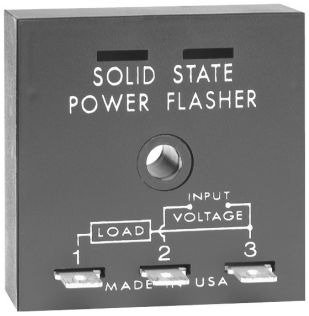


The FS100 Series (medium amp) may be used to control inductive, incandescent, or resistive loads. Input voltages of 24, 120, or 230VAC are available. Factory fixed flash rate of 90 FPM or may be ordered with a fixed, custom flash rate ranging from 10 to 300 FPM. Encapsulation provides protection against 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, page168, Figure 3 for connection diagram.

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

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.

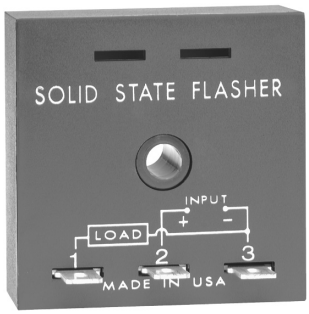
Available Models:

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

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

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.

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

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

Available Models:

FS224

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

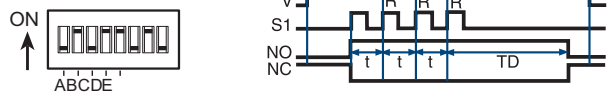
Specifications

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
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)

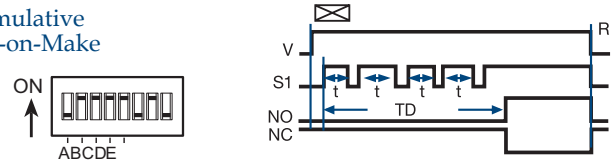
Appendix A - Timer/Flasher Functions

Single Functions

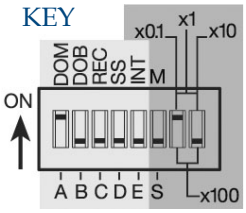
Retriggerable Single Shot



Accumulative Delay-on-Make



KEY



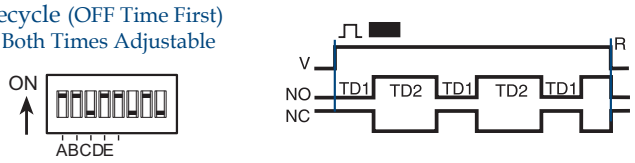
V=Voltage, R=Reset, S1=Initiate Switch, NO=Normally Open Contact, NC=Normally Closed Contact, TD,TD1,TD2=Complete Time Delay, t=Partial Time Delay, DOM=Delay-on-Make, DOB=Delay-on-Break, REC=Recycle, SS=Single Shot, INT=Interval, M=Minutes, S=Seconds, ≡⟨⟩≡ Undefined time

5 Switches for Function Selection
3 Switches for Time Delay Range

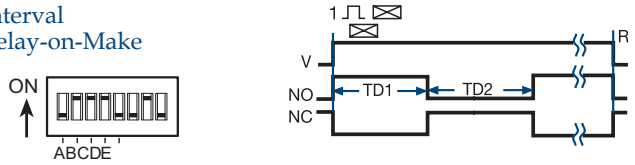
NOTE: The time delay range is the same for both functions when dual functions are selected.

Dual Functions

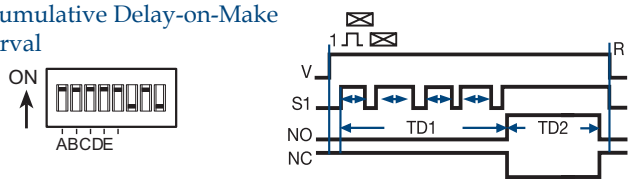
* Recycle (OFF Time First) Both Times Adjustable



* Interval Delay-on-Make



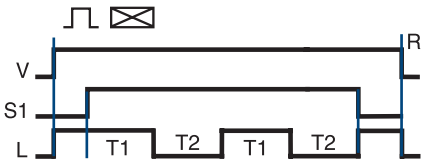
Accumulative Delay-on-Make Interval



* 9 Functions included in the 8 pin DPDT models

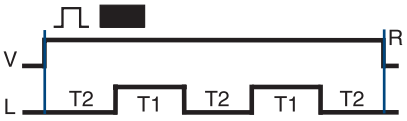
Flasher Function Diagrams

Flasher (NC)



