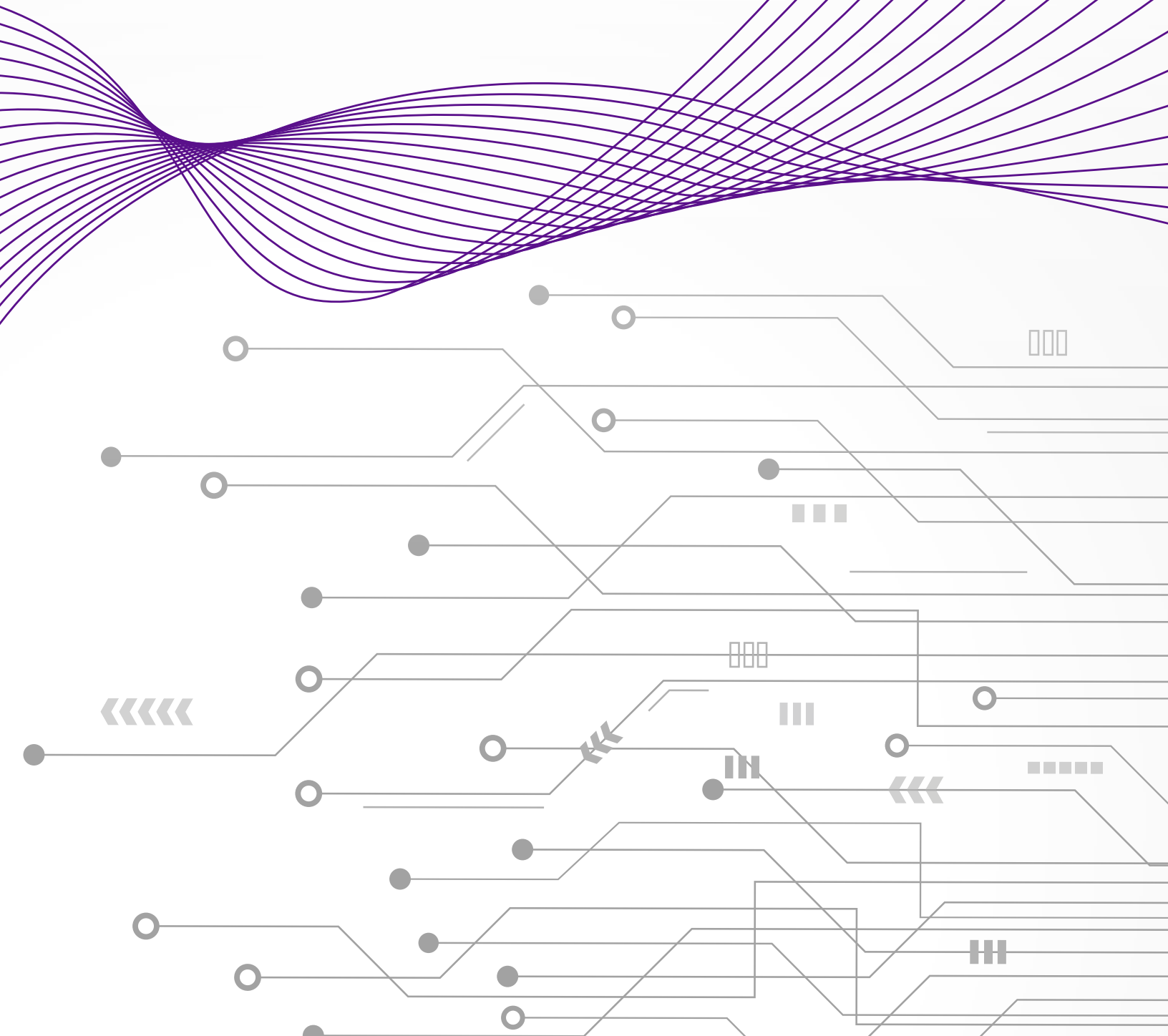




DOBLE PROTECTION TESTING

DOBLE F8-SERIES POWER SYSTEM SIMULATORS





Moving Forward in a World of Change

Protection system performance testing has entered the digital realm. Investments in protection system automation are increasing as Intelligent Electronic Device (IED) functionality continues to expand and the benefits of IEC 61850 materialize around the globe.

