

THYMOS - A PORTABLE OPEN HARDWARE TESTING DEVICE

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In the current era of easy availability of rapid prototyping means and the quest for customization of nearly every industrial product this contribution aims at providing an exposition on Open Hardware based high precision mechanical testing frame for experimentation on small-to-medium size samples under the loads up to 50N supported by the contact-less DIC control system.

Physical testing is usually very expensive and time demanding activity. To prepare a large scale test with complex boundary conditions usually requires careful experiment design and availability of suitable equipment. Many scientists and lab workers are familiar with situations when waiting days or weeks for the testing time on a large scale expensive machine that may be only one available at the institution. Then, after making pilot tests and postprocessing first results, they start to see weak aspects of their experimental setup, such that could not be revealed by a numerical analysis, however, could be seen on a much smaller scale physical experiment, if they have a portable small scale testing frame as Thymos on call.

In this contribution we discuss Thymos hardware solution, a portable self-replicable small scale testing frame that itself can serve to test samples/products (e.g. solder joints in miniaturized electronic devices) under reasonably small loads or as a tool to support proper design of expensive experiments in a proof of concept phase in academic institutions and/or R&D departments of private bodies.

Optical observation of results (DIC supported measurements) are the state-of-art component of the majority of all mechanical tests performed today. Last but not least, DIC thus plays a fundamental role also within the Thymos solution discussed here. Namely, it is at the heart of its contact less control system for tests controlled by linear combination of nodal displacements chosen arbitrarily at the testing domain monitored by an optical camera.

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