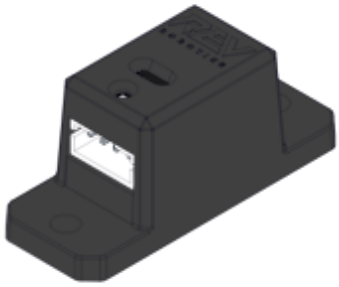
2m Distance Sensor

2m Distance Sensor - Overview

The REV Robotics 2m Distance Sensor (REV-31-1505) uses the ST Microelectronics VL53L0X Time-of-Flight (ToF) laser-ranging module to measure distances up to 2m with millimeter resolution.



Unlike other ranging sensors that rely on the intensity of reflected light, this sensor can measure how long it takes for the light to bounce back, the “time of flight.” This results in much more accurate measurements that are independent of the target’s reflectance.

Kit Contents

Part Number	Description	Qty
REV-31-1505	2m Distance Sensor	1
REV-31-1407	JST PH 4-pin Sensor Cable - 30cm	1

Specifications

Specifications

General Specifications

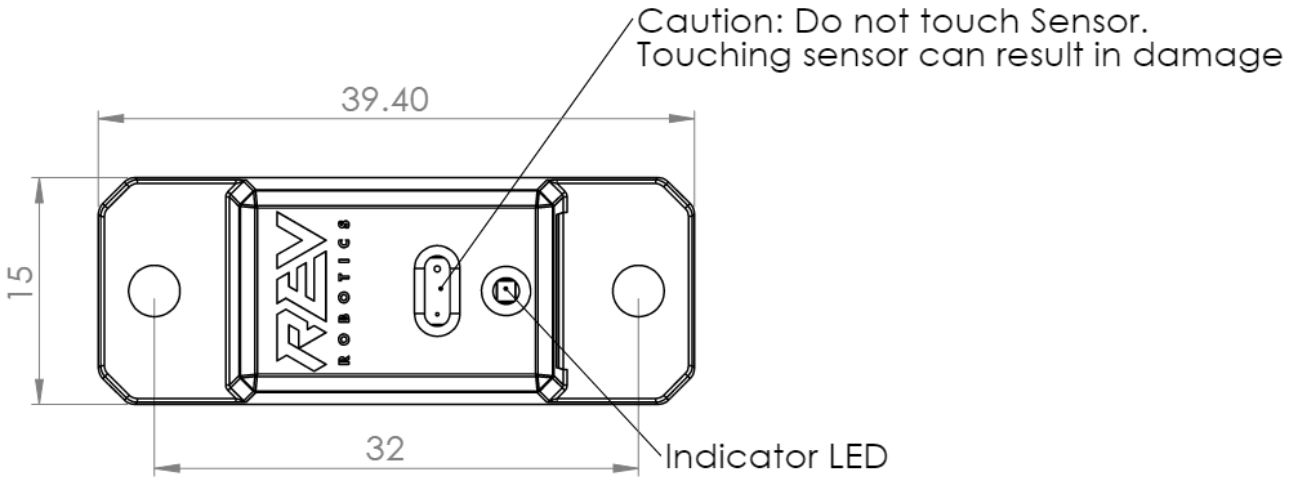
Parameter Description	Parameter
Sensor Type	I2C
I2C Address	0x52
Laser Type	940 nm (IR) Class 1

