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Robot ABB IRB 360 Applications in the Learning Process

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Abstract Teaching and working with robot ABB IRB 360 FlexPicker, located in laboratory of industrial robotics, we need to modify the air distribution. The aim is to make students work with robots and air distribution.

Keywords: *DSM modules, robotic arm, kinematic structure, DOF*

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1. Introduction

Each technical university was faced with a problem as to motivate students to better results. Our goal is to teach students to work with robots routinely deployed to industry. The main is range of robots representing greater use of robots with kinematic structures which students can meet.

2. Robot ABB IRB 360

Robot ABB IRB 360 is representative of a robot group known as parallel robots. The main objective of these robots are handling operations increasing efficiency palletizing and reloading of.

Figure 1. Robot ABB IRB 360 FlexPicker [1]

The robot ABB IRB 360 robot is called delta robot. That is, the movable base is in motion, always in horizontal position. Load capacity of our robot is 3 kg. The robot has three movable arms and one rotary axis.

3. The Objectives of Study

As mentioned, the goal is to teach students to work with robots. Graduate does not need to be an expert who is specialized on ABB robots. The aim is to teach students to logical thinking when working with the robot. That is why we take a comprehensive teaching and learning as students work with robots as a whole. However, we emphasize the individual functional blocks robots.

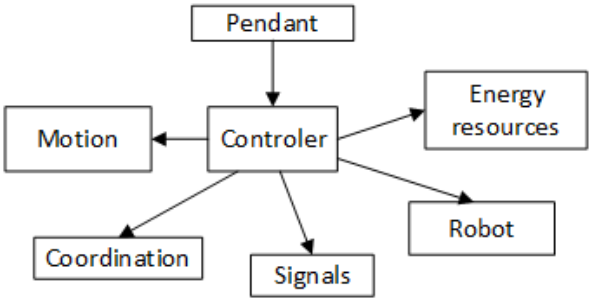

Figure 2. Overview teaching section

The first and main point of contact with the student with the robot is to teach students what should be observant of the robot. Description of robot mechanism. The principles of movement and basic description of the movement of individual arms.

Controller is the second part of the robot base with which students are acquainted. Students are not trained for service technicians. This means that you get a brief description of the essential elements. Their task is not to learn memorize parts of controller.

During the semester they are further acquainted with counterpart. He learned to speak and use the basic settings. The result of their efforts must be camera shake and robot navigation to desired points.

With regard to students without technical secondary education it is necessary to go through all the basic features.

Figure 3. Controller IRC 5 [1]

Figure 4. Pendant for ABB IRC5 [1]

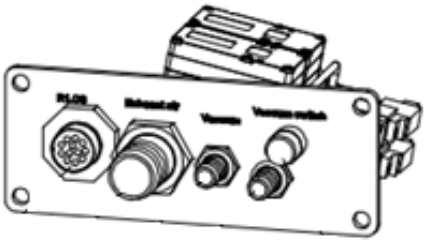

Figure 5. Panel for connections compressed air [1]

Figure 6. External vacuum connection

This includes familiarity with the electrical supply and compressed air supply. To better understand this information is drawn connecting the robot to power so that it can be easily disconnected from the robot's energy and thus allow students access to management of robot and drive. With samples of compressed air is a problem only if the IRB 360 is an air distribution system located in the body of the robot. Precisely because of the imposition of the robot IRB 360 is required for educational purposes modify the air distribution so that this distribution easily accessible and visible at the same time it is easily configurable.

So that students learn the economic operation of the system was adjusted to a low power vacuum. That we teach and students. Minimizing and maximizing spent medium obtained profits. Thanks to convert external air distribution is teaching easier and achieve better outcomes for students and increases their ability to successful deployment in practice.

