

TruCount™ Absolute Encoder Homing Setup for Integrated StepSERVO™ Motor



Description

This application note is intended for StepSERVO™ motor with TruCount™ absolute multi-turn encoder. The TruCount™ series encoder allows the motor to track the motor shaft position even when power is off. TruCount™ encoder does not need an external battery for encoder position tracking while the motor is power off.

This application note includes the following configurations:

Config encoder operation mode

Home position setup

Position limit setup

Setup home position and position limits with SCL commands

Other configurations

Config Encoder Operation Mode

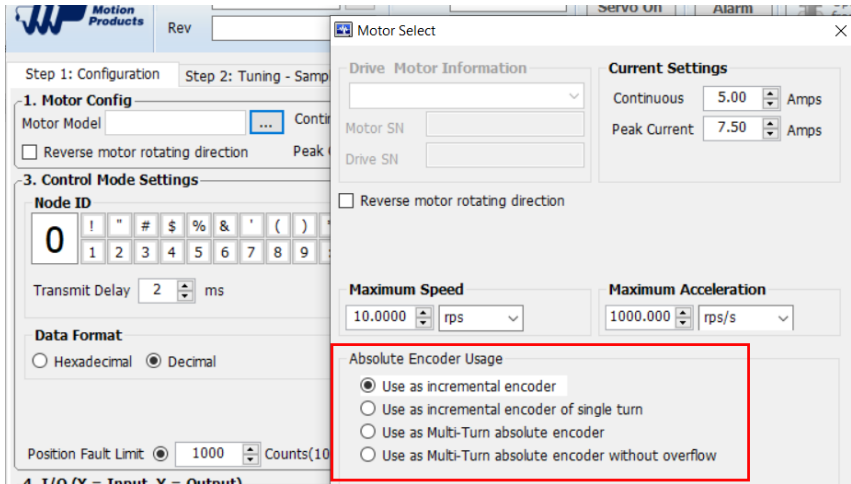
1. Once the motor is connected to the Step-Servo Quick Tuner software, Config your Encoder mode, by Click “...” next to your motor model

The screenshot shows the Step-Servo Quick Tuner V3.0.20.0113 software interface. The '1. Motor Config' section is highlighted with a red box. The 'Motor Model' field is set to 'TXM24X3B-R' and has a dropdown arrow next to it. Other settings include 'Continuous' at 6.00 A, 'Peak Current' at 7.50 A, and 'Control Mode' set to 'SCL/Q (Stream Command/Stan)'. The '3. Control Mode Settings' section shows 'Node ID' as 0, 'Data Format' as Decimal, and 'Power recycle is required after electronic gearing change'. The '4. I/O (X = Input, Y = Output)' section shows digital input and output configurations for X1, X2, and X3, and an input noise filter setting of 0.310 us.

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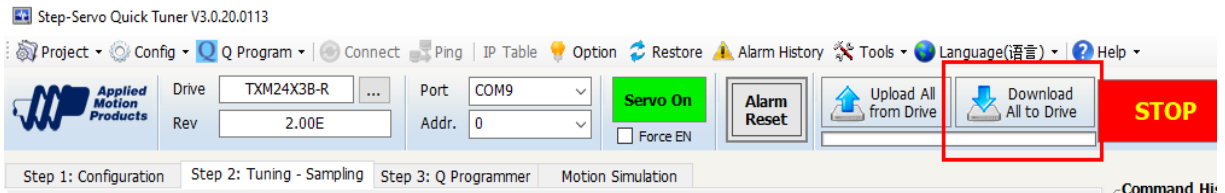


2. Select the correct encoder mode



Mode	Description
Incremental Encoder	Configure as an incremental encoder, where encoder position will not be remembered after power cycle.
Single-turn Absolute Encoder	Configure as a single turn absolute encoder, where only the single turn absolute encoder position will be remembered.
Multi-turn Absolute Encoder	Configure as an absolute multi-turn encoder. The absolute encoder position will be remembered after power cycle. If the encoder position exceeds maximum turn counts, the drive's encoder count overflow alarm will trip.
Multi-turn Absolute Encoder, No Overflow	Configure as an absolute multi-turn encoder. The absolute encoder position will be remembered after power cycle. If the encoder position exceeds maximum turn counts, the drive's encoder count overflow alarm will not trip.