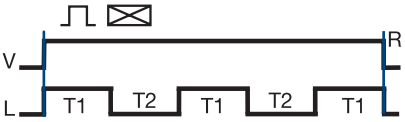
V = Voltage S1 = Initiate Switch L = Load
R = Reset T1 = ON Time T2 = OFF Time
T1 ≅ T2

Flasher (OFF First)



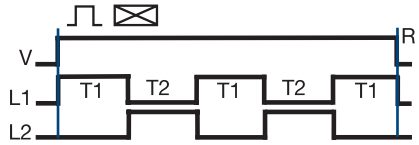
V = Voltage R = Reset L = Load
T1 = ON Time T2 = OFF Time
T1 ≅ T2

Flasher (ON First)



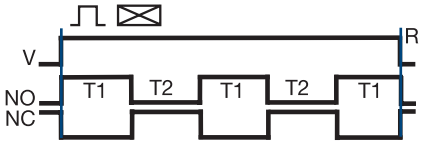
V = Voltage R = Reset L = Load
T1 = ON Time T2 = OFF Time T1 ≅ T2
ON time plus OFF time equals one complete flash.

Flasher (Alternating)



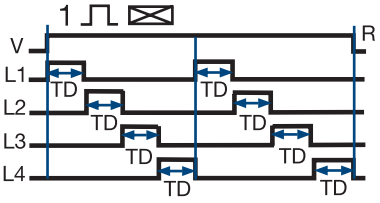
V = Voltage L1 = Load 1 L2 = Load 2
R = Reset T1 = ON Time T2 = OFF Time
T1 ≅ T2

Flasher (ON First-DPDT)



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

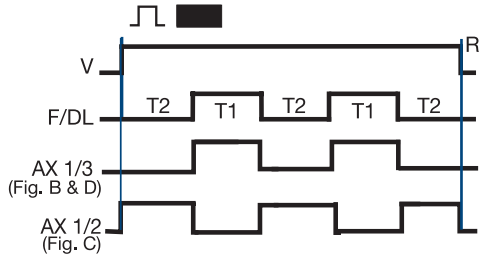
Flasher (Chasing)



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

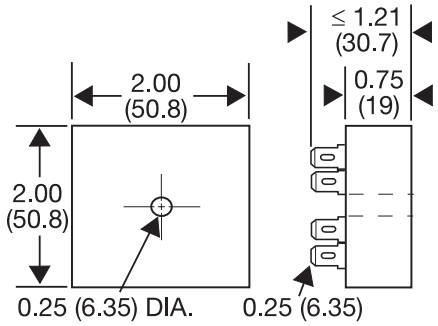
V = Voltage R = Reset L (1...4) = Lamps
TD = Time Delay (all are equal)

Flashers & Aux. Modules



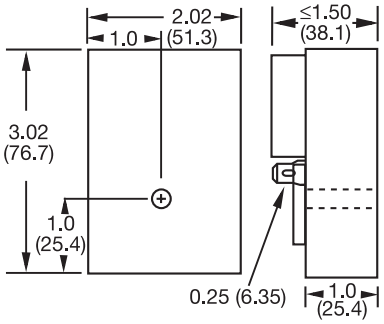
V = Voltage L = Load T1 = ON Time
T2 = OFF Time R = Reset
T1 ≅ T2

