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Positioner Manual

ver.1 rev.06/'07

Enclosures to Service Manuals of:

- **McbNET Digital™**
- **Magnum400™**
- **MiniMagnum400™**
- **FastBack™**

Summary

Release	Notes
ver.1 rev.06/'07	Preliminary first edition.

Print in Italy 06/2007

THIS MANUAL IS EXCLUSIVELY ADDRESSED TO TECHNICAL PERSONNEL WITH AN APPROPRIATE TECHNICAL KNOWLEDGE ON SERVODRIVE.
BEFORE USING THIS MANUAL READ DRIVE'S SERVICE MANUAL.

1 Positioner

The Axor drives can be controlled as **POSITIONERS**.

It is possible to set up to **32 trapezoidal positioner profiles**, by the *Speeder One* interface in the ***Axor Profile Tool*** window or by another *master ModBus*.

It is possible to execute a single profile or a sequence of blending profiles.

The implemented **ABSOLUTE POSITIONER** executes transactions to *absolute quota* reference to the reference point.

Example: Suppose we want to blend the following profiles, having the origin (0 pulses) as reference point:

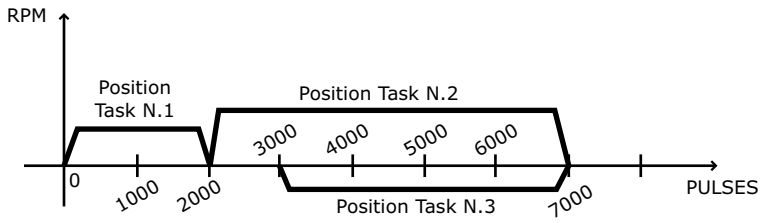
	POSITION TASK	**FINAL POSITION (**pulses**)**
1°	Position Task N.1	2000 pulses
2°	Position Task N.2	7000 pulses
3°	Position Task N.3	3000 pulses

a- During the first profile there will be a transaction from 0 pulses to 2000 pulses.

b- During the second profile there will be a transaction from 2000 pulses to 7000 pulses, so there will be a turning equivalent to 5000 pulses.

c- During the third profile there will be a transaction from 7000 pulses to 3000 pulses; to execute this movement the sense of rotation will change.

Example: Absolute Positioner



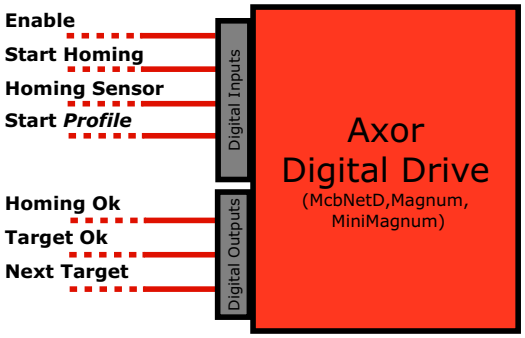
Notes:
- It is necessary to execute a correct *homing procedure* before starting an absolute positioner.

- There are *limit switches*.

2 Positioner - management

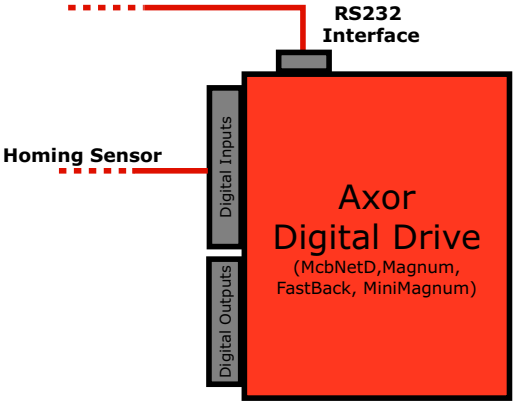
Positioner and homing procedures can be managed:

• **via hardware**: giving the correct voltage to the *dedicated digital inputs*, allows you to enable/disable a pre-set homing procedure and up to 32 pre-set positioner profiles (you can find more information about connection on drive's service manual):



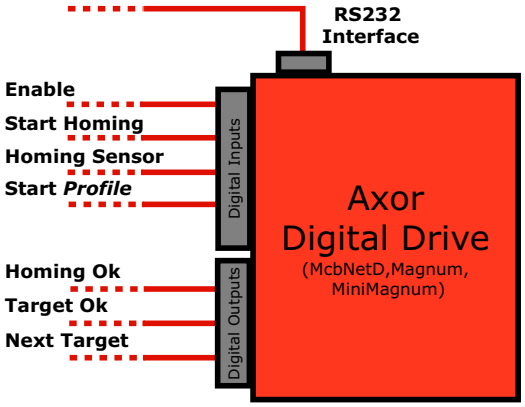
✓ **via hardware**

• **via RS232 interface**: by using *Speeder One* interface or another *master ModBus* (CNC or PLC), it is possible to manage a homing procedure and up to 32 positioner profiles (you can find more information on enclosure "ModBus Manual"):



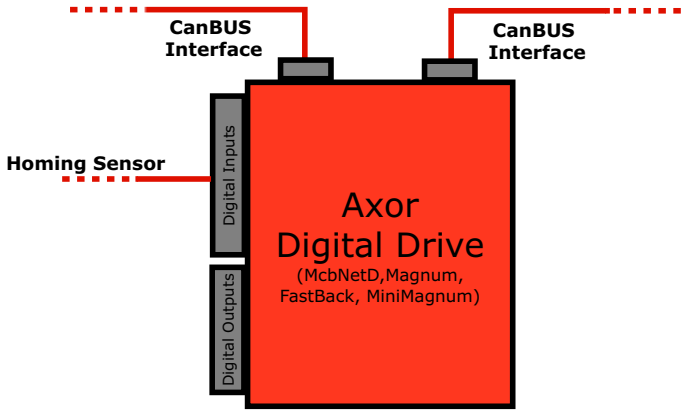
✓ **via RS232 interface**

• **mixed management**: by using the *RS232 interface*, it is possible to set a homing procedure and up to 32 positioner profiles; then it is possible to enable/disable these procedures via RS232 interface or giving the correct voltage to the *dedicated digital inputs*:



✓ **mixed management**

• **via CanBus**: by using *CanBus interface* and *CanOpen protocol*, it is possible to manage a homing procedure and up to 32 positioner profiles (you can find more information on enclosure "CanOpen Reference Manual"):



✓ **via CanBus**

• **via keypad:** for parameters' settings see enclosure "Display and KeyPad Manual", while for details about positioner and homing procedures contact Axor.

NOTE FOR FastBack™: FastBack™ HAS ONLY ONE PROGRAMMABLE DIGITAL INPUT, SO IT CAN MANAGE POSITIONER AND HOMING PROCEDURES ONLY VIA RS232 AND VIA CANBUS.

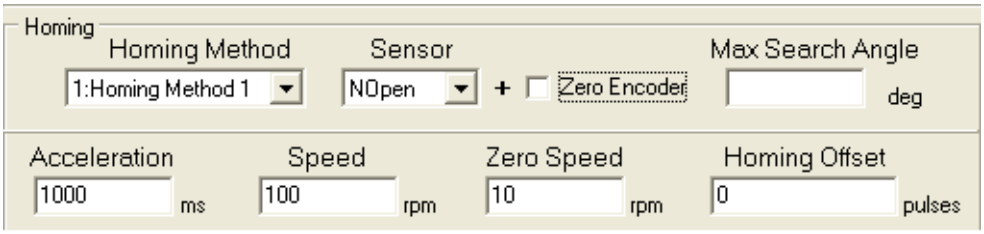
3 Homing - procedures

Before starting a positioning, it is necessary to execute a CORRECT homing procedure, which is the research of the reference position for the profile.
A homing procedure uses the signal of the **homing sensor** and, eventually, the **zero signal** of the encoder.

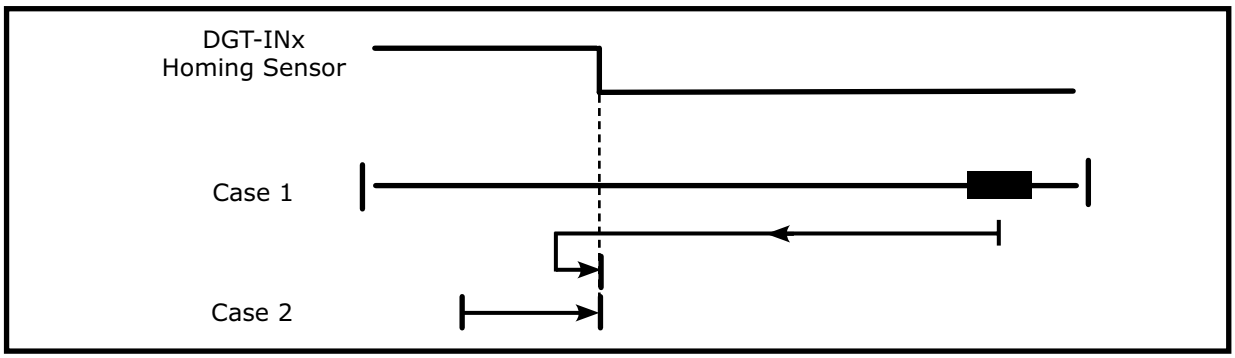
The Axor digital drives supports the following **HOMING PROCEDURES**:

a- **Direct homing procedure with normally opened home sensor**

Example:

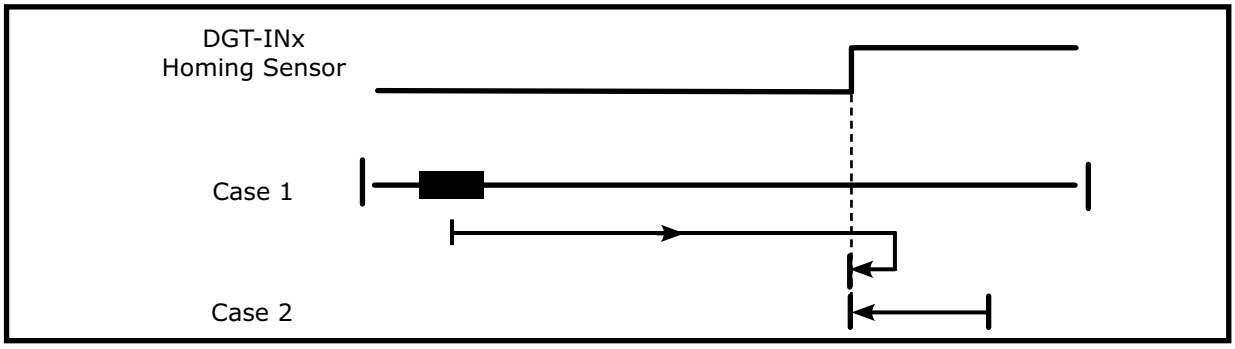


Case 1: If the homing sensor is low at the start homing the drive pilots the motor in counter-clockwise direction searching for the home sensor. When the sensor output becomes high, the motor decelerates and inverts its motion.
Case2: If the homing sensor output is already high at the homing start the motor simply turns clockwise with a speed like the "Zero speed" parameter.
The home position will be set when the falling edge of the home sensor is received.



