



Automatic Door Closing System

Introduction

A common application for Artisan's delay-on-make timers is automatically closing a garage door, overhead door, or automatic entrance gate. This application note describes the required material, shows how the application works, and provides wiring examples for typical door control systems.

Required Material

1. Delay On Make Timer

The most popular timer for this application is the Artisan 438USA timer. This delay-on-make timer operates from any voltage from 24 - 240 Volts AC or DC, and it includes a binary coded DIP switch for ease of setting the time delay. Any Artisan delay-on-make timer will work well in this application; the 438U, 438USAS (square version of 438USA), or 438A/438A/438AS/438FS voltage-specific series. These timers are wired into the application in the same manner, the two power terminals are wired in series with the coil of the control relay. The specifications for the 438USA are included in this application note, see Artisan's website for data on the other timers.

2. Control Relay

The control relay coil is wired in series with the selected timer, and its contacts are wired to the Door Close switch in order to initiate the close function when the timer has completed it's time delay.

IMPORTANT: The control relay selected must have a coil voltage the same as the operating voltage in the door closing system, and its relay contacts must be rated for switching the same current and voltage as the Door Close switch to assure reliable and safe operation.

Operation

Virtually all door opening systems use a limit switch which signals the door controller to stop raising the door. This application requires using the normally open contacts on this switch to start the timing period at the end of which the door will close automatically.

When the door (or gate) reaches the end of the raising (or opening) cycle, the limit switch stops the motion of the door. With the timer and relay wired as shown, once the limit switch stops the motor it applies power to the timing circuit. This starts the time delay period, and at the end of this period the timer energizes the control relay. The contacts of the control relay are wired to the Door Close switch and cause the door to start coming down, and the limit switch opens thus removing power from the timing circuit. This removal of power resets the timer so it is ready to start timing when the door is raised again.

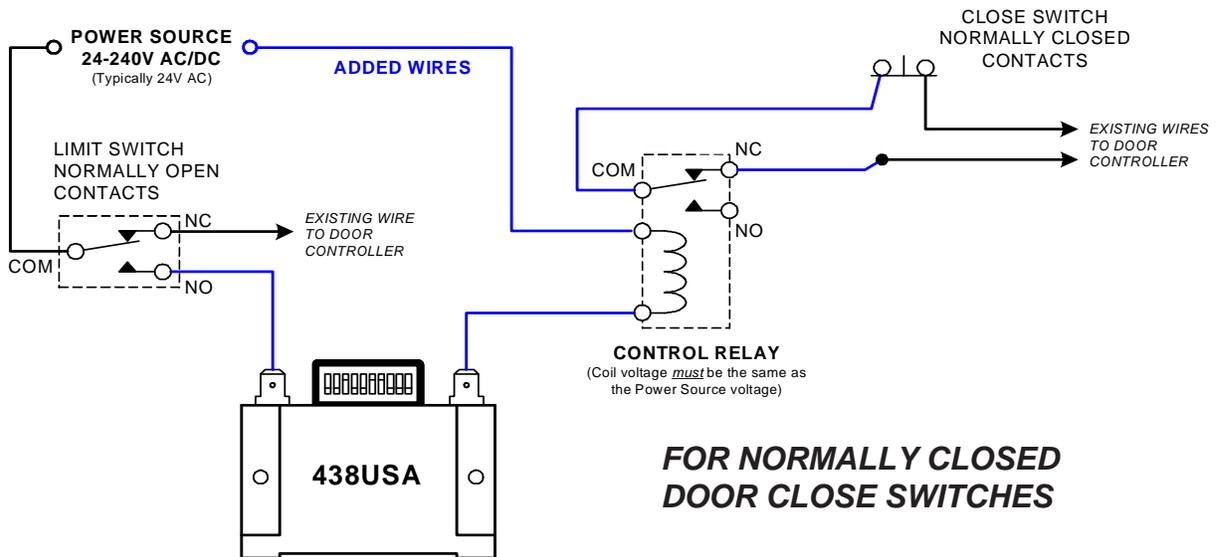
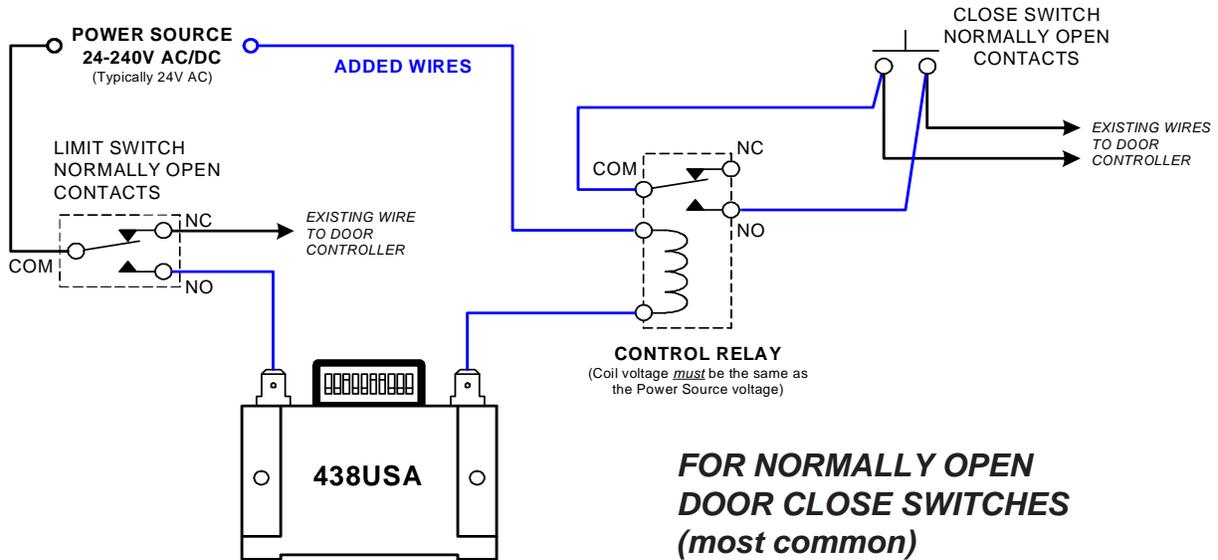
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Solid State Timers and Controllers