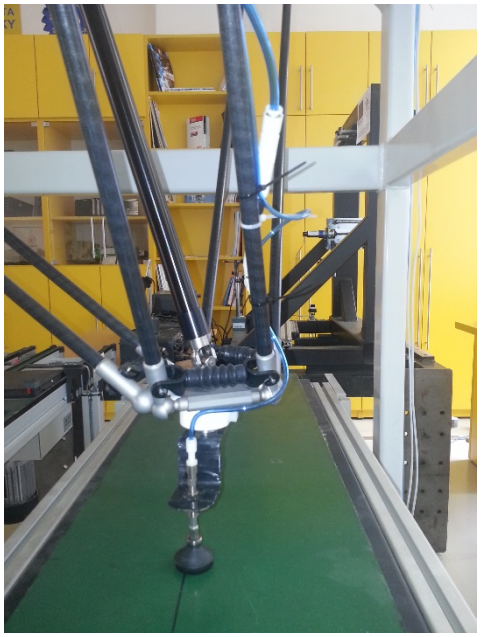

Figure 7. Check valve

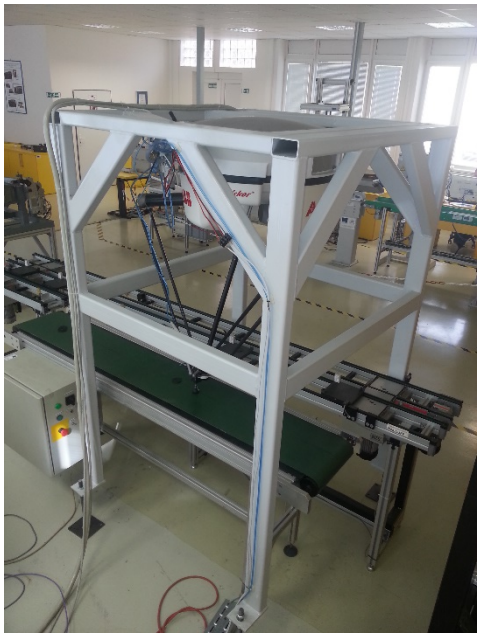

Figure 8. Our IRB 360 workspace

4. Saving Compressed Air

The main parameter in the technical practice is the cost of production. It is essential for this parameter to be taken into account when teaching future workers for industry. [4] The production of compressed air is expensive and the economic consequences are not negligible when misused.

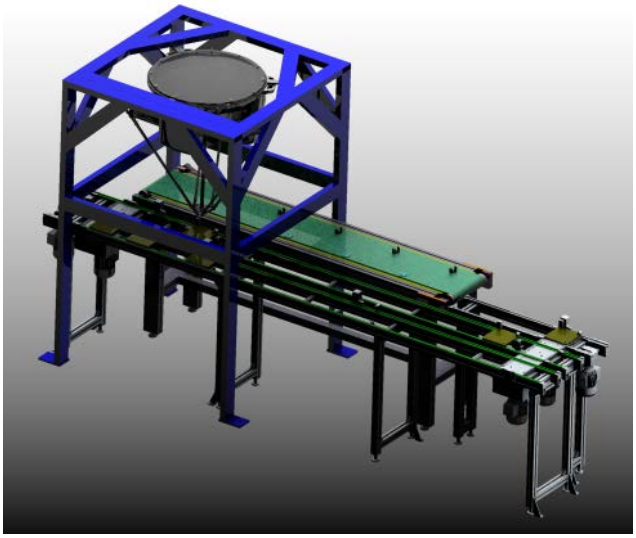

Figure 9. Model of training center [3]

The solution offered in the IRB 360 robot is advantageous for the use of the robot in steady state. To use the robot for simple operations and especially if it is necessary to save compressed air, this solution is inappropriate. We dispose of a 1100-liter compressor. With repeated cycles when it is necessary to grab the sink and move it, the compressor is overloaded. Demonstrations for the public and for students are frequent at our department, and their effect is often on the compressor. This means that if a robot is used for pick & place operations and a small volume of air is available, it is advantageous to use a modified air distribution.

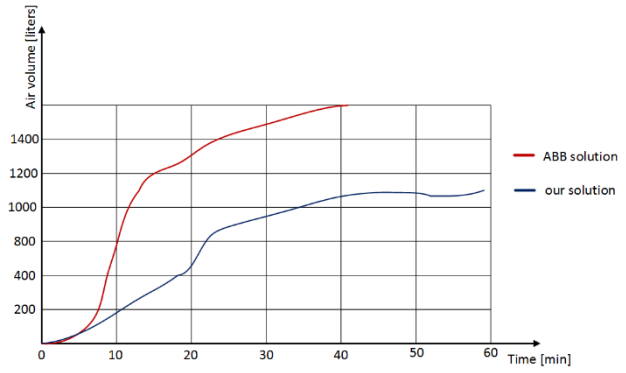

Figure 10. Air consumption

To compare our solution, we used a program of 4 points. The robot gets 2 times for each position. The test is based on the primary focus of the robot. The robot grabs the component with a sucker and transfers it to the other conveyor. This cycle was repeated for 60 minutes. Thanks to our solution, the compressor switching capacity has been reduced and consumption has been significantly reduced.

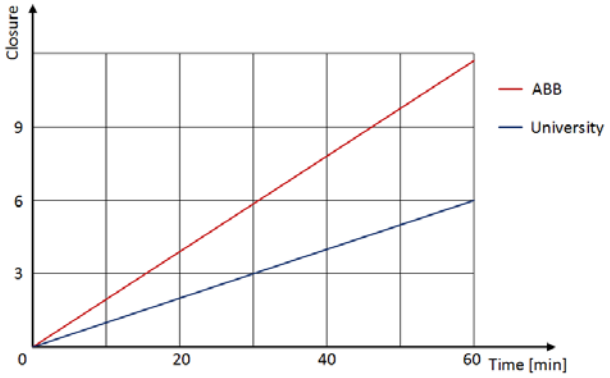

Figure 11. Number of compressor starts

5. Conclusion

Modifying air distribution for our needs has saved our compressed air production costs and reduced compressor maintenance costs. At the same time, this test offers an opportunity to clarify the economic impact of the technical parameters of the plant. Future workers have information about how to optimize production. This makes it possible to increase the competitiveness of businesses. This is also associated with productivity gains.

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