

Engineering Excellence in Test Stand Applications



# UNICO BATTERY TESTERS

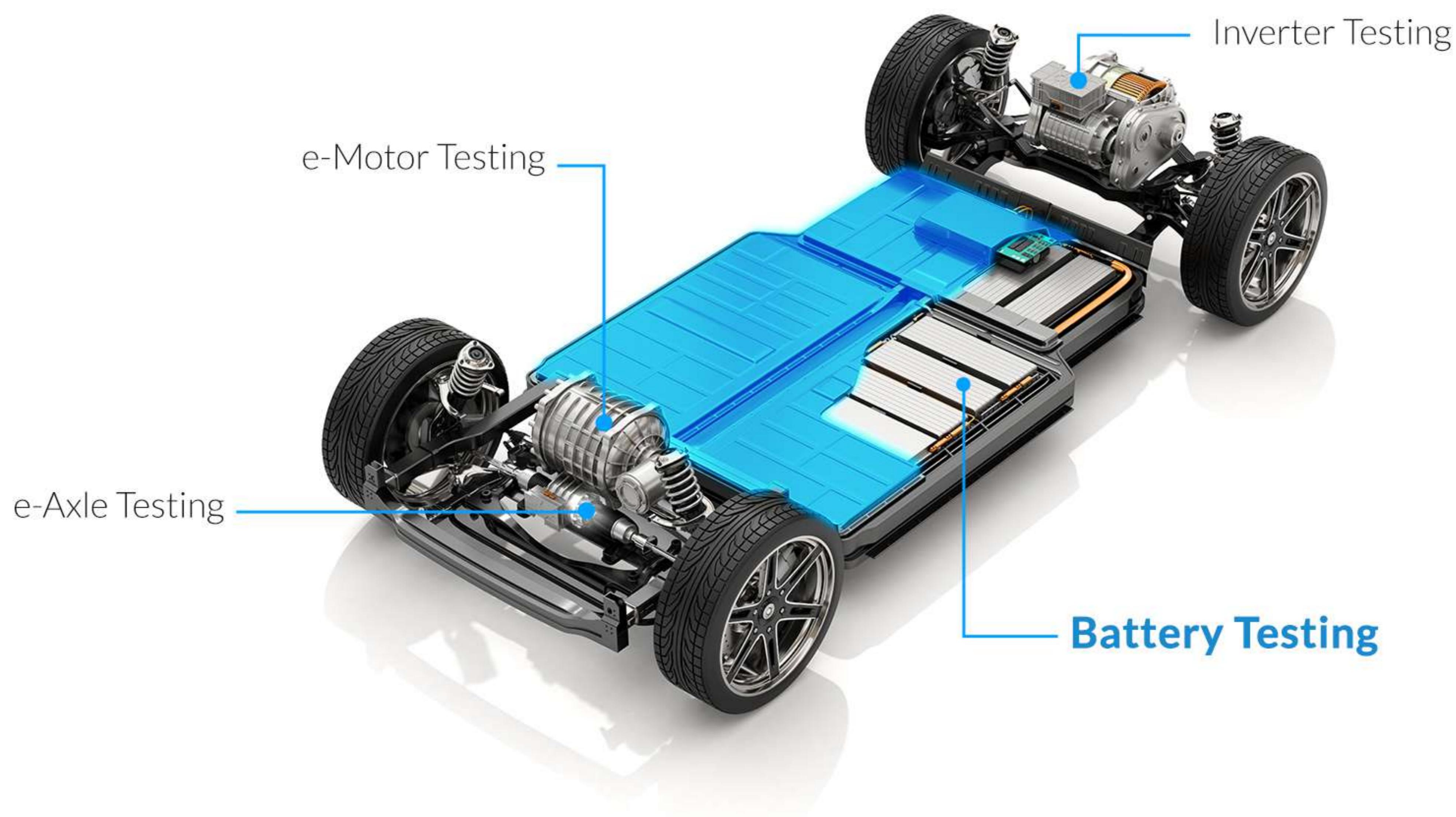
## BAT500 SERIES

Standard Performance IGBT Based Solutions



UNICO's IGBT based battery testers provide performance and service optimized solutions for many battery testing applications. UNICO offers a wide array of solutions based on IGBT technology delivering cost effective standard industry performance for less demanding applications. An add-on remote filter enables the system to be used also as a battery emulator (see TST600 for battery emulation details).

