



## Solid State Timers and Controllers

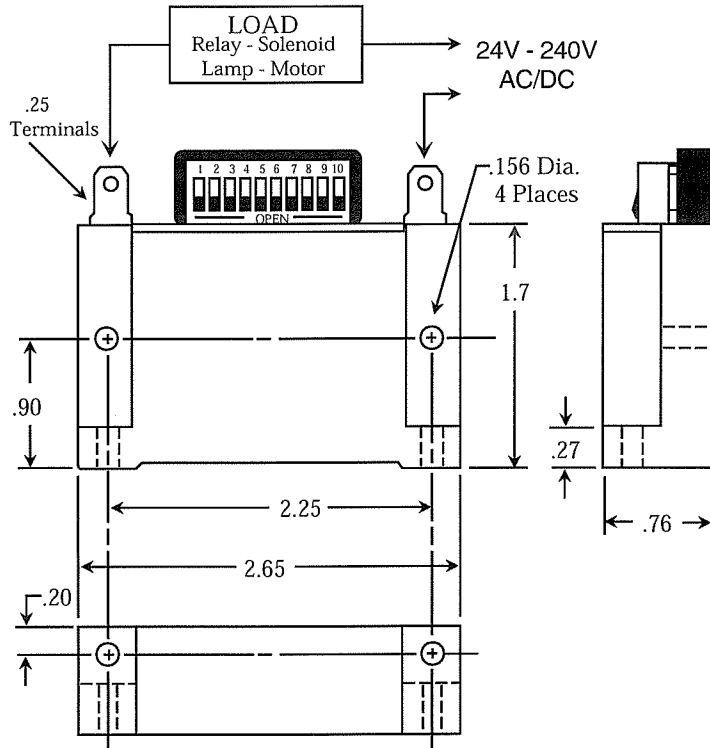
# 438USAF

### Universal Switch Adjustable Flasher

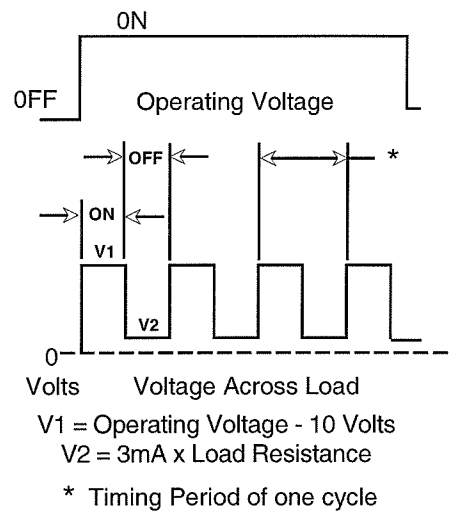


The Model 438USAF is an in-line solid state timing device that performs as a two terminal flasher, or a 50% repeat cycle timer. When connected in series with a load circuit, the 438USAF will turn the load circuit ON and OFF at a 50% duty cycle at the flashing rate determined by the settings of ten DIP switches. The flash rate can be made to vary from 30 flashes per minute (1 flash every 2 seconds) to 1 flash every 2000 seconds. The full flash rate range can be set with the ten DIP switches to a resolution of 2 seconds to the flash period. The 438USAF operates at voltages ranging from 24 to 240 volts AC or DC, and services inductive load circuits, as well as lamp circuits.

#### Mechanical .....



#### ..... Timing Diagram .....



#### How The 438USAF Works .....

When the operating voltage is applied to the series combination of the 438USAF and the load circuit, the 438USAF turns ON, and the load will be energized. It is important to understand that the load current that flows is determined by the (Applied Voltage - 10 volts) divided by the

load resistance. The 10 volts is the maximum voltage that will be dropped across the 438USAF at any operating voltage. As an example: a 440Ω (ohm) relay coil that would normally draw 250mA at 110V DC will now only be permitted to draw 227mA. This is determined by the voltage across the relay which becomes 110 - 10, or 100V DC (V1). At 100V, the current becomes 100V/440Ω = 227mA. At the end of the ON portion of the flashing cycle, the 438USAF turns OFF, but leakage current continues to flow. This leakage current can be as high as 3mA. This would cause the relay to have 3mA x 440Ω = 1.32V (V2) across it. Always make certain that the dropout voltage of the load circuit is below the voltage caused by the residual leakage current. At the end of the OFF portion of the flashing cycle, the load turns back ON. This action continues for as long as operating voltage is applied. The time of the ON portion of the cycle will always be equal to the time of the OFF portion of the cycle. In this manner, the 438USAF can also be used as a repeat cycle timer if the application can withstand the 50% duty cycle restriction. See *How The DIP Switches Work* section for an explanation on how to achieve any flash rate with the range of 2 seconds per period to 2000 seconds per period.



