

CMS programme functions – brief introduction

CMS programme – Control and Monitoring system (CMS)

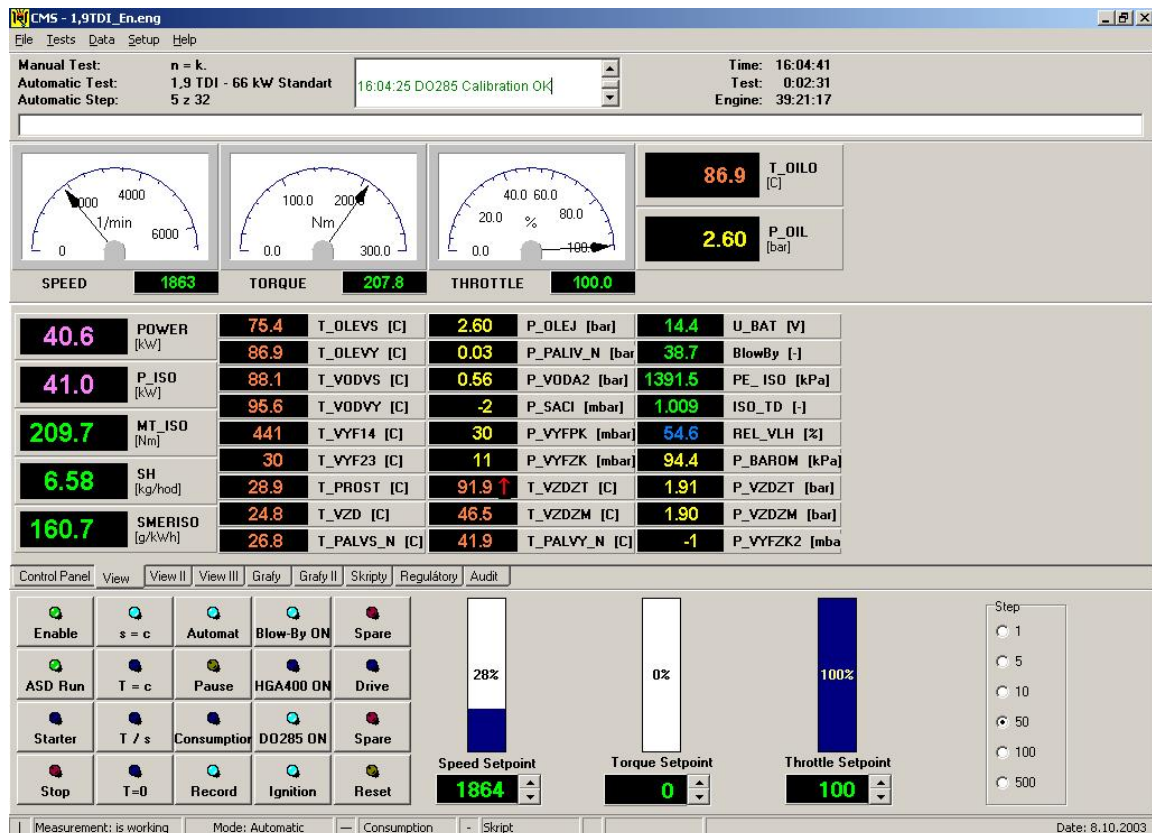
- **measures**,
- **displays** and
- **records** a great number of magnitudes monitored throughout combustion engines testing .

CMS not only displays measured values, but it also

- **enables control of the engine under test** and
- **operates in variety of modes**.

