Push-button Reaction switch

(Product No. 3261)

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Introduction

The *Smart Q* Push-button Reaction switch is a push-to-make switch fitted with a red LED to give a visual indication of the switches state. The switch is normally open (OFF). When the red button on the top of the housing is pressed the switch is closed (ON) and the red LED on the front will light.

The switches can be used singly or in pairs to provide timing and event monitoring. For example:

- Singly as a stopwatch (connected to input A).
- In pairs for speed of reaction investigations (connected to the inputs labelled A and B).
- To mark an event whilst logging e.g. the point at which a chemical was added, the time an indicator changed colour (connected to any available input).
- To trigger the start of a recording (A, B or any input – it depends on the trigger condition set).

Connecting

- Push one end of a sensor cable (supplied with the **EASY**SENSE unit) into the hooded socket on the switch with the locating arrow on the cable facing upwards.
- Connect the other end of the sensor cable to an input socket on the **EASY**SENSE unit.

Note: *Connect to the inputs labelled A and B for timing operations.*

The **EASY**SENSE unit will detect that a switch is connected and will either show as On/Off or as a percentage value, depending on the application used e.g. in Timing they will either be On/Off, in Graph they will be displayed as a percentage signal (under 6% when Off and over 90% when On).

Investigations

- *Introducing pupils to the idea of the computer acting as a stopwatch, e.g. starting and stopping timing.*
- *That speed can be calculated directly if the distance between the start and finish line is used.*
- *Record the differences in time taken to walk, run or hop over the same distance.*
- *Record the time taken by a vehicle to pass from one point to another.*
- *A reaction time investigation*.

Example of using a switch to time events

To use a Push-button Reaction switch as a stopwatch connected a single switch to input A. Select **Time from A to A.** Timing will start when the push-button switch is pressed (ON) and will continue until the switch is pressed again (ON).

Time from A to B will start timing when the push-button switch connected to input A is pressed (ON) and stop when the switch connected to input B is pressed (ON).

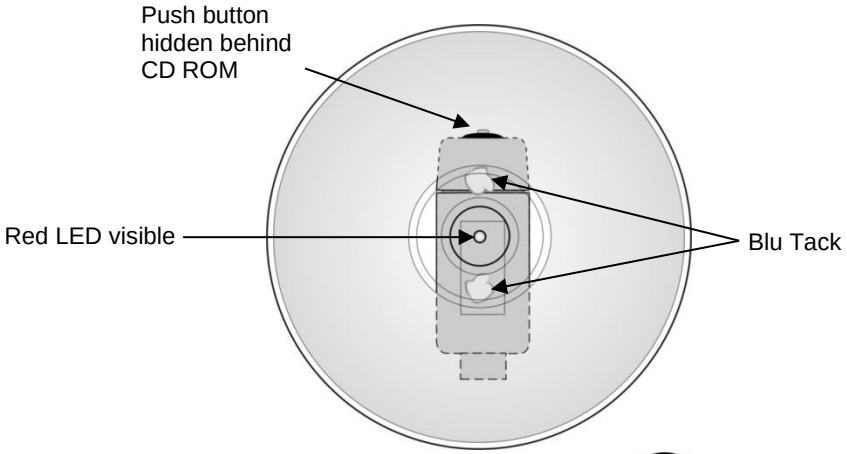
Speed/Velocity from A to B uses the same method together with the distance measurement (in m) between the connected switches to calculate the velocity.

$$\text{Velocity} = \frac{\text{Distance from A to B}}{\text{Time}}$$

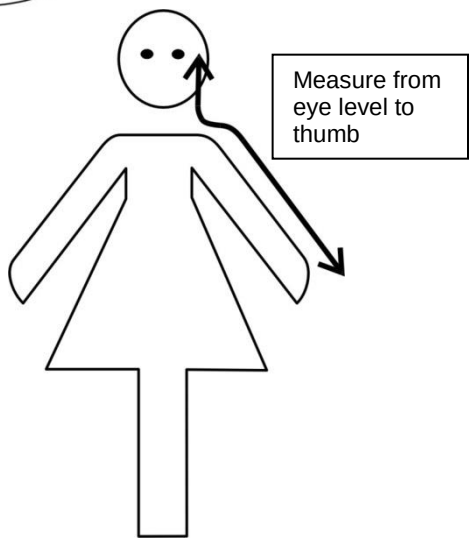
A Reaction time investigation

1. Connect a Push-button Reaction switch to input A and another to input B on the **EASY**SENSE unit. Give the switch that is connected to input A to the tester and the switch connected to input B to the test subject. The push-button part of the switch should be hidden from the view of the test subject so they will not see any movement of the tester's hand or fingers but will still see the LED.

