

## Standalone Capacitive Switch CP500

### Configurable Momentary/Toggle Mode Switch

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REV B

### Introduction

CP500 is a state of the art solid state capacitive sensing switch with built in selectable momentary and toggle mode. The switch offers adjustable delayed switch off as well as adjustable auto-reset function that prevents switch lock out. The CP500 has also excellent noise immunity against radiated and conducted noise, such as audio and radio frequency (RF) noise.



CP500 could be used anywhere a mechanical switch is required. The switch modes can be selected by simply toggling the on/off dip switch, no programming is required. The delayed switch off and the auto-reset period can be adjusted by the built in potentiometers. CP500 will function with an off-board sensor connected with a wire length up to 15". The external sensor is available in 0.5" and 1" diameter as an optional item (See P8 for details).

### Max Electrical Ratings @ 25°C

$V_{in_{max}} = 24V$

Max switch load Current = 3A.

### Maximum Overlay Sensing Distance

Acrylic Overlay = 10mm.

Wood Overlay = 12mm.

### Operating Conditions @ 25 °C

$5.5V \leq V_{in} \leq 24V$ .

I<sub>standby</sub> = 0.45 mA.

I<sub>operating</sub> = 14 mA.

### Mechanical Dimensions

W = 43.94 mm (1.730")

H = 25.1 mm (0.990")

Mounting Holes Diameter = 2.41 mm (0.095")



U.S. Quarter shown for scale



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the same current as the load current draw. A popular diode choice that is readily available is 1N4002.

If your load draws between 1 and 3 Amperes then we suggest using diode part# 1N5401. Both of these diodes can handle the voltage spike induced by the inductive load.

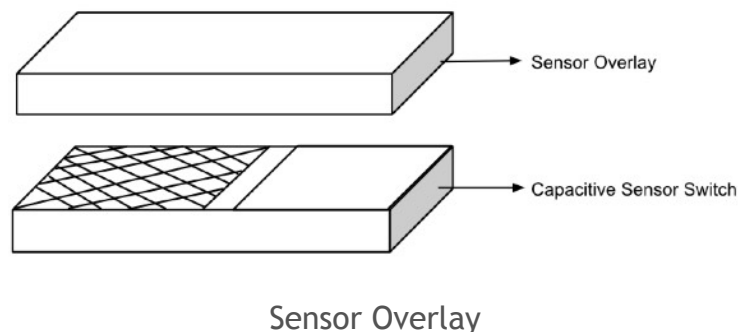
## Sensor Operation

In order for the capsense switch to function properly please follow this simple procedure:

1. Make sure the capsense switch is not powered.
2. Install the capsense switch in the desired location. Depending on your application, you may apply an overlay as shown below on top of the sensing pad or you may connect it to an external sensor (see [page 9](#)).
3. Apply power to the sensor and it will operate and respond to a finger touch. The sensor operation modes can be in either momentary or toggle mode. ( See next page for modes of operations)

**NOTE:** Any change to the sensor overlay or to the external sensor setup will require a power reset ( power down then power up) to allow the sensor to re-calibrate for the changes.

## Sensor Overlay



Sensor overlay can be both non-conductive and conductive material.

Typical non-conductive material are acrylic, glass, wood..etc. In order for the capacitive sensor to detect a finger touch through the overlay, the overlay thickness shall not exceed 10mm if it's acrylic or 12mm if it's wood.

The sensor could also be use with conductive overlay material such as aluminum or stainless steel sheet. The sensor overlay should be adhered on the capacitive with with a thin double side tape. The larger the metallic sheet the more sensitive the switch will be. Start with a small sheet and experiment with the size to get the right sensitivity for your application.

## Modes Of Operation

### Toggle Mode

In order to operate in toggle mode, please disconnect the switch power then set DIP switch 3, 2 & 1 as shown in figure 3.

