

The FS100 Series (medium amp) may be used to control inductive, incandescent, or resistive loads. Input voltages of 24, 120, or 230VAC are available. Factory fixed flash rate of 90 FPM or may be ordered with a fixed, custom flash rate ranging from 10 to 300 FPM. Encapsulation provides protection against shock, vibration, and humidity. This group of solid-state flashers has proven reliability with years of use throughout the world.

### Operation

Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the T1 ON time begins and the load energizes. At the end of T1, T2 begins and the load de-energizes. This cycle repeats until input voltage is removed.

Reset: Removing input voltage resets the output and the sequence to T2.

For more information see:

- Appendix A, page 164 for Flasher (OFF First) function.
- Appendix B, page, 165, Figure 1 for dimensional drawing.
- Appendix C, page 168, Figure 3 for connection diagram.

### Order Table:

Input Voltage	Rating	Part Number
24VAC	3A	FS143
120VAC	3A	FS152
230VAC	3A	FS162

Add the suffix "-##" to any part number to indicate the custom flash rate.

### Specifications

#### Technical Data

Operation	OFF/ON solid-state flasher (continuous duty)
Flash Rate	Fixed at 90 FPM ±10%
Custom Flash Rates	10 - 300 FPM ±10%
ON/OFF Ratio	≅ 50%

#### Input

Voltage/Frequency ..... 24, 120, or 230VAC ±15%/50/60 Hz

#### Output

Load Type ..... Inductive, resistive, or incandescent  
Output ..... Fullwave AC, solid state, SPST

Maximum Load Rating	3A steady state
Inrush	10 times steady state current

#### Mechanical

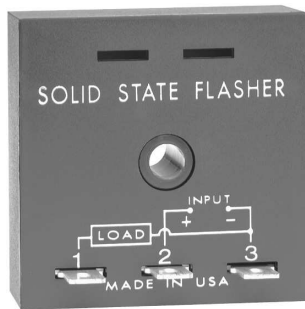
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Dimensions	2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals

#### Protection

Circuitry ..... Encapsulated

#### Environmental

Operating / Storage Temperature	-20° to 60°C / -40° to 85°C
Weight	≅ 2.2 oz (62 g)



The FS200 Series may be used to control inductive, incandescent, or resistive loads. Input voltages of 12, 24, 36, 48, or 110VDC are available. Factory fixed flash rate of 90 FPM or may be ordered with a fixed custom flash rate ranging from 10 to 180 FPM. Encapsulation provides protection against shock, vibration, and humidity. Uniform performance, high inrush current capability, and low RFI, make this series ideal for general industrial applications.

### Operation

Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the T1 ON time begins and the load energizes. At the end of T1, T2 begins and the load de-energizes. This cycle repeats until input voltage is removed.

Reset: Removing input voltage resets the output and the sequence to T2.

For more information see:

- Appendix A, page 164 for Flasher (OFF First) function.
- Appendix B, page, 165, Figure 1 for dimensional drawing.
- Appendix C, page 168, Figure 4 for connection diagram.

### Order Table:

Input Voltage	Rating	Part Number
12VDC ±20%	3A	FS219
24VDC ±20%	3A	FS224
36VDC ±20%	1A	FS236
48VDC ±15%	0.75A	FS248
110VDC ±15%	0.25A	FS290

### Specifications

#### Technical Data

Operation	OFF/ON solid-state flasher (continuous duty)
Flash Rate	Fixed at 90 FPM ±10%
Custom Flash Rate	10 - 180 FPM
ON/OFF Ratio	≅ 50%

#### Input

Voltage ..... 12, 24, 36, 48, or 110VDC

#### Output

Load Type ..... Inductive, resistive, or incandescent  
Maximum Load Rating ..... 0.25 - 3A steady state  
OFF State Leakage Current  
12 & 24VDC ..... ≤ 250 μA

Inrush	10 times steady state current
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#### Mechanical

Mounting	Surface mount with one #10 (M5 x 0.8) screw
Dimensions	2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals

#### Protection

Circuitry ..... Encapsulated

#### Environmental

Operating / Storage Temperature	-20° to 60°C / -40° to 85°C
Weight	≅ 2.2 oz (62 g)

