

PRECISION PROGRAMMABLE SHOCKER

MODEL H13-17

USERS' MANUAL



COULBOURN INSTRUMENTS

Table of Contents

| | |
|--|---|
| INTRODUCTION | 1 |
| INSTALLATION | 1 |
| SHOCKER SETUP..... | 1 |
| CONTROL – Programmable/Manual Amplitude and Manual/Remote Trigger Control..... | 2 |
| PRESET - Storing Amplitude Settings (Manual Amplitude Control)..... | 2 |
| LIGHT – Display Backlight Setting | 3 |
| EXIT – Exiting Setup Mode | 3 |
| OPERATING THE SHOCKER | 4 |
| MANUAL AMPLITUDE SETTING | 4 |
| EXTERNAL CONTROL - Programmable Amplitude Setting | 4 |
| REMOTE TRIGGER – Controlling Onset and Duration of the Shock Stimulus | 5 |
| RESET SHOCKER..... | 5 |
| SPECIFICATIONS..... | 6 |

Coulbourn Instruments
5583 Roosevelt Street
Whitehall, PA 18052

Phone: (610) 395-3771
Fax: (610) 391-1333
E-Mail: sales@coulbourn.com

Internet : www.coulbourn.com

INTRODUCTION

The H13-17 shocker is totally isolated (floating output) for operator and subject safety, as well as isolation from other sources of electrical stimulation such as physiological stimulators that may be in use concurrently. The unit can function as a two-pole (bipolar) shocker or as a scanner distributing the square wave, polarity reversal across an 8-pole output for grid floor applications. Shock amplitudes from as small as one microamp (0.001 milliamp) to five milliamps can be delivered in increments of one microamp with the H13-17.

The amplitude can be set manually or can be programmed by a 0 to 2.5 Volt DC signal allowing the amplitude of the shock stimulus to be changed during an experimental session. The duration of the shock stimulus can be controlled by an external trigger source (5 to 30 volts DC) or when precision timing is not required, by manually pressing a button on the front panel of the shocker.

INSTALLATION

Connect the power cord to the power connector on the rear panel of the shocker and to an appropriate outlet (110 VAC or 220 VAC) as indicted on the fuse near the power switch).

Connect the shock cable (H93-series) to the “Shock Output” connector on the rear panel of the shocker. Connect the other end of the shock cable to grid floor connector or, if using two pole shock, to the objects used to conduct the shock (e.g., lick tube and grid shorting connector).

To operate the shocker remotely, connect a cable to the “Remote Trigger” jack on the rear panel of the shocker. When using Graphic State to control the delivery of the shock, connect an auxiliary output to the “Remote Trigger” jack. If using Tru Scan, connect one of the “Stimuli” outputs to the “Remote Trigger” jack.

SHOCKER SETUP

Please note that the “Manual Trigger” and the “Pole Select” buttons are not active when the shocker is in the Setup Mode. These options can be changed when in the Operate Mode only.

Turn the power switch on the rear panel of the shocker on (press in on the “1”). The display on the front panel will display the word “READY” for two seconds. If the word “READY” does not appear, power off the shocker and then power the shocker on again. After three seconds the shocker will go to the Operate Mode and the display will list the memory location and shock amplitude value when the shocker was last shut down or the words “EXTERNALCONTROL” will appear if set for the External (Programmable) Control. The first time the shocker is powered on, the display will indicate the amplitude setting for register zero as follows:

READY 0: 0000 μ A

Once the shocker has been setup, the shocker will power up and display the shock level of the most recently used memory location or “EXTERNALCONTROL” if last set for External (Programmable) Control. For example, if memory location 3 is set for 2.050 milliamps and was displayed when the shocker was turned off, the next power up of the shocker will display “READY 3: 2050 μ A.”