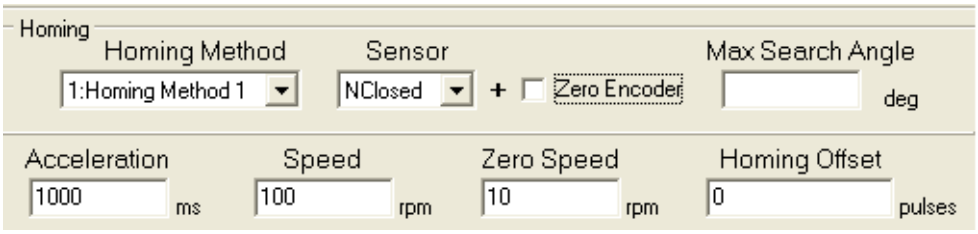
b- **Reverse homing procedure with normally opened home sensor**

Case 1: If the homing sensor is low at the start homing the drive pilots the motor in clockwise direction searching for the home sensor. When the sensor output becomes high, the motor decelerates and inverts its motion.
Case2: If the homing sensor output is already high at the homing start the motor simply turns counter- clockwise with a speed like the "Zero speed" parameter.
The home position will be set when the falling edge of home sensor is received.

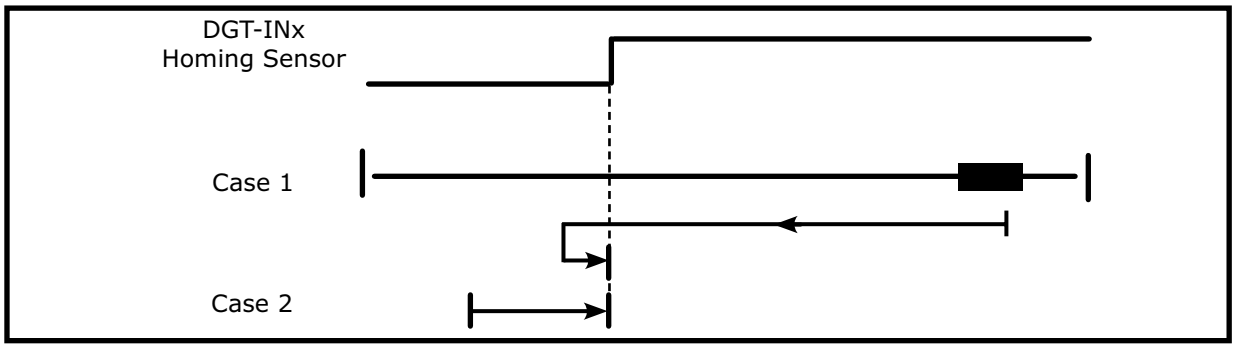


c- **Direct homing procedure with normally closed home sensor**

Example:

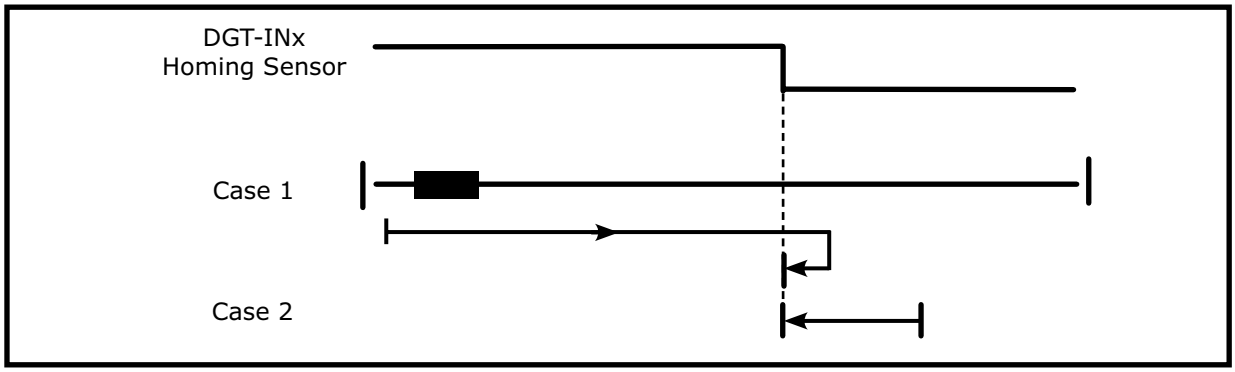


Case1: If the homing sensor is high at the start homing the drive pilots the motor in counter-clockwise direction searching for the home sensor. When the sensor output becomes low, the motor decelerates and inverts its motion.
Case2: If the homing sensor output is already low at the homing start the motor simply turns clockwise with a speed like the "Zero speed" parameter.
The home position will be set when the rising edge of home sensor is received.



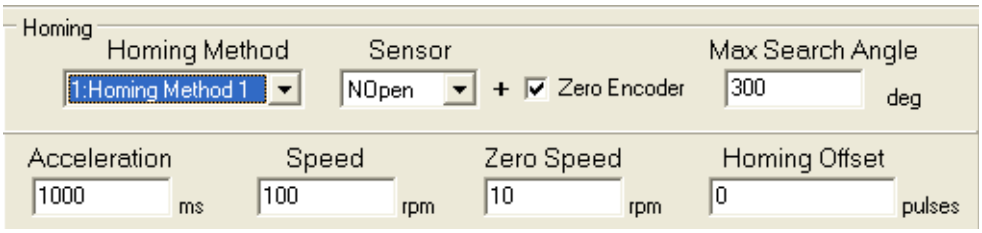
d- **Reverse homing procedure with normally closed home sensor**

Case1: If the homing sensor is high at the start homing the drive pilots the motor in clockwise direction searching for the home sensor. When the sensor output becomes low, the motor decelerates and inverts its motion.
Case2: If the homing sensor output was already low at the homing start the motor axis simply turns counter-clockwise with a speed like the "Zero speed" parameter.
The home position will be set when the rising edge of home sensor is received.

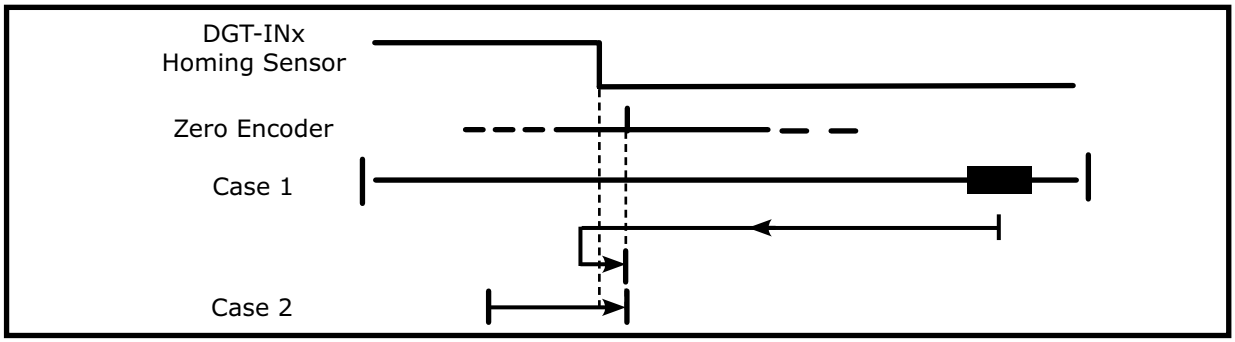


e- **Direct homing procedure with normally opened home sensor and zero index pulses**

Example:

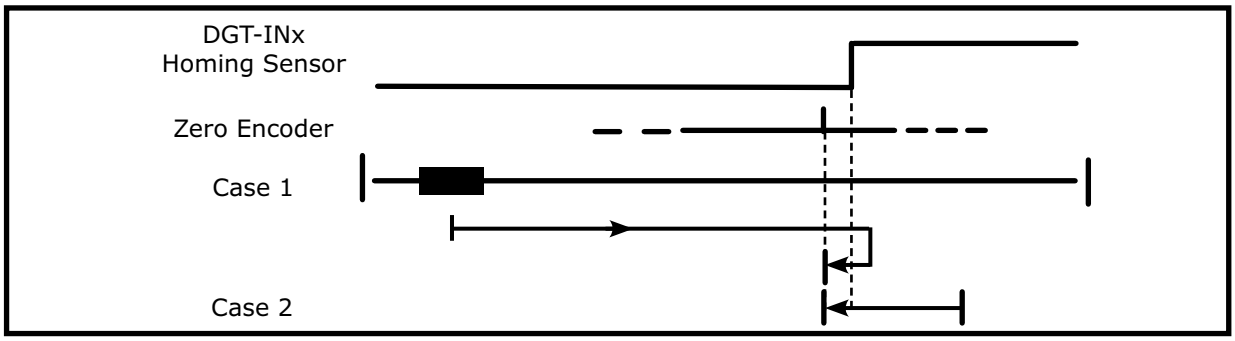


Case1: If the homing sensor is low at the start homing the drive pilots the motor axis in counter-clockwise direction searching for the home sensor. When the sensor output becomes high, the motor decelerates and inverts its motion.
Case2: If the homing sensor output is already high at the homing start the motor simply tursn clockwise with a speed like the "Zero speed" parameter.
The home position will be set on the first zero pulse after the falling edge of the home sensor.



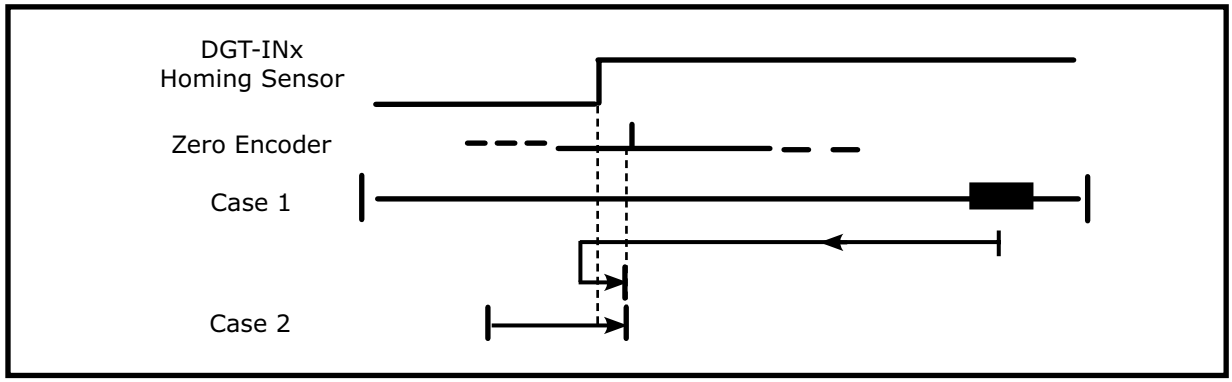
f- **Reverse homing procedure with normally opened sensor and zero index pulses**

Case1: If the homing sensor is low at the start homing the drive pilots the motor in clockwise direction searching for the home sensor. When the sensor output becomes high, the motor decelerates and inverts its motion.
Case2: If the homing sensor output is already high at the homing start the motor simply turns counter- clockwise with a speed like the "Zero speed" parameter.
The home position will be set on the first zero pulse after that the falling edge of the home sensor.



