



Homing

Application Note



www.agito-akribis.com

Member of Akribis Systems group



Revision History

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1 Introduction

1.1 About This Manual

Thank you for choosing Agito series motion control products. We strive to provide high-speed and high-precision motion control solutions with comprehensive technical support.

This manual focuses on the homing (return-to-zero) procedures for Agito motion controllers. Only homing-related configurations are detailed here; for other parameter settings, please refer to the Agito Quick Start Manual.

Important: Homing should only be performed after basic parameter settings are completed and the motor can move normally.

1.2 Homing Overview

When using incremental encoders, the servo cannot determine the motor position upon power-up. Therefore, homing is required each time the system is powered on.

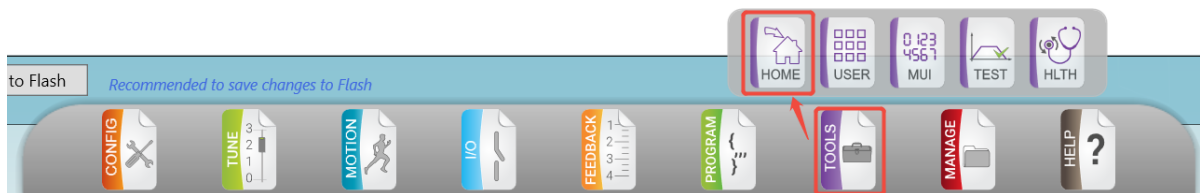
Agito controllers support multiple homing methods, allowing users to customize steps and procedures based on application needs.

2 Homing in PCSuite

Homing steps are configured in Agito PCSuite under the Homing interface. **Ensure motor parameters are correctly set and tuned before executing homing.**

2.1 Homing Interface Overview

Navigate to → in PCSuite.



Homing

D port: No Golden!

Pos. Ref.: 8,556	counts	Velocity: 0	counts/sec
Position: 8,557	counts	Motor Current: 0.000	A
Pos. Err.: 0	counts	Temperatures: NA/31/NC	°C

Status: No motion
No fault (Comm. Command)
Motion ended: Normally

RLS Low pos. i²t limit
 FLS High pos.

Critical Warnings (2) Limits Info HW Protect.

Homing by Flexible Sequence

<p>Homing Sequence</p> <ol style="list-style-type: none"> 1 - Motor On/Off 2 - Configure Position Lock 3 - Jog to Lock (index by HW) 4 - Move to Lock position 5 - Configure Position Lock 6 - Wait time 7 - Set position <li style="background-color: #d4edda; padding: 2px;">8 - End Homing <p style="color: red; font-weight: bold; font-size: small;">↑ Homing Sequence</p>	<p>Step 1 Definitions</p> <p>8 - Motor On/Off ← Step Name</p> <p>Disables or enables the motor. ← Step Explanation</p> <p> <input checked="" type="radio"/> Enable Motor <input type="radio"/> Disable Motor </p> <p>Timeout: <input type="text" value="1,000"/> msec ← Parameter Setting</p>
--	--

Export Homing Parameters to Local

Load Predefined Homing Sequence →

Load Local Homing Parameters File →

Homing Status and Current Homing Step

Perform Homing

Refresh Homing

Apply the Configured Parameters

Homing Status: Completed successfully Last step: 8

Load
Save As...
Perform Homing
Refresh All
Apply All

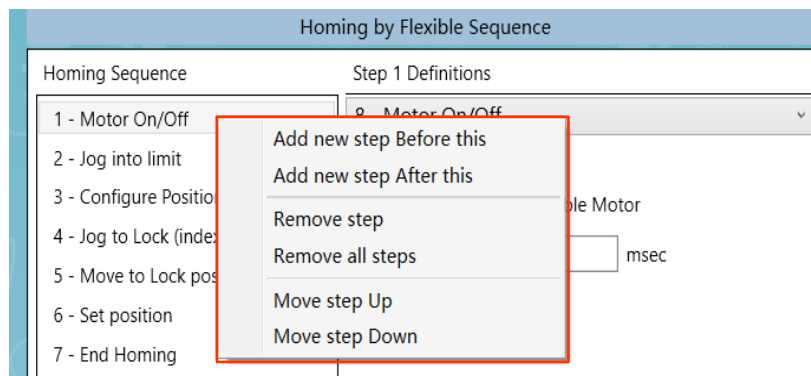
Left panel: Define homing steps and sequence (up to 15 steps; last step must be “End Homing”).

Right panel: Configure parameters for each step.

During the homing operation, you can observe the current execution step in real time at the bottom right corner of the homing interface.

2.2 Homing Steps Introduction

There are 20 types of homing steps available. The homing types may vary depending on the PCSuite version, controller model and firmware version. Right click any homing step and customize the homing sequence as your request.



- ① **Jog into limit:** Move to the limit switch position (the motor must have physical limit switches installed and correctly wired to the digital input port, configured as RLS or FLS). The positive limit is FLS, and the negative limit is RLS. The direction is determined by the speed sign: positive speed moves toward FLS, negative speed moves toward RLS.

1 - Jog into limit

Command the motor to move until hitting RLS or FLS. Motion direction is according to the Speed sign.

Speed: counts/sec

// Speed: The sign (positive or negative) determines the direction of motion.

Accel/Decel: counts/sec²

// Acceleration/Deceleration: Only the magnitude needs to be set.

Emergency Decel: counts/sec²

// Emergency Deceleration: Only the magnitude needs to be set.

Timeout: msec

// Timeout: Set the time threshold for completing this step. If the limit signal is not detected within this time, the controller will stop the homing sequence and trigger an alarm, resulting in homing failure. The timeout value must be greater than the time required to reach the limit position.

- ② **2-Check that out of limits:** Check whether both RLS and FLS are not activated. If either one is activated, exit the homing step.

2 - Check that out of limits

Check if indeed both RLS and FLS are not activated. Exit the homing process if one of them is activated.

- ③ **3-Relative PTP:** Move the motor by a relative distance from the previous position.

Homing in PCSuite

3 - Relative PTP

Command the motor to perform a relative point to point motion.

Speed: counts/sec // Speed: Only the magnitude needs to be set.

Accel/Decel: counts/sec² // Acceleration/Deceleration: Only the magnitude needs to be set.

Relative distance: counts // Relative Distance: The sign (positive or negative) determines the direction of motion.

Timeout: msec // Timeout: Set the time threshold for completing this step. If the defined relative distance is not completed within this time, the motion will stop and an alarm will be triggered, causing the homing process to fail. The timeout value must be greater than the time required to reach the relative distance.

- ④ **4-Search for index:** Search for the index signal in the specified direction at the defined speed. Note that this method requires the motor to support the index signal (usually provided by the encoder) and to be correctly wired.

4 - Search for index

Command the motor to move until detecting an index, and then to stop. Motion direction is according to the Speed sign.

Speed: counts/sec // Speed: The sign (positive or negative) determines the direction of motion. It usually needs to be opposite to the direction used in the previous step for finding the limit.

Accel/Decel: counts/sec² // Acceleration/Deceleration: Only the magnitude needs to be set.

Emergency Decel: counts/sec² // Emergency Deceleration: Only the magnitude needs to be set.

Timeout: msec // Timeout: Set the time threshold for completing this step. If the index signal is not detected within this time, the motion will stop and an alarm will be triggered, causing the homing process to fail. The timeout value must be greater than the time required to traverse the entire stroke.

- ⑤ **5-Move to last pos. of index:** Move to the last detected index signal position at the specified speed using absolute positioning.

5 - Move to last pos. of index

Command the motor to perform an absolute point to point motion, to the latest captured position of the index.

Speed: counts/sec // Speed: Only the magnitude needs to be set.

Accel/Decel: counts/sec² // Acceleration/Deceleration: Only the magnitude needs to be set.

Emergency Decel: counts/sec² // Emergency Deceleration: Only the magnitude needs to be set.

Timeout: msec // Timeout: Set the time threshold for completing this step. If the motor does not reach the last detected index position within this time, the motion will stop and an alarm will be triggered, causing the homing process to fail.

- ⑥ **6-Set position:** Define the current position value, which is typically used to set the current position to zero before the homing process ends.

6 - Set position

Set the current position of the motor to a user defined value. Typically used as the last step of an homing sequence.

Set Position value: counts // Set Position Value: Define the current position value.

Timeout: msec // Timeout: Set the waiting time for completing this step.

- ⑦ **7-Wait time:** Time to wait until moving to the next step.

7 - Wait time

Wait time to wait until moving to the next step.

Time to wait msec // Time to wait: Define the waiting time.

- ⑧ **8-Motor On/Off:** Enable or Disable the motor.

Homing in PCSuite

8 - Motor On/Off

Disables or enables the motor.

Enable Motor Disable Motor

// Choose to enable or disable the motor.

Timeout: msec

// Timeout: Set the waiting time for completing this step.

- ⑨ **9-Hard stop by motor stuck:** Determine whether the motor has stuck and reached the hard limit by monitoring its motion status (stall speed and current) during Jog movement. This is generally used for homing with hard limits.

9 - Hard stop by motor stuck

Jog until hard stop is detected by motor stuck. Assign home position at this point.

Speed: counts/sec

// Set the Jog speed for moving to the hard limit; the sign determines the direction.

Accel/Decel: counts/sec²

// Set the Jog acceleration/deceleration; only the magnitude is specified.

Emergency Decel: counts/sec²

// Set the emergency stop deceleration; only the magnitude is specified.

Stuck vel. Threshold: counts/sec

// Check if the speed threshold (minimum value) for detecting hard limit is met, along with current threshold and stuck time; if all conditions are satisfied, the motor is considered to have reached the hard limit.

Stuck curr. Threshold: mA

// Check if the current threshold (maximum value) for detecting hard limit is met, along with speed threshold and stuck time; if all conditions are satisfied, the motor is considered to have reached the hard limit.

Stuck time: msec

// Check if the stuck time (minimum value) is met, along with speed threshold and current threshold; if all conditions are satisfied, the motor is considered to have reached the hard limit.

Set position value: counts

// Set the current position value.

Timeout: msec

// Set a timeout for this step; if the hard limit is not detected within this time, the motion will stop, an alarm will be triggered, and the homing process will exit as failed.

- ⑩ **10-Hard stop by high error:** Determine whether the motor has stuck and reached the hard limit by monitoring its motion status (position error) during Jog movement. This is generally used for homing with hard limits. It is important that the set position error is not too small (smaller than the normal PosErr during motion). It is recommended to first use the PCSuite Data Recording to monitor the normal position error at the given speed to avoid misjudging the hard limit.

10 - Hard stop by high error

Jog until hard stop is detected by high position error. Assign home position at this point.

