Amperite Co. History/Milestones

1922 – Business Incorporated in New York City, NY by Samuel Ruttenberg - produced cartridge-type Automatic Adjusting Resistors (Ballast current-regulators) for tube-operated AC/DC radio sets

1930 – Began making hermetically-sealed ballast regulators in vacuum tube form with helium and hydrogen gas

1940(circa) – Manufactured hermetically sealed time delay relays in a vacuum tube form with different gases and also developed several series of microphones

1964(circa) – Moved operations to Union City, NJ in a newly acquired building

1980 – Amperite ownership transferred to Harold Rosenberg

1982 – Product manual AM82 for glass relays and regulators introduced

1984 – Introduction of the B, BR, BF Series Thermal Time Delay Relays & Flashers

1990 – C, CR, D TDR’s and Flasher Series introduced

1991 – DF Flasher, C10 and CR10 analog TDR’s introduced

1993 – CI, CIR, DC10 TDR’s and DF10 Flasher were introduced

1994 – DFV and DFA Variable Recycle timers were introduced

1995 – DCR10 Digital Triggered Delay was introduced

1996 – Web-Site and with Full Product Application went live

1998 – DFS Solid State Flasher was introduced

2000 – ST1, ST1A, ST2 and STB TDR’s were introduced

2002 – Amperite was Purchased by Olympic Controls Corp

2003 – Company relocated to West New York, NJ and introduced 20 new series of Relays, Auto, PCB, General Purpose, Power and Signal Relays to complete the line

2005 – Introduced SWRDC, TSW 2 & 3, ST1D and Head Alert 2
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B Series TDR

- Delay on Make or Delay on Break timing modes
- Thermal device
- 3 AMP rating
- Low cost
- 1 - 115V input voltage range - works on AC or DC
- Isolated output contacts
- Fixed delay times only
- Initial and reset (release) delay device
- Long life
- UL File #E96739 (M)
- CSA File #LR62586

**TIMING MODE:** Timing cycle begins upon application of power to the heater terminals. At the end of the initial delay time the relay contacts transfer and remain in a transferred state until input power is removed. When the heater input power is removed, the contacts transfer back to their original state at the end of a reset (release) delay period.

**CONTACT INFORMATION:**
Arrangement: 1 form A (SPST - Normally open) - Delay on Make
1 form B (SPST - Normally closed) - Delay on Break
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 3A \( \times \) 115V AC
Expected Life \( \times \) 25°C
500,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Operating & storage: -34°C to +77°C,
(-30°F to +171°F)

**MECHANICAL INFORMATION:**
Termination: .110 inch, .250 inch or screw terminals
Enclosure: Black plastic case
Mounting: Single screw or optional 2-screw panel mount
Weight: 0.8 oz (23g) approx

**OUTLINE DIMENSIONS:**

**TIMING DIAGRAM:**

**INPUT INFORMATION:**
Voltage: AC or DC - 6V, 12V, 26V, 50V and 115V
(Other voltages are available)
Power Requirement: 2.3 Watts
Transient Protection: impervious to transients
Polarity Protection: None required

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V AC/DC</td>
<td>4V</td>
<td>8V</td>
</tr>
<tr>
<td>12V AC/DC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>26V AC/DC</td>
<td>22V</td>
<td>30V</td>
</tr>
<tr>
<td>50V AC/DC</td>
<td>42V</td>
<td>58V</td>
</tr>
<tr>
<td>115V AC/DC</td>
<td>90V</td>
<td>130V</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**

<table>
<thead>
<tr>
<th>Diagram A</th>
<th>Diagram B</th>
<th>Diagram C</th>
</tr>
</thead>
</table>

**Ordering Information:**
Definition of a part number for the Ampere B Series Time Delay Relay.
Example:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>NO</td>
<td>60</td>
<td>X</td>
<td>B</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
</tbody>
</table>

A: Denotes nominal input voltage. Voltages Available: 6, 12, 26, 50 & 115V AC/DC.
Custom Voltages are available.

B: Denotes contact form: NO = normally open (Delay on Make) - 1 form A - SPST
C = normally closed (Delay on Break) - 1 form B - SPST

C: Denotes timing value. Factory preset time delays from 2 - 300 secs. are available.
Note: Contact factory for release (reset) time.

D: Denotes form of termination: Blank = .110 male electro-plate solder terminals
X = .250 male quick connect terminals
S = screw terminals.

E: Denotes use of thermal technology of B Series.
BF Series Flasher

- Thermal flasher circuitry
- Long life
- 2A load rating @ 115V AC
- Low cost
- Small size
- All units work on AC and DC input voltage
- 3 terminal configuration
- 6V to 115V input voltages available
- UL File #E96739 (M)
- CSA File #LR62586

**TIMING MODE:** Load is energized upon application of power. After initial delay time, flashing cycle begins.

**INPUT VOLTAGE:**

<table>
<thead>
<tr>
<th>Input</th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOLTAGE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONTACT INFORMATION:**
Arrangement: 1 form B (SPST - Normally closed) - Delay on Break Contact Material: Silver - Cadmium Oxide Rating (Resistive): 2A @ 115V AC, 60ma. minimum load required
Expected Life @ 25°C:
500,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Operating & storage: -34°C to +77°C (-30°F to +171°F)

**MECHANICAL INFORMATION:**
Termination: .110 inch, .250 inch or screw terminals
Enclosure: Black plastic case
Mounting: Single screw or optional 2-screw panel mount
Weight: 0.8 oz (23g) approx.

**OUTLINE DIMENSIONS:**

![Diagram of BF Series Flasher]

**WIRING DIAGRAM:**

![Diagram A]

**TIMING SPECIFICATIONS:**
Flash Rate - Fixed: Standard; from 10 - 60 FPM on 6 - 26V models and from 10 - 45 FPM on 50 - 115V models.
Custom rates are also available.

**INITIAL DIELECTRIC STRENGTH:**
Between open contacts: 500V RMS
Between contacts & coil: 500V RMS

**INPUT INFORMATION:**
Voltage: AC or DC - 6V, 12V, 26V, 50V and 115V (Other voltages are available)

Power Requirement: 2.3 Watts
Transient Protection: impervious to transients
Polarity Protection: None required

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal Voltage</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V AC/DC</td>
<td>4V</td>
<td>8V</td>
</tr>
<tr>
<td>12V AC/DC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>26V AC/DC</td>
<td>22V</td>
<td>30V</td>
</tr>
<tr>
<td>50V AC/DC</td>
<td>42V</td>
<td>58V</td>
</tr>
<tr>
<td>115V AC/DC</td>
<td>90V</td>
<td>130V</td>
</tr>
</tbody>
</table>

**Ordering Information:**
Definition of a part number for the Amperite BF Series Flasher.
Example:

```
115  F  30  X  B  
A    B    C    D    E
```

A: Denotes nominal input voltage. Voltages Available: 6, 12, 26, 50 & 115V AC/DC. Custom Voltages are available.
B: Denotes flasher configuration.
C: Denotes flash rate. Standard rates from 10 - 60 FPM on 6 - 26V models and from 10 - 45 FPM on 50 - 115V models. Custom Rates are available.
D: Denotes form of termination: Blank = .110 male electro-plate solder terminals, X = .250 male quick connect terminals, S = screw terminals.
E: Denotes use of thermal technology of BF Series.
BR Series TDR
- Delay on Release timing mode
- Thermal device
- 3 AMP rating
- Low cost
- 1 - 115V input voltage range - works on AC or DC
- Isolated output contacts
- Fixed delay times only
- Normally open or normally closed contacts available
- Long life
- UL File #E96739 (M)
- CSA File #LR62586

TIMING MODE: Power to the device must be applied prior to the delay cycle to initialize the heater. At the end of this initial delay time the relay contacts transfer and remain in a transferred state until input power is removed. When the heater input power is removed, the contacts transfer back to their original state at the end of a reset (release) delay period.

TIMING DIAGRAM:

CONTACT INFORMATION:
Arrangement: 1 form A (SPST - Normally open) - Delay on Make
1 form B (SPST - Normally closed) - Delay on Break
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 3A @ 115V AC
Expected Life @ 25°C:
500,000 operations minimum at rated loads

ENVIRONMENTAL INFORMATION:
Temperature Range: Operating & storage: -34°F to +77°F, (-30°F to +171°F)

MECHANICAL INFORMATION:
Termination: .110 inch, .250 inch or screw terminals
Enclosure: Black plastic case
Mounting: Single screw or optional 2-screw panel mount
Weight: 0.8 oz (23g) approx.

OUTLINE DIMENSIONS:

Ordering Information:
Definition of a part number for the Amperite BR Series Time Delay Relay.
Example:

115 NO 12 R 8 X B
A B C D E F G

A: Denotes nominal input voltage. Voltages Available: 6, 12, 26, 50 & 115V AC/DC
Custom Voltages are available.

B: Denotes contact form: NO = normally open (Delay on Make) - 1 form A - SPST
C = normally closed (Delay on Break) - 1 form B - SPST

C: Denotes initialization period timing value. This value varies with release time. Contact factory.

D: Denotes reset (release) function of BR Series

E: Denotes reset (release) timing value. Factory preset time delays from 10 - 600 secs. are available.

F: Denotes form of termination: Blank = .110 male electro-plate solder terminals,
X = .250 male quick connect terminals, S = screw terminals.

G: Denotes use of thermal technology of BR Series.
C Series TDR
- Solid state analog circuitry
- Delay on operate timing mode
- Compact size
- Relay output with SPST or SPDT contacts
- Timing selection: Fixed or knob adjustable
- Numerous models timing from 0.1 secs. to 300 secs.
- UL File #E96739 (M)
- CSA File # LR62586

**TIMING MODE:** Delay on operate timing cycle begins upon application of input power. The relay contacts transfer at the end of the delay period and will remain transferred until input voltage is removed. Reset occurs when input voltage is removed.

**INPUT TIMING DIAGRAM:**

<table>
<thead>
<tr>
<th>INPUT VOLTAGE</th>
<th>N.O. RELAY CONTACTS</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

**CONTACT INFORMATION:**

Arrangement: 1 form A (SPST Normally open) - Diagram A
1 form B (SPST Normally closed) - Diagram A
1 form C (SPDT) - Diagram B

<table>
<thead>
<tr>
<th>Contact Rating (Resistive)</th>
<th>Max. switching power</th>
<th>Max. switching voltage</th>
<th>Max. switching current</th>
<th>Max. carrying current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30W, 50VA</td>
<td>60V DC, 125V AC</td>
<td>1A DC, AC</td>
<td>0.5A AC, 1A 30V DC</td>
</tr>
</tbody>
</table>

UL/CSA rating: 0.5A AC, 1A 30V DC

Expected Life @ 25°C: 100,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**

Temperature Range: Operating and storage: -25°C to +60°C, (-13°F to +140°F)

**MECHANICAL INFORMATION:**

Termination: .110 inch, .250 inch or screw terminals
Enclosure: Black plastic case
Mounting: Single screw or optional 2-screw panel mount
Weight: 0.8 oz (23g) approx.

**OUTLINE DIMENSIONS:**

Ordering Information:
Definition of a part number for the Amperite C Series Time Delay Relay.
Example:

<table>
<thead>
<tr>
<th>115</th>
<th>A</th>
<th>NO</th>
<th>.1</th>
<th>-60</th>
<th>S</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
</tr>
</tbody>
</table>

A: Denotes nominal input voltage. Voltages Available: 12, 24 & 115V AC, 12, 24, 48 & 110V DC. **Custom Voltages are available.**
B: Denotes type of input current required for operation: A = AC - Alternating Current
   D = DC - Direct Current
C: Denotes contact form: NO = Normally Open - 1 form A, C = Normally Closed - 1 form B, SPDT = Single Pole, Double Throw - 1 form C.
D & E: Denotes range of knob adjustability for timing (in seconds) where:
   D = Minimum time delay.
   E = Maximum time delay for adjustable TDR’S.
2.) Both values (D & E) can be replaced by a single value for a factory preset time delay in seconds from .1 through 300 secs.
F: Denotes form of termination - blank = .110 male electro-plate solder terminals, X = .250 male quick connect terminals, S = screw terminals.
G: Denotes use of solid state analog circuitry of C Series.
C10 Series TDR

- Solid state analog circuitry
- Delay on operate timing mode
- DPDT (2 form C) isolated 10 ampere relay contacts
- Timing selection: Knob adjustable or Fixed
- Numerous models timing from 0.1 secs. to 480 secs.
- UL File #E96739 (M)
- CSA File #LR62586-3

**TIMING MODE:** Delay on operate timing cycle begins upon application of input power. The relay contacts transfer at the end of the delay period and will remain transferred until input voltage is removed. Reset occurs when input voltage is removed.

**TIMING DIAGRAM:**

<table>
<thead>
<tr>
<th>INPUT VOLTAGE</th>
<th>N.O. RELAY CONTACTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>OFF</td>
<td>TIME</td>
</tr>
</tbody>
</table>

**CONTACT INFORMATION:**
- Arrangement: 2 form C (DPDT) - Diagrams C & D
- Contact Material: Silver - Cadmium Oxide
- Rating (Resistive): 10A @ 240V AC Resistive
  - 15A @ 30V DC Resistive
  - 15A @ 120V AC Resistive
  - 1/2 HP @ 120V AC
  - 1/2 HP @ 250V AC
- Expected Life @ 25°C: 10 Million operations, Mechanical
- 100,000 operations minimum at rated loads
- Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
  - Operating: -45°C to +70°C (-49°F to +158°F)

**ENVIRONMENTAL INFORMATION:**
- Terminations: 8 pin Octal Style Plug or 11-Pin Spade Terminals (Dia. C & D)
- Enclosure: White plastic case. Knob adjustable models have a dial scale for reference only. "LC" version has a black case.
- Weight: 4 oz (114g) approx.

**MECHANICAL INFORMATION:**

<table>
<thead>
<tr>
<th>OUTLINE DIMENSIONS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Octal Style</td>
</tr>
<tr>
<td>Optional Spade Terminal Style</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**

Diagram A

Diagram B

Diagram C

Diagram D

**ORDERING INFORMATION:**
- Denotes nominal input voltage. Voltages Available: 12, 24 & 120V AC; 12, 24, 48 & 110V DC
- Denotes type of input current required for operation: A = AC - Alternating Current
  - D = DC - Direct Current
- Denotes contact form: P = DPDT - 2 form C.
- Denotes range of knob adjustability for timing (in seconds) where:
  - D = Minimum time delay.
  - E = Maximum time delay for adjustable TDR’S.
  - Custom timing is available.
- 2) Both values (D & E) can be replaced by a single value for a factory preset time delay in seconds from .1 through 480 secs.
- Enter "L" if optional 11-pin spade terminals are required (Diagrams B & D).
- Denotes use of solid state analog circuitry of C10 Series.
CI Series TDR

- Solid state analog circuitry
- One-shot timing mode (interval on)
- DPDT (2 form C) isolated 10 ampere relay contacts
- Timing selection: Knob adjustable or Fixed
- Numerous models timing from 0.1 secs. to 480 secs.
- UL File E96739 (M)
- CSA File LR62586-3

**TIMING MODE:** Relay contacts transfer, and timing cycle begins, upon application of power. At the end of the timing cycle, the relay contacts return to the de-energized position. Reset occurs upon removal of the input power.

**INPUT VOLTAGE:**

<table>
<thead>
<tr>
<th>N.O. RELAY CONTACTS</th>
<th>OFF</th>
<th>TIME</th>
<th>ON</th>
</tr>
</thead>
</table>

**CONTACT INFORMATION:**

Arrangement: 2 form C (DPDT) - Diagrams C & D
Contact Material: Silver - Cadmium Oxide
Rating (Resistive):
- 10A @ 240V AC Resistive
- 15A @ 30V DC Resistive
- 15A @ 120V AC Resistive
- 1/3 HP @ 120V AC
- 1/2 HP @ 250V AC

Expected Life @ 25°C:
- 10 Million operations, Mechanical
- 100,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**

Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

**MECHANICAL INFORMATION:**

Termination: 8 pin Octal Style Plug or 11-Pin Spade Terminal (Dia. C & D)
Enclosure: White plastic case. Knob adjustable models have a dial scale for reference only. "LCI" version has a black case.
Weight: 4 oz (114g) approx.

**OUTLINE DIMENSIONS:**

<table>
<thead>
<tr>
<th>Octal Style</th>
<th>Standard Octal Style</th>
<th>Optional Spade Terminal Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.86 73 mm</td>
<td>50 14 mm</td>
<td>2.4 61 mm</td>
</tr>
<tr>
<td>2.1 45 mm</td>
<td>58 15 mm</td>
<td>2.4 56 mm</td>
</tr>
<tr>
<td>3.475 89 mm</td>
<td>1.76 45 mm</td>
<td>2.4 61 mm</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**

Diagram A
Diagram B
Diagram C
Diagram D

**ORDERING INFORMATION:**
Definition of a part number for the Amperte CI Series Time Delay Relay.
Example:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A: Denotes nominal input voltage. Voltages Available: 12, 24 & 120V AC; 12, 24, 48 & 110V DC
Custom Voltages are available.

B: Denotes type of input current required for operation:
A = AC - Alternating Current
D = DC - Direct Current

C: Denotes contact form: P = DPDT - 2 form C.

D & E: Denotes range of knob adjustability for timing (in seconds) where:
D = Minimum time delay.
E = Maximum time delay for adjustable TDR’s.

Custom Timing is available.

2.) Both values (D & E) can be replaced by a single value for a factory preset time delay in seconds from .1 through 480 secs.

F: Enter "L" if optional 11-pin spade terminals are required (Diagrams B & D).

G: Denotes use of solid state analog circuitry of CI Series.
**CIR Series TDR**
- Solid state analog circuitry
- Triggered one-shot timing mode (triggered interval on)
- DPDT (2 form C) isolated 10 ampere relay contacts
- Timing selection: Knob adjustable or Fixed
- Numerous models timing from 0.1 to 480 secs.
- UL File #E96739 (M)
- CSA File #LR62586-3

**TIMING MODE:** Input voltage must be applied continuously to operate the internal relay. The relay energizes and timing begins when the external switch is closed. At the end of the time delay period the relay will de-energize. Reset is accomplished by opening and reclosing the control switch.

**TIMING DIAGRAM:**

**CONTACT INFORMATION:**
Arrangement: 2 form C (DPDT) - Diagrams C & D
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 10A @ 240V AC Resistive
15A @ 30V DC Resistive
15A @ 120V AC Resistive
1/2 HP @ 120V AC
1/2 HP @ 250V AC
Expected Life @ 25°C: 10 Million operations, Mechanical
100,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

**MECHANICAL INFORMATION:**
Termination: 11 pin Octal Style Plug or 11-pin spade terminals (Dia. C & D)
Enclosure: Black plastic case. Knob adjustable models have a dial scale for reference only
Weight: 4 oz (114g) approx.

**OUTLINE DIMENSIONS:**

**WIRING DIAGRAMS:**

** TIMING SPECIFICATIONS:**
Timing - Fixed: 1 through 480 secs.
Timing Ranges: 1 - 60, 60 - 120, 120 - 180, 180 - 240, 240 - 300, 300 - 480 secs. **Custom timing is available.**
Timing Adjustment: Knob adjustable potentiometer.
Timing Tolerance:
  - Fixed Units: ± 5%
  - Adjustable Units: -20% to +25% of maximum specified delay time.
  - Minimum specified value or less at low end.
Repeatability: ± 5%
Release Time: 60 ms typical, 100 ms maximum

**INITIAL DIELECTRIC STRENGTH:**
Between open contacts: 1000V RMS, Between adjacent contacts: 1500V RMS, Between contacts & coil: 1500V RMS

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V AC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V AC</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>120V AC</td>
<td>105V</td>
<td>130V</td>
</tr>
<tr>
<td>12V DC</td>
<td>11V</td>
<td>14V</td>
</tr>
<tr>
<td>24V DC</td>
<td>20V</td>
<td>32V</td>
</tr>
<tr>
<td>48V DC</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V DC</td>
<td>95V</td>
<td>125V</td>
</tr>
</tbody>
</table>

**Custom Voltages are available.**

**Ordering Information:**
Definition of a part number for the Amperite CIR Series Time Delay Relay.
Example:

```
120 A P .1 -60 L CIR
A B C D E F G
```

A: Denotes nominal input voltage. Voltages Available: 12, 24 & 120V AC; 12, 24, 48 & 110V DC
B: Denotes type of input current required for operation: A = AC - Alternating Current
D = DC - Direct Current
C: Denotes contact form: P = DPDT - 2 form C.
D & E: Denotes range of knob adjustability for timing (in seconds) where:
D= Minimum time delay. E= Maximum time delay for adjustable TDR’s.

2.) Both values (D & E) can be replaced by a single value for a factory preset time delay in seconds from .1 through 480 secs.

