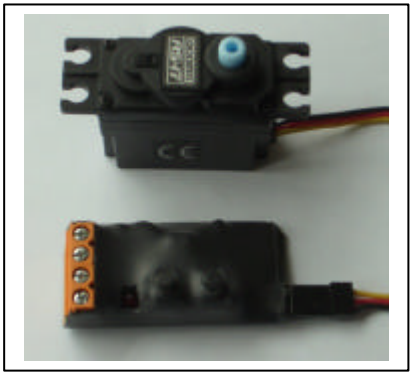
Timpdon Electronics

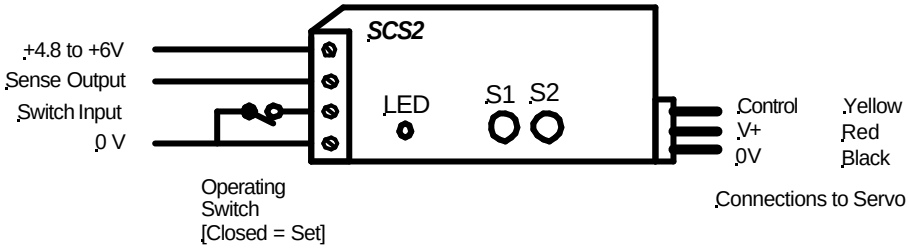
ServoSwitch Model *SCS2*



Features

- Controlled motion between two servo positions with a single switch, using a standard RC servo.
- Fully user programmable for independent servo end positions, rotation speed and end of travel bounce. Programmed settings retained when power removed.
- Sense output at end of throw, in both directions – permits daisy chaining of units with sequential operation, or external indication of servo position.
- Ideal for control of crossing gates, points and semaphore signals.
- Digital microprocessor controlled.
- Small size – 50mm x 25mm x 16mm.
- 4.8 V to 6 V d.c. supply.
- Screw terminals for connections to supply, control switch and sense output. 3 pin plug for direct servo connection.

Installation and Wiring



Notes

1 Connect a d.c. supply of between 4.8 V and 6V to the screw terminals, as shown. – Please read the **Cautionary Notes** below, before selecting your power source.

Do not exceed the maximum permitted nominal supply voltage of 6 V. Although the ***SCS2*** will accommodate higher voltages without blowing up, many RC servos will not.

Ensure that the power supply polarity is correct before powering up.

2 Connect a single pole operating switch between the switch input terminal and the 0V supply, as shown. Note that the **Reset** position of the servo, as described below, corresponds to the **switch open** condition, and the **Set** position to **switch closed**.

3 The sense output will switch from +5V to 0V on completion of a **Set** operation, and will switch back from 0V to +5V on completion of a **Reset** operation.

This output may be connected to the switch input of another ***SCS2*** [or ***SCS1***] to permit sequential operation, with the motion of the second servo starting on completion of movement of the first, and/or used to power an external indicator to display the current state [**Set** or **Reset**] of the servo.

Note that the maximum permitted load current on this output is 20mA.

4 Plug the servo connector on to the three pin plug connector on the opposite end of the ***SCS2***. Ensure that the **black** wire on the servo is positioned towards the bottom edge of the ***SCS2***, adjacent to the 0V screw terminal.

Operation

1 Once programmed, as described below, simply select the required servo end position, **Set** or **Reset** using the operating switch. The servo will move to the opposite programmed position, at the programmed rotation speed.

2 If a bounce level is programmed for the current direction of travel then, as soon as the programmed end position is reached the servo will reverse to the bounce position at the same speed, reverse again and finally return to the programmed end position at the same speed. This feature may be used to realistically simulate bounce at end of travel of semaphore signal arms or crossing gates and barriers. If you do not require bounce in either direction of travel, program the relevant bounce level to zero bounce.

3 Once the servo has reached its programmed end position, and after a further 1 second delay, the sense output will switch to the opposite state. For **Set**, the output will switch from +5V to 0V and, for **Reset**, from 0V to +5V. If this output is connected to the switch input of another servo controlled switch, the second unit will start a **Set** or **Reset** operation on completion of the same operation of the first unit.

4 Once the servo started has started moving towards either the **Set** or **Reset** positions it can not be stopped or reversed until it has completed its programmed travel, as described in **3** and, optionally, a further **ten** seconds have elapsed [See below].

5 Note that, in **normal** operation, the LED indicator will be **off**, unless the optional 10 second delay referred to in **4** is enabled. In this case, the LED will illuminate continuously during this period. Otherwise, the LED is used in programming mode only.

Optional End of Travel Control Switch Delay

For installations in which a number of ***SCS2*** units are connected in sequence, for example on a two gate crossing with overlapping gates, you may need to ensure that a complete gate sequence has completed before a reverse operation sequence can be initiated, to avoid a potential gate clash. To permit this, you may optionally incorporate a ten second delay after motion has completed before the ***SCS2*** will respond to a further operation of the control switch.

To incorporate this delay, press and hold switch **S2** when applying power to the unit. To cancel the delay, press and hold switch **S1** when applying power. Once set or cancelled the delay value is remembered by the ***SCS2*** and need not be set again.

Programming

Programming or re-programming may be performed at any time, using push button switches **S1** and **S2**, with indication provided by the **LED** indicator.

