SmartTS-BT Battery Test System

Modular, Scalable Power up to 2.7MW

High Power Regenerative Bidirectional DC Test System ideal for battery test, battery emulation, DC Testing

The SmartTS-BT is a high-power, bidirectional DC test system designed to simplify testing, accelerate development, and **scale from 120kW to 2.7MW**.

SmartTS-BT supports battery testing, battery emulation, and high-power DC power supply and load applications **in one flexible, mobile platform.**

Integrated bidirectional power, intuitive controls, measurement, safety, and software deliver a **ready-to-test system** that can adapt as test requirements evolve over time.



High Power Density up to 270kW per cabinet

- All-in-1
- Scale to 2.7MW
- User-Friendly Control
- Built-In Safety

AI Data Centers | Mil/Aero | EV & Charging | Batteries, Energy Storage | Fuel Cells | Industrial

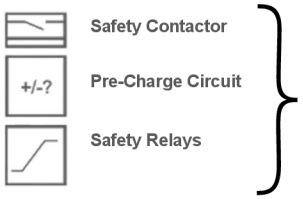
Features

- **Bidirectional DC power:** sources and sinks
- **Battery Test** and **Battery Emulator** Mode
- **High power density** 120kW up to 270kW per cabinet
- **Parallel cabinets** up to 2.7MW (10 cabinets)
- **Up to ~96% energy efficiency,** regenerative power
- **Standard facility power**: 380-480Vac three-phase input
- **Wide DC voltage range:** 0-1000V or 0-1500V
- **High current range:** 1000V model / up to 720Adc or 1500V model / up to 540Adc per cabinet
- **Regulation modes CV, CC, CP, CR,** with fast crossover
- **Fast dynamic response**: Voltage < 10ms, current < 2ms
- **Touchscreen OS**, remote panel, real-time measurement
- **Safety built-in:** Engineered pre-charge circuit, safety contactors and relays
- **Small mobile footprint:** Standard 19-inch rack that fits under a standard door size
- **Single or Dual Channel**: Run modules as one channel, or two independent lower-power channels (single cabinet units only).
- **High-resolution data logging:** Sub-second interval, up to 48 hours, real-time strip-chart
- **True autoranging**: Full rated power maintained down to 33% of rated voltage - no derating
- **Real-world drive-cycle emulation:** CSV import of WLTP, UDDS, or your own captured profile
- **Direct CAN / CAN FD** communication
- **Open Software Platform:** Use LabVIEW, Python-based control, Third-party test executives, and more

© PPST Solutions in 2026, this information is subject to change without notice

Start at 270kW. Scale to *2.7MW*.

Ready to test, modular 270kW building-block cabinets can be paralleled into one large system, up to 10 cabinets. Add power as your testing grows—without redesign.





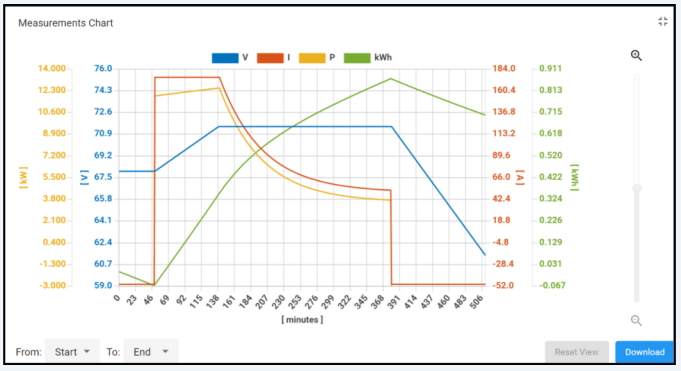
User-Friendly GUI, Remote Panel, and Integrated Measurement Capabilities

Intuitive touchscreen visual panel has integrated measurement, monitoring, and data logging—no separate DAQ H/W or custom S/W required, simplifying test.

- Real-Time Display shows voltage, current, power, Ampere-hours, kilowatt-hours, charge/discharge status
- Remote network access
- Built-in logging at sub-second resolution to easily capture and analyze battery performance



Overview Dashboard Monitoring Screen.

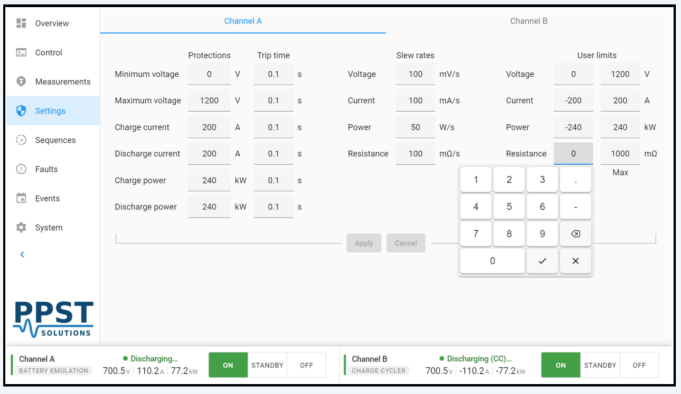


Real-time measurements and dynamic visual charts.

Layers of Safety, Built-In

Multiple layers of protection are integrated on every cabinet, providing confidence during test.

