

EMG Switch

Operation Manual

Introduction

The EMG switch box is designed to convert tiny electromyographic (EMG) signals which are present on the skin near muscle activity into a standard switch closure that can be used to activate assistive technology equipment. The input to the EMG switch box connects to a Ag/AgCl cloth electrode. The tiny signals on the surface of the skin are amplified with an internal low noise amplifier. The EMG switch box continuously monitors the amplified signals from the EMG electrodes, and when the signal level exceeds a user adjustable threshold, a relay is energized providing an isolated switch closure output. The unit is fully battery powered, and can operate for up to 60 hours on a charge. The internal batteries are recharged using a wall mounted transformer provided with the unit.

Operation

Connect the green reference electrode lead to the rear panel jack labeled REFERENCE. Connect the grey shielded electrode leads to the jacks labeled + and -. Connect the SWITCH OUTPUT #1 through a standard 3.5mm cable and plug to the primary assistive technology device to be controlled. If desired connect SWITCH OUTPUT #2 to the secondary assistive technology device to be controlled.

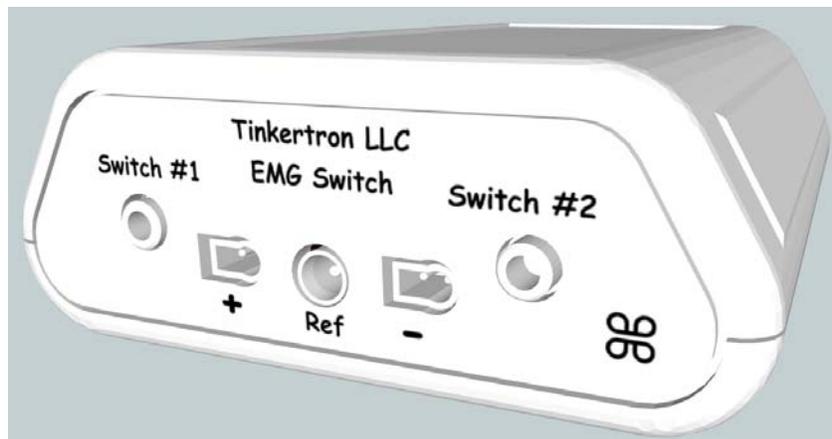


Figure 1 Rear Panel Connections

Snap the cloth electrodes onto the other end of the electrode leads. Place the reference electrode at some convenient location on the body away from the activation site. Place the active electrodes over the muscle site to be monitored. For very weak muscle activity electrode placement is critical. Observe the muscle twitch and place the electrode near the movement site, orienting the two electrodes in line with the muscle movement.