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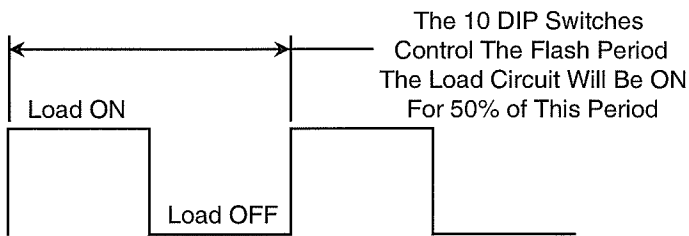


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## Specifications

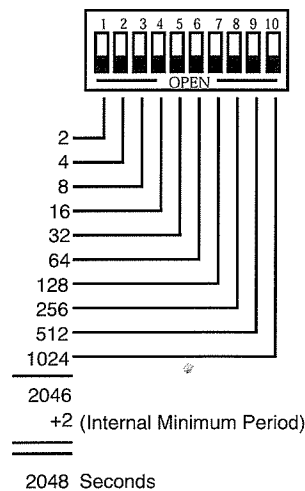
- Operating Voltage:** 24V - 240V AC/DC 50/60Hz.
- Timing Mode:** Flasher - Load turns ON for 50% of the flashing timing period.
- Period (Flash Rate) Timing Control:** Ten (10) DIP switches control flashing period from 2 to 2000 seconds in 2 second increments. Within the flash period, the load is ON for 50% of the time.
- Timing Tolerance:** ±10% of DIP switch setting.
- Timing Variation:** ±2% at any combination of operating voltage and temperature.
- Repeatability Of Flashing Period:** ±1% nominal.
- Recycle Time:** 200 milliseconds if the load is required to turn ON as soon as the operating voltage is re-applied. If this is not a requirement, then the recycle specification is not applicable.
- Output Rating:** .25 ampere inductive with inrush current to 8 amperes for 8 milliseconds.
- Output Voltage Drop in "ON" State:** 10 volts max. voltage drop across the 438USAF during the ON portion of the flashing period at any operating voltage and load current to .25A.
- Leakage Current in "OFF" State:** 3 milliamperes maximum at any operating voltage and load circuit.
- 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:** Two (2) .25 Faston type.
- Data Sheet Revision Date:** September 28, 1995

## How The DIP Switches Work



With all 10 switches open the flash period will be set to 2048 seconds, indicating that the load circuit will be ON for 1024 seconds, and OFF for 1024 seconds. With all 10 switches closed the flash period will be set to 2 seconds, indicating that the load circuit will be ON for 1 second, and OFF for 1 second. The flash period can be increased in 2 second increments from 2 to 2048 seconds. Each switch increases the period by twice the time of the proceeding switch. To start setting up the switches, CLOSE all 10. To determine which switches to OPEN subtract 2 from the required period and then OPEN those switches that add up to the time required to be added to the minimum period of 2 seconds. If a period of 16 seconds is required, the period to be added becomes:  $16 - 2 = 14$  seconds. To add 14 seconds OPEN switches: 1, 2, & 3. Switch #1 = 2 seconds, Switch #2 = 4 seconds, Switch #3 = 8 seconds, adding up to 14. Always remember that the minimum flash period (all switches CLOSED) is 2 seconds. The 2 + the 14 added equals a flash period of 16 seconds. The load circuit will then be ON for 8 seconds and OFF for 8 seconds for as long as power is applied.

DIP Switches Shown Setting The Flash Period To A Maximum Of 2048 Seconds



## Ordering Information

Part Number	Time Range	Operating Voltage
438USAF	2 - 2048 Seconds	24V - 240V AC or DC

