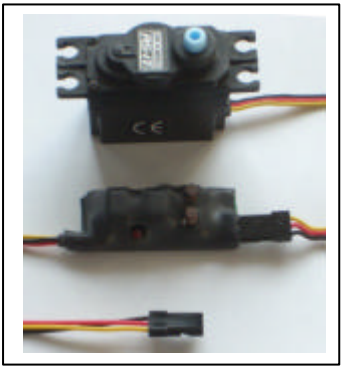
Timpdon Marine

Radio Servo Switch
Model MRSS3



Controlled rotation between two servo positions.

Programmable servo positions and rotation rate.

For use with slow slew rate digital transmitter channels.

Inline adaptor - fitted between RC receiver and servo.

Powered from RC receiver.

Features

- Switched control of a standard servo between two end points, at a controlled rate.
- For use with slow slew rate switch controlled digital transmitter channels – e.g. Planet T5 - Channel 5.
- User programmable servo positions, with programmable rotation speed.
- Can be re-programmed in-situ at any time, using built-in push button switches.
- Programmed settings retained when power removed.
- Accommodates servo position and transmitter pulse widths in range 0.6 ms to 2.4 ms. Auto zero with centre neutral joysticks.
- Digital microprocessor controlled.
- Small size – 45mm x 18mm x 12mm.
- Mounted inline between RC receiver and servo – powered from receiver.

Tel **0161 - 980 8054**
Web www.timpdon.co.uk
EMail **marine@timpdon.co.uk**
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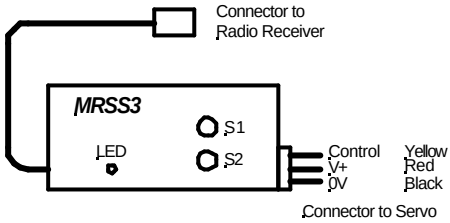
Installation and Wiring



1 Connect the flying lead to the selected channel of your radio receiver.

2 Connect your servo to the 3 pin plug on the ***MRSS3***, with the black servo lead adjacent to edge of unit, and the yellow or white data lead towards the middle.

3 Power up the transmitter. Then power up the receiver.

4 Check that, once the receiver has bound to the transmitter, the **LED** on the ***MRSS3*** illuminates continuously. This indicates that the ***MRSS3*** is receiving valid RC pulses. The ***MRSS3*** has a in-built start up delay of 4.5 seconds to permit binding. During this period, the **LED** will flash.

5 Check that, when you switch the channel control from the **0** to the **1** setting, the servo immediately rotates at a controlled rate to the **set** position, and when you switch back from the **1** to the **0** setting, the servo immediately rotates back to the **reset** position.

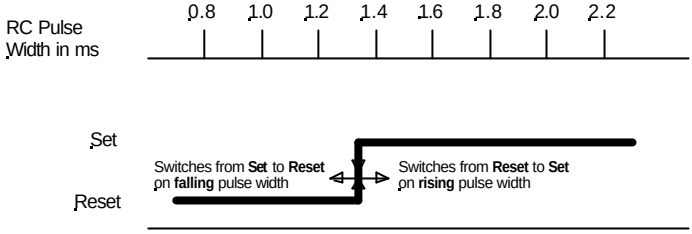
6 If, at any time, radio communication is lost, the **LED** will extinguish and the servo will maintain its last setting. Once communication is re-established, normal operation will start again automatically.

7 Now program the ***MRSS3***, as described below, for the required servo positions and rotation rate for your system.

On completion of programming, the programmed settings will be saved in non-volatile memory, and the system will automatically re-boot in normal operation mode.

8 Your system is now ready for use.

Principles of Operation



1 In a standard RC system, the output from each receiver channel is a variable width pulse, nominally between 1.0 ms and 2.0 ms in width, repeated at intervals of approximately 20 ms. A pulse width of 1.0 ms corresponds to the transmitter control at **minimum**, 2.0 ms to **maximum** and 1.5 ms to **centre**.

2 The ***MRSS3*** is specifically designed for operation on switched, slow slew rate digital channels where, when the channel control switch is operated, the output pulse width moves from 1.0 ms to 2.0 ms, or vice versa, over a period of several seconds. Such channels are commonly intended for operation of aircraft undercarriage controls, or similar. The ***MRSS3*** is designed to detect the **changing** pulse width and thus operate the output servo immediately, without any delay.