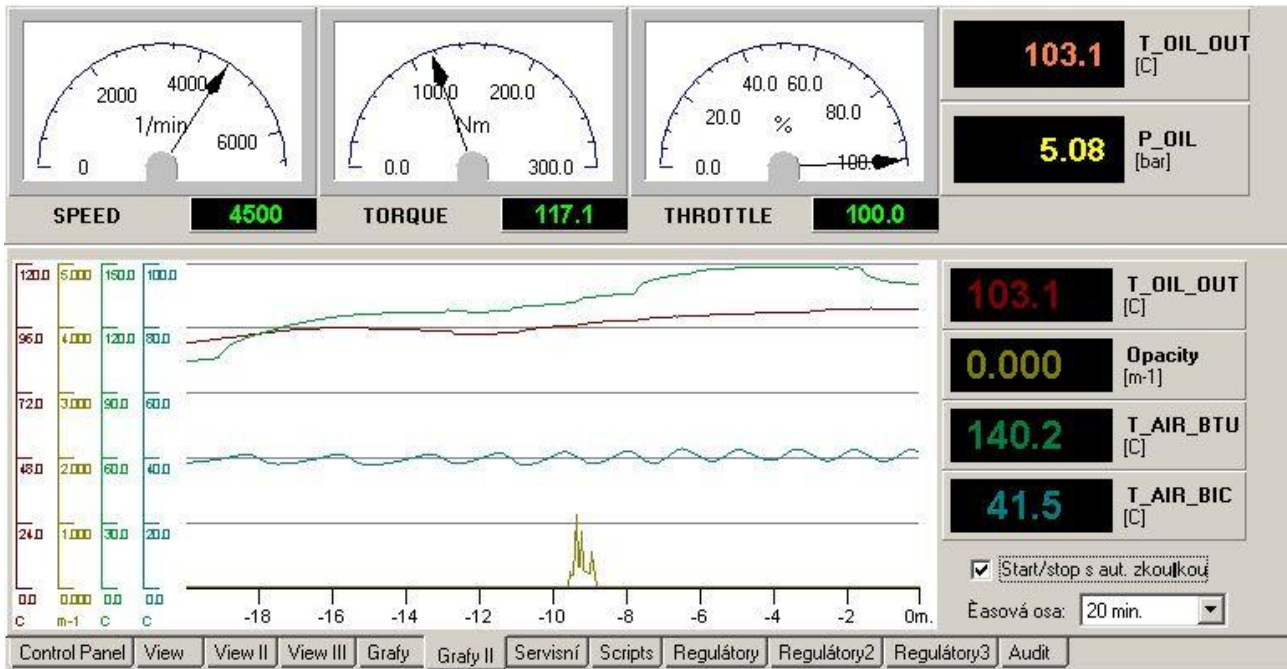
Any of the measured magnitudes can be displayed in many ways (they are saved in data files in a computer harddisc). It can be print in data file protocols.

In *picture 1* there are some measured and calculated magnitudes displayed in digital and analog format



Picture 1: The basic CMS window

This is the most common way of representation, but the measured and calculated magnitude can also be displayed as a time relation in a progress chart (picture 2).