**Important:** Please make sure POT1 is turned counterclockwise till it stops then power on the switch.

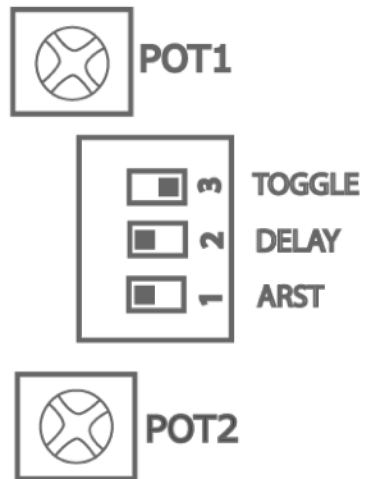


Figure.3. Toggle mode setting

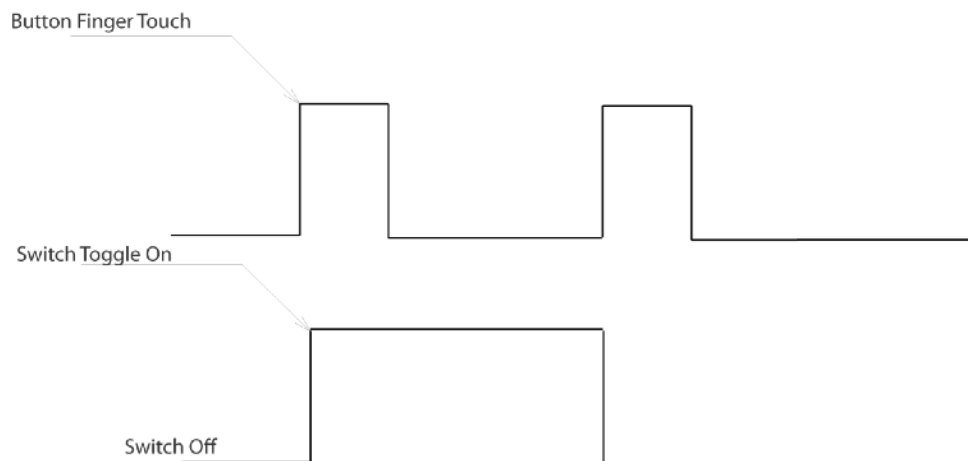


Figure.4.Toggle mode waveform

## Momentary Mode

In order to operate the switch in momentary mode, please disconnect the switch power then set DIP switch 3, 2 & 1 as shown in figure 5.

**Important:** Please make sure POT1 is turned counterclockwise till it stops then power on the switch.

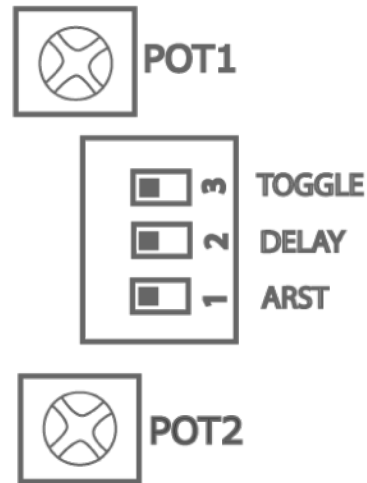


Figure.5. Momentary mode setting

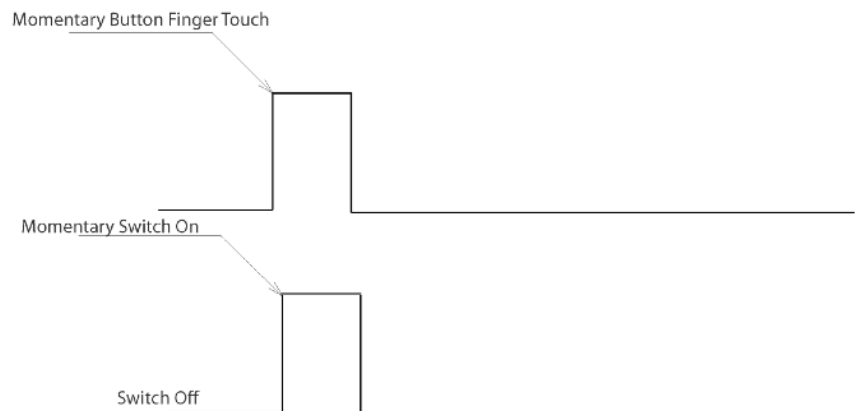


Figure.6. Momentary mode waveform

## Momentary Mode With Delay

In order to operate the switch in momentary mode with delayed turn off, please disconnect the switch power then set DIP switch 3, 2 & 1 as shown in figure 7. To adjust the switch delayed turn off after activation, turn POT2 counter clockwise or clockwise to increase or decrease the delay.

