Future electronics

OMRON Rotary Encoder E6B2-CWZ6C

1000P/R - 2000P/R

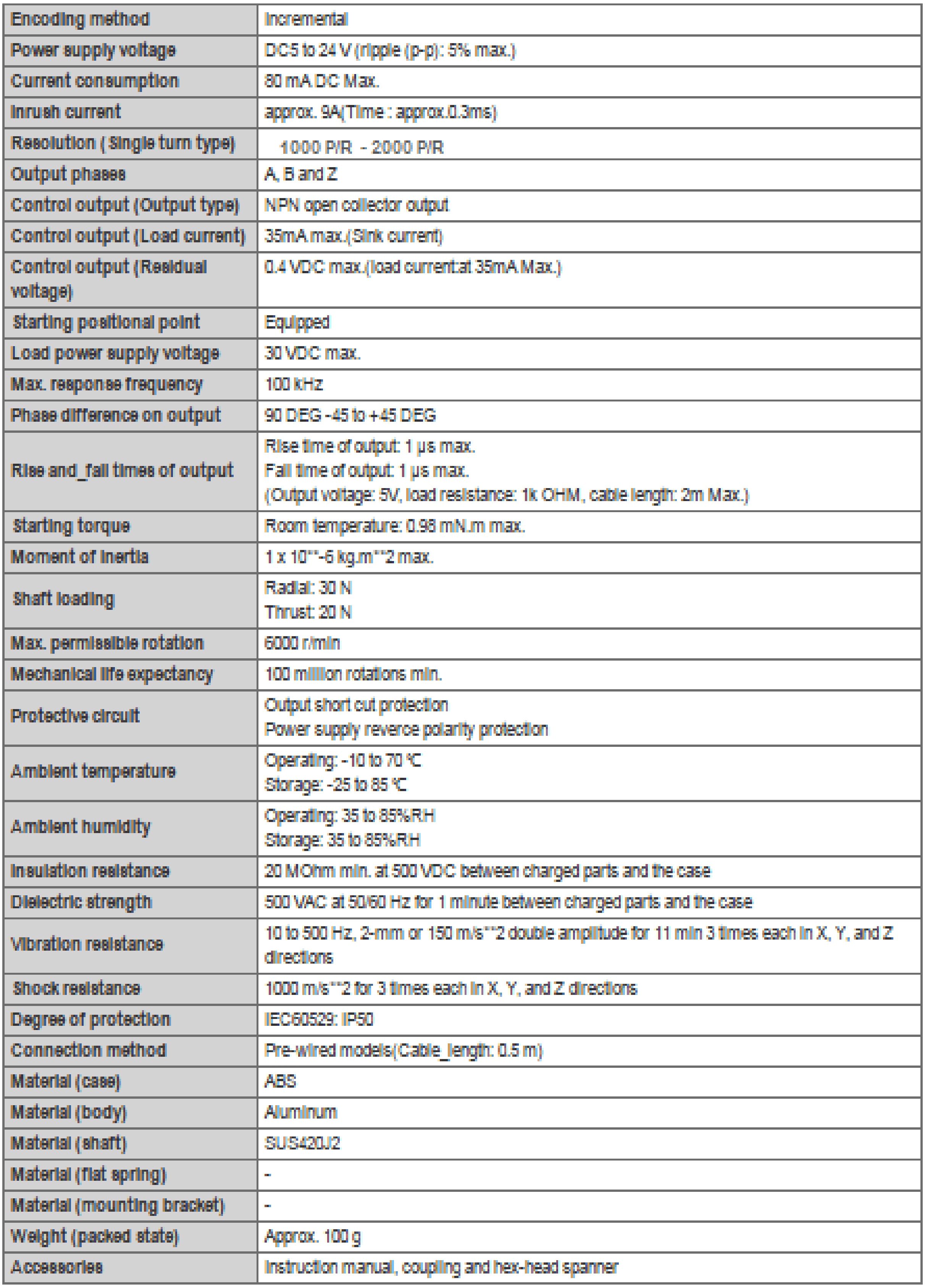
Introduction

This is Omron incremental rotary encoder E6B2-CW6C with 1200 pulse per rotation. The encoder outputs gray code which you can interpret using a microcontroller or Arduino and find out which direction the shaft is turning and by how much.

This allows you to add feedback to motor control systems. Encoders of this kind are often used in CNC machines, balancing robots and dead reckoning navigation.

