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Controlling Three NEMA34 Closed Loop Stepper Motors with CS-D808 Motor Drivers and Arduino

Electrical Components:

3 Closed Loop Stepper Motors NEMA34

3 CS-D808 Motor Drivers

1 Arduino UNO R3

30-80 Vdc, Max 8A power supply (we can use three 12v, 7A batteries connected in series)
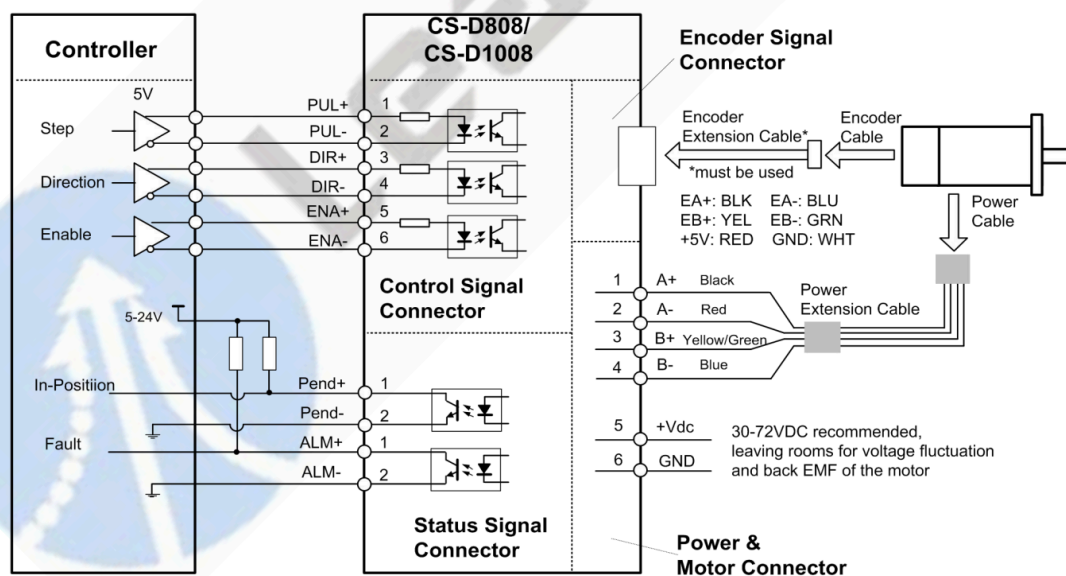
Typical connection:

Figure 7: Typical connection

Leadshine, CS-D808 & CS-D1008 Closed Loop Stepper Drive User Manual

where the motor and the power supply connect to driver's power and motor connector pins, the control signal connector (step, direction and enable) connected to the to Arduino as output pins, and the status signal connector as an analog input for controlling and monitoring.

Control System Installation Algorithm:

Step1:

Connect the motors with their motor drivers, whereas the positive and negative pins of the motor connected to the motor connector pins in the drivers.

Step2:

Connect the drivers control signal pins to the arduino's digital output pins.

Step3:

Connect the power connector pins of the drivers to the arduino 5vdc and GND pins.

Step4:

Connect the power supply with 24 vdc to the drivers.

Algorithm for working mechanism:

Step1:

Declare the 3 pins of the each driver (steps, direction and enable) to be as output pins in the arduino.

Step2:

The number of steps is determined depending on the actual number of steps 200 steps/ revolution.

Step3:

Set the enable pins to be LOW to ensure the motors are not running.

Step4:

The first motor will move counterclockwise for 45 degree then, the second motor will move clockwise for 90 degree and finally the third motor will move for 20 degree (adjustable values).

Step5:

Run the code.

The proposed Arduino code:

```
int stepPin1 = 5;
int dirPin1  = 6;
int  enPin1  = 7;
int stepPin2 = 8;
int dirPin2  = 9;
int  enPin2  = 10;
int stepPin3 = 11;
int dirPin3  = 12;
int  enPin3  = 13;

int numstep1 = 25;
int numstep2 = 50;
int numstep3 = 11;

void setup() {
// put your setup code here, to run once:

 pinMode(stepPin1, OUTPUT);
 pinMode(dirPin1, OUTPUT);
pinMode(enPin1, OUTPUT);
pinMode(stepPin2, OUTPUT);
pinMode(dirPin2, OUTPUT);
pinMode(enPin2, OUTPUT);
pinMode(stepPin3, OUTPUT);
 pinMode(dirPin3, OUTPUT);
pinMode(enPin3, OUTPUT);

digitalWrite(enPin1, LOW);
digitalWrite(enPin2, LOW);
digitalWrite(enPin3, LOW);
}

void loop() {
// move the first motor counterclockwise for 45 degree
digitalWrite(dirPin1, LOW);
for(int x = 0; x <= numstep1; x++) {
        digitalWrite(stepPin1,HIGH);
          }
 digitalWrite(stepPin1,LOW);
 delay(1000);

// move the second motor clockwise for 90 degree
digitalWrite(dirPin2, HIGH);
for(int x = 0; x <= numstep2; x++) {
        digitalWrite(stepPin2,HIGH);
 }
 digitalWrite(stepPin2,LOW);
delay(1000);

// move the third motor clockwise for 20 degree
digitalWrite(dirPin3, HIGH);
for(int x = 0; x <= numstep3; x++) {
        digitalWrite(stepPin3,HIGH);
   }
digitalWrite(stepPin3,LOW);
delay(1000);

}
```

Figure1: Arduino code for the system.