input
Voltage: 200 to 690 V AC, three-phase
Frequency: 50 / 60 Hz
Power factor: > 99%
Total harmonic distortion (THD): < 5%
Isolation transformer: Yes

Output
Maximum voltage: 350, 700, 900, or 1000 V DC
Minimum voltage: 1% of maximum, typical
Current and power: Refer to table below
Voltage ripple: < 0.1 V DC, typical
Current ripple: < 0.1 A DC, typical
Voltage step response: < 10 ms
Current step response: < 1 ms

Protection
Extensive electronic protective and diagnostic features are included

Packaging
Standard enclosure: NEMA 1 (IP20) or NEMA 12 (IP55)
Standard cooling: Air
Optional cooling: Water/glycol

Standards
Available approvals: UL, cUL, CE, IEEE-519

<table>
<thead>
<tr>
<th>Output V DC maximum</th>
<th>Rating at Each Output A DC continuous kW continuous</th>
<th>Combined Output Rating A DC continuous kW continuous</th>
</tr>
</thead>
<tbody>
<tr>
<td>350</td>
<td>250 75</td>
<td>500 150</td>
</tr>
<tr>
<td>350</td>
<td>385 116</td>
<td>770 231</td>
</tr>
<tr>
<td>350</td>
<td>405 122</td>
<td>810 243</td>
</tr>
<tr>
<td>350</td>
<td>565 170</td>
<td>1,130 339</td>
</tr>
<tr>
<td>350</td>
<td>630 189</td>
<td>1,260 378</td>
</tr>
<tr>
<td>700</td>
<td>210 126</td>
<td>420 252</td>
</tr>
<tr>
<td>700</td>
<td>315 189</td>
<td>630 378</td>
</tr>
<tr>
<td>700</td>
<td>490 294</td>
<td>980 588</td>
</tr>
<tr>
<td>900</td>
<td>279 212</td>
<td>558 424</td>
</tr>
<tr>
<td>900</td>
<td>355 270</td>
<td>710 540</td>
</tr>
<tr>
<td>900</td>
<td>434 330</td>
<td>868 660</td>
</tr>
<tr>
<td>1,000</td>
<td>234 198</td>
<td>468 395</td>
</tr>
<tr>
<td>1,000</td>
<td>340 287</td>
<td>680 575</td>
</tr>
<tr>
<td>1,000</td>
<td>364 308</td>
<td>728 615</td>
</tr>
</tbody>
</table>

Continuous Ratings
Continuous ratings assume 120% overload capability for one minute.

Rating Extensions
The table above illustrates a subset of available ratings. Unico’s system construction allows considerable flexibility to achieve either higher or lower ratings than shown. Contact Unico for more options.
1 Some models can be connected in series to achieve approximately double the standard voltage rating.
2 Other current and power ratings are available.
3 Multiple units can be connected in parallel to achieve a proportional increase in continuous currents and powers.

UNICO–Worldwide

Corporate Headquarters
Unico, LLC.
3725 Nicholson Rd.
P.O. Box 0505
Franksville, WI
53126-0505
262.886.5678
262.504.7396 / fax
www.unicous.com

Unico is a leading global innovator of motion-control solutions for industry. Founded in 1967, the company develops, manufactures, and services variable-speed drives, application-engineered drive products, integrated drive systems, and ancillary products that improve operations by increasing productivity, safety, and equipment life while lowering energy and maintenance costs.