

Real Time RTC 9001 and 9000 Controllers with RTC Software



The RTC 9000 controller range has been developed and assembled in Italy, using the best available technologies. The control system, in the new single-axis RTC 9001 version and the new RTC 9000 version with up to 4 axes, is designed to perform precise and reliable mechanical structural tests, allowing for the management of different types of actuators and motors. RTC 9000 can perform static and cyclical tests controlling Force, Displacement, on Auxiliary Channel +/- 10 V and on Incremental Encoder. The system is configured in pneumatic mode (P) for the management of pneumatic actuators, electric mode (E) for the management of electric actuators or hydraulic mode (H) for the management of hydraulic actuators

Applications



- 1 STATIC YIELD/FAILURE TESTING**
on composite materials and dental implants, etc.;
- 2 STIFFNESS TESTING** on single and assembled components, metal, plastic and composite material products, 3D-printed and biological material products;
- 3 DYNAMIC TESTING** with sine, pulsed square wave with settable duty cycle or constant speed triangle wave (e.g. for characterisation of suspensions/shock absorbers);
- 4 CONSTANT AMPLITUDE FATIGUE TESTING**
to determine the life under cyclic/repeated loads for any type of component (Wöhler curves);
- 5 CONSTANT AMPLITUDE BLOCK FATIGUE TESTING**
for the determination of the Palmgren-Miner relation and of the actual damage value;
- 6 VARIABLE AMPLITUDE FATIGUE TESTING**
using the reproduction/simulation in the laboratory of real world load curves acquired on-site;
- 7 REPRODUCTION OF LOAD CURVES**
Defined by the user during design phase, simulation of seismic tests.

Controller model	Control procedures	Test mode	Type of actuators	Number of axes	Multi-axis extension	Extension with ET-4C-R01 board
RTC-9001	Force Displacement Aux Encoder	Axial Torsional	Pneumatic Electrodynamic Electromechanical Servo motors Brushless Motors Hydraulic	Single-axis	No	Yes
RTC-9000-1				Single-axis	Yes (2 axes) Yes (4 axes)	Yes
RTC-9000-2				2 axes	Yes (4 axes)	Yes
RTC-9000-4				4 axes	Yes (max 4 axes)	Yes

RTC 9001 - Single-axis controller

The RTC 9001 controller is the entry-level model in our RTC controller family. It is non-expandable, and can control only one axis.

The control modes are identical to those of the multi-axis model:

- Displacement control test
- Force control test
- Control test with aux 1 channel (analogue auxiliary channel +/- 10V, 16 bit)
- Test with Encoder channel control

RTC 9000 - Multi-axis controller

RTC 9000 is a real time control system for multi-axis static, cyclical and fatigue tests. The RTC 9000-1, RTC 9000-2 and RTC 9000-4 multi-axis models are available according to the number of active channels.

The system can be extended at any time by simply purchasing the activation licence for the required number of axis without any further hardware implementation.

The unit ships with the standard RTC 9000 software, with a control window for each active axis.

Both the versions of the controller, RTC 9001 and RTC 9000, can be used for static, dynamic and cyclical tests on different types of actuators:

- Pneumatic actuators
- Electromechanical actuators
- Electrodynamic actuators
- Hydraulic actuators
- Brushless motors for torsional tests

RTC 9000 Performance

The whole system is equipped with an FPGA board with very high-speed control electronics required to acquire the signals coming from the sensors and to close the PID control loop which is performed at a frequency of 1000 Hz. The system is also provided with an integrated Real Time Processor which generates various wave forms to be performed by the connected actuator or motor.



TECHNICAL SPECIFICATIONS

	RTC-S (Slim)	RTC-9001	RTC-9002	RTC-9004
RTC Real Time Controller	Yes	Yes	Yes	Yes
Processor	Dual core 667 MHz			
Force Channel +/-10V, 16 bit	Yes	Yes (1)	Yes (2)	Yes (4)
Displacement Channel +/-10V, 16 bit	Yes	Yes (1)	Yes (2)	Yes (4)
Auxiliary Channel +/-10V, 16 bit	Yes	Yes (1)	Yes (2)	Yes (4)
Encoder (8000 v pulse/rev or more)	Yes	Yes (1)	Yes (2)	Yes (4)
PID output voltage	+/-10V			
PID Loop Control Frequency Standard	1000 Hz			
Safety limits	Yes	Yes	Yes	Yes
Panel emergency stop	Yes	Yes	Yes	Yes
Remote emergency stop	Yes	Yes	Yes	Yes
PC connection	RJ45 Ethernet Cable			
Extension 4 channels in reading ET-4C-R01	Extension with board for 4 channels in reading (requires software extension)			
Power supply	110-230 Vac / 50-60 Hz			



