



# F6150SV



## POWER SYSTEM SIMULATOR

### The Ultimate Tool for Protection Scheme Testing

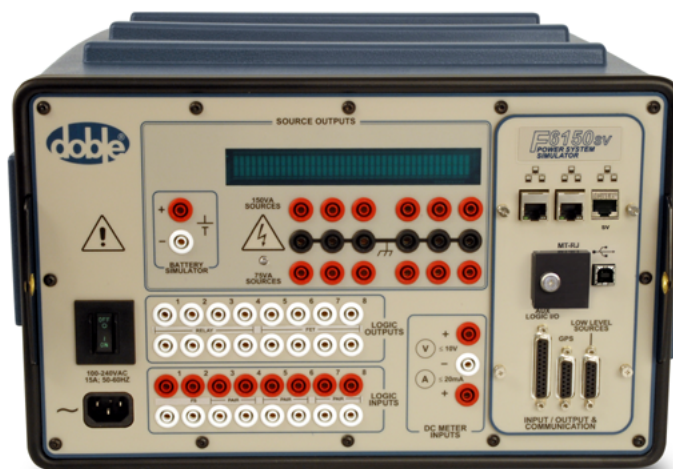
The F6150SV is your versatile, all-in-one solution for testing protection relays and schemes. Designed to meet your needs, the F6150SV is capable of performing the most simple through the most complex tests. Whether you need to test an individual component or test an entire scheme, the F6150SV is the proven solution to assess protection system performance for analog testing of 1A and 5A protection devices. Now with increased output power of amplifiers, the F6150SV offers IEC61850 testing, as well as Sample Value "Process Bus" and Station bus applications in one test set.

TOGETHER WE POWER THE WORLD



### The F6150SV Features:

- IEC61850 testing with 3 packets of 9-2 LE communication protocol and station bus messaging - one fiber and one copper IEC61850 communication port
- Wi-Fi Capable
- Standard relay calibration and verification testing of High Burden and Microprocessor relays
- Increased amplifier power output and ranges (enhanced ratings)
- Protection scheme testing using State Simulation and Transient testing: powerful models made available in Protection Suite Software
- Metering at 0.2 class CTs and Transducers
- End to End testing of Communication Based Schemes with GPS time syncing
- 12 Source, (6-Voltage, 6 Current), configurable for Bench testing and proof of concept testing for complicated relaying schemes



## Benefits of the F6150SV

Evaluate your protection relays and schemes in their environment, using simulated power system conditions and events.

No other single-box solution can equal the test capabilities of the F6150SV.

### Exceptional test flexibility

Six independently controlled direct coupled sources, each rated at 175 VA, provide more than 100 user-selectable test configurations to match any test requirement. Each continuous current source can be configured as two independent 87.5 VA sources for a total of 6 current sources.

### Field-rugged design

Rugged construction and proven state-of-the-art design provide laboratory accuracy with uncompromised field performance.

### Convenient panel display

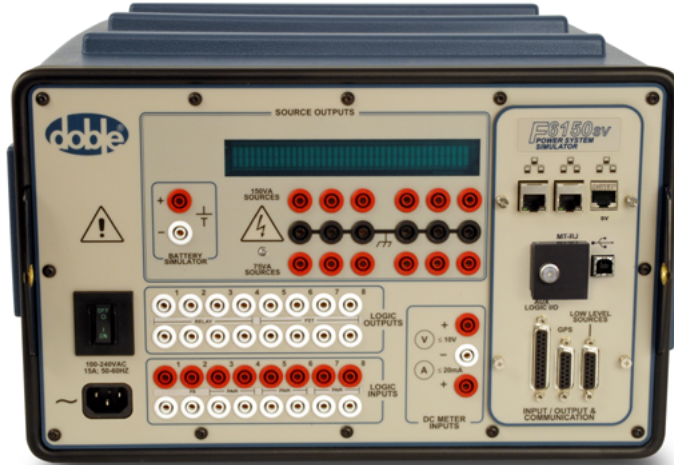
Front panel display indicates active voltage/current amplitudes and phase values during testing.

### Easy to use

PC interface (Ethernet or USB communications) and software for steady state, dynamic state and transient testing. All sources can be controlled from a PC for easy configuration for each test. Includes fiber optic and copper IEC61850 communication ports.

### Accurate meter testing

High-precision measurements for energy meter and transducer testing.



## F6150SV Enhanced Ratings

| Enhanced Ranges AC                                       | Enhanced Ranges DC                   | Enhanced Power      |
|--|--------------------------------------|---------------------|
| 6 X 8.75, 17.5 A rms (L-N)                               | 6 X 5.83, 11.6 A dc                  | 6 X 87.5VA / 87.5 W |
| 3 X 8.75, 17.5, 35 A rms (L-N)                           | 3 X 5.83, 11.6, 23.3 A dc            | 3 X 175VA / 175 W   |
| 1 X 17.5, 26.25, 35, 52.5, 70, 105 A rms (L-N), S1 S2 S3 | 1 X 5.83, 11.6, 35, 70 A dc S1 S2 S3 | 1 X 525VA / 525 W   |

| Enhanced Transient Ranges AC*                                 | Enhanced Transient Ranges DC*                   | Enhanced Transient Power* |
|---|---|---------------------------|
| 6 X 8.75, 17.5, 35 A rms (L-N)                                | 6 X 5.83, 11.6 A dc                             | 6 X 131.25VA / 131.25 W   |
| 3 X 8.75, 17.5, 35, 70 A rms (L-N)                            | 3 X 5.83, 11.6, 23.3 A dc                       | 3 X 262.5VA / 262.5 W     |
| 1 X 17.5, 26.25, 35, 52.5, 70, 105, 210 A rms (L-N), S1 S2 S3 | 1 X 11.6, 22.3, 35, 46.7, 70, 140 A dc S1 S2 S3 | 1 X 787.5VA / 787.5 W     |

\* Times of longer than 1.5 sec are possible; cooldown time applied by software

# Protection Suite Solutions

Protection Suite and F6Test are robust software programs for reliable, computer-based protection testing that is PRC-005 compliant.