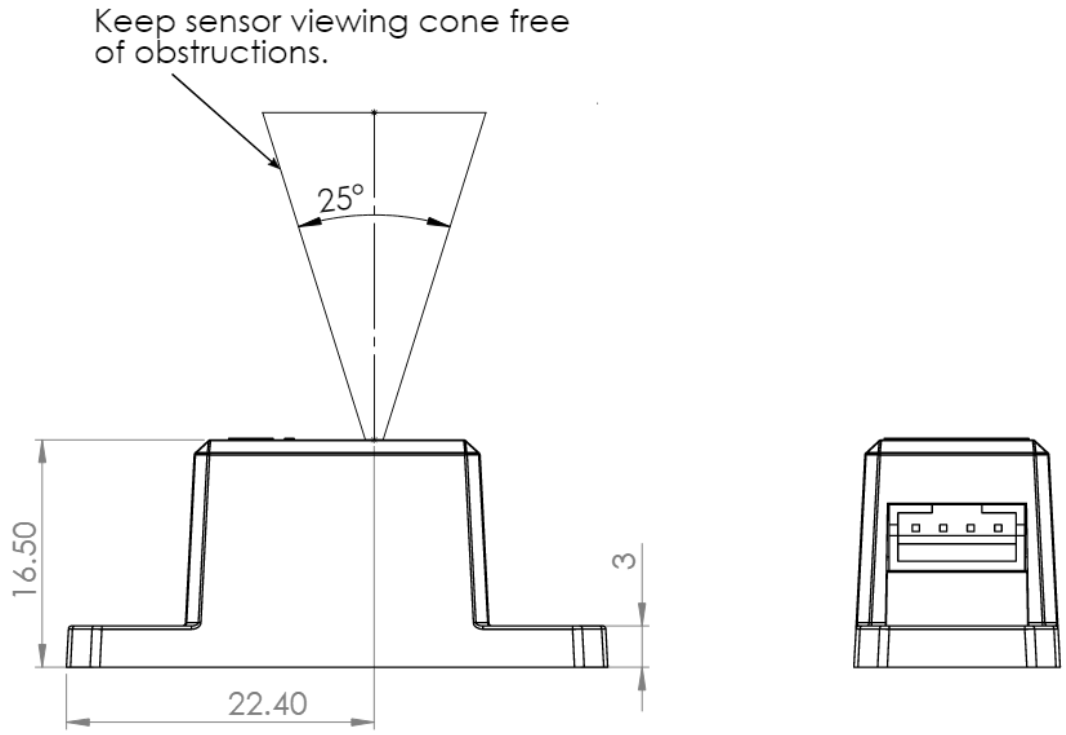
Electrical Specifications

Parameter	Min	Typ	Max	Units
Operating Voltage Range	3.3	-	5.0	V
Operating Current	-	-	40	mA
Measurement Range	5	-	200	cm
Measurement Resolution	-	1	-	mm
Field of View	-	25	-	degrees
Max. Bus Frequency	-	-	400	kHz

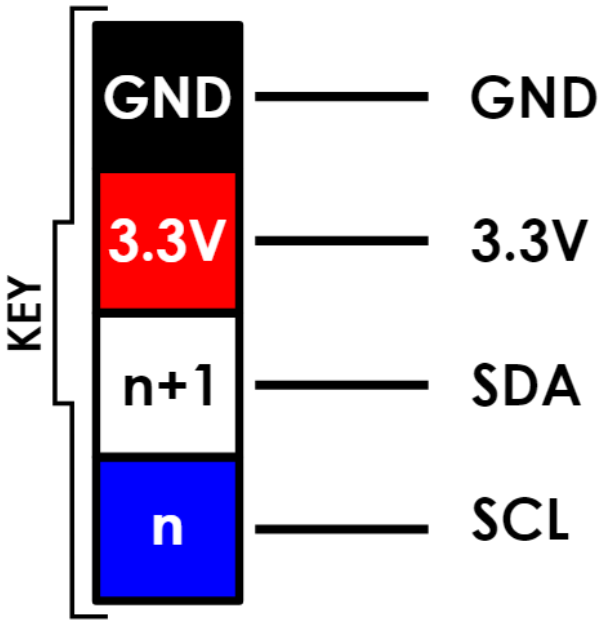
Mechanical Drawings

All dimensions are in millimeters





Pinout and Schematic


GND
3.3V
n+1
n
KEY
GND
3.3V
SDA
SCL

Application Information

Application Information

While the REV 2m Distance Sensor produces a significantly more accurate and reliable measurement than other types of ranging sensors, the following tips will help minimize errors.

A major benefit to time-of-flight measurements is that the target's surface reflectance does not significantly impact the calculated distance. However, the smallest errors and farthest measurements are achieved with more reflective targets. Similarly, larger targets are easier to detect because they fill more of the sensors 25° field of view.