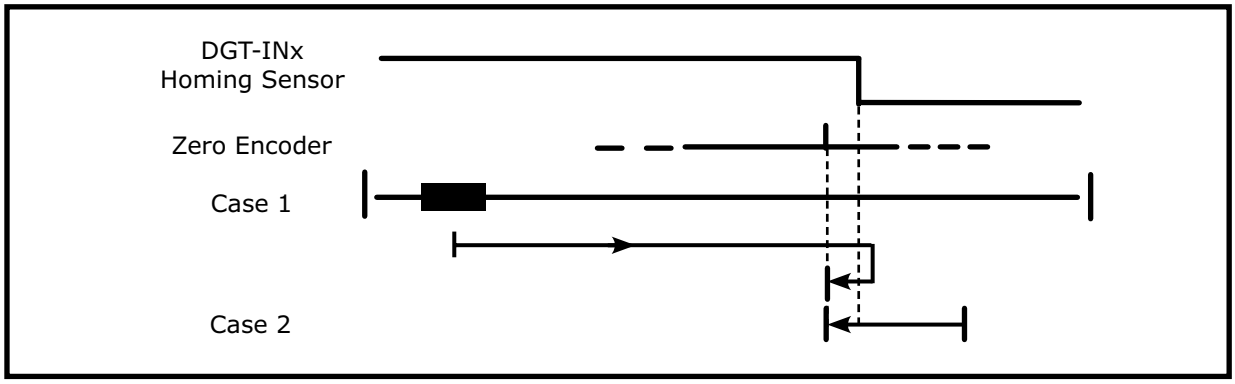
g- Direct homing procedure with normally closed home sensor and zero index pulses

Case1: If the homing sensor is high at the start homing the drive pilots the motor in counter-clockwise direction searching for the home sensor. When the sensor output becomes low, the motor decelerates and inverts its motion.
Case2: If the homing sensor output is already low at the homing start the motor simply turns clockwise with a speed like the "Zero speed" parameter.
The home position will be set on the first zero pulse after that the rising edge of home sensor is received.



h- Reverse homing procedure with normally closed home sensor and zero index pulses

Case1: If the homing sensor is high at the start homing the drive pilots the motor in clockwise direction searching for the home sensor. When the sensor output becomes low, the motor decelerates and inverts its motion.
Case2: If the homing sensor output is already low at the homing start the motor simply turns counter-clockwise with a speed like the "Zero speed" parameter.
The home position will be set on the first zero pulse after that the rising edge of home sensor is received.



i- Homing immediate

Enabling the digital input (active high) with this homing method the motor doesn’t move and the current position is set as the home position.

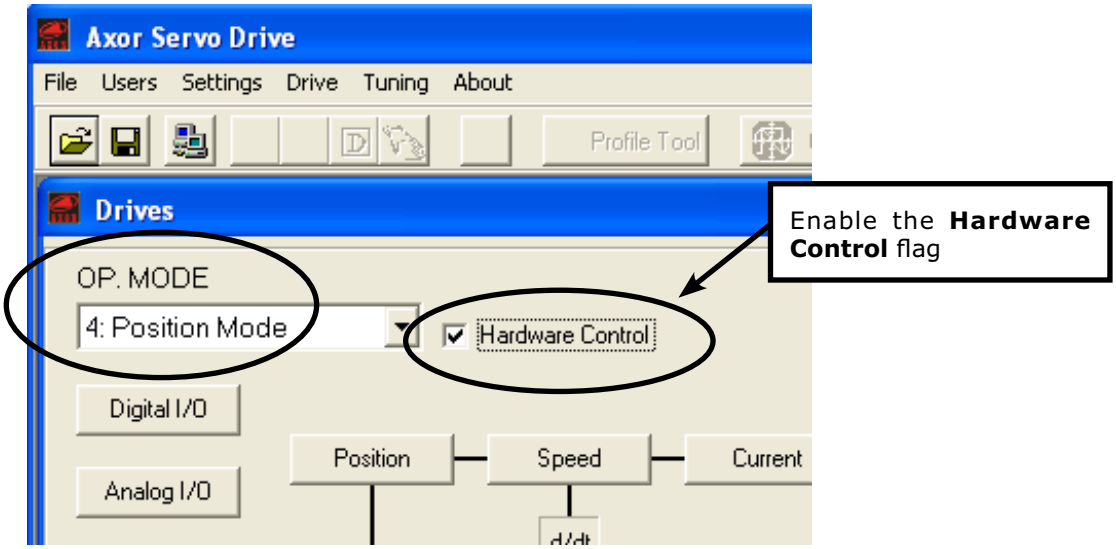
4 Homing - settings

To execute a homing procedure (via RS232 interface) you have to:

1- set operative mode "**4: Position Mode**" and enable "**Hardware Control**";
2- set correctly parameters in the "**Position**" window;
3- set correctly **homing parameters** in the main window of *Speeder One* interface;
4- set a digital input with function "**Homing Sensor**", another input with function "**Start Homing**" and an output with function "**Homing OK**";
5- connect homing sensor to digital input pin set with "**Homing Sensor**" function (refer to point 4 settings).

Let we see settings in detail:

1- Operative mode settings:

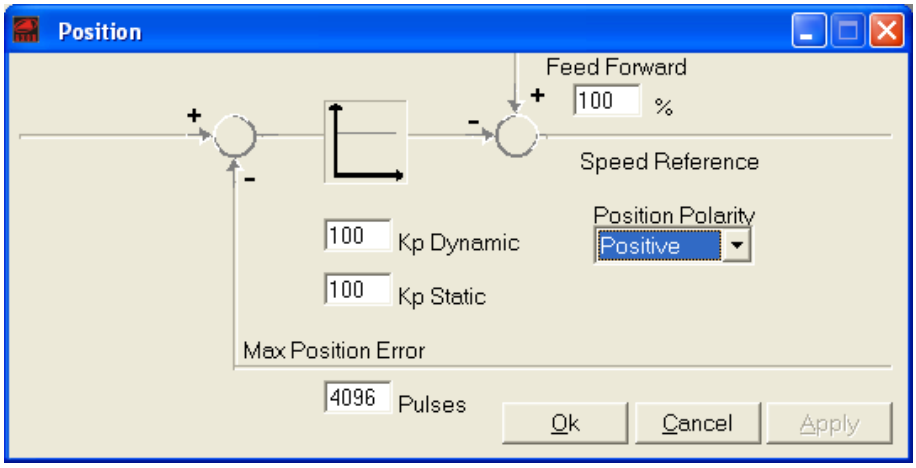


2- Settings on "Position" window:

Feed Forward
This improves the system's dynamics.
Suggested value: 100%.

Kp Dynamic
This is the position loop gain.
Suggested values: 1÷999.

Kp Static
Set as Kp Dynamic.



Position Polarity
Positive or Negative. This parameter enables a **complete inversion of axis control**, in fact selecting the "**Negative**" choice you have effects on homing and positioning procedures like as follow:
1) the rotation wise of supported homing procedures is inverted referred to the procedures in the chapter relative to homing procedures;
2) the "Homing Offset" value set is multiplied by -1;
3) all target positions ("Final Position") are multiplied by -1.

Max Position Error
This is the position error after which the drive goes into alarm 14 ("Following Error").
To calculate the value to insert in this field, use the following formula:

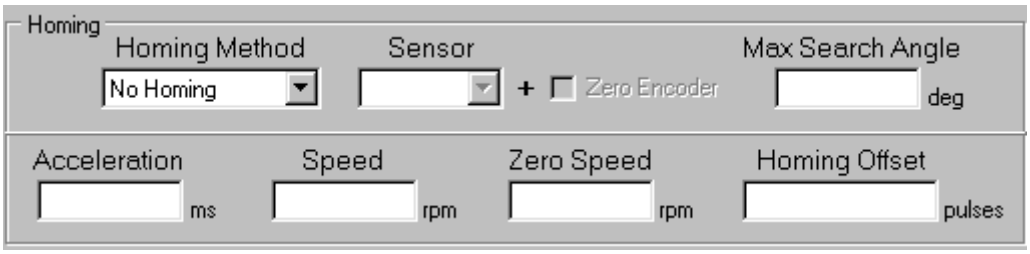
$$\text{Max\_Position\_Error} = \frac{K°}{360°} * 65536$$

where K° is the value in mechanical degrees of the maximum accepted error.
The maximum selectable position error is 180° (32767 pulses).

Example: If the maximum mechanical accepted error is 45° (1/8 mechanical turn), then the value to insert in the Max Position Error box is 8192, in fact 45°x65536/360°=8192.

We suggest to insert the value 8192.

3- Homing parameters settings:



Homing Method
It defines the method of homing. The supported options are:

- **No homing**: disables the homing procedure.
  For safety reasons it is not possible to use this option in the "**4:Position Mode**" operational mode. If this method is set it will not be possible to make the positioning procedure.
- **Homing method 1** (**direct**): the drive makes the motor turn in a **counter-clockwise** direction to search for the homing sensor.
- **Homing method 2** (**reverse**): the drive makes the motor turn in a **clockwise** direction to search for the homing sensor.
- **Immediate**: the current position becomes the home position without moving the motor to search the homing sensor.

Sensor
It selects the type of sensor used for the homing procedure. The available options are **NOpen** (**normally open**) or **NClosed** (**normally closed**).

Zero Encoder
Marking the "**Zero Encoder**" box the home position is set on the **first zero pulse** of the motor feedback after the interception of the homing sensor. This allows you to execute the homing procedure with better precision.

Max Search Angle
It is the maximum mechanical angle (0-359 degrees) that can be made during the search for the zero encoder signal after the correct interception of the homing sensor. Above this angle the motor stops, no homing position is saved and alarm 26 (the "Homing Error" alarm) is displayed (this alarm is cleared after the disabling of the digital input set with the "Reset Fault" function).
This parameter (when used correctly) allows the homing process to be repeated with excellent results and avoid errors due to sensor signal elasticity or mechanical tolerance.

Speed
This parameter sets the speed reference used during the homing process and it is given in "rpm". The admitted values are in ranges between 10 and 1000 rpm.

Acceleration

This is the acceleration and deceleration time for the homing procedure. It is defined in milliseconds and allows values in ranges between 10 and 5000 ms. This time references the maximum motor speed set by using the "Speed Limit" parameter in the "Speed" window, so the **actual acceleration** time can be found utilizing the following formula:

$$T\_acc\_homing\ [ms] = \frac{Speed\_homing\ [rpm]}{Speed\_motor[rpm]} * T\_acc\_sett[ms]$$

Where: **T_acc_homing** = real acceleration time during the homing search process;
Speed_homing = speed set for the homing process ("Speed" parameter);
Speed_motor = motor speed limit set on the interface ("Speed Limit" parameter);
T_acc_set = value inserted in the "Acceleration" parameter.

For example if you have a motor with the following parameters:
- "Speed Limit" (on the "Speed" window) = 3000 rpm;
- "Acceleration" (on the "Homing" window) =500 ms;
- "Speed" (on the "Homing" window) = 1000 rpm.

The acceleration time set in the homing window is the time that the motor should employ to accelerate from 0 rpm to the maximum speed (in this case 3000rpm).
The real acceleration time from 0 rpm to 1000 rpm is 167ms, in fact:

$$T\_acc\_homing\ [ms] = \frac{100\ rpm}{3000\ rpm} * 500\ ms = 167\ ms$$

Zero Speed

This defines the motor's speed during the realignment with the homing sensor and/or during the search for the encoder's zero pulse from the motor feedback after the home sensor is reached.
It is defined in "rpm" and allows values in ranges between 1 and 50 rpms. We suggested utilising low values for this parameter in order to obtain good precision.

