

# Valve Test Equipment and Services

## For Static Var Compensators (SVC)

Thyristor valves are critical components of static var compensators (SVC), providing the means to vary their var output in a controlled way. These valves are highly specialized assemblies of thyristors, gate driver units, and passive elements requiring a high level of availability. Therefore, regular tests of the SVC valve are mandatory for early detection of aging and faulty components, or to quickly troubleshoot the system in case of failure. Tests need to be performed with the least possible disruption to operations.

### Level Field Test Set (LFTS)

To improve testing process efficiency, GE designed a level field test set (LFTS) specifically for GE SVC valve testing. The equipment is a high-voltage controllable source with input and output channels and selectable testing modes to fulfill all the testing requirement for SVC valves.

This test equipment can be used by engineers and technicians to check the condition of the SVC thyristor valves on site, simplifying maintenance processes. The LFTS is packed in one practical case and includes:

- A level field test set
- 21 connectors isolated at 2kV
- Cables and power cord
- Technical manual

As the FLTS uses GE normalized parameters, tests results can be shared with GE experts for remote diagnostics and recommendations. The equipment can be used to test the following GE valve models: LEU 200B0228G01 to G26, GDU (all versions), NTV 4VE06, 4VE08, 4VE09, SCN666 and S500GU (Series V). It can also be adapted to new GE valve technology.

### Additional Test Services

SVC valve testing is part of the recommendations GE provides for annual preventive system maintenance. GE can deliver a full suite of SVC valve testing services including test execution by field technicians, analysis of results, diagnosis, recommendations by experts, training and technical support.

Test services are applicable to GE SVC valve models operating in industrial and utility applications.



## Increased Availability

LFTS includes testing protocols and the proper thresholds for GE SVC which provide:

- 37%-time reduction to perform preventive maintenance tests
- Up to 90% reduction in time spent troubleshooting valves using LFTS
- Valuable information to quickly select the required key spare parts

## Robust and Mobile

- All test equipment and accessories included in one aircraft-grade rigid case
- One test kit can be transported to test valves in multiple sites

## Safe Test Work

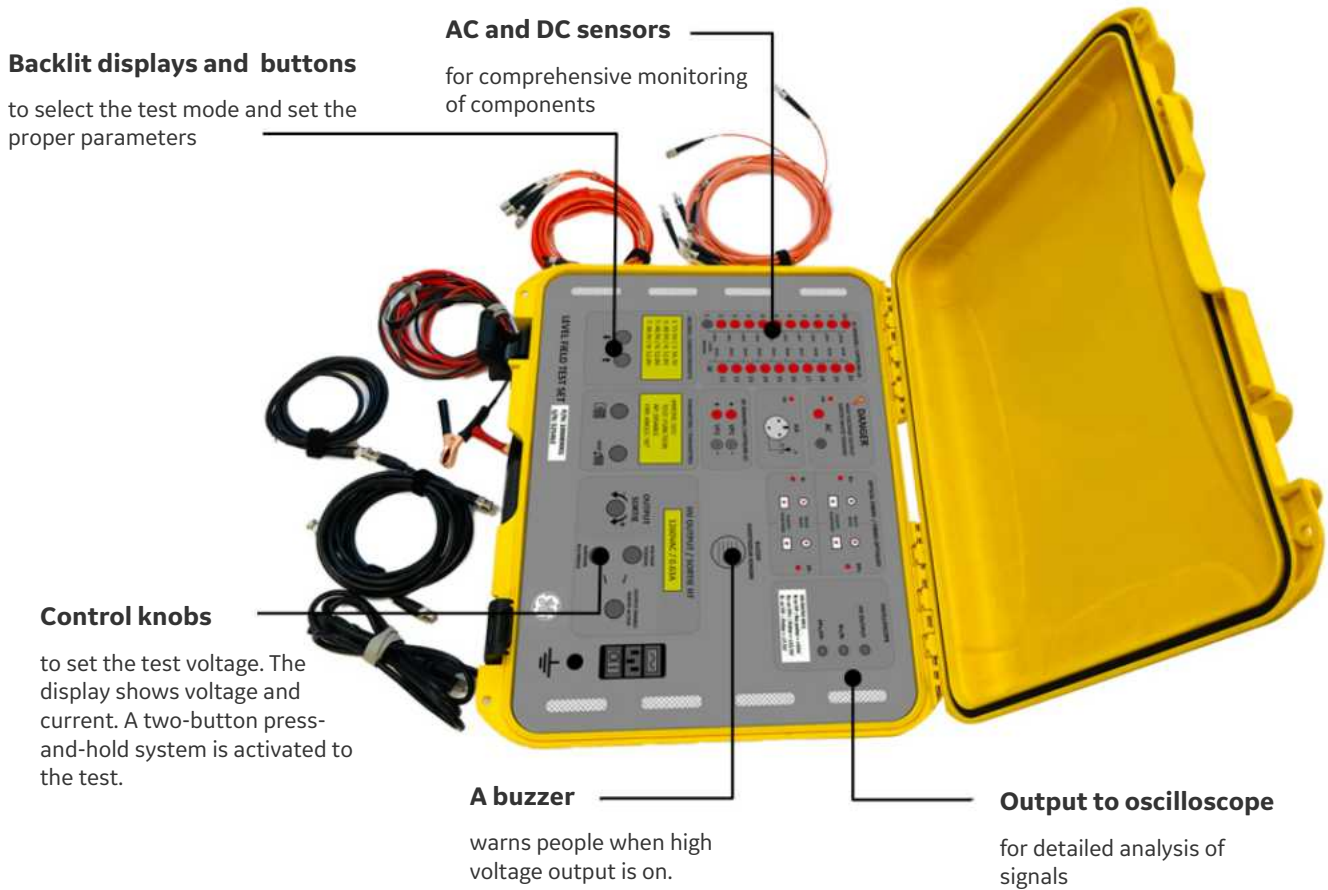
- Decreases risk of issues after maintenance by reducing the number of valve interventions needed
- Safety interlocks provide a safe way of executing high voltage tests