Using a variety of test systems and software to accommodate the multifaceted work of testing relays and IEDs invites errors, complicates troubleshooting, and produces data and results that are difficult to track.

Maintaining installed protection systems while advancing with newer technologies does not have to be complicated or disruptive to your workforce. Moving forward capably with clarity and consistency is possible. The key is equipping your team from a platform of modular protection test instruments that scale to your requirements, integrate seamlessly into your practices and remain compatible with your operations and infrastructures as they evolve.



A Complete and Integrated Protection Testing Platform

Doble F8-series Power System Simulators provide a range of possible solutions to your specific test requirements. The modular F8 platform lets you choose the capabilities and functionality that make sense for the protection applications you test.

Key design features include:

- Chassis that can be configured with your choice of voltage, current, and logic I/O modules.
- Module sockets with color-programmable LED rings that indicate correct test lead placements and alert if detecting setup issues.
- Direct time protocol and network synchronization connectivity.
- IEC 61850 compliance.
- Corner-and-edge protective bumpers and transport accessories for field use or mounting hardware for installing in 19" racks.
- Seamless compatibility with existing Protection Suite™ and Doble RTSTM test procedures.

Experience versatility and high performance with F8-series Power System Simulators, state-of-the-art instruments that equip you for any conventional, modern or digital test scenario.



F8 Modules: Performance Beyond the Ordinary

The modularity of the F8 platform lets you specify F8200/F8300 instruments with voltage, current and logic I/O that fit your requirements. Unmatched flexibility lets you simply install different F8 modules to change instrument capabilities and affix fitted blanks to safely use instruments that have empty module slots.

Beyond being interchangeable, F8 modules take the guess work out of test connections and troubleshooting. The sockets have LED rings that Protection Suite and RTS software can program to display colors indicating lead placements needed by specific applications. Users are alerted to problems by automatic color changes.

HIGH VA VOLTAGE MODULE

The HVA Voltage Module provides two 150 V sources at 150 VA or one 300 V source at 300 VA with both channels connected in parallel. The available Convertible Mode option converts outputs of the HVA Voltage Module into high-VA/low-range current sources. For safety and to prevent hardware damage, the HVA Voltage Module automatically stops operating and the LEDs turn red when sensing short circuit conditions.



HIGH VA CURRENT MODULE

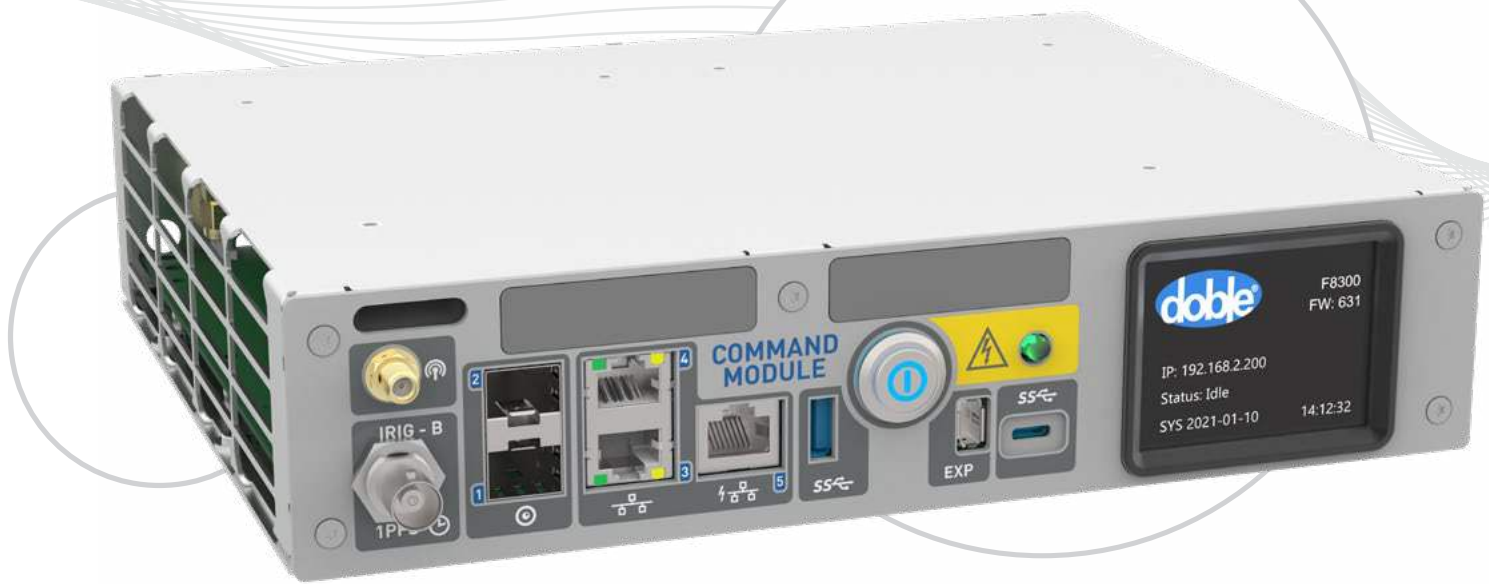
The HVA Current Module provides two 25 A sources at 150 VA each. When both sources are connected in parallel, 50 A at 300 VA continuous power is produced. Transient mode extends power and range up to 90 A at 300 VA for 30 seconds. DC output is 50 A. For safety and to prevent hardware damage, the HVA Voltage Module automatically stops operating and the LEDs turn red when sensing open circuit conditions.