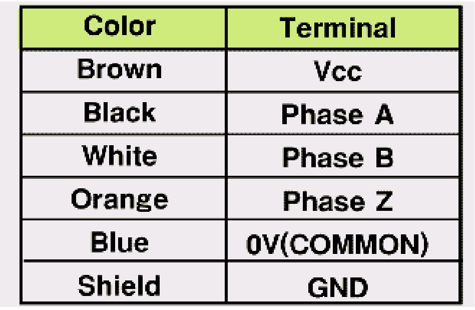
This encoder is of improved reliability with reverse connection and load short-circuit protection

Feature



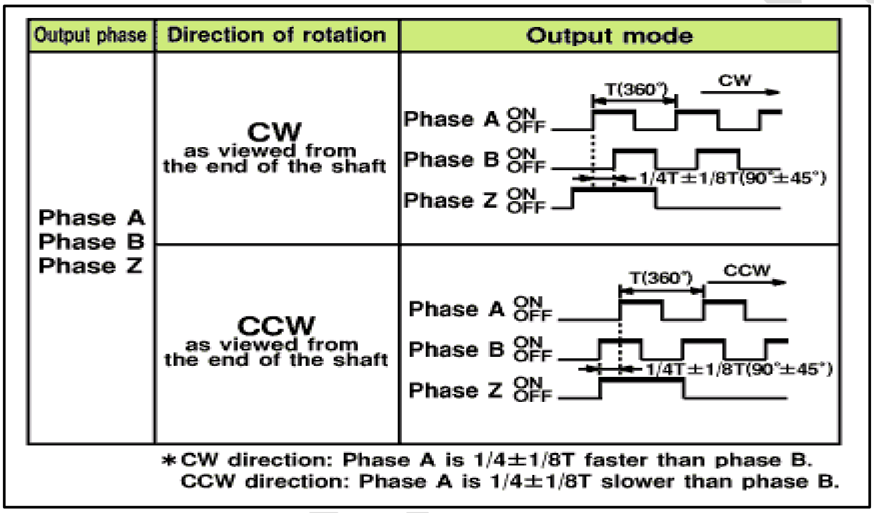
Encoding method	Incremental
Power supply voltage	DC5 to 24 V (ripple (p-p): 5% max.)
Current consumption	80 mA DC Max.
Inrush current	approx. 9A(Time : approx.0.3ms)
Resolution (Single turn type)	1000 P/R - 2000 P/R
Output phases	A, B and Z
Control output (Output type)	NPN open collector output
Control output (Load current)	35mA max.(Sink current)
Control output (Residual voltage)	0.4 VDC max.(load current:at 35mA Max.)
Starting positional point	Equipped
Load power supply voltage	30 VDC max.
Max. response frequency	100 kHz
Phase difference on output	90 DEG -45 to +45 DEG
Rise and_fall times of output	Rise time of output: 1 μs max. Fall time of output: 1 μs max. (Output voltage: 5V, load resistance: 1k OHM, cable length: 2m Max.)
Starting torque	Room temperature: 0.98 mN.m max.
Moment of inertia	1 x 10**-6 kg.m**2 max.
Shaft loading	Radial: 30 N Thrust: 20 N
Max. permissible rotation	6000 r/min
Mechanical life expectancy	100 million rotations min.
Protective circuit	Output short cut protection Power supply reverce polarity protection
Ambient temperature	Operating: -10 to 70 ℃ Storage: -25 to 85 ℃
Ambient humidity	Operating: 35 to 85%RH Storage: 35 to 85%RH
Insulation resistance	20 MOhm min. at 500 VDC between charged parts and the case
Dielectric strength	500 VAC at 50/60 Hz for 1 minute between charged parts and the case
Vibration resistance	10 to 500 Hz, 2-mm or 150 m/s**2 double amplitude for 11 min 3 times each in X, Y, and Z directions
Shock resistance	1000 m/s**2 for 3 times each in X, Y, and Z directions
Degree of protection	IEC60529: IP50
Connection method	Pre-wired models(Cable_length: 0.5 m)
Material (case)	ABS
Material (body)	Aluminum
Material (shaft)	SUS420J2
Material (flat spring)	-
Material (mounting bracket)	-
Weight (packed state)	Approx. 100 g
Accessories	Instruction manual, coupling and hex-head spanner

Pin Definition



Color	Terminal
Brown	Vcc
Black	Phase A
White	Phase B
Orange	Phase Z
Blue	0V(COMMON)
Shield	GND

