

Section 11 Solid State Relays

Solid State Relays



- SIR..... 11.2
- SLR..... 11.6
- NLF..... 11.8

PHS Series



- PHS 11.10

DIN Rail Mounting Solid State Relays



- R100.xx
- R300.xx
- R111
- R12x
- R31x

Product pages are not included in this catalog.
Go to: www.ssac.com/s11.pdf
Click on the Product Name (ie: R111) to open the catalog page.
[Adobe Acrobat Reader is required]

Isolated SIR1/SIR2 Series Solid State Relay

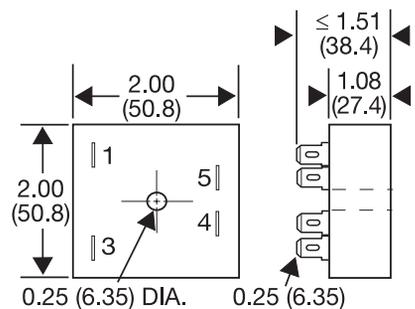


Technical Data

Output																
Type	Optical isolation, totally solid state															
Form	SPST, normally open or normally closed															
Voltage	24, 120, or 230 V AC															
Tolerance	+/-20%															
Ratings	<table border="1"> <thead> <tr> <th>Steady State</th> <th>Inrush*Output Device</th> <th></th> </tr> </thead> <tbody> <tr> <td>3 A</td> <td>30 A</td> <td>Triac</td> </tr> <tr> <td>6 A</td> <td>60 A</td> <td>Triac</td> </tr> <tr> <td>10 A</td> <td>100 A</td> <td>Triac</td> </tr> <tr> <td>20 A</td> <td>200 A</td> <td>Triac</td> </tr> </tbody> </table>	Steady State	Inrush*Output Device		3 A	30 A	Triac	6 A	60 A	Triac	10 A	100 A	Triac	20 A	200 A	Triac
Steady State	Inrush*Output Device															
3 A	30 A	Triac														
6 A	60 A	Triac														
10 A	100 A	Triac														
20 A	200 A	Triac														
Minimum Load Current	≅ 50 mA															
Voltage Drop	≅ 2.0 V at rated current															
Leakage Current (Open State)	≅ 6 mA															
Input																
Type	Optical isolation LED/photo transistor															
Control Voltage	9 ... 290 V AC/DC in 3 Ranges															
Power Consumption	≤ 0.5 W															
Protection																
Circuitry	Encapsulated															
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface															
Insulation Resistance	≥ 100 MΩ															
Mechanical																
Mounting*	Surface mount with one #10 (M5 x 0.8) screw															
Package	2 x 2 x 1.51 in. (50.8 x 50.8 x 38.4 mm)															
Termination	0.25 in. (6.35 mm) male quick connect terminals															
Environmental																
Operating Temperature	-20°C ... +60°C															
Storage Temperature	-40°C ... +85°C															
Humidity	95% relative, non-condensing															
Weight	≅ 3.9 oz (111 g)															

*Must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90°C. Inrush: Non-repetitive for 16 ms.

Mechanical View



Inches (Millimeters)

Non Isolated SLR1/SLR2 Series Solid State Relay



- SLR1 - Random Switching for Inductive Loads
- SLR2 - Zero Voltage Switching for Resistive & Incandescent Loads
- Normally Open or Normally Closed Output
- 1 ... 20 A with up to 200 A Inrush
- 0.25 in. (6.35 mm) Termination with Single Hole Mounting
- Noiseless Switching, Reliability, and Long Life

Approvals:

Accessories



Female quick connect P/Ns:
P1015-13 (AWG 10/12)
P1015-64 (AWG 14/16)
P1015-14 (AWG 18/22)



Quick connect to screw adaptor
 P/N: **P1015-18**

See accessory pages for specifications.

Description

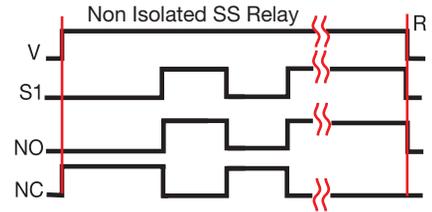
The SLR Series has no isolation between the control switch input and the solid state output. Select the SLR for applications where the control switch is the same voltage source as the load. Provides the noiseless, reliability and long life of a solid state relay without the cost of isolation circuitry. Zero voltage switching SLR2 can extend the life of an incandescent lamp up to 10 times its normal life. Random switching SLR1 is normally used for inductive loads. When fully insulated female terminals are used on the connection wires, the system meets the requirements for touch-proof connections.