F: Enter “L” if optional 11-pin spade terminals are required (Diagrams B & D).
G: Denotes use of solid state analog circuitry of CIR Series.
CR Series TDR

- Solid state analog circuitry
- Triggered delay on release timing mode
- Compact size
- Relay output with SPST or SPDT contacts
- Timing selection: Fixed or knob adjustable
- Numerous models timing from 1 sec. to 600 secs.
- UL File #E96739 (M)
- CSA File #LR62586

**TIMING MODE:** Input voltage must be applied continuously to operate the internal relay. Relay contacts transfer when the trigger input terminal is activated. The timing cycle begins when the trigger input terminal is deactivated. When the timing cycle is completed the relay will de-energize. The timing cycle may be reset to zero during the timing cycle by reactivating the trigger input terminal.

**TIMING DIAGRAM:**

<table>
<thead>
<tr>
<th>TRIGGER INPUT</th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.O. RELAY CONTACTS</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>TIME</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONTACT INFORMATION:**

Arrangement: 1 form A (SPST Normally open) – Diagram A
1 form B (SPST Normally closed) – Diagram A
1 form C (SPDT) - Diagram B

<table>
<thead>
<tr>
<th>Contact Rating (Resistive)</th>
<th>Max. switching power</th>
<th>30W, 50VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. switching voltage</td>
<td>60V DC, 125V AC</td>
<td></td>
</tr>
<tr>
<td>Max. switching current</td>
<td>1A DC, AC</td>
<td></td>
</tr>
<tr>
<td>Max. carrying current</td>
<td>0.5A AC, 1A 30V DC</td>
<td></td>
</tr>
</tbody>
</table>

UL/CSA rating: 0.5A AC, 1A 30V DC

Expected Life @ 25°C:
100,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**

Temperature Range: Operating and storage: -25°C to +60°C; (-13°F to +140°F)

**MECHANICAL INFORMATION:**

Termination: .110 inch, .250 inch or screw terminals
Enclosure: Black plastic case
Mounting: Single screw or optional 2-screw panel mount
Weight: 0.8 oz (23g) approx.

**OUTLINE DIMENSIONS:**

<table>
<thead>
<tr>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 1/16&quot;</td>
<td>11 1/8&quot;</td>
</tr>
<tr>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**

Diagram A

CR Series

1/2 A @ 115V AC
1/8 A @ 24V AC

**TIMING SPECIFICATIONS:**

- Timing - Fixed: 1 through 600 secs.
- Custom timing is available.
- Timing Adjustment: Knob adjustable potentiometer.
- Timing Tolerance:
  - Fixed Units: ± 5%
  - Adjustable Units: ± 0 to +25% of maximum specified delay time. Minimum specified value or less at low end.
- Repeatability: ± 5%
- Release Time: 60 ms typical, 100 ms maximum

**INITIAL DIELECTRIC STRENGTH:**

Between open contacts: 500V RMS, Between contacts & coil: 500V RMS

**INPUT INFORMATION:**

- Voltage: AC units- 12V, 24V, and 115V
- DC units- 12V, 24V, 48V and 110V

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V AC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V AC</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>115V AC</td>
<td>105V</td>
<td>130V</td>
</tr>
<tr>
<td>12V DC</td>
<td>11V</td>
<td>14V</td>
</tr>
<tr>
<td>24V DC</td>
<td>20V</td>
<td>32V</td>
</tr>
<tr>
<td>48V DC</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V DC</td>
<td>95V</td>
<td>125V</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION:**

Definition of a part number for the Amperite CR Series Time Delay Relay.

Example:

115 A NO R 1 -120 X C

A: Denotes nominal input voltage. Voltages Available:
12, 24 & 115V AC; 12, 24, 48 & 110V DC. Custom Voltages are available.
B: Denotes type of input current required for operation: A = AC - Alternating Current
D = DC - Direct Current
C: Denotes contact form: NO = Normally Open – 1 form A, C = Normally Closed – 1 form B,
SPDT = Single Pole, Double Throw – 1 form C
D: Denotes trigger reset function of CR Series TDR.
E & F: Denotes range of knob adjustability for timing (in seconds) where:
E = Minimum time delay, F = Maximum time delay for adjustable TDR’S.
Custom Timing is available.
2) Both values (E & F) can be replaced by a single value for a factory preset time delay in seconds from 1 through 600 secs.
G: Denotes form of termination - blank = .110 male electro-plate solder terminals,
X = .250 male quick connect terminals, S = screw terminals.
H: Denotes use of solid state analog circuitry of CR Series.
CR10 Series TDR

- Solid state analog circuitry
- Triggered delay on release timing mode
- DPDT (2 form C) isolated 10 amperes relay contacts
- Timing selection: Knob adjustable or Fixed
- Numerous models timing from 1 to 600 secs.
- UL File #E96739 (M)
- CSA File #LR62586-3

**TIMING MODE:** Input voltage must be applied continuously to operate the internal relay. Relay contacts transfer when the trigger input terminal is activated. The timing cycle begins when the trigger input terminal is deactivated. When the timing cycle is completed the relay will de-energize. The timing cycle may be reset to zero during the timing cycle by reactivating the trigger input terminal.

**TIMING DIAGRAM:**

<table>
<thead>
<tr>
<th>TRIGGER</th>
<th>INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>N.O. RELAY CONTACTS</td>
<td>TIME</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

**CONTACT INFORMATION:**
Arrangement: 2 form C (DPDT) - Diagrams C & D
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 10A @ 240V AC Resistive
15A @ 30V DC Resistive
15A @ 120V AC Resistive
1/3 HP @ 120V AC
1/2 HP @ 250V AC
Expected Life @ 25°C: 10 Million operations, Mechanical
100,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

**MECHANICAL INFORMATION:**
Termination: 11 pin Octal Style Plug or 11-pin spade terminal (Dia. C & D)
Enclosure: Black plastic case. Knob adjustable models have a dial scale for reference only
Weight: 4 oz (114g) approx.

**OUTLINE DIMENSIONS:**

<table>
<thead>
<tr>
<th>58</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>16mm</td>
<td>14mm</td>
</tr>
</tbody>
</table>

2.4mm Standard Octal Style

| 2.66 |
| 3.75mm |

2.4mm Optional Spade Terminal Style

| 3.465 |
| 88mm |

2.4mm Diagram A

| 0.465 |
| 7mm |

2.4mm Diagram B

2 Form C (DPDT)

**WIRING DIAGRAMS:**

**TIMING SPECIFICATIONS:**
Timing - Fixed: 1 through 600 secs.
Custom timing is available.
Timing Adjustment: Knob adjustable potentiometer.
Timing Tolerance:
Fixed Units: ± 5%
Adjustable Units: -0 to +25% of maximum specified delay time.
Minimum specified value or less at low end.
Repeatability: ± 5%
Release Time: 60 ms typical, 100 ms maximum
Timing Cycle Interrupt Transfer: none

**INITIAL DIELECTRIC STRENGTH:**
Between open contacts: 1000V RMS, Between adjacent contacts: 1500V RMS
Between contacts & coil: 1500V RMS

**INPUT INFORMATION:**
Voltage: AC units- 12V, 24V, and 120V
DC units- 12V, 24V, 48V and 110V
Other voltages are available
Power Requirement: AC units: 3 VA or less
DC units: 3 Watts or less
Transient Protection: 1 JOULE MOV
Polarity Protection: On DC units - Yes

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V AC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V AC</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>120V AC</td>
<td>105V</td>
<td>130V</td>
</tr>
<tr>
<td>12V DC</td>
<td>11V</td>
<td>14V</td>
</tr>
<tr>
<td>24V DC</td>
<td>20V</td>
<td>32V</td>
</tr>
<tr>
<td>48V DC</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V DC</td>
<td>95V</td>
<td>125V</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION:**
Definition of a part number for the Amperite CR10 Series Time Delay Relay.
Example:

120 A P R 1 -120 L C

A: Denotes nominal input voltage. Voltages Available: 12, 24 & 120V AC; 12, 24, 48 & 110V DC
Custom Voltages are available.
B: Denotes type of input current required for operation: A = AC - Alternating Current
D = DC - Direct Current
C: Denotes contact form: P = DPDT - 2 form C.
D: Denotes trigger reset function of CR10 Series TDR.
E & F: Denotes range of knob adjustability for timing (in seconds) where:
E = Minimum time delay. F = Maximum time delay for adjustable TDR’s.
Custom Timing is available.
2.) Both values (E & F) can be replaced by a single value for a factory preset time delay in seconds from 1 through 600 secs.
G: Enter “L” if optional 11-pin spade terminals are required (Diagrams B & D).
H: Denotes use of solid state analog circuitry of CR10 Series.
D Series Flasher

- Solid state analog flasher circuitry
- No moving parts to wear out
- 2A load rating
- Low cost
- Small size
- AC or DC units available
- 3 terminal configuration
- No current leakage to load
- UL File #E96739 (M)
- CSA File #LR62586

**TIMING MODE:** On/off recycling solid state flasher. The flash rates are fixed and are available from 2 to 1000 flashes per minute (FPM). Duty cycle is approximately 50% with custom duty cycles available.

**TIMING DIAGRAM:**

**OUTPUT CIRCUIT:**
AC units - triac; DC units - transistor

Rating: (Resistive): 2A @ 110 - 120V AC or DC
(Inrush): 10A maximum

Expected Life @ 25°C:
Solid state circuitry - no moving parts to wear out.

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Operating & storage: -23°C to +60°C,
(-10°F to +140°F)

**MECHANICAL INFORMATION:**
Termination: .110 inch, .250 inch, screw terminals, or 18" wires.
Enclosure: Black plastic case
Mounting: Single screw or optional 2-screw panel mount
Weight: 0.8 oz (23g) approx.

**OUTLINE DIMENSIONS:**

**WIRING DIAGRAM:**

**INPUT INFORMATION:**
Voltage: AC units- 6V, 12V, 24V, 48V and 115V
DC units- 6V, 12V, 24V, 48V and 110V

Power Requirement: AC units: 3 VA or less
DC units: 3 Watts or less

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V AC</td>
<td>5.4V</td>
<td>6.6V</td>
</tr>
<tr>
<td>12V AC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V AC</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>48V AC</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>115V AC</td>
<td>105V</td>
<td>130V</td>
</tr>
<tr>
<td>6V DC</td>
<td>5.4V</td>
<td>6.6V</td>
</tr>
<tr>
<td>12V DC</td>
<td>11V</td>
<td>14V</td>
</tr>
<tr>
<td>24V DC</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>48V DC</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V DC</td>
<td>95V</td>
<td>125V</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION:**
Definition of a part number for the Amperite D Series Flasher.
Example:

A: Denotes nominal input voltage. Voltages Available: 6, 12, 24, 48 & 115V AC
   8, 12, 24, 48 & 110V DC
   Custom Voltages are available.

B: Denotes type of input current required for operation: A = AC - Alternating Current
   D = DC - Direct Current

C: Denotes flasher configuration.

D: Denotes flash rate. Standard rates are 30, 45, 60, 75, 90 & 120 FPM.
   Custom rates are available from 2 to 1000 FPM.

E: Denotes current options - Blank = Standard, H = Higher Operating Current.

F: Denotes form of termination - Blank = .110 male electro-plate solder terminals,
   X = .250 male quick connect terminals, S = screw terminals, W = 3 18" wires.

G: Denotes use of solid state analog circuitry of D Series.
DC10 Series TDR

- Solid state CMOS digital circuitry
- Delay on operate timing mode
- DPDT (2 form C) isolated 10 ampere relay contacts
- Timing selection: Knob adjustable or Fixed
- Numerous models timing from 0.1 secs. to 1000 hours
- UL File #E96739 (M)
- CSA File #LR62586-3

**TIMING MODE:** Delay on operate timing cycle begins upon application of input power. The relay contacts transfer at the end of the delay period and will remain transferred until input voltage is removed. Reset occurs when input voltage is removed.

**TIMING DIAGRAM:**

- **INPUT** ON
- **VOLTAGE** OFF
- **N.O. RELAY** ON
- **CONTACTS** TIME

**CONTACT INFORMATION:**

Arrangement: 2 form C (DPDT) - Diagrams C & D
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 10A @ 240V AC Resistive
15A @ 30V DC Resistive
15A @ 120V AC Resistive
1/3 HP @ 120V AC
1/2 HP @ 250V AC
Expected Life @ 25°C:
  - 10 Million operations, Mechanical
  - 100,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**

Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

**MECHANICAL INFORMATION:**

Termination: 8 pin Octal Style Plug or 11-pin spade terminals (Dia. C & D)
Enclosure: White plastic case. Knob adjustable models have a dial scale for reference only. LDC version has a black case.
Weight: 4 oz (114g) approx.

**OUTLINE DIMENSIONS:**

<table>
<thead>
<tr>
<th>Standard Octal Style</th>
<th>Optional Spade Terminal Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagram A</td>
<td>Diagram B</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**

**TIMING SPECIFICATIONS:**

Timing - Fixed: 0.1 secs. through 1000 hours.
Timing Ranges: Standard timing ranges are as follows: 1 to 6 secs.,
.1 to 10 secs., 1 to 60 secs., 1.8 to 180 secs., 5 to 300 secs.,
1 to 60 mins., 1 to 60 hours. **Custom timing is available.**
Timing Adjustment: Knob adjustable potentiometer.
Timing Tolerance: Fixed Units: ± 5%; 1% units are available at extra cost.
  Adjustable Units: ±0 to +10% of maximum specified delay time.
  Minimum specified value or less at low end.
Repeatability: ± 1%
Release Time: 60 ms typical, 100 ms maximum
Timing Cycle Interrupt Transfer: none
Reset: Upon interruption of power

**INITIAL DIELECTRIC STRENGTH:**

Between open contacts: 1000V RMS, Between adjacent contacts: 1500V RMS,
Between contacts & coil: 1500V RMS

**INPUT INFORMATION:**

Voltage: AC units- 12V, 24V, and 120V
DC units- 12, 24V, 48V and 110V
Power Requirement: AC units- 3 VA or less
DC units: 3 Watts or less
Transient Protection: 1 JOULE MOV
Polarity Protection: On DC units - Yes

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V AC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V AC</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>120V AC</td>
<td>105V</td>
<td>130V</td>
</tr>
<tr>
<td>12V DC</td>
<td>11V</td>
<td>14V</td>
</tr>
<tr>
<td>24V DC</td>
<td>20V</td>
<td>32V</td>
</tr>
<tr>
<td>48V DC</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V DC</td>
<td>95V</td>
<td>125V</td>
</tr>
</tbody>
</table>

**Ordering Information:**

Definition of a part number for the Ampere
DC10 Series Time Delay Relay.

Example:

120 A P 60 S L DC

A: Denotes nominal input voltage. Voltages Available: 12, 24 & 120V AC; 12, 24, 48 & 110V DC.
B: Denotes type of input current required for operation: A = AC - Alternating Current,
  D = DC - Direct Current
C: Denotes contact form: P = DPDT - 2 form C.
D & E: Denotes range of knob adjustability for timing (in seconds, minutes or hours) where:
  D = Minimum time delay. E = Maximum time delay for adjustable TDR’S.
Note: 1) Ranges available: See standard timing ranges above. **Custom Timing is available.**
  2) Both values (D & E) can be replaced by a single value for a factory preset time delay in seconds, minutes or hours from 0.1 secs. through 1000 hours.
F: Denotes use of seconds, minutes or hours in timing value(s),
  S = seconds, M = minutes, H = hours.
G: Enter “L” if optional 11-pin spade terminals are required (Diagrams B & D).
H: Denotes use of solid state digital circuitry of DC10 Series.
DCR10 Series TDR

- Solid state CMOS digital circuitry
- Triggered delay on release timing mode
- DPDT (2 form C) isolated 10 ampere relay contacts
- Timing selection: Knob adjustable or Fixed
- Numerous models timing from 0.1 secs. to 1000 hours
- UL File #E96739 (M)
- CSA File #LR62586

TIMING MODE: Input voltage must be applied continuously to operate the internal relay. Relay contacts transfer when the trigger input terminal is activated. The timing cycle begins when the trigger input terminal is deactivated. When the timing cycle is completed the relay de-energize. The timing cycle may be reset to zero during the timing cycle by reactivating the trigger input terminal.

CONTACT INFORMATION:
Arrangement: 2 form C (DPDT) - Diagrams C & D
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 10A @ 240V AC Resistive
15A @ 30V DC Resistive
15A @ 120V AC Resistive
1/3 HP @ 120V AC
1/2 HP @ 250V AC
Expected Life @ 25°C :
10 Million operations, Mechanical
100,000 operations minimum at rated loads

ENVIRONMENTAL INFORMATION:
Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

MECHANICAL INFORMATION:
Termination: 11 pin Octal Style Plug or 11 pin spade terminals (Dia. C&D)
Enclosure: Black plastic case. Knob adjustable models have a dial scale for reference only.
Weight: 4 oz (114g) approx.

OUTLINE DIMENSIONS:

WIRING DIAGRAMS:

ORDERING INFORMATION:
Definition of a part number for the Amperite DCR10 Series Time Delay Relay.
Example:

120 A P 1 -60 M L
A B C D E F G H

A: Denotes nominal input voltage. Voltages Available: 12, 24 & 120V AC; 12, 24, 48 & 110V DC.
Custom Voltages are available.

B: Denotes type of input current required for operation: A = AC - Alternating Current,
D = DC - Direct Current

C: Denotes contact form: P = DPDT - 2 form C.
D & E: Denotes range of knob adjustability for timing (in seconds, minutes or hours) where:
D = Minimum time delay.
E = Maximum time delay for adjustable TDR's.

Note: 1.) Ranges available: See standard timing ranges above. Custom Timing is available.
2.) Both values (D & E) can be replaced by a single value for a factory preset time delay in seconds, minutes or hours from 0.1 secs. through 1000 hours.

F: Denotes use of seconds, minutes or hours in timing value(s).
S = seconds, M = minutes, H = hours.

G: Enter "L" if optional 11-pin spade terminals are required (Diagrams B & D).

H: Denotes use of solid state digital circuitry of DCR10 Series.
DF Series Flasher

- Solid state analog flasher circuitry
- No moving parts to wear out - totally encapsulated circuitry
- 2A load rating
- Low cost
- Small size
- Universal Input – 24V to 120V AC and DC operation in one device
- 2 terminal configuration - easy connection to load
- Factory fixed flash rates from 2 to 1000 FPM
- UL File #E96739 (M)
- CSA File #LR62586-3

**Timing Mode:** On/off recycling solid state flasher. The flash rates are fixed and are available from 2 to 1000 flashes per minute (FPM). Duty cycle is approximately 50% with custom duty cycles available.

**Timing Diagram:**

<table>
<thead>
<tr>
<th>INPUT VOLTAGE</th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAD VOLTAGE</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

**Output Circuit:**
Totally solid state switching device.

Rating: (Resistive): 2A @ 120V AC or DC
10mA minimum load
10A maximum
Higher loads and inrush capabilities are available.

Expected Life @ 25°C:
Solid state circuitry - no moving parts to wear out.

**Environmental Information:**
Temperature Range: Operating & storage: -23°C to +60°C, (-10°F to +140°F)

**Mechanical Information:**
Termination: .250 inch quick connect terminals are standard, .110 inch, screw terminals, or 18" wires are available.
Enclosure: Black plastic case
Mounting: Single screw or optional 2-screw panel mount
Weight: 2 oz (56g) approx.

**Outline Dimensions:**

**Timing Specifications:**
Flash Rate - Fixed: Standard - 30, 45, 60, 75, 90 & 120 FPM
Custom rates available from 2 to 1000 FPM.

Flash Rate Tolerance: ± 10%

**Input Information:**
Voltage: Universal input type: 24 - 120V AC or DC
Custom voltages from 5 - 240V are available.

Power Requirement: 3 Watts or less

**Input Voltages & Limits:**

<table>
<thead>
<tr>
<th>Nominal Voltage</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 - 120V AC/DC</td>
<td>22V AC/DC</td>
<td>125V AC/DC</td>
</tr>
</tbody>
</table>

**Wiring Diagram:**

Diagram A

**Note:** Optional 10 MA load may be used to reduce initial delay time.

Ordering Information:
Definition of a part number for the Amperite DF Series Flasher.
Example:

```
24-120 A E 60 H Q DF
```

A: Denotes input voltage: Universal input voltages from: 24 - 120V AC or DC
   Can be replaced by a single value from 5 - 240 for custom voltages.
B: For custom voltages – Denotes type of input current required for operation
   A = AC – Alternate Current, D = DC – Direct Current
C: Denotes flasher configuration.
D: Denotes flash rate. Standard rates are 30, 45, 60, 75, 90 & 120 FPM.
   Custom rates are available from 2 to 1000 FPM.
E: Denotes current options - Blank = Standard, H = Higher Operating Current.
F: Denotes form of termination – Blank = .250 Male Quick Connect Terminals,
   S = Screw Terminals, Q = .110 Male Solder Terminals, W = 2 18" wires.
G: Denotes solid state 2-terminal DF flasher.
DF10 Series Flasher

- Solid state analog flasher circuitry
- DPDT (2 form C) isolated 10 ampere relay contacts
- Fixed flash rate: Available from 10 to 240 FPM
- 12V to 120V input voltage available - Both AC and DC models
- UL File #E96739 (M)
- CSA File #LR62586-3

TIMING MODE: On/off recycling flasher. The flash rates are fixed and are available from 10 to 240 flashes per minute (FPM). Duty cycle is approximately 50% with custom duty cycles available.