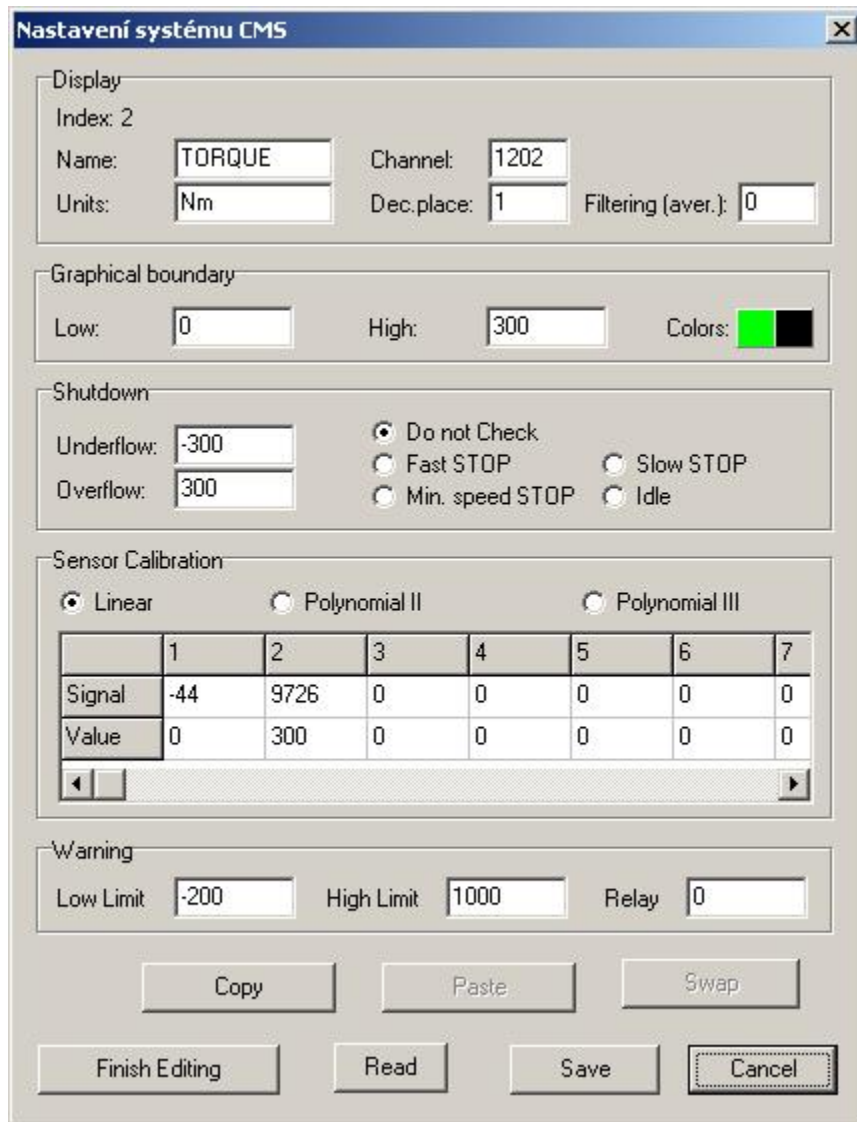


Picture 2: Representation of selected time-related magnitudes

CMS set up is flexible to a great extent. It can be easily adapted for

- a particular engine type (corresponding with so called Engine Prescript)
- and a variety of programme users requirements

Therefore characteristics of any of the measured magnitudes (like range, calibration, filtration, decimal place, warning and emergency limits) can be easily set.