Homing Offset

This defines the difference between the zero position for the application and the machine's home position (which is found during homing process). It is measured in pulses and the allowed values are in ranges: $+/-(2^{32}-1)$. This value is assigned to the home position found at the end of a successful homing process. The Homing Offset value is obtained by the execution of the following calculation:

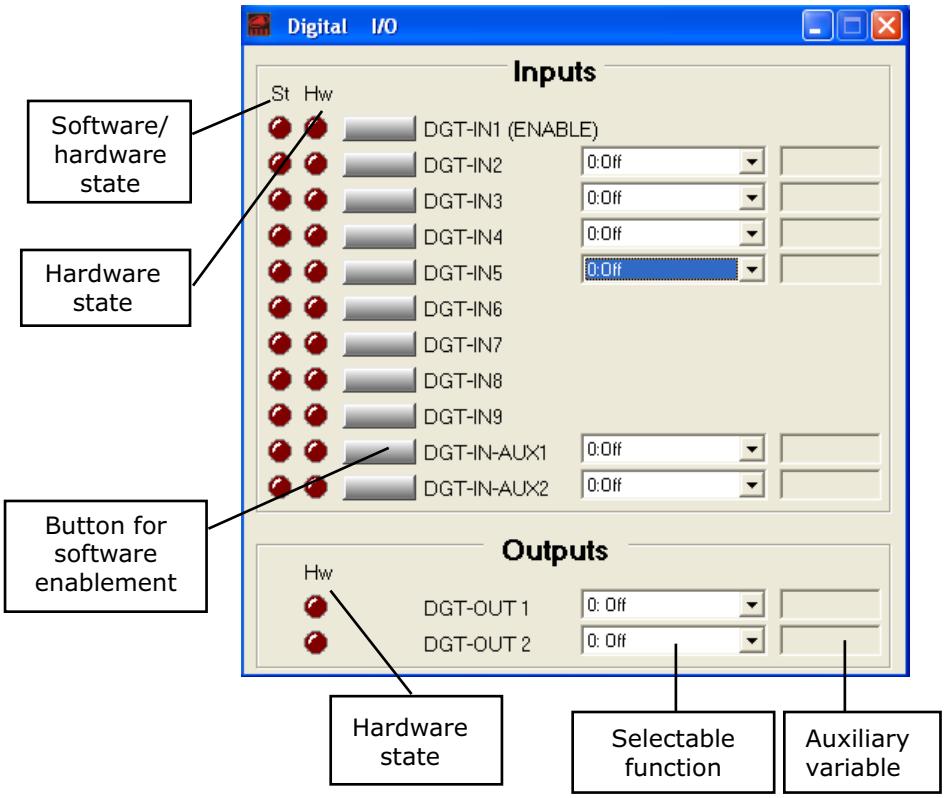
$$Homing\ Offset = n°\ turns\ (also\ not\ integer) * 65536$$

Example: suppose we have an application where the distance between the home position and the zero position of the axis is equal to the distance that the axis can go with a rotation of 4 turns plus an addition 90° mechanical turn.
The first thing to do is to find the number of turns to insert into the formula. In this example: n° turns = 4 + 90°/360° = 4.25 to refer to the fraction of turn above 360°. Now it is possible to calculate utilizing the following operation: 4,25 *65536 = **278528.** This bold number is the value that must be inserted in the "Homing Offset" window.

After the setting of the desired homing parameters save the changes using the "Save To EEPROM" function on the software interface, doing this the drive's setup will become permenent.

4- Digital inputs/output settings:

To *enable/disable/control* a homing procedure "**Digital I/O**" window is used:



The "**St**" led visualises the **status** (**software or hardware**) of the digital inputs. Clicking on the button near the name of the digital input, the "St" led becomes red and a high logic signal is present on the input.

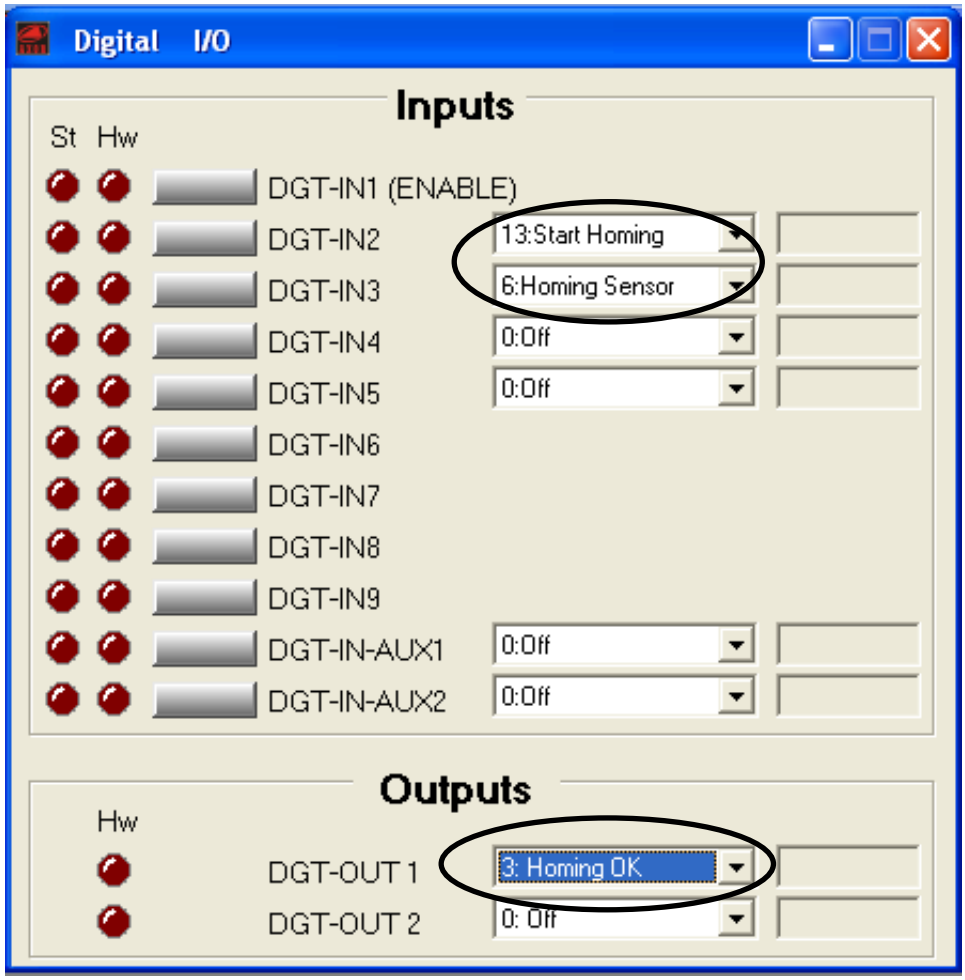
The "**Hw**" led visualises the **hardware status** of the digital input, if it is red a voltage is present on the input.
he DGT-IN1,...DGT-IN9 inputs are enabled by giving +24V, while the DGT-INAUX1 and DGT-IN-AUX2 inputs are enabled by giving +5V.
Attention: it is not possible to enable the DGT-INAUX1 and DGT-IN-AUX2 giving +24V.

If the Hw led is red, the St led is red too.

The "**Hw**" led, about digital outputs, visualises the **hardware status** of the digital outputs, if it is red the output is closed.

A homing procedure needs following settings:

- a digital programmable input with function **Start Homing**;
- a digital programmable input with function **Homing Sensor**;
- an outputput with function **Homing OK**.



5- Homing sensor connection:

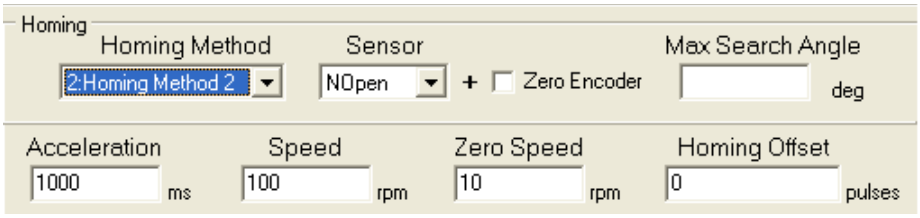
Connect homing sensor to digital input pin set with "**Homing Sensor**" function (see service manual of the drive).

5 Homing - example

Example: Homing sequence

Suppose to do the homing procedure: "b- **Reverse homing procedure with normally opened home sensor**". The procedure is the following:

1- Select the operative mode "**4:Position Mode**" and enable the "**Hardware Control**" box.
2- In the main window of the interface set the desired homing metod and its parameters. For example:



Save all by using the "**Save to EEPROM**" icon.

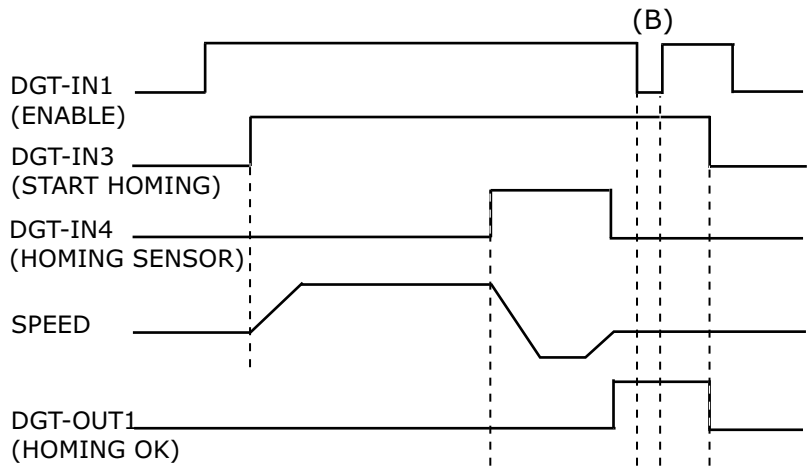
3- Open the "**Digital I/O**" window and set:
- a digital programmable input with the **Start Homing** function (for example: **DGT-IN3**);
- a digital programmable input with the **Homing Sensor** function (for example: **DGT-IN2**);
- a digital output with the **Homing OK** function (for example: **DGT-OUT1**);

Save all using the "**Save to EEPROM**" icon.

4- Execute homing procedure:

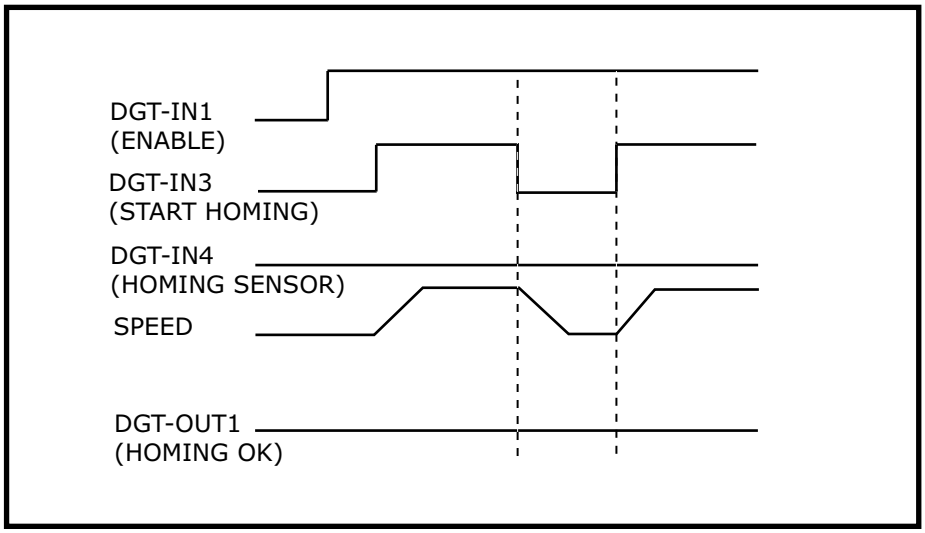
a- Enable the **DGT-IN1** (**Enable**) digital input ⇨ the motor will be on torque.
b- Enable the **DGT-IN3** (**Start Homing**) digital input ⇨ the motor moves to search the home position using the homing parameters saved on the interface. Every time this input is disabled the homing position is resetted.
c- When the home sensor output, connected to the **DGT-IN2** (**Homing Sensor**) digital input, is sensed active (in this example we considered a normally opened sensor), the motor decelerates and inverts its motion.
d- The home position is set when the falling edge of home sensor is received. When this happens the drive enables the **DGT-OUT1** (**Homing OK**) digital output. This value is kept high as soon as the **DGT-IN3** (**Start Homing**) digital input is kept high, independently of the **DGT-IN1** digital input (see (B) in the figure).