TIMING DIAGRAM:

<table>
<thead>
<tr>
<th>INPUT VOLTAGE</th>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAD VOLTAGE</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

CONTACT INFORMATION:

Arrangement: 2 form C (DPDT) - Diagrams C & D
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 10A @ 240V AC Resistive
15A @ 30V DC Resistive
15A @ 120V AC Resistive
1/3 HP @ 120V AC
1/2 HP @ 250V AC

Expected Life @ 25°C:
10 Million operations, Mechanical
100,000 operations minimum at rated loads

ENVIRONMENTAL INFORMATION:

Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

MECHANICAL INFORMATION:

Termination: 8 pin Octal Style Plug or 11 pin spade terminal (Dia. C & D)
Enclosure: White plastic case. DF10 version has a black case.
Weight: 4 oz (114g) approx.

OUTLINE DIMENSIONS:

<table>
<thead>
<tr>
<th>Standard Octal Style</th>
<th>Optional Spade Terminal Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagram A</td>
<td>Diagram B</td>
</tr>
</tbody>
</table>

WIRING DIAGRAMS:

- Diagram C
- Diagram D

Ordering Information:

Definition of a part number for the Amperite DF10 Series Flasher.

Example:

- 120 A F 60 L DF10

A: Denotes nominal input voltage. Voltages Available: 12, 24, & 120V AC
   12, 24, 48 & 110V DC
   Custom Voltages are available.

B: Denotes type of input current required for operation: A = AC - Alternating Current
   D = DC - Direct Current

C: Denotes flasher configuration.

D: Denotes flash rate. Standard rates are 30, 45, 60, 75, 90 & 120 FPM
   Custom rates are available from 10 to 240 FPM

E: Enter “L” if optional 11-pin spade terminals are required (Diagrams B & D).

F: Denotes 10A DPDT (2 form C) flasher - DF10 Series.
Amperite DFA Series Adjustable Recycling Timer

- Solid state CMOS digital recycle (flasher) timer circuitry
- DPDT (2 form C) isolated 10 ampere relay contacts
- Off and On user-adjustable over a 100:1 span
- 12V to 120V input voltage available - both AC and DC models
- UL File #E96739 (M)
- CSA File #LR62586-5

The Amperite DFA series adjustable recycling timers provide a continuously operating on/off cycle as long as power is applied to the input terminals. Two knob operated potentiometers provide user adjustment of both the flash rate and duty cycle. One knob sets the Off time; the other sets the On time. Standard models allow both the Off time and On time to be adjusted over a 100:1 range. Custom timing is available.

**TIMING MODE:** Off/On recycling (flasher) timer. The initial timing period, after application of power, is “off”. An option allows the unit to cycle “on” upon application of power. Standard timing ranges (Off and On time) are as follows:

A: .1 second to 10 seconds  G: 1 hour to 4 hours
B: .25 second to 25 seconds  H: 14.4 minutes to 24 hours
C: .6 second to 60 seconds  I: .6 minutes to 60 minutes
D: 1.2 second to 120 seconds  J: .1 minute to 10 minutes
E: 1.8 second to 180 seconds  K: 10 minutes to 24 hours
F: 1 minute to 100 minutes  M: 1 hour to 10 hours

**Custom Timing Is Available. Fixed Timing Is Available From 0.1 secs thru 240 Hrs. If fixed timing is desired, please indicate S for secs., M for mins. & H for hours.**

**TIMING DIAGRAM:**

```
<table>
<thead>
<tr>
<th>INPUT</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLTAGE</td>
<td>OFF</td>
</tr>
</tbody>
</table>
```

<table>
<thead>
<tr>
<th>N.O.</th>
<th>CONTACTS</th>
<th>OFF TIME</th>
</tr>
</thead>
</table>

**CONTACT INFORMATION:**

Arrangement: 2 form C (DPDT) - Diagrams C & D
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 10A @ 240V AC Resistive
15A @ 30V DC Resistive
15A @ 120V AC Resistive
1/3 HP @ 120V AC
1/2 HP @ 250V AC

Expected Life @ 25°C: 10 Million operations, Mechanical 100,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**

Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

**MECHANICAL INFORMATION:**

Termination: B pin Octal Style Plug or 11-pin spade terminals (Dia. C & D)
Enclosure: White plastic case. Knob adjustable models have a dial scale for reference only. LDFA version has a black case.
Weight: 4 oz (114g) approx.

**TIMEING SPECIFICATIONS:**

Timing - Fixed: 0.1 secs thru 240 Hrs.
Timing Adjustment: Two (2) knob adjustable potentiometers.
Timing Ranges: See Above
Timing Tolerance:
- Fixed Units: ± 5%; 1% units are available at extra cost.
- Adjustable Units: -0% to +10% of maximum specified delay time.
Minimum specified value or less at low end.

Repeatability: ± 1%
Release Time: 60 ms typical, 100 ms maximum
Timing Cycle Interrupt Transfer: none
Reset: Upon interruption of power

**INITIAL DIELECTRIC STRENGTH:**

Between open contacts: 1000V RMS
Between adjacent contacts: 1500V RMS
Between contacts & coil: 1500V RMS

**INPUT INFORMATION:**

Voltage: AC units - 12V, 24V and 120V
DC units - 12V, 24V, 48V and 110V
Power Requirement: AC units: 3 VA or less
DC units: 3 Watts or less
Transient Protection: 1 JOULE MOV + Polarity Protection: On DC units - Yes

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V AC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V AC</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>120V AC</td>
<td>105V</td>
<td>130V</td>
</tr>
</tbody>
</table>

**OUTLINE DIMENSIONS:**

- Standard Octal Style Diagram A
- Optional Spade Terminal Style Diagram B
- WIRING DIAGRAMS:

A: Denotes nominal input voltage. Voltages Available: 12, 24, & 120V AC; 12, 24, 48 & 110V DC
B: Denotes type of input current required for operation: A = AC - Alternating Current
D = DC - Direct Current
C: Denotes first timing period. See timing mode chart above for proper code letter.
For standard units this is an "OFF" time delay. Fixed timing available.
If fixed timing is desired, please indicate S for secs., M for mins. or H for hours.
D: Denotes second timing period. For standard units this is an "ON" timing period. Fixed timing available.
E: Add "R" only if the "ON" time delay period is to occur first. When using "R" option, enter timing range for ON-Time in "C" & OFF-Time in "D".
F: Enter "L" if optional 11-pin spade terminals are required (Diagrams B & D).
G: Denotes 10 ampere 2 form C adjustable recycle flasher - DFA Series.
DFS Series Solid State AC and DC Flashers

- 100% solid state circuitry – no moving parts
- Zero AC voltage switching – no RFI
- 3 ampere and 12 ampere models available
- Suitable for incandescent and inductive loads
- Fixed flash rate from 1 to 1000 FPM
- Duty cycle 50%
- UL File #E96739 (M)
- CSA File pending

**TIMING MODE:**
On/off recycling solid state flasher. Flash rates are fixed and are available from 1 to 1000 flashes per minute (FPM). Duty cycle is 50%; other duty cycles available.

**TIMING DIAGRAM:**

**OUTPUT CIRCUIT:**
Solid state switching device. Current rating 3 amperes and 12 amperes (see chart). Inrush current rating 10 times steady state value. Expected Life @ 25°C: indefinite, no moving parts to wear out.

**ENVIRONMENTAL INFORMATION:**
Operating & storage temperature range: -23°C to +60°C, (-10°F to +140°F).

**MECHANICAL INFORMATION:**
Termination: 0.250 quick connect male terminals.
Enclosure: 2 x 2 x 3/4 inch black plastic case, epoxy sealed.
Center hole mounting. 12 ampere units must be mounted to a suitable heat sink for proper heat dissipation.

**OUTLINE DIMENSIONS:**

**WIRING DIAGRAM:**

**TIMING SPECIFICATIONS:**
Standard flash rates: 30, 45, 60, 75, 90 and 120 FPM. Custom rates are available.

**INPUT VOLTAGES:**
12, 24, 48, 120, and 240 volts 60 Hz AC; 12, 24, 36, 48, and 110 volts DC. See chart. Custom voltages are available.

**INPUT VOLTAGE LIMITS:** +/- 10% of nominal.

Ordering Information:
Refer to model chart below. Select appropriate model number in accordance with the power input and load current required, and specify desired flash rate in flashes per minute (FPM). Note: Custom voltages and flash rates are available; consult factory.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>VOLTAGE</th>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFS123</td>
<td>12V AC</td>
<td>3 AMPERES</td>
</tr>
<tr>
<td>DFS124</td>
<td>12V AC</td>
<td>12 AMPERES</td>
</tr>
<tr>
<td>DFS143</td>
<td>24V AC</td>
<td>3 AMPERES</td>
</tr>
<tr>
<td>DFS144</td>
<td>24V AC</td>
<td>12 AMPERES</td>
</tr>
<tr>
<td>DFS152</td>
<td>120V AC</td>
<td>3 AMPERES</td>
</tr>
<tr>
<td>DFS154</td>
<td>120V AC</td>
<td>12 AMPERES</td>
</tr>
<tr>
<td>DFS162</td>
<td>230V AC</td>
<td>3 AMPERES</td>
</tr>
<tr>
<td>DFS163</td>
<td>230V AC</td>
<td>12 AMPERES</td>
</tr>
<tr>
<td>DFS164</td>
<td>110-230V AC</td>
<td>3 AMPERES</td>
</tr>
<tr>
<td>DFS166</td>
<td>110-230V AC</td>
<td>12 AMPERES</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODEL</th>
<th>VOLTAGE</th>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFS219</td>
<td>12V DC</td>
<td>3 AMPERES</td>
</tr>
<tr>
<td>DFS220</td>
<td>12V DC</td>
<td>12 AMPERES</td>
</tr>
<tr>
<td>DFS224</td>
<td>24V DC</td>
<td>3 AMPERES</td>
</tr>
<tr>
<td>DFS225</td>
<td>24V DC</td>
<td>12 AMPERES</td>
</tr>
<tr>
<td>DFS236</td>
<td>36V DC</td>
<td>3 AMPERES</td>
</tr>
<tr>
<td>DFS237</td>
<td>36V DC</td>
<td>12 AMPERES</td>
</tr>
<tr>
<td>DFS248</td>
<td>48V DC</td>
<td>3 AMPERES</td>
</tr>
<tr>
<td>DFS249</td>
<td>48V DC</td>
<td>12 AMPERES</td>
</tr>
<tr>
<td>DFS290</td>
<td>110V DC</td>
<td>0.5 AMPERES</td>
</tr>
<tr>
<td>DFS291</td>
<td>110V DC</td>
<td>2 AMPERES</td>
</tr>
</tbody>
</table>

**EXAMPLE:** DFS152 - 60 denotes 120 volt AC power, 3 ampere load rating, 60 FPM.
MODEL - FPM
DFV Series Flasher

- Solid state analog flasher circuitry
- DPDT (2 form C) isolated 10 ampere relay contacts
- Variable flash rate: standard flash rate range 10-120 F.P.M.
- Single knob adjustment on top of unit
- 12V to 120V input voltage available - both AC & DC models
- UL File #E96739 (M)
- CSA File #LR62586

TIMING MODE: On/off adjustable recycling flasher. The flash rate is adjustable from 10 to 120 flashes per minute (FPM). Custom rates are available within ranges between minimum of 1 FPM & maximum of 240 FPM. Duty cycle is 50%. Flash rate is adjustable by means of a knob potentiometer on top of the unit.

INPUT VOLTAGE
ON
OFF
LOAD VOLTAGE
ON
OFF

CONTACT INFORMATION:
Arrangement: 2 form C (DPDT) - Diagram C & D
Contact Material: Silver - Cadmium Oxide
Rating (Resistive):
10A @ 240V AC Resistive
15A @ 30V DC Resistive
15A @ 120V AC Resistive
1/3 HP @ 120V AC
1/2 HP @ 250V AC

Expected Life @ 25°C:
10 Million operations, Mechanical
100,000 operations minimum at rated loads

ENVIRONMENTAL INFORMATION:
Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

MECHANICAL INFORMATION:
Termination: 8 pin Octal Style Plug or 11 pin spade terminals (Dia. C & D)
Enclosure: White plastic case with a dial scale for knob adjustment, reference only. LDFV version has a black case.
Weight: 4 oz (114g) approx.

DIMENSIONS:
Standard Octal Style

Optional Spade Terminal Style

WIRING DIAGRAMS:

Ordering Information:
Definition of a part number for the Amperite DFV Series Adjustable Flasher.

Example:

120 A E 10 -120 L DFV
A: Denotes nominal input voltage. Voltages Available: 12, 24 & 120V AC;
   12, 24, 48 & 110V DC
   Custom Voltages are available.
B: Denotes type of input current required for operation: A = AC - Alternating Current,
   D = DC - Direct Current
C: Denotes flasher configuration.
D & E: Denotes range of knob adjustability for flash rate where:
   D= Minimum number of flashes per minute (FPM),
   E= Maximum number of flashes per minute (FPM).
Note: Standard rate is from 10 to 120 FPM. Custom rates are available within ranges between minimum of 1 FPM and a maximum of 240 FPM.
F: Enter "L" if optional 11-pin spade terminals are required (Diagrams B & D).
G: Denotes 10A DPDT (2 form C) adjustable flasher - DFV Series.
DFW Series Wig-Wag Flasher

- Ideal for emergency vehicular use
- Solid state analog circuitry with alternating SPST relay contacts
- 15 AMP Relay contacts
- Small, compact, reliable and easy to install: only one wire runs to vehicle interior
- 12V DC input
- 5 terminal or 5 wire lead configuration

The Ampere Model DFW wig-wag flasher is a combination solid state/electromechanical device that is designed to alternately flash a pair of lamps on police, ambulance, school buses, EMS, and other emergency vehicles. Its flash rate of approximately 110 times per minute provides maximum warning effectiveness to both traffic and pedestrians.

The DFW flasher unit employs a pair of heavy duty automotive relays, each of which are driven by a silicon transistor connected in a switching configuration. The oscillator circuit provides proven solid state reliability while the relays allow control of heavy load currents without the need for a heat sink.

The units are small and compact, allowing easy installation in the engine compartment of any vehicle. It is epoxy encapsulated to provide maximum protection against vehicle and engine vibration. Two versions are available for installation, using quick-connect terminals or hard wiring to the vehicle harness.

**TIMING MODE**: On/off recycling flasher with alternating outputs. Flash rate is fixed at 110 FPM with a 50% duty cycle. Custom flash rates and duty cycles are available.

**WIRING DIAGRAM**:

- Battery + (pos)
- Load #1
- Load #2
- Connection to Headlamp Switched Power Source
- 1 (Red) Connect directly to battery + (pos) terminal
- 2 & 3 (Blue) Headlamps or other load (2 output wires)
- 4 (Black) Connect to terminal of Wig-Wag on-off switch. Connect normally open terminal of switch to chassis ground. 
  **NOTE**: This is the only wire that needs to be run to the interior of the vehicle.
- 5 (Orange) To existing headlamp power switch

**WIRING OPTIONS**:

- Option L: Flasher unit with quick connect terminals.
- Option H: Flasher unit with #14 gauge flexible wire terminations, approximately 18" (300 centimeters) long.

**ENVIRONMENTAL INFORMATION**:
- Temperature Range: Storage: -40°C to +155°C (-40°F to +311°F) Operating: -40°C to +125°C (-40°F to +257°F)

**CONTACT INFORMATION**:
- Arrangement: 2 SPST contacts - Normally open (2 form A)
- Rating: (Resistive): 15A for each output contact (Incapacitance): 200 watts maximum lamp load (each side)
- Load and Input Termination: quick connects or #14 gauge wire harness.
- Enclosure: Black plastic case
- Mounting: Two screw mounting wings.
- Weight: 4 oz (112g) approx.

**OUTLINE DIMENSIONS**:

11 1/8"

** TIMING SPECIFICATIONS**:
- Flash Rate - Fixed: Standard - 110 FPM
- Custom rates are available from 10 - 120 FPM.
- Flash Rate Tolerance: ± 10%

**INITIAL DIELECTRIC STRENGTH**: Between contacts & coil: 500V RMS

**INPUT INFORMATION**:
- Voltage: 10.5 to 16V DC
- Power Requirement: 2 Watts or less

**INPUT VOLTAGES & LIMITS**:

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V DC</td>
<td>10.5V DC</td>
<td>16V DC</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION**:
- Definition of a part number for the Ampere DFW Series Flasher.
- Example: 12E110H

A: Denotes nominal input voltage: Voltage Available: 12V DC
B: Denotes flasher configuration.
C: Denotes flash rate. Standard rate is 110 FPM.
D: Custom rates are also available from 10 to 120 FPM.
E: Denotes form of termination - H = #14 gauge flexible wire
- L = quick connect input and load terminals.
- E: Denotes DFW Series alternating flasher.
DFWS Series Solid State AC and DC Flashers
- 100% solid state circuitry – no moving parts
- Alternating output - drives two independent loads
- Zero AC voltage switching – no RFI
- 10 ampere current rating
- Suitable for incandescent and inductive loads
- Fixed flash rates from 1 to 1000 FPM
- Duty cycle 50%

TIMING MODE:
On/off alternating solid state flasher with two independent output circuits. Flash rates are fixed and are available from 1 to 1000 flashes per minute (FPM). Duty cycle is 50%; other duty cycles available.

OUTPUT CIRCUIT:
Solid state switching device. Current rating 10 amperes RMS. Inrush current rating 10 times steady state value. Expected Life @ 25°C: indefinite, no moving parts to wear out.

ENVIRONMENTAL INFORMATION:
Operating & storage temperature range:
-23°C to +60°C, (-10°F to +140°F).

MECHANICAL INFORMATION:
Termination: .250 quick connect male terminals.
Enclosure: 2 x 3 x 1-1/2 inch black plastic case, epoxy sealed.
Two hole mounting. For full load operation the unit must be mounted to a suitable heat sink for proper heat dissipation.

ORDERING INFORMATION:
Definition of a part number for the Amperite DFWS Series Alternating Flasher:
Example:

A: Denotes nominal input voltage. Voltages available: 12, 24, 48, 120, and 240 volts AC; 12, 24, 36, 48, and 110 volts DC. For other voltages consult factory.
B: Denotes type of input power required for operation, A = AC - Alternating Current; D = DC - Direct Current
C: Insert F for flasher.
D: Denotes number of flashes per minute (FPM). Standard rates are 30, 45, 60, 75, 90, and 120 FPM. Custom rates are available from 1 to 1000 FPM.
E: Denotes Amperite DFWS Series solid state alternating flasher.
DOD Series TDR

- Solid state analog circuitry
- True delay on dropout: Timing cycle after power removal
- DPDT (2 form C) isolated 4 ampere relay contacts
- Timing selection: Knob adjustable or Fixed
- Numerous models timing from 0.1 secs. to 300 secs
- UL File #E96739 (M)
- CSA File #LR62586

**TIMING MODE:** Upon the application of input voltage the relay immediately energizes. The timing cycle begins when input voltage is removed. When the timing cycle is complete, the relay will de-energize. The relay contacts will reset when input voltage is reapplied.

**CONTACT INFORMATION:**
Arrangement: 2 form C (DPDT) - Diagrams C & D
Contact Material: Gold Clad Silver Alloy
Rating: Maximum Switching Power - 1000 VA, 90W
(Resistive): Maximum Switching Voltage - 250V AC, 48V DC
Maximum Switching Current - 4 Ampere
Nominal Switching Capacity - 4A 250V AC, 3A 30V DC,
UL/CSA Ratings - 4A 1/20 HP 125, 250V AC, 3A 30V DC.
Expected Life @ 25°C:
100 Million operations, Mechanical
Electrical: 100,000 operations at 4A 250V AC
200,000 operations at 3A 30V DC

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Ambient: -40°C to +65°C (-40°F to +149°F)

**MECHANICAL INFORMATION:**
Termination: 8 pin Octal Style Plug or 11 pin spade terminals (Dia. C & D)
Enclosure: Black plastic case. Knob adjustable models have a dial scale for reference only.
Weight: 4 oz (114g) approx.