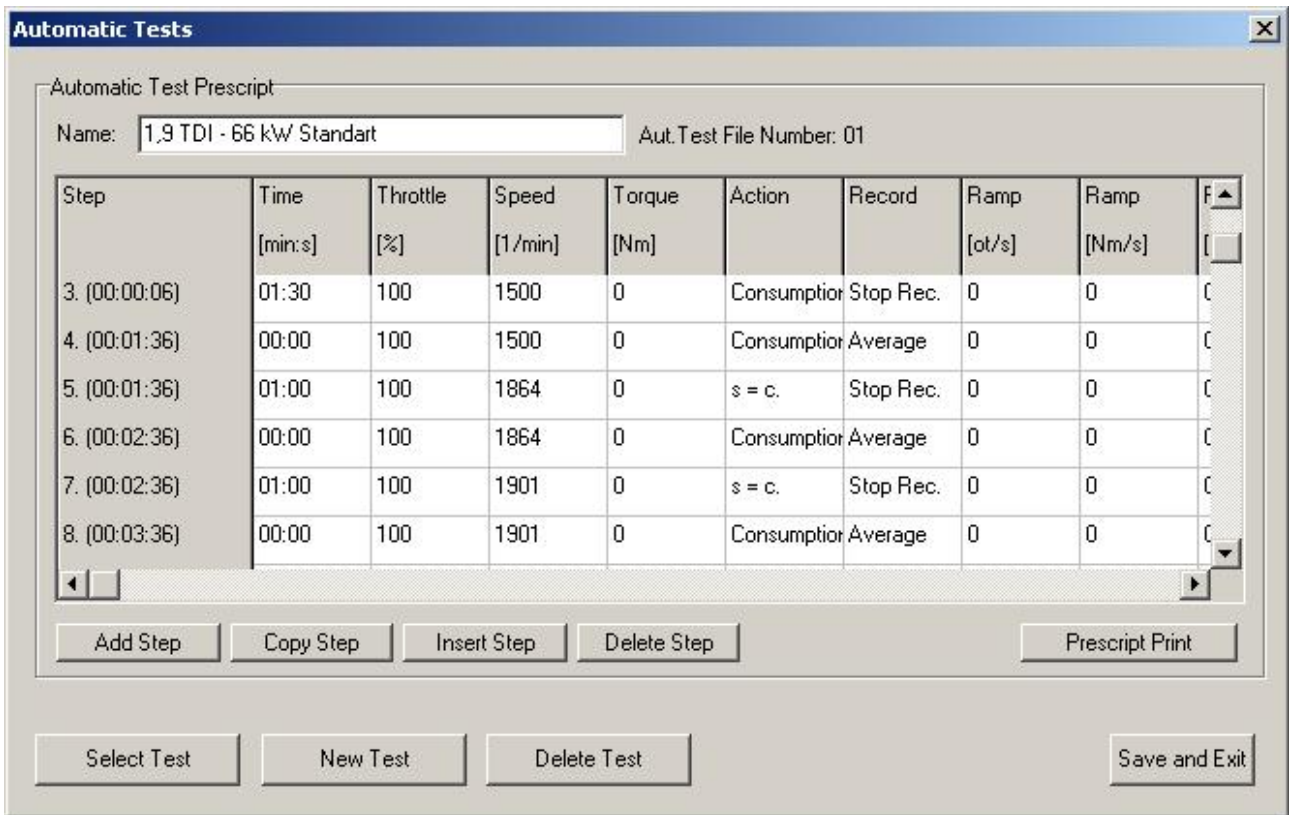


Picture 3: Measured value configuration window

Automatic Tests

CMS allows that a combustion engine can be controlled

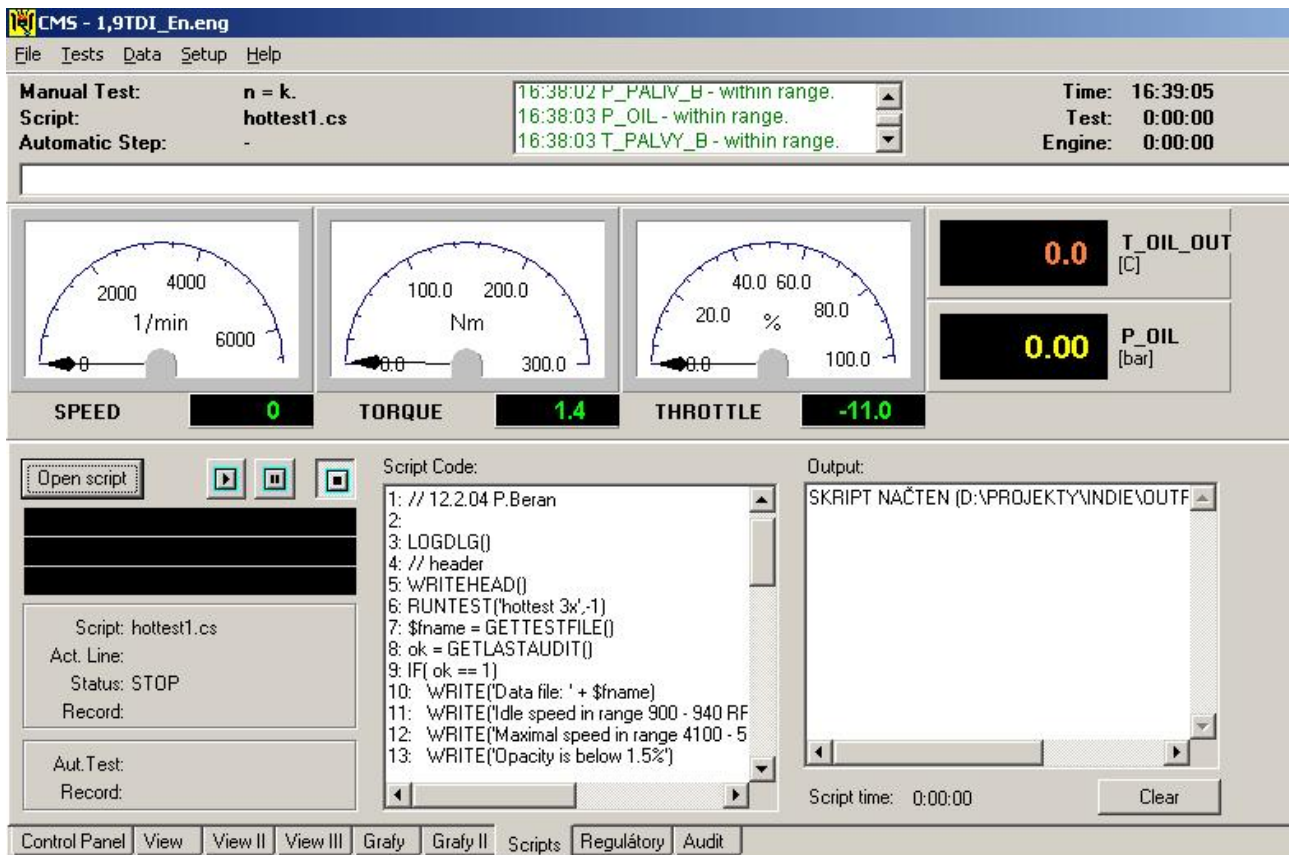
- either manually
- or automatically by means of Automatic Tests. To prepare the Automatic Test we need to fill in a table, which describes duration of single steps of the test and the engine operating mode in the particular step.