3. Download settings to the drive



4. Power cycle the

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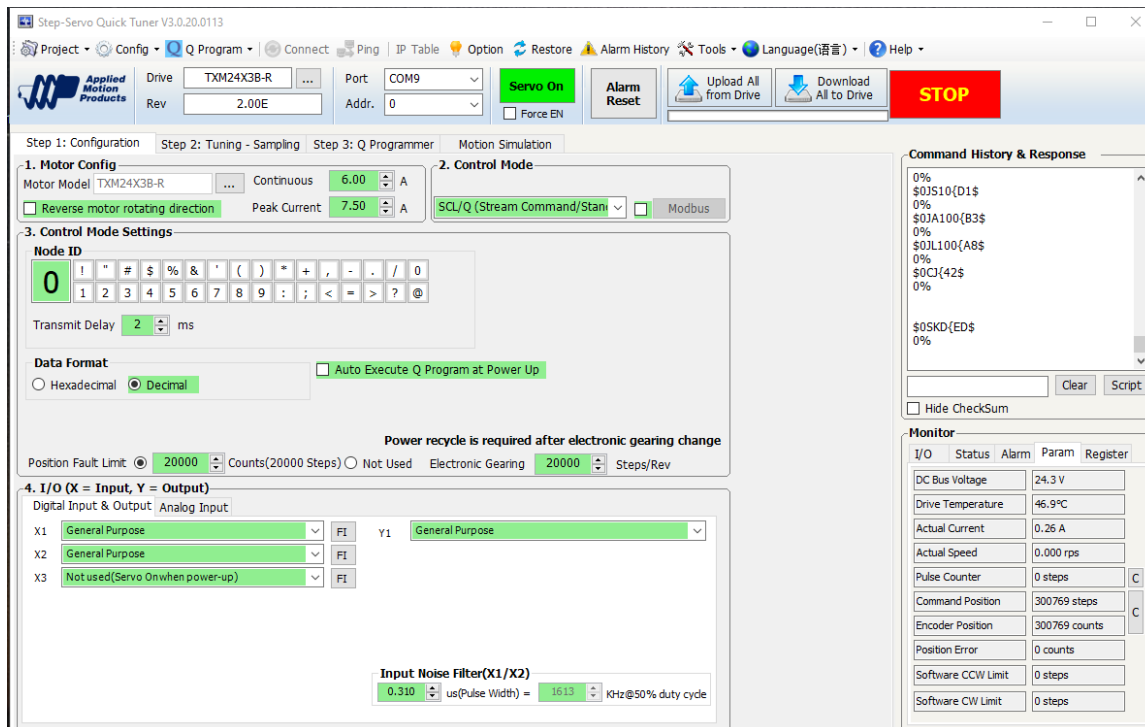


Homing Position Setup

For StepSERVO™ motor with TruCount™ encoder, home position setup is only needed when the system physical mechanics are changed. This can be setup via Step-Servo Quick Tuner software.

Step 1

After install the motor onto your mechanical system, connect your motor to Step-Servo Quick Tuner software. (for more details, please check the product hardware manual or quick setup guide)