### Features:

- Fixed at 90 FPM
- Custom flash rate 10 - 300 FPM
- Switches inrush currents up to 30A
- 24, 120, or 230VAC input voltages
- Totally solid state & encapsulated

Approvals:   

### Auxiliary Products:

- **Female quick connect:**  
P/N: P1015-64 (AWG 14/16)
- **Quick connect to screw adaptor:**  
P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

### Available Models:

FS143	FS152-60
FS152	FS162
FS152-30	FS162-30
FS152-50	

If desired part number is not listed, please call us to see if it is technically possible to build.

### Features:

- Fixed at 90 FPM
- Custom flash rate 10 - 180 FPM
- 3A, SPST output contact
- 12 to 110VDC input voltages in 5 ranges
- Totally solid state & encapsulated
- 0.25 in. (6.35 mm) male quick connects

### Auxiliary Products:

- **Female quick connect:**  
P/N: P1015-64 (AWG 14/16)
- **Quick connect to screw adaptor:**  
P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

### Available Models:

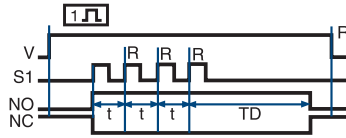
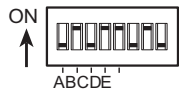
FS224

If desired part number is not listed, please call us to see if it is technically possible to build.

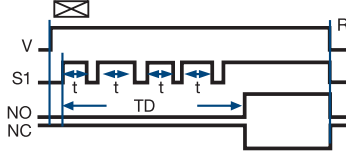
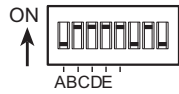
# Appendix A - Timer/Flasher Functions

## Single Functions

### Retriggerable Single Shot

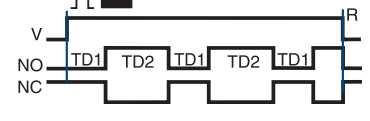
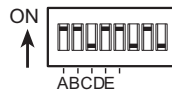


### Accumulative Delay-on-Make

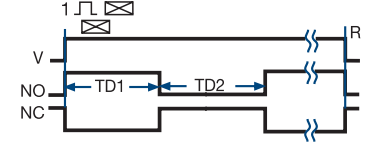
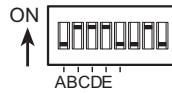


## Dual Functions

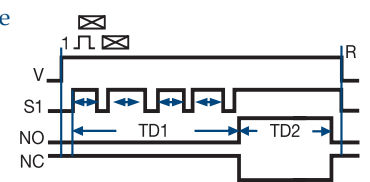
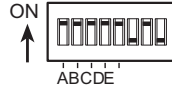
### \* Recycle (OFF Time First) Both Times Adjustable



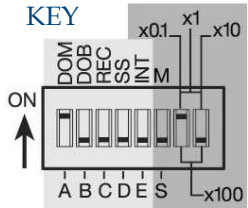
### \* Interval Delay-on-Make



### Accumulative Delay-on-Make Interval



## KEY



V=Voltage, R=Reset, S1=Initiate Switch,  
NO=Normally Open Contact, NC=Normally Closed Contact,  
TD,TD1,TD2=Complete Time Delay, t=Partial Time Delay,  
DOM=Delay-on-Make, DOB=Delay-on-Break, REC=Recycle,  
SS=Single Shot, INT=Interval, M=Minutes, S=Seconds,  
= Undefined time

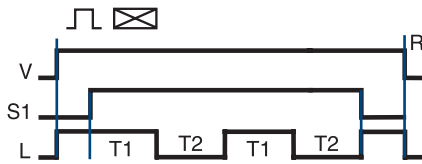
5 Switches for Function Selection  
3 Switches for Time Delay Range

NOTE: The time delay range is the same for both functions when dual functions are selected.

