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# COMPACT POWER

Power functional test with energy recovery solutions

Energy Saving

**In many industries, the electronic devices are designed for applications which require power availability and management, like motor control and power supplies (e.g. conditioners, inverters).**

**Seica, with its well-proven Compact Multi functional tester architecture, has created a standard tester capable of meeting comprehensively the specific nature and criticality of the requested tests.**



## THE POWER TEST

The Compact Power tester was engineered for the functional test of single-phase and three-phase motor inverters, and is based on Seica Compact Multi standard architecture.

The system consists of an input **AC generator** (able to change the input voltage and frequency to unit under test) current and phase meters to monitor all parameters (active and reactive power, distortion, etc.) and Seica modules for signal and waveform acquisition.

Then the tests are implemented through **electronic load** simulators, thus avoiding the presence of mechanical parts in motion, of TRIAC modules for short tests and mechanical switches for **high power electric test**.

With safety a big concern the Seica solution ensures and minimizes any operator contact with charged capacitors, and a discharge circuit with constant current is available, and can be programmed to discharge the inverter voltage bus.

## TEST PLATFORM

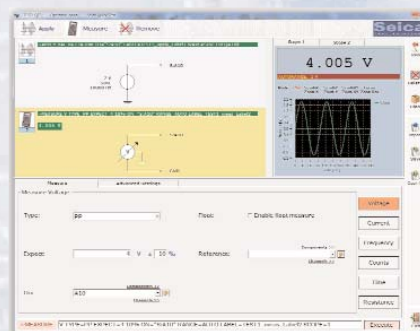
Like all Seica solutions, the Compact Power integrates the VIP platform, whose main feature is to provide optimum integration of technology and ease of use, empowering the user with all the capabilities required for an in-circuit or functional test even without real expertise in testing.

This is made available by the sophisticated measurement system (based on a Seica proprietary module designated as ACL) and by VIVA management software.

The first, built with **DSP technology**, integrates all of the test capabilities and enables the test execution in fully-automated mode; further, the communication with the monitoring PC is performed via optical fiber cable, in order to reduce sensitivity to external interference, and ensures electrical separation between the Main Computer and the measurement equipment.

The second, designed with a simple and intuitive logic, enables the operator to handle the tester autonomously and to perform the automatic test routines. Specifically, the so-called QuickTest module, a **graphical software** specifically created to compile and perform functional tests in very short times, enables the correct programming of all the resources available in the tester without knowledge of the internal architecture nor of a specific programming language.

The use of the same hardware architecture will allow the integration of third-party' languages and sequencers like Labview™ and Test-Stand™ by National Instruments™, thus enabling the user to use both its consolidated know-how and quickly integrating existing procedures.

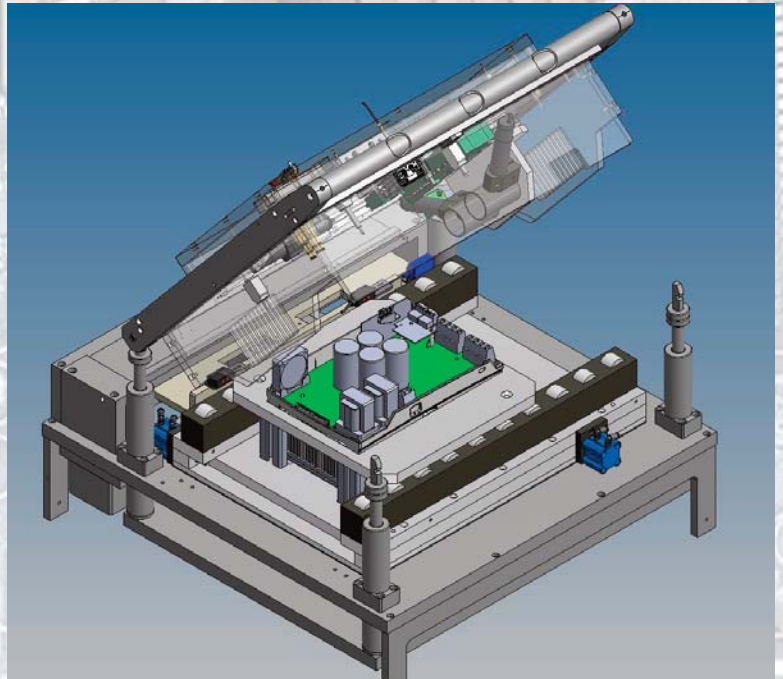


## SYSTEM DESIGN

The Compact Power system may be considered as consisting of two separate parts. The first is the electronics required for testing, while the second includes all the customizations and specific elements to implement the test specifications.

