

## Multi Event Timer for Beer Brewing (version 1.5)

This timer is designed based on commonly used beer-brewing recipe. It can help brewers track duration of the whole boiling process and remind brewers to add hops or other ingredients at each specific time. The relay output of the timer should be connected to a flashing buzzer (sold separately).

### 1. Description of the timer.



Figure 1. Front panel of the timer

1) Top LED display: In normal operation, it shows remaining time to next event. When remaining time is longer than 99'59", the display will show minutes only. If the ^/PAU key is pressed, it will display the number of the upcoming event (eg. T2, T3...). When an event time is up, it will flash the event number (T2, T3, T4, etc) until the alarm is turned off. In programming mode, it shows the parameter to be set.

2) Bottom LED display: In normal operation, it displays remaining time to the final stop of the timer. When remaining time is longer than 99'59", the display will show minutes only. In programming mode, it shows the set value of the parameter.

3) These two LED indicators are not used.

4) Run indicator: lit when the timer is running; flash when the timer is finished/stopped; off before timer is started or when timer is ready to start.

5) Output indicator: turns on when relay is on; turns off when relay is off. It will be on at the end of each event for the duration of "Ad". This light should be synchronized with the flashing buzzer that is connected to the relay.

6) SET key. Press and hold this key for 3 second will enter the programming mode to set nE and Ad. Press the key momentarily to set T1, T2, etc. This key is disabled when timer is running.

7) V / STP key: Decrease and stop key. When timer is running, press it to stop the timer and return to the beginning ready state. When timer is finished, press it to stop the timer from flashing “END” and make the timer ready for another run. In the programming mode, pressing it will decrease the set value of the parameter. Each time you press and release, the value will decrease by one unit. But if you press and hold it, the value will continuously decrease, as the holding time increases, the speed of number decreasing will accelerate. You can use this feature for large number reduction. When the number is getting close to desired value, release the key. Then, press it momentarily for fine setting adjustment.

8) ^ / PAU key: Increase and mute key. When the timer is running, press it to allow the top display show the number of the upcoming event. (T2 ,T3, etc). When an event time is up and relay is on, pressing this key once will turn off the relay and mute the alarm. This function only affect the relay. It will not interrupt the running timer.

In the programming mode, pressing it will increase the set value of the parameter. Each time you press and release, the value will increase by one unit. But if you press and hold it, the value will continuously increase, as the holding time increases, the speed of number increasing will accelerate. You can use this feature for large number increment. When the number is getting close to desired value, release the key. Then, press it momentarily for fine setting adjustment.

9) RST key: Reset key. Pressing it will start the timer. When timer finished and flashing “END”, pressing it once will stop the flashing, making the timer ready for the next run. Pressing second time will restart the timer. This key is disabled when timer is running.

## 2. Setting the Parameters.

There are only three parameters to be setup: Number of events, alarm duration and time of each event.

1) nE, The number of events are the total number of times you want the buzzer to be on. e. g. If you only add hops at the very beginning and want the buzzer to turn on when the boiling is done, that is one event. If you want to add another hop in the middle of boiling, it is considered two events. Up to nine events can be set for the process.

2) Ad, Alarm duration. It is the duration that you want the buzzer to be turned on at the end of each event. The duration of all events are the same. Ad can be set from 0 to 200. The unit is seconds. e. g. When Ad=5, the flashing buzzer will be on for 5 second. The number 0 and 200 have different meanings. When Ad=0, the timer will pause at the end of each event and turn on the buzzer, user need to press the Reset key to continue the timer. This is a feature designed for old school brewing. When Ad=200, it become “on until cancelled”. The relay will turn on until user press the mute key. Note: When the Ad is not set to zero, the timer counting will continue when the buzzer is on.

3) TX. Time duration of each event, X is the event number. TX is the boiling time of each ingredient as commonly used in beer recipe. For example, if hop A needs to be boiled for 60 minutes, hop B needs to be boiled for 10 minutes. Then set  $T1=60$  and  $T2=10$ . When, set the time, you need to set the longest time first and shortest time last ( $T1>T2>T3>....$ ). The value of T1 sets the up limit for T2, the value of T2 sets the up limit for T3 and so on..... If you set  $T1=T2$ , event T2 will be ignored.

### **3. How to set nE and Ad.**

Press and hold SET for 5 second, display will show NE. This is for setting the number of events.

Press SET again, display will show Ad. This is for setting the alarm duration.

Press SET again to exit.

### **4. How to set T.**

Press SET momentarily, display will show T1, use up and low key to set the value and press SET to confirm.

Note, the parameter setting change will not be saved until SET is pressed.

### **5. Application Example.**

A beer recipe requires three different hops to be boiled for different time.

1 oz Hop A, boiling for 60 minutes.

1 oz Hop B, boiling for 30 minutes.

1 oz Hop C, boiling for 1 minute

We want the buzzer connected to the timer relay to run for 10 seconds when it is the time to add Hop B and Hop C. The buzzer will also be on for 10 seconds when the 60 minutes boiling of hop A is finished

Set  $nE = 3$ ,  $Ad = 10$ ,  $T1=60$ ,  $T2=30$ ,  $T3=1$ .

### **6. Terminal Assignment.**

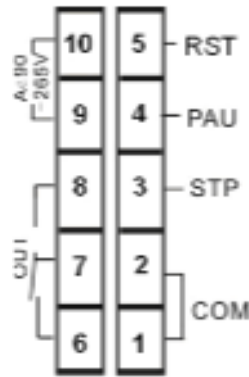


Figure 2. Back terminal assignments

Power for the timer needs to be connected to between terminal 9 and 10. The voltage should be in the 90 to 260V range.