Picture 4: Automatic Test Prescript Table

Scripts

In case, that the engine test will be more complex (for example a long-term test with repetition of several cycles), it is advantageous to use so called **scripts**: a simple programming language, that enables for instance cyclic starting of automatic tests but also many other tasks using CMS for automated production of combustion engines. Programming with scripts needs experience with some of programming languages.



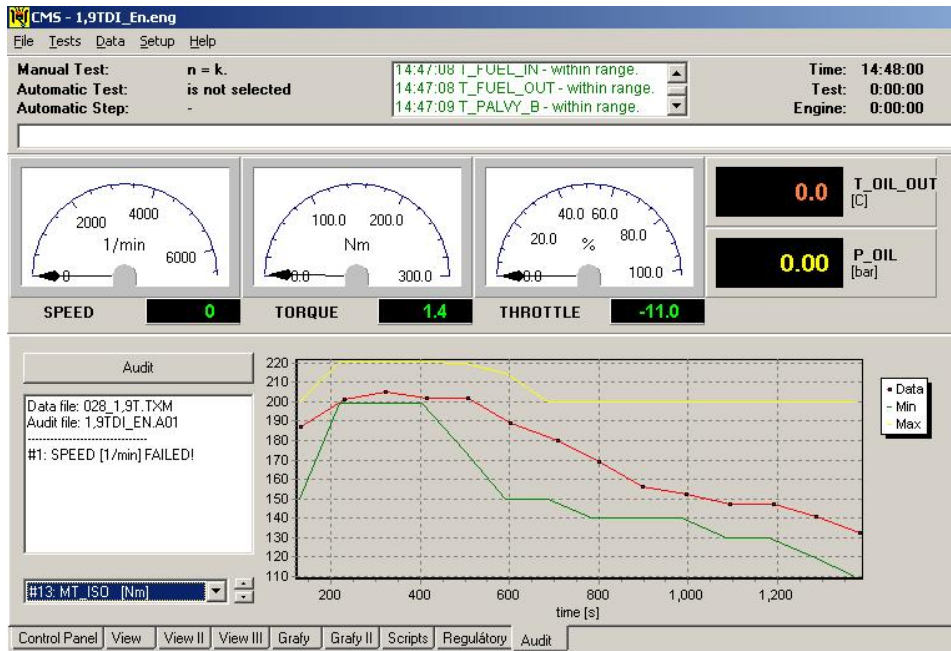
Picture 5: Scripts Window

Audit Program Unit

CMS Audit Program Unit checks if values of selected magnitudes of an engine under test remain in a predefined range, in so called "tolerance field". For particular Automatic Test, Audit Program Unit enables

- to create easily a "tolerance field" for any of measured or calculated magnitudes
- to check exceeding of the predefined limits throughout the testing.

To make automated testing of combustion engines more effective, the Audit Program Unit can be interconnected with Script Program Unit.



Picture 6: Audit Program Unit Window

Database Server

In case, that there are several CMS Brake Benches at a plant, it should be equipped with a Database Server. CMS is prepared to cooperate with it and supply it with data of all the completed tests. By means of the Database Server all the data are gathered in one place, which simplifies archiving and searching records about tested engines. The data can be searched according to various criteria, for instance: date, time, engine factory number, successfulness of the test, testing stand etc. The criteria can be combined. The Database Server operates in MySQL database programme, but it is possible to use different database programme based on SQL query language.

CDA Programme

If you find CMS standard data representation unsatisfactory, the data acquired by CMS can be processed by CDA Programme (CDA). CDA offers

- fast and well-arranged data evaluation and comparison and
- spreadsheet graphic data output and protocols.

CDA is designed as a modular system, which uses DLL libraries – DLLmodules. CDA can use unlimited number of the modules – prefabricated or designed according to end user's requirements. Standard supply contents four modules: two graphical and two tabular. The system offers wide spectrum of data processing and representation according to end user's individual concepts.