Step 2

Step 3

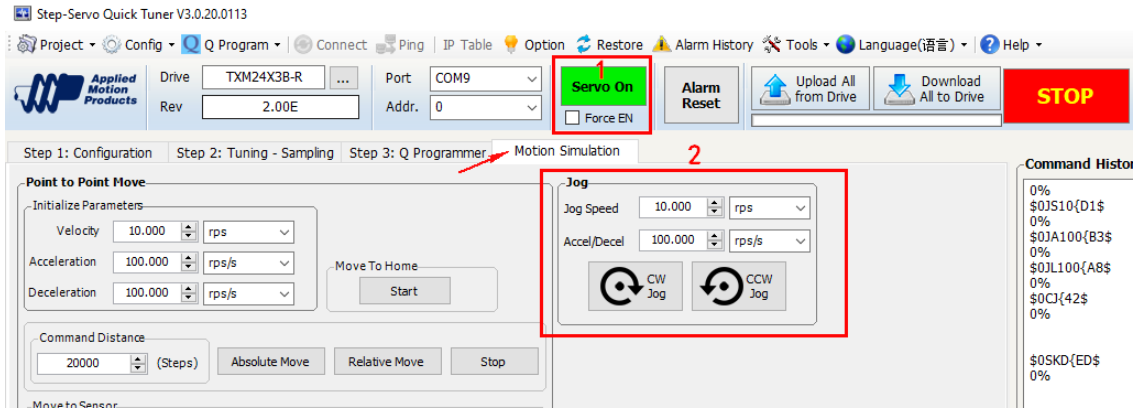
Option 1

1. Physically move your axis to its home position, see step 3.

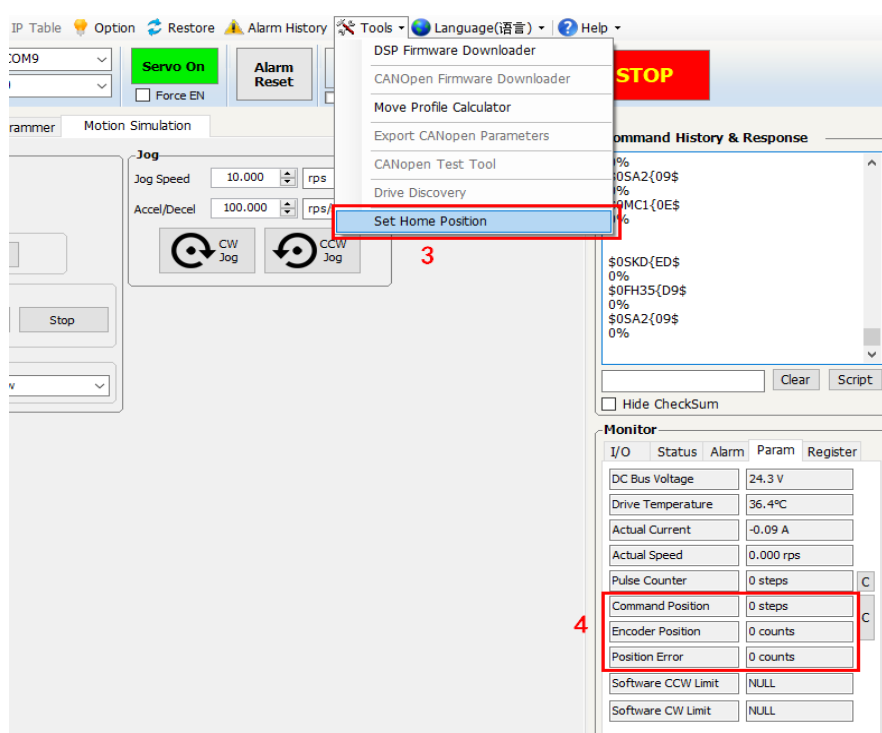
Option 2

1. Enable your StepSERVO™ motor.
2. Move your axis to desired home position by using the Jog function in Motion Simulation tab.

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3. Click on “Tools ---> Set Home Position”
4. Check on “Monitor ---> Param” to ensure Encoder Position is “0”



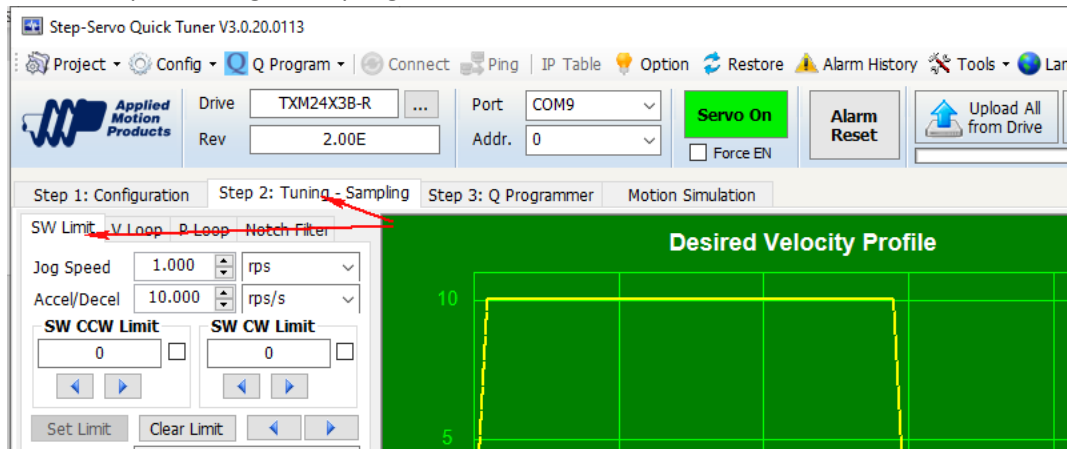
Position Limit Setup

For StepSERVO™ Motor with TruConut™ encoder, the software position limits can be saved permanently in the drives' non-volatile memory for use as end of travel limits.