LOW-DENSITY LOGIC I/O MODULE

The Low-Density Logic I/O Module provides four pairs of programmable input/output ports featuring LED rings that indicate port assignments. The LEDs turn off during testing and turn back on if an input is triggered. This module also provides functions for testing transducers and Class 2 meters.





Command Module

The Command Module that is embedded in F8200 and F8300 chassis controls all instrument operations from Protection Suite and RTS software. Communication and synchronization functions are hosted, and instrument status information is displayed. IEC 61850 standard-based protection scheme testing options are available.

COMMUNICATIONS

3 x Ethernet ports (10/100/1000 Mbps each)
 1 x 40 W Power over Ethernet (PoE) port
 2 x SFP (copper & fiber) ports (1 Gbps each)
 2 x USB 3.0 ports (types A & C)

TIMING

Phase voltage line synchronization
 Simple Network Time Protocol (SNTP)

TIME SYNCHRONIZATION

IRIG-B modulated & unmodulated
 IEEE 1588 / IEC 61850-9-3 Precision Time Protocol (PTP)
 GPS at 1 PPS

IEC 61850

Sampled Values - IEC 61869-9 & IEC 61850-9-2LE (publishing)
 GOOSE (publishing & subscribing)

BATTERY SIMULATOR

Each F8000-series chassis includes a battery simulator with a power range of 6 to 300 V at 90 W.

F8 Chassis and Module Combinations: Configure Your Ideal Instrument

Think about how you test and what you need when you test. Now consider these recommended configurations of F8-series Power System Simulators. If you don't see what you need, no problem: the F8 platform lets you configure an ideal protection test instrument of your own design.



F8200 FOUR-MODULE TEST SET

A compact instrument with next-level protection testing performance.

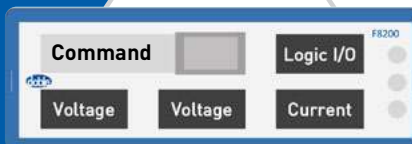
F8200 for testing electromechanical relay schemes and single or multi-phase simulations on microprocessor-based relays:

- 1 x High VA Voltage module
- 2 x High VA Current modules
- 1 x Low-Density Logic I/O module



F8200 for single-phase testing and to enable simulations requiring three-phase directional voltage:

- 2 x High VA Voltage modules
- 1 x High VA Current module
- 1 x Low-Density Logic I/O module



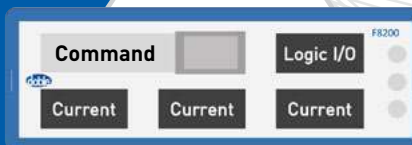
F8200 for testing digital substations and provides analog inputs and outputs that enable simulations on hybrid digital-analog schemes:

- 4 x Low-Density Logic I/O modules



F8200 for single-phase high current testing:

- 3 x High VA Current modules
- 1 x Low-Density Logic I/O module



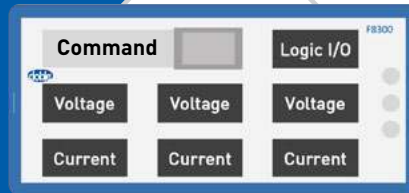


F8300 SEVEN-MODULE TEST SET

Hosts more modules for expanded protection testing capabilities.

