

Application Note

How to use *Clock Direction Mode* in NanoJ

Version 1.0.0

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1 Intended use and audience

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

Clock Direction Mode offers a NanoJ code template for using the clock direction mode with electronic Nanotec motor controllers. 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.

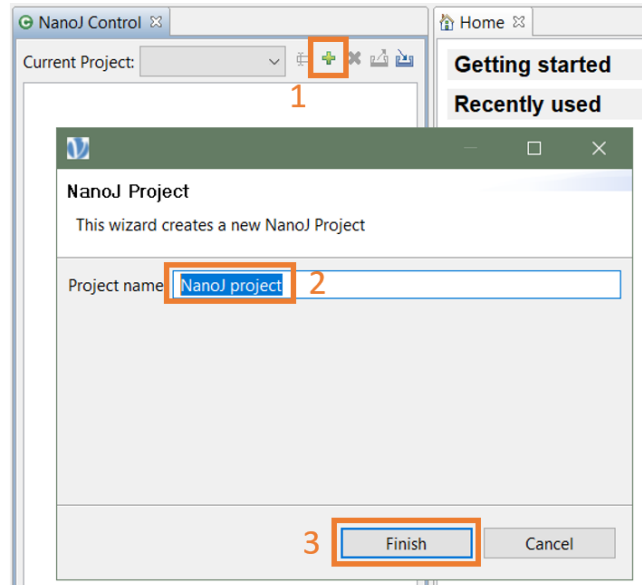
You must have the correct Plug & Drive Studio version installed on your computer:

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:

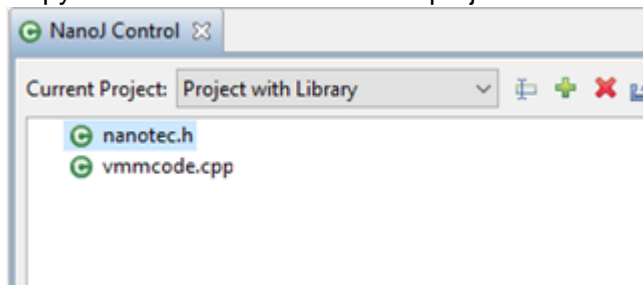
1. Assign a new project name (2).
2. Click on *Finish* (3) to close the tab.
3. Your new project is now created.



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 clock direction mode in NanoJ

Our example shows how to use the clock direction mode in NanoJ in order to operate the motor with clock and direction signal.

5.1 Including libraries, mappings

For our case, we use the Nanotec NanoJ V2 library `nanotec.h` in our code template to provide basic functions to control our motor. To include the `nanotec.h` library, we must add the object mappings in lines 23 to 30 to our code. We also include the libraries `wrapper.h` and `nanotec.h`:

```
18 // In this example the clock-direction mode is set and activated with input 4
19
20
21 // You can map frequently used objects to be able to read or write them using In.* and Out.*.
22 map U16 Controlword as inout 0x6040:00
23 map U16 Statusword as input 0x6041:00
24 map U32 Inputs as input 0x60FD:00
25 map U32 Outputs as inout 0x60FE:01
26 map S08 ModesOfOperation as output 0x6060:00
27 map S08 ModesOfOperationDisplay as input 0x6061:00
28 map S16 AnalogInput as input 0x3220:01
29
30 #include "wrapper.h"
31 #include "nanotec.h"
```

5.2 Main program loop: void user()

5.2.1 Selecting the clock direction mode

Via mapped object (0x6060=-1), we first select the mode clock-direction `modesOfOperation(-1)`.

```
33 void user()
34 {
35
36     ModesOfOperation(-1);
```

5.2.2 Setting the step mode

- Line 37: Via `Shutdown()`, we set the state machine to *ReadyToSwitchOn*.
- Line 39: The clock count value multiplies by the value in object 2057 (clock direction multiplier). We set this object to $0x2057 = 512$ to define the basic step resolution as full-step.
- Line 40: By defining object 2058 (clock direction divider) as value 2, we set the step-mode to half-step, that is $0x2057 / (512 * 0x2058)$.

```
37     Shutdown();
38
39     od_write(0x2057, 0x00, 512);
40     od_write(0x2058, 0x00, 2);
```

5.2.3 Assigning a start button (Input 4)

- Line 44: We assign Input 4 to a start button; a high Input 4 will start the motor.
- Line 46: Via `nanotec.h` library function `EnableOperation()`, we switch the power state machine to *Operation Enabled*.
- Line 51: If we use `Shutdown()` to set the power state machine to *ReadyToSwitchOn*, and if the start button is low, the motor stops.

```
42  while(true)
43  {
44      if(DigitalInput(4))
45      {
46          EnableOperation();
47      }
48
49      else
50      {
51          Shutdown();
52      }
53
54      yield();
55  }
```

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.

It serves as general guidance and should not be construed as a commitment of Nanotec to guarantee its applicability to all customer applications without additional tests under the specific conditions and – if and when necessary – modifications by the customer.

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7 Imprint

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