

ROBOT VIRTUAL PENDANT LABORATORY EXERCISE 2

CONTROLLING THE ROBOT WITH THE RVP

NAME: _____ DATE: _____ SCORE: _____

Points Possible: 43 Possible Points

Performance Plan: After completing LAB EXERCISE 1 and the Introduction and Familiarization lesson, this lab will allow the learner to use the knowledge gained to identify the various components of the robot arm and the corresponding movements of the robot arm using the RVP controller. This will be accomplished through manual control of the robot arm using the RVP, exploration, and observation of each RVP control and the associated robot arm movements. Further proficiencies will require use of the knowledge gained from this exercise to perform manual manipulation of the robot using the RVP to accomplish specific tasks.

Equipment Required:

- Introduction and Familiarization lesson for the Lab-Volt Model 5150 Robot Arm
- Computer with the RVP program preloaded
- Keyboard
- Mouse
- Lab-Volt 5150 robot arm

Discussion: Learning controls of a robot is an important part of the learning process for operators, skilled technicians, and robotics setup and programming personnel. Learning the controls, various axes, and the related movements will enable the learner to be able 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 log into the learner's RVP account and start the RVP controls.
2. After reviewing the lesson Introduction and Familiarization with the Lab-Volt 5150 Robot Arm:
 - a. Correctly identify the number of axes of freedom.
 - b. Correctly identify the robotics industry name for each axis.
 - c. Correctly identify the axis and expected movement(s) related to each RVP control.
3. Manually operate each of the RVP controls and explore and observe the movements of the robot arm associated with each RVP control.
4. Accurately document observations and findings associated with the exploration and observations.
5. Correctly and successfully log out of the RVP system.

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Procedures:

Identification of Robot Arm Axes and Controls

- I. After reviewing the Lab-Volt robot arm Introduction and Familiarization lesson, complete the following tasks. Use the robot arm and RVP picture in Appendix 'A' for this part of the lab.

Points Possible:

Correct identification of robot arm component by the industry name. (1 point each, 7 points possible).

- a. For each letter below write the correct robotics industry name for the axis identified in the RVP / Robot picture in Appendix 'A'. Write the name of the axis on the line provided beside the corresponding letter below.

A _____

B _____

C _____

G _____

H _____

J _____

K _____

Points Possible:

Correct identification of robot arm movement (1 point each, 6 points possible).

- b. Identify each of the robot arm axis movements (i.e.: up/down, rotate, in/out, etc...) For each letter below write the corresponding movement of the axis on the line provided beside the corresponding letter.

A _____

B _____

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C _____

F _____

D _____

E _____

Points Possible:

Correct identification of robot arm movement (1 point each, 6 points possible).

- c. Identify the name of the controls on the RVP that would control the movement of the axis of the robot arm indicated by each letter below. Write the name of the controls on the line provided beside the corresponding letter.

H _____

A _____

J _____

D _____

F _____

E _____

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Robot Control using RVP

Points Possible: 1 point each, 24 points possible.

II. Use what you have learned in LAB EXERCISE 1 and the Introduction and Familiarization lesson to help you complete the following tasks and to respond to the questions.

- a. Log into your account on the RVP system.
- b. Start the RVP control and complete the following tasks as specified:
 - i. Using the mouse pointer and click on the RVP BASE (+) control, several times, and observe the movement of the robot arm.

QUESTIONS:

1. What part of the robot arm moved? (Use the industry name)
 2. What direction did it move?
 3. What is different if you click on the BASE (-), several times?
- ii. Using the mouse pointer click on the RVP SHDR (+) control, several times, and observe the movement of the robot arm.

QUESTIONS:

1. What part of the robot arm moved? (Use the industry name)
 2. What direction did it move?
 3. What is different if you click on the SHDR (-), several times?
- iii. Using the mouse pointer click on the RVP ARM (+) control, several times, and observe the movement of the robot arm.

QUESTIONS:

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1. What part of the robot arm moved? (Use the industry name)
 2. What direction did it move?
 3. What is different if you click on the ARM (-), several times?
- iv. Using the mouse pointer click on the RVP PITCH (+) control, several times, and observe the movement of the robot arm.

QUESTIONS:

1. What part of the robot arm moved? (Use the industry name)
 2. What direction did it move?
 3. What is different if you click on the PITCH (-), several times?
- v. Using the mouse pointer click on the RVP ROLL (+) control, several times, and observe the movement of the robot arm.

QUESTIONS:

1. What part of the robot arm moved? (Use the industry name)
 2. What direction did it move?
 3. What is different if you click on the ROLL (-), several times?
- vi. Using the mouse pointer click on the RVP GRIP (+) control, several times, and observe the movement of the robot arm.

QUESTIONS:

1. What part of the robot arm moved? (Use the industry name)
2. What direction did it move?
3. What is different if you click on the GRIP (-), several times?

