# Homing

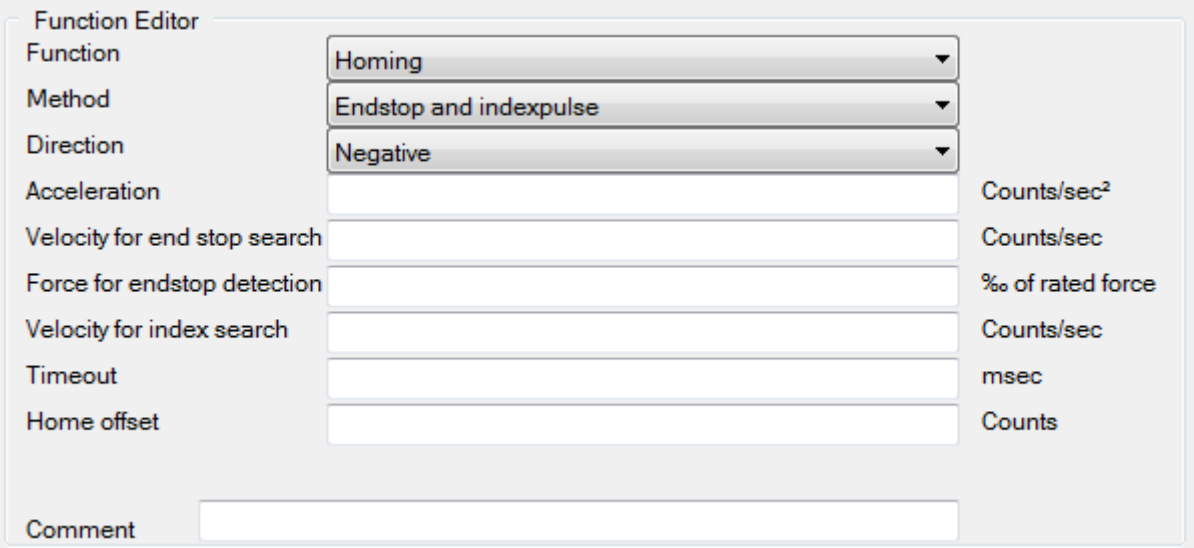
The homing routine is generally done at start-up of the controller. Its purpose is to take care that the reproducible reference is created using the relative position encoder.

For **linear homing** it is most common to first move towards the end-stop (in retract direction) and then move forward until the index is found. When the index is found, the controller takes this index position as the zero position of the relative encoder. For most actuators the index is between 1 and 3 mm from the retract end-stop.

For **rotary homing** it is most common to move in either positive or negative direction until the index is found. When the index is found, the controller takes this index position as the zero position of the relative encoder. For a rotary encoder there is only 1 index per revolution. If a gearbox is attached the numbers of indexes per revolution of the shaft is equal to the gear factor. (4:1 gearbox creates 4 indexes per revolution).

## Linear homing function

The homing settings are by default in the config file. If you have a multipole (3 phase) actuator, a phasing is required before the homing is done. In general you don't need to change the config file parameters. The function editor of the homing is shown below.



The **Acceleration** value is the used acceleration value throughout the total homing. If the homing is set to high it could trigger the end stop detection too soon resulting in not finding an index and going to the full extend position.

The **Velocity for end stop search** is important for not making a too hard end stop impact and should not be too low so that the homing would take too long.

The **Force for endstop detection** is the maximum current that is applied for the motion of retracting to the end stop position. Generally this value is about 1000 ‰ of motor rated current. When the actuator reaches this value while moving to retract position, it detects the end stop and will start moving forward to search for the index

The **Velocity for index search** can be set equal or lower than the velocity for end stop search since the distance is shorter (index is in general 1 to 3 mm from end stop). The speed of this move determines the accuracy of the index detection slightly.

The **Timeout** is finishing the homing routine even if the index is not found after the timeout time has been reached. In that case the target reached bit is not set in the status word. The timeout is the time in msec from the start of the homing. If you want to calculate the safe timeout value you need to take the time for a full stroke move using the “velocity for end stop search” plus the time for the move of 3 mm at the “velocity for index search” plus some margin (keep in mind that you need acceleration to reach the velocities).

The **Home offset** enables you to create a zero position which is related to the index position by an offset. If you use an offset value of -200, you will have a zero position that is 200 counts closer to the retract end stop.

## Homing programming

The homing always finishes (before or after the timeout). The program will continue. If the homing wasn't completed (it timed out) then the start position at power up is taken as the zero position. You should avoid the actuator to start its application with the wrong zero position. Therefore a check if the homing was successful should be done.

In the program below you can see how this check can be implemented in a program.

| # | Line | Command | Parameter | Comment |
|---|---|---|---|---|
| 0 | | MacroNumber | 0 | Autostart at power up |
| 5 | 0-1 | Homing | Endstop_and_indexpulse,Negative,Acc=,Vendstop=,Force=,Vindex=,Timeout=,Offset= | |
| 3 | 0-2 | If | Variable,Var=Error_code(0x00603F),Equal,Const=34323,Then_Macro_Jump=1,Else_Macro_Continue | |
| 3 | 0-3 | PositionMove | Absolute,Target=0,Vel=,Acc=,Change_immediate | |
| 1 | 0-4 | Macro | Jump,MacroNumber=2 | |
| 0 | | MacroNumber | 1 | Homing nok |
| 2 | 1-1 | Motor | Off | |
| 1 | 1-2 | GetVariable | Var=Error_code(0x00603F) | |
| 1 | 1-3 | Wait | Time,Timeout=50 | |
| 1 | 1-4 | Macro | Repeat,RepeatCount=0 | |
| 0 | | MacroNumber | 2 | Start Application |

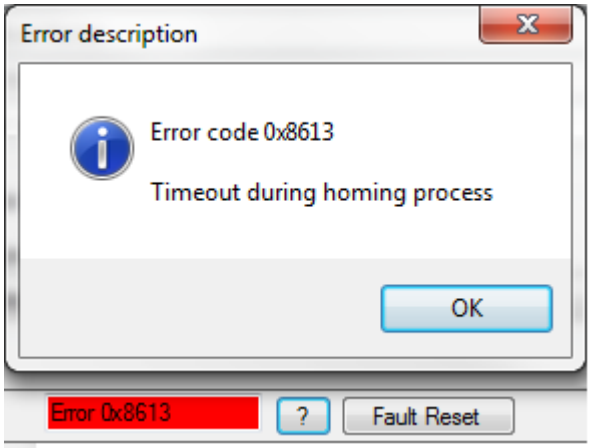
Line 0-1 the standard homing with the config file settings is created.

Line 0-2 checks if a homing error (time out occurred) and if this is the case it will jump to macro 1. If not it will continue to the next line in the macro

Line 0-3 performs a move to the zero position.

Line 0-4 makes a jump to macro 2 where the application can be programmed.

Macro 1 is executed if the homing timed out. It switches off the motor in line 1-1, it pushes the error message up to the pc (control center) in line 1-2, it waits for 50 msec in line 1-3 and it repeats this macro continuously in line 1-4. This way the error is pushed out every 50 msec. if you stop executing this macro, the error message of the control center will return to zero. The error message can be seen in the control center as shown in the image. Pressing the question mark (?) shows the error description window.




The way to reset this error is by switching off the controller power and switching it on again.