\* 9 Functions included in the 8 pin DPDT models

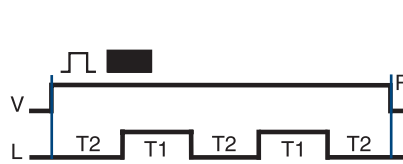
## Flasher Function Diagrams

### Flasher (NC)



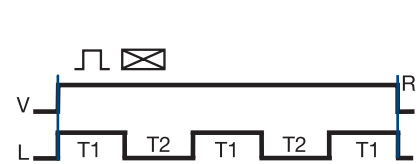
V = Voltage S1 = Initiate Switch L = Load  
R = Reset T1 = ON Time T2 = OFF Time  
T1 ≅ T2

### Flasher (OFF First)



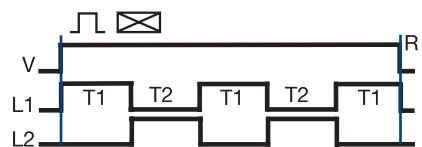
V = Voltage R = Reset L = Load  
T1 = ON Time T2 = OFF Time  
T1 ≅ T2

### Flasher (ON First)



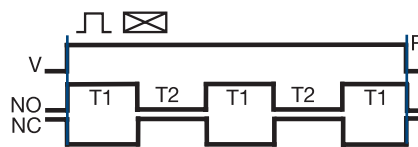
V = Voltage R = Reset L = Load  
T1 = ON Time T2 = OFF Time T1 ≅ T2  
ON time plus OFF time equals one complete flash.

### Flasher (Alternating)



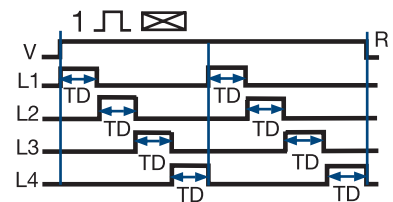
V = Voltage L1 = Load 1 L2 = Load 2  
R = Reset T1 = ON Time T2 = OFF Time  
T1 ≅ T2

### Flasher (ON First-DPDT)



V = Voltage R = Reset  
T1 = ON Time T2 = OFF Time  
NO = Normally Open NC = Normally Closed

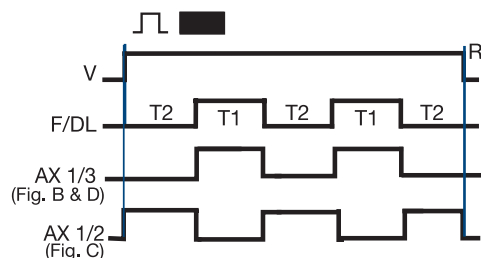
### Flasher (Chasing)



SC4 shown; SC3, L4 is eliminated  
and L1 TD begins as soon as L3 TD is  
completed.

V = Voltage R = Reset L (1...4) = Lamps  
TD = Time Delay (all are equal)

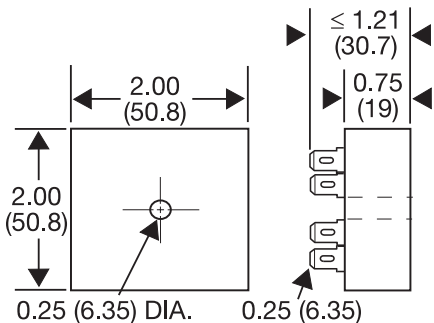
### Flashers & Aux. Modules



V = Voltage L = Load T1 = ON Time  
T2 = OFF Time R = Reset  
T1 ≅ T2

# Appendix B - Dimensional Drawings

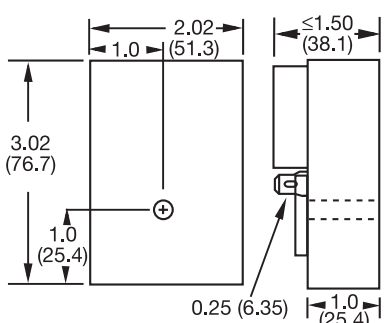
**FIGURE 1**



0.25 (6.35) DIA. 0.25 (6.35)

