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MOTION TECHNOLOGY

Predefined homing modes

Application Note

Easy Motion Studio II

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1. Application description

Homing modes are specialized functions used to align an axis with a known position. This is essential in applications where motion is restricted and there is no absolute position sensor.

This application note provides an overview of the predefined homing modes in Easy Motion Studio II and demonstrates how to home the axis to a limit switch using homing method 18 – "Homing to the Positive Limit Switch."

2. Homing modes overview

A list and short descriptions of the predefined homing modes can be found under the "Homing" section of the "Motion" branch in Easy Motion Studio II.

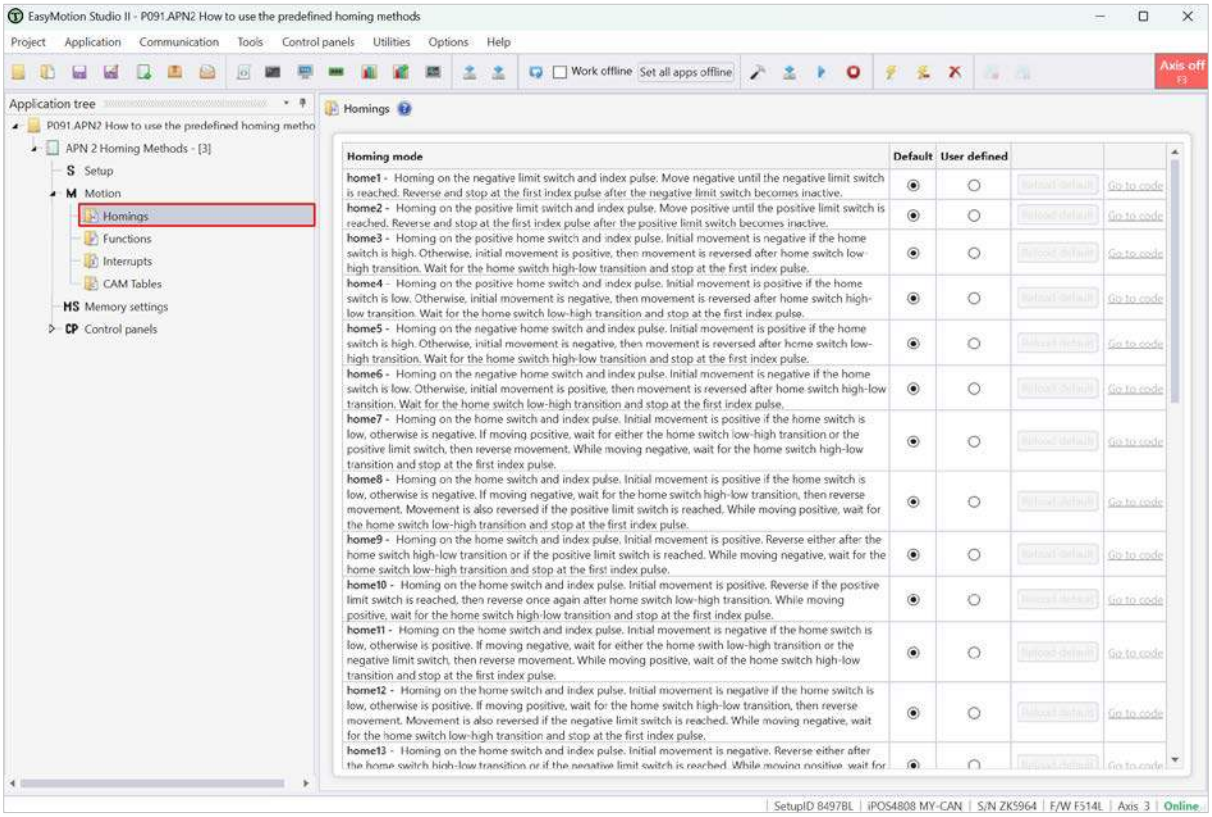

Figure 1 - Homing modes list and description

These predefined homing methods cover most common scenarios and are based on:

- System actual position
- Limit switches sensors
- Encoder index
- Mechanical limits

When the required homing routine cannot be found among the predefined methods, it is possible to customize (set as user defined) the closest routine, to meet specific demands, or the necessary sequence can be implemented as a function. This is exemplified in the "APN 3 - Homing to the middle of the working area" application note.

3. Homing modes usage in EasyMotion Studio II

The first step is to identify the appropriate homing mode or implement a custom homing routine. Once this is done, the homing mode can be inserted into the TML application using the “Homing” wizard.

