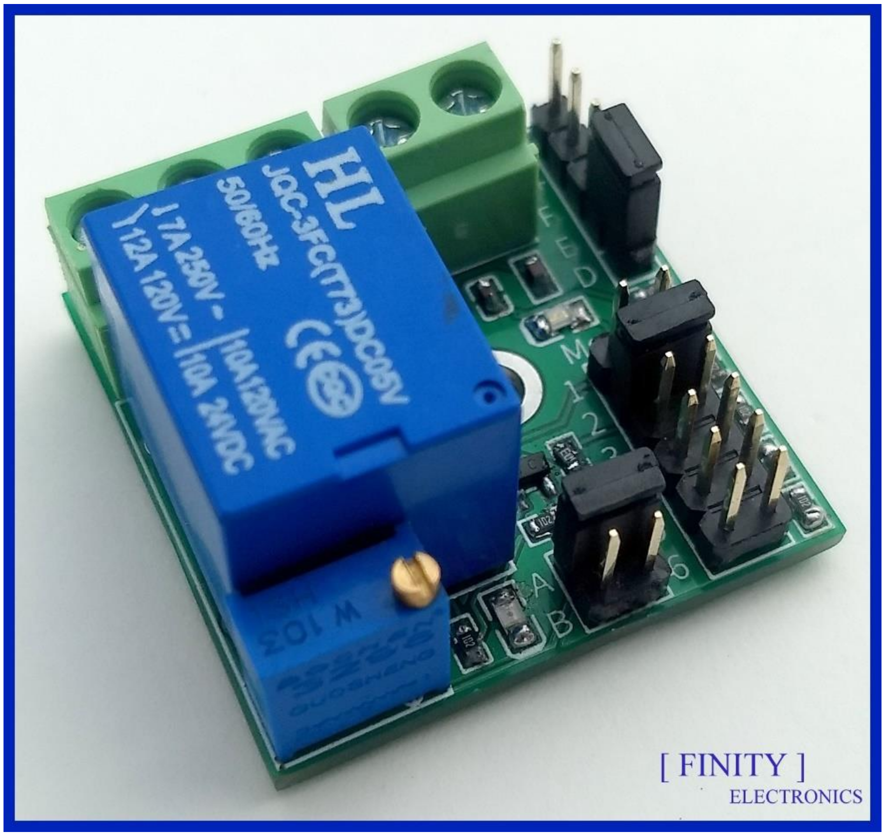
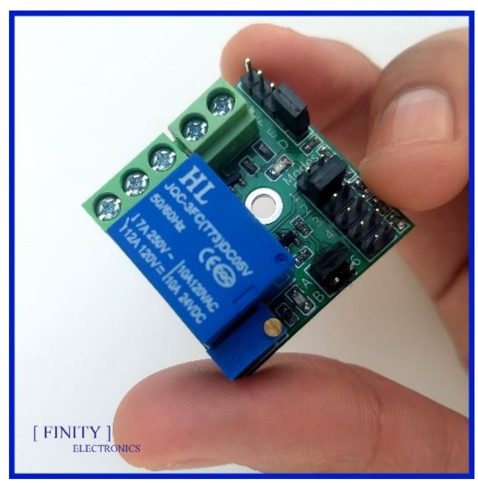


MK1 ON Delay Timer User Manual



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Features:

- System:
  - Embedded with a dedicated microcontroller for powerful processing.
  - ADC noise cancellation results an accurate delay adjustment.
- Technical Specifications:
  - **Six** different delay adjustment modes for timing from **5ms to 24hrs**.
  - Can also be used as OFF delay timer by changing the relay connections from NO-C to NC-C or vice versa as per type of delay required.
  - System clock very precisely adjusted with real time. **0.1%** error measured.
  - Four **Single Pulse** modes and two **Continuous Pulse** modes.
  - Available option for being used as a **triggering circuit**. Thus, provided with trigger signal output (S+, S-). For this shift jumper from E-D to F-E.
  - Precision Resistor available with **30±1** turns for precise delay adjustment.
  - Enhanced technical design equipped with terminals for measuring the resistance, thus user can know the delay time adjusted.
  - On board power ON indication LED (green) and relay status indication LED (orange).
- Electrical Technicalities:
  - Wide operating voltage range: 5.5V to 24.5V DC.
  - Low power consumption:
    - While in delay or when relay not latched:
      - 4.2mA @ 5.5V DC
    - While active or when relay latched:
      - 42.5mA @ 5.5V DC
  - Relay Contact Ratings:
      - 7A @ 250V AC
      - 10A @ 24V DC
  - Good **isolation** between Control and Power Circuit.
  - Heavy solder covered **PCB traces** for relay, ensuring safe conduction of current up to 10A.
- Design Parameters:
  - Compact, crisp and easy to use design.
  - Detailed visible pin markings.
  - Weight: 17 grams.
  - Length : Width : Height : 33.3 mm : 33.3 mm : 20±2 mm
  - 3.5 mm dia screw hole. Perfect for **M3** screws.
- Temperature Range:
  - 0°C to +55°C

