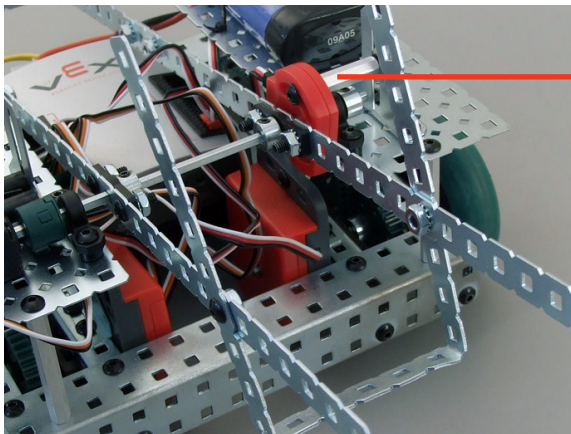# **Potentiometers** Overview

The Potentiometer is used to measure the angular position of the axle or shaft passed through its center. The center of the sensor can rotate roughly 265 degrees and outputs values ranging from 0-1023 to the Vex Microcontroller.

The Potentiometer can be attached to the robot using the mounting arcs surrounding the center of the sensor. The arcs provide flexibility for the orientation of the Potentiometer, allowing the full range of motion to be utilized more easily.

When mounted on the rotating shaft of a moving portion of the robot, such as an arm or gripper, the Potentiometer provides precise feedback regarding its angular position. This sensor data can then be used for accurate control of the robot.
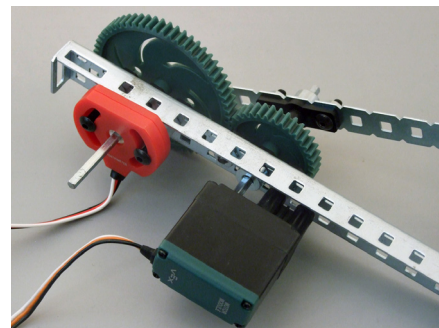

Mounted Potentiometer
Here, the Potentiometer is mounted on Squarebot 3.0. It provides feedback regarding the position of the movable arm.

CAUTION! When mounting the Potentiometer on your robot, ensure that the range of motion of the rotating shaft does not exceed that of the sensor. Failure to do so may result in damage to your robot and the Potentiometer.

Gear it Up
If the range of motion is too large for the Potentiometer, try developing a gear train that would allow you to measure the rotation of the shaft.
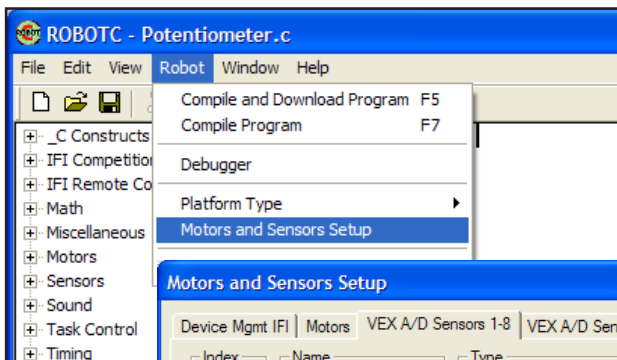
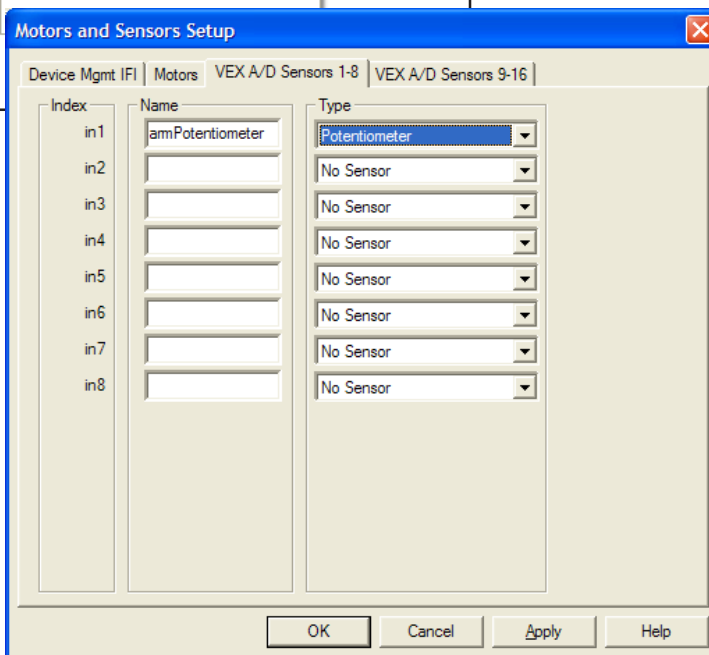**Note:** Your sensor feedback will lose some resolution.

Potentiometers ROBOTC Setup

The Potentiometer is fully supported by ROBOTC for IFI (v. 1.4 and up). Use the following instructions and to correctly configure one within ROBOTC.
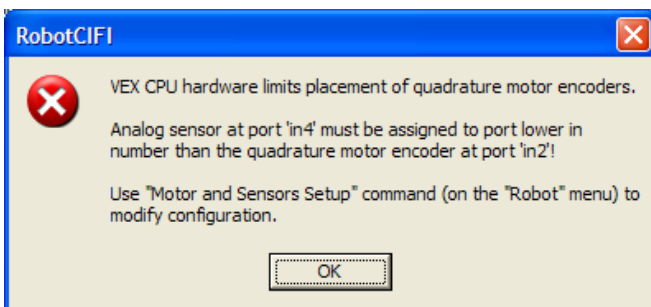
Robot > Motors and Sensors Setup
Open the Motors and Sensors Setup window.

Sensor Configuration
Select A/D Sensors 1-8.

Type a Name for your sensor next to one of the ports, and set it as Type "Potentiometer".

Press "OK" to complete the configuration.

Note: The Potentiometer can be plugged into any of the Analog / Digital ports (in1 through in16). Any digital sensors (Limit Switches, Bumper Switches, Encoders, Ultrasonic Rangefinders) must be used in higher Port numbers for them to be configured correctly.

Potentiometers Sample Code

Limiting Arm Movement with the Potentiometer

This code allows the rotating arm of a robot to be remote controlled using the Ch5 rear buttons on the Radio Control Transmitter. The Potentiometer is used to prevent the motor from spinning once the arm has reached its minimum and maximum points.

```
bIfiAutonomousMode = false;    //Enable Radio Control mode
while(true)                     //Loop forever
{
  if(vexRT[Ch5] == 127)        //If the top Ch5 button is pressed...
  {
     if(SensorValue[armPotentiometer] < 900) //If the Potentiometer
     {                          //has not reached its maximum point...
       motor[port6] = 31;       //turn the motor on forward.
     }
     else                       //If the Potentiometer has reached
     {                          //its maximum point...
       motor[port6] = 0;        //turn the motor off.
     }
  }
  if(vexRT[Ch5] == -127)        //If the bottom Ch5 button is pressed...
  {
     if(SensorValue[armPotentiometer] > 550) //If the Potentiometer
     {                          //has not reached its minimum point...
       motor[port6] = -31;      //turn the motor on in reverse.
     }
     else                       //If the Potentiometer has reached
     {                          //its minimum point..
       motor[port6] = 0;        //turn the motor off.
     }
  }
}
```