# APPLICATIONS



- Research and Development
- End of Line (EOL) Testing
- Characterization Testing
- Life Cycle & Endurance
- Safety Testing
- Environmental Testing



Performance



Reliability



Accuracy



Flexibility



Efficiency

## BENEFITS



### PERFORMANCE AND ACCURACY

- UNICO's technology offers the highest level of accuracy, minimizing uncertainty errors of your results.
- High power and performance in a flexible and scalable package.



### FLEXIBLE HIGH POWER

- High efficiency reduces operational costs.
- Separate isolation transformer offers flexible installation options.
- Ability for multi-megawatt systems with a single grid connection.



### STANDARD DESIGN

- Proven durability and reliability.
- Faster commissioning.
- Configurable systems and custom systems also available.
- Single flexible control interface.

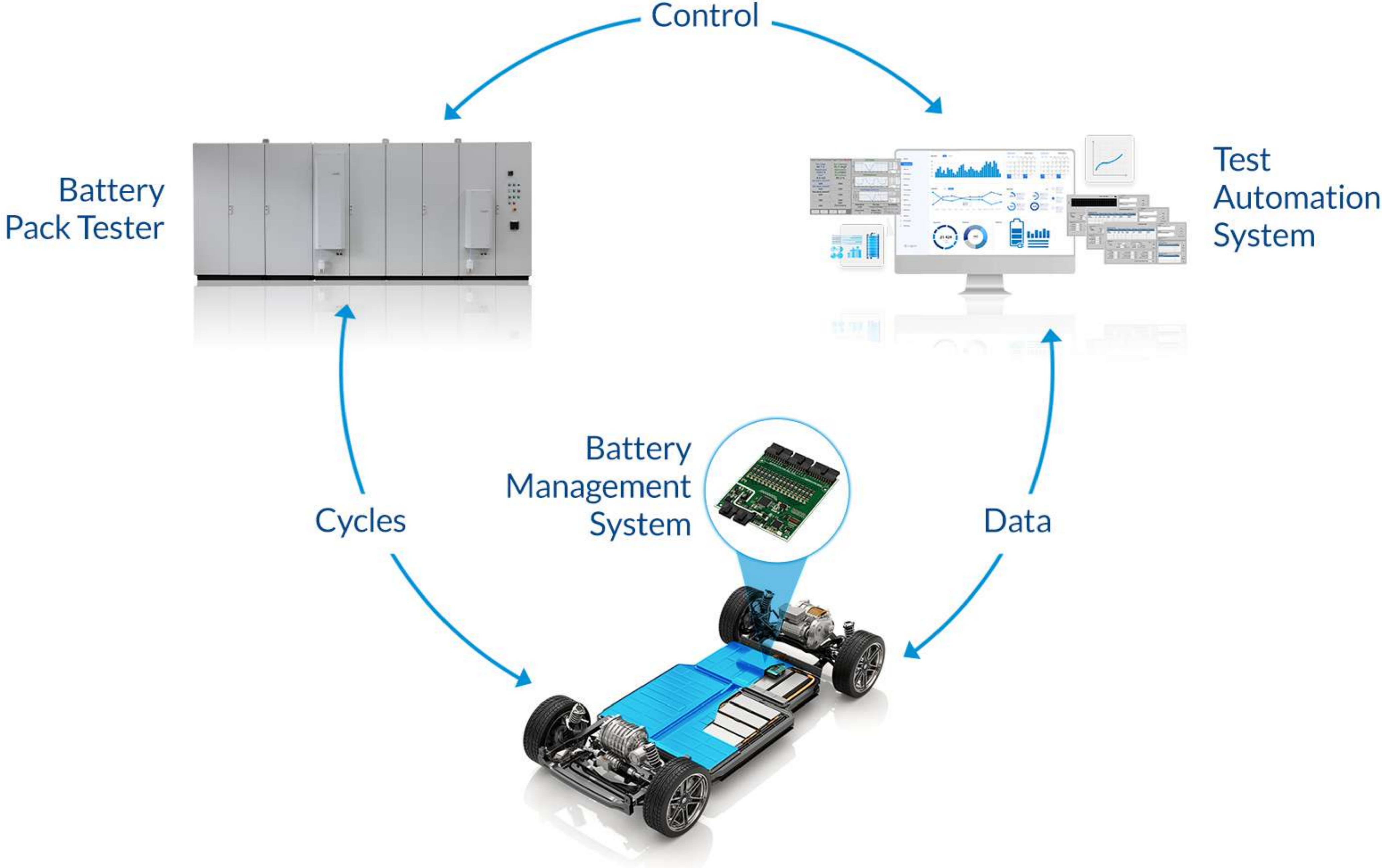


### REDUCED DELIVERY TIMES

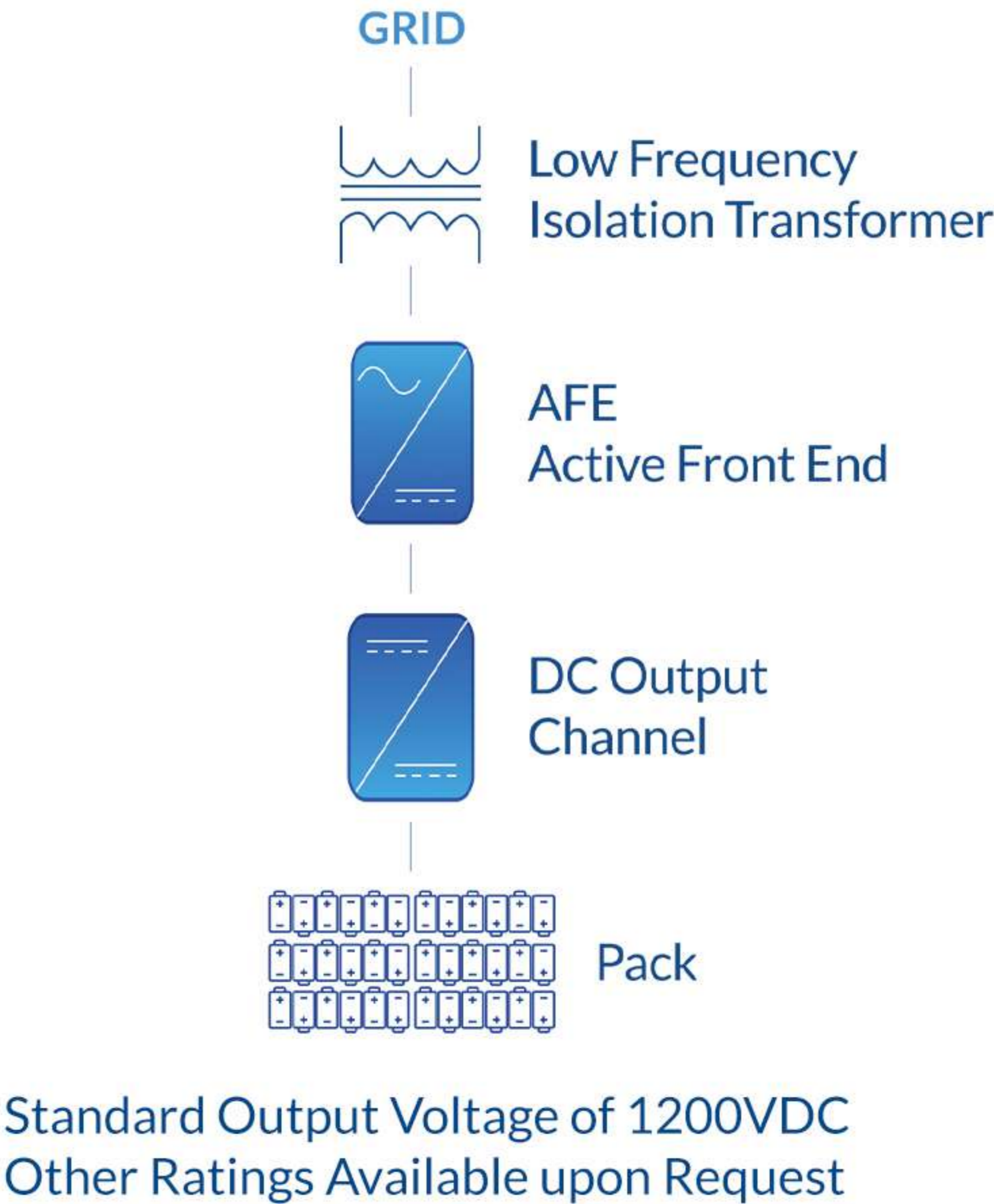
- Both in-stock and ready-to-build standard systems available.
- Configured standard systems have reduced delivery times over custom systems.