FIGURE 1



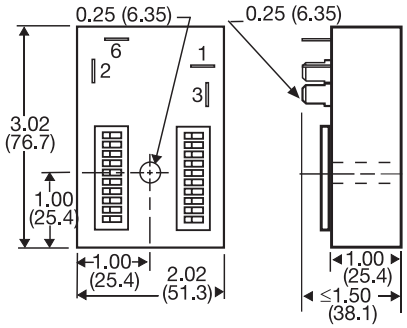
CT; ESD5; ESDR; FS100; FS200; FS300; KRD3; KRD9; KRDB; KRDI; KRDM; KRDR; KRDS; KRPD; KRPS; KSD1; KSD2; KSD3; KSD4; KSDB; KSDR; KSDS; KSDU; KSPD; KSPS; KSPU; KVM; T2D; TA; TAC1; TAC4; TDU; TDUB; TDUI; TDUS; TL; TMV8000; TS1; TS2; TS4; TS6; TSB; TSD1; TSD2; TSD3; TSD4; TSD6; TSD7; TSDB; TSDR; TSDS; TSS; TSU2000

FIGURE 2



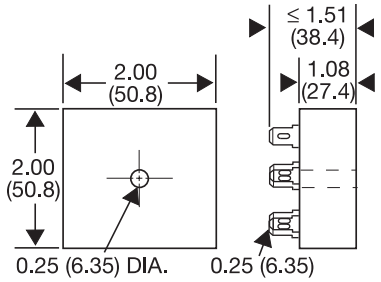
HLV; HRD3; HRD9; HRDB; HRDI; HRDM; HRDR; HRDS; HRID; HRIS; HRIU; HRPD; HRPS; HRPU; HRV; RS

FIGURE 3



HSPZ

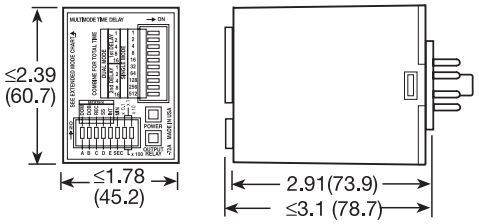
FIGURE 4



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

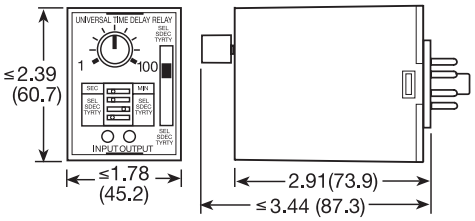
*If unit is rated @ 1A, see Figure 1

FIGURE 5



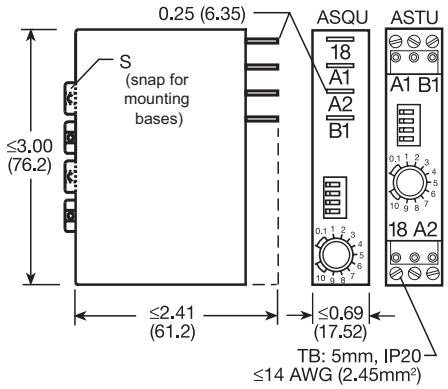
TRDU

FIGURE 6



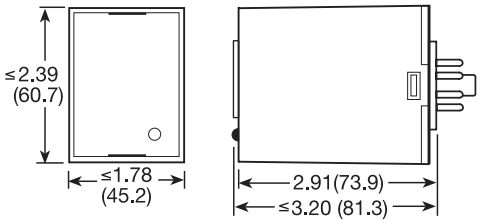
TRU

FIGURE 7



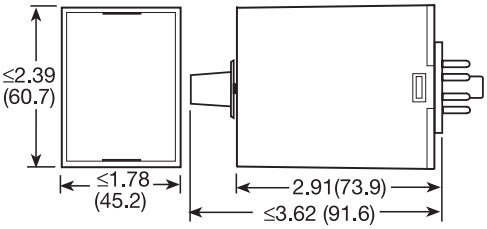
ASQU; ASTU; DSQU; DSTU

FIGURE 8



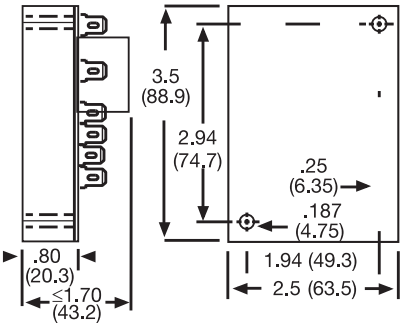
PLM; PLR; TDB; TDBH; TDBL; TDI; TDIH; TDIL; TDM; TDMB; TDMH; TDML; TDR; TDS; TDSH; TDSL