Operation

The solid state output is located between terminals 1 and 2 and can be ordered as either normally open or normally closed, when voltage is applied and S1 is open. When S1 is closed, the solid state output between terminals 1 and 2 closes (or opens). If S1 is opened, the solid state output will open (or close).

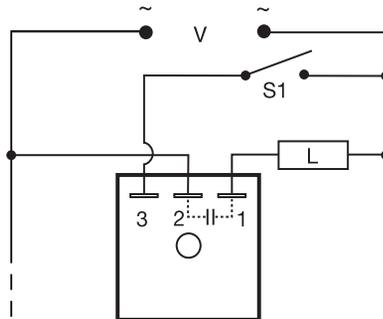
Reset: Opening S1 resets the output to its original state. Reset is also accomplished by removing input voltage.

Function



V = Voltage S1 = Initiate Switch R = Reset
 NO = Normally Open Output
 NC = Normally Closed Output
 —||— = Undefined time

Connection



Note: Normally open output is shown. Normally closed output is also available.

Dashed lines are internal connections.

L = Load S1 = Initiate Switch

Ordering Table

X Series	X Voltage	X Rating	X Form
SLR1 (Random Switching)	2 - 24 V AC 4 - 120 V AC 6 - 230 V AC	1 A 6 A 10 A 20 A	A - Normally Open B - Normally Closed
SLR2 (Zero Voltage Switching)			

Example P/N: **SLR1410A, SLR2220B**

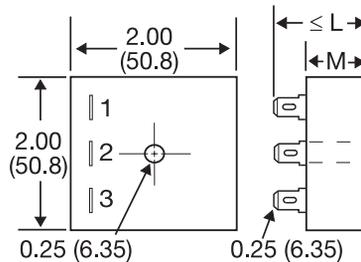
Non Isolated SLR1/SLR2 Series Solid State Relay



Technical Data

Output (Contact)	Non-isolated solid state			
Type	SPST, normally open or normally closed			
Form	24, 120, or 230 V AC			
Voltage	+/-20%			
Tolerance	Steady State	Inrush*	Output Device	*Must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90°C. Inrush: Non-repetitive for 16 ms.
Ratings	1 A	10 A	SCR & Bridge Rectifier	
	6 A	60 A	Triac	
	10 A	100 A	Triac	
	20 A	200 A	Triac	
Minimum Load Current	≅ 50 mA			
Voltage Drop (at Rated Current)	≅ 2.0 V - 6, 10, & 20 A units; ≅ 2.5 V - 1 A units			
Leakage Current (Open State)	≤ 5 mA			
Initiate Switch Voltage	Same as the output voltage			
Power Consumption	≤ 0.5 W			
Protection	Encapsulated			
Circuitry	≥ 2000 V RMS terminals to mounting surface			
Dielectric Breakdown	≥ 100 MΩ			
Insulation Resistance				
Mechanical	Surface mount with one #10 (M5 x 0.8) screw			
Mounting*	0.25 in. (6.35 mm) male quick connect terminals			
Termination				
Environmental	-20°C ... +60°C			
Operating Temperature	-40°C ... +85°C			
Storage Temperature	95% relative, non-condensing			
Humidity	≅ 3.9 oz (111 g)			
Weight				

Mechanical View



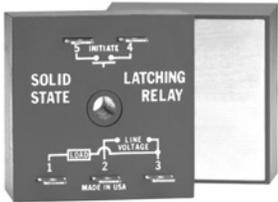
	1A	6A+
L	1.21 (30.7)	1.51 (38.4)
M	0.75 (19.1)	1.08 (27.4)

Inches (Millimeters)

Impulse Latching Relay

NLF1/NLF2 Series

Solid State Relay



10 YEAR WARRANTY

- Totally Solid State Latching Relay--Encapsulated
- Non-Isolation to Reduce Cost
- 1 ... 20 A with 200 A Inrush
- 24, 120, or 230 V AC Input Voltages
- NLF1--Random Switching for Inductive Loads
- NLF2--Zero Voltage Switching for Lamp and Resistive Loads