**Important:** Please make sure POT1 is turned counter clockwise till it stops then power on the switch

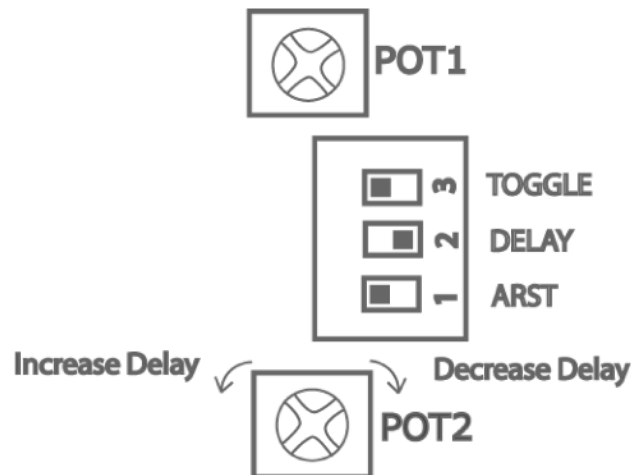


Figure.7. Momentary mode waveform

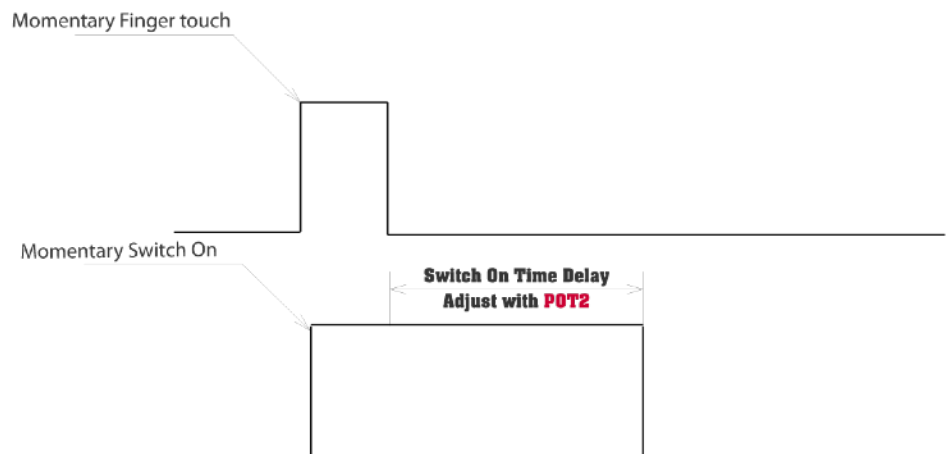


Figure.8. Momentary mode with delay waveform  
Switch on time delay  $\approx 0.2$  to 2.20 seconds.

## Momentary Mode With Auto-Reset

In order to operate the switch in momentary mode with auto-reset, please disconnect the switch power then set DIP switch 3, 2 & 1 as shown in *figure 9*.

To adjust the auto-reset period, turn POT1 counter clockwise or clockwise to decrease or increase the period then power on the switch

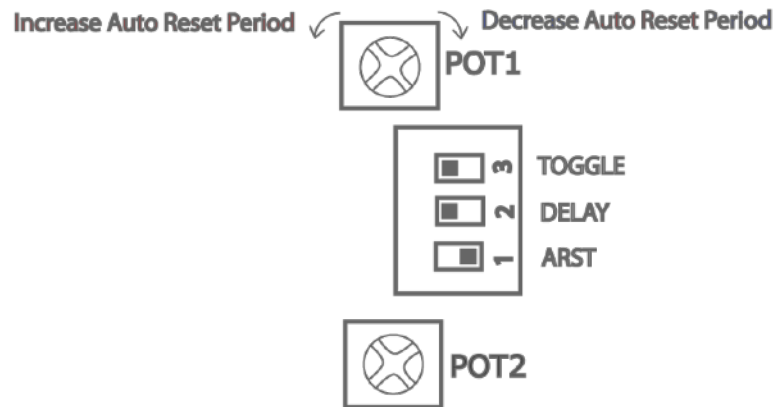


Figure.9. Momentary mode with auto-reset settings.

