37D Metal Gearmotors

Pololu

Lead Color	Function
Red	Motor power
Black	Motor power
Green	Encoder ground
Blue	Encoder Vcc (3.5 V to 20 V)
Yellow	Encoder A output
White	Encoder B output

The Hall sensors require an input voltage, Vcc, between 3.5 V and 20 V and draw a maximum of 10 mA. The A and B outputs are square waves from 0 V to Vcc approximately 90° out of phase. The speed of the motor can be determined from the frequency, and the direction of rotation can be determined from the order of the transitions. The following oscilloscope capture shows the A and B (yellow and white) encoder outputs using a 12 V motor at 12 V and a Hall sensor Vcc of 5 V:

Teensy Pinouts 042225

Component	Signal	Teensy Pin
Motor Driver – Channel A	IN1 (A)	2
Motor Driver – Channel A	IN2 (A)	3
Motor Driver – Channel A	EN (A) (PWM speed)	4
Motor Driver – Channel B	IN1 (B)	5
Motor Driver – Channel B	IN2 (B)	6
Motor Driver – Channel B	EN (B) (PWM speed)	7
Ultrasonic A	Trigger	8
Ultrasonic A	Echo	9
Ultrasonic B	Trigger	10
Ultrasonic B	Echo	11
Motor A Encoder A	Hall A output	12
Motor B Encoder B	Hall A output	13
Encoder Power	VCC (blue wire)	5 V
Encoder Power	GND (green wire)	GND
I^2C Multi	SDA (MPU6050 & Compass)	18
I^2C Multi	SCL (MPU6050 & Compass)	19
MPU6050 / Compass	VCC	3.3 V
MPU6050 / Compass	GND	GND

DBH-12V Wiring

Power Inputs

- V+ (A,B): 12 V + buck converter
- GND (A,B): 12 V - buck converter

Motor Connections

- A+, A–: Connect to Motor A Red (+) and Black (–) leads.
- B+, B–: Connect to Motor B Red (+) and Black (–) leads.

Control Signals (Teensy - DBH)

- IN1 (A) ← Teensy pin 2
- IN2 (A) ← Teensy pin 3
- EN (A) ← Teensy pin 4 *(PWM speed control)*
- IN1 (B) ← Teensy pin 5
- IN2 (B) ← Teensy pin 6
- EN (B) ← Teensy pin 7 *(PWM speed control)*
- CT(A,B): Current sensing. Not set up yet, but we should. Leave disconnected for now

Encoder Power & Data

- Motor Blue (encoder Vcc) - Teensy 5 V
- Motor Green (encoder GND) - Teensy GND
- Motor A Yellow (Hall A output) - Teensy pin 12
- Motor B Yellow (Hall A output) - Teensy pin 13
- Motor White (Hall B output): sketch currently has only single-channel counting. Leave disconnected for now, but we probably want to set this up, too