# BATTERY PACK TESTER - BAT500 SERIES

The BAT500 Series from UNICO offers a broad range of IGBT based DC Power solutions developed for the exacting needs of today's battery testing applications for battery packs. Our designs bring performance and efficiency in a wide range of packages from 100kW to 4000kW or more. The BAT500 Series is flexible with a variety of industry standard interfaces available to provide simple and robust connections to your Test Automation System (TAS), allowing for optimal utilization and flexibility of your testing schedules.

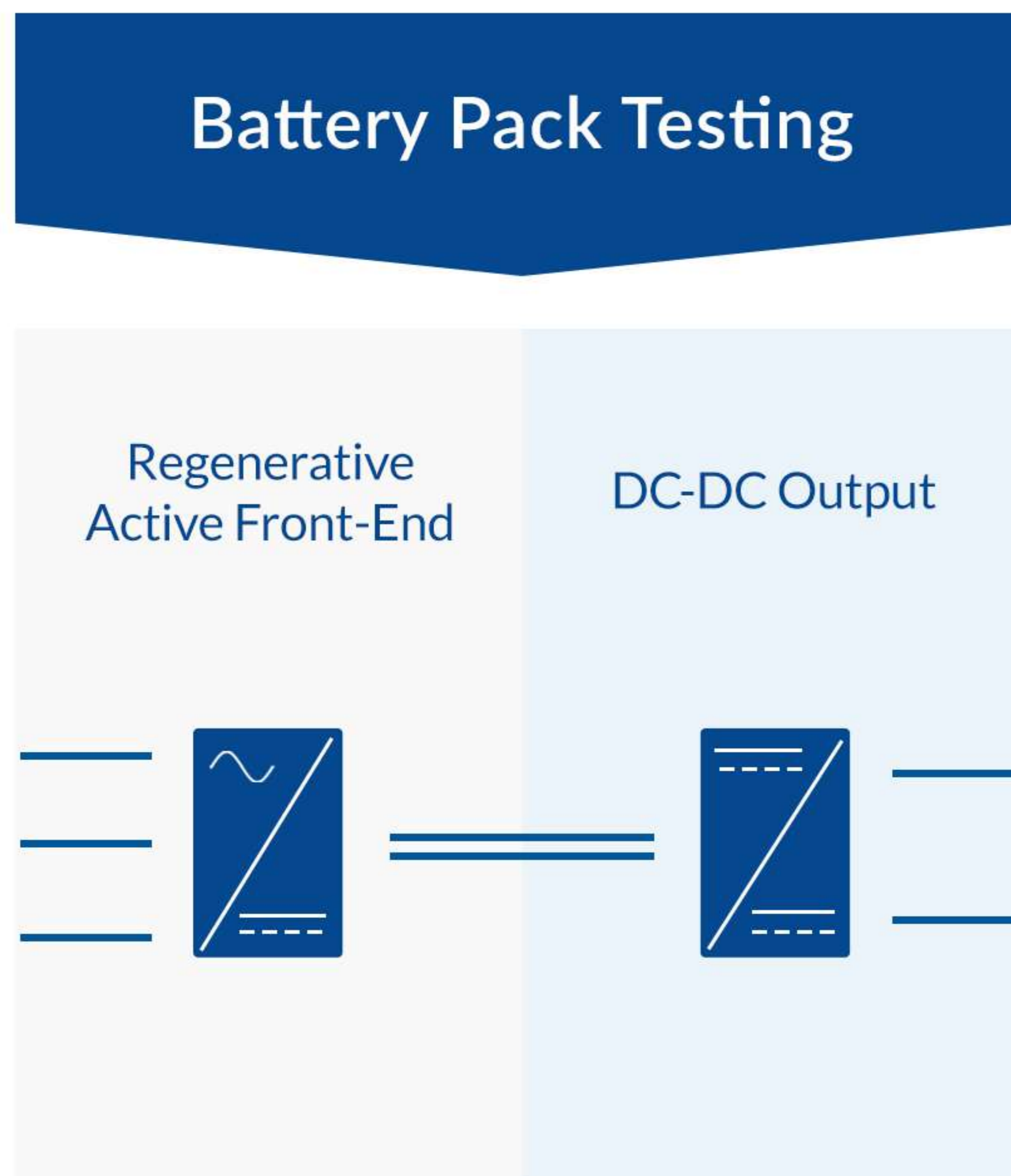


## IGBT BASED SYSTEMS WITH EXTERNAL ISOLATION TRANSFORMER



The standard configuration of our IGBT solutions are cost-effective, easy to maintain, and provide competitive performance for a wide variety of battery testing needs. They utilize a low frequency transformer that is separate from the main cabinet to aid in installation flexibility.

- 100kW up to 1000kW Or More...
- Up to 4000kW With 4 Units in Parallel
- 50-1200VDC Half Bridge  
0-1200VDC Full Bridge
- Voltage/Current/Power Control Modes
- Low Current Ripple  $\pm 0.05\%$  FS or better
- Current Measurement  $\pm 0.05\%$  FS or better
- Low Voltage Ripple 0.1% FS rms
- Voltage Measurement  $\pm 0.05\%$  FS or better



- High Speed Control Up to 4kHz with EtherCAT
- HIL Integration Real-time Interface
- Dynamic Current Response 10-90% FS in <4.0ms
- Current Slew Rate Up to 400A/ms
- Remote Voltage Sense Voltage Drop Compensation
- Integrated Isolation Monitoring
- Air Cooled Less Facility Connections
- Flexible Isolation Transformer Installation Options

The system is configured by selecting an AFE with the desired power and a DC-DC output for your desired voltage and current range. A wide selection of configurations are available with higher powers available by using systems in parallel and series.

## DC OUTPUT CONFIGURATIONS

The IGBT based battery testers can be configured with two possible output topologies. The half bridge topology which has a minimum output voltage of 50VDC and a full bridge topology which has a minimum output voltage of 0VDC.

The half bridge configuration of our systems allow for the most flexible and cost effective solution. In addition, if you need additional flexibility in your test facility, our half bridge configurations can be put in parallel for higher currents or in series for high voltages.