Terminal 6, 7 and 8 are for relay output. Terminal 6 is Normally-closed (NC) contact. Terminal 8 is Normally-open (NO) contact. Terminal 7 is common contact of the terminal 6 and 8. When the relay is energized (or when the OUT LED is on), terminal 8 connects to terminal 7, and terminal 7 disconnects terminal 6; When the relay is NOT energized (or when the OUT LED is off), terminal 6 connects to terminal 7, and terminal 7 disconnects terminal 8. The relay is a “dry switch” that does not provide power by itself. Please see the wiring example below.

Terminal 5 is the reset terminal that has the same function as the RST key in the front panel. Terminal 4 is the pause/mute terminal that function the same as the “^/PAU” key in the front panel. Terminal 3 is the stop terminal that function the same as the “V/STP” key in the front panel. Terminal 1 and 2 are the common contacts of the terminal 3/4/5. There are two ways to operate terminal 3, 4 and 5.

1) Connecting a normally open (NO) momentary push button switch between the terminal (3, 4 or 5) to the COM (1 or 2). Please note, the function starts when you release (or open) the button of the switch, not when you press down the switch.

2) Connecting a DC logic signal (TTL or CMOS or voltage in the range from 3 to 30 VDC) between the terminal (3, 4 or 5) to the COM (1 or 2). Please note, the function is rising-edge triggered. The logic signal should normally be at high level. The function starts when the signal goes from low to high. If you have an inverted logic signal, you need to connect a NPN transistor between terminal and COM; add 10Kohm resistor to the gate for signal input.

## 7. Back Terminal Wiring examples.

### 1) Signal controlled by switches.

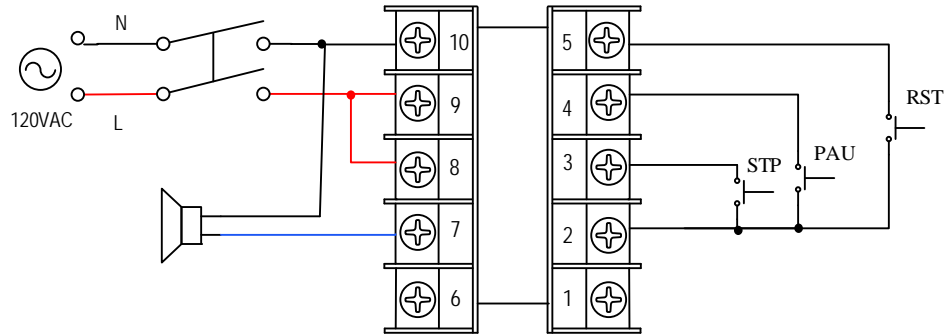


Figure 3. Wiring example of JSL-73.

Power (120 or 240V AC) is sent to terminal 9 and 10. The external switches on terminals 2, 3, 4 and 5 should be momentary type. They are needed only if you want to control the timer remotely. Otherwise, you can use the front keys on the timer. The buzzer used in this example is also optional. The buzzer is powered by the 120VAC.

### 2) Signal controlled by DC logic signal

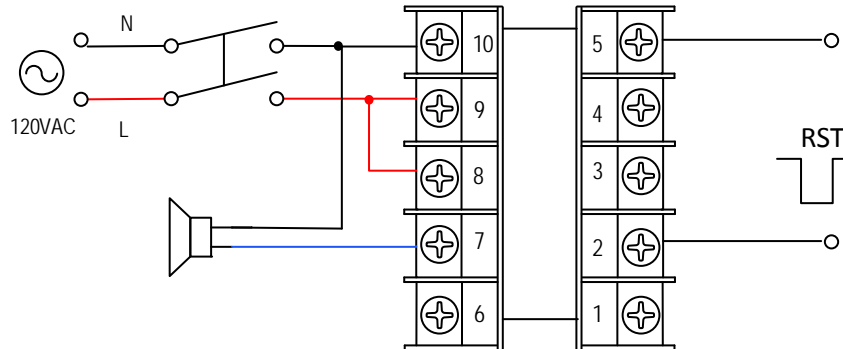


Figure 4. Rising-edge triggered signal

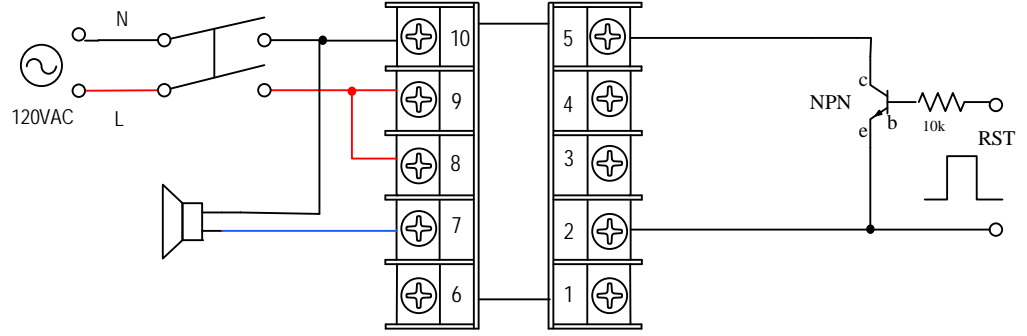


Figure 5. Inverted logic signal