2 Within the ***MRSS3***, the servo output is limited to one of two actions, depending on the setting, **0** or **1**, of the transmitter control switch:

Channel Switch	**Action**
1 = Maximum	Rotate to programmed **set** position
0 = Minimum	Rotate to programmed **reset** position

The rotation rate of the servo, at all times, is constant.

Note that the sense of the switch [**0** or **1**] with respect to **maximum** or **minimum** may be reversed on some transmitters.

3 The servo output pulse widths corresponding to the **1** and **0** control switch positions [**set** and **reset**] are user programmable, as is the **rotation rate** of the servo between these positions. The available range of servo output pulse widths is 0.6 ms to 2.4 ms.

Programming

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

Programming is performed in three steps, in order – **Servo Reset Position, Servo Set Position** and **Servo Rotation Rate**

The **set** and **reset** limit positions of the servo may be set anywhere within its operating range, subject to a limitation of RC pulse widths of 0.6 ms to 2.4 ms, as described above.

Programming Procedure

Programming may be undertaken with the transmitter either on or off.

Press and hold both switches **S1** and **S2** together.
The **LED** will flash rapidly for about 5 seconds, and then go on continuously. Then release both switches.

If you release either switch before the LED stops flashing, the unit will remain in normal operation.

1 You are now in **Step 1 – Servo Reset Position**

The **LED** will flash with **single short** flashes, and the servo will move to the current **reset** position.

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

When satisfied, press and hold both switches **S1** and **S2** together.
The **LED** will flash rapidly for about 2 seconds, and then go on continuously. Then release both switches.

If you release either switch before the LED stops flashing, the unit will remain in program Step 1.

The unit will then proceed automatically proceed to program **Step 2**.

2 You are now in **Step 2 – Servo Set Position**

The **LED** will flash with **double short** flashes, and the servo will move to the current **set** position.

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

When satisfied, press and hold both switches **S1** and **S2** together. The **LED** will flash rapidly for about 2 seconds, and then go on continuously. Then release both switches.

If you release either switch before the LED stops flashing, the unit will remain in program Step 2.

The unit will then proceed automatically to program **Step 3**

3 You are now in **Step 3 – Servo Rotation Rate**

The **LED** will flash with **single long** flashes, and the servo will rotate continuously between the current **set** and **reset** positions at the current **rotation rate**.

There are sixteen separate **rotation rates**, between 0.25 and 20 seconds for 90° rotation. Select the required **rotation rate** using either **S1** to increase the rate or **S2** to decrease it. After the last step, the rate will revert to the other end of the scale.

When satisfied, press and hold both switches **S1** and **S2** together. The **LED** will flash rapidly for about 2 seconds, and then go on continuously. Then release both switches.

If you release either switch before the LED stops flashing, the unit will remain in program Step 3.

The unit will then save all programmed values to non-volatile memory.

The **LED** will then flash rapidly for about 4 seconds to indicate completion of programming, and then the ***MRSS3*** will automatically reboot in normal operation mode, with the new programmed settings operational.

The ***MRSS3*** is now ready for use.

Notes on Programming

1 Once you have entered programming mode, there is no exit until all programming steps have been completed. If you enter programming mode inadvertently, and you do not wish to re-program the unit, remove and re-apply power, to restart in normal operation mode.

2 Remember that no new programmed settings are saved until the end of programming **Step 3**. All steps must therefore be completed for programming to be valid.

3 If you make an error during programming, simply repeat the programming procedure after the unit has re-booted in normal operation mode.

Constraints on Operation

1 The ***MRSS3*** is designed to detect a change in pulse width on consecutive transmissions from the transmitter, at nominal intervals of 20 ms, in order to determine a **set** or **reset** condition of the output.

2 An **increase** in pulse width will be interpreted as a **set** request, and a **decrease** as a **reset** request.

3 In order for the ***MRSS3*** to detect a valid change in pulse width, the slew rate of the transmitter pulse width output must be greater than or equal to 0.17 ms per second, representing a maximum total slew period between pulse widths of 1.0 ms and 2.0 ms of 6 seconds.

4 In addition to slew rate detection, in order to accommodate the end conditions [pulse width = 1.0 ms or 2.0 ms nominal] where the pulse width no longer changes, the ***MRSS3*** will, in addition, consider a pulse width **greater** than 1.5 ms to represent a **set** condition, and a pulse width of **less** than 1.5 ms to represent a **reset** condition, if the pulse widths are no longer changing.