FIGURE 9



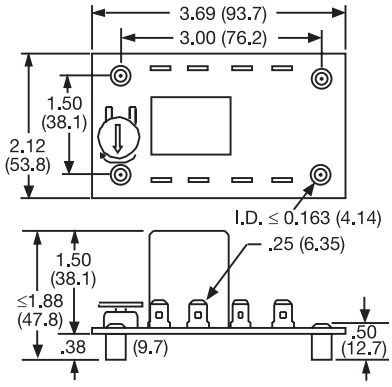
FS500; PRLB; PRLM; PRLS; TRB; TRM; TRS

FIGURE 10



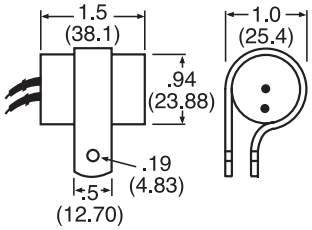
ERD3; ERDI; ERDM

FIGURE 11



ORB; ORM; ORS

FIGURE 12

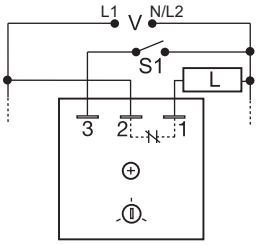


FS100; FS400

inches (millimeters)

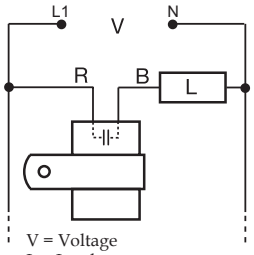
Appendix C - Connection Diagrams

FIGURE 1 - FSU1000 Series



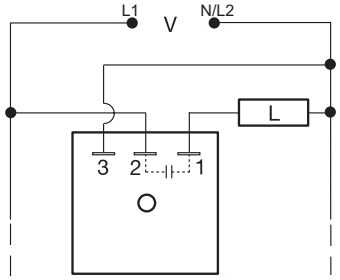
S1 = Optional low current switch
V = Voltage
L = Load

FIGURE 2 - FS100 Series



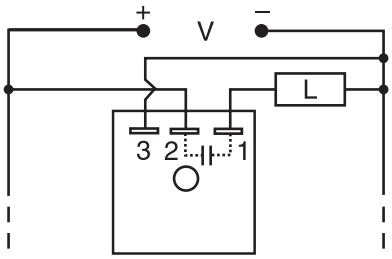
V = Voltage
L = Load
R = Red Wire
B = Black Wire

FIGURE 3 - FS100 Series



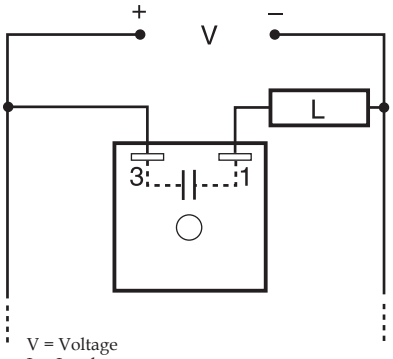
V = Voltage
L = Load

FIGURE 4 - FS200 Series



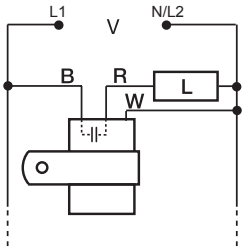
V = Voltage
L = Load

FIGURE 5 - FS300 Series



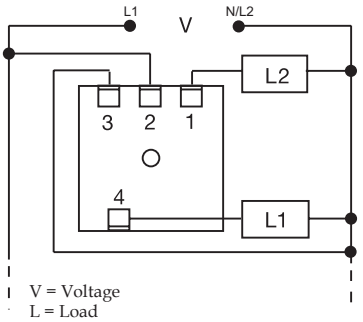
V = Voltage
L = Load
Note: Load may be in positive side.

