**Distance Measurement with Encoder**

Encoder use : Orange 600 PPR 2-Phase Incremental Optical Rotary Encode

Controller use : Arduino

Encoder output values in 1 Revolution = 2400 values

25.8 values = 1 mm (Physical testing)

1 Revolution (360 degree) =2400 values = 93 mm (Physical testing)

1 Value = 0.03875 mm

**Distance travel = Encoder value x 0.03875**

**Error = ± 1 degree**

**Code //**

int encoderPin1 = 2;

int encoderPin2 = 3;

volatile int lastEncoded = 0;

volatile long encoderValue = 0;

long lastencoderValue = 0;

float encoderValueDegrees = 0;

float distance = 0;

int lastMSB = 0;

int lastLSB = 0;

void setup() {

  Serial.begin (9600);

  pinMode(encoderPin1, INPUT);

  pinMode(encoderPin2, INPUT);

  digitalWrite(encoderPin1, HIGH); //turn pullup resistor on

  digitalWrite(encoderPin2, HIGH); //turn pullup resistor on

  //call updateEncoder() when any high/low changed seen

  //on interrupt 0 (pin 2), or interrupt 1 (pin 3)

  attachInterrupt(0, updateEncoder, CHANGE);

  attachInterrupt(1, updateEncoder, CHANGE);

}

void loop(){

  // Read the encoder value in degrees

  encoderValueDegrees = encoderValue \* 0.15;  //0.075; // Using the conversion factor = 180/2400= 0.075, Adjusted for a 1:2 ratio (360/2 = 180 degrees per count)

  distance = encoderValue \* 0.03875;

  Serial.print("Value : ");

  Serial.println(encoderValue);

  Serial.print("Degree : ");

  Serial.println(encoderValueDegrees);

  Serial.print("Distance : ");

  Serial.print(distance);

  Serial.println(" mm");

  delay(200); //just here to slow down the output, and show it will work  even during a delay

}

void updateEncoder(){

  int MSB = digitalRead(encoderPin1); //MSB = most significant bit

  int LSB = digitalRead(encoderPin2); //LSB = least significant bit

  int encoded = (MSB << 1) |LSB; //converting the 2 pin value to single number

  int sum  = (lastEncoded << 2) | encoded; //adding it to the previous encoded value

  //  Serial.print("sum ");

  //  Serial.println(sum);

  if(sum == 0b1101 || sum == 0b0100 || sum == 0b0010 || sum == 0b1011) encoderValue ++;

  if(sum == 0b1110 || sum == 0b0111 || sum == 0b0001 || sum == 0b1000) encoderValue --;

  lastEncoded = encoded; //store this value for next time

  }