**OUTLINE DIMENSIONS:**

<table>
<thead>
<tr>
<th>Diagram A</th>
<th>Optional Spade Terminal Style</th>
<th>Diagram B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Octal Style</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.98</td>
<td>73 mm</td>
<td>1.76</td>
</tr>
<tr>
<td>58</td>
<td>15mm</td>
<td>24</td>
</tr>
<tr>
<td>2.4</td>
<td>81mm</td>
<td>2.4</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**

**Ordering Information:**
Definition of a part number for the Amperite DOD Series Time Delay Relay.
Example:

120 A .6 -60 S L DOD

A: Denotes nominal input voltage. Voltages Available: 12, 24 & 120V AC; 12, 24, 48 & 110V DC
B: Custom Voltages are available.

C & D: Denotes range of knob adjustability for timing (in seconds or minutes) where:
C= Minimum time delay.
D= Maximum time delay for adjustable TDR’s.

Note:
1) Ranges available: See standard timing ranges above. Custom Timing is available.
2) Both values (C & D) can be replaced by a single value for a factory preset time delay in seconds or minutes from 0.1 secs. through 300 secs.

E: Denotes use of seconds or minutes in timing value(s),
S = seconds, M = minutes.

F: Enter “L” if optional 11-pin spade terminals are required (Diagrams B & D).

G: Denotes DPDT (2 form C) 4 amp delay on dropout DOD Series Time Delay Relay.

**INPUT VOLTAGES & LIMITS:**
Nominal | Minimum | Maximum
--- | --- | ---
12V AC | 10V | 14V
24V AC | 20V | 28V
120V AC | 105V | 130V

**INPUT INFORMATION:**
Voltage: AC units - 12V, 24V, and 120V
DC units - 12V, 24V, 48V and 110V
Power Requirement: AC units: 2 VA or less, DC units: 2 Watts or less
Transient Protection: 1 JOULE MOV
Polarity Protection: On DC units - Yes
G Series TDR

- Hermetically sealed
- Delay on Make or Delay on Break timing modes
- Thermal device
- 3 AMP rating
- 1 - 115V input voltage range - works on AC or DC
- Isolated output contacts
- Fixed delay times only
- Initial and reset (release) delay device
- Long life
- UL File #E96739 (M)

**TIMING MODE:** Timing cycle begins upon application of power to the heater terminals. At the end of the initial delay time the relay contacts transfer and remain in a transferred state until input power is removed. When the heater input power is removed, the contacts transfer back to their original state at the end of a reset (release) delay period.

**CONTACT INFORMATION:**
Arrangement: 1 form A (SPST - Normally open) - Delay on Make
1 form B (SPST - Normally closed) - Delay on Break
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 3A @ 115V AC
Expected Life @ 25°C:
500,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Operating & storage: -55°C to +80°C, (-67°F to +176°F)

**MECHANICAL INFORMATION:**
Termination & Enclosure: Octal style, or 9-pin miniature style glass envelope. See Diagrams A & B.
Weight: 1 oz (28g)

**OUTLINE DIMENSIONS:**

<table>
<thead>
<tr>
<th>Diagram A</th>
<th>Diagram B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Octal Base</td>
<td>9-Pin Miniature Base</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**

Base Wiring 9-Pin Miniature
Pins 1 & 5 - Heater
Pins 3 & 4 - First Contact
Pins 8 & 9 - Second Contact

Base Wiring Standard Octal
Pins 2 & 3 - Heater
Pin 5 - First Contact
Pin 7 - Second Contact

**ORDERING INFORMATION:**
Definition of a part number for the Amperite G Series Time Delay Relay.
Example:

115  NO  60  T
A B C D

A: Denotes nominal input voltage. Voltages Available: 6, 12, 26, 50 & 115V AC/DC
Custom Voltages are available.

B: Denotes contact form: NO = normally open (Delay on Make) - 1 form A - SPST
C = normally closed (Delay on Break) - 1 form B - SPST

C: Denotes timing value: Factory preset time delays from 1 - 300 secs. are available (octal style) and 1 - 120 secs. (9-pin miniature style).

D: Denotes type of glass envelope: Blank = octal style. T = 9-pin miniature style.
GF Series Flasher

- Hermetically sealed
- Thermal flasher circuitry
- Long life
- 0.5A load rating @ 115V AC
- All units work on AC and DC input voltage
- Octal & 9-pin glass tube configuration
- 6V to 115V input voltages available
- UL File #E96739 (M)

**TIMING MODE:** Load is energized upon application of power. After initial delay time, flashing cycle begins.

**TIMING DIAGRAM:**

**CONTACT INFORMATION:**
Arrangement: 1 form B (SPST - Normally closed) - Delay on Break Contact Material: Silver - Cadmium Oxide Rating (Resistive): 0.5A @ 115V AC, 1.5A intermittent, 60 ma. minimum load
Expected Life @ 25°C:
500,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Operating & storage: -55°C to +80°C (-67°F to +176°F)

**MECHANICAL INFORMATION:**
Termination & Enclosure: Octal style, or 9-pin miniature style glass envelope. See Diagrams A & B.
Weight: 1 oz (28g) approx.

**OUTLINE DIMENSIONS:**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Standard Octal Base</th>
<th>9-Pin Miniature Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>2 3/4&quot; MAX</td>
<td>2 1/2&quot; MAX</td>
</tr>
<tr>
<td>Height</td>
<td>1 1/8&quot; MIN</td>
<td>7/8&quot; MAX</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**
Diagram C: Base Wiring 9-Pin Miniature
- Pins 1 & 6 - Heater
- Pins 3 & 4 - First Contact
- Pins 5 & 6 - Second Contact
Diagram D: Base Wiring Standard Octal
- Pins 2 & 3 - Heater
- Pin 5 - First Contact
- Pin 7 - Second Contact

**Ordering Information:**
Definition of a part number for the Ampere GF Series Flasher.
Example:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>F</td>
<td>45</td>
<td>T</td>
</tr>
</tbody>
</table>

A: Denotes nominal input voltage. Voltages Available: 6, 12, 26, 50 & 115V AC/DC

B: Denotes flasher configuration.

C: Denotes flash rate. Standard flash rates from 10 - 90 FPM are available.

H DFA Series Adjustable
Recycling Time Delay Relays (Flashers)

- 10 Ampere SPDT (1 form C) Switching
- CMOS digital timing circuitry
- OFF and ON-Time user adjustable
- Timing from milliseconds to hours

**DESCRIPTION:** The Amperite HDFA Series low cost adjustable recycling timers may be used to alternately switch one or two load circuits with both OFF-Time and ON-Time adjustable by means of two built-in potentiometers. A SPDT 10 amperes contact set alternates continuously as long as power is applied to the relay. Typical applications include OFF/ON cycling for equipment burn-in test, lighting controls, and automatic cycling of electrically operated devices.

**CONTACT INFORMATION:** 1 form C (SPDT) contact set. 1/2 HP @ 240 VAC, 1/3 HP @ 125 VAC. 10 amperes maximum @ 30 VDC or 250 VAC. Minimum switching load current 10 ma @ 5 VDC.

**TIMING MODE:** OFF/ON recycling (flashing) timer. Standard timing ranges are shown below. Custom and fixed timing are available; consult factory. **Note:** maximum time on high band to minimum time on low band must not exceed ration of 200:1

**TIMING RANGES:**
A: .25 to 10 secs.  
B: .25 to 25 secs.  
C: .6 to 60 secs.  
D: 1.2 to 120 secs.  
E: 1.8 to 180 secs.  
F: 1 to 100 min.  
G: 1 to 4 hrs.  
H: 14.4 min. to 24 hrs  
I: .6 to 60 min.  
J: .1 to 10 min.  
K: 10 min. to 24 hrs.  
L: 1 to 10 hrs.

**OUTLINE DIMENSIONS:**

```
2.00

.250 DIA. .250 MALE QUICK CONNECT TERMINALS

1.2

.75
```

**INFORMATION:**

**VOLTAGE:** AC units: 12V, 24V and 120V AC.  
DC units: 12V, 24V, 48V and 110V DC.  
**Custom voltages are available.**

**POWER REQUIREMENT:** AC units: 3 VA or less;  
DC units: 3 watts or less.

Polarity Protection on DC units – Yes.

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V AC</td>
<td>10V</td>
<td>14V</td>
<td>12V DC</td>
<td>11V</td>
<td>14V</td>
</tr>
<tr>
<td>24V AC</td>
<td>20V</td>
<td>28V</td>
<td>24V DC</td>
<td>20V</td>
<td>32V</td>
</tr>
<tr>
<td>120V AC</td>
<td>105V</td>
<td>130V</td>
<td>110V DC</td>
<td>96V</td>
<td>125V</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**

**MECHANICAL INFORMATION:**

Enclosure 2 x 2 x 3/4 inch black plastic, epoxy sealed. Center hole mounting. 1/4 inch quick connect male terminals.

**Ordering Information:**
Definition of a part number for the Amperite HDFA Series Recycling Relay:

**Example:**

```
120 A A / A R HDFA
```

<table>
<thead>
<tr>
<th>A:</th>
<th>Denotes nominal input voltage. Voltages available: 12V, 24V &amp; 120V AC; 12V, 24V, 48V &amp; 110V DC. <strong>Custom voltages are available.</strong></th>
</tr>
</thead>
</table>
| B: | Denotes type of control input power required for operation:  
A = AC - Alternating Current; D = DC - Direct Current. |
| C: | Denotes first timing period which is an "OFF" time delay.  
See chart above. If fixed time is required, specify time followed by S = seconds; M = minutes; or H = hours. |
| D: | Denotes second timing period; see chart above. For fixed timing, specify time followed by S = seconds; M = minutes; or H = hours. |
| E: | Add "R" only if the "ON" time delay period is to occur first. When using "R" option, enter timing range for ON-Time in "C" & OFF-Time in "D". |
| F: | Denotes Amperite HDFA Series 10 ampere SPDT recycling timer. |
HDOD Series Delay-On-Dropout Time Delay Relay

- Solid state CMOS digital circuitry
- True delay on dropout: Timing cycle after power removal
- DPDT (2 form C) isolated 4 ampere relay contacts
- Built-in timing adjust potentiometer
- Numerous models from 0.1 seconds to hours

**TIMING MODE:**
Upon the application of input voltage the relay immediately energizes. The timing cycle begins when input voltage is removed. When the timing cycle is complete, the relay will de-energize.

**TIMING DIAGRAM:**

**CONTACT INFORMATION:**
Arrangement: 2 form C (DPDT)
Contact Material: Gold Clad Silver Alloy
Rating: Maximum Switching Power – 1000 VA, 90W
(Resistive): Maximum Switching Voltage – 250V AC, 48 V DC
Maximum Switching Current – 4 Amperes
Nominal Switching Capacity – 4A 250V AC, 3A 30V DC
UL/CSA Ratings – 4 A 1/20 HP 125, 250V AC, 3A 30V DC
Expected Life: @ 25°C
- Mechanical: 100 Million operations
- Electrical: 100,000 operations at 4A 250V AC
- 200,000 operations at 3A 30V DC

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Ambient: -40°C to 65°C (-40° to +149°F)

**OUTLINE DIMENSIONS:**

**WIRING DIAGRAM:**

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>11V</td>
<td>15V</td>
</tr>
<tr>
<td>24V</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>48V</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V</td>
<td>95V</td>
<td>125V</td>
</tr>
<tr>
<td>120V</td>
<td>105V</td>
<td>130V</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION:**
Definition of a part number for the Amperite HDOD Series Time Delay Relay:
Example:

120 A 1 - 10 M HDOD

- A: Denotes nominal input voltage. Voltages available: 12, 24, and 120V AC; 12, 24, 48, and 110V DC.
- B: Denotes type of input power: A = AC, D = DC.
- C & D: Denotes timing range of knob adjustability. See standard ranges above.
  For fixed units specify a single number. Custom timing available.
- E: Denotes unit of time delay: S = seconds; M = minutes; H = hours
- F: Denotes Amperite HDOD Series DPDT 4 ampere delay-on-dropout TDR
Amperite Head-Alert Vehicular Headlight Modulator

- Enhancement of motorcycle headlamp illumination
- 100% Solid State
- Quick and easy installation
- Incandescent lamp power rating 120 watts
- Epoxy sealed
- Low cost
- High reliability

The Amperite HEAD-ALERT modulator has been designed to enhance awareness of motorcycle headlamp illumination in accordance with Federal Standard 49, CFR Part 571.106. An external disable switch (not included) is used to disable the modulation function during nighttime driving.

The HEAD-ALERT is a two-terminaial device that is connected in series with the power feed to the lamp (see the installation diagram at right). This safety device has been designed for motorcycle use, to provide additional awareness to other vehicles on the road during daylight hours.

The rate of modulation is 200 to 280 cycles per minute, with maximum power being applied to the headlamp for 50 to 70% of each cycle. During the low intensity portion of the cycle, power to the headlamp is held to not less than 17% of maximum intensity.

**OUTPUT CIRCUIT:**
Solid state switching transistor.

**POWER RATING:**
120 Watts incandescent.

**INPUT VOLTAGES:**
11 to 16 volts (standard automotive range).

**ENVIRONMENTAL INFORMATION:**
Operating temperature range -40°C to +60°C. (-40°F to +140°F).

**MECHANICAL:**
Glass reinforced black Lexan plastic, epoxy encapsulated for maximum protection against moisture and vibration.
Termination: Two 1/4 inch quick-connect male terminals.
Size: 1 3/4 x 7/8 x 11/8 inches (45 x 22 x 29 mm).
Single hole mounting, or two hole panel mount available at extra cost.

**INSTALLATION INSTRUCTIONS:**
The Amperite HEAD-ALERT headlamp modulator is a two-terminal device that is connected in series with the headlamp of a motorcycle or other vehicle. Use the following procedure for installation:
1. Locate the +12 volt wire that feeds the headlamp of the vehicle. This lead will have a +12 volt potential when the headlamp is switched on, and zero volts when the headlamp is switched off. Turn power off
2. Noting where the HEAD-ALERT module is to be mounted, cut the 12 volt feed wire at a location where it is in close proximity.
3. Strip both cut ends about 1/4 inch, being careful not to cut into the copper wires.
4. Crimp or solder a 1/4 inch quick-connect female terminal to each cut end.
5. Locate the cut wire that comes from the headlamp switch, and connect it to the positive terminal of the HEAD-ALERT module.
6. Locate the cut wire that feeds the headlamp and connect it to the negative side of the HEAD-ALERT module.
7. IMPORTANT: Reverse polarity connections will destroy the HEAD-ALERT module. Check the wiring carefully before applying power.

**INSTALLATION DIAGRAM:**

```
TERMINAL VIEW SHOWN

HEADLAMPOFF
MODULATION FREQUENCY 250 HERTZ
HEADLAMP ON

HEADLAMP
POWER SOURCE
DISABLE
SWITCH
CHASIS
```
Amperite Head-Alert 2 Motorcycle Headlight Modulator

- Enhancement of motorcycle headlamp illumination
- Quick and easy installation
- Incandescent lamp power rating 120 watts
- Photo-electric sensor equipped
- Epoxy sealed
- High reliability

The Amperite HEAD-ALERT 2 modulator has been designed to enhance awareness of motorcycle headlamp illumination in accordance with Federal Standard 49, CFR Part 571.106. Modulation of motorcycle headlamps has been shown to significantly reduce collisions between motorcycles and other vehicles.

The HEAD-ALERT 2 is a three wire device that is connected in series with either the high beam or low beam feed wire to the bulb. (See the installation diagram.) A photo-electric sensor is included in the unit to disable modulation at night-time as required by Federal law.

The rate of modulation is 200 to 280 cycles per minute, with maximum power being applied to the headlamp for 50 to 70% of each cycle. During the low intensity portion of the cycle, headlamp power is held to not less than 17% of maximum power.

**OUTPUT CIRCUIT:**
Solid state switching transistor.

**POWER RATING:**
120 Watts incandescent.

**INPUT VOLTAGES:**
11 to 16 volts (standard automotive range).

**ENVIRONMENTAL INFORMATION:**
Operating temperature range –40°C to +60°C. (–40°F to +140°F).

**MECHANICAL:**
Black plastic enclosure, epoxy sealed for protection against moisture and vibration. Size: 2 1/8 x 1 1/2 x 3/4 inches.
Three wire termination about 12 inches long.
Photocell assembly cable length 18 inches.

**TIMING DIAGRAM:**
MODULATION FREQUENCY 260 HERTZ
HEADLAMP ON
HEADLAMP OFF
0.25 SEC. 0.1 SEC.

**INSTALLATION INSTRUCTIONS:**
The Amperite HEAD-ALERT 2 is a three wire device that is connected in series with either the high-beam or low-beam +12 volt wire to the headlamp bulb. Only negative-ground systems may be accommodated. Use the following installation procedure:

1. Locate the +12 volt wire that feeds the high-beam or low-beam of the headlamp bulb. This wire will have a +12 volt potential when the desired beam is energized, and zero volts when not. Turn power off
2. Select a location for the HEAD-ALERT 2 module.
3. Cut the +12 volt feed wire at a convenient location. Strip back both ends, being careful not to cut into the copper wires.
4. Connect the green lead of the HEAD-ALERT 2 module to the cut end that feeds the headlamp bulb. Use crimp terminals, wire nuts, or solder as desired.
5. Connect the other cut wire (+12 volt feed from the high-beam/low-beam switch) to the red wire of the HEAD-ALERT 2 module.
6. Connect the black lead of the HEAD-ALERT 2 module to chassis’ ground.
7. If necessary, use insulation to cover any exposed wires.
8. IMPORTANT: Reverse polarity connections will destroy the HEAD-ALERT 2 module. Check wiring carefully before applying power.
9. Locate and secure a place on the motorcycle for the photo sensor. It should be placed pointing up to measure ambient light coming from the sky.

**INSTALLATION DIAGRAM:**

High Beam Installation Shown
ST1 Series Solid State Delay-On-Make Timers

- 100% solid state circuitry - no moving parts
- Two terminal series connection to load
- Fixed or field adjustable delays from milliseconds to hours
- Up to 1 ampere continuous load current
- CMOS digital circuitry
- UL File #E96739 (M)
- CSA File #LR62586

**TIMING MODE:**
Delay on operate begins upon application of input power. The load is energized at the end of the delay period and remains so until input power is removed.

**TIMING DIAGRAM:**

- **INPUT VOLTAGE**
  - ON
  - OFF

- **LOAD VOLTAGE**
  - ON
  - OFF

  **DELAY**

**CONTACT INFORMATION:**
Solid state switching device 1 form A, normally open series connection. Continuous current rating 1 amperes. Maximum inrush 10 amperes. Minimum load current 5 milliamperes. Voltage drop typically 2.5 volts RMS @ 1 amperes.

**TIMING SPECIFICATIONS:**
Timing: Factory fixed, or 0.1 seconds to 100 hours in any one of the ranges below. Timing is set by user supplied resistor or potentiometer. Custom timing available.

Timing ranges:
- .1 to 10 seconds
- .2 to 20 seconds
- 1 to 100 seconds
- 10 to 1000 seconds
- .1 to 10 minutes
- 1 to 100 minutes
- 10 to 1000 minutes
- 1 to 100 hours

Timing tolerance: fixed units = +/- 10%
Timing repeatability: +/- 2%
Timing cycle interrupt transfer: none

**OUTLINE DIMENSIONS:**

- 2.00
- .75
- .250 MALE QUICK CONNECT TERMINALS
- 250 DIA.

**AC (60 Hz) and DC INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>36V</td>
<td>30V</td>
<td>42V</td>
</tr>
<tr>
<td>48V</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V</td>
<td>95V</td>
<td>125V</td>
</tr>
<tr>
<td>120V</td>
<td>105V</td>
<td>130V</td>
</tr>
<tr>
<td>230V</td>
<td>190V</td>
<td>255V</td>
</tr>
</tbody>
</table>

**EXTERNAL RESISTOR SELECTION:**

<table>
<thead>
<tr>
<th>0</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>90</td>
<td></td>
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<td>80</td>
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<td>50</td>
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<td>30</td>
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</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS:**

- POWER INPUT
- LOAD

- POWER INPUT
- LOAD

**MECHANICAL INFORMATION:**
Enclosure 2 x 2 x 3/4 inch black plastic, epoxy sealed. Center hole mounting. Two or four 1/4 inch quick connect male terminals.

**Ordering Information:**
Definition of a part number for the Amperite ST1 Series Time Delay Relay:
Example:

<table>
<thead>
<tr>
<th>120</th>
<th>A</th>
<th>1 - 100</th>
<th>S</th>
<th>ST1</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
</tbody>
</table>

A: Denotes nominal input voltage. Voltages available 12, 24, 48, 120 and 230 volts AC, 12, 24, 36, 48 and 110 volts DC. For other voltages consult factory.