## Protection Suite and Protection Web

Protection Suite and Protection Web work together to form a file based management system for the field testing and administrative control of all relay testing.



### Protection Suite

Protection Suite is a technician's control system to test and check complicated relaying schemes.

PRC-005 compliant testing can be performed and all records kept electronically and stored via Protection Web on your company's server for ease of NERC reporting and auditing.

### Protection Web

Protection Web is a server based application that collects and manages test results and reporting features tailored to NERC auditing and compliance.

It is also used to assign administrative users and privilege settings. Host on your company's network or on a Doble server.

### Spotlight: Transducer and Meter Control Panel

This graphical interface enables test engineers to quickly perform simple performance verification tests on Class 0.2 metering and transducers.

It allows users to develop a library of automated tests based on their specific practices and test results.

## F6Test - Visual Testing Software

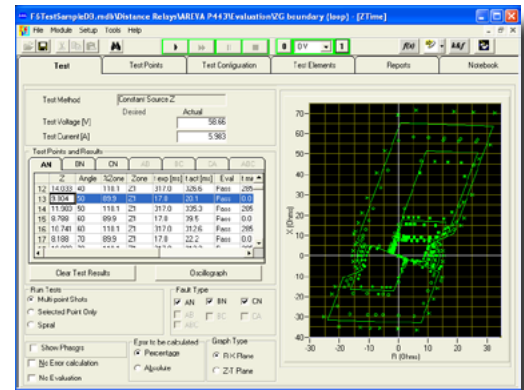
F6Test is a highly-automated and graphical testing solution for all protection testing.

Complex multi-zone distance relays and differential characteristics are easy to test with a point-and-click interface.

The test modules are based on state simulation providing a realistic dynamic test.

Other functions like power swings are tested graphically with automatic generation of transient oscillation and fault conditions with the WaveSim module.

A versatile state simulation module allows testing of advanced protection schemes.



### Spotlight on IEC61850 Testing with F6Test and the F6150SV

F6Test supports the F6150SV power system simulator for testing IEC61850-based systems using process bus sampled values (per IEC61850 9-2 LE guidelines) and generic substation events (GSE) messages.

- F6Test offers easy configuration of sampled value streams with up to 24 currents and voltages.
- It also allows testing in mixed mode using a combination of conventional voltages and currents as well as sampled values.

| IEC 61850 Sampled Values Sources |                                     |       |       |       |          |       |       |       |       |
|----------------------------------|-------------------------------------|-------|-------|-------|----------|-------|-------|-------|-------|
| Voltages                         |                                     |       |       |       | Currents |       |       |       |       |
| SV 1                             | <input checked="" type="checkbox"/> | VA_e1 | VB_e1 | VC_e1 | VN_e1    | IA_e1 | IB_e1 | IC_e1 | IN_e1 |
| SV 2                             | <input checked="" type="checkbox"/> | VA_e2 | VB_e2 | VC_e2 | VN_e2    | IA_e2 | IB_e2 | IC_e2 | IN_e2 |
| SV 3                             | <input checked="" type="checkbox"/> | VA_e3 | VB_e3 | VC_e3 | VN_e3    | IA_e3 | IB_e3 | IC_e3 | IN_e3 |

## Customize your Protection Testing

Doble provides several options for expanding your F6150SV so you can configure it to exactly fit your needs. These options include:

- F6910 Simulator Control and Automation Module
- F6800 Transducer Interface
- F6810 High Power Convertible Voltage/Current Sources
- F6300 High Current Source
- F6860 Support for IEC61850 GSE
- F6885 Global Positioning System (GPS) Receiver Interface
- F6895 Global Positioning System Receiver and Antenna
- F6820 AIM Option



## Expert Help When You Need It

With a Doble Services Agreement you have access to valuable resources and tools to enhance your protection and control testing.

Services agreements include:

- Test plan consulting from Doble's application engineers
- Product support
- Annual on-site training customized for your team
- Doble Client Committee membership
- Client Conference invitation
- Software upgrades
- Doble Portal access and more
- [fserieshelp@doble.com](mailto:fserieshelp@doble.com) for answers from Doble's Protection experts

## Doble Knowledge is Power

Doble customers using Doble's protection test software are invited to participate in the International Protection Testing Users Group (PTUG), which is a venue for relay protection engineers and technicians to exchange ideas and new techniques for testing relays. PTUG meetings are held throughout the world.

Service Agreement clients are encouraged to participate in Doble's Client Committees, including the committee on Protection, Automation Controls and Communications (PACC).

Client Committees review topics of greatest interest and concern, share service advisories, best practices and lessons learned. Participation is limited to representatives from utility, industrial or testing companies to facilitate open discussion without the presence of manufacturers.

Committees meet twice a year at the International Conference of Doble Clients and the Client Committee Meetings. Join the conversation.



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