Example: *homing procedure*

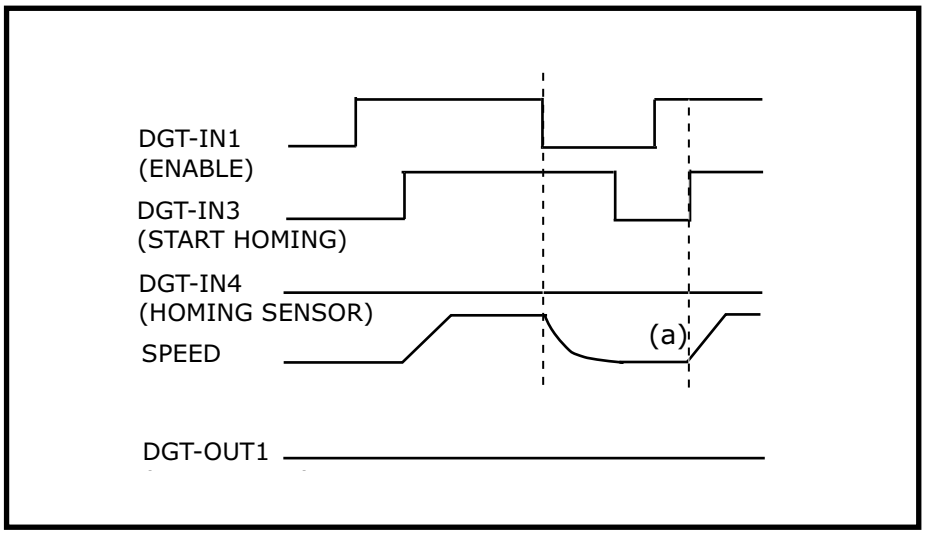


Warnings:

1) Disabling the **DIG-IN3** (**Start Homing**) digital input, before that the home position reached indication is generated, makes the homing process to abort. No home position is saved and the motor decelerates using the "**Acceleration**" parameter.



2) Disabling the **DGT-IN1** (**ENABLE**) digital input, before the ending of the homing procedure, causes the interruption of homing process. In this case no homing position is saved and the motor is left free (deceleration is depending of inertia and friction). A new homing process can be start disabling the **DGT-IN3** input and then enabling the **DGT-IN1** and **DGT-IN3** digital inputs ((a) in figure).



6 Positioner - procedures

The following table illustrates the "**Positioning Procedures**" available by the Axor drive:

FUNCTION	DESCRIPTION
Start Jog	It enables a movement having the following parameters: • "acceleration time" that is equal to the homing acceleration time; • "speed (in rpm)" equal to the value set in the auxiliary variable; • "target" equal to the positive extreme (PSTOP software) of the axis if the speed is positive, or equal to the negative extreme (NSTOP software) of the axis if the speed is negative; • "deceleration time" that is equal to the homing acceleration time.
Start Task I/O	It enables the task set by the digital inputs: DGT-IN5...DGT-IN9. There is not possibility of blending with this function.
Start_Task_n°	It enables the task set by the auxiliary variable. There is not possibility of blending with this function.
Start Sequence	It enables a sequence of tasks. The first task is set by the digital inputs DGT-IN5...DGT-IN9, while the next tasks are set by using the "Next Profile" parameter associated to each task. At the end of each task the following automatically starts.
Start Next	It enables a sequence of tasks. The first task is set by the digital inputs DGT-IN5...DGT-IN9, while the next tasks are set by using the "Next Profile" parameter associated to each task. At the end of each task the motor stops, the user has to click twice the task button (disabling and enabling) in order to start the next task of the sequence.

7 Positioner - settings

To execute an ***absolute positioner procedure*** you have to:

1- execute correctly a homing procedure;
2- set correctly parameters in the "**Axor Profile Tool**" window;
3- set a digital input with desired function.

Let we see settings in detail:

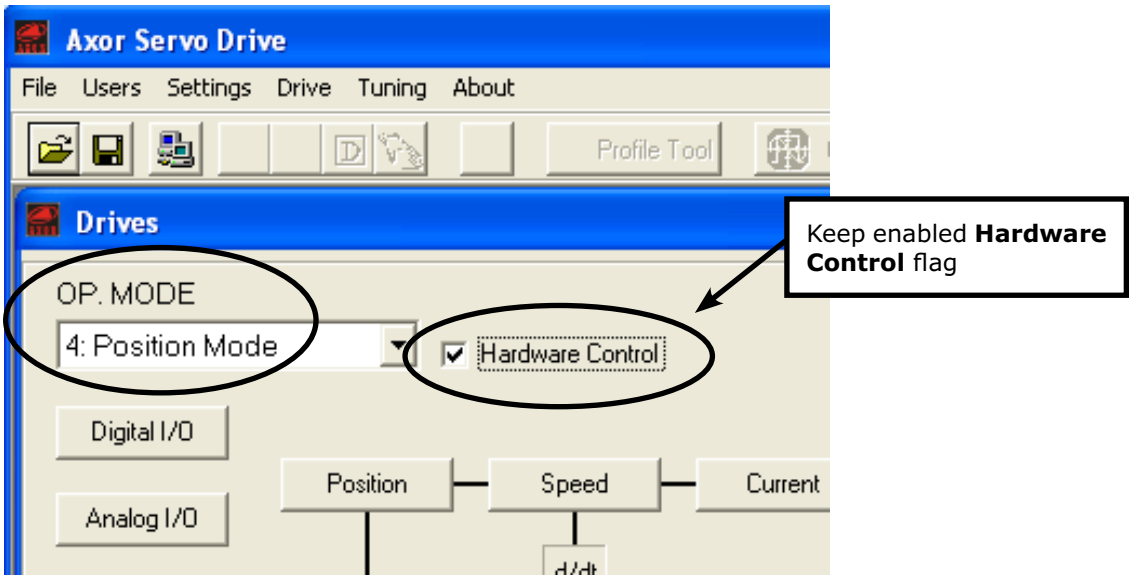
1- Homing procedure:

See paragraphs 3, 4 and 5 for a description about settings and homing procedures.

IF NO HOMING PROCEDURE IS SUCCESSFUL COMPLETED, NO POSITIONING PROFILE CAN BE MADE.

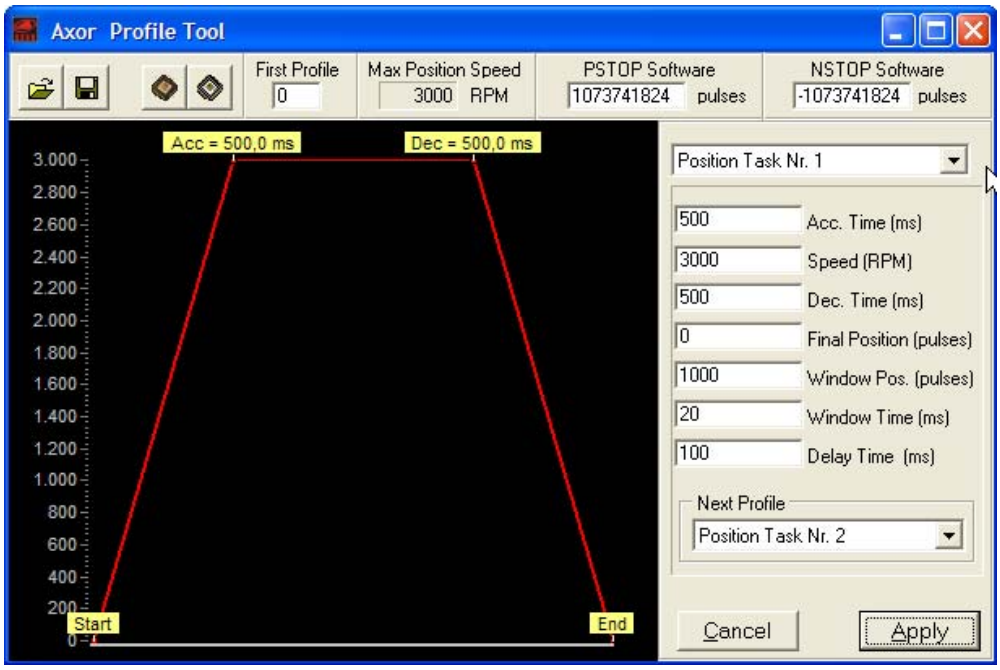
AFTER A HOMING PROCEDURE, TO EXECUTE A PROFILE IT IS NECESSARY TO KEEP THESE SETTINGS:

- **OPERATIVE MODE 4:POSITION MODE";**
- ***HARDWARE CONTROL* BOX ENABLED.**



ATTENTION: IF HARDWARE CONTROL BOX IS NOT ENABLED, IT IS NOT POSSIBLE TO EXECUTE ANY PROFILE.

2- Settings positioner parameters:



Final position

It defines the absolute position reference for the selected position profile.
The admitted values are in the range +/-(2^{31}-1). Setting the value 0 means "return to zero position" (the position found during homing only if the Homing Offset was set to zero).
To define the value (approximated at the nearest integer value) that should be inserted, the following formula will be used:

Final position = n° turns (also not integer) * 65536

Example: We want to start from the position 0 after a successful homing procedure, with a Homing Offset value equal to zero. Suppose that the set task makes a rotation of the motor's shaft of 20 turns and 60° mechanical. First thing is to normalise 60° on 360° and add the obtained value to the number of integer turn: n° of turns = 20 + 60°/360° = 20 + 0,16 = 20,16 after this you must multiply by 65536 the obtained number like as follow: 20,16 * 65536 = 1321642,6 and insert in the Final Position parameter the integer part of the number found, in this case 1321642.

Acc Time

It sets the acceleration time value for the trapezoidal profile ramp. This parameter admits values in the range: 10...5000 ms. The time value is refered to the max motor speed, "Speed Limit" parameter set in the "Speed" window, so the real acceleration time related to the profile speed can be found using the following expression:

$$T\_acc\ [ms] = \frac{Speed\ \ [rpm]\ * T\_acc\_set\ [ms]}{Speed\_motor\ [rpm]}$$

where: **T_acc** = real acceleration time for the profile ramp;
Speed = speed set for the profile ("Speed" parameter);
Speed_motor = motor speed limit set on interface ("Speed Limit" parameter in the "Speed" window);
T_acc_set = value inserted in the "Acc. Time" parameter.

Dec Time

It sets the deceleration time value of the trapezoidal profile ramp. This parameter admits values in the range: 10...5000 ms. The time value is refered to the max motor speed, "Speed Limit" parameter set in the "Speed" window, so the real acceleration time related to the profile speed can be found using the following expression:

$$T\_dec\ [ms] = \frac{Speed\ [rpm]}{Speed\_motor\ [rpm]} * T\_dec\_set\ [ms]$$

where: **T_dec** = real deceleration time for the profile ramp;
Speed = speed set for the profile ("Speed" parameter);
Speed_motor = motor speed limit set on interface ("Speed Limit" parameter);
T_dec_set = value inserted in the "Dec. Time" parameter;

Speed

It sets the speed reference of the trapezoidal profile. This parameter is limited by "Max Position Speed".

