

## I. IDENTIFICATION DATA

<b>Thesis name:</b>	<b>Piston Temperature Measurement for a Spark Ignition Engine</b>
<b>Author's name:</b>	<b>Sugesh Balasubramanian</b>
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Mechanical Engineering (FME)
<b>Department:</b>	Department of automotive, combustion engine and railway engineering
<b>Thesis reviewer:</b>	Ing. Vít Doleček, Ph.D.
<b>Reviewer's department:</b>	CTU in Prague – FME, Department of Automotive, Combustion Engines and Railway Engineering

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b> <i>Evaluation of thesis difficulty of assignment.</i>	<b>ordinarily challenging</b>
The thesis is focused on complete design and implementation wireless piston temperature measurement acquisition system into prototype engine. The first part deals with connection of measurement system on engine movable parts and thermocouples connection with piston. The second part is focused on data acquisition system programming in LabView software tool.	

<b>Satisfaction of assignment</b> <i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	<b>fulfilled</b>
Assignment was fulfilled completely without any objections.	

<b>Method of conception</b> <i>Assess that student has chosen correct approach or solution methods.</i>	<b>correct</b>
The brief research of applicable solutions of wireless temperature measurement system does not result into critical selection of the best suitable solution. Instead of selection, one existing measurement system is described and its implementation into engine was part of the following work. Dynamic forces acting on measurement system were calculated and all connecting parts were checked from material strength point of view. The last part deals with programming of communication with wireless measurement system, measured temperatures processing, averaging and storage.	

<b>Technical level</b> <i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	<b>E - sufficient.</b>
Technical solution of measurement system connection to piston and connecting rod lacks any boundary limitations given by used engine. I miss description of free space around crankshaft in crankcase and description of possible entrance into engine block for wireless measurement system maintenance and battery charging. Thermocouples are connected to piston by glue. Nevertheless, used thermal compound Arctic Cooling MX-2 is considered as a glue. Movable wires from piston to transmitting units are not checked for possible collision with crankshaft and cooling piston oil jet spray (if is used, which is not clear from the work). The second part describes communication with wireless model and its implementation in LabView program. The program also checks for possible communication error. Measured data are than averaged and stored into file. Example of data export file shows only measured temperatures without time trace of measurement. Time information is key for proper synchronization of all measured signals on the engine and independent measurement system should be on the time basis.	

<b>Formal and language level, scope of thesis</b> <i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	<b>D - satisfactory.</b>
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Typographical arrangement of the work is on a good level. The paragraph titles, figures and equations are numbered according to demands claimed on diploma thesis. English grammar of the work is on poor level and it contains a lot of typing errors. Some figures are mirrored and difficult to read.

### **Selection of sources, citation correctness**

**D - satisfactory.**

*Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.*

Used sources are cited in a text according to citation norm. Nevertheless, the list of references are described with only few information, which makes almost impossible to track the sources. Name of Authors' are shorten only to the first letters of their names. Some sources contain only source name.

### **Additional commentary and evaluation**

*Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.*

Please insert your commentary (voluntary evaluation).

### **III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION**

*Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.*

I would like to ask following questions:

- Is there sufficient space under the crankshaft inside crank case without danger of wireless module collision with engine block or oil in oil pan.
- How the data are processed and stored in measurement acquisition system?

I evaluate handed thesis with classification grade **E - sufficient**.

Date: **30.1.2019**

Signature: