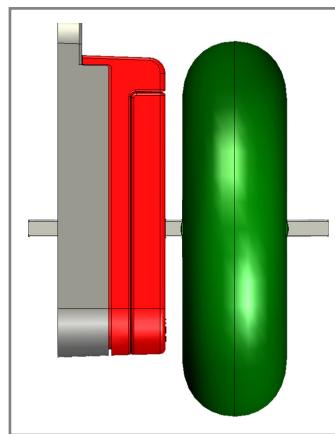


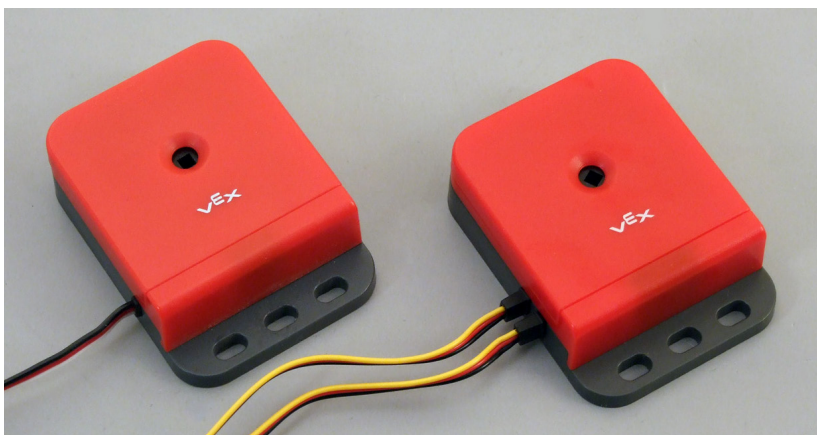
Reference

Quadrature Shaft Encoders Overview

The Quadrature Shaft Encoder detects the rotation of an axle that passes through it. It has a resolution of 360 counts per revolution (2 count intervals), and can distinguish between clockwise and counterclockwise rotation.



The Quadrature Shaft Encoder is an upgrade from the original Shaft Encoder. The original version contains only one internal sensor, which detects the slits in an internal disc as it spins, giving it a resolution of 90 counts per revolution. Only one output channel (wire) is needed to transmit the sensor data to the Vex Microcontroller.



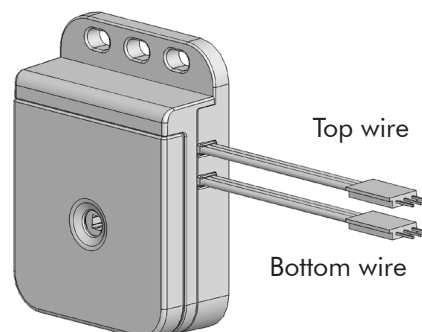
The upgraded Quadrature Shaft Encoder includes a second optical sensor which allows the sensor to detect if the internal disk is spinning clockwise or counterclockwise and increases the resolution to 360 counts per revolution (2 count intervals). Two output channels (wires) are needed to transmit its sensor data to the Vex.

Original Shaft Encoder
Only has one output wire.

Quadrature Shaft Encoder
Has two output wires.

When wiring the Quadrature Shaft Encoder, both wires must be in adjacent digital ports. For example, if the top wire is in digital port 1, the bottom wire must be in digital port 2.

If you put the top wire in the lower numbered port, and the bottom wire in higher numbered port, then the encoder will record clockwise rotations as positive, and counterclockwise rotations as negative. Switching the wire ports switches the positive and negative directions.



Reference

Quadrature Shaft Encoders

Natural Language Sample Code

Programming with the Quadrature Shaft Encoders in Natural Language is fairly straightforward. The sample programs below demonstrate how to control your robot's movements using Quadrature Shaft Encoders. The Natural Language Library automatically accounts for which direction the encoders are rotating, so you do not need to worry about positive or negative counts.

Driving Forward and Reverse with Quadrature Shaft Encoders

This code will move the robot forward for two rotations, and then in reverse for 720 encoder counts. Since there are 360 counts in each rotation, 720 counts should move the robot the same distance as the two rotations.

```
task main()
{
  robotType(recbot);          // We are using the Recbot.

  forward(63);                // Move forward at speed 63.
  untilRotations(2.0, dgt11); // Wait until the wheels have rotated 2.0
                              // times, the sensor is in digital port 1
                              // (the second wire is in digital port 2)

  stop();                     // Stop.

  wait(0.5);                  // Wait 0.5 seconds.

  backward(63);               // Move backward at speed 63.
  untilEncoderCounts(720, dgt11); // Wait until the encoders count is 720
                                  // times
                                  // Stop.
  stop();
}
```

Making a Right Point Turn with Quadrature Shaft Encoders

This code will cause the robot to make a right point turn for 1.1 rotations. Note that this is rotations of the shaft encoder, not the robot.

```
task main()
{
  robotType(recbot);          // We are using the Recbot.

  pointTurn(right);           // Make a right point turn in place.
  untilRotations(2.0, dgt11); // Wait until the wheels have rotated 2.0
                              // times, the sensor is in digital port 1
                              // (the second wire is in digital port 2)

  stop();                     // Stop.
}
```