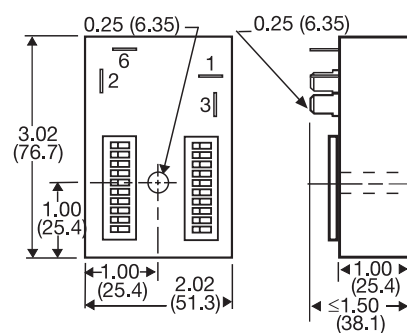
CT; ESD5; ESDR; FS100; FS200; FS300; KR3; KR9;  
KRDB; KRDI; KRDM; KRDR; KRDS; KRPD; KRPS;  
KSD1; KSD2; KSD3; KSD4; KSDB; KSDR; KSDS;  
KSDU; KSPD; KSPS; KSPU; KVM; T2D; TA; TAC1;  
TAC4; TDU; TDUB; TDUI; TDUS; TL; TMV8000;  
TS1; TS2; TS4; TS6; TSB; TSD1; TSD2; TSD3; TSD4;  
TSD6; TSD7; TSDB; TSDR; TSDS; TSS; TSU2000

**FIGURE 2**



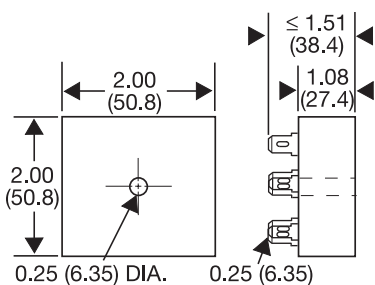
HLV; HRD3; HRD9; HRDB; HRDI;  
HRDM; HRDR; HRDS; HRID; HRIS;  
HRIU; HRPD; HRPS; HRPD; HRV; RS

**FIGURE 3**



HSPZ

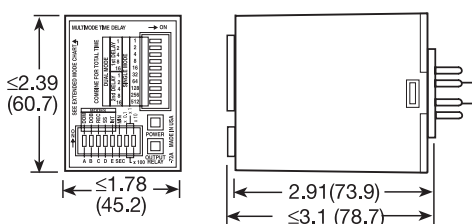
**FIGURE 4**



FA; FS; FSU1000\*; NHPD; NHPS; NHPU;  
NLF1\*; NLF2\*; PHS\*; PTHF\*; SIR1; SIR2;  
SLR1\*; SLR2\*; TH1; TH2; THC; THD1;  
THD2; THD3; THD4; THD7; THDB; THDM;  
THDS; THS

