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CLD Actuators with Rockwell Automation SERCOS:

Abstract:

CLD Linear actuators can and do work with Rockwell Automations version of SECROS. A bug exists in the present version of ControlLogix, this bug results in a miscalling of inch or millimeter units in ControlLogix it has no effect when programming in units of the encoder counts and does not affect system repeatability. The bug is the result of a calculation error in the ControlLogix software platform. Rockwell Automation has been aware of the problem for the past two years and has chosen not to correct it.

Description:

When setting up a motor with ControlLogix the motors commutation length and encoder resolution are specified (23.4 millimeter commutation cycle and 200,000 counts/meter resolution for a CLD actuator). These values are multiplied in ControlLogix software to determine the correct number of encoder pulses per electrical cycle of the motor. The correct value for a motor with a 23.4 millimeter electrical cycle and a 5 micron encoder is:

.0234 (meters/cycle) × 200,000 (cnts/meter) = 4680 (cnts/cycle).

In the case of ControlLogix the calculation results in ***4600 cnts/cycle,*** an error of 80 encoder counts per electrical cycle. The way that linear motors function with servo drives this type of error is cumulative with shaft extension. This causes long shaft motors to have reduced efficiency at the end of stroke. In applications with extension distances greater than 150 millimeters this error becomes significant and noticeable.

The Fix:

The fix is to adjust the encoder resolution in the setup of ControlLogix so that the calculation error results in the correct number of encoder counts per electrical cycle. This is done by entering an encoder resolution of 203478 cnts/meter. When this value is used in the erroneous calculation the result is the correct electrical cycle of 4680 cnts/cycle. This issue in no way affects the repeatability of the system or motion defined in encoder counts. Due to the fact that an incorrect encoder resolution was used in the setup, distances defined in meters or inches are affected, a scale factor of 1.01739 should be multiplied by all motion defined in millimeters or inch units in the programming.

Conclusion:

This is not an ideal situation but is easily dealt with by using the native encoder counts to define positional moves, or the scale factor for other units. This approach has been used and tested in 4 or 5 applications over the past two years. Several groups over the past few years have incorrectly stated that CLD actuators are not compatible with SERCOS, this could not be more incorrect. Rockwell Automation has a bug in ContorlLogix that still needs to be corrected. The bug affects the position scaling in ContrlLogix and that is all.