B: Denotes type of input power required for operation.

C: Alternating Current
D: Direct Current

C & D: Denotes range of adjustability using an external resistor or potentiometer, where C is the minimum timing and D is the maximum timing. Standard timing span is 100:1. For fixed timing units specify a single number.

E: Denotes unit of time delay: S = seconds; M = minutes; H = hours.

F: Denotes Amperite ST1 Series solid state, normally open time delay.
ST1A Series Solid State Delay-On-Make Timers

- 100% solid state circuitry – no moving parts
- CMOS digital circuitry
- Fixed or field adjustable delays from milliseconds to hours
- 2 ampere continuous load current
(10 amperes available; consult factory)

**TIMING MODE:**
Delay on operate begins upon application of input power. The load is energized at the end of the delay period and remains so until input power is removed.

**CONTACT INFORMATION:**
Solid state switching device 1 form A; normally open series connection. Continuous current rating 2 amperes. Maximum inrush 20 amperes. Voltage drop 2.5 volts RMS or less @ 2 amperes. (For 10 ampere load current rating consult factory).

**NOTE:** Maximum current rating for 110V DC is 2 amperes (heat sink required).

**TIMING SPECIFICATIONS:**
Timing: Factory fixed, or 0.1 seconds to 100 hours in any of the ranges below. Timing is set by user supplied resistor or potentiometer.

Custom timing available.

Timing ranges:
- .1 to 10 seconds 1 to 100 minutes
- .2 to 20 seconds 10 to 1000 minutes
- 1 to 100 seconds .1 to 10 hours
- 10 to 1000 seconds 1 to 100 hours
- .1 to 10 minutes

Timing tolerance: fixed units = +/- 10%
Timing repeatability: 2%
Timing cycle interrupt transfer: none

**OUTLINE DIMENSIONS:**

**AC (60 Hz) and DC Input Voltages & Limits:**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>10V</td>
<td>14V</td>
<td></td>
</tr>
<tr>
<td>24V</td>
<td>20V</td>
<td>28V</td>
<td></td>
</tr>
<tr>
<td>48V</td>
<td>41V</td>
<td>55V</td>
<td></td>
</tr>
<tr>
<td>110V</td>
<td>95V</td>
<td>155V</td>
<td></td>
</tr>
<tr>
<td>120V</td>
<td>105V</td>
<td>130V</td>
<td></td>
</tr>
<tr>
<td>230V</td>
<td>190V</td>
<td>255V</td>
<td></td>
</tr>
</tbody>
</table>

**EXTERNAL RESISTOR SELECTION:**

**WIRING DIAGRAMS:**

**MECHANICAL INFORMATION:**

Enclosure 2 x 2 x 3/4 inch black plastic, epoxy sealed. Center hole mounting. Three or five 1/4 inch quick connect male terminals.

**Ordering Information:**
Definition of a part number for the Amperite ST1A Series Time Delay Relay:

Example: 120 A .1 - 10 S ST1A

<table>
<thead>
<tr>
<th>A:</th>
<th>B:</th>
<th>C:</th>
<th>D:</th>
<th>E:</th>
<th>F:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denotes nominal input voltage. Voltages available 12, 24, 120 and 230V AC, 12, 24, 48 and 110V DC. Custom voltages are available, consult factory.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denotes type of input power required for operation. A = AC - Alternating Current; D = DC - Direct Current</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C &amp; D: Denotes range of adjustability using an external resistor or potentiometer, where C is the minimum timing and D is the maximum timing. Standard timing span is 100:1. For fixed timing units specify a single number. See standard ranges above.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denotes unit of time delay: S = seconds; M = minutes; H = hours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denotes Amperite ST1A Series solid state delay-on-make timer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ST2 Series Solid State
Interval (One-Shot) Timers

- 100% solid state circuitry - no moving parts
- CMOS digital timing circuitry
- Fixed or field adjustable delays from milliseconds to hours
- 2 amperes continuous load current
  (10 amperes available; consult factory)

TIMING MODE: Upon application of power the load is
energized and the time delay cycle is initiated. At the end of
the delay time the load is deenergized. Reset is accomplished
by removing input power.

TIMING DIAGRAM:

- CONTACT INFORMATION: Solid state switching device
  1 form A; normally open series connection. Continuous current
  rating 2 amperes. Maximum inrush 20 amperes. Voltage drop
  2.5 volts RMS or less @ 2 amperes.
  (For 1 ampere load current rating consult factory).
  
  NOTE: Maximum current rating for 110V DC units is 2 amperes
  (Heat sink required).

TIMING SPECIFICATIONS: Timing: Factory fixed, or .1 seconds
to 100 hours in any of the ranges below.
Timing is set by user supplied resistor or potentiometer.

Custom timing available.
Timing ranges:
.1 to 10 seconds 10 to 1000 seconds 10 to 1000 minutes
.2 to 20 seconds .1 to 10 minutes .1 to 10 hours
1 to 100 seconds 1 to 100 minutes 1 to 100 hours

Timing tolerance: fixed units +/- 10%
Timing repeatability: 2%
Timing cycle interrupt transfer: none

OUTLINE DIMENSIONS:

Ordering Information:
Definition of a part number for the Amperite
ST2 Series Time Delay Relay:
Example:

120  A  .1  - 10  M  ST2
A B C D E F

AC (60 Hz) and DC INPUT VOLTAGES & LIMITS:

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>48V</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V</td>
<td>95V</td>
<td>125V</td>
</tr>
<tr>
<td>120V</td>
<td>105V</td>
<td>130V</td>
</tr>
<tr>
<td>230V</td>
<td>190V</td>
<td>255V</td>
</tr>
</tbody>
</table>

EXTERNAL RESISTOR SELECTION:

WIRING DIAGRAMS:

MECHANICAL INFORMATION:
Enclosure 2 x 2 x 3/4 inch black plastic, epoxy sealed.
Center hole mounting. Three or five 1/4 inch quick connect male terminals.

A: Denotes nominal input voltage. Voltages available: 12V, 24V, 120V &
230V AC; 12V, 24V, 48V & 110V DC.
Custom voltages are available.

B: Denotes type of input power required for operation:
A = AC - Alternating Current; D = DC - Direct Current.

C & D: Denotes range of adjustability by using an external resistor or
potentiometer, where C is the minimum timing and D is the
maximum timing. Standard timing span is 100:1. For fixed timing
units specify a single number.

E: Denotes unit of time delay: S=seconds; M=minutes; H=hours.

F: Denotes Amperite ST2 Series solid state, normally open time delay.
STB Series Solid State Triggered Delay-On-Release Timers

- 100% solid state circuitry - no moving parts
- CMOS digital timing circuitry
- Fixed or field adjustable delays from milliseconds to hours
- 2 amperes continuous load current
  (10 amperes available; consult factory)

TIMING MODE: Power is applied to the relay prior to the timing cycle. Upon application of power to the trigger input terminal the load is energized. When power is removed from the trigger terminal the time delay cycle is initiated. At the end of the delay time the load is deenergized. Reset is accomplished by reapplying power to the trigger input terminal.

CONTACT INFORMATION: Solid state switching device
1 form A; normally open series connection. Continuous current rating 2 amperes. Maximum inrush 20 amperes. Voltage drop 2.5 volts RMS or less @ 2 amperes.
(For 10 amper load current rating consult factory).  
NOTE: Maximum current rating for 110V DC is 2 amperes (heat sink required).

TIMING SPECIFICATIONS: Timing: Factory fixed, or .1 seconds to 100 hours in any one of the ranges.
Timing is set by user supplied resistor or potentiometer.
Custom timing available.
Timing ranges:
.1 to 10 seconds 10 to 1000 seconds 10 to 1000 minutes
.2 to 20 seconds .1 to 10 minutes .1 to 10 hours
1 to 100 seconds 1 to 100 minutes 1 to 100 hours
Timing tolerance: fixed units +/- 10%
Timing repeatability: 2%
Timing cycle interrupt transfer: none

OUTLINE DIMENSIONS:

Ordering Information:
Definition of a part number for the Amperite STB Series Time Delay Relay:
Example:


Custom voltages are available.

B: Denotes type of input power required for operation:
A = AC - Alternating Current; D = DC - Direct Current.

C & D: Denotes range of adjustability by using an external resistor or potentiometer, where C is the minimum timing and D is the maximum timing. Standard timing span is 100:1. For fixed timing units specify a single number.

E: Denotes unit of time delay: S=seconds; M=minutes; H=hours.

F: Denotes Amperite STB Series triggered delay-on-release relay.
ST1D Series Solid State Delay-On-Make Timer

- 100% Solid State Circuitry – no moving parts
- CMOS digital circuitry
- Adjustable delay by means of a 10 position DIP switch
- 3 ampere continuous load current
  (10 amperes available; consult factory)
- CSA File #LR62586

**TIMING MODE:**
Delay on operate begins upon application of input power. The load is energized at the end of the delay period and remains so until input power is removed.

**TIMING DIAGRAM:**

<table>
<thead>
<tr>
<th>INPUT</th>
<th>LOAD</th>
<th>DELAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLTAGE ON</td>
<td>VOLTAGE ON</td>
<td></td>
</tr>
<tr>
<td>VOLTAGE OFF</td>
<td>VOLTAGE OFF</td>
<td></td>
</tr>
</tbody>
</table>

**CONTACT INFORMATION:**
Solid state switching device 1 form A; normally open series connection. Continuous current rating 3 amperes. Maximum inrush 20 amperes. Voltage drop 2.5 volts RMS or less @ 3 amperes.

*For 10 ampere load current rating consult factory.*

**NOTE:** Maximum current rating for 110V DC is 2 amperes (heat sink required).

**TIMING SPECIFICATIONS:**
Two timing ranges available:
- .2 to 102.3 seconds in increments of 0.1 second and 1 to 1023 seconds in increments of 1 second.

*Custom timing available.*
Timing adjustment by means of a 10 position DIP switch encoded in binary format (1, 2, 4, 8, etc.)
Timing accuracy: +/- 5% plus 1/2 increment
Timing repeatability: 2%
Timing cycle interrupt transfer: none

**OUTLINE DIMENSIONS:**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>.250 DIA.</td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>

**WIRING DIAGRAM:**

**MECHANICAL INFORMATION:**
Enclosure 2 x 2 x 3/4 inch black plastic, epoxy sealed. Center hole mounting. Three 1/4 inch quick connect male terminals.

**Ordering Information:**
Definition of a part number for the Amperite ST1D Series Time Delay Relay:
Example:

A: Denotes nominal input voltage. Voltages available 12, 24, 48, 110 and 120V AC or DC. *Custom voltages are available; consult factory.*
B: Denotes input current:
  A = AC - Alternating Current;  D = DC - Direct Current
C: Denotes range of timing adjustability using built-in DIP switch. Ranges available are listed above.
D: Denotes unit of time delay: S = seconds.
E: Denotes Amperite ST1D Series solid state delay-on-make timer.
Amperite STOP-ALERT™ Automotive Lamp Pulsator

- Enhancement of automotive lamp illumination
- Solid state circuitry - no moving parts
- Quick and simple 2 terminal installation
- For all 12 volt vehicular electrical systems
- Incandescent power rating 60 watts continuous; 120 watts intermittent
- Epoxy sealed
- Low Cost
- High reliability

The Amperite STOP-ALERT™ automotive lamp pulsator is a 100% solid state device that is connected in series with one or more automotive lamps. It controls current to the lamps to produce a moderate “pulsating” or “glimmering” effect of the lamp illumination for increased awareness and safety.

The standard 300 pulse per minute, 85% duty cycle yields a substantial increase in visual effectiveness (when compared to constant illumination) without the distraction level generated by common flashers. The Amperite STOP-ALERT™ is ideal for many automotive uses such as certain headlight/taillight, stoplight, and back-up light applications. It can also be used to enhance lamp illumination on all emergency or police vehicles.

The STOP-ALERT™ is exceptionally small and easy to install. The 2 terminal unit is connected in series with the power line that feeds one or more lamps. No additional wires or connections are necessary. One pulsator can conservatively drive two standard #1156 or #1157 automotive lamps, or one headlamp.

**TIMING MODE:** On/off recycling automotive lamp pulsator. Standard pulse rate 300 pulses per minute (5 pulses per second) at a duty cycle of 85%. Custom pulse rates and duty cycles are available.

**OUTPUT CIRCUIT:**
Totally solid state switching device.

**POWER RATING:**
Continuous 60 watts incandescent
Intermittent 120 watts incandescent
Maximum surge current 160 amperes

**INPUT VOLTAGES & LIMITS:**
Continuous rating 11 to 15 volts (standard automotive range)
Surge voltage 50 volts maximum.

**ENVIRONMENTAL INFORMATION:**
Operating temperature range -40°C to +60°C,
(-40°F to +140°F)

**MECHANICAL INFORMATION:**
Enclosure: Glass reinforced black Lexan plastic; epoxy encapsulated for maximum protection against moisture and vibration.
Termination: 1/4 inch male quick connect terminals
Size: 13/4 x 7/8 x 11/8 inches.

**INSTALLATION DIAGRAM:**

**STOP-ALERT™ INSTALLATION PROCEDURE:**
A. Locate existing 12V power wire feeding lamp.
B. Cut and strip wire at convenient place.
C. Crimp supplied terminals to exposed wires.
D. Assemble power feed wire to terminal 1 of STOP-ALERT™.
E. Assemble lamp wire to terminal 2 of STOP-ALERT™.
Amperite Stop-Alert 2 & 2M Automotive Lamp Pulsators

- Enhancement of vehicle lamp illumination
- 100% Solid State
- Quick and easy installation
- For vehicular and motorcycle applications
- Incandescent lamp power rating 60 watts continuous, 120 watts intermittent
- Epoxy sealed
- Low cost
- High reliability

The Amperite STOP-ALERT 2 and 2M lamp pulsators are 100% solid state devices that are connected in series with the third brake light of automobiles, and the stop lamp of motorcycles, to enhance awareness of stop-lamp illumination. Each time the brakes of a vehicle are applied, the stop lamp flashes rapidly for a period of 5 seconds. If the brakes continue to be applied, the stop lamp remains illuminated until the brakes are released.

**TWO MODELS ARE AVAILABLE:**
The STOP-ALERT 2 is designed for "third" brake light automotive applications where the lamp common wire may be isolated from vehicle chassis. For motorcycles and other applications where the stop-lamp is permanently connected to battery negative, the STOP-ALERT 2M is required.

**ENVIRONMENTAL INFORMATION:**
Operating temperature range -40°C to +60°C.
(-40°F to +140°F).

**MECHANICAL:**
Glass reinforced black Lexan Plastic, epoxy encapsulated for protection against moisture and vibration.
Termination: Three 1/4 inch quick-connect male terminals.
Size: 13/4 x 7/8 x 11/8 inches (45 x 22 x 29 mm).
Single hole mounting, or two hole panel mount available at extra cost.

**INSTALLATION DIAGRAMS:**

**STOP-ALERT 2**

**TERMINAL VIEW SHOWN**

TO EXISTING STOP LAMP POWER FEED SOURCE

CHASIS

STOP LAMP

Automotive Installation

**STOP-ALERT 2M**

**TERMINAL VIEW SHOWN**

TO EXISTING STOP LAMP POWER FEED SOURCE

CHASIS

STOP LAMP

Motorcycle Installation

**TIMING DIAGRAM:**

<table>
<thead>
<tr>
<th>BRAKE</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STOP LAMP</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

**OUTPUT CIRCUIT:**
Solid state switching.

**POWER RATING:**
60 Watts continuous, 120 intermittent.

**INPUT VOLTAGES & LIMITS:**
Continuous rating 11 to 16 volts (standard automotive range).
Surge voltage 50 volts maximum.
SWDC Series Delay-On-Make Timers

- CMOS Digital Circuitry
- Timing adjustment with 10 position Dip Switch, 1023:1 span
- Adjustment resolution 1 part in 1023
- DPDT 10 amperes relay contacts

**TIMING MODE:**
Delay on operate timing cycle begins upon application of input power. The relay contacts transfer at the end of the delay period and will remain transferred until input voltage is removed. Reset occurs when input voltage is removed.

**INPUT VOLTAGE:**
ON
OFF

**TIME:**

**N.O. RELAY CONTACTS:**
ON
OFF

**CONTACT INFORMATION:**
Arrangement: 2 form C (DPDT) - Diagrams C & D
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 10A @ 240V AC Resistive
15A @ 30V DC Resistive
15A @ 120V AC Resistive
1/3 HP @ 120V AC
1/2 HP @ 250V AC

Expected Life @ 25°C:
- 10 Million operations, Mechanical
- 100,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

**MECHANICAL INFORMATION:**
Termination: 8 pin Octal Style Plug or 11 pin spade terminals (Dia. C & D).
Enclosure: White plastic case. "L" version has a black case.
Weight: 4 oz (114g) approx.

**OUTLINE DIMENSIONS:**
Standard Octal Style
Diagram A

Optional Spade Terminal Style
Diagram B

**WIRING DIAGRAMS:**
Diagram C
Diagram D

**TIMING SPECIFICATIONS:**
Timing: Three timing ranges, each covering a 1023:1 span, are standard. These are:
A: .1 second to 102 seconds
B: 1 second to 1023 seconds (17 minutes)
C: 10 second to 10230 seconds (2.84 hours)

Custom timing ranges are available.
Timing Adjustment: User operated 10 position DIP switch encoded in binary format.
Adjustment Resolution: Equal to minimum time delay.
Timing tolerance: +/- 2%
Timing repeatability: +/- 1%
Timing cycle interrupt transfer: none
Reset: Upon interruption of input power

**INITIAL DIELECTRIC STRENGTH:**
Between open contacts: 1000V RMS. Between adjacent contacts: 1500V RMS. Between contacts & coil: 1500V RMS

**INPUT INFORMATION:**
Voltage: AC units - 12V, 24V and 120V
DC units - 12V, 24V, 48V and 110V

Power Requirement:
AC units: 3 VA or less
DC units: 3 Watts or less
Transient Protection: 1 JOULE MOV
Polarity Protection: On DC units - Yes

**INPUT VOLTAGES & LIMITS:**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V AC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V AC</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>120V AC</td>
<td>105V</td>
<td>130V</td>
</tr>
<tr>
<td>12V DC</td>
<td>11V</td>
<td>14V</td>
</tr>
<tr>
<td>24V DC</td>
<td>20V</td>
<td>32V</td>
</tr>
<tr>
<td>48V DC</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V DC</td>
<td>95V</td>
<td>125V</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION:**
Definition of a part number for the Amperite SWDC Series Time Delay Relay.
Example:

120 A 1-1023 S L SWDC

A: Denotes nominal input voltage. Standard voltages are 12V, 24V and 120V AC;
12V, 24V, 48V and 110V DC. Custom Voltages are available.

B: Denotes type of input current required for operation:
A = AC - Alternating Current; D = DC - Direct Current

C & D: Denotes timing range of adjustability in seconds, minutes, or hours.

E: Denotes unit of time delay: S = seconds; M = minutes; H = hours.

F: Denotes form of termination: Leave blank for standard octal plug-in; Enter "L" if optional spade terminals are required (Diagrams B & D).

G: Denotes use of solid state digital circuitry of SWDC Series.
**SWPDC Series TDR**

- Solid state CMOS digital circuitry
- Delay on operate timing mode
- DPDT (2 form C) isolated 10 ampere relay contacts
- Timing Selection: 5 position binary coded Dip Switch plus vernier knob adjustment
- Twenty overlapping timing ranges covering .25 secs. to 160 hours.
- UL File #E96739 (M)
- CSA File #LR62586

**TIMING MODE:** Delay on operate timing cycle begins upon application of input power. The relay contacts transfer at the end of the delay period and will remain transferred until input voltage is removed. Reset occurs when input voltage is removed.

**INPUT DIAGRAM:**

- **VOLTAGE**
  - Input Voltage: On
  - Input Voltage: Off

- **N.O." Relay**
  - Normally Open Relay: On
  - Normally Open Relay: Off

- **CONTACT INFORMATION:**
  - Arrangement: 2 form C (DPDT) - Diagrams C & D
  - Contact Material: Silver - Cadmium Oxide
  - Temperature Rating (Resistive): 10A @ 240V AC Resistive
  - 15A @ 30V DC Resistive
  - 15A @ 120V AC Resistive
  - 1/3 HP @ 120V AC
  - 1/2 HP @ 250V AC
  - Expected Life @ 25°C:
    - 10 Million operations, Mechanical
    - 100,000 operations minimum at rated loads
  - **ENVIRONMENTAL INFORMATION:**
    - Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
    - Operating: -45°C to +70°C (-49°F to +158°F)
  - **MECHANICAL INFORMATION:**
    - Termination: 8 pin Octal Style Plug or 11 pin spade terminals (Dia. C & D)
    - Enclosure: White plastic case with a dial scale for reference only.
    - LSWPDC version has a black case.
    - Weight: 4 oz (114g) approx.