Max Position Speed

It sets the maximum speed allowed for all motion position profiles. It is defined in "rpm" and rappresents the minimum value between 6000 rpm and the motor speed limit ("Speed Limit" parameter on the "Speed" window).

Next Profile

It is the number of the following profile to execute after the quote reached of last task. This parameter is defined for concatenated profiles mode.

Window Pos.

It is the window of position quotes admitted around the sensor position to declare "position reached". It is defined in feedback pulses and can be calculated with the following formula:

Window Pos = n° turns (also not integer) * 65536

Window Time

It is the time limit used when the motor is within the position window to set "target reached" indication. It is declared in "ms" and admits values in the range: 0...65536.

Window Delay

It is the waiting time after the quote reached and after the "Window Time", to declare "position reached".

Note: The **Window Pos**, **Window Time**, and **Window Delay** parameters are utilised to guarantee a good positioning; in fact there are some situations (very high inertia, joint elasticity or belt, etc), where after a positioning there is an oscillation. Setting correctly these parameters it is possible to be sure that these oscillation is contained in a range (Window Pos) for a time over the time set in "Window Time" parameter.

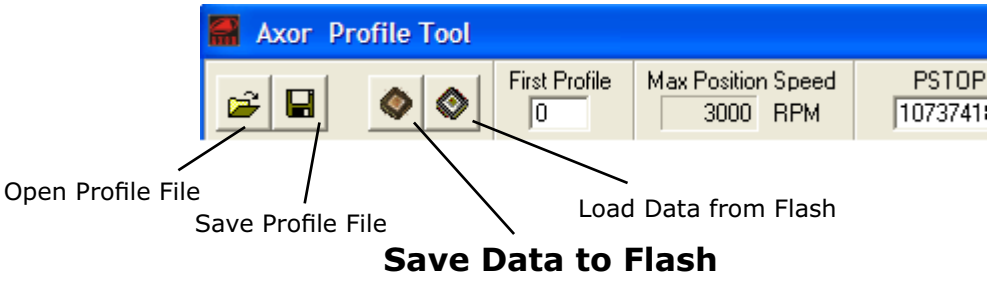
PSTOP Software
If the Final Position parameter is greater then the PTSOP Software, the task stops when the PSTOP target is reached.

NSTOP Software
If the Final Position parameter is greater then the NTSOP Software, the task stops when the NSTOP target is reached.

First profile
Not used.

Note: Each profile is identified and saved with a number from 1 to 32 (for example "Position Task Nr. 1"), selectable in the dedicated menu on the "Axor Profile Tool" window.

The "**Axor Profile Tool**" window has 4 icons which helps you during the parameter configuration:



Load Data from Flash
It permits the visualisation of the data saved into Flash. This values can be different from the precedent visualised value, if a saving process has not been performed yet.

Save Data to Flash
It permits to save the parameter into Flash. In this mode the parameter will be loaded automatically at the next power-up.

Save Profile File
It permits to save on a file the parameters set in the "Axor Profile Tool" window.

Open Profile File
It permits the loading of the parameters saved on a file.

Note: The functions **Save Profile File** and **Open Profile File** are very useful if you want to configure more than a drive with the same setup.
In this case you can configure all parameters on a drive, save in flash and save the setup on a file.
For other drives it is not necessary to configure one by one the parameter of the single task but you can use the file saved before and load the parameter saved on the file. After this save the parameter into flash.

3- Digital inputs/output settings:

A *positioner procedure* needs these settings:

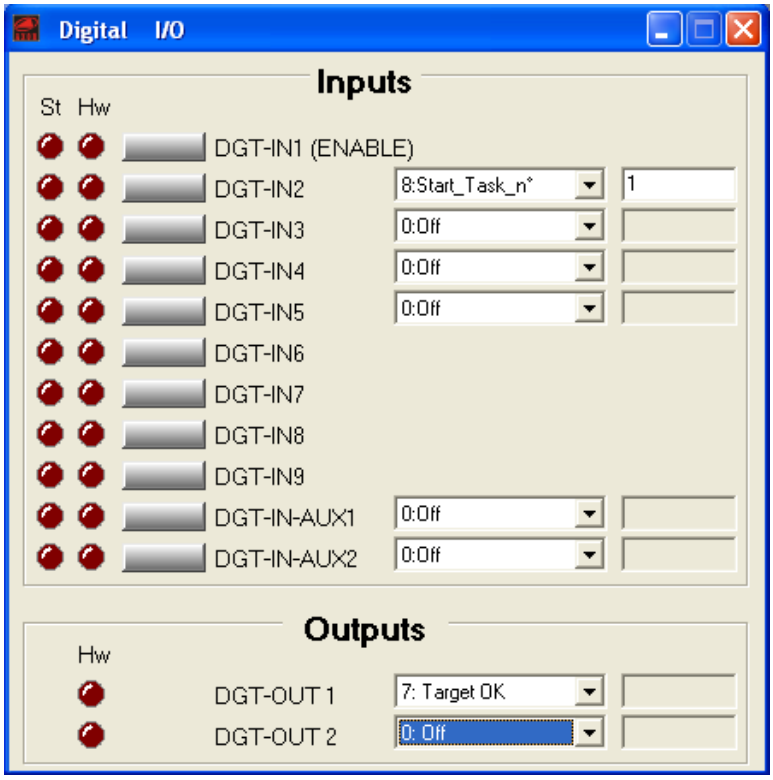
a) set a digital input with desired function (**Start Jog** or **Start Task I/O** or **Start_Task_n°** or **Start Sequence** or **Start Sequence**), then, if necessary, set the auxiliary variable;

b) if necessary, set digital inputs DGT-IN5...DGT-IN9 in order to select the first profile of the sequence;

c) if necessary, set a digital output with the function **Target OK** (doing this, at the end of a profile the output is closed, while at the beginning of a new profile the output is re-opened);

d) if necessary, set another output with function **Next Target** (this setting can be used only together with "Start Sequence" and "Start Next" ⇨ at the beginning of the first profile the output is opened, while at the beginning of each next profile the output change its state).

Example:



The **DGT-IN5**...**DGT-IN9** are used to select via software one of the **32 pre-set positioning profiles** for the functions: *Start Task I/O*, *Start Sequence*, *Start Next*.

If the **DGT-IN5** digital input is set with the "**Off**" function, it is possible to make the direct addressing of **all the 32 available tasks** by using the tables below:

Profile N°	Digital Inputs				
	9	**8**	**7**	**6**	**5**
1	0	0	0	0	0
2	0	0	0	0	1
3	0	0	0	1	0
4	0	0	0	1	1
5	0	0	1	0	0
6	0	0	1	0	1
7	0	0	1	1	0
8	0	0	1	1	1
9	0	1	0	0	0
10	0	1	0	0	1
11	0	1	0	1	0
12	0	1	0	1	1
13	0	1	1	0	0
14	0	1	1	0	1
15	0	1	1	1	0
16	0	1	1	1	1

Profile N°	Digital Inputs				
	9	**8**	**7**	**6**	**5**
17	1	0	0	0	0
18	1	0	0	0	1
19	1	0	0	1	0
20	1	0	0	1	1
21	1	0	1	0	0
22	1	0	1	0	1
23	1	0	1	1	0
24	1	0	1	1	1
25	1	1	0	0	0
26	1	1	0	0	1
27	1	1	0	1	0
28	1	1	0	1	1
29	1	1	1	0	0
30	1	1	1	0	1
31	1	1	1	1	0
32	1	1	1	1	1

Example: If the **DGT-IN5** digital input is set with the "**Off**" function and you want to select the **n° 10 profile**: apply a high logic signal to the **DGT-IN8** and **DGT-IN5** inputs and disable the **DGT-IN6**, **DGT-IN7** and **DGT-IN9** inputs.

If the **DGT-IN5** digital input is set with any functions other than "**Off**", it is possible to make the direct addressing of only **16 profiles**, from 1 to 16, using the tables below:

Profile N°	Digital Inputs				
	9	**8**	**7**	**6**	**5**
1	0	0	0	0	X
2	0	0	0	1	X
3	0	0	1	0	X
4	0	0	1	1	X
5	0	1	0	0	X
6	0	1	0	1	X
7	0	1	1	0	X
8	0	1	1	1	X
9	1	0	0	0	X
10	1	0	0	1	X
11	1	0	1	0	X
12	1	0	1	1	X
13	1	1	0	0	X
14	1	1		0	X
15	1	1	1	0	X
16	1	1	1	1	X

Example: If the **DGT-IN5** digital input is set with any functions other than "**Off**" and you want to select the **n° 10 profile**: apply a high logic signal to the **DGT-IN9** and **DGT-IN6** inputs and disable the **DGT-IN7** and **DGT-IN8** inputs.

8 Positioner - examples

Example: Start Task I/O positioning procedure

Suppose we want to do the **Start Task I/O** positioning procedure, which executes the task selected by the **DGT-IN5...DGT-IN9** digital inputs.

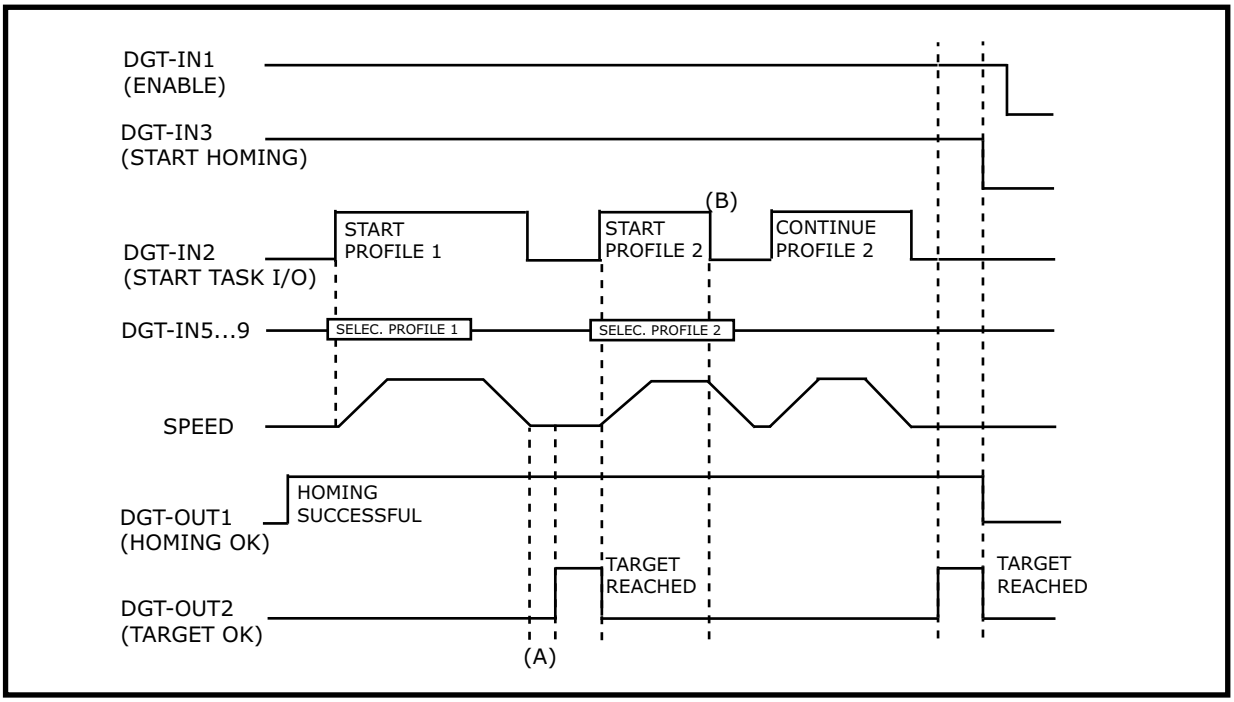
1. Execute a successful homing procedure. If no homing procedure is successful completed, no positioning profile can be made.
At the end of the homing procedure keep active the **DGT-IN1** (**ENABLE**) and **DGT-IN3** (**Start Homing**) digital inputs.