CONTROL – Programmable/Manual Amplitude and Manual/Remote Trigger Control

Press and hold the “MENU” button for three seconds until the word “MENU” appears on the display. Release the button and the word “CONTROL” will be displayed. Press in on the “MENU” button to set the control options. The display will read “CONTROL SETUP”. When the shocker is in the control mode you can select the amplitude control method (external or manual) and the shock trigger option (remote or manual). Press left on the “MENU” switch one time to set the shocker for to the programmable shock mode (External Control). The green LED labeled “EXT.” will illuminate. To return to the manual amplitude control setting press left on the “MENU” switch again. Pressing left on the “MENU” switch will toggle between external (programmable) and manual control of the amplitude.

Press right on the “MENU” switch one time to set the shocker to the Remote Trigger mode. A 5 to 30 volt DC signal applied to the “Remote Trigger” jack on the rear panel will operate the shocker when in the Remote Trigger mode. To return to the manual mode, press right on the “MENU” switch again. Pressing right on the “MENU” switch while in the “CONTROL SETUP” mode will toggle between Remote and Manual Trigger modes. The Manual Trigger is always available when the shocker is not in the setup mode and can be used to trigger a stimulus at anytime.

PRESET - Storing Amplitude Settings (Manual Amplitude Control)

Up to 10 different amplitude settings can be stored in the shocker for delivering shock using manually set amplitude control. If you are using the shocker in the programmable mode (External Control), you do not need to store any amplitude settings. When using the shocker with manually stored amplitudes, you must have at least one amplitude value stored. This value can be stored in any of the memory locations. Press up on the “MENU” switch one time while “CONTROL” is displayed and the display will change to “PRESET”. Press in on the “MENU” switch to enter the preset setup menu. Pressing up on the “MENU” switch will scroll through the 10 memory locations going from 0 to 9 and then “FINISHED”. Pressing down on the “MENU” switch will scroll through the 10 memory locations in reverse order, from 9 through 0 followed by “FINISHED”.

To set one of the amplitudes, press the “MENU” switch while the memory location to be written to is displayed on the screen. The first digit of the setting will begin to blink. Pressing left or right on the “MENU” switch will move the cursor in the appropriate direction. Press up on the “MENU” switch to increase the selected digit by one. If you advance the value past 9, the value of the digit to the left of the cursor will increase by 1. Press down on the “MENU” switch to decrease the selected digit by one. If the value of the digit to the left of the cursor is greater than zero and you decrease the value at the cursor below zero, the value in the column to the left will decrease by 1. (NOTE: If the milliamp digit is set to 5 then a value greater than zero cannot be set in any of the other digits since the maximum output is 5 milliamps).

Pressing the “MENU” button stores the value at the specified memory location. The word “SET” will appear briefly indicating the value entered has been stored. If you wish to change the value simply press the “MENU” button again to advance to the milliamp column. To store a value at another memory location press up or down on “MENU” to move to another memory location and follow the same steps for storing a different amplitude in a different memory location.

To exit the PRESET mode, advance to memory location zero and press down button or advance to memory location 9 and press up so that the word “FINISHED” is displayed. Then press the “MENU” button to return to the main menu.

DISPLAY – Display Contrast Setting

Press up on the “MENU” button to advance to the “DISPLAY” control. Press the “MENU” switch to begin setting up the display. The display will change to “DISPLAY SETUP”. Press and hold down on the “MENU” button to decrease the contrast of the display or press and hold up on the “MENU” button to increase the contrast. The contrast is set back to average when the shocker is first powered on. When the desired setting is obtained, press the “MENU” button, the display return to the display option on the main menu. To change the backlight again, press the “MENU” button to return to the “DISPLAY SETUP” screen.

To exit the Contrast Setting Mode, Press the “MENU” and the display will return to the “MENU DISPLAY” screen.

EXIT – Exiting Setup Mode

Press up to scroll to the “EXIT” option in the menu. Press the “MENU” button with the word “EXIT” displayed to exit the shocker setup mode and return to the shocker operate mode.

OPERATING THE SHOCKER

Once the shocker has been setup the shocker can be used to deliver a shock stimulus. Before using the shocker, be sure that the correct delivery option, 2-Pole or 8-Pole (scanned shock for grid floor applications) has been chosen. Pressing the “Select Pole” button will toggle the setting between the 2-Pole and the 8-Pole mode.