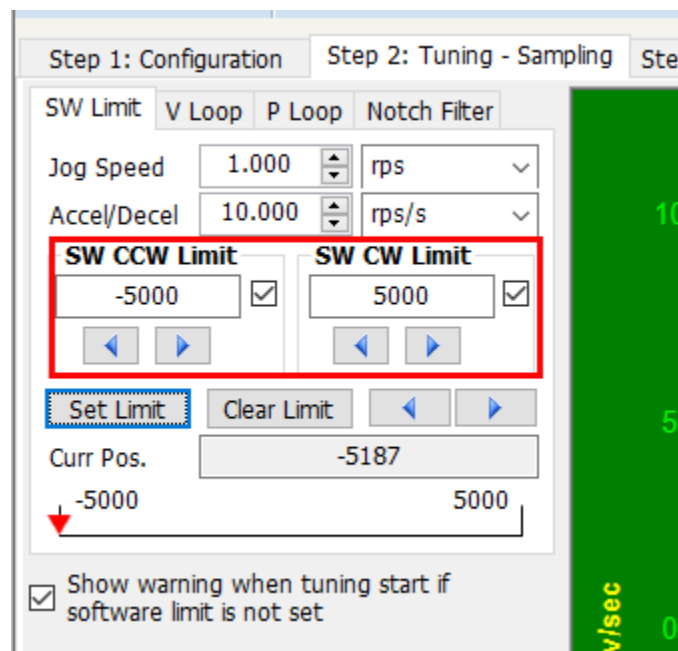
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1. Go to “Step 2: Tuning – Sampling” ----> SW Limit



2. For each position limit direction (CW/CCW), use the Jog button to move the axis to the desired safety limit position.

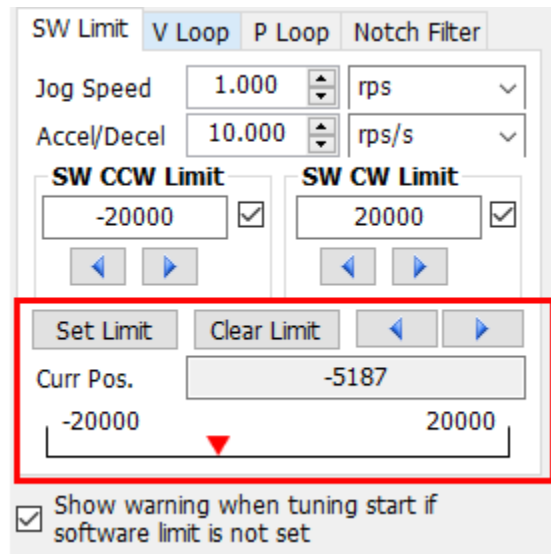


3. Click on “Set Limit” to confirm

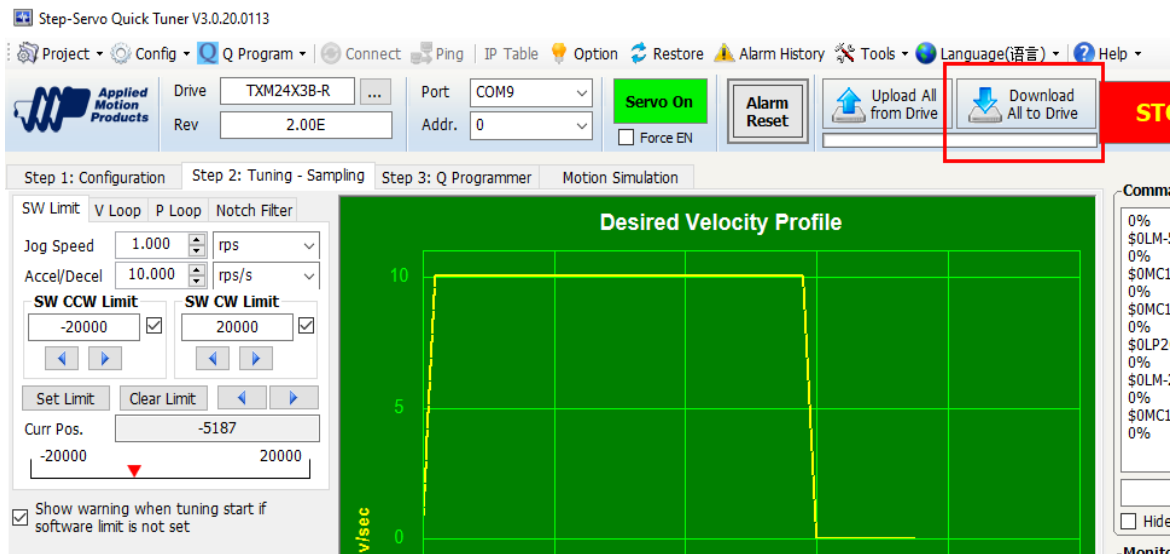
Warning:

