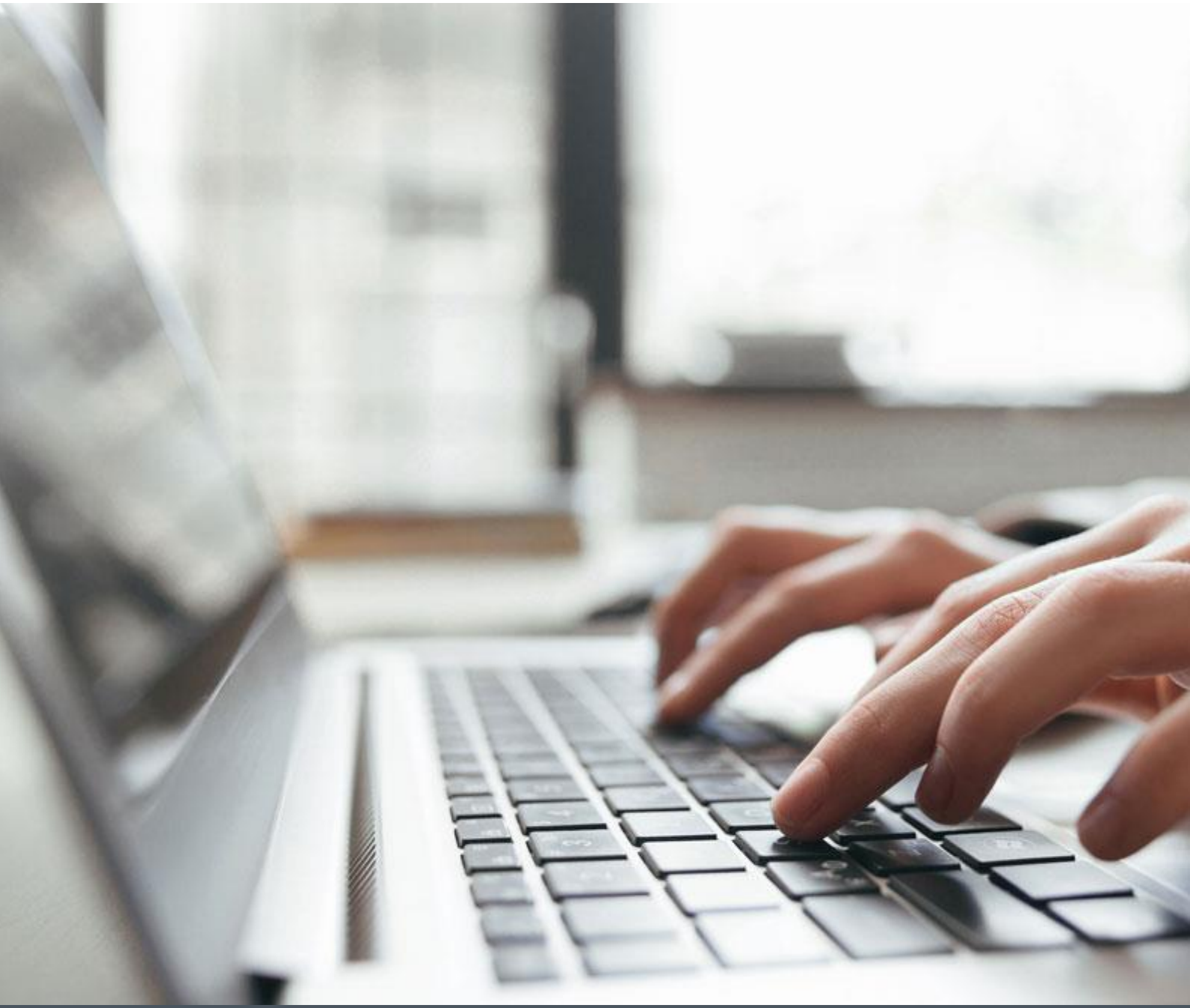


Application Note

How to use *Profile Position* in *NanoJ*

Version 1.0.0

www.nanotec.com

Contents

1 Intended use and audience

This application note shows you how to use the digital outputs of a Nanotec motor controller in a NanoJ program. You can find the corresponding NanoJ code template in the download folder.

Profile Position offers a NanoJ code template for setting target position and target velocity via digital inputs of an electronic Nanotec motor controller. To open and edit the template requires Plug & Drive Studio software. Both NanoJ and Plug & Drive Studio are for use with Nanotec products only, by trained specialists only.