When the shocker is in the 2-Pole mode, a 2-Pole Shock cable is used. When the shocker is in the 8-Pole mode, a grid floor shock cable is required. In the 8-Pole mode, there are 8 unique outputs. Each of these outputs can be reflexed, via a shock cable or a circuit board, to deliver shock to all of the grids in the cage. For example, if the grid floor of the cage consists of 16 grids, output 1 is connected to grids 1 and 9, output 2 is connected to grids 2 and 10, output 3 to grids 3 and 11, etc.

MANUAL AMPLITUDE SETTING

For delivering a shock stimulus with a manually set amplitude, use up or down on the “MENU” switch to select the memory location with the amplitude that you wish to use. The amplitude stored in the selected memory location is also displayed. When the shocker is operated, the shock amplitude selected will be presented each time the shocker is operated.

EXTERNAL CONTROL - Programmable Amplitude Setting

When the External Control LED is on, the amplitude will be determined by the voltage level of the DC signal connected to the External Control input on the rear panel of the shocker. The amplitude will be incremented from 0 to 5 milliamps over a 0 (0 milliamps) to 2.5 Volts (5 milliamps) signal source. The resolution of the programmable control is dependent upon the resolution of your source signal. For example, an 8-Bit D-A converter with 256 steps from 0 to 2.5 volts would provide a resolution of 20 microamps. A 10-Bit D-A converter would provide a resolution of 5 microamps. When using the External Control Mode with Graphic State, select the H13-16 as the Device and then enter the value you wish to use. Graphic State will calculate the value of the control source voltage needed for the specified amplitude.

When exiting the setup mode with External Control active, the display will show “EXTERNAL”. Once the shocker is activated the display will indicate the value of the shock. For example, X: 0820 μ A would indicate that a shock stimulus of 820 microamps (0.82 milliamps) is being delivered. NOTE: The up and down buttons are inactive when the shocker is in the External Control mode.

REMOTE TRIGGER – Controlling Onset and Duration of the Shock Stimulus

With the Remote Trigger LED on, the onset of the stimulus delivery as well as the duration of the stimulus delivery can be controlled by a 5 to 30 Volt DC connected to the “Remote Trigger” input on the rear panel of the shocker. When the signal is present, and for as long as the signal is present, the shocker will be operated.

A shock stimulus can be initiated at anytime by pressing the “Manual Trigger” button on the front panel of the shocker. The shock stimulus will be present for as long as the “Manual Trigger” button is pressed.

RESET SHOCKER

To reset the shocker to the factory set conditions, exit the SETUP MODE and press and hold the pole select and left “MENU” buttons simultaneously for three seconds. This action will clear all of the memory locations, reset the External Control to off, reset the Remote Trigger to off, and set the shocker for 8-Pole (Scanned) shock. Once the pole select and left “MENU” buttons have been held for three seconds, the display will show “RESET” for three seconds and then return to the power up mode where the word “READY” will be displayed followed by the value at memory location 0 which will now be zero (0: 0000 μ A).

SPECIFICATIONS

Maximum Output Current: 5 milliamps into 50 kohms
Current Resolution: 1.25 microamps
Maximum Output Voltage: 300 volts
Maximum Subject Resistance: = (300/desired current) – 10 kohms
Output Waveform: Square pulse

Indicators: Power
External (Programmable Amplitude) Control
Remote Trigger
Shock On
Pole Select (2 or 8)
LCD display

Dimensions: 10" W x 7" D x 3 1/4" H.
LCD Display Dimensions: 1 x 8 characters, 2" W, 5/8" H.
Electrical Connection: 110/120 VAC 50-60 Hz or 220/240 VAC 50-60 Hz.

Coulbourn Instruments
5583 Roosevelt Street
Whitehall, PA 18052

Phone: (610) 395-3771
Fax: (610) 391-1333
E-Mail: sales@coulbourn.com

Internet : www.coulbourn.com