Description

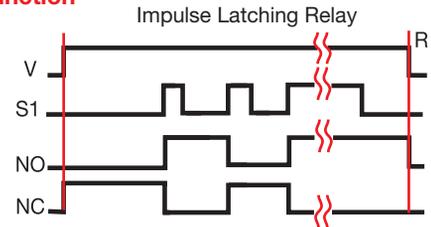
The NLF1 and NLF2 provide a *Flip-Flop* latching function. Each time the control switch is closed, the solid state output changes state and latches. The NLF Series has no isolation between the control switch and the solid state output, which lowers cost and reduces the number of connections required. For use where the control switch is the same voltage source as the load. Zero voltage switching NLF2 extends the life of an incandescent lamp up to 10 times. Random switching NLF1 is ideal for inductive loads. When accessory fully insulated female terminals are used on the connection wires, the system meets the requirements for touch-proof connections.

Operation

The solid state output is located between terminals 1 and 2, and can be ordered as either normally open or normally closed, when voltage is applied. When S1 is closed, the solid state output between terminals 1 and 2 closes (or opens). If S1 is opened and reclosed, the solid state output will open (or close).

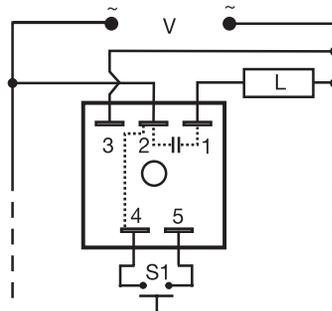
Reset: Open and reclose S1. Reset is also accomplished by removing and reapplying input voltage.

Function



V = Voltage S1 = Control Switch
 R = Reset NO = Normally Open Output
 NC = Normally Closed Output
 —||— = Undefined time

Connection



Internal connection between terminals 2 & 4.
 Dashed lines are internal connections.

L = Load S1 = Control Switch

Accessories



Female quick connect
 P/Ns:
P1015-13 (AWG 10/12)
P1015-64 (AWG 14/16)
P1015-14 (AWG 18/22)



Quick connect to screw adaptor
 P/N: **P1015-18**

Ordering Table

X	X	X	X
Series	Input	Output Rating	Output Form
NLF1 (Random Switching)	2 - 24 V AC 4 - 120 V AC 6 - 230 V AC	1 A 6 A 10 A 20 A	A - Normally Open B - Normally Closed
NLF2 (Zero Voltage Switching)			

Example P/N: NLF1410A, NLF261B

See accessory pages for specifications.

Impulse Latching Relay

NLF1/NLF2 Series

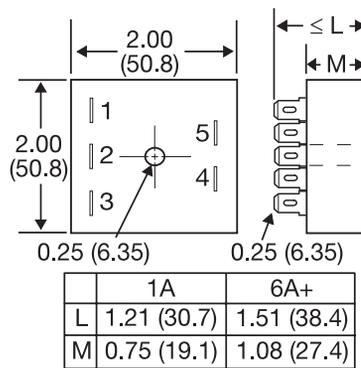
Solid State Relay



Technical Data

Output		Non-isolated solid state		
Type		SPST, normally open or normally closed		
Form				
Ratings		Steady State	Inrush*	Output Device
		1 A	10 A	SCR & Bridge Rectifier
		6 A	60 A	Triac
		10 A	100 A	Triac
		20 A	200 A	Triac
Minimum Load Current		50 mA		
Voltage Drop (at Rated Current)		≅ 2.0 V – 6, 10, & 20 A units; ≅ 2.5 V – 1 A units		
Leakage Current (Open State)		≤ 5 mA		
Input		Non-isolated, switch contact (customer supplied)		
Type		24, 120, or 230 V AC +/-20%		
Voltage		≤ 0.5 W		
Power Consumption		≤ 5		
Operations Per Second				
Protection		Encapsulated		
Circuitry		≥ 2000 V RMS terminals to mounting surface		
Dielectric Breakdown		≥ 100 MΩ		
Insulation Resistance				
Mechanical				*Units rated ≥ 6 A must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90°C. Inrush: Non-repetitive for 16 ms.
Mounting *		Surface mount with one #10 (M5 x 0.8) screw		
Package	6, 10, 20 A units	2 x 2 x 1.51 in. (50.8 x 50.8 x 38.4 mm)		
	1 A units	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		
Environmental				
Operating Temperature		-20°C ... +60°C		
Storage Temperature		-40°C ... +85°C		
Humidity		95% relative, non-condensing		
Weight		1 A units: ≅ 2.4 oz (68 g); 6, 10, 20 A units: ≅ 3.9 oz (111 g)		