Programming is performed in five steps, in order – **Set Position**, **Reset Position**, **Rotation Speed, Reset Bounce Level** and **Set Bounce Level**. No new programmed settings will be saved unless **all five** programming steps are correctly completed, in sequence.

The **Set** and **Reset** positions of the servo may be anywhere within the controlled operating range of the servo – approximately 160 degrees rotation on most servos.

Programming Procedure

Press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about 2 seconds. Then release both switches.

1 You are now in **Step 1 – Program Reset Position**.
The **LED** will flash with **single short** flashes.

Adjust the required **Reset** position using either **S2** to increase the servo position or **S1** to decrease it. The actual rotation direction is servo dependent.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

2 You are now in **Step 2 – Program Set Position**.
The **LED** will flash with **double short** flashes.

Adjust the required set position using either **S2** to increase the servo position or **S1** to decrease it. The actual rotation direction is servo dependent.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

3 You are now in **Step 3 – Program Rotation Speed**.
The **LED** will flash with **single long** flashes.

In programming step 3, the servo will rotate continuously between the two end positions which have already been programmed, at the current rotation speed.

There are sixteen steps of rotation speed, varying from about 0.25 s to 20 s for 90 degree rotation. Press and release **S2** to increase the speed by one step, or press and release **S1** to decrease it by one step.

Please read the **Cautionary Notes** below before attempting to use very high rotation speeds.

After the last step, the rotation speed will revert to the other end of the speed scale.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

4 You are now in **Step 4 – Program Reset Bounce Level**.
The **LED** will flash with **single long** followed by **single short** flashes.

In programming step 4, the servo will rotate continuously between the programmed **Reset** position and the position represented by current Reset Bounce level, at the programmed rotation speed.

There are sixteen steps of bounce level, varying from zero to approximately 20% of the programmed servo range between **Set** and **Reset**. Press and release **S2** to increase the bounce level by one step, or press and release **S1** to decrease it.

After the last step, the bounce level will revert to the other end of the setting range. To disable bounce, set the bounce level to zero.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

5 You are now in **Step 5 – Program Set Bounce Level**.
The **LED** will flash with **single long** followed by **double short** flashes.

In programming step 5, the servo will rotate continuously between the programmed **Set** position and the position represented by current Set Bounce level, at the programmed rotation speed.

There are sixteen steps of bounce level, varying from zero to approximately 20% of the programmed servo range between **Set** and **Reset**. Press and release **S2** to increase the bounce level by one step, or press and release **S1** to decrease it.

After the last step, the bounce level will revert to the other end of the setting range. To disable bounce, set the bounce level to zero.

When satisfied, press and hold both switches **S1** and **S2** together until the **LED** illuminates continuously, after about two seconds. Then release both switches.

6 At this point **only**, programming is complete. All new settings will now be saved in non-volatile memory, and applied to ***SCS2*** operation. The unit will then automatically exit programming mode, the **LED** will extinguish and the ***SCS2*** is ready for normal operation.

Cautionary Notes

1 The current consumption of a servo, when in motion, increases with the rotation speed and load. At high rotation rates, the current on a single standard servo can reach as much as 500 mA.

Most small batteries [eg AA cells] used by many modellers to power servos can not supply this level of current without a very significant voltage drop, in the order of one or two volts, at the battery terminals. With 4.8V supplies, or with partially discharged batteries, this may well result in erratic servo operation if the battery terminal voltage falls below the minimum specified servo operating voltage.

If you experience such erratic operation, either reduce the servo rotation speed or improve your power supply arrangements before assuming that the ***SCS2*** is faulty and returning it for repair.

2 Although the rotation rate of the ***SCS2*** can be programmed to a maximum speed of 0.25 seconds for 90 degree rotation, many servos can not achieve this speed

If you program a rotation speed higher than the servo can actually achieve the servo will not be able to keep up with the programmed output of the ***SCS2*** when moving between **Set** and **Reset**, and vice versa.

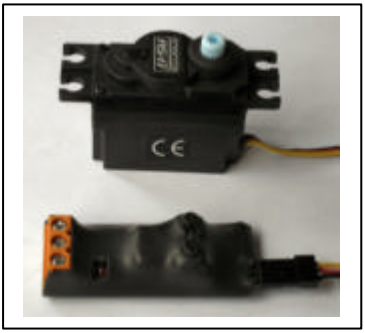
If this occurs, and you have bounce levels programmed, the actual bounce levels achieved in normal operation may vary considerably from those programmed, or even be lost completely. This problem is likely to be more apparent if you have programmed a large angle of rotation between **Set** and **Reset**.

If this happens, reduce the programmed rotation speed until the effect is corrected, or change the servo for one with a higher maximum rotation speed.

For the ***ACOMS AS17*** servo, supplied by ***Timpdon Electronics***, the maximum specified rotation rate is approximately 0.35 s for 90 degree rotation at 5V.

Other Timpdon ServoSwitches

Model *SCS1*



Identical in performance and operation to ***SCS2***, but without the sense output.

Recommended for use for control of single signals or points, or at the end of a series of daisy-chained ***SCS2*** units, where no further sequential operation of servos is required.

User Notes