**OUTLINE DIMENSIONS:**

- **Standard Octal Style**
  - Diagram A
  - **Optional Spade Terminal Style**
  - Diagram B

**WIRING DIAGRAMS:**

- **Diagram C**
  - **Diagram D**

**ORDERING INFORMATION:**

- **Definition of a part number for the Amperite SWPDC Series Time Delay Relay**

Example:

```
120 - L
A B C D
```

A: Denotes nominal input voltage. Voltages Available:
- 12V - AC or DC, 24V - AC or DC, 48V - AC or DC, 110 - 120V - AC or DC.
**Custom Voltages are available.**

B: For custom voltages - denotes type of input current required for operation.
- A = AC – Alternating Current
- D = DC – Direct Current.

C: Enter "L" if optional 11-pin spade terminals are required (Diagrams B & D).

D: Denotes DPDT (2 form C) 10 amperes CMOS delay on operate SWPDC Series
Time Delay Relay with binary code five position Dip Switch and built in potentiometer.
SWRDC Series Time Delay Relay

- M36 DIN Rail Mounting 22.5 MM Wide or Octal Plug-in Style
- Solid State CMOS Digital Circuitry
- Delay on Operate Timing Mode
- DIN Style – SPDT, 8 Amps; Octal Style – 2 Form C, 10 Amps
- Rotary Switch Course Time Setting plus Fine Time Adjustment Potentiometer
- 16 Overlapping Timing Ranges from .1 Seconds to 120 Minutes
- 2 LED Indicators: Power On and Output Relay Energized

**Timing Mode:**
Delay on operate timing cycle begins upon application of input power. The relay contacts transfer at the end of the delay period and will remain transferred until input voltage is removed. Reset occurs when input voltage is removed.

**Timing Specifications:**
The SWRDC has 16 overlapping timing ranges covering 0.10 secs. to 120 minutes. Timing is user selectable by means of a 16 position rotary switch and potentiometer allowing the time delay within the range to be set precisely.

**Timing Adjustments:**

<table>
<thead>
<tr>
<th>Timing Range</th>
<th>Switch Position</th>
<th>Timing Range</th>
<th>Switch Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10 - 0.25 Secs.</td>
<td>A</td>
<td>15 - 60 Secs.</td>
<td>I</td>
</tr>
<tr>
<td>0.20 - 0.50 Secs.</td>
<td>B</td>
<td>30 - 120 Secs.</td>
<td>J</td>
</tr>
<tr>
<td>0.30 - 1.0 Secs.</td>
<td>C</td>
<td>1.0 - 4.0 Mins.</td>
<td>K</td>
</tr>
<tr>
<td>0.50 - 2.0 Secs.</td>
<td>D</td>
<td>2.0 - 8.0 Mins.</td>
<td>L</td>
</tr>
<tr>
<td>1.0 - 4.0 Secs.</td>
<td>E</td>
<td>4.0 - 15 Mins.</td>
<td>M</td>
</tr>
<tr>
<td>2.0 - 8.0 Secs.</td>
<td>F</td>
<td>8.0 - 30 Mins.</td>
<td>N</td>
</tr>
<tr>
<td>4.0 - 15 Secs.</td>
<td>G</td>
<td>15 - 60 Mins.</td>
<td>O</td>
</tr>
<tr>
<td>8.0 - 30 Secs.</td>
<td>H</td>
<td>30 - 120 Mins.</td>
<td>P</td>
</tr>
</tbody>
</table>

**Wiring Diagrams:**

**DIN Connection Chart:**

<table>
<thead>
<tr>
<th>1</th>
<th>Positive DC Input</th>
<th>5</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Ground</td>
<td>6</td>
<td>Common</td>
</tr>
<tr>
<td>3</td>
<td>Open</td>
<td>7</td>
<td>Normally Closed</td>
</tr>
<tr>
<td>4</td>
<td>Open</td>
<td>8</td>
<td>Normally Open</td>
</tr>
</tbody>
</table>

**Ordering Information:**
Definition of a part number for the Amperite SWRDC Series Time Delay Relay.

Example:

12D SWRDC - DIN

A: Denotes nominal input voltage. Voltages available: 12V DC and 24V DC. Custom voltages: Consult factory.

B: Denotes current type: D = DC, direct current.

C: Denotes CMOS delay on operate SWRDC Series Time Delay with rotary range selector with built-in potentiometer.

D: Leave blank for Octal Style; Add –DIN for DIN Rail M36 22.5 wide enclosure.
SWU DC Series TDR
- Solid state CMOS digital circuitry
- Four timing modes: Delay on operate; delay on release delay on operate & release, and interval or one-shot
- DPDT (2 form C) isolated 10 ampere relay contacts
- Timing Selection: Binary coded Dip Switch with knob adjustable potentiometer
- User selectable timing ranges covering 0.1 secs. to 77.5 hours.

**TIMING MODE:** The SWU DC Series time delay relay operates in any one of four timing modes, user selected by means of 2 sections (S8, S9) of a 9 position Dip Switch (the other 7 sections control timing). These modes are as follows:
- Delay on operate; delay on release; delay on operate and release; interval or one-shot. An external switch may be used to provide trigger control of the time delay cycle.

### TIMING DIAGRAMS & MODES:

#### Delay On Operate:
- Two operation methods:
  1. With external switch closed: delay on operate timing cycle begins upon application of input power. The relay contacts transfer at the end of the delay period and will remain transferred until input voltage is removed. Reset occurs when input voltage is removed.
  2. With external switch open: delay on operate timing cycle begins after the application of input power and the closure of the external switch. Upon switch closure the relay contacts transfer at the end of the delay period and will remain transferred until the input voltage is removed. Reset occurs when input voltage is removed.

**POWER**
- OFF
- ON

**EXT. SW**
- CLOSED
- OPEN

**CONTACTS**
- DE-ENERG
- ENERG

**Time Delay**

#### Delay On Release:
- Two operation methods:
  1. With external switch closed: Upon application of input voltage relay contacts transfer immediately. The timing cycle will begin when the external switch is opened. When the timing cycle is completed the relay contacts will release. The timing cycle may be reset to zero during the timing cycle by closing the external switch.
  2. With the external switch open: Upon application of input voltage and the closure of the external switch the relay contacts transfer immediately. The timing cycle will begin when the external switch is opened. When the timing cycle is completed the relay contacts will release. The timing cycle may be reset to zero during the timing cycle by closing the external switch.

**POWER**
- OFF
- ON

**EXT. SW**
- CLOSED
- OPEN

**CONTACTS**
- DE-ENERG
- ENERG

**Time Delay**

#### Delay On Operate and Release:
- With the external switch open input voltage is applied. With the closure of the external switch the delay on operate timing cycle begins and the delay on release timing cycle begins. With the re-opening of the external switch the relay on release timing cycle will begin and the relay contacts will transfer at the end of the delay period.

**POWER**
- OFF
- ON

**EXT. SW**
- CLOSED
- OPEN

**CONTACTS**
- DE-ENERG
- ENERG

**Time Delay**

#### Interval or One-Shot:
- With the external switch closed input power is applied. The relay contacts transfer immediately and the interval or one-shot timing cycle begins. When the timing cycle is completed the relay contacts will release. The timing cycle may be reset to zero during the timing cycle by removing input power.

**POWER**
- OFF
- ON

**EXT. SW**
- CLOSED
- OPEN

**CONTACTS**
- DE-ENERG
- ENERG

**Time Delay**

**CONTACT INFORMATION**:
- Arrangement: 2 form C (DPDT) - Diagrams C & D
- Contact Material: Silver – Cadmium Oxide
- Rating (Resistive):
  - 10A @ 240V AC Resistive
  - 15A @ 30V DC Resistive
  - 15A @ 240V AC Resistive
  - 1/3 HP @ 120V AC
  - 1/2 HP @ 250V AC
- Expected Life @ 25°C:
  - 10 Million operations, Mechanical
  - 100,000 operation minimum at rated loads

**ENVIRONMENTAL INFORMATION**:
- Temperature Range:
  - Storage: -60°C to +105°C (-76°F to +221°F)
  - Operating: -45°C to +70°C (-49°F to +158°F)

**MECHANICAL INFORMATION**:
- Termination: 11-pin Octal Style Plug or 11-pin Spade Terminals (Diagrams C & D).
  - Enclosure: White plastic case with a dial scale for knob adjustment, reference only. LSWU DC version has a black case.
  - Weight: 4 oz (114 g) approx.

**INITIAL DIELECTRIC STRENGTH**:
- Between open contacts: 1000V RMS, Between adjacent contacts: 1500V RMS, Between contacts and coil: 1500V RMS

**INPUT INFORMATION**:
- Voltage: 12V - AC or DC, 24V - AC or DC, 48V DC
  - 110-120V - AC or DC, Other voltages available.
- Power Requirements:
  - AC inputs: 3 VA or less
  - DC inputs: 3 Watts or less
- Transient Protection: 1 JOULE MOV
- Polarity Protection: On DC inputs - Yes

**INPUT VOLTAGES & LIMITS**:

<table>
<thead>
<tr>
<th>Nominal</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V AC</td>
<td>10V</td>
<td>14V</td>
</tr>
<tr>
<td>24V AC</td>
<td>20V</td>
<td>28V</td>
</tr>
<tr>
<td>120V AC</td>
<td>105V</td>
<td>130V</td>
</tr>
<tr>
<td>12V DC</td>
<td>11V</td>
<td>14V</td>
</tr>
<tr>
<td>24V DC</td>
<td>20V</td>
<td>32V</td>
</tr>
<tr>
<td>48V DC</td>
<td>41V</td>
<td>55V</td>
</tr>
<tr>
<td>110V DC</td>
<td>95V</td>
<td>125V</td>
</tr>
</tbody>
</table>

**WIRING DIAGRAMS**:

<table>
<thead>
<tr>
<th>Ext. Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>9</td>
</tr>
</tbody>
</table>
**TIME DELAY SELECTION PROCEDURE:** The SWUDC Series has four basic timing ranges selectable by means of two selections of a Dip Switch (S1 & S2). These ranges represent a starting point from which the user, utilizing Dip Switch positions S3 - S7, customizes a narrower timing range to suit his/her timing application. This custom timing range is knob adjustable with a 5:1 vernier control.

**HOW TO SELECT A TIME DELAY:**

1) **Determining The Appropriate Timing Range** – Set Dip Switch positions S1 & S2 as follows for the four basic timing ranges:

<table>
<thead>
<tr>
<th>Time Delay Range</th>
<th>Switch Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 0.1 sec. to 15.5 secs.</td>
<td>S1 ON, S2 ON</td>
</tr>
<tr>
<td>B. 10 secs. to 25 mins.</td>
<td>S1 OFF, S2 ON</td>
</tr>
<tr>
<td>C. 10 mins. to 25 hrs.</td>
<td>S1 OFF, S2 OFF</td>
</tr>
<tr>
<td>D. 30 mins. to 77.5 hrs.</td>
<td>S1 ON, S2 OFF</td>
</tr>
</tbody>
</table>

*Choose the range which most narrowly incorporates the time delay you desire, e.g., for 180 secs. choose range B set S1 to OFF and S2 to ON*

2) **Calculating The Multiplier For The Desired Time Delay** – Dip Switch positions S3 - S7 are used to set the multiplier which will customize your time delay range. The values are as follows:

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Multiplier Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3</td>
<td>16</td>
</tr>
<tr>
<td>S4</td>
<td>8</td>
</tr>
<tr>
<td>S5</td>
<td>4</td>
</tr>
<tr>
<td>S6</td>
<td>2</td>
</tr>
<tr>
<td>S7</td>
<td>1</td>
</tr>
</tbody>
</table>

**Total = 31**

The Formula – Once you have chosen the appropriate basic timing range, perform the following calculations – (to clarify the steps use the desired time delay of 180 secs. as an example):

A) For 180 seconds select range B (10 sec. to 25 mins.).
B) Divide the desired time delay (180 secs.) by the minimum time of the selected range, (Minimum time in range B is 10 secs.) 180/10 = 18. Always convert to the same time units (mins., sec., hrs.) when dividing.
C) The multiplier is equal to 1/2 of this quotient = 18/10 = 1.8. 18/2 = 9

Therefore the multiplier for 180 seconds is 9 and the user must set switches S3 - S7 as follows:

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3</td>
<td>16</td>
</tr>
<tr>
<td>S4</td>
<td>8</td>
</tr>
<tr>
<td>S5</td>
<td>4</td>
</tr>
<tr>
<td>S6</td>
<td>2</td>
</tr>
<tr>
<td>S7</td>
<td>1</td>
</tr>
</tbody>
</table>

*Select the on positions which add up to the multiplier.

The multiplier is always the closest number equal to half the quotient.

This formula will give you a 5:1 vernier knob adjustable timing range with the user desired time delay as the middle timing range. The approximate maximum of any timing range the user selects is always 2x the desired timing e.g. 2 x 180 = 360 secs. The maximum of the selected range will be 360 secs.

To determine the approximate minimum setting of the timing range simple divide the maximum setting by 5. e.g. 360/5 = 72 secs. Therefore, as per our example, to get a time delay of 180 secs. the switch positions will be as follows:

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>OFF</td>
</tr>
<tr>
<td>S2</td>
<td>ON</td>
</tr>
<tr>
<td>S3</td>
<td>OFF</td>
</tr>
<tr>
<td>S4</td>
<td>ON</td>
</tr>
<tr>
<td>S5</td>
<td>OFF</td>
</tr>
<tr>
<td>S6</td>
<td>OFF</td>
</tr>
<tr>
<td>S7</td>
<td>ON</td>
</tr>
</tbody>
</table>

User will have a time delay range of 72 secs - 360 secs.

**ORDERING INFORMATION:**

Definition of a part number for the Amperite SWUDC Series Time Delay Relay.

Example:

```
120  SWUDC
A   B   C   D
```

A: Denotes nominal input voltage. Voltages Available:
- 12V - AC or DC, 24V - AC or DC, 48V DC, 110-120V - AC or DC.
- Custom Voltages are available.

B: For custom voltages - denotes type of input current required for operation,
- A = AC - Alternating Current, D = DC - Direct Current.

C: Enter "L" if optional 11-pin spade terminals are required (Diagrams B & D).

D: Denotes DPDT (2 form C) 10 amperes CMOS delay on operate SWUDC Series Time Delay Relay with binary code nine position Dip Switch and built in potentiometer.
**DESCRIPTION:**

The Amperite TSW Series thermal cut-out switches provide a simple means to monitor temperature, using a solid state sensing device. When the temperature exceeds the customer specified value, the relay contacts transfer. Upon sensor cool-down the contacts return to the unenergized position.

**INPUT VOLTAGE:**

12V, 24V, 36V, 48V and 120V AC or DC.
Custom voltages are available.

**CONTACT INFORMATION:**

One form C (SPDT) isolated relay contact.

**CONTACT RATING:**

Max. Switching Power: 30W, 50 VA
Max. Switching Voltage: 60V DC, 125V AC
Max. Switching Current: 1A AC/DC
Max. Carrying Current: 1A @ 30V DC

**THERMAL SPECIFICATIONS:**

Fixed temperature cut-out, customer specified over a range of 0°C to 150°C. Accuracy +/- 5 degrees.
Differential 10 degrees C.
Custom differential is available.

**SENSING:**

Thermal sensor built-in, or optional remote sensing for units up to 70°C. Above 70°C remote sensing cable is required.

**MECHANICAL:**

Epoxy sealed enclosure. 2 x 2 x 3/4 inch hockey-puck with five 1/4 inch quick connect male terminals. Remote cable length (if so equipped) specified by user.

**OUTLINE DIMENSIONS:**

[Diagram showing outline dimensions]

**WIRING DIAGRAM:**

[Diagram showing wiring diagram]

---

**Ordering Information:**

Definition of a part number for the Amperite TSW Series Thermal Switch.
Example:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>100</td>
<td>C</td>
<td>R-LENGTH</td>
<td>TSW</td>
<td></td>
</tr>
</tbody>
</table>

A: Denotes nominal input voltage. Voltages available are 12V, 24V, 36V, 48V and 120V AC & DC.

For other input voltages consult factory.

B: Denotes input power required for operation:
A = AC - Alternating Current; D = DC - Direct Current.

C: Denotes trip temperature.

D: C = Celsius; F = Fahrenheit.

E: Leave blank for built-in sensing (70°C and below only). Add “R” for remote cable & specify cable length in inches.
(Up-charge for extra cable, contact factory).

F: Denotes Amperite TSW Series solid state Thermal Cut-Out Switch.
TSW2 Series Thermal Switches

- 100% Solid State Circuitry
- 1 Form A or 1 form B Output Switching
- Fixed switching temperature from -40°C to +125°C
- 3 ampere load rating standard, 10 ampere optional

**DESCRIPTION:**
The Amperite TSW2 Series thermal switches provide a simple means to monitor temperature, using a solid state sensing device. When the temperature exceeds the customer specified value, the output terminal is energized. Upon cool-down the output terminal is de-energized. Reverse sensing is available.

**INPUT VOLTAGE:**
12V, 24V, 36V, 48V, and 120V AC or DC. Custom voltages are available.

**CONTACT INFORMATION:**
One form A or 1 form B solid state switching device.

**CONTACT RATING:**
Max. Switching Current: 3 amperes
10 ampere rating available at extra cost.

**THERMAL SPECIFICATIONS:**
Fixed temperature cut-out, customer specified over a range of -40°C to +125°C. Accuracy + / - 3°C. Higher accuracy is available. Differential 2°C standard; 10°C available at no extra cost.

**SENSING:**
Solid state sensing device, located at the top surface (terminal side) of the enclosure.

**MECHANICAL:**
Epoxy sealed enclosure. 2 x 2 x 3/4 inch hockey-puck with three 1/4 inch quick connect male terminals.

**OUTLINE DIMENSIONS:**

**WIRING DIAGRAM:**

---

**Ordering Information:**
Definition of a part number for the Amperite TSW2 Series Thermal Switch.

Example:

<table>
<thead>
<tr>
<th>120</th>
<th>A</th>
<th>100</th>
<th>C</th>
<th>R</th>
<th>TSW2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
</tbody>
</table>

A: Denotes nominal input voltage. Voltages available 12V, 24V, 36V, 48V and 120V AC and DC.

**For custom voltage please consult the factory.**

B: Denotes input current: A = AC, alternating current; D = DC, direct current

C & D: Denotes trip temperature, C = Celsius; F = Fahrenheit.

E: Leave blank for close on rise in temperature. Insert “R” for open on rise in temperature.

F: Denotes Amperite TSW2 Series solid state Thermal Cut-Out Switch
TSW3 Series Thermal Switches

- 100% Solid State Circuitry
- Two fixed temperature switching points
- Customer specified acceptance window
- 1 Form A or B Output Switching
- 3 ampere load rating standard, 10 ampere optional
- Remote sensing available

**DESCRIPTION:**
The Amperite TSW3 Series thermal switch provides a means to monitor ambient temperature, and provides an output voltage when the temperature is within the customer specified window.
Temperature sensing range -40°C to +125°C

**INPUT VOLTAGE:**
12V, 24V, 36V, 48V, 110V and 120V AC or DC. Custom voltages are available.

**CONTACT INFORMATION:**
SPST solid state switching, one form A or one form B.

**CONTACT RATING:**
Max. Switching Current: 3 amperes
10 ampere rating available at extra cost.

**THERMAL SPECIFICATIONS:**
Fixed dual temperature switching is accordance with user requirement. When the ambient temperature is within the specified window, the output terminal is energized. Reverse sensing is available.

**SENSING:**
Two solid state sensors located at the top surface (terminal side) of the module. Remote sensing is available.

**MECHANICAL:**
Epoxy sealed enclosure. 2 x 2 x 3/4 inch hockey-puck with three 1/4 inch male quick connect terminals. Single hole mounting. Remote cable length (if so equipped) specified by user.

**OUTLINE DIMENSIONS:**

**WIRING DIAGRAM:**

**Ordering Information:**
Definition of a part number for the Amperite TSW3 Series Thermal Switch.
Example:

120 A 85 - 115 E R TSW3 -
A B C D E F G H

A: Denotes nominal input voltage in accordance with the specification shown above. *Custom voltages: Consult factory.*
B: Denotes input current: A = AC, alternating current; D = DC, direct current
C & D: Denotes temperature acceptance window.
E: C = Celsius; F = Fahrenheit.
G: Denotes Amperite TSW3 Series Thermal Switch.
H: Leave blank when remote sensor not required. For remote sensing add the following suffix after the part number: REM - length in inches. Example: REM-12 (for 12 inch remote sensor).
VPR Series Voltage Protection Relays

- Protects against low and high voltage
- DPDT 10 amperes isolated contacts
- Voltage accuracy 5%
- Customer specified voltage window

**DESCRIPTION:** The Amperite VPR Series voltage protection relays are designed to protect electrical equipment from low and/or high line voltages. When line voltage falls within the customer specified window the relay is energized. Should line voltage fall out of the specified range the relay is de-energized.