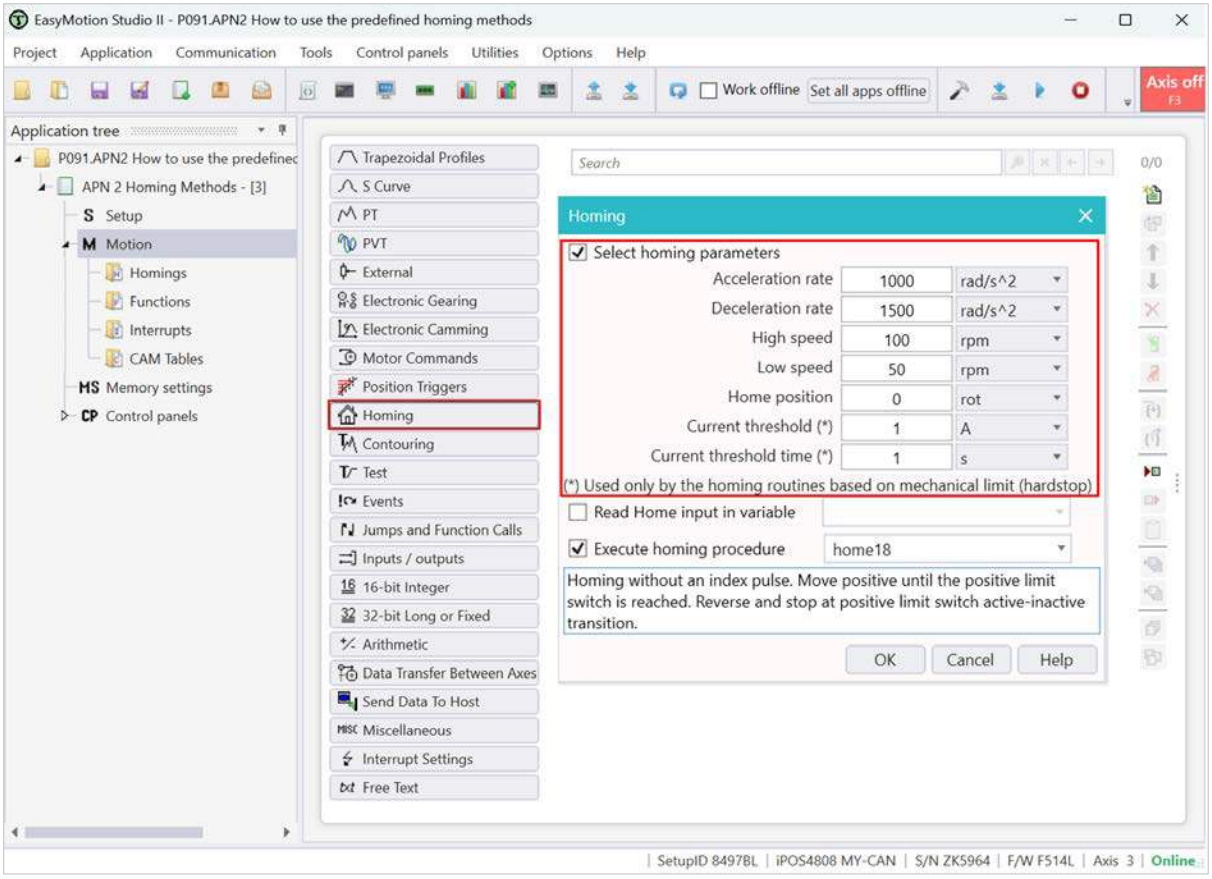

Figure 2 - Homing wizard

The “Homing” wizard is also used to set the homing parameters, which are application-dependent and must be configured before initiating the homing routine.

• ***Acceleration rate****:* Represents the acceleration used by the motion profiles inside the selected homing routine. It will be set function of the load inertia and system capabilities, to ensure a smooth load speed ramp-up and prevent the homing failure due to a drive protection triggering.
• ***Deceleration rate:*** Represents the deceleration value used to stop the movement when the homing condition (limit switch, home switch, encoder index or mechanical limit) is detected. If the system allows, the deceleration rate should be higher than the acceleration rate, to stop the load quickly and avoid the sensor or mechanical system damaging.
• ***High speed***: Represents the speed value used when searching for the homing condition (limit switch, home switch, encoder index or mechanical limit).
• ***Low speed***: Represents the speed used for the final approach towards the home position.
• ***Home Position***: Represents the new home position set at the end of homing procedure.
• **Current threshold**: Represents the current level for homing routines based on mechanical limits (hard stop). When using a physical switch, this setting will be completely ignored.
• ***Current threshold time***: Represents the time window for homing routines based on mechanical limit. The drive will consider that the mechanical limit was reached if the current output of the drive remains greater or equal than the current threshold until the time elapses. As before, if a physical switch is used, this setting will be ignored.

To illustrate the usage of homing modes, homing 18 (homing to the positive limit switch) was used. The corresponding TML code will be automatically generated by the “Homing” wizard.