2. In the "**Axor Profile Tool**" window set all of the parameters reference the desired positioner profile, then save to FLASH utilizing the "**Save Data to FLASH**" icon.
Each task is saved with a number (from 1 to 32). Refer to that number to select the desired task using the digital inputs.

3. Open the "**Digital I/O**" window and set:
- a programmable input with the **Start Task I/O** function (for example **DGT-IN2**);
- the **DGT-IN5...DGT-IN9** inputs in order to select the desired positioner profile. If the **DGT-IN5** digital input is set with the "**Off**" function, it is possible to make the direct addressing of all the 32 available tasks, while if the **DGT-IN5** digital input is set with any functions other than "Off", it is possible to make the direct addressing of only 16 profiles, from 1 to 16.
- an output with the **Target OK** function (for example **DGT-OUT2**).

Save all utilizing the "**Save to EEPROM**" icon.

4. Enabling the **DGT-IN2** (**Start Task I/O**) input the selected task will start and the motor will move following the defined motion profile parameters.



Note:

• If during a profile task the **DGT-IN2** (**Start Task I/O**) digital input is disabled (see (B)), the motor decelerates using the "**Dec.Time**" parameter associated to the selected profile and stops. If the **DGT-IN2** (**Start Task I/O**) is re-enabled, it will be possible to conclude the interruped task.

• At the end of a successful position task the drive will enable the **DGT-OUT2** (**Target OK**) digital output to indicate the position quote has been reached. This indication is generated when the absolute quote of the motor is within the "**Window Pos.**" parameter for a period (A) longer than the "**Window Time**" value.
The **DGT-OUT2** (**Target OK**) output will be high until the next profile starts or the **DGT-IN3** (**Start Homing**) input is high.

• After the conclusion of the position profile there are two different possibilities:

Disable the drive:
Disabling the **DGT-IN1** (**Enable**) digital input will release the motor (quote can be lost). Remember this in order to maintain safe working conditions for the system!
The axis position is kept as long as the drive is powered, so it is possible to re-enable the drive and make other positions without completing a new homing procedure.

Start another motion profile:
To start another position task keeping the home position already defined, use the **DGT-IN5... DGT-IN9** digital inputs to select the new profile task. Then disabling and re-enabling the **DGT-IN2** digital input (**Start Task I/O**) the new position task will start.

During this time the **DGT-IN3** (**Start Homing**) input must remain active.

Example: Start_Task_n° positioning procedure

Suppose we want to do the **Start_Task_n°** positioning procedure, which executes the task selected by the **auxiliary variable** associated to the **Start_Task_n°** function.

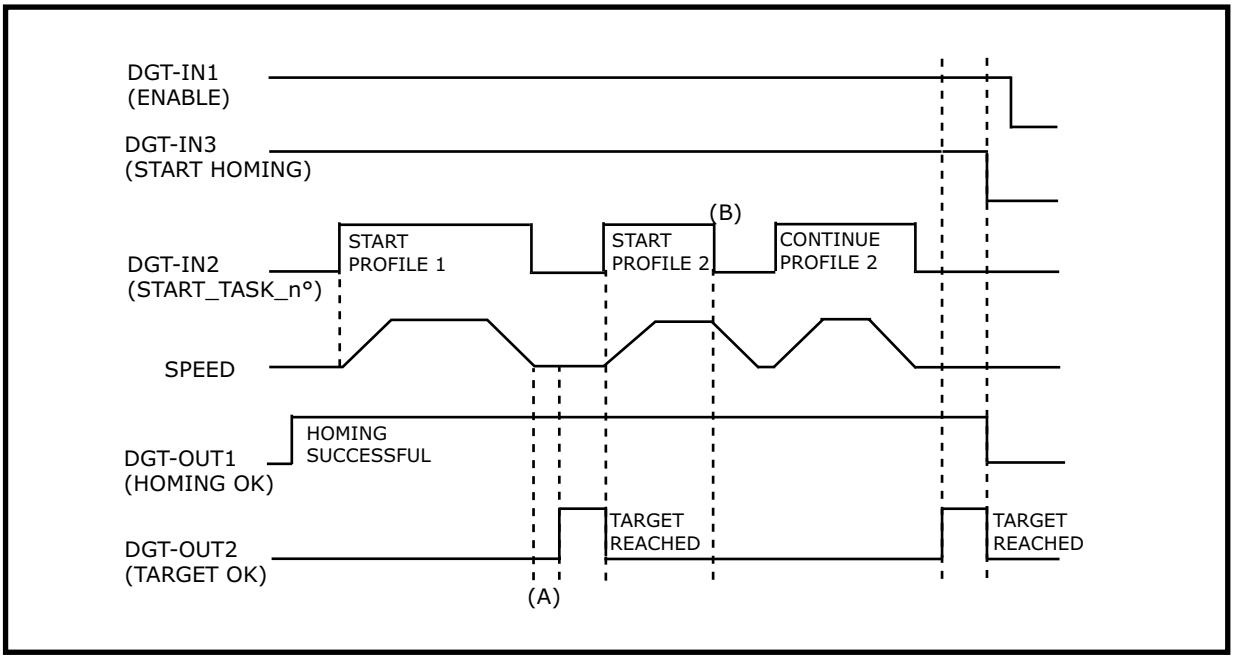
1. Execute a successful homing procedure. If no homing procedure is successful completed, no positioning profile can be made.
At the end of the homing procedure keep active the **DGT-IN1** (**ENABLE**) and **DGT-IN3** (**Start Homing**) digital inputs.

2. In the "**Axor Profile Tool**" window set all of the parameters reference the desired positioner profile, then save to FLASH utilizing the "**Save Data to FLASH**" icon.
Each task is saved with a number (from 1 to 32). Refer to that number to select the desired task using the auxiliary variable.

3. Open the "**Digital I/O**" window and set:
- a programmable input with the **Start_Task_n°** function (for example **DGT-IN2**), inserting in the auxiliary variable the number of the desired task;
- an output with the **Target OK** function (for example **DGT-OUT2**).

Save all utilizing the "**Save to EEPROM**" icon.

4. Enabling the **DGT-IN2** (**Start_Task_n°**) input the selected task will start and the motor will move following the defined motion profile parameters.



Note:

• If during a profile task the **DGT-IN2** (**Start_Task_n°**) digital input is disabled (see (B)), the motor decelerates using the "**Dec.Time**" parameter associated to the selected profile and stops. If the **DGT-IN2** (**Start_Task_n°**) is re-enabled, it will be possible to conclude the interruped task.

• At the end of a successful position task the drive will enable the **DGT-OUT2** (**Target OK**) digital output to indicate the position quote has been reached. This indication is generated when the absolute quote of the motor is within the "**Window Pos.**" parameter for a period (A) longer than the "**Window Time**" value.
The **DGT-OUT2** (**Target OK**) output will be high until the next profile starts or the **DGT-IN3** (**Start Homing**) input is high.

• After the conclusion of the position profile there are two different possibilities:

Disable the drive:
Disabling the **DGT-IN1** (**Enable**) digital input will release the motor (quote can be lost). Remember this in order to maintain safe working conditions for the system!
The axis position is kept as long as the drive is powered, so it is possible to re-enable the drive and make other positions without completing a new homing procedure.

Start another motion profile:
To start another position task keeping the home position already defined:

1- change the auxiliary variable of the digital input set with the **Start_Task_n°** function, save all, then disable and enable the digital input. Or:

2- set another digital input with the **Start_Task_n°** function, save all, then enable the digital input to start the new sequence.

During this time the **DGT-IN3** (**Start Homing**) input must remain active.

Example: Start Next positioning procedure

Suppose we want to do the **Start Next** positioning procedure.

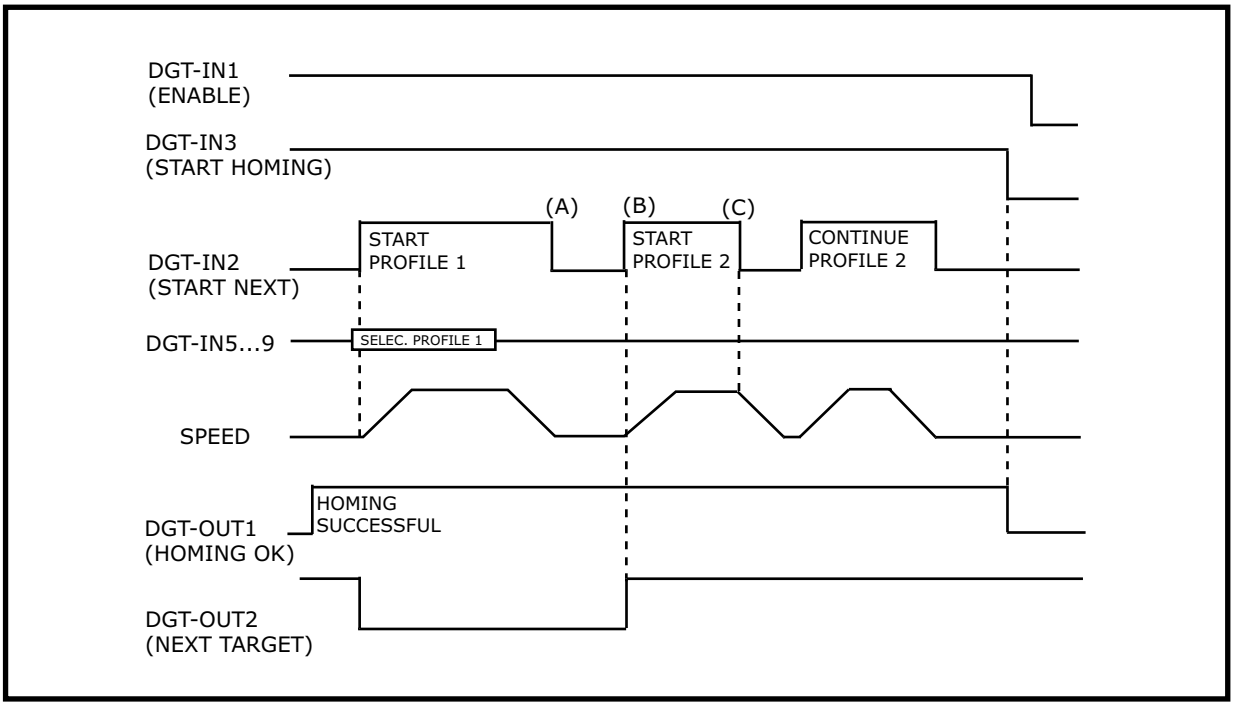
1. Execute a successful homing procedure. If no homing procedure is successful completed, no positioning profile can be made.
At the end of the homing procedure keep active the **DGT-IN1** (**ENABLE**) and **DGT-IN3** (**Start Homing**) digital inputs.

2. In the "**Axor Profile Tool**" window set all of the parameters of the positioner profiles of the sequence, then save to FLASH utilizing the "**Save Data to FLASH**" icon.
Each task is saved with a number (from 1 to 32). Refer to that number to select the first task of the sequence using the digital inputs.