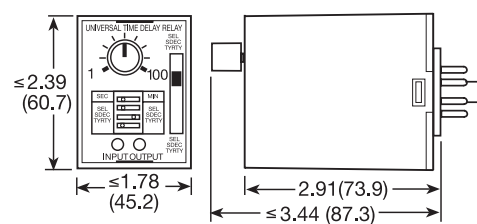
\*If unit is rated @ 1A, see Figure 1

**FIGURE 5**



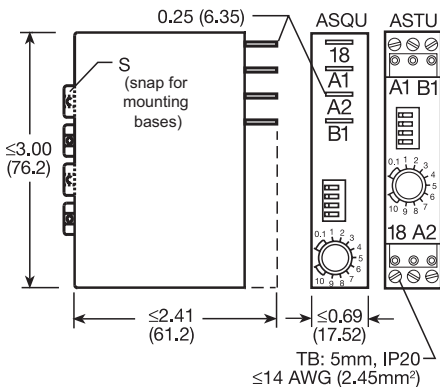
TRDU

**FIGURE 6**



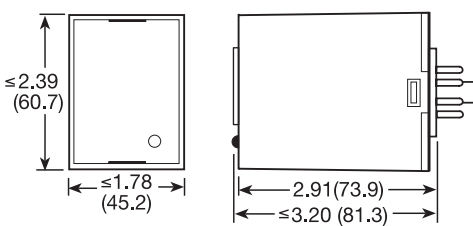
TRU

**FIGURE 7**



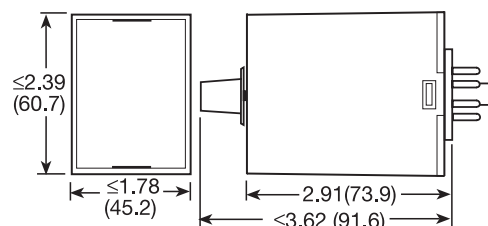
ASQU; ASTU; DSQU; DSTU

**FIGURE 8**



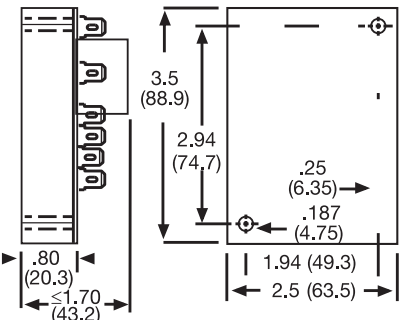
PLM; PLR; TDB; TDBH; TDBL; TDI; TDIH;  
TDIL; TDM; TDMB; TDMH; TDML; TDR;  
TDS; TDSH; TDSL

**FIGURE 9**



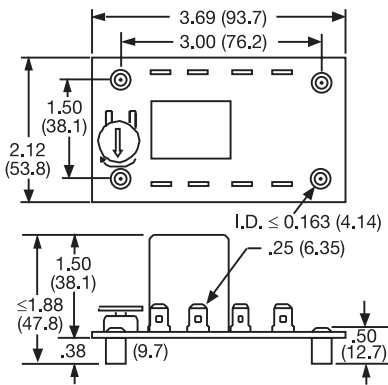
FS500; PRLB; PRM; PRLS; TRB; TRM; TRS

**FIGURE 10**



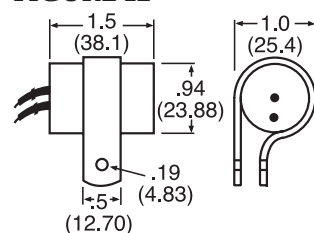
ERD3; ERDI; ERDM

**FIGURE 11**



ORB; ORM; ORS

**FIGURE 12**

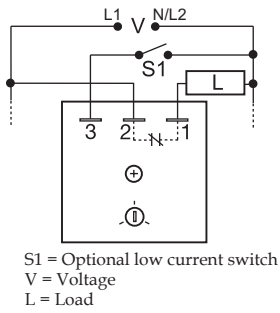


FS100; FS400

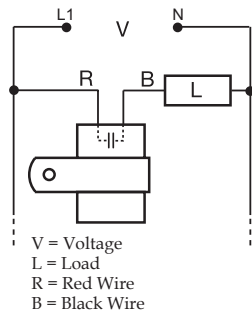
inches (millimeters)