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GENERAL QUESTIONS:

Based on your exploration, observation, and recorded findings:

1. How many axes of freedom (not including the EOAT gripper) does this robot have?
2. What is the name of the primary mover for each axis and for the gripper mechanism?
3. For the prime mover used by the axes of this robot, what is one movement of the prime mover called?
4. What type(s) of mechanical systems are used to move the axes of the robot arm?
5. To correct a positioning error what corrective action(s) must be taken?
6. How does this robot arm fit the definition of anthropomorphic?

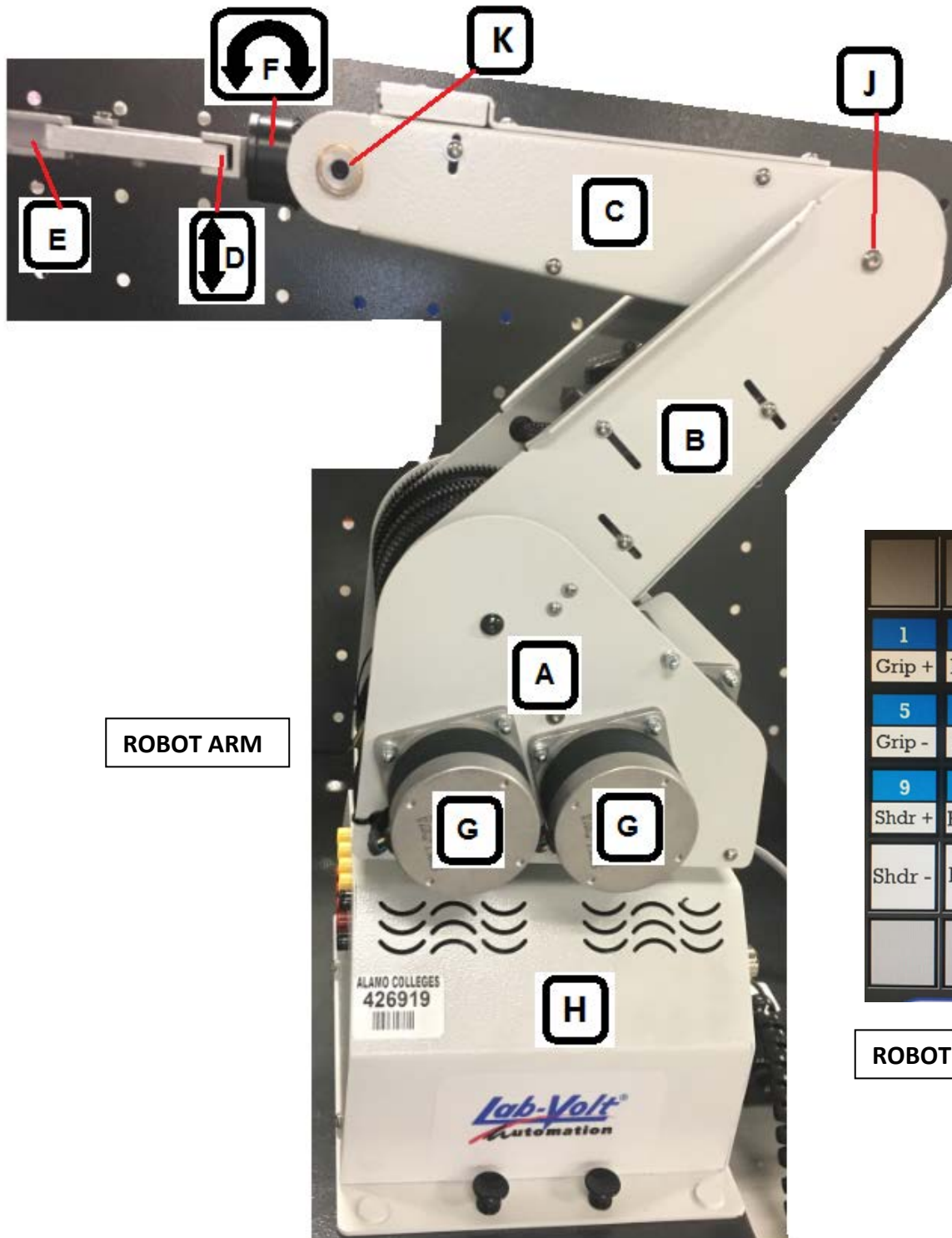
III. Click on the EXIT button below the RVP controls.

IV. Log out of the RVP system.

V. Notify the instructor that you have completed this exercise and you are ready for LAB 3. The instructor will score this lab and provide you with LAB 3.

END OF LAB 2

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APPENDIX 'A'



ROBOT ARM

1	2	3	4
Grip +	Roll +	Pitch +	Arm +
5	6	7	8
Grip -	Roll -	Pitch -	Arm -
9	0		
Shdr +	Base +		
Shdr -	Base -		

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