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- Delay Adjustment Instructions:
  - The dial is duly calibrated with the controller. If you increase or decrease the resistance so will be increased or decreased the delay time.
  - Moving the dial clockwise decreases resistance, while moving it anticlockwise increases the resistance.
  - **Rx** is the resistance calibrated with controller for delay, also called as the delay resistance. The delay time depends on the value of Rx.
  - Procedure for setting delay resistance **Rx**:
    - Remove jumper from the **A** marked terminals.
    - Measure the resistance across **B** marked terminals.
    - Keep turning the dial till the measured resistance equates to Rx, needed to get the required delay.
    - Always remember to put back the jumper across **A** marked terminals after measuring the resistance.
  - **Rx(max)** is fixed the maximum value of resistance you get while turning the dial anticlockwise to furthermost.
  - Procedure for measuring delay resistance **Rx(max)**:
    - Remove jumper from the **A** marked terminals.
    - Measure the resistance across **B** marked terminals.
    - Turn the dial anticlockwise till the measured resistance sets at a constant maximum value. This measured value is **Rx(max)**.
    - Put back the jumper across **A** marked terminals after measuring the resistance.

Modes Description:

- Mode 1:
  - This **Continuous Pulse** mode is used to set delay from 5ms to 1s. Here you get 200 distinct delay timings in intervals of every 5ms till 1s. Here the output toggles after every required delay.
  - Keep jumper at marking **1** in **Modes** section for enabling this mode.
  - Here the delay resistance Rx for required delay can be calculated as:
    - $Rx = \frac{Rx(max) * Td}{1000}$ Td = required delay time in milliseconds, Rx, Rx(max) in Ω,
  - This mode is helpful in continuous pulse generation at variable frequency.
- Mode 2:
  - This **Single Pulse** mode is used to set delay from 5ms to 1s. Here you get 200 distinct delay timings in intervals of every 5ms till 1s.
  - Keep jumper at marking **2** in **Modes** section for enabling this mode.

- Here the delay resistance Rx for required delay can be calculated as:
  - $Rx = \frac{Rx(max) * Td}{1000}$ Td = required delay time in milliseconds, Rx, Rx(max) in Ω,
- This mode is helpful in circuits requiring a millisecond delay to avoid the spikes at time of enabling the source.

- Mode 3:
  - This **Continuous Pulse** mode is used to set delay from 250ms to 1minute. Here you get 240 distinct delay timings in intervals of every 250ms till 1minute. Here the output toggles after every required delay.
  - Keep jumper at marking **3** in **Modes** section for enabling this mode.
  - Here the delay resistance Rx for required delay can be calculated as:
    - $Rx = \frac{Rx(max) * Td}{60000}$ Td = required delay time in milliseconds, Rx, Rx(max) in Ω,
  - This mode is helpful to the processes requiring regular ON-OFF switching.
- Mode 4:
  - This **Single Pulse** mode is used to set delay from 250ms to 1minute. Here you get 240 distinct delay timings in intervals of every 250ms till 1minute.
  - Keep jumper at marking **4** in **Modes** section for enabling this mode.
  - Here the delay resistance Rx for required delay can be calculated as:
    - $Rx = \frac{Rx(max) * Td}{60000}$ Td = required delay time in milliseconds, Rx, Rx(max) in Ω,
  - This mode is helpful as a general-purpose timer.
- Mode 5:
  - This **Single Pulse** mode is used to set delay from 15s to 1hour. Here you get 240 distinct delay timings in intervals of every 15s till 1hour.
  - Keep jumper at marking **5** in **Modes** section for enabling this mode.
  - Here the delay resistance Rx for required delay can be calculated as:
    - $Rx = \frac{Rx(max) * Td}{3600}$ Td = required delay time in seconds, Rx, Rx(max) in Ω,
  - This mode is helpful for getting process specific delays.
- Mode 6:
  - This **Single Pulse** mode is used to set delay from 10mins to 24hrs. Here you get 144 distinct delay timings in intervals of every 10mins till 24hrs.
  - Keep jumper at marking **6** in **Modes** section for enabling this mode.
  - Here the delay resistance Rx for required delay can be calculated as:
    - $Rx = \frac{Rx(max) * Td}{1440}$ Td = required delay time in minutes, Rx, Rx(max) in Ω,
  - This mode is helpful for long time controlling processes.