|  |  |  |  |
| --- | --- | --- | --- |
|  | **TMC2208** | **A4988** | **DRV8825** |
| **Driver type** | Bi-polar | Bi-polar | Bi-polar |
| **Pinout** | How to use TMC2208 Stepper Motor Driver with Arduino |  |  |
| **Voltage rating** | 4.75 V to 36 V. | 35V | 8.2 V to 45 V. |
| **Max Current** | 2A | 2A | 2.5A |
| **Step – angle** | This driver has a specialty for it has 1.8 angle / step, but it can be micro stepped until it becomes 1/256 through MS1 & MS2: | 1.8 | 1.8 but it supports micro stepping until 1/32. |
| **Other attributes** | With this driver, motor can operate silently |  |  |

**Library less operation modes & codes:**

**Constant RPM:**

The rpm speed of the stepper motor controlled by the TMC2209 is given by the following equation implemented in the following code:

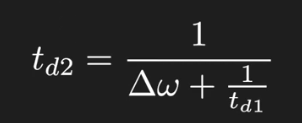
|  |  |
| --- | --- |
|  | * fstep = 1/T where T is the period of rotation to be determined in the code as shown * Steps per Revolution = |

**Entire code:**

[**https://github.com/Abdulrhman1692004/My\_projects/blob/faac4a5a89147b925eee684d0c6196b521705d17/stepper/constant\_rpm**](https://github.com/Abdulrhman1692004/My_projects/blob/faac4a5a89147b925eee684d0c6196b521705d17/stepper/constant_rpm)

**Constant acceleration:**

Accelration ,which implies change in velocity, would depend on the change of the delay time in the code. This change is managed by the following equaiton.

where td2 is the next delay time from td1

**Entire code:** [**https://github.com/Abdulrhman1692004/My\_projects/blob/faac4a5a89147b925eee684d0c6196b521705d17/stepper/constant\_rpm**](https://github.com/Abdulrhman1692004/My_projects/blob/faac4a5a89147b925eee684d0c6196b521705d17/stepper/constant_rpm)

**Stepper libraries:**

**Accel stepper motor library:**

As its name implies, Accel stepper library enables determination of acceleration of the motor as well as its speed range. The library also determines the target position as well as it can determine the current position of the motor.

**Main functions of the library:**

|  |  |
| --- | --- |
| **Accel stepper** | AccelStepper x (interface, pin1, pin3, pin2, pin4)  It is basically a class that determines the connected pins and seen as the constructor of the whole system |
| **SetAccelration ()** | It is used to determine the acceleration of the motor. |
| **SetMaxspeed ()** | Used to set the highest limit of the speed |
| **Moveto()** | Tells the motor to move to a certain position from 0 to 2048. If it is in negative, it would be moving CCW |
| **SetTargetposition ()** | Used to determine the target position of the movement |
| **Run ()** | Used to make the robot move to the target position |

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