### The Level Field Test Set Main Features

The level field test set has a variable high voltage AC voltage source plus analog and optical inputs that can monitor different valve parameters and the firing control signals. Through a control panel and display, the user can select the model of the valve under test as well as the type of test to perform.

Each valve model and test function requires specific interface material, communication protocols, electrical parameters, and testing criteria.



*Level Field Test Set*

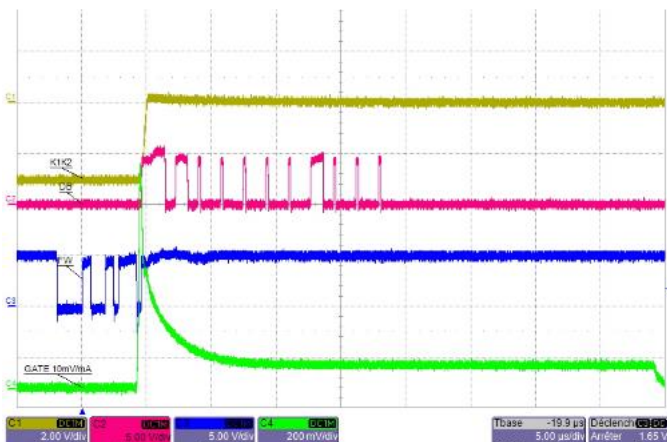
## Tests performed with the LFTS

Various tests can be performed safely and simply using the LFTS, as the equipment includes testing protocols and proper thresholds for all GE SVC.

### Function tests

#### Idle test

LFTS applies a normalized AC voltage and checks the level charging. The system sends message and verifies the timing sequence. The LFTS displays the result and pass/fail message.



Firing test example (switching Zoom)

#### Firing test

LFTS applies a standardized AC voltage and generates a firing pulse upon a valid acknowledge verification. Then it verifies the level firing and timing sequence and sends a message. With the oscilloscope, the gate current waveform can be analyzed in amplitude, timing, and pulse synchronization. In case of any issue, parameters settings allow the operator to enable/disable acknowledge verification and modulate the firing command from 90° to 160° for diagnostic purposes.

### Thyristor switching tests

Following maintenance or an emergency thyristor replacement, defective thyristors are often mixed up with spare thyristors. This test allows operators to test a thyristor without reinstalling it. The LFTS includes an internal gate drive unit to generate the proper gate current to fire the thyristor and confirm its operation.