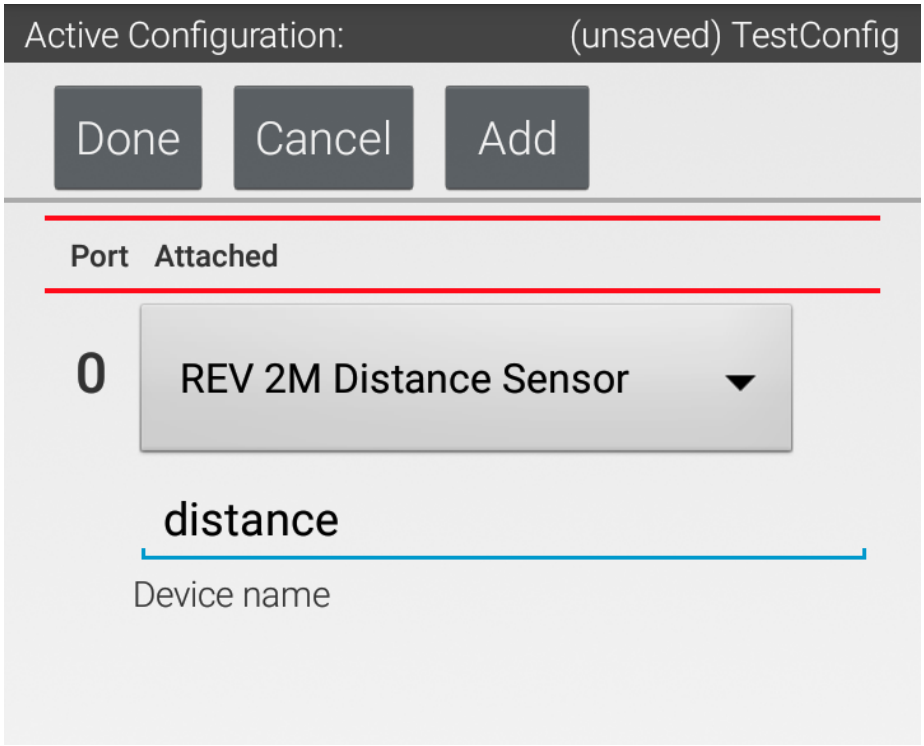
Ambient infrared (IR) interference can also affect the measurement distance and quality. The sensor can produce accurate measurements in sunlit environments, but the maximum distance will be reduced. The following table outlines the typical ranging capabilities of the sensor:

Target Reflectance	Indoor	Outdoor (overcast)
White (88%)	200 cm	80 cm
Grey (17%)	80 cm	50 cm

FTC Applications

Configuring in the Control System

Configure the 2m Distance Sensor as "REV 2M Distance Sensor," shown in the image below.