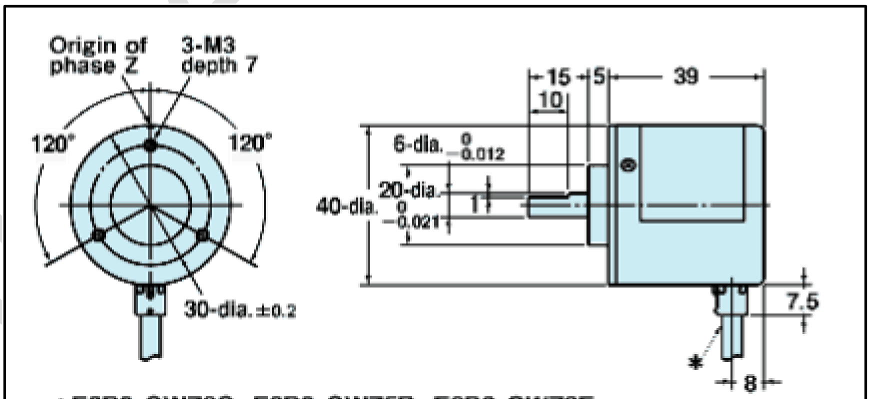
Signal



Output phase	Direction of rotation	Output mode
Phase A Phase B Phase Z	CW as viewed from the end of the shaft	T(360°) CW Phase A ON OFF Phase B ON OFF 1/4T±1/8T(90°±45°) Phase Z ON OFF
	CCW as viewed from the end of the shaft	T(360°) CCW Phase A ON OFF Phase B ON OFF 1/4T±1/8T(90°±45°) Phase Z ON OFF

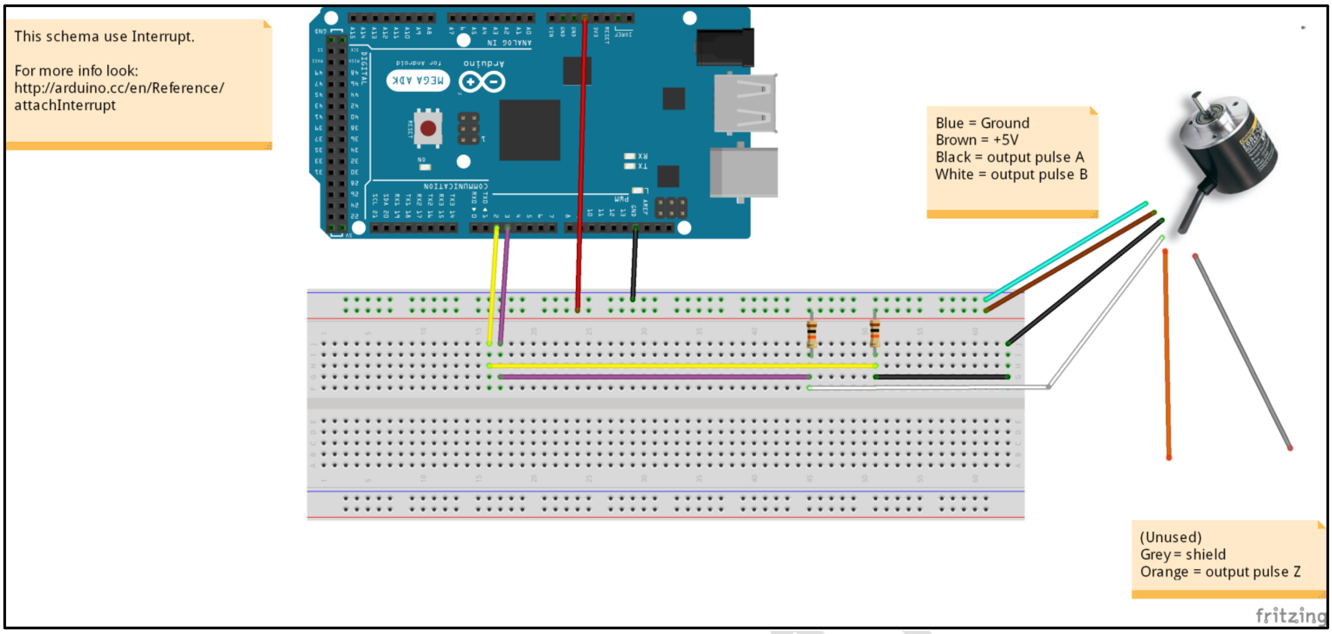
∗CW direction: Phase A is 1/4±1/8T faster than phase B.
CCW direction: Phase A is 1/4±1/8T slower than phase B.

Dimensions



∗E6B2-CWZ6C, E6B2-CWZ5B, E6B2-CWZ3E
5-dia. Shielded cable with 5 conductors
(conductor cross section: 0.2mm^2, insulator diameter: 1.0mm)
Standard length: 500mm
E6B2-CWZ1X
5-dia. Shielded cable with 8 conductors
(conductor cross section: 0.2mm^2, insulator diameter: 1.0mm)
Standard length: 500mm

Connection with Arduino



This schema use Interrupt.