If your application needs true zero volt operation, such as fuel cell system testing, the DC output stage can also be provided in a full bridge configuration. This allows our system to operate with full power and performance down to 0VDC. However, due to the nature of the architecture, serial operation of multiple full-bridge systems is currently not possible.

# DETAILED SPECIFICATIONS

Specifications	
Available Power Versions	Single systems are available with a wide range of AFE powers from 100kW up to 1000kW, or more.
Output Current	Single systems are available with current outputs of 600A up to 3000A
Overload Current	150% (Other values available as configurable or custom systems)
Output Voltage	Half Bridge: 50-1200VDC, Full Bridge: 0-1200VDC (Other output voltages available upon request)
Power Device	IGBT (see BAT600 for SiC based solutions)
PWM Switch Frequency	3kHz typical, up to 10kHz
Control Modes	Voltage, Current, Power
Measuring Ranges	±0.1% Standard ±0.01% High Precision Option **
Voltage Measuring Accuracy	±0.1% Standard ±0.01% High Precision Option **
Current Measuring Accuracy	±0.1% Standard ±0.01% High Precision Option **
Current Control Accuracy	Better than 0.2%
Voltage Control Accuracy	Better than 0.2%
Voltage Thermal Drift	0.003%/°C
Performance Dynamics	Up to 400A/ms
Voltage Ramp (10-90% FS)	Not Applicable for Battery Testing
Current Ramp (10-90% FS)	<4.0ms
Current Overshoot	±2% Typical Less than +/-1% with dedicated tuning
Current Ripple	Less than 1% Typical
DC Voltage Ripple	0.1% rms of full scale
Power Factor	0.99
Efficiency	Better than 95%

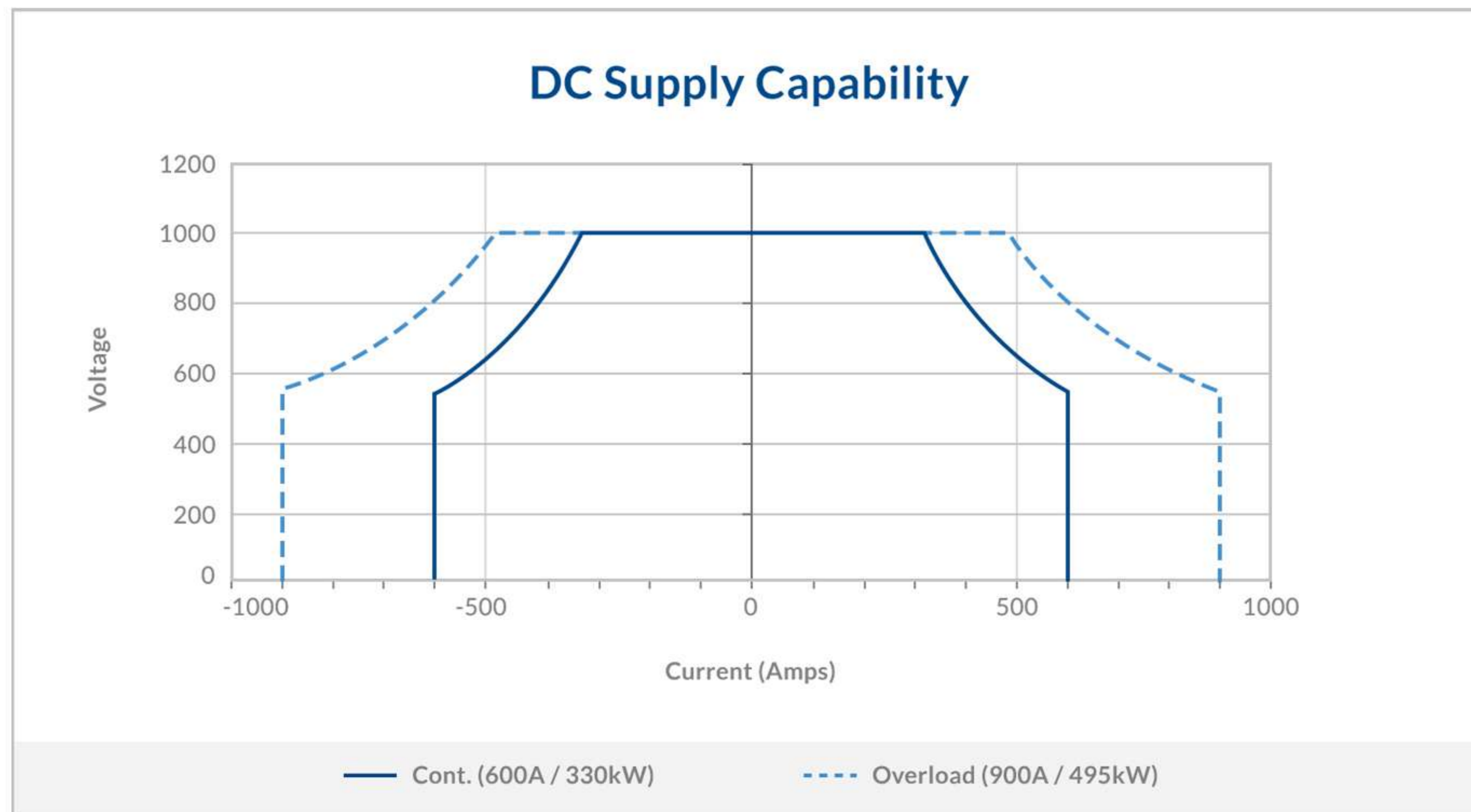
\* Performance specifications are assuming a 500VDC battery with a DCIR=10mΩ and half bridge configuration  
System Full Scale Voltage: 1000VDC  
System Full scale Current: 600A