Speed: counts/sec

// Set the Jog speed for moving to the hard limit; the sign determines the direction.

Accel/Decel: counts/sec²

// Set the Jog acceleration/deceleration; only the magnitude is specified.

Emergency Decel: counts/sec²

// Set the emergency stop deceleration; only the magnitude is specified.

Pos. error Threshold: counts

// Check if the position error threshold (maximum value) for detecting the hard limit is exceeded; if the position error surpasses this value, the motor is considered to have reached the hard limit.

Set position value: counts

// Set the position at which the motor is detected to have reached the hard limit to a custom-defined value.

Timeout: msec

// Set a timeout for this step; if the hard limit is not detected within this time, the motion will stop, an alarm will be triggered, and the homing process will exit as failed.

- ⑪ **11-Jog to Home switch change:** Jog the motor to the position of the homing switch (requires the motor to be equipped with a homing switch).

11 - Jog to Home switch change

Jog until home switch toggles its state. Direction defined by Speed sign and Home state.

Speed: counts/sec

// Set the Jog speed; the sign determines the direction.

Accel/Decel: counts/sec²

// Set the Jog acceleration/deceleration; only the magnitude is specified.

Emergency Decel: counts/sec²

// Set the emergency stop deceleration; only the magnitude is specified.

Timeout: msec

// Set a timeout for this step; if no change in the homing switch signal is detected within this time, the motion will stop, an alarm will be triggered, and the homing process will exit as failed.

- ⑫ **12-Absolute PTP:** Send an absolute target position command to the motor to perform an absolute point-to-point (PTP) movement.

Homing in PCSuite

12 - Absolute PTP

Command the motor to perform an absolute point to point motion.

Speed: counts/sec // Set the absolute PTP motion speed; only the magnitude is specified.

Accel/Decel: counts/sec² // Set the absolute PTP motion acceleration/deceleration; only magnitude is specified.

Absolute target: counts // Set absolute target position.

Timeout: msec // Set a timeout for this step; if the motor does not reach the absolute target position within this time, the motion will stop, an alarm will be triggered, and the homing process will exit as failed.

- ⑬ **13-Set pos. software limits:** Set the positive and negative soft limit positions (absolute positions), which are usually configured after homing.

13 - Set pos. software limits

Provides the means to optionally set the position software limits (RevPLim and/or FwdPLim).

Set Reverse position limit at: counts // Set negative soft position limit.

Set Forward position limit at: counts // Set positive soft position limit.

- ⑭ **14-Configure Position Lock:** Set the position lock (or probe) signal source, commonly used for configuring index signal homing.

14 - Configure Position Lock

Configures the Position Lock feature. Refer to 'Feedback/Lock' window for 'Source' value and more details.

Enable Lock // Check to enable position lock.

Polarity: Rising Edge Falling Edge // Select the trigger signal polarity: rising edge or falling edge.

Lock Source: // Select the signal source. Click "Show Sources" to display the source numbers.

*Note! 'Lock Source' differs between products and versions!
Please verify the correct value at Feedback/Lock window.*

Timeout: msec // Set a timeout for this step.

- ⑮ **15-Jog to Lock(index by HW):** Capture the position of the index signal during Jog movement.

15 - Jog to Lock (index by HW)

Jog with the provided motion parameters till Lock happens and Lock position is latched. Then decelerate and stop.

Speed: counts/sec // Set the Jog motion speed; the sign (positive or negative) determines the direction of movement.

Accel/Decel: counts/sec² // Set the Jog motion acceleration/deceleration; only the magnitude needs to be specified.

Emergency Decel: counts/sec² // Set the emergency stop deceleration; only the magnitude needs to be specified.

Timeout: msec // Set a timeout for this step. If the trigger position capture is not detected within this time, the motion will stop, an alarm will be output, the homing procedure will exit, and homing will fail.

- ⑯ **16-Move to Lock position:** Move the motor to the absolute target position at the location captured in step 15.

16 - Move to Lock position

Move (using the provided motion parameters) to the last recorded Lock position (LockVal).

Speed: counts/sec // Set the motor movement speed; only the magnitude needs to be specified.

Accel/Decel: counts/sec² // Set the motor movement acceleration/deceleration; only the magnitude needs to be specified.

Emergency Decel: counts/sec² // Set the emergency stop deceleration; only the magnitude needs to be specified.

Timeout: msec // Set a timeout for this step. If the motor does not reach the position captured in step 15 within this time, the motion will stop, an alarm will be output, the homing procedure will exit, and homing will fail.

17-Set Motion Mode: Set the motor motion mode. The specific values meaning can be found by



referring to the explanation of the keyword “MotionMode” under **DOCS**. Note that the motion mode cannot be changed during movement or in gear mode.

17 - Set Motion Mode

*Set a value to MotionMode (not allowed in-Motion).
(not allowed to use the Gearing motion modes).*

Motion mode: // Set motion mode.

18-Set Error Mapping type: Set the position error mapping type. “0” disables the feature; “1-3” enables 1D, 2D and 3D error mapping. Note that the error mapping function must be disabled before starting the homing process (see chapter 2.4).

18 - Set Error Mapping type

*Set a value to MapType (not allowed in-Motion).
'0' disables the feature, 1-3 enables 1D, 2D and 3D Err. Map.*

Map type: // Set error mapping type.

19-Set UserParam: Assign desired UserParam to specified value.

19 - Set UserParam

Assign desired UserParam to specified value

Applied on Axis: // Select applied axis.

UserParam index: // Set desired UserParam Index.

Value to set: // Set UserParam Value.

20-Wait User Param: Wait for UserParam to be equal to “Value”.

20 - Wait UserParam

Wait for UserParam to be equal to 'Value'

Applied on Axis: // Select applied axis.

UserParam index: // Set desired UserParam Index.

Value to wait for: // Set the UserParam Value to wait for.

Timeout: msec // Timeout for this step. Homing will fail if the step is not completed within the timeout value.

2.3 Common Homing Methods

The following introduces several commonly used homing methods for Agito. Users can choose the appropriate homing method based on their requirements and application scenarios. It is important to note that different homing methods require different external hardware signal support, which will affect the homing sequence and position.

No.	Homing Methods	Applicable Motor Type	Required Hardware Support
1	Lock Index Position with Limit Switches	Rotary, Linear, Voice Coil	Index Signal, Limit Switches

No.	Homing Methods	Applicable Motor Type	Required Hardware Support
2	Lock Index Position with Mechanical Hardstop	Rotary, Linear, Voice Coil	Index Signal, Hardstop
3	Search Index Position (no Limits)	Rotary	Index Signal
4	Hardstop Homing (no Index or Limit Switches)	Rotary, Linear, Voice Coil	Hardstop
5	Limit Switch Homing	Rotary, Linear, Voice Coil	Limit Switches (RLS, FLS)
6	Home Switch Homing	Rotary, Linear, Voice Coil	Home Switch

2.3.1 Lock Index Position with Limit Switches

By locking the index position (together with limit switches), the homing mechanism works by defining an index signal (typically from the current motion axis) as the position capture or “probe” trigger. The physical position at which this index signal is detected is then used as zero reference.

This method is commonly used for high-speed and high-precision homing and is suitable for motors equipped with both an index signal and limit switch signals. It is considered a recommended homing method.

1. Hardware Setup

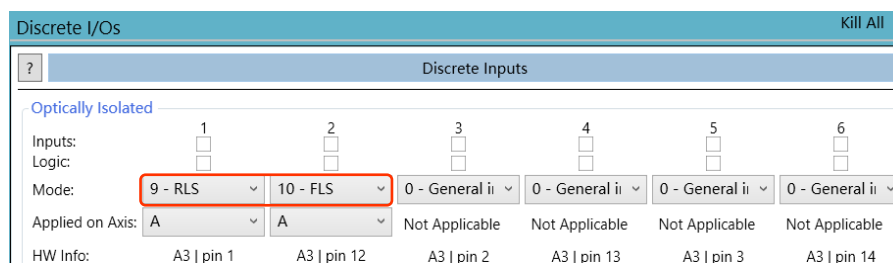
- 1) Index Signal (also called Z-signal) Wiring:

Motor Encoder Port	Agito Controller Main Encoder Port	
Index+ (or Z+)	PIN_9	Encoder_4+
Index- (or Z-)	PIN_10	Encoder_4-

- 2) Limit Switch Signals Setting in PCSuite:

Connect the positive limit (FLS) and negative limit (RLS) switches (refer to the *Agito Quick Start Guide*). According to the hardware manual of the device you are using, wire the limit switch signals to the corresponding digital input ports.

This example shows the positive and negative limit signals connected to the AGD301 controller’s Digital Input 1 and Digital Input 2, respectively, and configured as FLS and RLS according to the encoder direction.



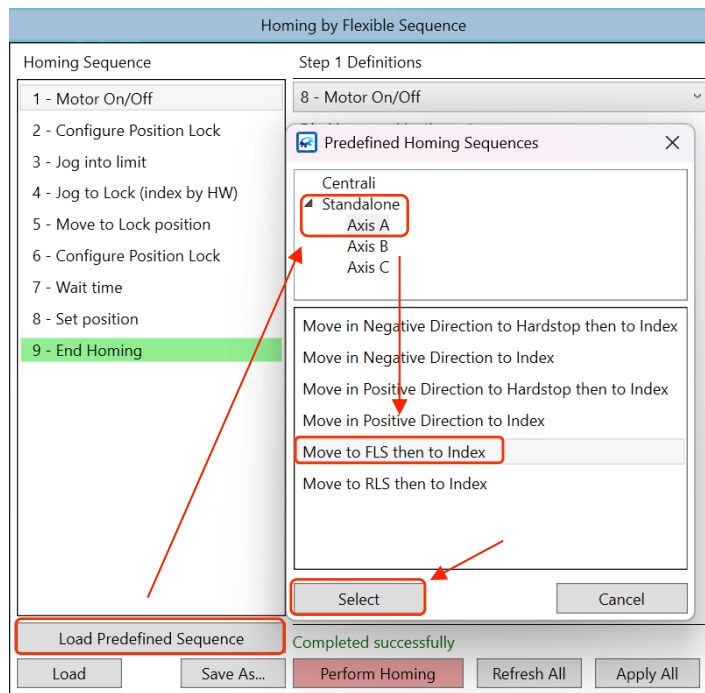
2. Homing Operation



- 1) Click  -> , navigate to Homing interface in PCSuite.