3. Open the "**Digital I/O**" window and set:
- a programmable input with the **Start Next** function (for example **DGT-IN2**);
- the **DGT-IN5...DGT-IN9** inputs in order to select the first profile of the sequence.
- an output with the **Target OK** function (for example **DGT-OUT2**).

Save all utilizing the "**Save to EEPROM**" icon.

4. Enabling the **DGT-IN2** (**Start Next**) input the first task of the sequence, selected by the digital inputs, will start and the motor will move following the defined motion profile parameters.
At the end of each task the motor stops, then disabling (see (A)) and enabling (see(B)) the **DGT-IN2** (**Start Next**) input the task set in the "**Next Profile**" parameter will start. If in the "**Next Profile**" parameter there is "**None**", the sequence will start from the first task.



Note:

• If during a task the **DGT-IN2** (**Start Next**) digital input is disabled (see (C)), the motor decelerates using the "**Dec.Time**" parameter associated to the current task and stops. If the **DGT-IN2** (**Start Next**) is re-enabled, it will be possible to finish the interrupted task.

• When the first task of the sequence starts, the output set with the "**Next Target**" is opened, then at the end of each position task the "Next Target" digital output changes its status.

• After the conclusion of the sequence there are two different possibilities:

Disable the drive:
Disabling the **DGT-IN1** (**Enable**) digital input will release the motor (quote can be lost). Remember this in order to maintain safe working conditions for the system!
The axis position is maintained as long as the drive is powered, so it is possible to re-enable the drive and make other positions without completing a new homing procedure.

Start another motion profile:
To start another position task keeping the home position that is already defined, use the **DGT-IN5... DGT-IN9** digital inputs to select the new first task of the sequence. Then disabling and re-enabling the **DGT-IN2** digital input (**Start Next**) the new sequence will start.

During this time the **DGT-IN3** (**Start Homing**) input must remain active.

Example: Start Sequence positioning procedure

Suppose we want to do the **Start Sequence** positioning procedure.

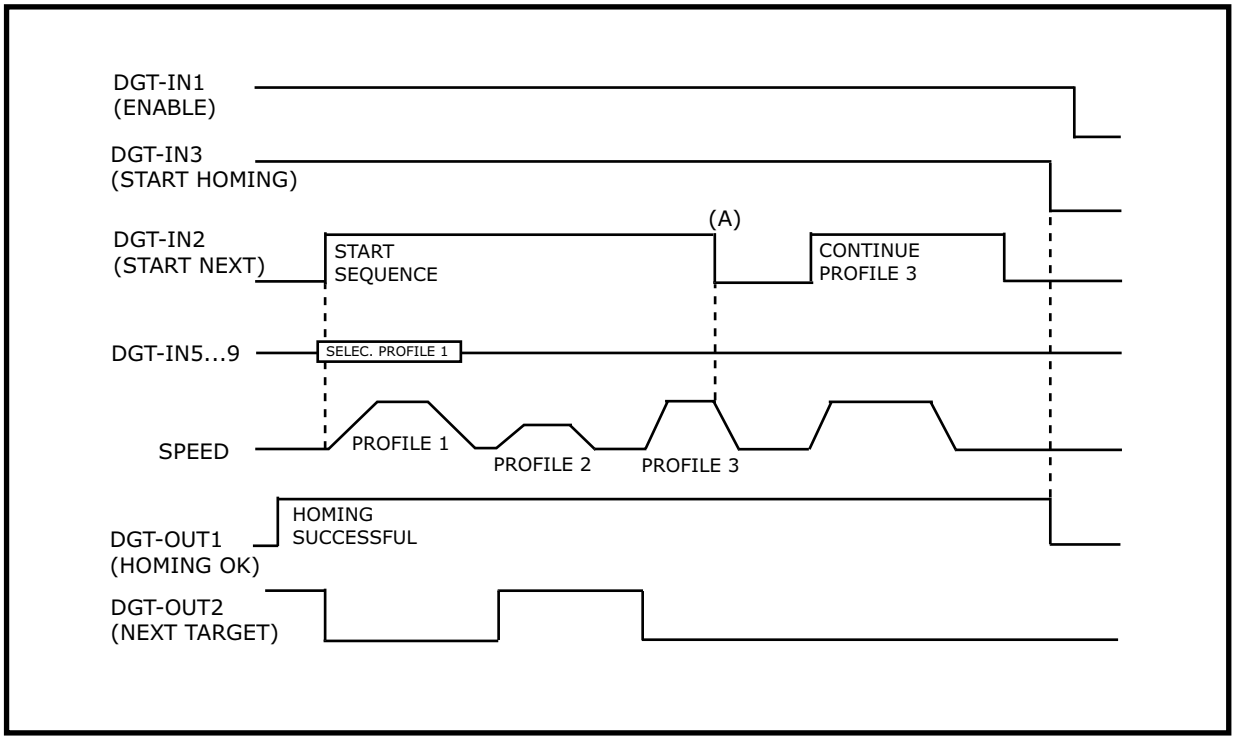
1. Execute a successful homing procedure. If no homing procedure is successful completed, no positioning profile can be made.
At the end of the homing procedure keep active the **DGT-IN1** (**ENABLE**) and **DGT-IN3** (**Start Homing**) digital inputs.

2. In the "**Axor Profile Tool**" window set all of the parameters of the positioner profiles of the sequence, then save to FLASH utilizing the "**Save Data to FLASH**" icon.
Attention: set the "**Next Profile**" parameter in order to execute correctly the desired sequence.
Each task is saved with a number (from 1 to 32). Refer to that number to select the desired task using the digital inputs.

3. Open the "**Digital I/O**" window and set:
- a programmable input with the **Start Sequence** function (for example **DGT-IN2**);
- the **DGT-IN5...DGT-IN9** inputs in order to select the first profile of the sequence.
- an output with the **Target OK** function (for example **DGT-OUT2**).

Save all utilizing the "**Save to EEPROM**" icon.

4. Enabling the **DGT-IN2** (**Start Sequence**) input the first task of the sequence, selected by the digital inputs, will start and the motor will move following the defined motion profile parameters.
If at the end of a task the **DGT-IN2** input is kept active and in the "**Next Profile**" variable there is a label other than "**None**", the task set in the "**Next Profile**" starts automatically. This sequence continues until a label "**None**" is found in the "**Next Profile**" variable. In this case the sequence is ended and must be re-programmed by the user.



Note:

• If during a task the **DGT-IN2** (**Start Sequence**) digital input is disabled (see (A)), the motor decelerates using the "**Dec.Time**" parameter associated to the selected profile and stops. If the **DGT-IN2** (**Start Sequence**) is re-enabled, it will be possible to finish the interrupted task.

• When the first task of the sequence starts the output set with the "**Next Target**" is opened, then at the end of each position task the "Next Target" digital output changes its status.

• After the conclusion of the sequence there are two different possibilities:

Disable the drive:
Disabling the **DGT-IN1** (**Enable**) digital input will let the motor free (quote can be lost). Remember this in order to maintain safe working conditions for the system!
The axis position is kept as long as the drive is powered, so it is possible to re-enable the drive and make other positions without completing a new homing procedure.

Start another sequence:
To start another sequence keeping the home position that is already defined, use the **DGT-IN5... DGT-IN9** digital inputs to select the new first motion profile task of the sequence. Then disabling and re-enabling the **DGT-IN2** digital input (**Start Sequence**) the new sequence will start.

During this time the **DGT-IN3** (**Start Homing**) input must remain active.

Example: Start_JOG positioning procedure

Suppose we want to do the **Start_JOG** positioning procedure.

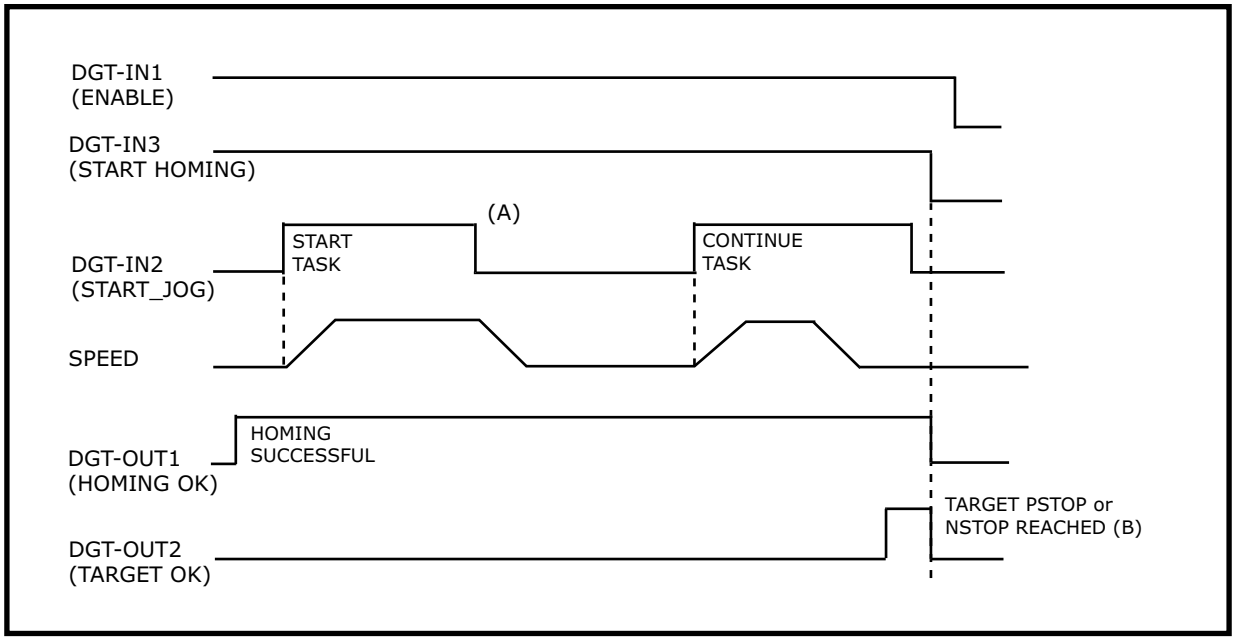
1. Execute a homing procedure. In this case a homing procedure is not necessary.
At the end of the homing procedure keep active the **DGT-IN1** (**ENABLE**) and **DGT-IN3** (**Start Homing**) digital inputs.

2. In the "**Axor Profile Tool**" window set the parameters "**PSTOP Software**", "**NSTOP Software**", "**Window Pos**.", "**Window Time**", then save to FLASH utilizing the "**Save Data to FLASH**" icon.

3. Open the "**Digital I/O**" window and set:
- a programmable input with the **Start_Jog** function (for example **DGT-IN2**);
- an output with the **Target OK** function (for example **DGT-OUT2**).

Save all utilizing the "**Save to EEPROM**" icon.

4. By clicking the **DGT-IN2** (**Start_JOG**) digital input, it enables a moviment having the following parameters:
- "acceleration time" that is equal to the homing acceleration time;
- "speed (in rpm)" equal to the value set in the auxiliary variable;
- "target equal" to the positive extreme (PSTOP software) of the axis if the speed is positive, or equal to the negative extreme (NSTOP software) of the axis if the speed is negative;
- "deceleration time" that is equal to the homing acceleration time.



Note:

If during a profile task the **DGT-IN2** (**Start_JOG**) digital input is disabled (see (A)), the motor decelerates using the "**Acceleration**" parameter associated to the homing procedure and stops. If the **DGT-IN2** (**Start_JOG**) is re-enabled, it is possible to finish the interrupted task.
At the end of a successful position task the drive will enable the **DGT-OUT2** (**Target OK**) digital output to indicate the position quote has been reached (see (B)).

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