For more info look:
http://arduino.cc/en/Reference/attachInterrupt

Blue = Ground
Brown = +5V
Black = output pulse A
White = output pulse B

(Unused)
Grey= shield
Orange = output pulse Z

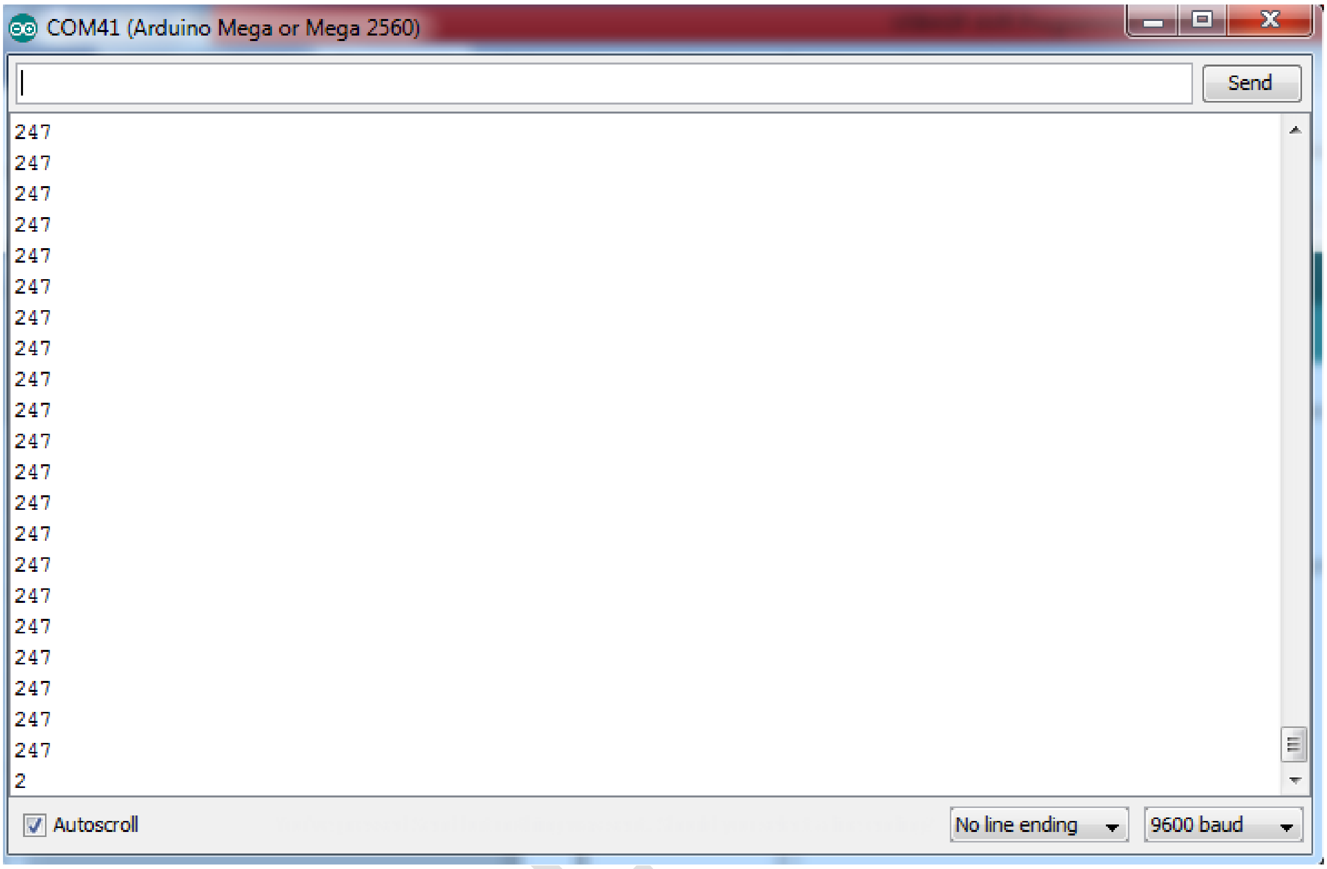
- **2 Resistors 1k ohm**

Arduino code

```
// Encoder connect to digitalpin 2 and 3 on the Arduino.

volatile unsigned int counter = 0;  //This variable will increase or decrease depending on the rotation of encoder

void setup() {

Serial.begin (9600);

  //Setting up interrupt

  //A rising pulse from encodenren activated ai0(). AttachInterrupt 0 is DigitalPin nr 2 on moustArduino.

attachInterrupt(0, ai0, RISING);


  //B rising pulse from encodenren activated ai1(). AttachInterrupt 1 is DigitalPin nr 3 on moustArduino.

attachInterrupt(1, ai1, RISING);

}
```

```
void loop() {
  // Send the value of counter
Serial.println (counter/2);
}


void ai0() {
  // ai0 is activated if DigitalPin nr 2 is going from LOW to HIGH
  // Check pin 3 to determine the direction
if(digitalRead(3)==LOW) {
counter++;
}else{
counter--;
  }
}
void ai1() {
  // ai0 is activated if DigitalPin nr 3 is going from LOW to HIGH
  // Check with pin 2 to determine the direction
if(digitalRead(2)==LOW) {
counter--;
}else{
counter++;
  }
}
```

The Result



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