SUMMARY IN ENGLISH

In the modern world the robotics sector is a highly developed industry, which still has great potential for development. By applying robotics, many processes have been automated. Many processes which required human labour are successfully accomplished by the robots. The tasks with the high complexity level are easily done by robots. However, machine automation is still a subject for further advancement and many recourses are applied to it. This thesis has also been oriented on automation processes. It describes development of the positioning system, external axis rotary table for the ABB industrial robot with the Nikon scanner.

The first step of the development process was to choose the best solution for the rotary table. Four main solutions have been reviewed: fully manual solution, fully electronic, half-electronic with the electronically rotated table top, and manual height adjustment option and half-electronic with electronically adjustable height but manual top rotation. Half-electronic solution with the electronically rotating table top has been chosen for the further development based on evaluation performed.

The initial solution was considered to be with the direct transmission, the motor was attached in the middle of the holding plate. It inefficiently consumed the space on the bottom of the holding plate, which caused an issue regarding the leg attachment. Therefore, the motor was relocated, the gear transmission and the belt transmission systems were developed. As for the final solution gear transmission system has been used.

The parts were designed by the educational version of the SolidWorks. To confirm the ability of the parts, withstanding the dedicated loads, finite element analysis has been performed. Number of simulations have been implemented and studied. The test simulated the worst-case scenario situations with the higher loads than the structure would had to withstand in real-life exploitation. The tests have proven that the structure of the rotary table is fully capable to operate.

The thesis was mainly oriented on developing the mechanical solution. By the end of the process all the necessary parts were available for the production. The parts have been created, tested and the mechanical drawing has been produced. All the necessary parts which were not produced within university have been searched and chosen from the different providers.

As for the electronical solution, it has been created on the level of the flowchart. Some components of the electrical solution have been chosen. However, it is subject for further development. Electronical

solution description given in this paper provides the basic information regarding the electronics needed for the structure. The solution explains the basic principal of circuit and method of controlling the DC motor.

As for the further enhancement of the electronics of the rotary table, the following implementation should be beneficial. The rotary table should have the tight communication with the robot. It should understand the signals coming from the robot, like to make a rotation or rotate to the home position. The rotary table should forward the information of the task execution, when the movement is complete and when it is ready to start scanning, to the robot.

To summarize, the assignment was aimed to create an external axis system for scanning. The mechanical part of the project is fully complete and ready to be executed. Present paper also gives information on required electronic solution to support the described system operation. This model can be operated for the different tasks including scanning operation, where the need of external axis occurs.