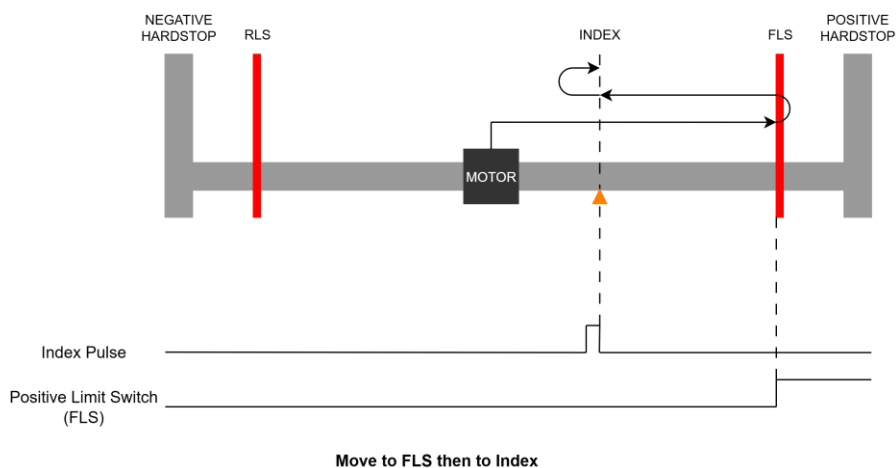
2) Set Homing Sequence Steps

You can choose to “Load Predefined Sequence” or configure the homing sequences as you request.



3) Let’s take “Move to FLS then to Index” as example.

The homing workflow for Moving to FLS then to Index is illustrated in the figure shown below.



When the homing sequence is configured as the predefined “Move to FLS then to Index”, the motor first jogs toward the positive limit switch (FLS). After the FLS is detected, the motor reverses direction and moves until the index position is found. The index position is configured as the lock position. Once the index is detected, the motor moves to the lock position and completes homing. In this configuration, the lock position (index position) is set to zero.

Step 1: Enable the Motor (Type 8-Motor On/Off)

Homing in PCSuite

Homing Sequence	Step 1 Definitions
1 - Motor On/Off	8 - Motor On/Off
2 - Configure Position Lock	Disables or enables the motor.
3 - Jog into limit	<input checked="" type="radio"/> Enable Motor <input type="radio"/> Disable Motor
4 - Jog to Lock (index by HW)	Timeout: <input type="text" value="1,000"/> msec
5 - Move to Lock position	
6 - Configure Position Lock	
7 - Wait time	
8 - Set position	
9 - End Homing	

Step 2: Enable Position Lock (Type 14-Configure Position Lock)

Homing Sequence	Step 2 Definitions
1 - Motor On/Off	14 - Configure Position Lock
2 - Configure Position Lock	Configures the Position Lock feature. Refer to 'Feedback/Lock' window for 'Source' value and more details.
3 - Jog into limit	<input checked="" type="checkbox"/> Enable Lock
4 - Jog to Lock (index by HW)	Polarity: <input checked="" type="radio"/> Rising Edge <input type="radio"/> Falling Edge
5 - Move to Lock position	Lock Source: <input type="text" value="32"/> <input type="button" value="Show Sources"/>
6 - Configure Position Lock	<i>Note! 'Lock Source' differs between products and versions! Please verify the correct value at Feedback/Lock window.</i>
7 - Wait time	Timeout: <input type="text" value="100"/> msec
8 - Set position	
9 - End Homing	

Lock Source is the trigger source of the position capture signal. When "Show Sources" is clicked, PCSuite displays the corresponding signal source number as shown below. Enter the corresponding number according to the currently configured axis number.

Homing

Available Sources for connected Controller:

- 0 - Do not use
- 1 - Discrete input 1
- 2 - Discrete input 2
- 3 - Discrete input 3
- 4 - Discrete input 4
- 5 - Discrete input 5
- 6 - Discrete input 6
- 7 - Discrete input 7
- 8 - Discrete input 8
- 9 - Discrete input 9
- 10 - Discrete input 10
- 11 - Discrete input 11
- 12 - Discrete input 12
- 13 - Discrete input 13
- 14 - Discrete input 14
- 15 - Discrete input 15
- 16 - Discrete input 16
- 17 - Discrete input 17
- 18 - Discrete input 18
- 19 - Discrete input 19
- 20 - Discrete input 20
- 21 - Discrete input 21
- 22 - Discrete input 22
- 23 - Discrete input 23
- 24 - Discrete input 24
- 25 - Discrete input 25
- 26 - Discrete input 26
- 27 - Discrete input 27
- 28 - Discrete input 28
- 29 - Discrete input 29
- 30 - C axis index
- 31 - B axis index
- 32 - A axis index
- 33 - Discrete input 30
- 34 - Discrete input 31
- 35 - Discrete input 32
- 36 - Discrete input 33
- 37 - Discrete input 34
- 38 - Discrete input 35



Note

Lock Source differs between products and versions!

For standalone controllers, the lock source is 32 for A axis index; 31 is for B axis index; 30 is for C axis index.

For central-i products, the lock source is 16 for index.



Please verify the correct value at / window.

Timeout can't be set to "0".

Step 3: Jog to FLS (Type 1-Jog into limit)

Homing Sequence	Step 3 Definitions
1 - Motor On/Off	1 - Jog into limit
2 - Configure Position Lock	Command the motor to move until hitting RLS or FLS. Motion direction is according to the Speed sign.
3 - Jog into limit	Speed: 10,000 counts/sec
4 - Jog to Lock (index by HW)	Accel/Decel: 50,000 counts/sec ²
5 - Move to Lock position	Emergency Decel: 10,000,000 counts/sec ²
6 - Configure Position Lock	Timeout: 30,000 msec
7 - Wait time	
8 - Set position	
9 - End Homing	



Note

The sign of the speed determines the direction of motion. In this example, the positive limit (FLS) is used, so the Speed value is positive, indicating motion in the positive direction until the FLS is reached. If the motion is toward the negative limit (RLS), the Speed value must be negative.

Select an appropriate Timeout value, which must be longer than the time required for the motor to travel the full stroke.

Step 4: Jog to Index and Lock the Position (Type 15-Jog to Lock (index by HW))

Homing Sequence	Step 4 Definitions
1 - Motor On/Off	15 - Jog to Lock (index by HW)
2 - Configure Position Lock	Jog with the provided motion parameters till Lock happens and Lock position is latched. Then decelerate and stop.
3 - Jog into limit	Speed: -5,000 counts/sec
4 - Jog to Lock (index by HW)	Accel/Decel: 100,000 counts/sec ²
5 - Move to Lock position	Emergency Decel: 10,000,000 counts/sec ²
6 - Configure Position Lock	Timeout: 60,000 msec
7 - Wait time	
8 - Set position	
9 - End Homing	

Step 3 moves the motor toward the positive limit (FLS). After the FLS is reached, the motor must move in the negative direction to capture the index; therefore, the Speed value here is negative. If Step 3 moves the motor toward the negative limit (RLS), the Speed value here must be positive.



Note

The sign of the speed is opposite to that used in Step 3.

Step 5: Move to Lock Position (Type 16-Move to Lock position)

Homing Sequence	Step 5 Definitions
1 - Motor On/Off	16 - Move to Lock position
2 - Configure Position Lock	<i>Move (using the provided motion parameters) to the last recorded Lock position (LockVal).</i>
3 - Jog into limit	Speed: <input type="text" value="5,000"/> counts/sec
4 - Jog to Lock (index by HW)	Accel/Decel: <input type="text" value="100,000"/> counts/sec ²
5 - Move to Lock position	Emergency Decel: <input type="text" value="10,000,000"/> counts/sec ²
6 - Configure Position Lock	Timeout: <input type="text" value="10,000"/> msec
7 - Wait time	
8 - Set position	
9 - End Homing	



Note

After triggered the “Lock” function at the last step, the motor will move to the locked index position by absolute motion. Therefore, the speed only needs to set the positive value.

Step 6: Disable Position Lock (Type 14-Configure Position Lock)

Homing Sequence	Step 6 Definitions
1 - Motor On/Off	14 - Configure Position Lock
2 - Configure Position Lock	<i>Configures the Position Lock feature. Refer to 'Feedback/Lock' window for 'Source' value and more details.</i>
3 - Jog into limit	<input type="checkbox"/> Enable Lock
4 - Jog to Lock (index by HW)	
5 - Move to Lock position	
6 - Configure Position Lock	Timeout: <input type="text" value="98"/> msec
7 - Wait time	
8 - Set position	
9 - End Homing	



Note

Timeout can't be set to “0”.

Step 7: Wait until moving to the next step (Type 7-Wait time)

Homing in PCSuite

Homing Sequence	Step 7 Definitions
1 - Motor On/Off	7 - Wait time
2 - Configure Position Lock	Wait time to wait until moving to the next step.
3 - Jog into limit	Time to wait: <input type="text" value="300"/> msec
4 - Jog to Lock (index by HW)	
5 - Move to Lock position	
6 - Configure Position Lock	
7 - Wait time	
8 - Set position	
9 - End Homing	

Step 8: Set position (Type 6-Set position)

Homing Sequence	Step 8 Definitions
1 - Motor On/Off	6 - Set position
2 - Configure Position Lock	Set the current position of the motor to a user defined value. Typically used as the last step of an homing sequence.
3 - Jog into limit	Set Position value: <input type="text" value="0"/> counts
4 - Jog to Lock (index by HW)	Timeout: <input type="text" value="1,000"/> msec
5 - Move to Lock position	
6 - Configure Position Lock	
7 - Wait time	
8 - Set position	
9 - End Homing	

Set the current position to “Zero”.

Step 9: End Homing (Type 0-End Homing)



Note

The last step must be “End Homing”.

- Click “Apply All” (or press Enter) to apply the above setting.
- Then “Perform Homing” to start the homing sequence according to the applied steps. When homing is complete, the status will update to “Completed successfully”.

Homing Status:	Last step: 7
Completed successfully	
<input type="button" value="Perform Homing"/>	<input type="button" value="Refresh All"/> <input type="button" value="Apply All"/>

2.3.2 Lock Index Position with Mechanical Hardstop

For systems in which the controlled motor provides only an Index signal—without electrical limit switches—but incorporates mechanical hardstops (e.g., linear motors, voice coil motors, or rotary motors with constrained rotation angles), homing can be achieved using a hard-limit–based search procedure. The mechanism operates by performing a jog motion until the actuator reaches the mechanical hard limit. After contacting the hard stop, the motor reverses direction to search for and capture the Index signal, thereby establishing the home position.



