	Motor power (connects to one motor terminal)
	Motor power (connects to other motor terminal)
	Encoder GND
	Encoder Vcc
	Encoder output A
	Encoder output B

INSTRUCTIONS TO CHECK MOTORS

REQUIRED

- SIGLENT DC Power Supply (Obtain from Telecommunication Laboratory)
- KEITHLEY DC Power Supply (Obtain from Digital Laboratory)
- Tektronix Digital Oscilloscope
- POLOLU Motor
- Jumper wires

SIGLENT power supply

KEITHLEY power supply

PROCEDURE

1. Calibrate the oscilloscope
2. Go to Measure > Channel > Frequency to enable frequency measurement for both the channels
3. Connect the wires of POLOLU motor to the instruments as follows ;

	+VE terminal of SIGLENT power supply
	-VE terminal of SIGLENT power supply
	-VE terminal of KEITHLEY power supply
	+VE terminal of KEITHLEY power supply
	Channel 1 of oscilloscope
	Channel 2 of oscilloscope

4. Connect GND terminal of Channel 1 of oscilloscope to the -VE terminal of the KEIHTLEY power supply
5. Set the SIGLENT DC Power Supply to parallel mode.
   Select Current and set to 3A.
   Select Voltage and set to 9V / 12V.
   (This will provide a total of 6A parallel current from the two channels of the power supply)
6. Set the voltage of the KEITHLEY power supply to 5V and current to 0.1A to supply power to the encoder of the motor.
7. Make sure to hold the motor in your hand before supplying output to the motor
8. Switch ON the SIGLENT and KEITHLEY power supplies.
9. When the motor is working, check the waveform on the oscilloscope. It should have an approximate square waveform and the two waveforms taken from two encoder cables should have a phase difference of 90°
10. Note down the following measurements at 9V and 12V of the SIGLENT power supply.
    a. Frequency reading in oscilloscope
    b. Current reading in SIGLENT power supply

11. The encoder is a 48CPM encoder counting both edges of both outputs. To get the rpm value of the motor shaft, use the following equation

$$rpm = frequency \times \frac{60}{12}$$

12. To get the rpm of the motor, divide the motor shaft rpm by the gear ratio.
13. Readings for a WORKING motor should be in the following range:
    a. At 9V
        i. Frequency reading: 7200 - 7500
        ii. Current reading: 0.16A – 0.2A
    b. At 12V
        i. Frequency reading: 9700 - 10000
        ii. Current reading: 0.18A – 0.22A

NOTE: Please check the QR code of the **motor** and **its box** to make sure both matches.