FIGURE 6 - FS400 Series



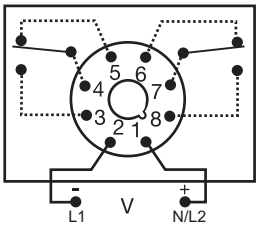
V = Voltage
L = Load
R = Red Wire
B = Black Wire
W= White Wire

FIGURE 7 - AF Series



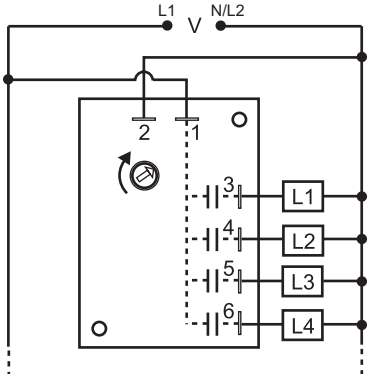
V = Voltage
L = Load

FIGURE 8 - FS500 Series



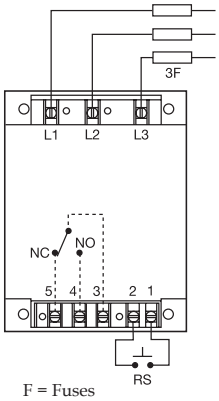
V = Voltage

FIGURE 9 - SC3/SC4 Series



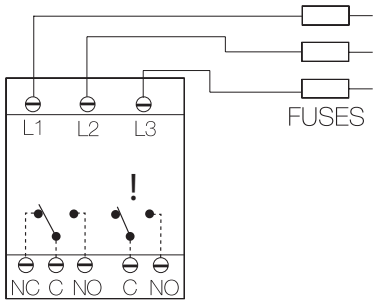
SC4 shown;
for SC3, terminal 6 & load L4 are eliminated.

FIGURE 10 - WVM Series



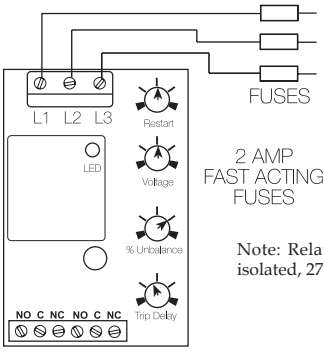
F = Fuses
NO = Normally Open
NC = Normally Closed
RS = Optional Remote Reset Switch
Relay contacts are isolated.
CAUTION:
2 amp max fast acting fuses must be installed externally in series with each input. (3)

FIGURE 11 - DLMU Series



L1, L2, L3 = Line Voltage Input
NO = Normally Open Contact
NC = Normally Closed Contact
C = Common, Transfer Contact
CAUTION: 2 amp max. fast acting fuses are recommended to protect the equipment's wiring. They are not required to protect the DLMU.
! = Select alarm contact connection as N.O. or N.C. when ordering; N.O. Shown.

FIGURE 12 - HLMU Series

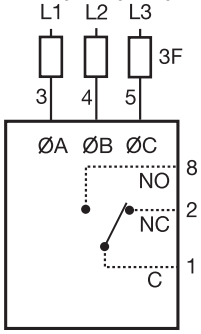


2 AMP
FAST ACTING
FUSES

Note: Relay contacts are isolated, 277VAC max.

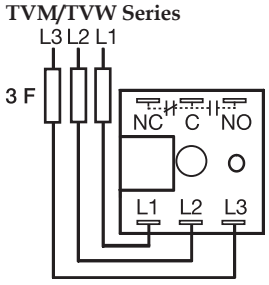
L1, L2, L3 = Line Voltage Input
NO = Normally Open Contact
NC = Normally Closed Contact
C = Common, Transfer Contact
CAUTION: 2 amp max. fast acting fuses are recommended to protect the equipment's wiring. They are not required to protect the HLMU.

FIGURE 13 - PLMU/PLM/PLR/PLS Series



F = Fuses
ØA = Phase A = L1
ØB = Phase B = L2
ØC = Phase C = L3
NO = Normally Open
NC = Normally Closed
2A fast acting fuses recommended for safety (not required)
Relay contacts are isolated.

FIGURE 14 - TVM/TVW Series



L1 = Phase A
L2 = Phase B
L3 = Phase C
NO = Normally Open
NC = Normally Closed
C = Common, Transfer Contact
Relay contacts are isolated.
F = 2A Fast acting fuses are recommended, but not required

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