1.0 PURPOSE:

To guide the user through the basic setup and controls of the A465 6-Axis robot.

2.0 PROCEDURES:

**BEFORE USE, make sure the robot has room to move around, without any obstructions. The robot will NOT STOP if it hits an object, which can cause damage and/or injury.*

2.1 Setup

1. Turn on laptop.
2. Plug robot in.
3. Connect USB cord into the robot (front, above **Console** label). Plug robot into USB port of the laptop.
4. Make sure the **Emergency Stop** button is pushed in (ON).
5. Turn on robot by the power button on the bottom left of its console.
6. On the laptop, go to **Start → All Programs → CRS Active Robot → Active Robot Configuration**
7. Click the **Test Tab.** Click **Test.** The robot will test its settings and see if the computer is communicating properly with the control console. In order for the robot to work correctly, it must be configured to the proper COM port for communication. If it is, go to step 8. IF IT ISN'T:
   i. **Start → Control Panel → System → Hardware → Device Manager →** Expand **Port (COM & LPT).** Check the COM #.
   ii. Go to **Configure** in the **Active Robot Configuration** window; change the **com Port** by inputting in the box.
   iii. Now retest the robot as in step 6 and 7.
8. On the laptop, click **VB Knee Folder** on the desktop → **Knee (Visual Basic Project** file**).** Microsoft Visual Basic window appears.
9. Click "Play" arrow at the top of the window.
10. **Dynamic Knee Test** window appears.
11. Release the **Emergency Stop button**, and then activate the **Arm Power** button.
12. Make sure the "End Effecter" (upper limb part) of the robot is free of obstacles that might get in the way.
13. Click **Home** in the **Dynamic Knee Test** window. Each joint of the robot will move to home itself with respect to its internal encoders – this takes 2-3 minutes.
14. **DON'T click Ready** if there is something mounted to the end effecter.
15. Click **Open Existing** in the **Dynamic Knee Test** window. Choose **"Start Position.v3"** file.
16. Set **Set Location** to 0.
17. Click **Move to Location.** Robot moves to this position.

2.2 Manual Robot Control

1. In **Dynamic Knee Test** window, click **Manual Control**.

2. To move the each axis separately, use the joint controls in the upper portion of the window (Joint1, Joint2, …, Joint6). Set the **Angular Increment** to control the step size of each incremental joint movement, and set the **Speed** to control the speed of the robots movement.
3. To move the robot in world coordinates, use the world movement controls in the lower portion of the window (tx, ty, tz, Rx, Ry, Rz). Set the **Angular Increment** to control the rotational step size, the **Translational Increment** to control the translational step size, and the **Speed** to control the speed of the robot.
4. **Note:** Be reasonable when adjusting the speed settings, **NEVER** start using 100% robot speed.

2.3 Teaching the Robot

1. Click **Create New** vB file. Enter an appropriate name.
2. Click **Open**.
3. MAKE SURE SOMEONE IS HOLDING THE ROBOT. Click **Limp.**
4. Manually maneuver the robot and axis into a desired position.
5. Click **Teach World Position.** The position is now saved to the V3 file**.**
6. Repeat steps #4-5 for the desire amount of positions you want to teach the robot.
7. Click **No Limp.** Let go of robot and its axis.
8. To move the robot to its saved location, enter in the appropriate location # into the **Set Location** box, then click **Move to Location.**
9. To automatically cycle the robot through each of its taught locations, enter the # of motion cycles into the **Moving Cycles** box. Click **Move Path,** and the robot will move forward and back through all of its taught locations. Adjust the **Speed** parameter to control the speed of the robot's motion (be reasonable with the speed setting, **NEVER** start off at 100% speed).

2.4 Erasing Locations

**When erasing locations, all locations proceeding the one you want to delete must be deleted first, in chronological order (ie. to delete Location #5 with a total of 7 locations, the order of deletion would be #7 → #6 → #5). **

1. To erase location, type in the location # you want to delete in the **Active Location** box.
2. Click **Erase** to delete the desired location.

2.5 Shutdown

1. Click **Open Existing.**
2. Select **Start Position.**
3. Input **0** into the **Active Location**, and then click **Move to Location**.
4. Click **Exit.**
5. Press **Emergency Stop** button.
6. On the desktop, click **Start → All Programs → CRS Active Robot → Active Robot Terminal**
7. Type in **Shutdown now**

8. Check **Status** on robot console. If it reads "**Systems Halted"** then shutdown via the power button can be done.

2.6 Troubleshooting

- Each axis has a fuse, located at the bottom panel of the console (pull panel down).
- If a breaker is pulled, the axis corresponding to that breaker will not be powered, and the robot will be unable to respond to commands to unpowered joint.
- If the GUI crashes for whatever reason, restart the program, move the robot to its start position (i.e. **Open existing** StartPosition.v3, set **Set Location** to "0", **Move to Location**). At this point the GUI will prompt you to press the **Continue** button on the robot consule, press it and the robot will perform the specified movement. Continue operation of the robot.

3.0 REFERENCES

- A465 Robot System User Guide

4.0 REVIEWS AND REVISIONS:

This procedure shall be reviewed for compliance and effectiveness and revised as necessary (or at a specified interval).