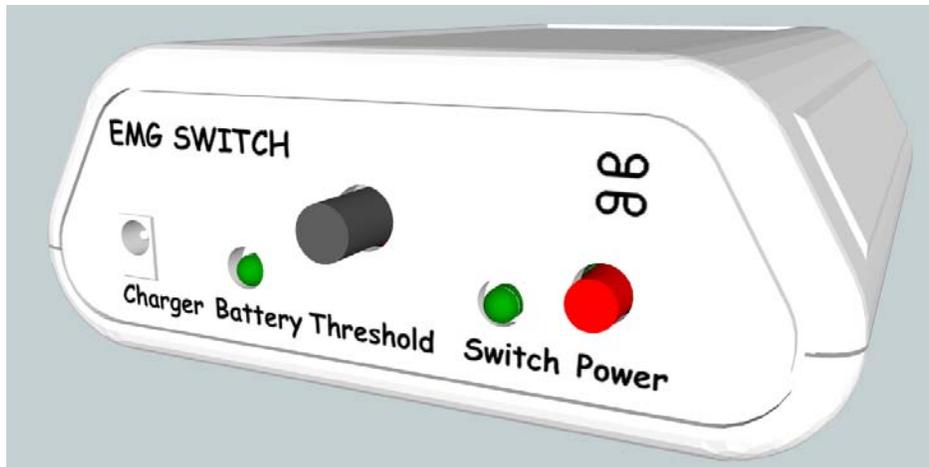


Figure 2 Front Panel Connections

Press the POWER switch to turn the power on. The power switch is ON when the switch is in the IN position. When the power switch is first turned on the SWITCH lamp will illuminate. Turn the THRESHOLD knob fully counter clockwise and verify that the SWITCH lamp comes on. Fully counter clockwise corresponds to the lowest threshold setting, and at this setting the switch is closed all the time. Turn the THRESHOLD knob fully clockwise. Clockwise rotation corresponds to the highest threshold setting. At a fully clockwise setting it takes a very large muscle contraction to activate the switch. With the muscle site inactive, gradually turn the knob counter clockwise until the SWITCH light is illuminated. Illumination of the light indicates that the switch is active. With the muscle site inactive turn the THRESHOLD knob slightly clockwise to increase the threshold above noise. Ask the user to activate the muscle site, and verify that the light comes on when the site is activated and that the light goes out when muscle site is at rest. It may take some experimentation to optimize the placement of the electrodes, and to optimize the setting of the THRESHOLD knob. The lower the threshold setting the more sensitive the device is to surface signals. A higher threshold takes a stronger signal to activate the switch and also minimizes the false triggers.

Switch Rollover

A feature of the switch is that two devices can be connected to the unit. When the threshold is first exceeded Switch #1 is activated. If the threshold is exceeded for an amount of time greater than the ROLLOVER TIME Switch #1 is deactivated and Switch #2 is activated. The timing diagram is shown in Figure 3. The ROLLOVER TIME is set by miniature programming switches internal to the unit. The location of the programming switches is shown in Figure 4. The ROLLOVER TIME can be set from 3 sec to 6 seconds. When Switch #1 is activated the SWITCH lamp turns Green. When Switch #2 is activated the SWITCH lamp turns red.

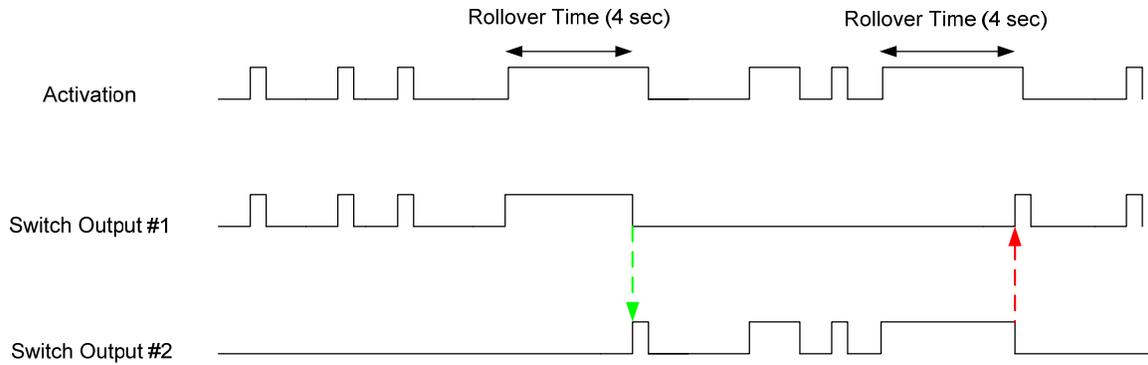


Figure 3 Switch Rollover

If only one device is connected the switch rollover feature can be disabled by placing the SINGLE/DUAL miniature programming switch in the SINGLE position.

Battery Charging

For added safety and to minimize interference the unit should be disconnected from the user during the charging cycle. The batteries are charged by connecting the wall adapter to the CHARGER plug on the front panel of the unit. A complete charge takes around 8 hours. When the unit is plugged into the charger and the power switch is turned on the BATTERY lamp will be green indicating that the batteries are being charged. After the battery has been charged and the unit is removed from the charger the BATTERY lamp flashes green. When the unit is disconnected from the charger and the battery voltage drops to a low level, the BATTERY lamp flashes red indicating it is in need of a charge. After the battery has been charged and the unit is removed from the charger the BATTERY lamp flashes green. After several hours the green flashing will stop. This means that the charge is not fully topped off. There is 20-40 hours of use before the red low battery warning lamp will start to flash.