2 Prerequisites

NOTICE
Malfunction from incompatibility! Plug & Drive Studio comes in various software versions. Find out and, if necessary, install the correct version for your Nanotec motor controller in advance.

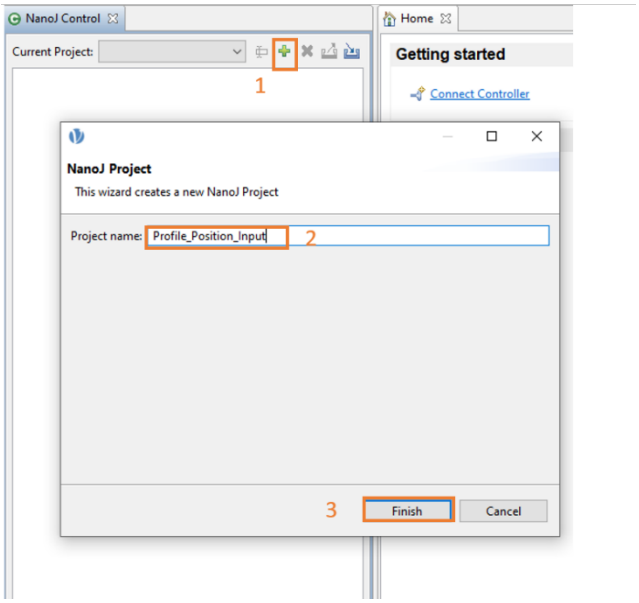
You must have the correct Plug & Drive Studio version installed on your computer:

1. Open the Nanotec software webpage.
2. Click on the *Plug & Drive Studio* buttons.
3. Browse *Compatible Products* to find out which version is compatible with your motor controller.
4. Download and install the latest compatible Plug & Drive Studio version on your computer.
5. If not done so yet: Also download the latest NanoJ V2 Library (`nanotec.h`).

3 Creating a new project in Plug & Drive Studio

Open the *NanoJ Control* tab and click on the "**+**" icon (1). A *NanoJ Project* tab pops up:

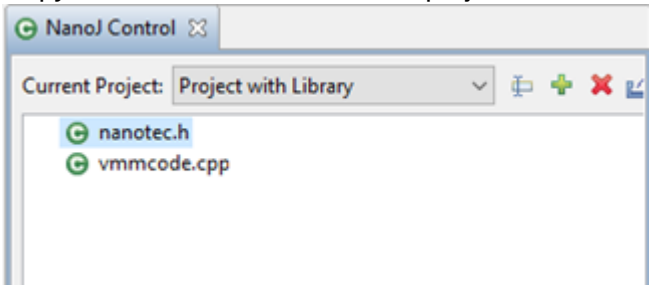
1. Assign a new project name (2).
2. Click on *Finish* (3) to close the tab.
3. Your new project is now created.



4 Including the nanotec.h library into your NanoJ project

The Plug & Drive Studio installation folder does include `wrapper.h`. But you must download the NanoJ V2 library (`nanotec.h`) from our knowledge base and copy it into NanoJ:

1. Generate a new NanoJ project or open an existing one.
2. Copy the `nanotec.h` file into the project tree via drag & drop:



3. To implement the NanoJ V2 library, add `#include wrapper.h` and `#include nanotec.h` to your code:

```
10
11 #include "wrapper.h"
12 #include "nanotec.h"
13
14
15 void user()
16 {
```

5 Using the code template for digital outputs in NanoJ

NOTICE

Variable signal level! Some Nanotec controllers provide digital input pins switchable between 5V and 24V. For correct digital inputs setup: Refer to the corresponding manual of your motor controller.

Profile Position code allows a routing in a NanoJ program depending on the input signals. In a first step, we include the libraries and mappings.

5.1 Including libraries, mappings

For our case, we use the Nanotec NanoJ V2 library `nanotec.h` to implement the code template and provide basic functions to control our motor. To include the `nanotec.h` library, we must at least add the object mappings in lines 25 to 32 to our code:

```
25 map U16 Controlword as inout 0x6040:00
26 map U16 Statusword as input 0x6041:00
27 map U32 Inputs as input 0x60FD:00
28 map U32 Outputs as inout 0x60FE:01
29 map S08 ModesOfOperation as output 0x6060:00
30 map S08 ModesOfOperationDisplay as input 0x6061:00
31 map S16 AnalogInput as input 0x3220:01
32 map S32 TargetVelocity as output 0x60FF:00
```

5.2 Main program loop: void user()

5.2.1 Implementing a release function (Input 1)

For Input 1 signals, we implement a release function. A high release signal **powers** the motor, a low signal **unpowers** it. The release function thus ensures the motor to run on a high release signal only.