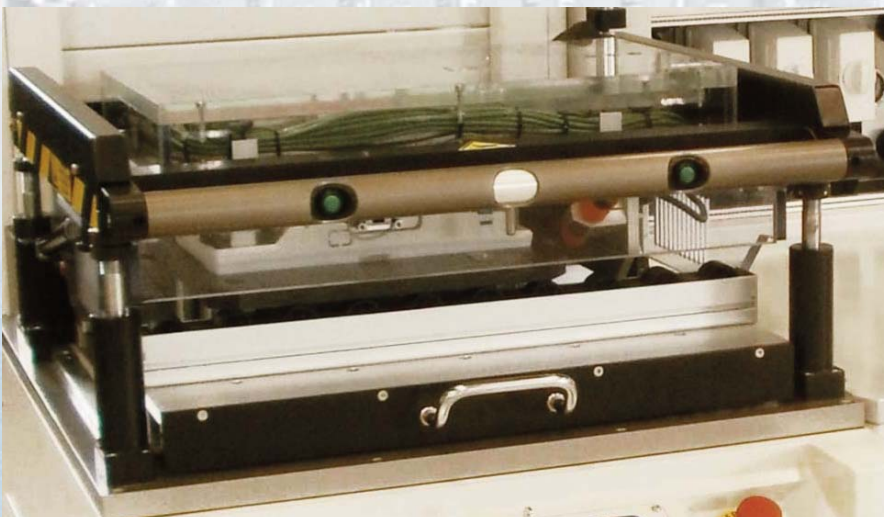
The test electronics is based on Seica modules including the ACL (internal driver and measure system tools, used by all Seica testers), the S64H (general purpose scanner board with high-isolation relays, capable of connecting up to 64 points to the 8 analog lines) and the IFUN.

The latter module may host multiple customizations, among which include 16 digital-analog converters and allows management of hardware and software synchronism among the circuits involved in the voltage measurement up to 500V.



As mentioned, in the system are installed the elements needed for correct simulation and management of the power signals:

- ⇒ **AC Group:** is the Management Module for system safety unit and power commands using a static switch contactor. It is equipped with the thermal magneto and differential switches.
- ⇒ **Frequency converter:** it consists of programmable voltage power supplies able to output 10 KVA single-phase or 30 KVA three-phase with selectable frequency 50 / 60 Hz and programmable voltage in the range 50 to 280 VAC phase, which corresponds to a combined three-phase voltage of 480 VAC. This power is supplied to the DUT through transducers which allow measurement, monitoring voltage and current on all the phases in use.
- ⇒ **Load simulator:** The load on DUT output is implemented with a static system, so to prevent rotating mechanical parts which would drastically shorten its lifecycle. This load is implemented via a sinusoid reformer, an insulation transformer and three PFC (Power Factor Correction) absorbers, which simulate the behavior of the motor.
- ⇒ **Transducers:** implemented with insulation amplifiers, allow to monitor and acquire the three phases of motor input/output.
- ⇒ **Actuators:** the availability of TRIAC actuators allows to simulate possible leakage in short-circuit towards GND and between the phases, through an overall verification of the protections presumably existing in the DUT.



The solution is necessarily completed with a receiver and related test-fixtures dedicated for the different types of products to test. Aiming to guarantee the best contact and signal management, the system-to-fixture connection is implemented via quick ODU-type connections. The fixture is manually connected to the DUT, possibly assisted by a pneumatic piston if requested, as well as the DUT positioning. To further ensure safety the solution is delivered with a protection cover equipped with safety switch and transparent inspection window.

## ENERGY RECOVERY

A tester for power modules implies by necessity the use of a considerable amount of energy. Aiming to reduce this consumption, Seica has installed into the Compact Multi an inverter, which is able to recover most of the energy employed. This will achieve both a direct saving on the energy consumed by the system (over 80% of the energy supplied to the load is recovered) and an indirect saving on the air-conditioning /cooling system needed to dissipate the heat produced by the load. The result is a reduction of costs and a more eco-friendly system.

## SAFETY AND INTEGRATION WITH EXTERNAL INSTRUMENTS



The Compact Power test system has been designed and manufactured in accordance with the main safety requirements set forth in the directives concerning the electromagnetic compatibility and electric safety.

The compliance with the aforementioned directives minimize the risks for the operator, both during the ordinary system operation and the maintenance activity. In fact, the system is equipped with safety devices like magneto thermal and differential protections.

Since tests require very specific performances, the Compact Power allows the integration of specific external equipments, like the tool for electrical safety tests, configurable for high voltage tests with the instruments housed in the 19"-rack. All of this allows for a simple integration and test strategy.

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