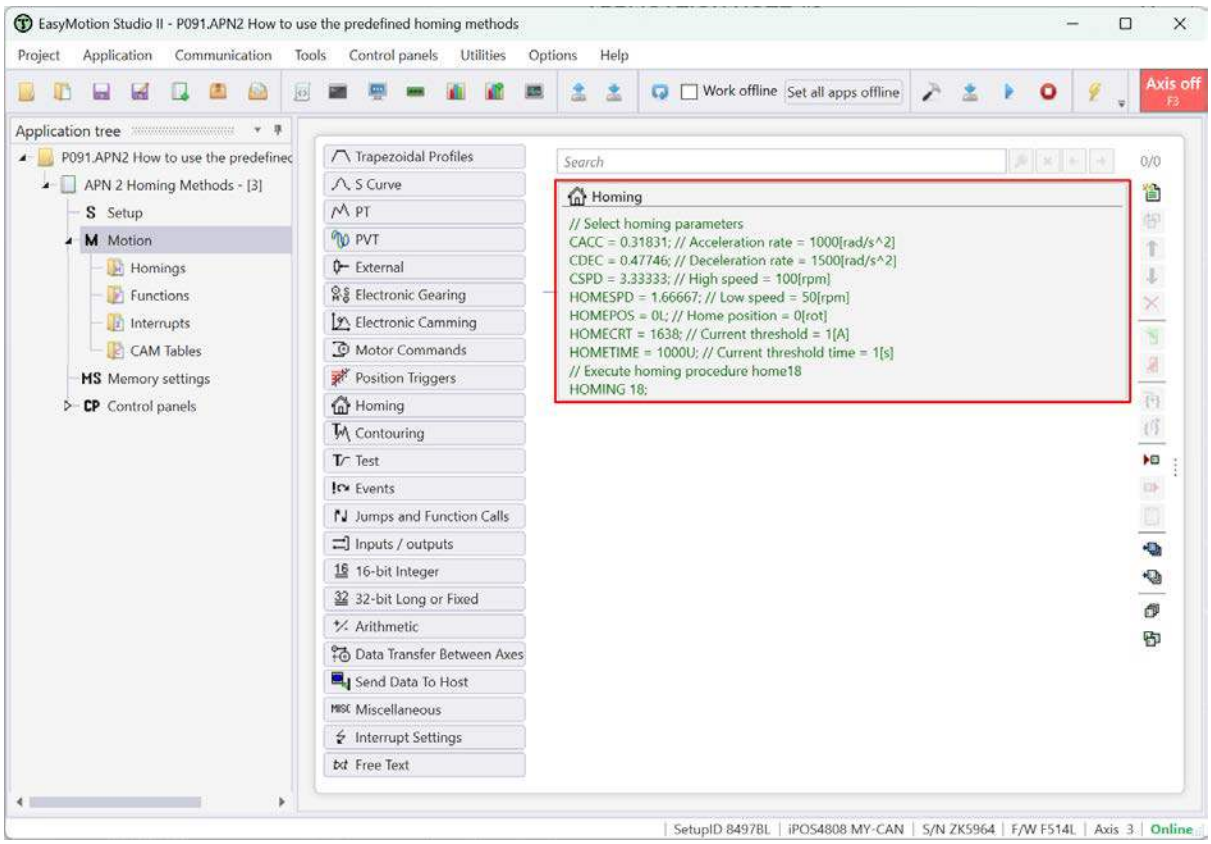

Figure 3 – TML code corresponding to Homing 18 mode

When the routine is executed, the drive first checks the status of the positive limit switch to see if it is active or inactive.

If the limit switch is inactive, a positive movement will be commanded, moving the load at high speed until the inactive-to-active transition of the positive limit switch is detected. The movement stops, using the set deceleration, and the motor will reverse at low speed to move the load away from the limit switch. When the active-to-inactive limit switch transition is detected, the movement stops, and the respective position is set as the home position.

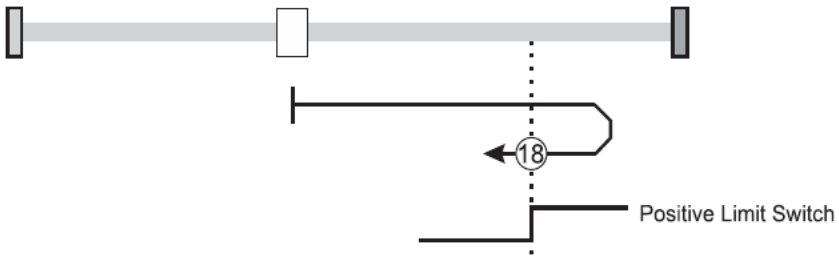

Figure 4 – Homing 18 - Homing to the Positive Limit Switch

If the positive limit switch is active when the homing starts, the drive moves the load negatively until the limit switch active-to-inactive transition is detected. The movement stops, using the set deceleration, and the drive sets that position as the home position.