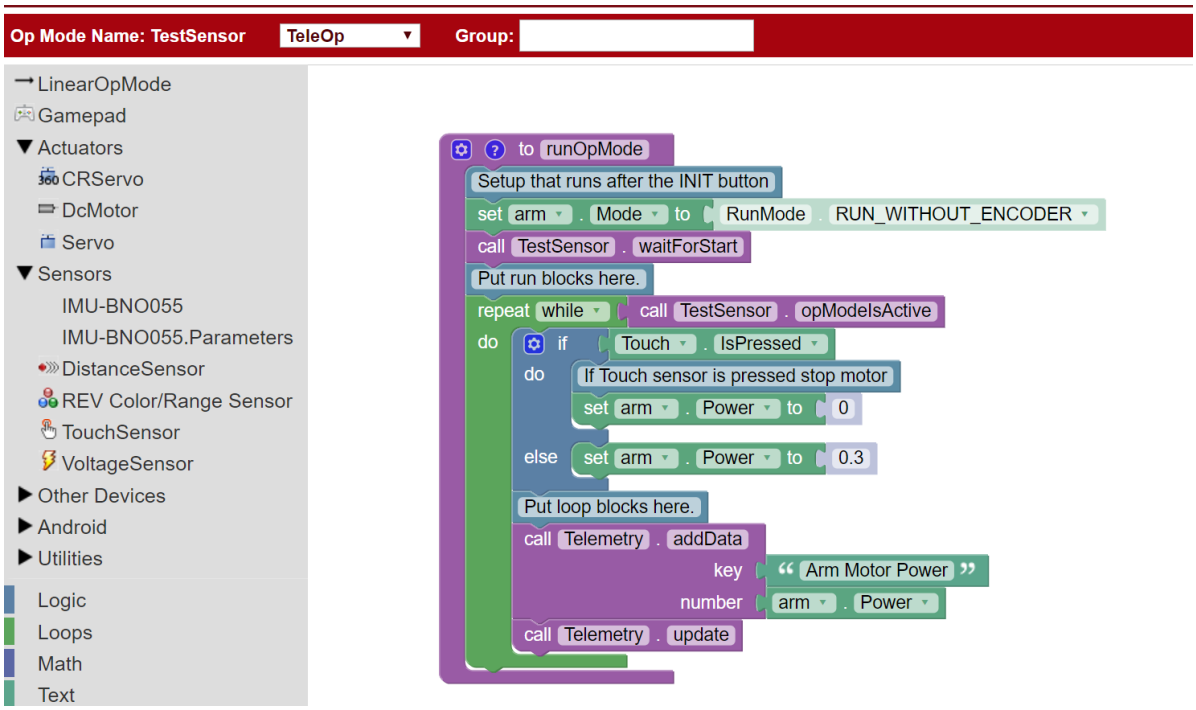
In this example, the 2m Distance Sensor is configured on I2C bus 1. The 2m Distance Sensor can be configured on any of the I2C busses as long as a Color Sensor V3 is not configured to the same bus.

> Recall that I2C sensors must have different addresses in order to operate on the same bus. The Color Sensor V3 and 2m Distance Sensor share the same address.

Programming Applications

This program moves a motor if there is an object less than 10 centimeters from the distance sensor, and stops it if there is no object within that range.

Blocks


Op Mode Name: TestSensor
TeleOp
Group:
LinearOpMode
Gamepad
Actuators
CRServo
DcMotor
Servo
Sensors
IMU-BNO055
IMU-BNO055.Parameters
DistanceSensor
REV Color/Range Sensor
TouchSensor
VoltageSensor
Other Devices
Android
Utilities
Logic
Loops
Math
Text
to runOpMode
Setup that runs after the INIT button
set arm . Mode to RunMode . RUN_WITHOUT_ENCODER
call TestSensor . waitForStart
Put run blocks here.
repeat while call TestSensor . opModeIsActive
do if Touch . IsPressed
do If Touch sensor is pressed stop motor
set arm . Power to 0
else set arm . Power to 0.3
Put loop blocks here.
call Telemetry . addData
key "Arm Motor Power"
number arm . Power
call Telemetry . update

OnBot Java

The Java version of this program is pasted below. It assumes that the Distance Sensor was configured with the name “Distance” and that a motor was configured with the name “Motor.”

```
package org.firstinspires.ftc.teamcode;

import com.qualcomm.robotcore.eventloop.opmode.TeleOp;
import com.qualcomm.robotcore.hardware.DcMotor;
import org.firstinspires.ftc.robotcore.external.navigation.DistanceU
import com.qualcomm.robotcore.hardware.DistanceSensor;
import com.qualcomm.robotcore.eventloop.opmode.LinearOpMode;

@TeleOp
public class DistanceTest extends LinearOpMode {
    DistanceSensor distance;
    DcMotor motor;

    @Override
    public void runOpMode() {
        // Get the distance sensor and motor from hardwareMap
        distance = hardwareMap.get(DistanceSensor.class, "Distance")
        motor = hardwareMap.get(DcMotor.class, "Motor");

        // Loop while the Op Mode is running
        waitForStart();
        while (opModeIsActive()) {
            // If the distance in centimeters is less than 10, set t
            if (distance.getDistance(DistanceUnit.CM) < 10) {
                motor.setPower(0.3);
            } else {  // Otherwise, stop the motor
                motor.setPower(0);
            }
        }
    }
}

```

Additional Resources

Additional information about the VL53L0X, its capabilities, and the ST Application Programming Interface (API) can be found through the ST website:

- VL53L0X Datasheet
- VL53L0X API and Documentation