1. Hardware Setup

Index Signal (also called Z-signal) Wiring:

Motor Encoder Port	Agito Controller Main Encoder Port	
Index+ (or Z+)	PIN_9	Encoder_4+
Index- (or Z-)	PIN_10	Encoder_4-

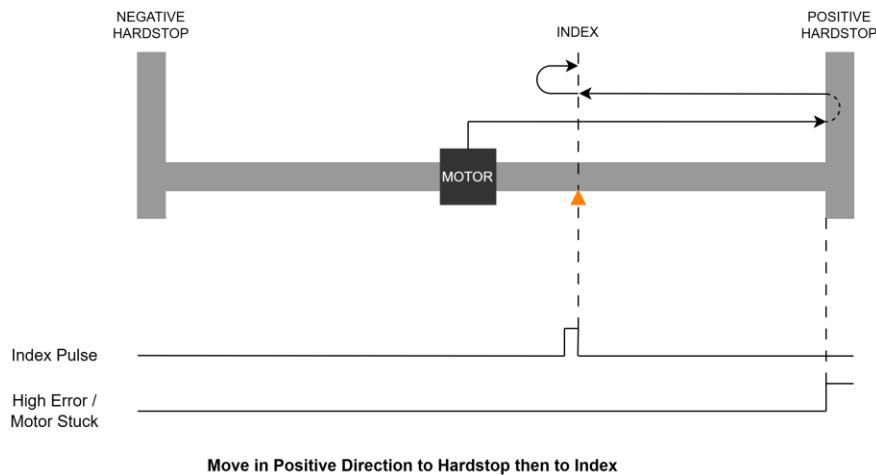
2. Homing Operation



1) Click  -> , navigate to Homing interface in PCSuite.

2) Set Homing Sequence Steps

The homing workflow for Moving in Positive Direction to Hardstop then to Index is illustrated in the figure shown below.



Move in Positive Direction to Hardstop then to Index

All steps are identical to the homing method described in chapter 2.3.1 (Page 11), “Lock Index Position with Limit Switches,” except for Step 3.

Due to different methods of detecting the mechanical hard limit, Step 3 is further divided into two approaches:

Method 1: Detecting whether the position error meets the specified condition.

Homing Sequence	Step 3 Definitions
1 - Motor On/Off	10 - Hard stop by high error
2 - Configure Position Lock	<i>Jog until hard stop is detected by high position error. Assign home position at this point.</i>
3 - Hard stop by high error	Speed: 10,000 counts/sec
4 - Jog to Lock (index by HW)	Accel/Decel: 50,000 counts/sec ²
5 - Move to Lock position	Emergency Decel: 10,000,000 counts/sec ²
6 - Configure Position Lock	Pos. error Threshold: 50 counts
7 - Wait time	Set Position value: 0 counts
8 - Set position	Timeout: 30,000 msec
9 - End Homing	

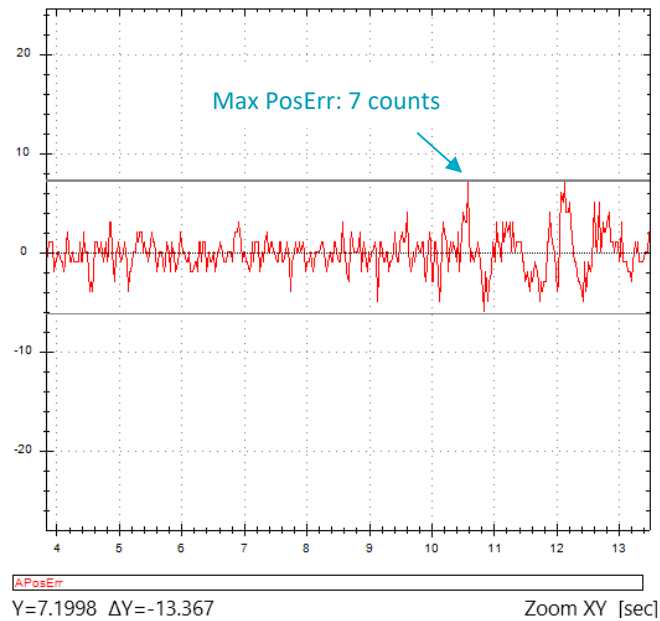
The key parameters for detecting the mechanical hard limit using this method are the Pos. Error Threshold and the motion speed.

Homing in PCSuite

If the position error threshold is set too high, the actuator may strike the mechanical stop with excessive force, causing noticeable impact noise. Conversely, if the threshold is set too low, the controller might misinterpret normal motion fluctuations as a hard-limit condition. The speed is set too low, the overall homing time will increase significantly.

Therefore, before configuring the threshold, it is recommended to use the PCSuite Data Recording to record the PosErr during a PTP or Jog motion at an appropriate speed and motion parameters. The measured position error can then be used as a reference for selecting the threshold.

For example, as shown in the figure below, the maximum observed absolute position error is 7 counts. Based on this measurement, it is recommended to set the Position Error Threshold to approximately 5–10 times the maximum observed PosErr value.



Method 2: Detecting whether the stuck velocity, current, and duration meet the defined criteria.

Homing Sequence	Step 3 Definitions
1 - Motor On/Off	9 - Hard stop by motor stuck
2 - Configure Position Lock	<i>Jog until hard stop is detected by motor stuck. Assign home position at this point.</i>
3 - Hard stop by motor stuck	Speed: 10,000 counts/sec
4 - Jog to Lock (index by HW)	Accel/Decel: 100,000 counts/sec ²
5 - Move to Lock position	Emergency Decel: 1,000,000 counts/sec ²
6 - Configure Position Lock	Stuck vel. Threshold: 16,384 counts/sec
7 - Wait time	Stuck curr. Threshold: 1,000 mA
8 - Set position	Stuck time: 100 msec
9 - End Homing	Set Position value: 0 counts
	Timeout: 30,000 msec

The key parameters for determining mechanical hard limits with this method are the stuck velocity threshold, stuck current threshold and stuck time.

If these values are not set properly, mechanical noise or false detection may occur.

- The stuck velocity threshold is recommended to be set to about 30% of the motion speed (the Speed value in this step). However, If the motor's encoder resolution is low and the configured speed in this step is less than 16,384 counts/s, please set the stuck velocity

threshold to at least 16,384 counts/s. Otherwise, the motor stuck condition will not be triggered until the motor off.



Minimum Velocity Feedback Resolution

Due to the controller sampling time—typically 61 μs (and 62.5 μs for EtherCAT products)—the minimum velocity feedback resolution is 16,384 counts/s (calculated as 1 count / 61 μs).

For EtherCAT products, the minimum value is approximately 16,000 counts/s (1 count / 62.5 μs).

- The stuck current threshold should be set to approximately 150% of the motor’s continuous current (this value must not exceed the motor’s safe current).
- The stuck time is typically recommended to be within 100–500 ms.

- 3) Click “Apply All” (or press Enter) to apply the above setting.
- 4) Then “Perform Homing” to start the homing sequence according to the applied steps. When homing is complete, the status will update to “Completed successfully”.

2.3.3 Search Index Position (no Limits)

The working principle of homing by searching for the Index position (without limit switches) is as follows:

When the controlled motor only provides an Index signal and no physical or electrical limit switches exist—such as in the case of a rotary motor—the motor can perform a jog motion in the defined direction to search for the Index position and complete the homing process.



1. Hardware Setup

Index Signal (also called Z-signal) Wiring:

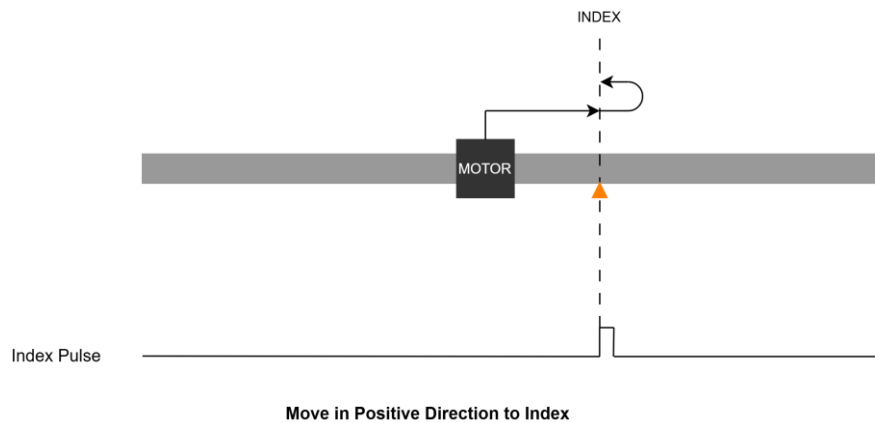
Motor Encoder Port	Agito Controller Main Encoder Port	
Index+ (or Z+)	PIN_9	Encoder_4+
Index- (or Z-)	PIN_10	Encoder_4-

2. Homing Operation



- 1) Click  -> , navigate to Homing interface in PCSuite.
- 2) Set Homing Sequence Steps

The homing workflow for Moving in Positive Direction to Index is illustrated in the figure shown below.



All steps are similar to the previous two homing methods, except that Step 3 is omitted.

Just move at the configured speed to search for the Index signal. Note that the speed should not be too high; a recommended speed is approximately 1/5 rev/s. The Timeout for this step must be set longer than the time required for a full travel range at this speed.

Homing Sequence	Step 3 Definitions
1 - Motor On/Off	15 - Jog to Lock (index by HW)
2 - Configure Position Lock	<i>Jog with the provided motion parameters till Lock happens and Lock position is latched. Then decelerate and stop.</i>
3 - Jog to Lock (index by HW)	Speed: <input type="text" value="5,000"/> counts/sec
4 - Move to Lock position	Accel/Decel: <input type="text" value="100,000"/> counts/sec ²
5 - Configure Position Lock	Emergency Decel: <input type="text" value="10,000,000"/> counts/sec ²
6 - Wait time	Timeout: <input type="text" value="60,000"/> msec
7 - Set position	
8 - End Homing	

- 3) Click “Apply All” (or press Enter) to apply the above setting.
- 4) Then “Perform Homing” to start the homing sequence according to the applied steps. When homing is complete, the status will update to “Completed successfully”.

2.3.4 Hardstop Homing (no Index or Limit Switches)

The working principle of homing by colliding with a mechanical hard stop (without Index signals or limit switches) is as follows:



When the controlled motor has neither an Index signal nor limit switches, and only a mechanical hard stop is available, the motor can perform a jog motion in the defined direction until it contacts the mechanical hard stop. The hard stop is then used as the reference point to establish the home position.

This homing method is suitable for linear motors, voice coil motors, and rotary motors with angle limited mechanical hard stops. It should be noted that small variations in homing repeatability are acceptable, as slight differences in detected hard stop position may occur due to changes in the user’s load inertia.

