Homing Techniques

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Overview

This application note describes how to set a "home" position (i.e. zero position). A variety of methods are described below. It is assumed the reader is familiar with QuickSilver programming.

Each technique is illustrated by an example program. Many of the techniques are similar, the differences relate to the different features of the servo and the different methods of sensing the home position.

Home Against a Hard Stop.qcp

The routine works by programming the servo to move in one direction until it hits a physical stop and cannot move any further. This stop defines the absolute limit in one direction for the axis (one edge of an X-Y table, for example). See program for details.

Home to Sensor.qcp

When a move's stop condition is triggered, the controller automatically stores the motor position in the Last Trig Position register (register 4). Home to Sensor moves until the Home sensor goes high, then does an absolute move to the position stored in this register 4. This will place the servo at the edge of the Home sensor. See program for details.

Home to Encoder Index.qcp

The servo stores the last position where the index mark was found in register 2, Last Index Position. Home to Encoder Index moves until the index if found, decelerates to a stop and then does an absolute move back to the position stored in register 2. See program for details.

Home to an Explicit Location.qcp

This homing routine allows the servo to set the home (zero) for the axis at an arbitrary position (i.e. the servo can "declare" the home position to be location 2000). In this example, the index pulse will be used as the Home sensor. In summary the following steps are preformed. See program for details.

1) Home to Index (see Move To Encoder Index for details)

2) Zero Target (ZTG): This command zeros the Target position and subtracts the previous Target Position from the Actual Position. For example:
Target Position = 500
Actual Position = 501
After ZTG
Target Position = 0
Actual Position = 1

3) Subtract -2000 from both Target and Actual Position registers. Using our previous example:
Target Position = 0
Actual Position = 1
Target Position = 0 - (-2000) = 2000
Actual Position = 1 - (-2000) = 2001

The Index position is now location 2000.

Home to Axis Midpoint and Set SSL.qcp
This homing routine allows the servo to find the center of travel for an axis and set that as the home location. The routine is similar to the first routine described in that it finds the edge of the motion range by bumping up against the hard stops. Once the servo determines the limits of travel (the edges of a slide, for example), the program calculates the midpoint of the travel range, moves to that position, sets the zero position, and then sets the Soft Stop Limits (SSL). The soft stop limits are virtual stops that the servo will not move beyond, even if commanded to do so. These limits protect the actual stops, as well as the rest of the system, from damage during a hard, fast move. See program for details. See Soft Stop Limits (SSL) in Command Reference for details.

Home to EOT and Set SSL.qcp
The program will home to the first EOT sensor, find the opposite EOT, then set the soft stop limits using the command Soft Stop Limits (SSL). See Soft Stop Limits (SSL) in Command Reference for details.

Home to EOT and Set ETN an ETP.qcp
This program presets the End of Travel Negative and Positive then homes to an input, moves off the input a small amount, sets this as zero, moves to the opposite end of travel stopping on an input and move off that location a small amount. The program moves back to the home location, zero.