\*\* Depending on calibration accuracy, system installation details, and temperature control of the system

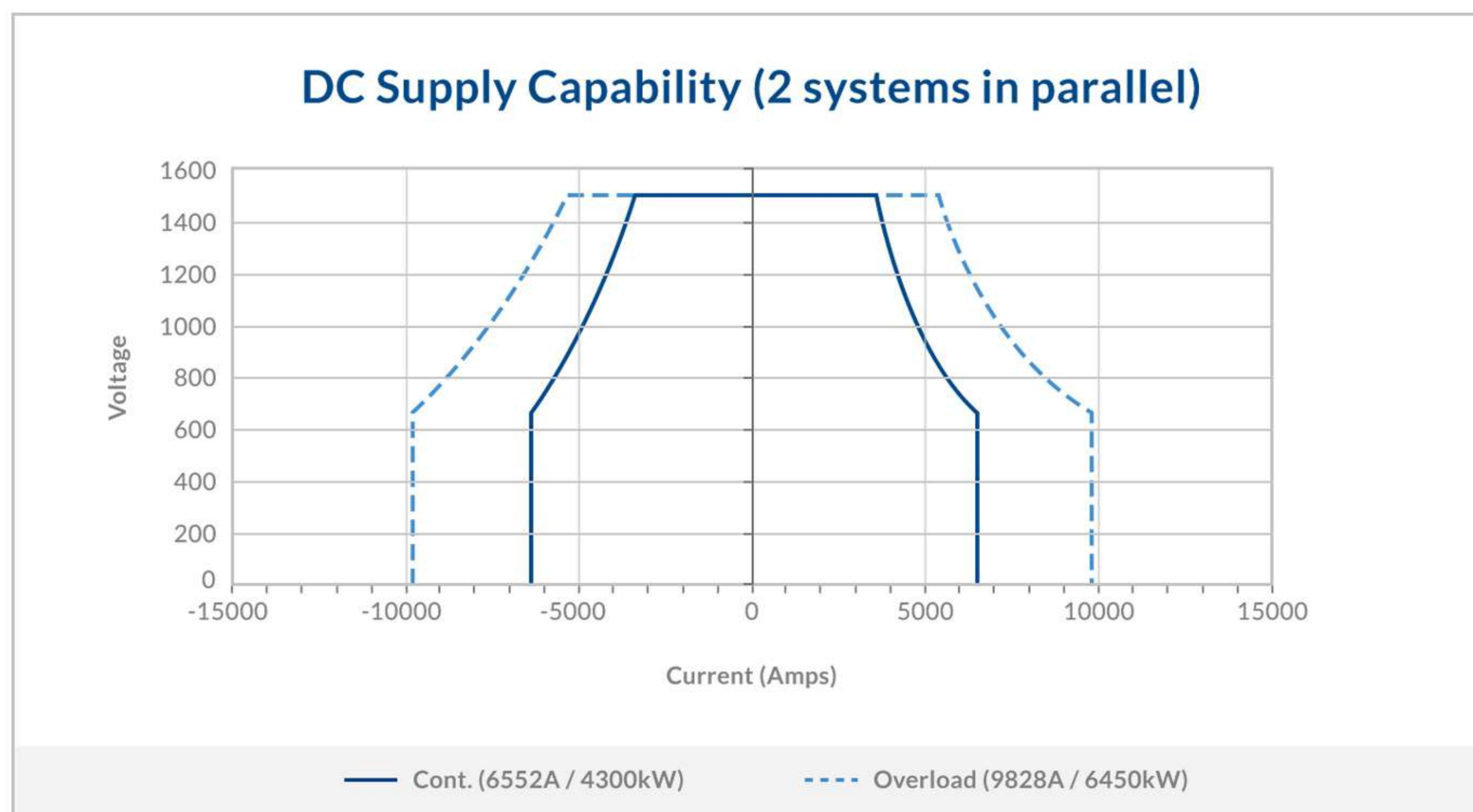
If your exact needs are not met by our range of standard products, please contact UNICO to discuss our configurable and custom design options.

Specifications	
AC Input	Isolation transformer can be selected with your desired input voltage.
Ambient	Up to 40°C, max 1000m above sea level, 95%RH non-condensing
Enclosure	IP54/NEMA 1 (other options available upon request)
Cooling	Water cooled or air-conditioned enclosures available
Enclosure Paint	RAL 7035 rough semi-gloss poly powder finish
Certification Compliance	UL, CE (other certifications available)
Control Modes	Voltage, Current, Power
Control	Local and remote
Built-in Remote Interface	Analog as well as RS-422, RS-485, two ports (other interface and protocol, see options below)
Safety and Control Interlocks	Hardwired, opto-isolated, software configurable
Data Logging	Data sampler through UEdit®
Battery Emulator	Optional. See battery emulator brochure TST600
Options	
Isolation Transformer	Required. UNICO can offer, or you can supply.
Cabinet Paint Finish	Customer specific color cabinets can be ordered as a configurable or custom system
External Communication Interface (2x Interface Per Cycler)	<ul style="list-style-type: none"> <li>• Ethernet with Modbus TCP, ProfiNET and Ethernet IP</li> <li>• EtherCAT (Async and Sync)</li> <li>• CC-Link</li> <li>• CAN open</li> <li>• ControlNet</li> <li>• Modbus Plus</li> <li>• Profibus DPV1</li> </ul>

# SAMPLE POWER CURVES



Example of a single system



Example of multiple systems in parallel

These power curves are examples of some system configurations built from our portfolio of different active front ends and DC output sections. Samples are from single systems and from multiple systems in parallel.

Half-bridge versions of our systems can also be put in series for up to 2000VDC with standard configurations and up to 3000VDC with custom configurations. Systems can also be ordered with custom DC output combiners which incorporate DC contactors and a control PLC to automatically put channels in parallel or series.



Specifications are subject to change without notice

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