



# Solid State Timers and Controllers

## 438US

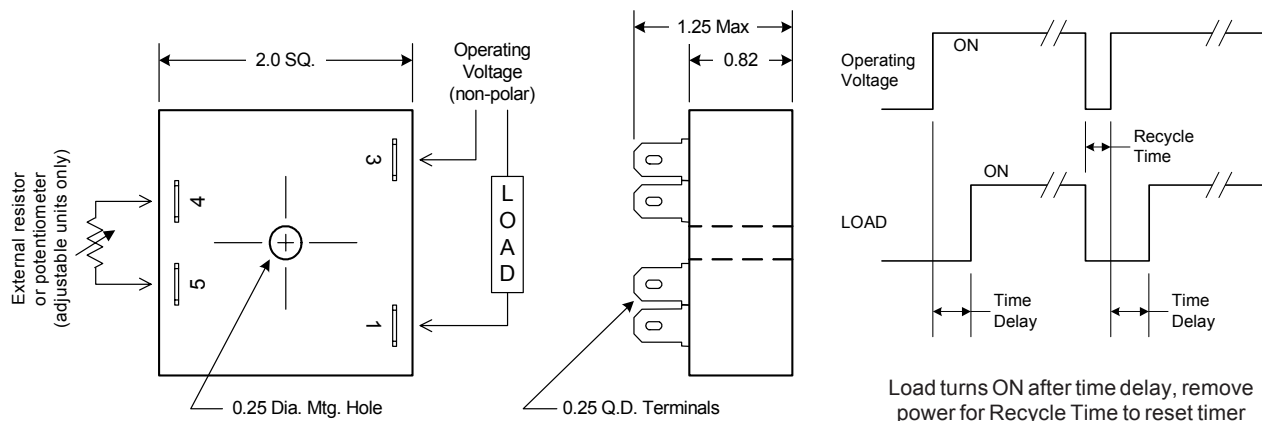
## Universal Time Capsule® Delay-On-Make Timer



The Model 438US is an in-line timing device that performs as an in-line delay-on-make timer. By connecting the two outside terminals in series with any load circuit drawing between ten milliamperes and one ampere operating from any voltage between 19 volts and 288 volts AC or DC, the 438US turns that load circuit into a delay-on-make timing circuit. The timing period is set by an external resistor across terminals 4 & 5, and permits the 438US to be adjusted from 1 second to 1000 seconds, and the 438US-1 to be adjusted from 2 seconds to 2000 seconds. The value of the external timing resistor ranges from 0 ohms to 10 meg ohms. After the load circuit has energized a new cycle can be repeated by removing and re-applying the operating voltage.

### Mechanical

### Timing Diagram



Load turns ON after time delay, remove power for Recycle Time to reset timer

### How The 438US Works

When the operating voltage is first applied to the series combination of the 438US and the load circuit, the 438US is OFF, and appears like a large resistor permitting only leakage current to flow. The amount of leakage current is determined from the specifications at the working operating voltage. The load circuit should be analyzed to determine if the small amount of leakage current through it will cause the load to pickup during the OFF period of the 438US. In most cases the leakage current is well below the operating threshold of most load circuits such as relays, solenoids, lights, or motors. At the end of the delay period as determined by the value of the external timing resistor, the 438US turns ON, and full load current is permitted to flow through the load current. There is a small voltage drop across the 438US when it is ON. This voltage, should be subtracted from the operating voltage to determine if the load circuit can operate at the voltage permitted as a result of the series connection of the 438US and the load circuit.

#### Finding The Value Of The Timing Resistor For Any Timing Interval From 1 second To 1000 Seconds For The 438US

A short circuit across the center two terminals will produce a 1 second interval. To increase the interval, increase resistor by 10,000 ohms for each additional second required. As an example: To find the value of the resistor for 300 seconds, subtract 1 from the 300 and multiply the answer by 10,000 ohms to get a value of 2,990,000 ohms, or 2.99 meg. As a practical matter you would select a 3 meg ohm resistor and connect it across the center two terminals. Time is doubled for the model 438US-1.