**The software position limit is now set temporarily until motor's next power cycle.
To position limit permanently in non-volatile memory, please see “Step 4”.**

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4. Click “Download all to Drive” to save software position limit to the drive’s non-volatile memory.



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Config encoder mode with SCL commands

Command	Drive Response	Notes
ES0	%	Set encoder
SA	%	Save setting to non-volatile memory

Warning: This setting will not be saved after next power cycle

ES0, Use as incremental encoder

ES1 Use as incremental encoder with single turn absolute

ES2 Use as multiturn with overflow alarm Use as multi-turn absolute encoder

ES3 Use as multiturn with no overflow alarm

Setup home position and position limits with SCL commands

Setup home position

For permanent use

Command	Drive Response	Notes
EPO	%	(Step 1) Reset internal encoder position counter
SPO	%	(Step 2) Reset internal set position counter
SA	%	Save setting to non-volatile memory

Note: Non-volatile memory of the StepSERVO™ drive is limit to 10,000 write cycle.

For temporary use

Command	Drive Response	Notes
EPO	%	(Step 1) Reset internal encoder position counter
SPO	%	(Step 2) Reset internal set position counter

Warning: This setting will not be saved after next power cycle

Check current home position value

Command	Drive Response	Notes
EP	EP=0	Current encoder position is 0 (Home)
SP	SP=0	Current set position is 0 (Home)

Setup Position Limit

For permanent use

Command	Drive Response	Notes
LP10000	%	Set software CW limit value to 10000 counts.
LM200	%	Set software CCW limit value to 200 counts.
SA	%	Save setting to non-volatile memory

Note: Non-volatile memory of the StepSERVO™ drive is limit to 10,000 write cycle.

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For temporary use

Command	Drive Response	Notes
LP10000	%	Set software CW limit value to 10000 counts.
LM200	%	Set software CCW limit value to 200 counts.

Warning: This setting will not be saved after next power cycle

Check current position limit value

Command	Drive Response	Notes
LP	LP = 10000	Current software CW limit value to 10000 counts.
LM	LM = 200	Current software CCW limit value to 200 counts.

Other Configurations

Reverse Motor rotating direction

This setting can be configured via “Step 1: configuration” tab. Click Download all to Drive to save the setting.

Warning: Reverse motor rotational direction will affect encoder counting direction.

Power cycle of is required after changing motor rotational direction.

Please reset your home position and software position limit after power cycle.

The screenshot shows the Step-Servo Quick Tuner V3.0.20.0113 software interface. The '1. Motor Config' tab is active, and the 'Reverse motor rotating direction' checkbox is checked. The '2. Control Mode' tab shows 'SCL/Q (Stream Command/Stan)' selected. The '3. Control Mode Settings' tab shows 'Node ID' set to 0 and 'Data Format' set to Decimal. A 'Command History & Response' window is open on the right, showing a list of commands and their responses.

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Electronic Gearing

This setting can be configured via “Step 1: configuration” tab. Click Download all to Drive to save the setting.

Warning: Changing the Electronic Gearing (EG) of the motor will change the counts per revolution (SP)

Power cycle of is required after changing Electronic Gearing.

Please reset your home position and software position limit after power cycle.

The screenshot shows a software interface for motor configuration with the following sections:

- 1. Motor Config**: Motor Model TSM23X3B-IP, Continuous, 5.00 A, Peak Current 7.50 A, Reverse motor rotating direction.
- 2. Control Mode**: SCL/Q (Stream Command/Stan), Modbus.
- 3. Control Mode Settings**:
 - Data Format: Hexadecimal, Decimal.
 - Auto Execute Q Program at Power Up.
 - Position Fault Limit: 20000 Counts(20000 Steps), Not Used.
 - Electronic Gearing: 20000 Steps/Rev.
- 4. I/O (X = Input, Y = Output)**: Digital Input & Output, Analog Input.

A red box highlights the text: **Power recycle is required after electronic gearing change**.