Homing in PCSuite

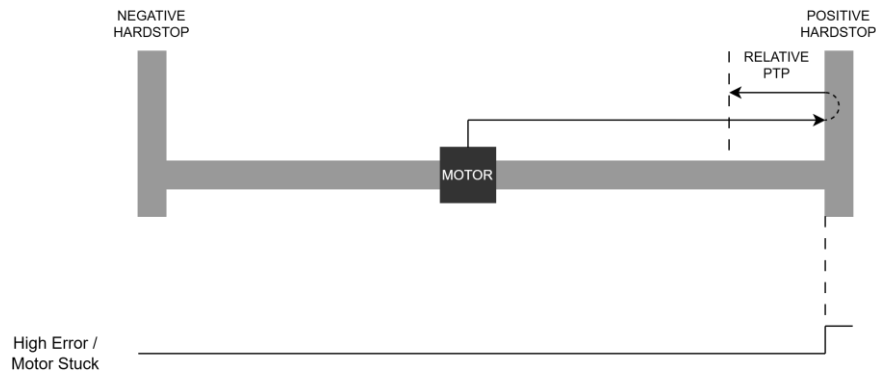
Homing Operation



1) Click  -> , navigate to Homing interface in PCSuite.

2) Set Homing Sequence Steps

Homing Steps as below (use mechanical stop as reference):



Move in Positive Direction to Hardstop then Relative PTP (No Index and limit switches)

Step 1: Enable the Motor (Type 8-Motor On/Off)

Homing by Flexible Sequence	
Homing Sequence	Step 1 Definitions
<ul style="list-style-type: none"> 1 - Motor On/Off 2 - Set pos. software limits 3 - Hard stop by high error 4 - Relative PTP 5 - Set position 6 - Set pos. software limits <li style="background-color: #90EE90;">7 - End Homing 	<ul style="list-style-type: none"> 8 - Motor On/Off <p><i>Disables or enables the motor.</i></p> <p><input checked="" type="radio"/> Enable Motor <input type="radio"/> Disable Motor</p> <p>Timeout: <input type="text" value="1,000"/> msec</p>

Step 2: Set higher software limit for jogging (Type 13-Set pos. software limits)

Homing by Flexible Sequence	
Homing Sequence	Step 2 Definitions
<ul style="list-style-type: none"> 1 - Motor On/Off <li style="background-color: #ADD8E6;">2 - Set pos. software limits 3 - Hard stop by high error 4 - Relative PTP 5 - Set position 6 - Set pos. software limits <li style="background-color: #90EE90;">7 - End Homing 	<ul style="list-style-type: none"> 13 - Set pos. software limits <p><i>Provides the means to optionally set the position software limits (RevPLim and/or FwdPLim).</i></p> <p><input checked="" type="checkbox"/> Set Reverse position limit at: <input type="text" value="-1,000,000"/> counts</p> <p><input checked="" type="checkbox"/> Set Forward position limit at: <input type="text" value="1,000,000"/> counts</p>



Note

Configure sufficiently high positive and negative limit values to ensure the motor can complete the full homing procedure, avoiding limit triggering during motion that could interrupt and halt the homing process.

Step 3: Jog to Hard Stop (Type 10-Hard stop by high error or Type 9-Hard stop by motor stuck)

There are two methods used to detect the mechanical hard stop (please refer to the details described in the chapter 2.3.2):

- a) Detecting whether the position error meets the specified condition (Type 10-Hard stop by high error).

Homing by Flexible Sequence																										
<table border="1"> <tr><td>1 - Motor On/Off</td></tr> <tr><td>2 - Set pos. software limits</td></tr> <tr style="background-color: #ADD8E6;"><td>3 - Hard stop by high error</td></tr> <tr><td>4 - Relative PTP</td></tr> <tr><td>5 - Set position</td></tr> <tr><td>6 - Set pos. software limits</td></tr> <tr style="background-color: #90EE90;"><td>7 - End Homing</td></tr> </table>	1 - Motor On/Off	2 - Set pos. software limits	3 - Hard stop by high error	4 - Relative PTP	5 - Set position	6 - Set pos. software limits	7 - End Homing	<table border="1"> <tr> <th colspan="2">Step 3 Definitions</th> </tr> <tr> <td colspan="2">10 - Hard stop by high error</td> </tr> <tr> <td colspan="2"><i>Jog until hard stop is detected by high position error. Assign home position at this point.</i></td> </tr> <tr> <td>Speed:</td> <td>10,000 counts/sec</td> </tr> <tr> <td>Accel/Decel:</td> <td>100,000 counts/sec²</td> </tr> <tr> <td>Emergency Decel:</td> <td>10,000,000 counts/sec²</td> </tr> <tr style="border: 2px solid red;"> <td>Pos. error Threshold:</td> <td>100 counts</td> </tr> <tr> <td>Set Position value:</td> <td>0 counts</td> </tr> <tr> <td>Timeout:</td> <td>30,000 msec</td> </tr> </table>	Step 3 Definitions		10 - Hard stop by high error		<i>Jog until hard stop is detected by high position error. Assign home position at this point.</i>		Speed:	10,000 counts/sec	Accel/Decel:	100,000 counts/sec ²	Emergency Decel:	10,000,000 counts/sec ²	Pos. error Threshold:	100 counts	Set Position value:	0 counts	Timeout:	30,000 msec
1 - Motor On/Off																										
2 - Set pos. software limits																										
3 - Hard stop by high error																										
4 - Relative PTP																										
5 - Set position																										
6 - Set pos. software limits																										
7 - End Homing																										
Step 3 Definitions																										
10 - Hard stop by high error																										
<i>Jog until hard stop is detected by high position error. Assign home position at this point.</i>																										
Speed:	10,000 counts/sec																									
Accel/Decel:	100,000 counts/sec ²																									
Emergency Decel:	10,000,000 counts/sec ²																									
Pos. error Threshold:	100 counts																									
Set Position value:	0 counts																									
Timeout:	30,000 msec																									

- b) Detecting whether the stuck velocity, current, and duration meets the defined criteria (Type 9-Hard stop by motor stuck).

Homing by Flexible Sequence																														
<table border="1"> <tr><td>1 - Motor On/Off</td></tr> <tr><td>2 - Set pos. software limits</td></tr> <tr style="background-color: #ADD8E6;"><td>3 - Hard stop by motor stuck</td></tr> <tr><td>4 - Relative PTP</td></tr> <tr><td>5 - Set position</td></tr> <tr><td>6 - Set pos. software limits</td></tr> <tr style="background-color: #90EE90;"><td>7 - End Homing</td></tr> </table>	1 - Motor On/Off	2 - Set pos. software limits	3 - Hard stop by motor stuck	4 - Relative PTP	5 - Set position	6 - Set pos. software limits	7 - End Homing	<table border="1"> <tr> <th colspan="2">Step 3 Definitions</th> </tr> <tr> <td colspan="2">9 - Hard stop by motor stuck</td> </tr> <tr> <td colspan="2"><i>Jog until hard stop is detected by motor stuck. Assign home position at this point.</i></td> </tr> <tr> <td>Speed:</td> <td>10,000 counts/sec</td> </tr> <tr> <td>Accel/Decel:</td> <td>100,000 counts/sec²</td> </tr> <tr> <td>Emergency Decel:</td> <td>1,000,000 counts/sec²</td> </tr> <tr style="border: 2px solid red;"> <td>Stuck vel. Threshold:</td> <td>16,384 counts/sec</td> </tr> <tr style="border: 2px solid red;"> <td>Stuck curr. Threshold:</td> <td>1,000 mA</td> </tr> <tr style="border: 2px solid red;"> <td>Stuck time:</td> <td>100 msec</td> </tr> <tr> <td>Set Position value:</td> <td>0 counts</td> </tr> <tr> <td>Timeout:</td> <td>30,000 msec</td> </tr> </table>	Step 3 Definitions		9 - Hard stop by motor stuck		<i>Jog until hard stop is detected by motor stuck. Assign home position at this point.</i>		Speed:	10,000 counts/sec	Accel/Decel:	100,000 counts/sec ²	Emergency Decel:	1,000,000 counts/sec ²	Stuck vel. Threshold:	16,384 counts/sec	Stuck curr. Threshold:	1,000 mA	Stuck time:	100 msec	Set Position value:	0 counts	Timeout:	30,000 msec
1 - Motor On/Off																														
2 - Set pos. software limits																														
3 - Hard stop by motor stuck																														
4 - Relative PTP																														
5 - Set position																														
6 - Set pos. software limits																														
7 - End Homing																														
Step 3 Definitions																														
9 - Hard stop by motor stuck																														
<i>Jog until hard stop is detected by motor stuck. Assign home position at this point.</i>																														
Speed:	10,000 counts/sec																													
Accel/Decel:	100,000 counts/sec ²																													
Emergency Decel:	1,000,000 counts/sec ²																													
Stuck vel. Threshold:	16,384 counts/sec																													
Stuck curr. Threshold:	1,000 mA																													
Stuck time:	100 msec																													
Set Position value:	0 counts																													
Timeout:	30,000 msec																													

Step 4: Relative PTP motion (Type 3-Relative PTP)

After finding the mechanical hard limit, move a short distance in the opposite direction to avoid hard-limit collision during subsequent motion.

Homing by Flexible Sequence																						
<table border="1"> <tr><td>1 - Motor On/Off</td></tr> <tr><td>2 - Set pos. software limits</td></tr> <tr><td>3 - Hard stop by high error</td></tr> <tr style="background-color: #ADD8E6;"><td>4 - Relative PTP</td></tr> <tr><td>5 - Set position</td></tr> <tr><td>6 - Set pos. software limits</td></tr> <tr style="background-color: #90EE90;"><td>7 - End Homing</td></tr> </table>	1 - Motor On/Off	2 - Set pos. software limits	3 - Hard stop by high error	4 - Relative PTP	5 - Set position	6 - Set pos. software limits	7 - End Homing	<table border="1"> <tr> <th colspan="2">Step 4 Definitions</th> </tr> <tr> <td colspan="2">3 - Relative PTP</td> </tr> <tr> <td colspan="2"><i>Command the motor to perform a relative point to point motion.</i></td> </tr> <tr> <td>Speed:</td> <td>10,000 counts/sec</td> </tr> <tr> <td>Accel/Decel:</td> <td>100,000 counts/sec²</td> </tr> <tr style="border: 2px solid red;"> <td>Relative distance:</td> <td>-100,000 counts</td> </tr> <tr> <td>Timeout:</td> <td>20,000 msec</td> </tr> </table>	Step 4 Definitions		3 - Relative PTP		<i>Command the motor to perform a relative point to point motion.</i>		Speed:	10,000 counts/sec	Accel/Decel:	100,000 counts/sec ²	Relative distance:	-100,000 counts	Timeout:	20,000 msec
1 - Motor On/Off																						
2 - Set pos. software limits																						
3 - Hard stop by high error																						
4 - Relative PTP																						
5 - Set position																						
6 - Set pos. software limits																						
7 - End Homing																						
Step 4 Definitions																						
3 - Relative PTP																						
<i>Command the motor to perform a relative point to point motion.</i>																						
Speed:	10,000 counts/sec																					
Accel/Decel:	100,000 counts/sec ²																					
Relative distance:	-100,000 counts																					
Timeout:	20,000 msec																					



Note

The sign (positive or negative) of relative distance determines the direction of motion.