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Tel: 973-598-9400 • Fax: 973-598-9410 • Toll Free: 800-457-4950  
Artisan Controls Corporation, 111 Canfield Ave., Bldg B15-18, Randolph, NJ, 07869, USA

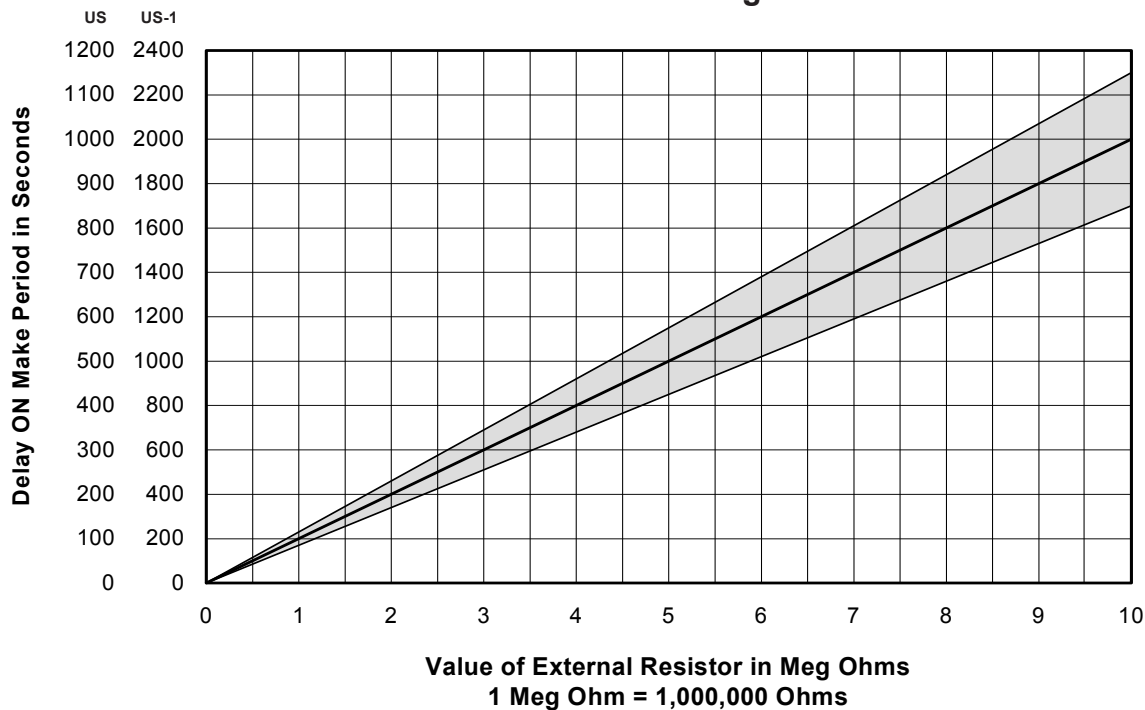


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## Specifications

- Operating Voltage:** 19 to 288 Volts AC 50/60 Hz or DC.
- Timing Mode:** Delay-On-Make - timing period set by external resistor.
- Timing Range:** 438US 1 to 1000 seconds in 1 second increments.  
438US-1 2 to 2000 seconds in 2 second increments.
- Timing Tolerance:** ±10%.
- Timing Variation:** ±15% worst case at any combination of voltage and temperature.
- Repeatability Of Timing Period:** ±1% nominal.
- Recycle Time:** 50 milliseconds if output is ON, 200 milliseconds during a timing cycle while output is OFF.
- Output Rating:** 10 milliamperes to 1 ampere inductive with inrush current to 25 amperes for 8 milliseconds.
- Output Voltage Drop in "ON" State:** 4 volts maximum.
- Leakage Current in "OFF" State:** 0.6 mA @ 24V, 1.8 mA @48V, 5.4 mA @120V, 11.4 mA @ 240V.
- Transient Protection:** Maximum transient voltage protection is 6000 volts as delivered through a source resistance of 30 ohms with a maximum duration of 8.3 milliseconds.
- Operating Temperature:** -20°C to +85°C
- Humidity:** 95% condensing
- Terminations:** Four (4) .25 Faston type.
- Agency Recognition:** UL File E47858, Appliance Controls - Component ATNZ2 (US) & ATNZ8 (Can), Auxiliary Devices - Component NKCR2 (US) & NKCR8 (Can).
- Data Sheet Revision Date:** February 4, 2006

## External Resistor Timing Curve



## Ordering Information

Part Number	Time Range	Operating Voltage
438US	1 - 1000 Seconds	19V - 288V
438US-1	2 - 2000 Seconds	AC or DC

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