**CONTACT INFORMATION:**
Arrangement: 2 form C (DPDT) - Diagrams C & D.
Contact Material: Silver - Cadmium Oxide
Rating (Resistive): 10A @ 240V AC Resistive
15A @ 30V DC Resistive
15A @ 120V AC Resistive
1/3 HP @ 120V AC
1/2 HP @ 250V AC
Expected Life @ 25°C:
10 Million operations, Mechanical
100,000 operations minimum at rated loads

**ENVIRONMENTAL INFORMATION:**
Temperature Range: Storage: -60°C to +105°C (-76°F to +221°F)
Operating: -45°C to +70°C (-49°F to +158°F)

**MECHANICAL INFORMATION:**
Termination: 8 pin Octal Style Plug or optional 11-pin spade terminals (Diagrams C & D). Octal style case is white, 11-pin spade style case is black.

**INITIAL DIELECTRIC STRENGTH:**
Between open contacts: 1000V RMS.
Between adjacent contacts: 1500V RMS.
Between contacts & coil: 1500V RMS.

**INPUT INFORMATION:**
Voltage: AC units- 12V, 24V, 120V and 240V
DC units- 12V, 24V, 48V and 110V
Other volt. are available
Power Requirement: AC units: 3 VA or less
DC units: 3 Watts or less
Transient Protection: 1 JOULE MOV
Polarity Protection: On DC units - Yes

**OUTLINE DIMENSIONS:**
Standard Octal Style
Optional Spade Terminal Style

**WIRING DIAGRAMS:**
2 Form C (DPDT)

**Ordering Information:**
Definition of a part number for the Amperite VPR Series Voltage Protection Relay.
Example:

A: Denotes nominal input voltage. Voltages Available: 12, 24, 120 and 240 V AC;
12, 24, 48 & 110V DC. Custom Voltages are available.
B: Denotes type of input power current required for operation:
A = AC - Alternating Current, D = DC - Direct Current.
C & D: Denotes voltage acceptance window in which the relay will be energized.
E: Enter “L” if optional 11-pin spade terminals are required (Diagrams B & D).
F: Denotes Amperite VPR Series voltage protection relay.
ADOD Series
Automotive Delay-On-Dropout Timer
• Solid State Digital Circuitry
• Automotive Voltage Range
• Delay-On-Dropout Function
• 40 Ampere SPST Relay Contact (Form A)
• Compact Size

TIMING MODE:
12 volt power is applied to the relay at all times. When the ignition circuit of the vehicle is activated the relay contacts close. When the ignition circuit is turned off the timing cycle begins. At the end of the time delay the relay contacts open. Reset is accomplished by reactivating the ignition circuit of the vehicle.

ENVIRONMENTAL INFORMATION:
Temperature range -40°C to +70°C (-40°F to +158°F).

MECHANICAL INFORMATION:
Size 2 x 2 x 1 1/2 inch epoxy sealed plastic enclosure. Two mounting tabs.

OUTLINE DIMENSIONS:

WIRING DIAGRAM:

TIMING SPECIFICATIONS:
Fixed 45 minute timing cycle. Other timing cycles are available.

INPUT VOLTAGE INFORMATION:
Vehicular voltage range: 11 to 16 volts DC. Other voltages available.

CONTACT INFORMATION:
One SPST normally open relay contact set (Form A).

Ordering Information:
Definition of a part number for the Amperite Automotive Delay-On-Dropout Timer.
Example:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>D</td>
<td>45</td>
<td>M</td>
<td>ADOD</td>
</tr>
</tbody>
</table>

A: Denotes nominal input voltage: 12 volts DC. Custom voltages available; consult factory.
B: Denotes type of input current required for operation: D = DC, direct current.
C: Denotes fixed time delay. Enter number for fixed delay time required.
D: Denotes use of seconds, minutes or hours in timing value; S = seconds, M = minutes, H = hours.
E: Denotes Amperite ADOD Series Delay-On-Dropout automotive timer.
CLASSIFICATION

SOLID STATE TIME DELAY RELAY

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SST1</th>
</tr>
</thead>
</table>

SECURITY CERTIFICATES

UL File #E96739 (M)

OUTLINE DIMENSIONS

(L x W x H)

50.5mm x 50.5mm x 32mm

PART NO.

SST1-1A 288AD 01

<table>
<thead>
<tr>
<th>TIME DELAY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>Adjustable knob with dial</td>
</tr>
<tr>
<td>RANGE</td>
<td>0.1 to 8 min (Reference Dial) (Fixed timing available by special order.)</td>
</tr>
<tr>
<td>REPEAT ACCURACY</td>
<td>2%</td>
</tr>
<tr>
<td>RECYCLE TIME</td>
<td>100 Milliseconds Max.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>Solid State</td>
</tr>
<tr>
<td>FORM</td>
<td>Normally Open</td>
</tr>
<tr>
<td>MAX. LOAD CURRENT</td>
<td>1 Amp Steady State 10 Amp inrush @ 55˚C</td>
</tr>
<tr>
<td>OPERATING VOLTAGE</td>
<td>19 to 288V AC or DC</td>
</tr>
<tr>
<td>LINE FREQUENCY</td>
<td>50 / 60 Hz</td>
</tr>
<tr>
<td>MINIMUM HOLDING CURRENT</td>
<td>40 Milliamperes</td>
</tr>
<tr>
<td>VOLTAGE DROP</td>
<td>2.5V typical at 1 ampere</td>
</tr>
<tr>
<td>DIELECTRIC BREAKDOWN</td>
<td>Greater than 1500V RMS</td>
</tr>
<tr>
<td>INSULATION RESISTANCE</td>
<td>100 Megohms Min.</td>
</tr>
<tr>
<td>TRANSIENT PROTECTED</td>
<td>—</td>
</tr>
<tr>
<td>MOUNTING</td>
<td>Surface mount with one #8 or #10 Screw</td>
</tr>
<tr>
<td>PACKAGE</td>
<td>Molded Housing/ Encapsulated Circuitry</td>
</tr>
<tr>
<td>TERMINATION</td>
<td>1/4” quick connect terminals</td>
</tr>
<tr>
<td>OPERATING TEMPERATURE</td>
<td>-20˚C to +70˚C</td>
</tr>
<tr>
<td>STORAGE TEMPERATURE</td>
<td>-30˚C to +85˚C</td>
</tr>
</tbody>
</table>

WIRING DIAGRAM

(bottom view)

[Diagram of wiring connections]
## DIGITAL TIME DELAY RELAY

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DET1 - On-Delay / Int. w/ Signal, Reset</th>
<th>DET2 - On-Delay Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECURITY CERTIFICATES</td>
<td>![UL US]</td>
<td>![UL US]</td>
</tr>
<tr>
<td>OUTLINE DIMENSIONS (L x W x H)</td>
<td>3.7mm x 1.9mm x 1.9mm</td>
<td>3.7mm x 1.9mm x 1.9mm</td>
</tr>
<tr>
<td>PART NO.</td>
<td>DET1-1C110A08</td>
<td>DET2-2C220A08</td>
</tr>
<tr>
<td>CONTACT ARRANGEMENT</td>
<td>1C (SPDT)</td>
<td>2C</td>
</tr>
<tr>
<td>RESISTIVE LOAD COS. $\phi = 1$</td>
<td>5A@24 VDC 5A@220 VAC</td>
<td>5A@250 VAC</td>
</tr>
<tr>
<td>MAX. SWITCHED CURRENT</td>
<td>5A</td>
<td>5A</td>
</tr>
<tr>
<td>TERMINATION</td>
<td>08=Octal Plug-in</td>
<td>08=Octal Plug-in</td>
</tr>
<tr>
<td>NOMINAL VOLTAGE (VAC)</td>
<td>110 VAC</td>
<td>220 VAC</td>
</tr>
<tr>
<td>POWER CONSUMPTION</td>
<td>5 VA</td>
<td>5 VA</td>
</tr>
<tr>
<td>TEMPERATURE RISE</td>
<td>25°C</td>
<td>25°C</td>
</tr>
<tr>
<td>TIMING RANGE</td>
<td>0.02 - 9999 Sec., 0.02 - 9999 Min., 0.02 - 99 Hours 99 Min.</td>
<td>0.02 - 9999 Sec., 0.02 - 9999 Min., 0.02 - 99 Hours 99 Min.</td>
</tr>
<tr>
<td>TIMING ERROR</td>
<td>0.05% = 50 Milliseconds</td>
<td>0.05% = 50 Milliseconds</td>
</tr>
<tr>
<td>RESET TIME</td>
<td>1 Second</td>
<td></td>
</tr>
<tr>
<td>MIN. SIGNAL INPUT TIME</td>
<td>20 Milliseconds</td>
<td></td>
</tr>
<tr>
<td>VIBRATION RESISTANCE</td>
<td></td>
<td>Functional: 10 to 55Hz Dbl Amp of 1.5 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Destruction: 10 to 55 Hz Dbl Amp of 1.5 mm</td>
</tr>
<tr>
<td>SHOCK RESISTANCE</td>
<td></td>
<td>Functional: 20 G's Minimum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Destruction: 100 G's Minimum</td>
</tr>
<tr>
<td>LIFE (Minimum Operations)</td>
<td>Mechanical: At 180 CPM 10,000,000</td>
<td>Electrical: At 20 CPM 100,000</td>
</tr>
<tr>
<td>AMBIENT TEMPERATURE</td>
<td>-40°C to +85°C</td>
<td></td>
</tr>
<tr>
<td>OPERATING HUMIDITY</td>
<td>98% RH @ -40°C</td>
<td></td>
</tr>
<tr>
<td>UNIT WEIGHT</td>
<td>193 Grams</td>
<td>175 Grams</td>
</tr>
</tbody>
</table>

### SOURCE

#### CHARACTERISTICS

- **CONTACT DATA**
  - NOMINAL VOLTAGE (VAC): 220 VAC
  - POWER CONSUMPTION: 5 VA
  - TEMPERATURE RISE: 25°C
  - TIMING RANGE: 0.02 - 9999 Sec., 0.02 - 9999 Min., 0.02 - 99 Hours 99 Min.
  - TIMING ERROR: 0.05% = 50 Milliseconds

- **CONTACT ARRANGEMENT**
  - 2C
  - SPDT

- **TERMINATION**
  - 08=Octal Plug-in

- **RESISTIVE LOAD COS. $\phi = 1$**
  - 5A@250 VAC

### OUTLINE DIMENSIONS (mm)

![Outline Dimensions](image)

### WIRING DIAGRAM

![Wiring Diagram](image)
### AUTOMOTIVE RELAYS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>AR1</th>
<th>AR2</th>
<th>AR3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECURITY CERTIFICATES</td>
<td></td>
<td>[UL] US</td>
<td></td>
</tr>
</tbody>
</table>
| OUTLINE DIMENSIONS  
(L x W x H) | 15mm x 18.7mm x 15.4mm | 28mm x 31.2mm x 25mm | 12.2mm x 15.5mm x 13.8mm |
| PART NO. | AR1-1C012D02 | AR2-2A012D01 | AR31C012D02 |

#### CONTACT DATA

<table>
<thead>
<tr>
<th>CONTACT MATERIAL</th>
<th>Silver Alloy</th>
<th>Silver Alloy</th>
<th>Silver Alloy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTACT ARRANGEMENT</td>
<td>1C (SPDT)</td>
<td>1C (SPDT), 2A (DPSTNO)</td>
<td>1C (SPDT)</td>
</tr>
<tr>
<td>CONTACT RESISTANCE</td>
<td>100 Milliohms Max.</td>
<td>100 Milliohms Max.</td>
<td>100 Milliohms Max.</td>
</tr>
<tr>
<td>RESISTIVE LOAD COS. &amp; = 1</td>
<td>12A 250 VAC / 10A 28 VDC</td>
<td>N.C. 30A / N.O. 40A</td>
<td>5A 250 VAC / 10A 14 VDC</td>
</tr>
<tr>
<td>COIL TO CONTACT</td>
<td>1500 VAC (50/60 Hz)</td>
<td>500 VAC (50/60 Hz)</td>
<td>500 VAC (50/60 Hz)</td>
</tr>
<tr>
<td>MAX. CONTACT VOLTAGE</td>
<td>125 VDC / 250 VAC</td>
<td>14 @ 40A</td>
<td>14 VDC @ 10A</td>
</tr>
<tr>
<td>NOMINAL VOLTAGE (VDC)</td>
<td>12</td>
<td>12, 24</td>
<td>12</td>
</tr>
<tr>
<td>PICK-UP VOLTAGE(VDC)</td>
<td>9</td>
<td>9, 18</td>
<td>8.4</td>
</tr>
<tr>
<td>DROP-OUT VOLTAGE VDC (MIN)</td>
<td>0.6</td>
<td>0.6, 1.2</td>
<td>0.6</td>
</tr>
<tr>
<td>COIL RESISTANCE OHMS +/− 10%</td>
<td>400</td>
<td>80, 320</td>
<td>240</td>
</tr>
<tr>
<td>POWER CONSUMPTION</td>
<td>.36</td>
<td>1.8</td>
<td>0.6</td>
</tr>
<tr>
<td>MAX. VOLTAGE</td>
<td>130%</td>
<td>150%</td>
<td>150%</td>
</tr>
</tbody>
</table>

#### CHARACTERISTICS

| OPERATING TIME | 8msec. Max. | 10msec. Max. | 10msec. Max. |
| RELEASE TIME | 5msec. Max. | 10msec. Max. | 5msec. Max. |
| MECHANICAL LIFE | At 180 CPM 10,000,000 | At 180 CPM 10,000,000 | At 180 CPM 10,000,000 |
| ELECTRICAL LIFE | At 20 CPM 100,000 | At 20 CPM 100,000 | At 20 CPM 100,000 |
| AMBIENT TEMPERATURE | -40˚C to +85˚C | -40˚C to +85˚C | -40˚C to +85˚C |
| UNIT WEIGHT | 9 Grams | 42 Grams | 6 Grams |

#### MOUNTING LAYOUT (mm)  
(bottom view)

#### WIRING DIAGRAM  
(bottom view)
<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>GEN. PURPOSE LOW COST RELAY</th>
<th>POWER RELAY</th>
<th>MINIATURE GEN. PURPOSE RELAY</th>
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<tbody>
<tr>
<td>TYPE</td>
<td>GP1</td>
<td>GP2</td>
<td>GP3</td>
</tr>
</tbody>
</table>

| SECURITY CERTIFICATES | ![UL logo] | ![UL logo] | ![UL logo] |

| OUTLINE DIMENSIONS (L x W x H) | 28mm x 21.5mm x 36mm | 37mm x 34.3mm x 55mm | 35mm x 35mm x 55mm |

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>GP1-2C 012D 01</th>
<th>GP2-2C 012D 01</th>
<th>GP3-2C 012D 01</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GP1-4C 012D 01</td>
<td>GP2-2C 024D 01</td>
<td>GP3-2C 024D 01</td>
</tr>
<tr>
<td></td>
<td>GP1-110A 01</td>
<td>GP2-3C 012D 01</td>
<td>GP3-2C 120A 08</td>
</tr>
<tr>
<td></td>
<td>GP1-110A 01</td>
<td>GP1-2C 012D 01</td>
<td>GP3-3C 012A 11</td>
</tr>
<tr>
<td></td>
<td>GP1-220A 01</td>
<td>GP2-3C 240A 01</td>
<td>GP3-2C 240A 08</td>
</tr>
</tbody>
</table>

| CONTACT MATERIAL | Silver Alloy | Silver Alloy | Silver Alloy |
| CONTACT ARRANGEMENT | 2C           | 4C           | 2C           |
| CONTACT RESISTANCE | 100 Millohm Max. | 50 Millohm Max. | 50 Millohm Max. |
| RESISTIVE LOAD COS. ø = 1 | 250VAC 250VAC | 350VAC 350VAC | 250VAC 350VAC |
| RESISTIVE LOAD COS. ø = 0.7-0.8 | 200VAC 200VAC | 180VAC 180VAC | 200VAC 200VAC |
| COIL TO CONTACT | 1500 VAC (50/60 Hz) for 1 Min. | 1500 VAC (50/60 Hz) for 1 Min. | 1500 VAC (50/60 Hz) for 1 Min. |
| MAX. CONTACT VOLTAGE | 110 VDC / 250 VAC | 110 VDC / 250 VAC | 120 VDC / 250VAC |
| MAX. CONTACT CURRENT | 5A           | 3A           | 12A           |
| MAX. SWITCHED POWER | 150W / 600 VA | 90W / 360 VA | 336W 3000VA |
| NOMINAL VOLTAGE(VDC) | 12VDC        | 110VAC       | 220VAC        |
| PICK-UP VOLTAGE VDC(MAX.) | 9.6          | 88           | 176           |
| DROP-OUT VOLTAGE VDC (MIN) | 1.2          | 33           | 66            |
| COIL RESISTANCE OHMS +/- 10% | 160Ω          | 3400Ω        | 13600Ω        |
| POWER CONSUMPTION | 0.9W 1.3V 1.3V | 1.2W 1.2W 2W | 1.5 1.4 9/8.5W |
| MAX. VOLTAGE | 110% of Nominal Voltage | 120% of Nominal Voltage | 110% of Nominal Voltage |
| OPERATING TIME | 20msec. Max. | 10msec. Max. | 30msec. Max. |
| RELEASE TIME | 20msec. Max. | 10msec. Max. | 20msec. Max. |
| MECHANICAL LIFE | At 180 CPM 1,000,000 | At 180 CPM 1,000,000 | At 180 CPM 1,000,000 |
| ELECTRICAL LIFE | At 20 CPM 100,000 | At 20 CPM 100,000 | At 20 CPM 100,000 |
| AMBIENT TEMPERATURE | -25°C - +55°C | -40°C to +55°C | -40°C to +55°C |
| UNIT WEIGHT | 40 Grams | 90 Grams | 90 Grams |

| MOUNTING LAYOUT (mm) | ![MOUNTING LAYOUT] |
| WIRING DIAGRAM (bottom view) | ![WIRING DIAGRAM] |
## MINIATURE GENERAL PURPOSE RELAYS

### Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>MP1</th>
<th>MP2</th>
<th>MP3</th>
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</thead>
<tbody>
<tr>
<td>Security Certificates</td>
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<td><img src="image2" alt="UL US" /></td>
<td><img src="image3" alt="UL US" /></td>
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</tbody>
</table>

### Outline Dimensions

<table>
<thead>
<tr>
<th></th>
<th>MP1</th>
<th>MP2</th>
<th>MP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(L x W x H)</td>
<td>28mm x 21.5mm x 35mm</td>
<td>28mm x 21.5mm x 35mm</td>
<td>28mm x 31.5mm x 35mm</td>
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### Part No.