Rollover Time

S4-1	S4-2	Time
Off	Off	6 s
On	Off	5 s
Off	On	4 s
On	On	3 s

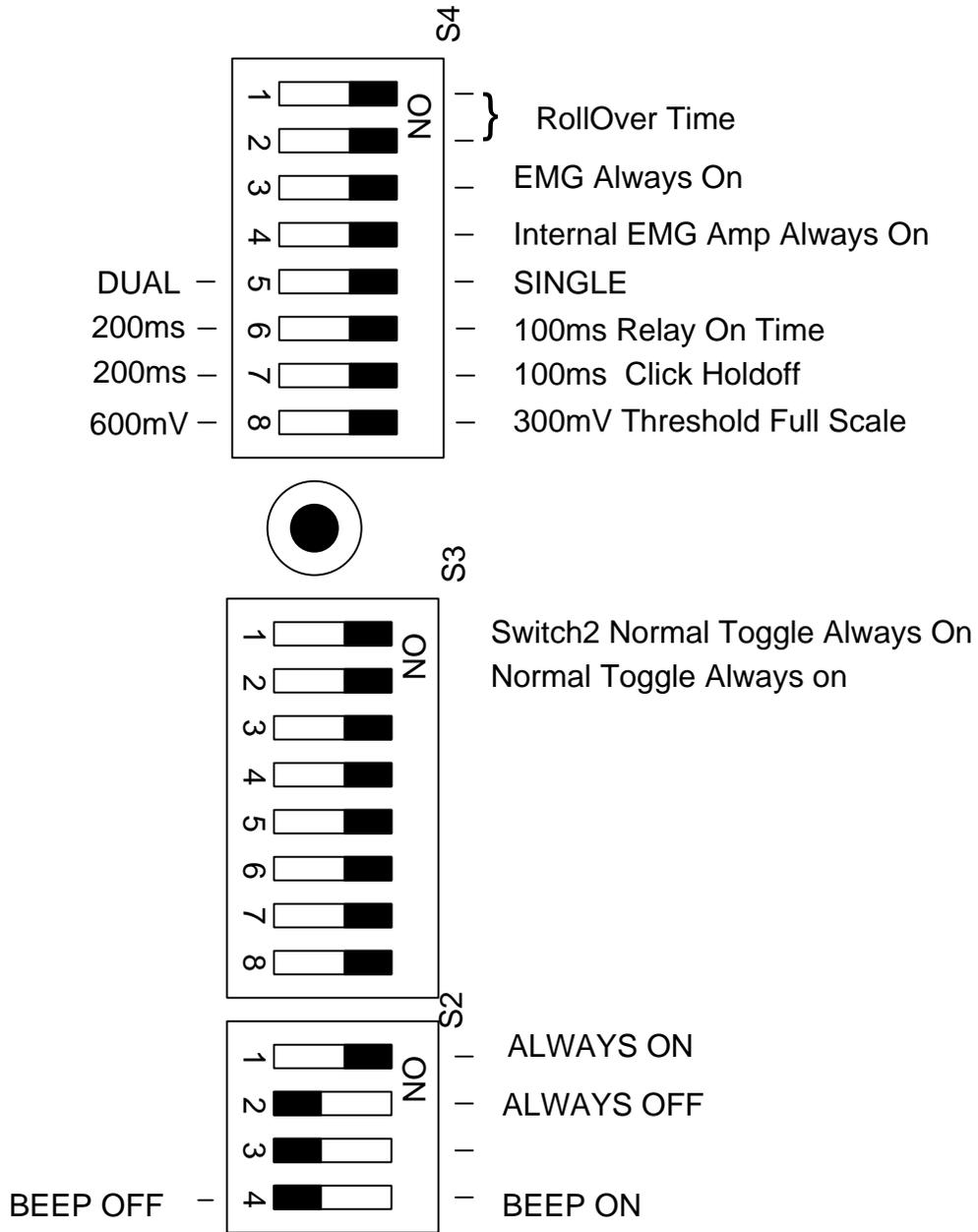


Figure 4 Internal Programming Switch Settings

Supplies

One source of electrodes is Biotac 7665 cloth electrodes. These have been used with success and are latex free and easy on the skin. They are available from MVAP Medical Supplies \$11.65 for a box of 60. MVAP Phone Number 1-877-735-MVAP (6827)

There are many other electrodes and electrode distributors. Some vendors provide smaller electrode with less adhesive material, and some vendors provide electrodes with special adhesives to prevent skin irritation. Any electrode with a snap connector is compatible with the unit.

Contact

To obtain additional information please contact:

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