Step 5: Set position (Type 6-Set position)

Homing by Flexible Sequence	
<p>Homing Sequence</p> <ul style="list-style-type: none"> 1 - Motor On/Off 2 - Set pos. software limits 3 - Hard stop by high error 4 - Relative PTP <li style="background-color: #ADD8E6;">5 - Set position 6 - Set pos. software limits <li style="background-color: #90EE90;">7 - End Homing 	<p>Step 5 Definitions</p> <p>6 - Set position</p> <p><i>Set the current position of the motor to a user defined value. Typically used as the last step of an homing sequence.</i></p> <p>Set Position value: <input type="text" value="0"/> counts</p> <p>Timeout: <input type="text" value="1,000"/> msec</p>

Set the current position to “Zero”.

Step 6: Configure safety position limits for motion (Type 13-Set pos. software limits)

Homing by Flexible Sequence	
<p>Homing Sequence</p> <ul style="list-style-type: none"> 1 - Motor On/Off 2 - Set pos. software limits 3 - Hard stop by high error 4 - Relative PTP 5 - Set position <li style="background-color: #ADD8E6;">6 - Set pos. software limits <li style="background-color: #90EE90;">7 - End Homing 	<p>Step 6 Definitions</p> <p>13 - Set pos. software limits</p> <p><i>Provides the means to optionally set the position software limits (RevPLim and/or FwdPLim).</i></p> <p><input checked="" type="checkbox"/> Set Reverse position limit at: <input type="text" value="-100,000"/> counts</p> <p><input checked="" type="checkbox"/> Set Forward position limit at: <input type="text" value="100,000"/> counts</p>



Note

Configure the soft limit travel range (optional but recommended to avoid hard-limit mechanical collisions). The zero-position direction must be considered when defining the positive and negative soft-limit range. In this example, the negative direction is set to -100000 counts and the positive direction to 100000 counts, assuming a total travel of 210000 counts with a 5000-count offset on each side.

Step 7: End Homing (Type 0-End Homing)

- 3) Click “Apply All” (or press Enter) to apply the above setting.
- 4) Then “Perform Homing” to start the homing sequence according to the applied steps. When homing is complete, the status will update to “Completed successfully”.

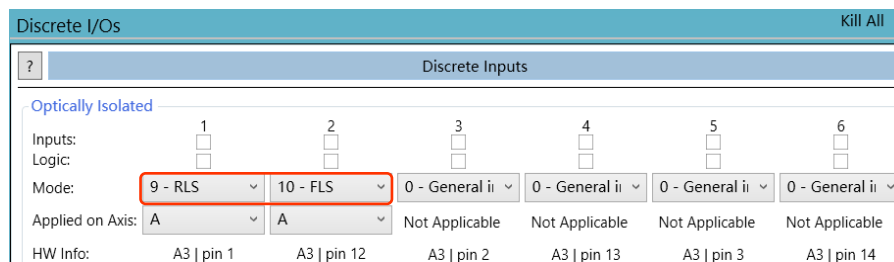
2.3.5 Limit Switch Homing

When no index signal is available, the motor homes by moving in a defined direction to search for a limit switch (RLS or FLS), which is then used as zero reference. As the motor stops using emergency deceleration, slight homing repeatability errors may occur. This method is suitable for applications where small positioning deviations are acceptable.

1. Limit Switch Setup



Connect the positive limit (FLS) and negative limit (RLS) switches (refer to the *Agito Quick Start Guide*). According to the hardware manual of the device you are using, wire the limit switch signals to the corresponding digital input ports.

This example shows the positive and negative limit signals connected to the AGD301 controller's Digital Input 1 and Digital Input 2, respectively, and configured as FLS and RLS according to the encoder direction.

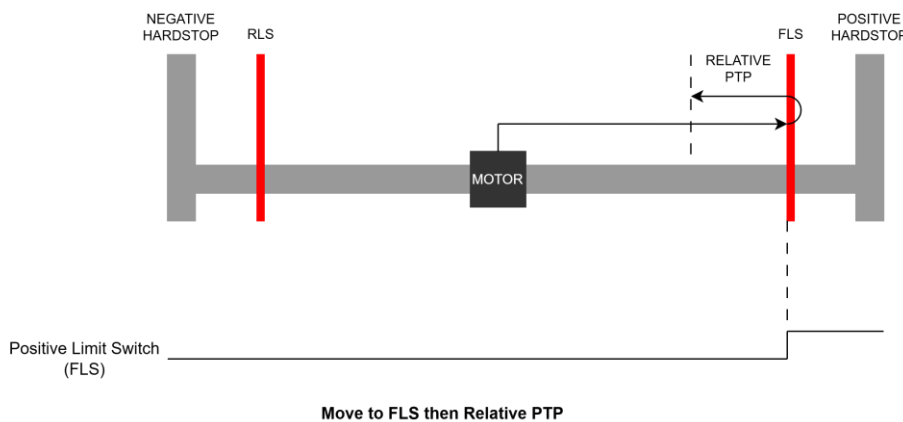


2. Homing Operation



- 1) Click  -> , navigate to Homing interface in PCSuite.
- 2) Set Homing Sequence Steps

The homing workflow for Moving to FLS then Relative PTP is illustrated in the figure shown below.



Step 1: Enable the Motor (Type 8-Motor On/Off)

Homing in PCSuite

Homing by Flexible Sequence	
Homing Sequence	Step 1 Definitions
1 - Motor On/Off	8 - Motor On/Off
2 - Jog into limit	<i>Disables or enables the motor.</i>
3 - Relative PTP	<input checked="" type="radio"/> Enable Motor <input type="radio"/> Disable Motor
4 - Set position	Timeout: <input type="text" value="1,000"/> msec
5 - End Homing	

Step 2: Jog to FLS (Type 1-Jog into limit)

Homing by Flexible Sequence	
Homing Sequence	Step 2 Definitions
1 - Motor On/Off	1 - Jog into limit
2 - Jog into limit	<i>Command the motor to move until hitting RLS or FLS. Motion direction is according to the Speed sign.</i>
3 - Relative PTP	Speed: <input type="text" value="10,000"/> counts/sec
4 - Set position	Accel/Decel: <input type="text" value="100,000"/> counts/sec ²
5 - End Homing	Emergency Decel: <input type="text" value="10,000,000"/> counts/sec ²
	Timeout: <input type="text" value="30,000"/> msec



Note

The sign of the speed value determines the direction of motion. To jog toward the RLS, set the speed to a negative value.

Step 3: Relative PTP motion (Type 3-Relative PTP)

After detecting the limit switch, move a short distance in the opposite direction to avoid hard-limit collision during subsequent motion.

Homing by Flexible Sequence	
Homing Sequence	Step 3 Definitions
1 - Motor On/Off	3 - Relative PTP
2 - Jog into limit	<i>Command the motor to perform a relative point to point motion.</i>
3 - Relative PTP	Speed: <input type="text" value="10,000"/> counts/sec
4 - Set position	Accel/Decel: <input type="text" value="100,000"/> counts/sec ²
5 - End Homing	Relative distance: <input type="text" value="-100,000"/> counts
	Timeout: <input type="text" value="20,000"/> msec



Note

The sign (positive or negative) of relative distance determines the direction of motion.

Step 4: Set position (Type 6-Set position)

Homing in PCSuite

Homing by Flexible Sequence	
Homing Sequence	Step 4 Definitions
1 - Motor On/Off	6 - Set position
2 - Jog into limit	<i>Set the current position of the motor to a user defined value. Typically used as the last step of an homing sequence.</i>
3 - Relative PTP	Set Position value: <input type="text" value="0"/> counts
4 - Set position	Timeout: <input type="text" value="1,000"/> msec
5 - End Homing	

Set the current position to “Zero”.

Step 7: End Homing (Type 0-End Homing)

- 3) Click “Apply All” (or press Enter) to apply the above setting.
- 4) Then “Perform Homing” to start the homing sequence according to the applied steps. When homing is complete, the status will update to “Completed successfully”.

2.3.6 Home Switch Homing

When a home switch is installed, homing is performed by monitoring the home switch signal during jog motion and using the signal transition position as the reference zero point. The limit switch and mechanical hard limit search procedures are the same as described in chapters 2.3.1–2.3.3 and are not repeated here. This section describes only the procedure for searching the home switch signal.

Application Scenarios	Reference Chapters	Homing Steps
Limit Switch + Home Switch	Chapter 2.3.1 (Page 11)	1 - Motor On/Off 2 - Jog into limit 3 - Jog to Home switch change 4 - Set position 5 - End Homing
Mechanical Hardstop + Home Switch	Chapter 2.3.2 (Page 16)	1 - Motor On/Off 2 - Hard stop by high error 3 - Jog to Home switch change 4 - Set position 5 - End Homing
Home Switch only	Chapter 2.3.3 (Page 19)	1 - Motor On/Off 2 - Jog to Home switch change 3 - Set position 4 - End Homing

1. Hardware Setup

- 1) Home Switch Wiring:

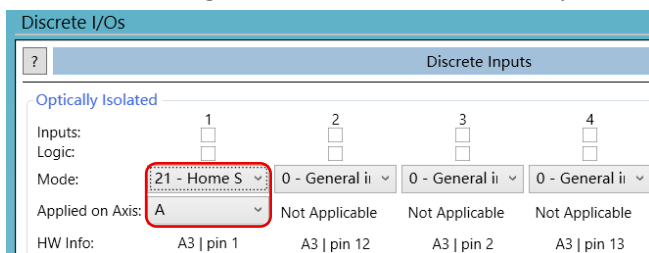
According to the controller user manual, connect the home switch sensor signal to the corresponding Discrete Input of the controller. If RLS and FLS signals are available, connect them to their respective Discrete Inputs as well.

2) Home Switch Signal Setting in PCSuite:



Navigate to the PCSuite menu I/O -> Discrete I/Os -> Discrete Inputs.

In this example, the home switch sensor is connected to DI_1# of the AGD301 controller. Configure the mode as '21 – Home Switch' and assign it to motion axis 'A'. If RLS and FLS are connected, configure them as described in chapter 2.3.1 (Page 11).