<table>
<thead>
<tr>
<th></th>
<th>MP1</th>
<th>MP2</th>
<th>MP3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MP1-2C 012D 01/02</td>
<td>MP1-3C 024D 01/02</td>
<td>MP2-3C 012D 02</td>
</tr>
<tr>
<td></td>
<td>MP1-2C 120A 01</td>
<td>MP1-4C 120A 01/02</td>
<td>MP2-3C 120A 01</td>
</tr>
<tr>
<td></td>
<td>MP1-3C 012D 01/02</td>
<td>MP1-3C 024D 01/02</td>
<td>MP3-3C 120A 01</td>
</tr>
<tr>
<td>CONTACT MATERIAL</td>
<td>Silver Alloy</td>
<td>Silver Alloy</td>
<td>Silver Alloy</td>
</tr>
<tr>
<td>CONTACT ARRANGEMENT</td>
<td>2C 3C 4C</td>
<td>1C 2C 3C</td>
<td></td>
</tr>
<tr>
<td>CONTACT RESISTANCE</td>
<td>50 Millohms Max.</td>
<td>50 Millohms Max.</td>
<td>50 Millohms Max.</td>
</tr>
<tr>
<td>RESISTIVE LOAD COS. $\alpha = 1$</td>
<td>4C 5A 250 VAC / 30 VDC 4C 5A 250 VAC / 30 VDC 3C 5A 250 VAC / 30 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COIL TO CONTACT</td>
<td>1500 VAC (50/60 Hz)</td>
<td>1500 VAC (50/60 Hz)</td>
<td>1500 VAC (50/60 Hz)</td>
</tr>
<tr>
<td>MAX. CONTACT VOLTAGE</td>
<td>30 VDC / 250A</td>
<td>28 VDC / 250 VAC</td>
<td>30 VDC / 250 VAC</td>
</tr>
<tr>
<td>MAX. CONTACT CURRENT</td>
<td>7A</td>
<td>1C = 15A 2C = 10A</td>
<td>5A</td>
</tr>
<tr>
<td>NOMINAL VOLTAGE (VDC)</td>
<td>12 VDC</td>
<td>24 VDC</td>
<td>110 / 120 / 240 VAC</td>
</tr>
<tr>
<td>PICK-UP VOLTAGE VDC (MAX.)</td>
<td>9V</td>
<td>19.2 VDC</td>
<td>96 / 176 VAC</td>
</tr>
<tr>
<td>DROP-OUT VOLTAGE VDC (MIN)</td>
<td>9.6 VDC</td>
<td>2.40 VDC 36 / 66 VAC</td>
<td>3.2 / 4.0VA</td>
</tr>
<tr>
<td>COIL RESISTANCE OHMS +/- 10%</td>
<td>160Ω</td>
<td>650Ω 4550/14400Ω</td>
<td>160Ω 4450Ω</td>
</tr>
<tr>
<td>POWER CONSUMPTION</td>
<td>0.9W</td>
<td>0.9W</td>
<td>2.7 / 3.2 / 4.0VAC</td>
</tr>
<tr>
<td>MAX. VOLTAGE</td>
<td>110%</td>
<td>110%</td>
<td>110%</td>
</tr>
<tr>
<td>MECHANICAL LIFE</td>
<td>At 180 CPM 1,000,000</td>
<td>At 180 CPM 20,000,000</td>
<td>At 180 CPM 1,000,000</td>
</tr>
<tr>
<td>ELECTRICAL LIFE</td>
<td>At 20 CPM 100,000</td>
<td>At 20 CPM 100,000</td>
<td>At 20 CPM 100,000</td>
</tr>
<tr>
<td>AMBIENT TEMPERATURE</td>
<td>-55˚C to +70˚C</td>
<td>-40˚C to +70˚C</td>
<td>-40˚C to +85˚C</td>
</tr>
<tr>
<td>UNIT WEIGHT</td>
<td>37 Grams</td>
<td>37 Grams</td>
<td>37 Grams</td>
</tr>
</tbody>
</table>

### MOUNTING LAYOUT (mm)

(bottom view)

### Wiring Diagram

(bottom view)
## PCB RELAYS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PC1</th>
<th>PC2</th>
<th>PC3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECURITY CERTIFICATES</td>
<td>![C UL US]</td>
<td>![C UL US]</td>
<td>![C UL US]</td>
</tr>
<tr>
<td>OUTLINE DIMENSIONS</td>
<td>15.3mm x 20.5mm x 15.3mm</td>
<td>20.2mm x 16.5mm x 20.2mm</td>
<td>28.5mm x 10.1mm x 12.3mm</td>
</tr>
<tr>
<td>PART NO.</td>
<td>PC1-1A 005D 02</td>
<td>PC2-1C 006D 02</td>
<td>PC3-1C 006D 02</td>
</tr>
<tr>
<td>CONTACT MATERIAL</td>
<td>Silver Alloy</td>
<td>Silver Alloy</td>
<td>Gold Plating / Silver Alloy</td>
</tr>
<tr>
<td>CONTACT ARRANGEMENT</td>
<td>1A</td>
<td>1C</td>
<td>1C</td>
</tr>
<tr>
<td>CONTACT RESISTANCE</td>
<td>100 Millohms Max.</td>
<td>100 Millohms Max.</td>
<td>100 Millohms Max.</td>
</tr>
<tr>
<td>RESISTIVE LOAD COS. ø = 1</td>
<td>5A 250 VAC / 28 VDC</td>
<td>10A 250 VAC / 24 VDC</td>
<td>8A 250 VAC / 30 VDC</td>
</tr>
<tr>
<td>COIL TO CONTACT</td>
<td>1500 VAC (50/60 Hz)</td>
<td>1500 VAC (50/60 Hz)</td>
<td>1500 VAC (50/60 Hz)</td>
</tr>
<tr>
<td>MAX. CONTACT VOLTAGE</td>
<td>30 VDC / 250 VAC</td>
<td>30 VDC / 250 VAC</td>
<td>30 VDC / 250 VAC</td>
</tr>
<tr>
<td>MAX. CONTACT CURRENT</td>
<td>5A</td>
<td>10A</td>
<td>8A</td>
</tr>
<tr>
<td>DIMENSION (L x W x H)</td>
<td>15.3mm x 20.5mm x 15.3mm</td>
<td>20.2mm x 16.5mm x 20.2mm</td>
<td>28.5mm x 10.1mm x 12.3mm</td>
</tr>
</tbody>
</table>
### CLASSIFICATION

#### PCB RELAYS

<table>
<thead>
<tr>
<th>Type</th>
<th>PC4</th>
<th>PC5</th>
<th>PC6</th>
</tr>
</thead>
</table>

### OUTLINE DIMENSIONS

(L x W x H)

- **PC4**: 18.7mm x 15.4mm x 15mm
- **PC5**: 29mm x 12.7mm x 15.7mm
- **PC6**: 28.5mm x 10.1mm x 12.3mm

### PART NO.

- **PC4-1C**: 006D 02
- **PC4-1C**: 012D 02
- **PC4-1C**: 024D 02
- **PC5-1C**: 005D 02
- **PC5-1C**: 012D 02
- **PC5-1C**: 024D 02
- **PC3-1C**: 006D 02
- **PC3-1C**: 012D 02
- **PC3-1C**: 024D 02

### CONTACT DATA

<table>
<thead>
<tr>
<th>Contact Material</th>
<th>Gold Plating / Silver Alloy</th>
<th>Silver Alloy</th>
<th>Silver Alloy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Arrangement</td>
<td>1C</td>
<td>1C</td>
<td>1A</td>
</tr>
<tr>
<td>Contact Resistance</td>
<td>100 Millohms Max.</td>
<td>50 Millohms Max.</td>
<td>50 Millohms Max.</td>
</tr>
<tr>
<td>Resistive Load Cos. φ = 1</td>
<td>8A 250 VAC / 30 VDC</td>
<td>16A 250 VAC / 30 VDC</td>
<td>16A 250 VAC / 30 VDC</td>
</tr>
<tr>
<td>Coil to Contact</td>
<td>1500 VAC (50/60 Hz)</td>
<td>5000 VAC (50/60 Hz)</td>
<td>2500 VAC (50/60 Hz)</td>
</tr>
<tr>
<td>Max. Contact Voltage</td>
<td>30 VDC / 250 VAC</td>
<td>30 VDC / 250 VAC</td>
<td>28 VDC / 277 VAC</td>
</tr>
<tr>
<td>Max. Contact Current</td>
<td>8 A</td>
<td>16A</td>
<td>30A</td>
</tr>
<tr>
<td>Nominal Voltage (VDC)</td>
<td>6 VDC</td>
<td>12 / 24 VDC</td>
<td>18 VDC / 220 VDC</td>
</tr>
<tr>
<td>Pick-up Voltage (VDC (Max.))</td>
<td>4.5 VDC</td>
<td>9 / 18 VDC</td>
<td>13.5 VDC / 96 / 192 VDC</td>
</tr>
<tr>
<td>Drop-Out Voltage (VDC (Min.))</td>
<td>0.6 VDC</td>
<td>1.2 / 24 VDC</td>
<td>1.8 VDC / 24 / 48 VDC</td>
</tr>
<tr>
<td>Coil Resistance (ohms +/− 10%)</td>
<td>164Ω 620 / 2350Ω</td>
<td>62Ω 360 / 1400Ω</td>
<td>380Ω 250 / 13490Ω</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>0.25W Max.</td>
<td>0.41 Max.</td>
<td>.85W Max.</td>
</tr>
<tr>
<td>Max. Voltage</td>
<td>120%</td>
<td>120%</td>
<td>120%</td>
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### Coil Data

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<tr>
<th>Operating Time</th>
<th>7msec. Max.</th>
<th>7msec. Max.</th>
<th>15msec. Max.</th>
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<tr>
<td>Release Time</td>
<td>3msec. Max.</td>
<td>3msec. Max.</td>
<td>10msec. Max.</td>
</tr>
<tr>
<td>Mechanical Life</td>
<td>At 120 CPM 10,000,000</td>
<td>At 120 CPM 10,000,000</td>
<td>At 120 CPM 10,000,000</td>
</tr>
<tr>
<td>Electrical Life</td>
<td>At 20 CPM 100,000</td>
<td>At 20 CPM 100,000</td>
<td>At 20 CPM 100,000</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>-40°C to +70°C</td>
<td>-40°C to +70°C</td>
<td>-40°C to +70°C</td>
</tr>
</tbody>
</table>

### Unit Weight

- **PC4**: 10 Grams
- **PC5**: 13.5 Grams
- **PC6**: 36 Grams

### Mounting Layout (mm)

(bottom view)

### Wiring Diagram

(bottom view)
## PCB Relays

### Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>SR1</th>
</tr>
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### Outline Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (L x W x H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR1</td>
<td>15.5mm x 10.5mm x 11.5mm</td>
</tr>
</tbody>
</table>

### Security Certificates

- UL

### Part No.

- SR1-1C 005D 02
- SR1-1C 009D 02
- SR1-1C 012D 02
- SR1-1C 024D 02

### Contact Data

- Contact Material: Silver Alloy
- Contact Resistance: 100 MiliOhms Max.
- Resistive Load COS. ø = 1: 3A 120 VAC / 24 VDC
- Coil to Contact: 500 VAC (50/60 Hz)
- Max. Contact Voltage: 60 VDC / 12 VAC
- Max. Contact Current: 3 A

### Coil Data

- Nominal Voltage (VDC): 5 / 9 VDC 12 / 24 VDC
- Pick-up Voltage VDC (Max.): 3.8 / 6.8 VDC 9 / 18 VDC
- Drop-out Voltage VDC (Min.): 0.3 / 0.5 VDC 0.6 / 1.2 VDC
- Coil Resistance Ohms +/- 10%: 125 / 405Ω 720 / 2880Ω
- Power Consumption: 0.20 / 0.20W 0.20 / 0.20W
- Max. Voltage: 130%

### Characteristics

- Operating Time: 10msec. Max.
- Mechanical Life: At 120 CPM 10,000,000
- Electrical Life: At 20 CPM 100,000
- Ambient Temperature: -40°C to +70°C
- Unit Weight: 3.5 Grams

### Wiring Diagram

![Wiring Diagram](bottom view)

## Miniature Solid State Relays

### Classification

<table>
<thead>
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<th>Type</th>
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</table>

### Outline Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (L x W x H)</th>
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</thead>
<tbody>
<tr>
<td>MS1</td>
<td>20mm x 24mm x 6.5mm</td>
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</tbody>
</table>

### Security Certificates

- UL

### Part No.

- MS1-1A 005D 02
- MS1-1A 012D 02
- MS1-1A 024D 02

### Contact Data

- Control Voltage Range: 50-4 to 6 VDC 120-9.6 to 14.4 VDC 240-19.2 to 28.8 VDC
- Must Operate Voltage: 050 - 4 VDC Max. 120 - 5.6 VDC
- Must Release Voltage: 1.0 VDC Min.
- Max. Input Current: 10mA
- Load Voltage Range: 75 to 264 VAC @47 to 63Hz
- Load Current Range: 0.1 to 2A
- Max. Surge Current (10MS): 25Apk
- Max. Leakage Current: 1.5mA
- Max. On-State Voltage Drop: 1.5 VAC
- Max. Turn-On Time: Zero cross turn on 10ms Random turn-on 1ms
- Max. Turn-Off Time: 10ms
- Transient Over Voltage: 600Vpk max
- Min. OFF-State DV.DT: 100V/us min.
- Zero-Crossover Voltage: 15V Max.
- Min. Power Factor: 0.5
- Dielectric Strength: 2000 VAC min. 50/60 Hz 1 min. (input to output)
- Insulation Resistance: 1000MΩ, min. (at 500 VDC)
- Max. Capacitance: 5pF
- Ambient Temperature: -30°C to +80°C
- Unit Weight: 3.5 Grams

### Characteristics

- Mounting Layout (mm) (bottom view)

![Mounting Layout](bottom view)

### Wiring Diagram

![Wiring Diagram](bottom view)
### RELAY SOCKETS

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>RELAY SOCKETS</th>
</tr>
</thead>
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<tr>
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<tr>
<td>DESCRIPTION.</td>
<td>8-Pin Spade Terminal Snap-n Panel Mount</td>
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<tr>
<td>APPLICATIONS</td>
<td>Relay Series MP2 (1C) - MP2 (2C)</td>
</tr>
<tr>
<td>MOUNTING LAYOUT (mm)</td>
<td><img src="image" alt="Mounting Layout" /></td>
</tr>
<tr>
<td>WIRING DIAGRAM (bottom view)</td>
<td><img src="image" alt="Wiring Diagram" /></td>
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</tbody>
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### RELAY SOCKETS

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>RELAY SOCKETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>RS-29</td>
</tr>
<tr>
<td>OUTLINE DIMENSIONS (L x W x H)</td>
<td>72mm x 29.5mm x 30mm</td>
</tr>
<tr>
<td>DESCRIPTION.</td>
<td>14-Pin Spade Terminal Din Rail Mounted or Surface Mount</td>
</tr>
<tr>
<td>APPLICATIONS</td>
<td>Relay Series GP1 (4C) - MP1 (4C)</td>
</tr>
<tr>
<td>MOUNTING LAYOUT (mm) (bottom view)</td>
<td><img src="image" alt="Mounting Layout" /></td>
</tr>
<tr>
<td>WIRING DIAGRAM (bottom view)</td>
<td><img src="image" alt="Wiring Diagram" /></td>
</tr>
</tbody>
</table>
## RELAY SOCKETS

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>RELAY SOCKETS</th>
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<tbody>
<tr>
<td><strong>TYPE</strong></td>
<td><strong>RS-206</strong></td>
</tr>
<tr>
<td>OUTLINE DIMENSIONS (L x W x H)</td>
<td>25.5mm x 27mm x 18.6mm</td>
</tr>
<tr>
<td>DESCRIPTION.</td>
<td>8-Pin Spade Terminal</td>
</tr>
<tr>
<td>MOUNTING LAYOUT (mm) (bottom view)</td>
<td><img src="image1" alt="Image" /></td>
</tr>
<tr>
<td>APPLICATIONS</td>
<td>Relay Series GP1 (2C0 - MP2 (2C) Relay Series GP1 (2C) - MP2 (2C) Relay Series MP2 (1C0 - MP2 (2C)</td>
</tr>
</tbody>
</table>

## RELAY SOCKETS

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>RELAY SOCKETS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TYPE</strong></td>
<td><strong>RS-210</strong></td>
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<tr>
<td>OUTLINE DIMENSIONS (L x W x H)</td>
<td>84mm x 43mm x 30mm</td>
</tr>
<tr>
<td>DESCRIPTION.</td>
<td>11-Pin Spade Terminal</td>
</tr>
<tr>
<td>Has Five (5) Color Coded Leads</td>
<td>Surface Mount</td>
</tr>
<tr>
<td>APPLICATIONS</td>
<td>Relay Series (see dim. for specific applications)</td>
</tr>
<tr>
<td>MOUNTING LAYOUT (mm) (bottom view)</td>
<td><img src="image4" alt="Image" /></td>
</tr>
<tr>
<td>DIAGRAM</td>
<td><img src="image7" alt="Image" /></td>
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</tbody>
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## Classification

<table>
<thead>
<tr>
<th>RELAY SOCKETS</th>
<th>DIN RAIL</th>
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<tbody>
<tr>
<td><strong>TYPE</strong></td>
<td>RS-601</td>
</tr>
<tr>
<td><strong>OUTLINE DIMENSIONS</strong></td>
<td>(L x W x H)</td>
</tr>
<tr>
<td>80mm x 28mm x 32.5mm</td>
<td>39.37L x 1.063W x .287H</td>
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<tr>
<td><strong>DESCRIPTION</strong></td>
<td>8-Pin Spade Terminal</td>
</tr>
<tr>
<td>Din Rail Mount or Surface Mount</td>
<td>DR1-1M-AL</td>
</tr>
<tr>
<td><strong>APPLICATIONS</strong></td>
<td>Relay Series MP2</td>
</tr>
<tr>
<td><strong>MOUNTING LAYOUT (mm)</strong></td>
<td></td>
</tr>
<tr>
<td>(bottom view)</td>
<td></td>
</tr>
<tr>
<td><strong>DIAGRAM</strong></td>
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</tbody>
</table>

## BRACKETS

<table>
<thead>
<tr>
<th>PANEL MOUNT</th>
<th>PMC BRACK</th>
<th>PMCR BRACK</th>
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</thead>
<tbody>
<tr>
<td><strong>TYPE</strong></td>
<td><strong>OUTLINE DIMENSIONS</strong></td>
<td>(L x W x H)</td>
</tr>
<tr>
<td><strong>DESCRIPTION</strong></td>
<td>Panel Mount Bracket (2 Screws)</td>
<td>Panel Mount Bracket (2 Screws)</td>
</tr>
<tr>
<td><strong>APPLICATIONS</strong></td>
<td>Non-Adjustable C, CR, B, BF, BR, D, DF</td>
<td>Adjustable C Series</td>
</tr>
<tr>
<td><strong>LAYOUT (mm)</strong></td>
<td></td>
<td>Adjustable CR Series</td>
</tr>
<tr>
<td><strong>DIAGRAM</strong></td>
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</table>
## Accessories

### Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Figure</th>
<th>AMPERITE PART #</th>
<th>Used with These AMPERITE Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis Mount Octal Socket</td>
<td>(Figure A)</td>
<td>OCTAL</td>
<td>C10, CI, DC10, DF10, DFA, DFV, DOD, SWDC, SWPDC, G, GF</td>
</tr>
<tr>
<td>Surface Mount Octal Socket</td>
<td>(Figure B)</td>
<td>8-PIN-SM</td>
<td>C10, CI, DC10, DF10, DFA, DFV, DOD, SWDC, SWPDC, G, GF</td>
</tr>
<tr>
<td>Surface Mount 11-Pin Octal Style Socket</td>
<td>(Figure C)</td>
<td>11-PIN-SM</td>
<td>CR10, CIR, DCR10, SWUDC</td>
</tr>
<tr>
<td>Chassis Mount 9-Pin Socket</td>
<td>(Figure D)</td>
<td>9-PIN-SM</td>
<td>9-Pin Miniature G, GF</td>
</tr>
<tr>
<td>P.C. Mount 9-Pin Socket</td>
<td>(Figure E)</td>
<td>9-PIN-PC</td>
<td>9-Pin Miniature G, GF</td>
</tr>
<tr>
<td>11-Pin Spade Terminal Socket</td>
<td>(Figure I)</td>
<td>11-LPIN-SM</td>
<td>“L” version of C10, CI, CIR, CR10, DC10, DCR10, DF10, DFA, DFV, DOD, SWDC, SWPDC, SWUDC</td>
</tr>
<tr>
<td>Octal DIN Rail Socket</td>
<td>(Figure K)</td>
<td>8-PIN-DIN</td>
<td>C10, CI, DC10, DF10, DFA, DFV, DOD, SWDC, SWPDC, G, GF</td>
</tr>
<tr>
<td>11-Pin Octal Style DIN Rail Socket</td>
<td>(Figure L)</td>
<td>11-PIN-DIN</td>
<td>CR10, CIR, DCR10, SWUDC</td>
</tr>
<tr>
<td>QUICK CONNECTS</td>
<td></td>
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</tr>
<tr>
<td>.110 Female Quick Connect Terminals</td>
<td>(Figure F)</td>
<td>110 FEMALE</td>
<td>B, BF, BR, C, CR, D, DF</td>
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<tr>
<td>.250 Female Quick Connect Terminals</td>
<td>(Figure G)</td>
<td>250 FEMALE</td>
<td>B, BF, BR, C, CR, D, DF, DFW</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>HDFA, ST1, ST1A, ST2, STB, TSW</td>
</tr>
<tr>
<td>BRACKETS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-Screw Panel Mount Brackets</td>
<td>(Figure H)</td>
<td>1) PANEL MOUNT</td>
<td>1) Non-Adjustable C, CR, B, BF, BR, D, DF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) PMC BRACK</td>
<td>2) Adjustable C Series</td>
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<tr>
<td></td>
<td></td>
<td>3) PMCR BRACK</td>
<td>3) Adjustable CR Series</td>
</tr>
<tr>
<td>MISCELLANEOUS</td>
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<tr>
<td>Hold Down Spring</td>
<td>(Figure J)</td>
<td>10A-SPRING</td>
<td>C10, CI, CIR, CR10, DC10, DCR10, DF10, DFA, DFV, DOD, SWDC, SWPDC, SWUDC</td>
</tr>
</tbody>
</table>

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**NOTE:** The pronunciation guide for certain terms can be found at the top of the page.
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