Wiring Examples



NOTE: These wiring examples show typical control configurations, it is the *installers* responsibility to analyze their application and adapt these examples to the control system and switching arrangement in their application to ensure safety and reliability

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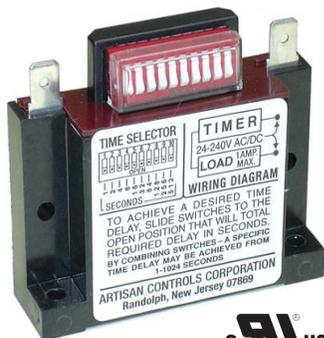
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Solid State Timers and Controllers

438USA

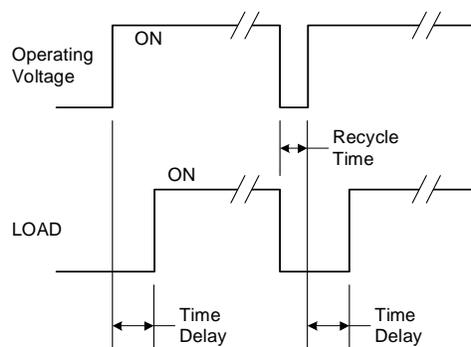
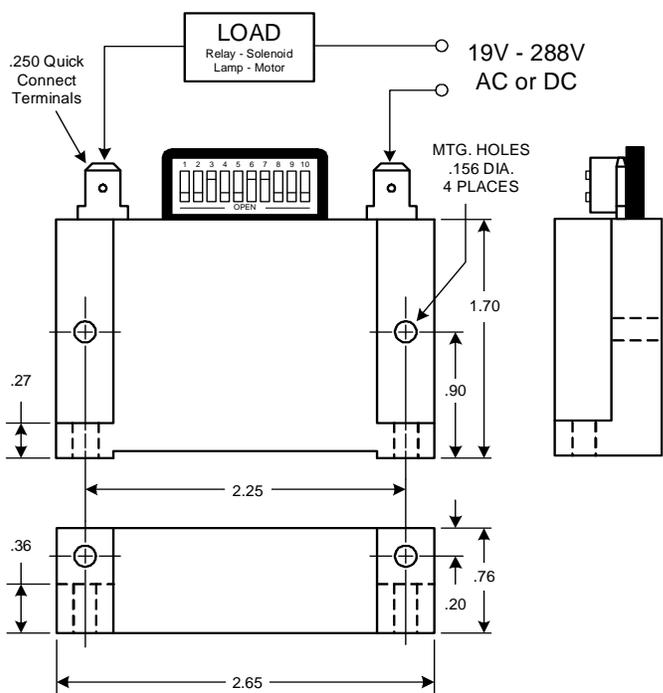
Universal Switch Adjustable Time Capsule®



The Model 438USA is the most popular of all Artisan Controls Corporation Time Capsule® devices. By merely connecting the two 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 438USA turns that load circuit into a delay on make timing circuit. Set the 10 DIP switches to the required delay, and apply operating voltage. When the operating voltage is applied, a small amount of current will flow through the load and the timer (leakage current). At the end of the delay period, the model 438USA turns ON and full load current is permitted to flow

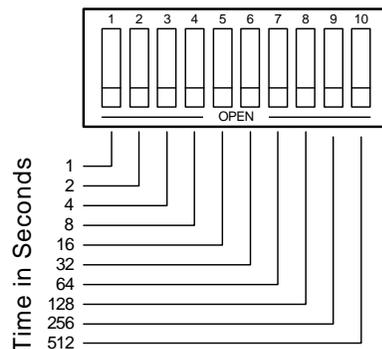
Mechanical & Wiring

Timing Diagram



Setting the DIP Switches

The DIP switches are used to set the time delay period between 1 and 1024 seconds. The timer has an internal 1 second delay, opening of the DIP switches adds their corresponding value to that internal delay. The switches to the right are all opened for a total delay of 1023 seconds, adding that to the internal 1 second provides the full 1024 seconds. Any time delay from 1 to 1024 seconds can be achieved by opening the appropriate switches



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Solid State Timers and Controllers

Specifications

Operating Voltage: 19 to 288 Volts AC 50/60 Hz or DC.

Timing Mode: Delay-On-Make, External load energizes after preset timing period as set by the 10 DIP switches.

Timing Range: Digital timing is DIP switch programmable from 1 to 1024 seconds.

Timing Adjustment: From 1 second (All Closed) to 1024 seconds (All Open) in 1 second increments.

Programmable Timing Tolerance: $\pm 10\%$

Timing Variation: $\pm 15\%$ worst case at any combination of operating voltage and temperature.

Repeatability Of Timing Period: $\pm 1\%$ 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 $+85^{\circ}\text{C}$

Humidity: 95% condensing

Terminations: Two (2) .25 Faston type.

Agency Certifications: UL File E47858, Appliance Controls - Component ATNZ2 (US) & ATNZ8 (Can), Auxiliary Devices - Component NKCR2 (US) & NKCR8 (Can).

National Stock Number: NSN 5999-01-113-0824

Data Sheet Revision Date: January 3, 2006

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