2. Homing Operation

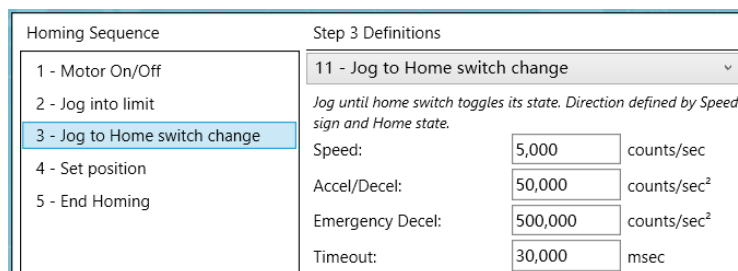


1) Click TOOLS -> HOME, navigate to Homing interface in PCSuite.

2) Set Homing Sequence Steps

For detailed procedures, please refer to Table 2.3.6 (Page 26). This section only explains the Step: *Type 11-Jog to Home switch change*.

Taking the “Limit Switch + Home Switch” scenario as an example, after the motor detects the FLS or RLS limit signal, it moves in the reverse direction to search for the home switch signal. Therefore, the speed value (Speed) configured here should be set in the direction opposite to that used when approaching the limit.



3) Click “Apply All” (or press Enter) to apply the above setting.

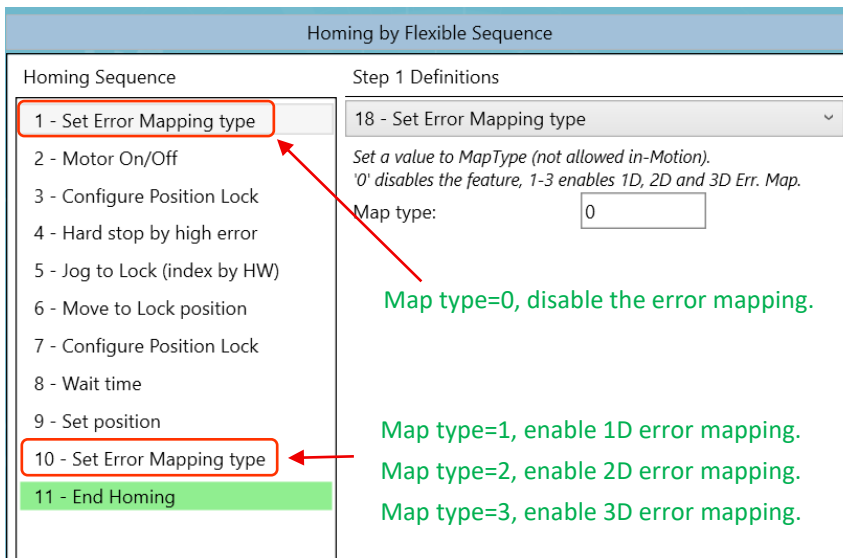
4) Then “Perform Homing” to start the homing sequence according to the applied steps. When homing is complete, the status will update to “Completed successfully”.

2.4 Error Mapping in Homing

The error compensation function must be disabled during the homing process. Detailed steps are described in Chapter 2.2-(18).

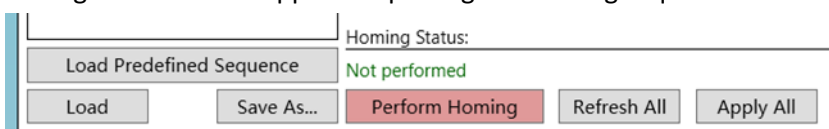
The following example uses Homing Mode 1 (2.3.1 Lock Index Position with Limit Switches) to illustrate how to configure the error compensation function. Other homing modes can be handled in the same manner.

Step 18 – Set Error Mapping Type should be added both at the beginning and near the end of the homing sequence. In the first step, the Map Type value should be set to 0 to disable error mapping. In the second-to-last step, the Map Type value should be configured according to the error mapping type used.



2.5 Import/Export Homing Sequence

The Agito controller supports exporting the homing sequence to a local file in .hseq format.



Click “Save As...” and select a destination path in the dialog box to save the homing sequence to the specified directory.

Click “Load” and select the target file in the dialog box to import a local file into PCSuite.

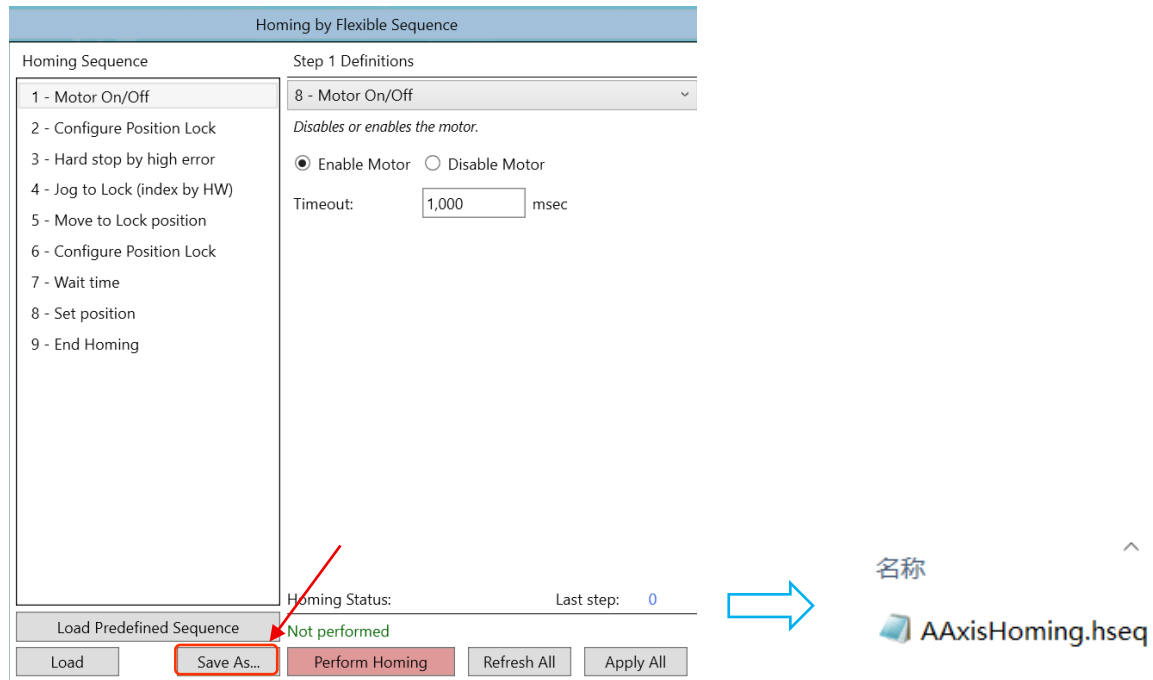
Click “Load Predefined Sequence” to import predefined homing sequences provided by the software.

Click “Apply All” to apply the current homing configuration shown in the interface.

3 IDE+ Example

In the IDE+ user programming environment of Agito PCSuite, it is convenient to execute homing user programs. The following example introduces a homing user program by using Axis A (Standalone Product) to capture the index position for homing (Homing Method 2.3.1 in this document).

Step 1: Export the homing sequence as an .hseq file.

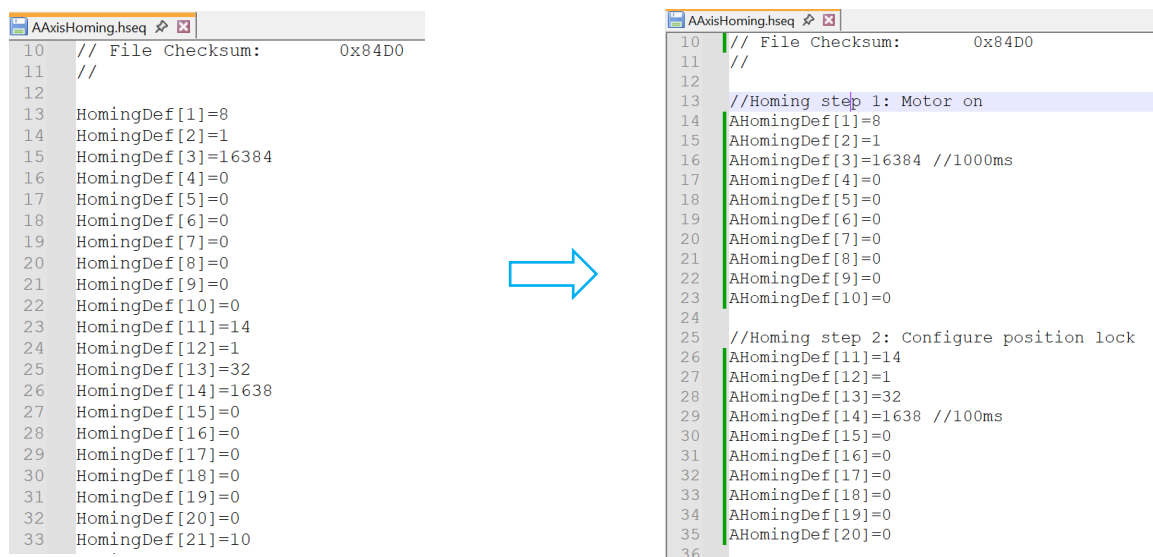


The screenshot shows the 'Homing by Flexible Sequence' dialog box. On the left, under 'Homing Sequence', there is a list of steps from 1 to 9. On the right, under 'Step 1 Definitions', there is a dropdown menu set to '8 - Motor On/Off', a description 'Disables or enables the motor.', radio buttons for 'Enable Motor' (selected) and 'Disable Motor', and a 'Timeout:' field set to '1,000' msec. At the bottom, there are buttons for 'Load', 'Save As...', 'Perform Homing', 'Refresh All', and 'Apply All'. A red box highlights the 'Save As...' button, with a red arrow pointing to the right. To the right of the dialog, a file icon labeled 'AAxisHoming.hseq' is shown, with a blue arrow pointing from the 'Save As...' button to it.

Step 2: Open the exported .hseq file in Notepad, and add the axis identifier before each homing parameter HomingDef[].*

For example, add “A” for Axis A, and so on for other axes.

This step can also be performed directly in the IDE+ user programming environment. Additional comments can be added to aid understanding.