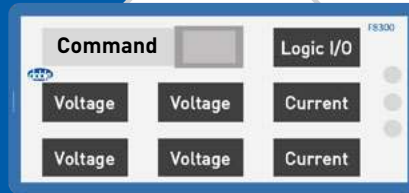
F8300 providing three phases of 300 V L-N and six currents for all-purpose testing including differential and distance applications:

- 3 x High VA Voltage modules
- 3 x High VA Current modules
- 1 x Low-Density Logic I/O module



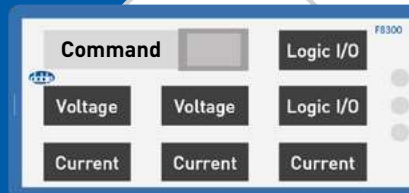
F8300 providing four phases of 300 V L-N for testing generation protection schemes:

- 4 x High VA Voltage modules
- 2 x High VA Current modules
- 1 x Low-Density Logic I/O module



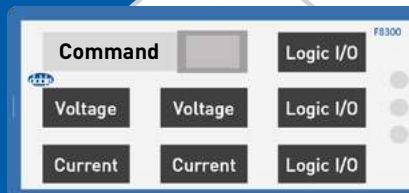
F8300 providing four phases of 150 V L-N, six currents, and eight logic I/O for transformer differential and transmission protection testing:

- 2 x High VA Voltage modules
- 3 x High VA Current modules
- 2 x Low-Density Logic I/O modules



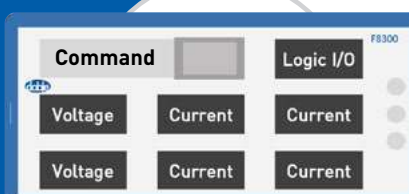
F8300 providing four phases of 150 V L-N, four currents, and twelve logic I/O for three-phase testing and phase-to-phase transformer protection testing:

- 2 x High VA Voltage modules
- 2 x High VA Current modules
- 3 x Low-Density Logic I/O modules



F8300 providing four phases of 150 V L-N, eight currents, and four logic I/O for testing three-phase transformer differential and transmission protection:

- 2 x High VA Voltage modules
- 4 x High VA Current modules
- 1 x Low-Density Logic I/O module



Software That Extends Your Investment in F8 Hardware

F8-series Power System Simulators are fully compatible with current and future versions of Doble protection testing software products. Use your existing Protection Suite and Doble RTS test plans without modification and take advantage of the latest software enhancements.

PROTECTION SUITE

- Includes an expansive collection of industry-proven test macros plus straightforward methods for assembling and editing test plans.
- Supports relay testers of all skill and experience levels with intuitive test creation, increased automation and highly-adaptive test techniques.
- Supports all F-series instrument configurations for any test situation from commissioning and routine maintenance to testing IEDs over digital networks based on IEC 61850.

DOBLE RTS

- Robust database features standardize elements of relay testing programs and powerful automation tools increase efficiency and reduce complexity.
- Comes with an extensive relay test plan database offering more than 600 pre-written test routines; enables quick test plan modifications and sharing.
- Captures and stores important maintenance information for CTs/VTs, DC control circuitry, communication systems and more, along with consolidated reporting of test histories and results.

61850 Test

- Processes multiple SCL files (ICD, IID, CID, SED, and SCD) for analyzing IEC 61850 substation configurations.
- Creates fault conditions to verify IED logic for proper control scheme coordination.
- Helps with planning testing scenarios in a laboratory or offline environment and uses saved configuration files for efficiency in the field.

DOBLE POWERBASE™

- Highly configurable central test and asset database system for protection data and records management with robust work tracking and extensive reporting features.
- Interfaces to Doble RTS and Protection Suite plus numerous third-party software products.
- Tracks any power system component and simplifies compliance audit readiness.

Visit www.doble.com/F8000 to select an F8-series instrument configured for your specific protection testing requirements.

EXPERIENCE, KNOWLEDGE, INSIGHT YOU CAN COUNT ON.



F8000 Patents Pending

CONTACT DOBLE TODAY.

Doble Engineering Company

Worldwide Headquarters | 123 Felton Street, Marlborough, MA 01752 USA | +1 617 926 4900

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