

ROBOT VIRTUAL PENDANT LABORATORY EXERCISE 3

COMPLETING A TASK USING THE ROBOT WITH THE RVP

NAME: _____ DATE: _____ SCORE: _____

Points Possible:

Ability to manually manipulate the robot arm within the current limitations of movement, using the RVP, to complete the task with 80 - 100% accuracy will result in 100 points awarded.

Performance Plan: After completing previous lessons and labs, this lab will allow the learner to apply the knowledge gained to perform a simple task using the RVP to control the robot arm. The task will replicate a simple ***pick and place procedure*** that will move a product, using the RVP to manually control the robot arm, from one location to a location marked with yellow tape on the work surface. Further proficiencies will require use of the knowledge gained from this exercise to perform programming the robot, using the RVP, to perform this same task.

Equipment Required:

- Computer with the RVP program preloaded
- Keyboard
- Mouse
- Lab-Volt 5150 robot arm
- Product to be moved
- Specified location marked with yellow square for product placement

Discussion: Familiarization is the first step to learning controls and associated movements of a robot arm. Being able to effectively manipulate the robot arm to complete a task is an important part of the learning process for operators, skilled technicians, and robotics setup and programming personnel. This exercise will build on the familiarization exercises conducted in previous labs and help the learner to gain skill and experience in manipulating the robot arm using the RVP. This exercise in manipulating the robot arm using the RVP to complete a specific task is essential for the learner to gain experience to accurately and effectively move and teach the robot movements that will be required for future labs.

Objectives:

Upon completion of this lab exercise students will be able to:

1. Successfully manipulate the robot arm to the location for product pick.
2. Pick product without dropping it or running the product or robot into any obstruction.
3. Relocate the product to the specified location.
4. Return the robot arm to the pick location for the next product to be moved.

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Procedures:

Use RVP to Control the Robot Arm to Pick and Place Product

- I. Product comes onto an outfeed conveyor and stops at the end of the conveyor similar to the one shown in Figure 3-1. Using the RVP to control the robot arm, learners must manually operate the robot to maneuver from the **Home** position to the product and then successfully remove the product from the conveyor, while meeting the following conditions. Note: The Home position is a preprogrammed position that is the starting point for the robot. The robot completes a Hard Home when learners enter the RVP system and this is the starting position.
 - Product must be removed from the conveyor without the product or the robot coming in contact with any part(s) of the conveyor or other obstructions.
 - The product cannot be dropped, therefore learners should insure grippers are closed firmly.
 - The product cannot be knocked over or knocked off of the conveyor during the pick procedure.
 - The product cannot be dropped during transport.
 - The product cannot extend past the outer edge of the yellow tape that marks the destination.
 - The product cannot be higher than ½" from the work surface when released from the grippers.

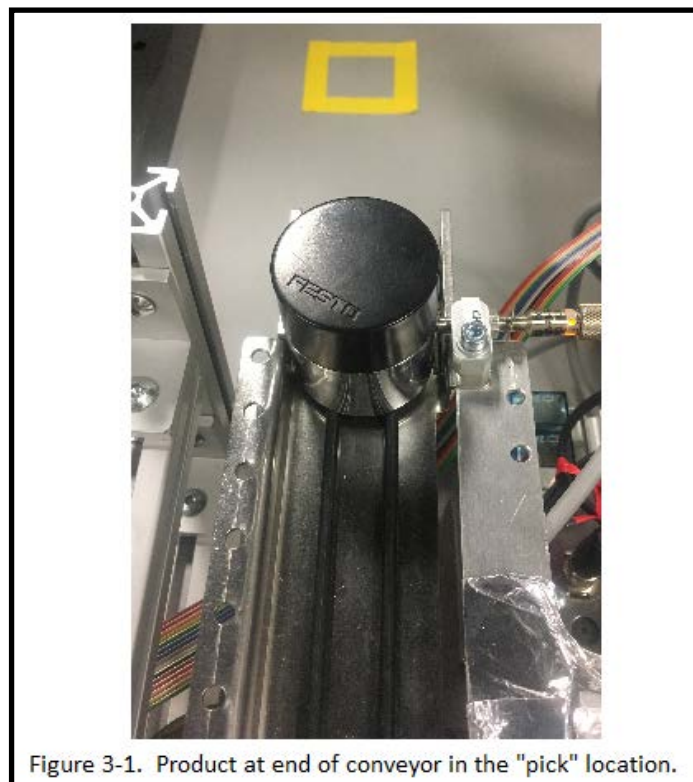


Figure 3-1. Product at end of conveyor in the "pick" location.

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Use RVP to Control the Robot Arm to Return to a Perch Position

- II. Robots are used in industry to perform repetitive tasks. This part of the exercise requires learners to return the robot arm to a **“Perch”** position above the pick point, where product stops at the end of the conveyor, to prepare for the next product transport. Using the RVP control, learners must manually operate the robot arm to maneuver to a perch point above the pick location, while meeting the following conditions.
 - The robot must be returned to the perch position without the robot coming in contact with any parts of the conveyor or other obstructions.
 - The perch position must be within 2” of the pick point at the end of the conveyor, but not closer than ½” of the total product height. The Perch position allows product to enter the point to be picked without colliding with the robot EOAT, while reducing the distance the robot has to move, to pick the next product, and therefore reduces process time.
 - The grippers must be open wide enough to allow the robot to lower to pick the next product without adjusting the grippers or base of the robot arm.
- III. When part II. of the exercise is complete, log out of the RVP system.
- IV. Notify the instructor that you have completed this exercise and you are ready for LAB 4. The instructor will score this lab and provide you with LAB 4.

END OF LAB 3

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RVP ASSESSMENT MATRIX		
Picking Product from Conveyor (20 points)	Points Possible	Points Awarded
Excellent : Picked product and removed from conveyor no restart	20	
Good: Correct pick of product with one restart	10	
Fair: Pick of product with two or more restarts	5	
Poor: Unable to correctly pick product	0	
Move without Dropping Product (20 points)	Points Possible	Points Awarded
Excellent: Never dropped product	20	
Good: Dropped product once and required restart	10	
Fair: Dropped product two or more times requiring restarts	5	
Poor: Unable to correctly pick product	0	
All Tasks Accomplished in Allotted Time (20 points)	Points Possible	Points Awarded
Excellent: In the allotted time and complete	20	
Good: 2 minutes over the allotted time	10	
Fair: Over 2 but under 5 minutes over the allotted time but completed	5	
Poor: Unable to complete in the allotted time	0	
Placing Product at Location without Collisions (20 points)	Points Possible	Points Awarded
Excellent : Placed product within specified parameters	20	
Good: Placed product slightly, but not more than 25% out of yellow lines	10	
Fair: Placed product 25% - 50% out of yellow lines	5	
Poor: More than 50% out of yellow line or unable to complete	0	
Completion without Collisions (20 points)		
Excellent: No collisions during exercise	20	
Good: One collision during exercise	10	
Good: Two but not more than three collisions during exercise	5	
Poor: More than three collisions during exercise	0	
TOTAL POINTS AWARDED FOR LEARNER PROJECT (100 Possible):		
Comments: Use this area to document observations and feedback notes.		