Knowledgebase

T4885 INFO: Recovering Robot Calibration and Taught Positions from a Monument Position

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Recovering Robot Calibration and Taught Positions from a Monument Position

G-Series, LS-Series and RS-Series SCARA Robots using RC170, RC180 or RC620 controllers

Use the following steps to create a monument position for each robot. If a crash occurs or a motor needs to be replaced, recalibrate the robot at the monument position so that previously taught positions will still be correct.

Create a monument position

1. Choose a monument point in the robot work envelope that is repeatable and fixed. If tooling is used to align the robot, ensure that the attached tool is rigid and repeatable.

2. Open Epson RC+ and turn motors on using the Robot Manager (Control Panel tab) or using the MOTOR ON command in the Command Window. Jog the robot using the Robot Manager (Jog & Teach tab) or by using the SFREE command in the Command Window to free the joints and manually move the robot:

> motor on [Enter]

> sfree [Enter]

3. Move the robot to the monument point as closely as possible. If using the SFREE command to manually move the robot, use the SLOCK command to lock the joints when in position:

> slock [Enter]

4. Verify LOCAL 0 and TOOL 0 in the Jog & Teach tab, or by entering the TOOL command and LOCAL command in the Command Window:

> local 0 [Enter]

> tool 0 [Enter]

5. Once in the monument position, record the encoder pulse values for all four joints. Do this by looking at the current pulse position in the Jog & Teach tab, or by executing the PULSE command in the Command Window.

Using the pulse command will return a result with encoder pulse values for all four joints. For example, pulse values of 45721, 12888, -4512, 3416 will return the result shown below:

> pulse [Enter]

> PULSE: 1: 45721 pls 2: 12888 pls 3: -4512 pls 4: 3416 pls

NOTE: These numbers are used as an example only. Each robot point will have its own unique encoder pulse values for each axis.

6. Store the pulse values for each robots' monument positions in a safe place, readily available to those who might need them.

It is imperative that the original monument pulse position is recorded before any maintenance or mishap.

The monument position should recover taught points if internal mechanical maintenance on the robot or a crash has occurred. Here is how to recalibrate the robot and recover taught points using this technique:

Recover using a monument position

1. Move the robot to its monument position using the same methods described in creating the monument position.

Ensure the robot arm orientation (Lefty or Righty) as well as U-axis rotation is exactly the same as when the monument position was created. Ensure that tooling is mounted in exactly the same way if the monument position was created with a tool attached.

2. Verify TOOL 0 and LOCAL 0 as described in step 4 of creating the monument position.

3. Reset the motor encoders by executing the ENCRESET command in the Command Window:

> encreset 1,2,3,4

4. In the Command Window, execute the CALPLS command to set the original, recorded pulse values for the monument position. Substitute the recorded pulse values for the numbers in red below.

For example, if the original pulse values were 45721, 12888, -4512, 3416, execute:

> calpls 45721, 12888, -4512, 3416

Make sure to substitute that robot's monument position recorded pulse values for the numbers shown in red.

5. Complete the calibration by executing the CALIB command in the Command Window:

> calib 1,2,3,4

The calibration is complete and taught points should be recovered. Carefully test each point prior to system operation.

NOTE: A monument position does not recover the robot positions if the entire robot mounting has been moved. If robot mounting may change, install dowel pins or dial indicators at the base of the robot to get it mounted back in its original position.

SPEL+ Software Command Definitions:

MOTOR ON – turns the robot servo motors on.

MOTOR OFF - turns the robot servo motors off.

SFREE - removes servo power from the specified servo axis, or all axis if no axis is specified.

SLOCK - restores servo power to the specified servo axis, or all axis if no axis is specified.

LOCAL - sets/returns the current local.

TOOL – sets/returns the current tool.

PULSE – returns the encoder pulses for each axis.

ENCRESET – encoder reset command which clears the stored motor encoder pulse values for an one or more axis.

CALPLS – calibration placeholder – this command provides new locations for the motor encoders after they are reset with the encreset command.

CALIB – calibration command which finalizes new reference system based on the calpls numbers.

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