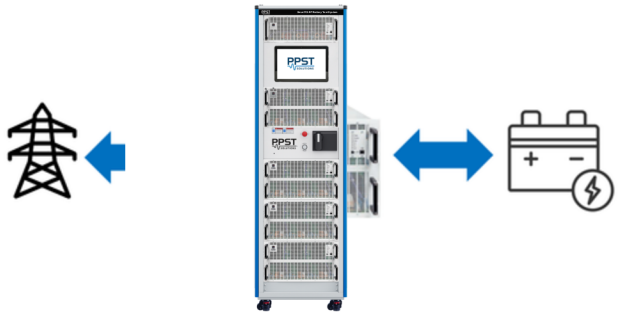
- **Bipolar disconnect contactors:** On every cabinet
- **Engineered pre-charge:**Matches system output to battery's present voltage before closing contactors; minimizes inrush current caused by voltage mismatch
- **Reverse-polarity detection:** protection against incorrect battery connections.
- **Emergency stop & mains disconnect:** Front panel
- **Programmable Protection limits:** Voltage, current, power, temp.
- **Communication watchdog:** Auto-shutdown of output if remote-control communication is lost
- **High-voltage isolation:** 1500 VDC (–) / 2000 VDC (+), DC output



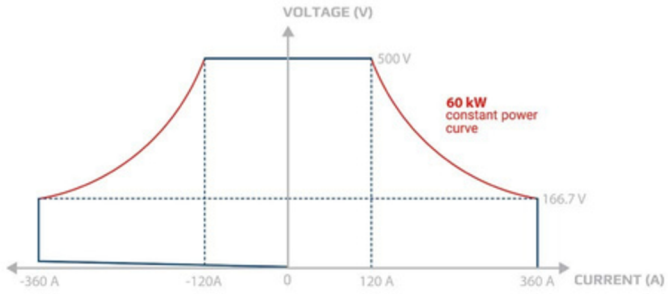
Programmable test limits for added safety measures.

Regenerative Power with Leading up to 96% Efficiency

- Active Power Factor Correction typical .99
- Low audible noise
- Wide AC input voltage range: 380-480V with 3 phases



How Regenerative Power Works
The power mains connect to the SmartTS-BT which connects to the DUT. When pulling current from the DUT, energy is converted back into AC current and returned to the facility mains.



True Autoranging for Fast, Continuous Power

- **Full power down to 33%** of rated voltage
- **Test a broad range of conditions** with constant power
- **Eliminates potential power loss** & UUT shutdown, typical when switching between ranges

Real Battery Emulation

Emulate real battery behavior—not just voltage and current setpoints. **SmartTS-BT adds a programmable series-resistance term (Rint)** to voltage and current control, directly modeling the battery's internal resistance. This enables realistic battery behavior for BMS development, validation, and system-level testing, helping engineers test against battery characteristics without physical batteries.

Software: The Power of Choice

We know that it doesn't end with hardware. PPST Solutions is software-agnostic and customer-centric. We support and advise across a wide range of test environments, including LabVIEW, Python-based control, Third-party test executives, legacy and emerging platforms.

Rather than forcing a single software path, PPST has the expertise to help customers choose, integrate, and evolve the software strategy that best fits their needs.



Why PPST? Battery Test Expertise & Turn-Key Cabinet Integration

PPST differentiates through expertise, service, and fully integrated cabinet solutions engineered for high-power battery test and emulation. *Not just rack and stack.*

- Get ready-to-test systems with minimal setup, reduced costs
- Built-in safety protections and industrial design
- Battery expertise, application-driven support, test program development, and training
- ONE accountable point of contact

© PPST Solutions in 2026, this information is subject to change without notice

Technical specifications	SmartTS-BT 1000 V	SmartTS-BT 1500 V
Voltage range	0-1000 V (333–1000 Vdc at Full Power)	0-1500 V (500–1500 Vdc at Full Power)
Current range	0–720 Adc	0–540 Adc

AC Input		**Interfaces - Digital (galvanically isolated)**	
Voltage, phases	380–480 Vac ±10%, 3ph AC	**Built-in**	Ethernet (SCPI)
Frequency	45–65 Hz	**Optional**	CAN, CAN FD, digital I/O
Battery Test / Emulation Output		**Control**	
Operating modes	CV, CC, CP, CR, with fast crossover	**Local / remote**	Touchscreen GUI, usable locally or remotely
Battery emulation	Programmable voltage + series resistance (Rint)	**Controls**	SCPI, LabVIEW, and the built-in touchscreen GUI
Rise/fall time (10-90%)	V < 10 ms / I < 2 ms	**Real-time readouts**	Voltage, current, power, Ah, kWh
Voltage accuracy	0.1%	**Data logging**	Strip-chart trending, sub-second interval
Current accuracy	0.1%	**Device Configuration**	
Autoranging	Full rated power maintained down to 33% of rated voltage	**Building block**	Configurations up to 270 kW per cabinet
Regeneration efficiency	Up to 96%	**Paralleling**	Up to 10 cabinets, synchronized, up to 2.7 MW
Protective Functions		**Channel**	One channel, or independent channels
Programmable Limits	Overvoltage / overcurrent / overpower / overtemperature	**Power density**	270 kW in 37U instrument cabinet
Battery-specific safety	Bipolar contactors, pre-charge, reverse-polarity detection	**Physical**	
Communication watchdog	Automatic output shutdown on loss of remote comms	**Form factor**	19-inch rack-mount cabinet
Insulation		**Dimensions (H x W x D)**	77 in x 23.6 in x 42.5 in / 1956 x 599 x 1080 mm
DC negative terminal output to chassis	±1500 Vdc	**Weight**	450 kg / 992 lbs (estimate)
DC positive terminal output to chassis	+2000 Vdc	**Cooling**	Air-cooled

About PPST Solutions

PPST Solutions provides comprehensive, best-in class, and high performance power test equipment for leading-edge design and manufacturing test engineers. As your one-stop shop for AC & DC power test solutions, we deliver the brands, tools, and systems you need to validate your critical designs with confidence.

Our Brands

ppstsolutions.com | sales@ppstsolutions.com | 1-888-239-1619 | Irvine, CA