# Appendix C - Connection Diagrams

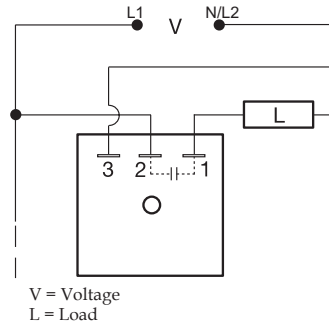
**FIGURE 1 - FSU1000 Series**



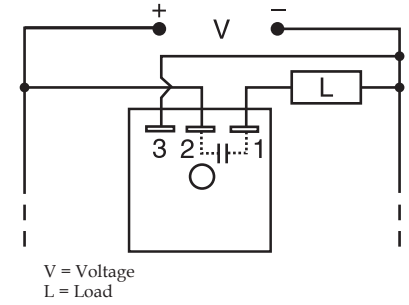
**FIGURE 2 - FS100 Series**



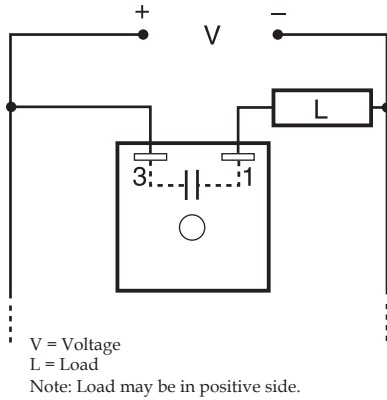
**FIGURE 3 - FS100 Series**



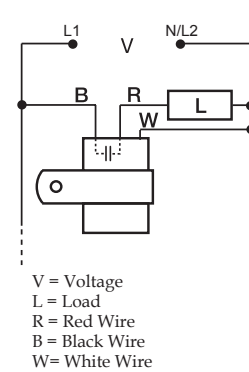
**FIGURE 4 - FS200 Series**



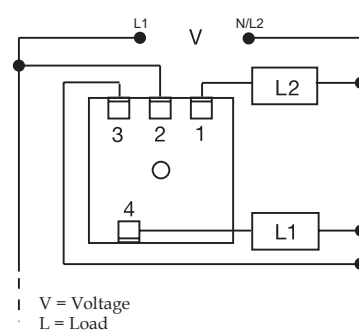
**FIGURE 5 - FS300 Series**



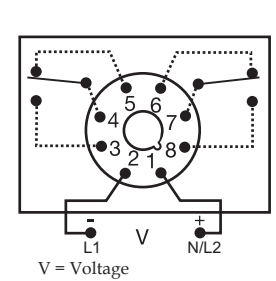
**FIGURE 6 - FS400 Series**



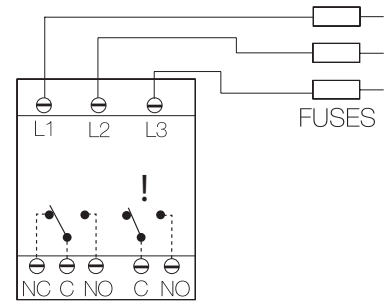
**FIGURE 7 - AF Series**



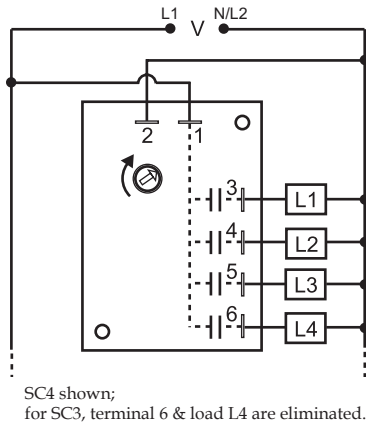
**FIGURE 8 - FS500 Series**



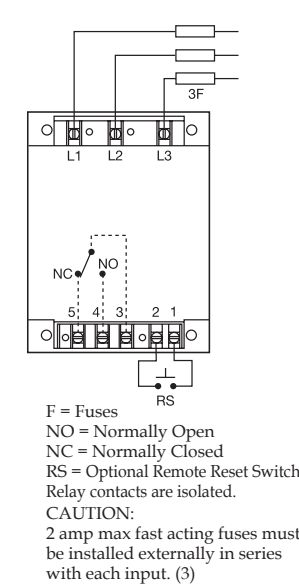
**FIGURE 11 - DLMU Series**



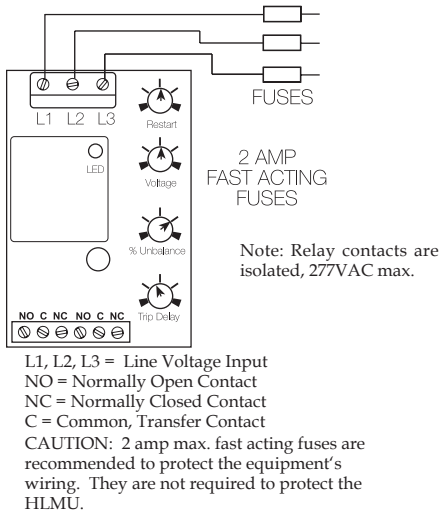
**FIGURE 9 - SC3/SC4 Series**



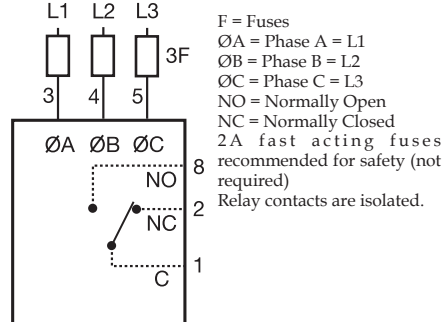
**FIGURE 10 - WVM Series**



**FIGURE 12 - HLMU Series**



**FIGURE 13 - PLMU/PLM/PLR/PLS Series**



**FIGURE 14 - TVM/TVW Series**

