

Traffic Light Controller with Car Sensor

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Firmware Build 1.00

1. Introduction

The traffic light controller with car sensor project is housed in a weather resistant enclosure which is IP65 resistant to dust and water. The car sensor is also weather resistant as well. The electronics are designed to sequence a standard 3 lamp stop light with red, yellow, and green lights. When a car is detected by the sensor, it immediately turns the green light on.

The car sensor is an ultrasonic range finder similar to the ones used in parking garages to determine the occupancy status of parking spots. The micro-controller in the control box commands the sensor to emit an ultrasonic audio “chirp” every 100 milliseconds and then it measures the time it takes for the echo bouncing off of a surface to return to the sensor. This is very similar to the echolocation that bats use to locate prey when flying at night. The audio chirp frequency is far above the human hearing range and is not audible to humans.

2. Install

Mount the control box with the cables exiting the bottom of the enclosure for maximum water ingress protection. The back of the enclosure Controller has a number of screw holes that can accept M4 screws. Be careful not to crack the enclosure when mounting or water ingress protection will be compromised. Small flat sheet metal brackets may be useful for hanging the box.

Mount the car sensor on a wooden post at the edge of the driveway using the two screw holes such that the sensor’s transmitter and receiver face towards the driveway and the sensor is at a vertical height which corresponds to the midpoint height of the typical vehicle. The sensing range of the sensor is from 3 inches to 48 inches from the sensor’s face. The side of the vehicle must be within this sensing range for the sensor to detect the vehicle.

The output wires from the controller box must be connected to the traffic light as follows:

Wire Color	Signal
Green	Safety Ground
White	Common Neutral
Red	Red Light
Orange	Yellow Light
Black	Green Light

The outputs on the 3 wires to the lights are 120VAC with a maximum current of 2A. **Drawing in excess of 2A may damage the solid state relays.**

3. Operation

After installation of the unit, plug the unit in to test it without anything in front of the sensor. The lights should run through the following sequence repeatedly: Green for 5 seconds, Yellow for 3 seconds, and Red for 5 seconds. Place your hand approximately 12 inches in front of the sensor; the traffic light should immediately transition to green and stay green as long as your hand is detected by the sensor. After removing your hand from in front of the sensor, the green light should stay on for 5 seconds and then transition to yellow as normal.