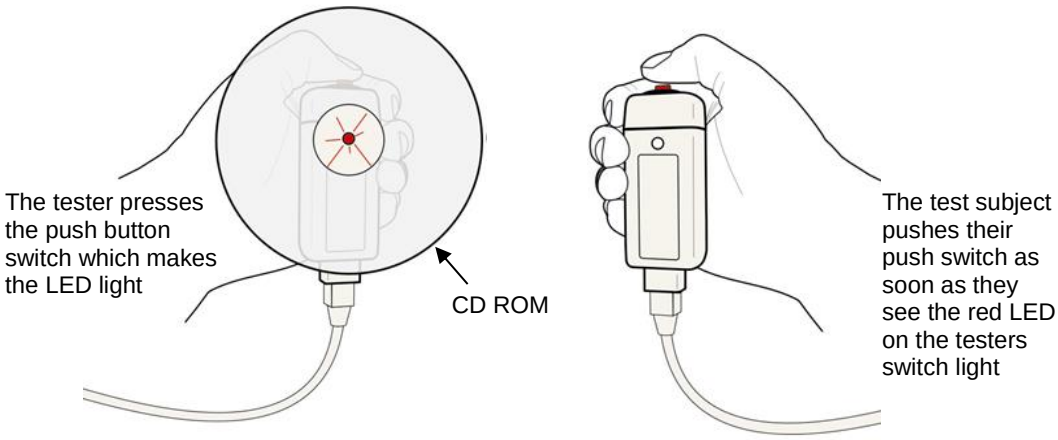
   ***Note**: The switch could be hidden behind a CD ROM with the LED made visible through the centre hole.*



2. To record the speed of reaction you will need to enter the distance (in m) between the stimulus (the test subject seeing the LED light up) and the response (the test subject pressing the switch) i.e. use a fabric tape to measure the length from the subjects eye level, down the neck, along the outstretched arm to the thumb tip.



3. Select **Timing** from the Home page in the **EASY**SENSE software. From the Timing Wizard select to measure **Speed/Velocity**, Next, **from A to B**, Next, enter the **distance** from the eye level to thumb, Next, enter the number of **decimals places** as at least 3 and the units for speed as **m/s**, Next, select to also display the **Time A to B** column, Finish.

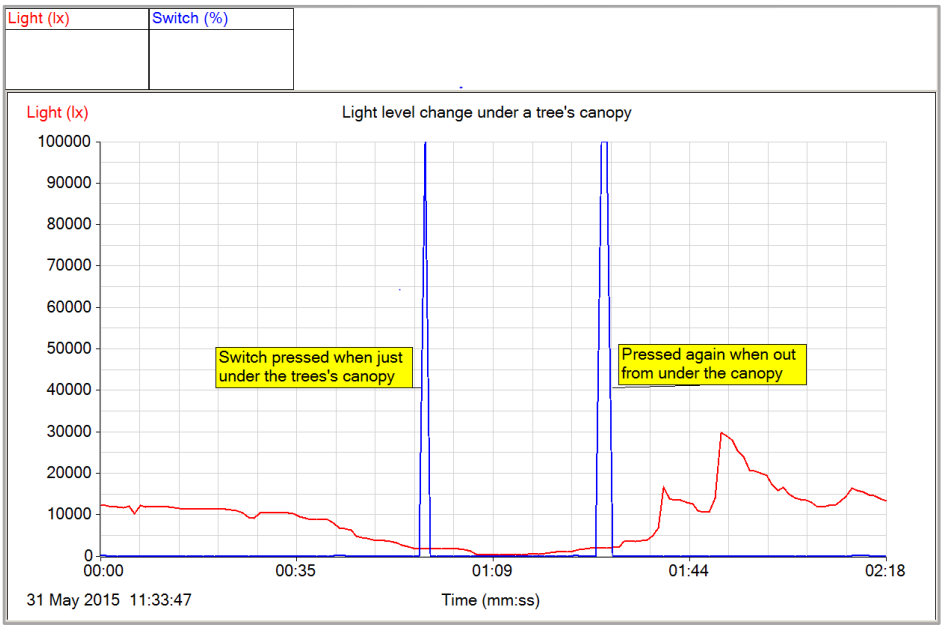


4. When you are ready to start recording click on the **Start** icon. The tester should press the switch, which will make the LED light. The test subject must respond by pressing their switch as soon as they see the LED light.

5. Repeat for at least 10 measurements and then click on **Stop**.

Using a switch to mark an event

A digital switch-type sensor can be used to mark a point or the length of an event whilst data is being logged. If a switch (which can be connected to any of the inputs on an **EASY**SENSE unit) is pressed during logging it will alter its value from under 6% when off to over 90% when on, to create a spike on the graph. If the switch is left on it will continue to mark the graph until it is switched off.



In this example a switch was used to mark two points (entry and exit) when walking with a Light Sensor under the canopy of a tree

Limited warranty

For information about the terms of the product warranty, see the Data Harvest website at:
https://data-harvest.co.uk/warranty

Note: Data Harvest products are designed for **educational** use and are not intended for use in industrial, medical or commercial applications.

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