### Gate drive unit internal regulator tests

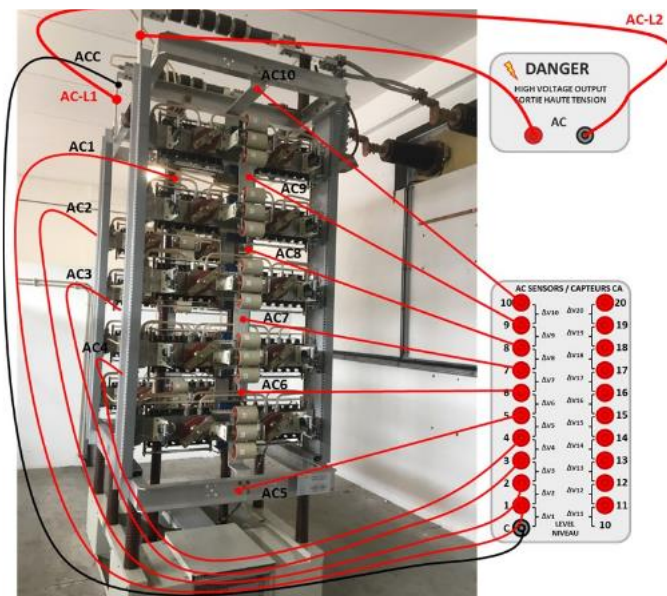
This test is not always performed during regular maintenance, but it is a useful diagnostic test to pinpoint faults associated with intermittent undesired behavior of the level.

LFTS applies a standardized HV AC voltage on the level and measures the voltage regulation before and after firing. The absolute values, delta value, and power reserved are then compared to criteria values. The results will help determine if the gate drive unit is the root cause of the level fault.

### Valve stack voltage distribution tests

LFTS applies a standardized HV AC voltage and measures the voltage on each level simultaneously. The voltages measured are displayed on the case screen. A set of criteria based on the voltage delta between levels will determine a pass/fail result, allowing the user to identify any faulty or aged levels. Operators will also be able to continue the investigation to determine if the snubber (capacitor/resistor) or any other component on the same level is the root-cause of the fault.

With this test, the maintenance team can observe the aging process of each level. Based on historical measurement performed periodically, the operator can schedule future maintenance, manage spare parts quantity, and request budget based on maintenance results.



Valve stack voltage distribution tests with SCN666

## Technical Specifications

### HV output:

- Isolated 2000 VAC / 1000 VA. Can be grounded on one side during testing
- Internal resistive load
- Internal thermal protection
- Double flush push button press/hold requiring both hands for personal safety
- Internal electrical and mechanical switching output off for personal safety
- HV terminal discharges capacitive load when output switch off

### Analog inputs:

- 20x isolated AC channels inputs, 100 VAC $\pm$ 3% F.S. with overvoltage clipping protection and 4mm shrouded female banana connectors
- 2 isolated DC channels input, 100 VDC $\pm$ 3% F.S. with overvoltage clipping protection and 4 mm shrouded female banana connectors

### Optical I/O:

- 4 optical inputs 850 nm: 2 with ST connectors and 2 with VLINK connectors
- 4 optical outputs 850 nm: 2 with ST connectors and 2 with VLINK connectors

### Analog/Digital outputs:

- 50 $\Omega$  BNC output low voltage, isolated signals to oscilloscope
- HV output with ratio 60:1
- Optical receiving and transmitting messages

### Power input:

- 120 VAC, 47 Hz-63 Hz or 240 VAC, 47 Hz-63 Hz 1200 W

### Additional features :

- Functional firing tests settable from 90° to 160°, at 10° interval.
- Gate drive voltage regulator circuit
- Standalone thyristors current gate switching

### Accessories

- LFTS rigid aircraft grade case (L x W x H): 21,7"x16,9"x8,5"
- 21x test leads with 4mm shrouded male banana connectors isolated at 2kV
- Choice of one set of the following optical fiber (Please specify SVC model):
  - 4x fibers ST/ST, 10' (for LEU, GDU and SCN666 SVC models)
  - 4x fibers ST/SMA, 10' ( for LEU, GDU, SCN666 and S500 SVC models)
  - 4x fibers VLINK/VLINK, 10' (for NTV 4VE06, 4VE08 and 4VE09 SVC model)
- 3x coax cable R59 with BNC/BNC connectors
- Power cord 14AWG (please specify required plug type)

### Optional (not supplied in standard)

- 4x channels oscilloscope
- Current probe (P6021A or equivalent)

### Warranty

- One-year parts and labor

For more information please contact  
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