- Line 54: With a release signal not set to high, you can stop the motor via `Quickstop()` function.
- Line 46: Input 1 also selects *Profile Position* via `ModesOperation(1)`.
- Line 48: `AbsoluteMovement()` defines the absolute movement operation mode.
- Line 50: With `ChangeSetPointImmediately()` set to `true`, you can activate *change setpoint immediately* to execute each new travel command immediately:

```
42    while(true)
43    {
44        if(DigitalInput(1))                    //if Input 1 is high.
45        {
46            ModesOfOperation(1);               //set the Mode to Profile Position
47            EnableOperation();                 //change the state to Operation Enabled
48            AbsoluteMovement();                //set to absolute movement
49            //RelativeMovement();              //set to relative movement
50            ChangeSetPointImmediately(true);   //change setpoint immediately
51        }
52        else                                   //else...
53        {
54            Quickstop();                       //stop the motor
55        }
```

5.2.2 Setting a target position (Input 2 & 3)

- Line 58, 60: By default, the code template selects *0* for target position if both Input 2 and 3 is low.
- Line 62, 64: If only Input 2 is high, the new target position is *2000*.
- Line 66, 68: With both inputs high, the third target position is *6000*.

```
57          // change the Target Position via digital input 2 and 3...
58          if(!DigitalInput(2) & !DigitalInput(3))         //if Input 2 and 3 low
59          {
60              Out.TargetPosition=0;                     //set the target position to 0
61          }
62          else if(DigitalInput(2) & !DigitalInput(3))     //if Input 2 high and 3 low
63          {
64              Out.TargetPosition=2000;                  //set the target position to 2000
65          }
66          else if (DigitalInput(3) & !DigitalInput(2))    //if Input 2 low and 3 high
67          {
68              Out.TargetPosition=4000;                  //set the target position to 4000
69          }
70          else if (DigitalInput(3) & DigitalInput(2))     //if Input 2 and 3 high
71          {
72              Out.TargetPosition=6000;                  //set the target position to 6000
73          }
```

5.2.3 Starting a position movement (Input 4)

Line 76: Via Input 4, we can start the position movement.

```
75          // start a movement to the selected Target Position...
76          if(DigitalInput(4))                             //if Input 4 is active.
77          {
78              NewSetPoint(true);                          //set new setpoint
79          }
80          else                                            //else
81          {
82              NewSetPoint(false);                         //reset new setpoint
83          }
```

5.2.4 Changing the target velocity (Input 5 & 6)

- Line 87: We use Inputs 5 and 6 to automatically select user-defined speeds.
- Line 89: With both Inputs low, the speed is set to 100 rpm.
- Line 91, 93: If only Input 5 is high, speed rises to 200 rpm.
- Line 95, 97: We reach 300 rpm if only Input 6 is high.
- Line 99, 101: Both inputs high make the motor run with 500 rpm.

```
86          // change the Profile Velocity via digital input 5 and 6...
87          if(!DigitalInput(5) & !DigitalInput(6))         //if Input 5 and 6 low
88          {
89              Out.ProfileVelocity=100;                  //set the velocity to 100
90          }
91          else if(DigitalInput(5) & !DigitalInput(6))     //if Input 5 high and 6 low
92          {
93              Out.ProfileVelocity=200;                  //set the velocity to 200
94          }
95          else if(!DigitalInput(5) & DigitalInput(6))     //if Input 5 low and 6 high
96          {
97              Out.ProfileVelocity=300;                  //set the velocity to 300
98          }
99          else if(DigitalInput(5) & DigitalInput(6))      //if Input 5 and 6 high
100         {
101             Out.ProfileVelocity=500;                  //set the velocity to 500
102         }
103         yield();
```

Your code is finally implemented.

6 Liability

This Application Note is based on our experience with typical user requirements in a wide range of industrial applications. The information in this Application Note is provided without guarantee regarding correctness and completeness and is subject to change by Nanotec without notice.

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