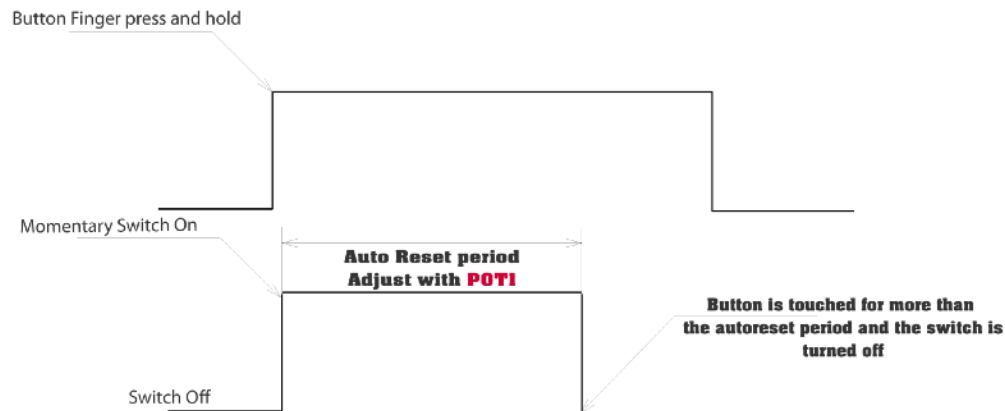


Figure.10. Momentary mode with auto-reset waveform.  
Minimum auto reset period is  $\approx 5$  seconds.



## Using CP500 With an External Sensor

The CP500 can be ordered with an external sensor from pcbgadgets.com. There are two parameters that need to be specified when ordering an external sensor.

- Sensor diameter
- Sensor wire length.

Please note: If the CP500 is ordered with an external sensor, the built in sensor becomes inactive.

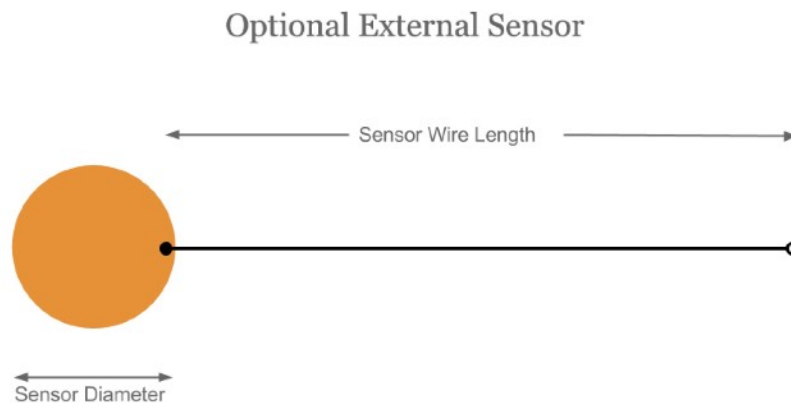


Figure.11. External sensor parameter.

The external sensor can be installed by the user however soldering skills and soldering equipment is required. Start by de-soldering resistor Re and solder the same resistor to Rb as shown in figure.12.

Solder the external sensor wire to the SMD pad labeled "S" on the PCB.

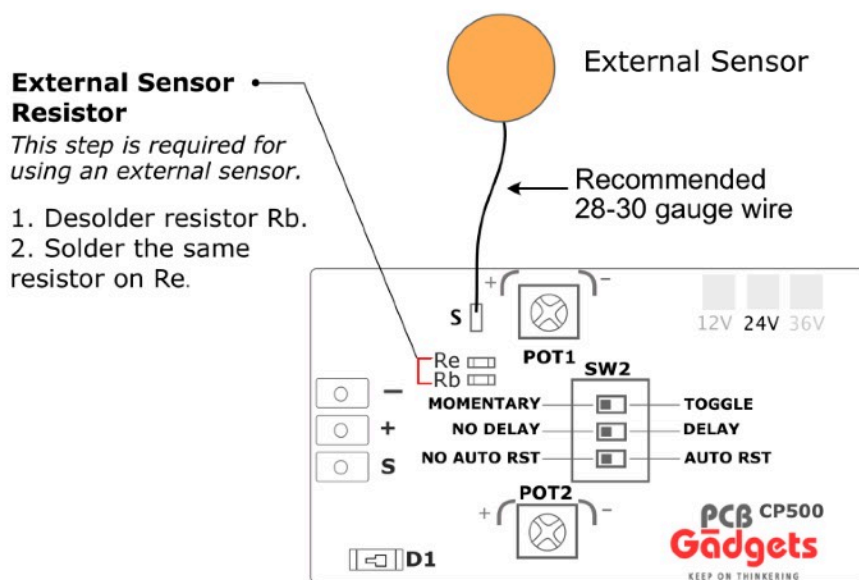


Figure.12. External sensor installation.

**Sensor diameter:** We offer sensor diameters of 0.5" and 1" however we could build a larger sensor for applications requiring a more sensitive switch.

**Sensor wire length:** We offer many sensor wire lengths. The longer the wire the less sensitive the sensor will be. We recommend a max wire length of 15" however you could certainly go with a longer wire.