RTC 9000 Performance

The RTC 9000 controller is connected with a RJ45 network port to a PC (Windows 7 or Windows 10) with the RTC 9000 control software installed. From the simple and easy-to-use user interface, operators can manage settings for the following test parameters:

- Set-point (end point)
- Load or displacement speed
- Cycle amplitude
- Cycle frequency
- Type of wave shape (ramp, sine, square, triangular and user customised)
- Safety limits
- PID coefficients of the control cycle
- Setting the recording and display modes for the acquired values



- » Graphical display of the sensors in the time domain;
- » Graphical display of the max-min values according to cycles. Ideal for cyclical and fatigue tests;
- » XY graph display with user-selectable sensors;
- » Graphical display of load and displacement for static tests;
- » Graphical display of hysteresis for static and cyclical tests;
- » Setting sensor parameters for each single channel

Software SS 9000 and Tools

The SS 9000 software includes specific tools for different applications. The software tools can be activated remotely with a software licence at any time.



SCOPE Software Tool

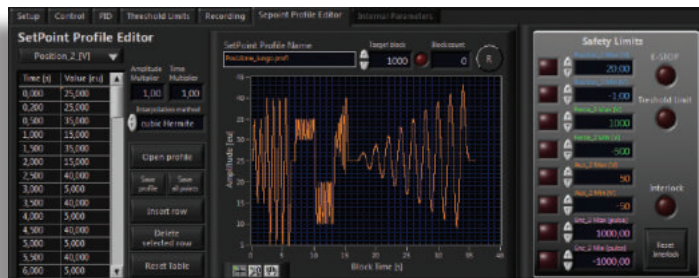
The software licence provides for the activation, display and registration of the values of the 4 reading channels of the controller. Channels are synchronised with axis 1 of the controller and the values synchronised with the control commands.

SHAKER Software Tool

The software licence allows for the running and management of the VIBRO 8000 exciter.



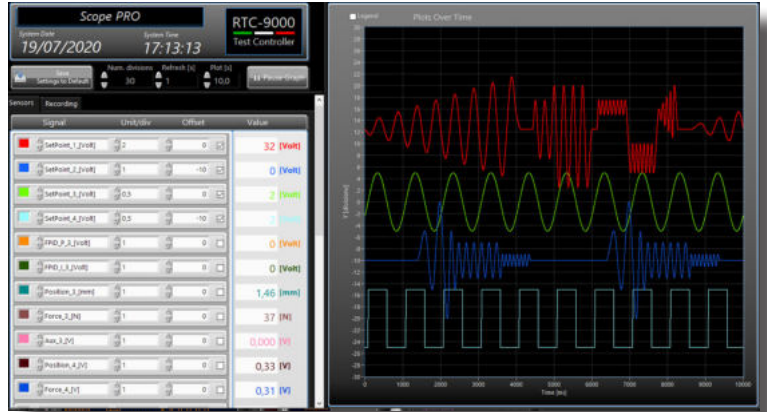
PROFILE EDITOR Software tool



PROFILE EDITOR Software tool
The software licence allows you to create a test profile which will be executed by the actuator. The profile can be executed with any type of control mode permitted by the controller (force, displacement, AUX and encoder).

SCOPE PRO Software Tool

The software licence provides for the activation, display and registration of the values of the 4 reading channels of the controller. In addition it allows you to consult all the values of the actuators and of the recording channels simultaneously.

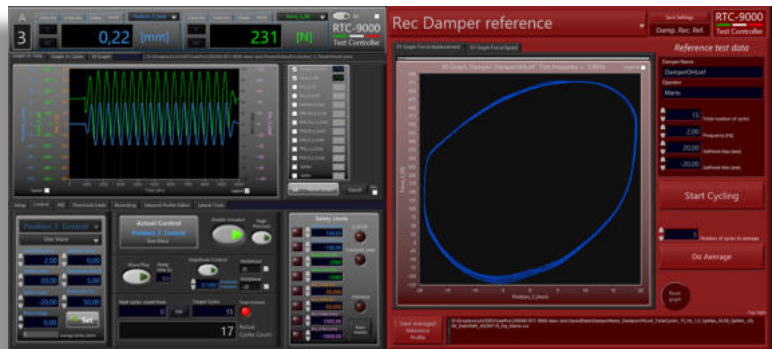


TIME Software Tool

The software licence allows you to run cyclical tests with duration based on time and not on the number of cycles.

DAMPER Software Tool

The software licence activates the Damper function which is essential for shock absorber tests.



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