The image shows two screenshots of a Notepad window editing the 'AAxisHoming.hseq' file. The left screenshot shows the original file content with lines 10 to 33 containing HomingDef parameters. The right screenshot shows the same file with 'A' added as a prefix to each HomingDef parameter and a comment added for the first step. A blue arrow points from the left screenshot to the right screenshot.

```

10 // File Checksum: 0x84D0
11 //
12
13 HomingDef[1]=8
14 HomingDef[2]=1
15 HomingDef[3]=16384
16 HomingDef[4]=0
17 HomingDef[5]=0
18 HomingDef[6]=0
19 HomingDef[7]=0
20 HomingDef[8]=0
21 HomingDef[9]=0
22 HomingDef[10]=0
23 HomingDef[11]=14
24 HomingDef[12]=1
25 HomingDef[13]=32
26 HomingDef[14]=1638
27 HomingDef[15]=0
28 HomingDef[16]=0
29 HomingDef[17]=0
30 HomingDef[18]=0
31 HomingDef[19]=0
32 HomingDef[20]=0
33 HomingDef[21]=10

```

```

10 // File Checksum: 0x84D0
11 //
12
13 //Homing step 1: Motor on
14 AHomingDef[1]=8
15 AHomingDef[2]=1
16 AHomingDef[3]=16384 //1000ms
17 AHomingDef[4]=0
18 AHomingDef[5]=0
19 AHomingDef[6]=0
20 AHomingDef[7]=0
21 AHomingDef[8]=0
22 AHomingDef[9]=0
23 AHomingDef[10]=0
24
25 //Homing step 2: Configure position lock
26 AHomingDef[11]=14
27 AHomingDef[12]=1
28 AHomingDef[13]=32
29 AHomingDef[14]=1638 //100ms
30 AHomingDef[15]=0
31 AHomingDef[16]=0
32 AHomingDef[17]=0
33 AHomingDef[18]=0
34 AHomingDef[19]=0
35 AHomingDef[20]=0
36

```

IDE+ Example



Note

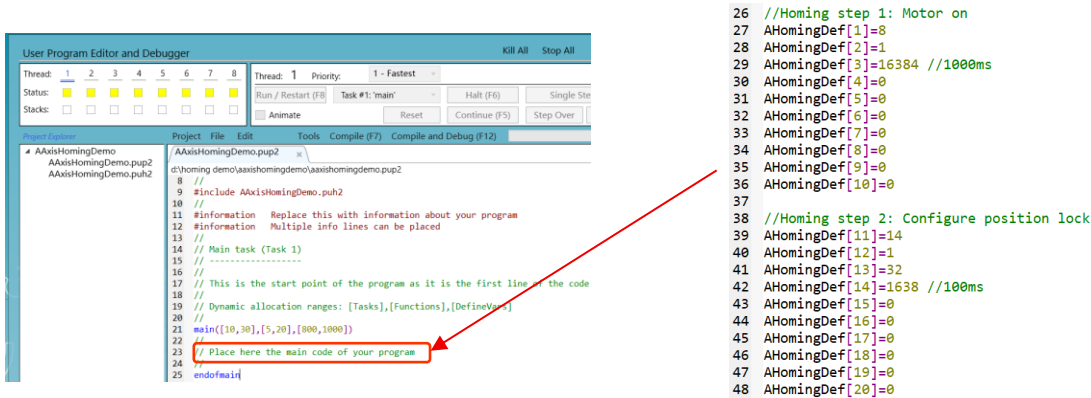
In PCSuite IDE+ user program, the “Timeout” unit in the HomingDef[*] is one interrupt (per 61 μ s), not “msec”.

1 interrupt = 1 count/61 μ s = 16.384 counts/ msec

Therefore, in the example, the AHomingdef[3]=16384 (Timeout: 1000msec).

Step 3: Copy and paste the updated parameters into the main function in the IDE+ programming interface.

Alternatively, the parameters can be encapsulated into a function and called from the main function.



```

26 //Homing step 1: Motor on
27 AHomingDef[1]=8
28 AHomingDef[2]=1
29 AHomingDef[3]=16384 //1000ms
30 AHomingDef[4]=0
31 AHomingDef[5]=0
32 AHomingDef[6]=0
33 AHomingDef[7]=0
34 AHomingDef[8]=0
35 AHomingDef[9]=0
36 AHomingDef[10]=0
37
38 //Homing step 2: Configure position lock
39 AHomingDef[11]=14
40 AHomingDef[12]=1
41 AHomingDef[13]=32
42 AHomingDef[14]=1638 //100ms
43 AHomingDef[15]=0
44 AHomingDef[16]=0
45 AHomingDef[17]=0
46 AHomingDef[18]=0
47 AHomingDef[19]=0
48 AHomingDef[20]=0
  
```

Step 4: Add appropriate status checks to prevent potential errors.

Even if the homing parameters [HomingDef] are not loaded into the IDE user program, the homing operation can still be started by sending the command [AxisNum]HomingOn = 1 from the IDE+.

However, this requires that the homing parameters have already been configured in the homing interface and saved to the controller.

```

main([10,30],[5,20],[800,1000])

while (AComtStatus[1]!=100) // Auto-phasing finished successfully (if need)
end

//Homing step 1: Motor on
AHomingDef[1]=8
AHomingDef[2]=1
AHomingDef[3]=16384 //1000ms
AHomingDef[4]=0
AHomingDef[5]=0
AHomingDef[6]=0
AHomingDef[7]=0
AHomingDef[8]=0
AHomingDef[9]=0
AHomingDef[10]=0
  
```

```
//Homing step 2: Configure position lock
AHomingDef[11]=14
AHomingDef[12]=1
AHomingDef[13]=32
AHomingDef[14]=1638 //100ms
AHomingDef[15]=0
AHomingDef[16]=0
AHomingDef[17]=0
AHomingDef[18]=0
AHomingDef[19]=0
AHomingDef[20]=0

..... // Homing Sequence Parameter Setting

//Homing step 9: End homing
AHomingDef[81]=0
AHomingDef[82]=0
AHomingDef[83]=0
AHomingDef[84]=0
AHomingDef[85]=0
AHomingDef[86]=0
AHomingDef[87]=0
AHomingDef[88]=0
AHomingDef[89]=0
AHomingDef[90]=0

AHomingOn=1
while (AHomingStat!=100) //Homing completed successfully
end

..... //Continue other user program after homing

endofmain
```

4 API Example

4.1 Perform homing by using default homing file

```
using AAMotion;

private void Home_button_Click(object sender, EventArgs e)
{
    _controller.GetAxis(AxisRef.A).Home();    //Perform homing on A axis by using default homing file
}
```

4.2 Perform homing by using custom homing file

```
using AAMotion;

private void Home_button_Click(object sender, EventArgs e)
{
    string homingfilepath = "C:\\Users\\...\\AAxisHoming.hseq";    //Custom homing file location
    AAMotionAPI.Home(_controller, AxisRef.A, homingfilepath);
}
```

4.3 Check Homing Status

4.3.1 Use "IsHomed" function

```
using AAMotion;

private void Home_button_Click(object sender, EventArgs e)
{
    //Perform homing on A axis by using default homing file
    _controller.GetAxis(AxisRef.A).Home();

    Thread.Sleep(20000);    //Wait for 20s before checking

    //Check if homing is completed by IsHomed function
    bool ishomed = AAMotionAPI.IsHomed(_controller, AxisRef.A);
    if (ishomed)
    {
        MessageBox.Show("Homing completed successfully");
    }

    else
    {
        MessageBox.Show("Homing failed");
    }
}
```

4.3.2 Use “HomingStat” function

```
using AAMotion;

private void Home_button_Click(object sender, EventArgs e)
{
    //Perform homing on A axis by using default homing file
    _controller.GetAxis(AxisRef.A).Home();

    Thread.Sleep(20000);           //Wait for 20s before checking

    //Check if homing is completed by HomingStat function
    bool success = AAMotionAPI.SendCommandString(_controller, "AHomingStat", out string response);
    if (success)
    {
        if (response.Contains("100"))           // Homing completed successfully
        {
            MessageBox.Show("Homing completed successfully!");
        }
        else
        {
            MessageBox.Show("Homing failed, response " + response);
        }
    }
    else
    {
        MessageBox.Show("Failed to send command!");
    }
}
```

5 Keywords

A full explanation of each parameter can be found in the communication and keywords documentation. The recording parameters and functions are listed below for convenience with a short explanation of each:

Keyword	Description																																
HomingDef	HomingDef defines homing configurations for up to 15 homing steps.																																
HomingOn	HomingOn parameter is cleared to "0" upon power on or reset. When HomingOn is set to "1", the controller will start the homing process according to the HomingDef while reporting its status on the HomingStat parameter. HomingOn parameter is cleared by the controller upon completion of the homing process (whether successfully or due to some error).																																
HomingStat	<p>Reports the status of homing.</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No homing was done after power on or reset.</td> </tr> <tr> <td>Positive value (not 100)</td> <td>Homing is in process. HomingStat value reflects the number of the currently processed step in the homing process.</td> </tr> <tr> <td>-1</td> <td>Failed due to wrong parameter.</td> </tr> <tr> <td>-2</td> <td>Failed due to timeout.</td> </tr> <tr> <td>-3</td> <td>Failed due to unexpected motor off (see MotorReason).</td> </tr> <tr> <td>-4</td> <td>Failed due to wrong motion reason.</td> </tr> <tr> <td>-5</td> <td>Failed due to wrong step type.</td> </tr> <tr> <td>-6</td> <td>Failed due to in motion.</td> </tr> <tr> <td>-7</td> <td>Failed due to steps out of range.</td> </tr> <tr> <td>-8</td> <td>Failed due to unexpected limit.</td> </tr> <tr> <td>-9</td> <td>Can't do set position. See SetPosition in manual for details.</td> </tr> <tr> <td>-10</td> <td>Failed due to requested motion mode value out of range or gear mode (not allowed).</td> </tr> <tr> <td>-11</td> <td>Failed due to requested error mapping value out of range.</td> </tr> <tr> <td>-12</td> <td>Failed because auto phasing has not been performed yet.</td> </tr> <tr> <td>100</td> <td>Completed successfully.</td> </tr> </tbody> </table>	Value	Meaning	0	No homing was done after power on or reset.	Positive value (not 100)	Homing is in process. HomingStat value reflects the number of the currently processed step in the homing process.	-1	Failed due to wrong parameter.	-2	Failed due to timeout.	-3	Failed due to unexpected motor off (see MotorReason).	-4	Failed due to wrong motion reason.	-5	Failed due to wrong step type.	-6	Failed due to in motion.	-7	Failed due to steps out of range.	-8	Failed due to unexpected limit.	-9	Can't do set position. See SetPosition in manual for details.	-10	Failed due to requested motion mode value out of range or gear mode (not allowed).	-11	Failed due to requested error mapping value out of range.	-12	Failed because auto phasing has not been performed yet.	100	Completed successfully.
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100	Completed successfully.																																
HomingStep	Records the current homing step.																																

Keywords