Mechanical View



Inches (Millimeters)

Phase Control

PHS Series

AC Phase Control



10 YEAR WARRANTY

- External Adjustment - 230 V AC Rated Potentiometer
- 120 or 230 V AC Input Voltages Available
- Up to 20 A Steady State - 200 A Inrush
- Single Hole Surface Mounting

Approvals:

Accessories

Female quick connect
P/Ns:
P1015-13 (AWG 10/12)
P1015-64 (AWG 14/16)
P1015-14 (AWG 18/22)

Quick connect to screw adaptor
P/N: P1015-18

Versa-knob
P/N: P0700-7

See accessory pages for specifications.

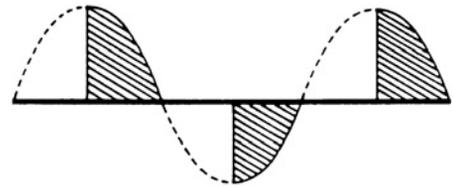
Description

The PHS Series is an ideal method of changing lamp intensity, varying the speed of a fan/motor, or controlling the temperature of a heater. The effective output voltage is adjusted with an accessory external potentiometer suitable for line voltage applications.

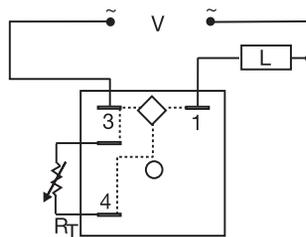
Operation

Upon application of input voltage, effective output voltage can be varied by changing the external resistance value. As the external resistance increases, the effective output voltage decreases. The inverse is also true.

Typical Output Waveform



Connection



Triac Output Device

V = Voltage L = Load R_t = External Adjustment
Dashed lines are internal connections.

Ordering Table

PHS Series	X Input	X Rating
	-120A - 120 V AC	-1 A
	-230A - 230 V AC	-6 A
		-10 A
		-20 A

Example P/N: PHS120A10, PHS230A6

Phase Control

PHS Series

AC Phase Control

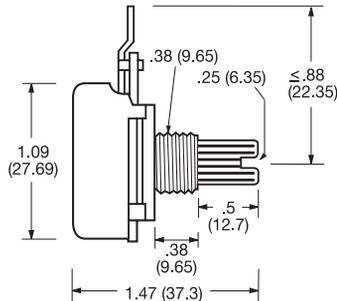
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Technical Data

Output	Variable voltage phase angle control	
Type	Steady State (at 100% On)	Inrush*
Rating	1 A	10 A
	6 A	60 A
	10 A	100 A
	20 A	200 A
Minimum Load Current	100 mA	
Voltage Drop	≅ 2.0 V at rated current	
Input		
Voltage	120 or 230 V AC	
Tolerance	+/-20%	
Frequency	50 ... 60 Hz	
Protection		
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface	
Insulation Resistance	≥100 MΩ	
Mechanical		
Mounting *	Surface mount with one #10 (M5 x 0.8) screw	
Termination	0.25 in. (6.35 mm) male quick connect terminals	
Environmental		
Operating / Storage Temperature	-20°C ... +60°C / -40°C ... +85°C	
Humidity	95% relative, non-condensing	
Weight	1A: ≅ 2.4 oz (68 g) 6, 10, & 20A: ≅ 3.9 oz (111 g)	
External Adjustment Potentiometer		
120 V AC	100K Ω rated at 1 W	
230 V AC	200K Ω rated at 2 W	
	Must have insulation resistance suitable for line voltage applications	

*Units rated ≥ 6A must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90°C. Inrush: Non-repetitive for 16 ms.

Potentiometer

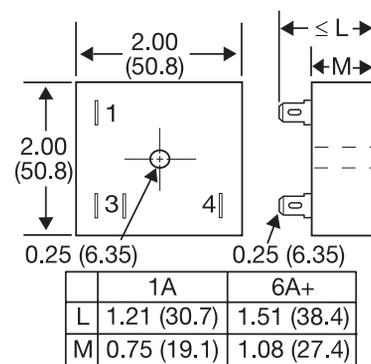


Part Number	Value (Ohms)	Wattage
P1004-174	100K	1 W
P1004-175	200K	2 W

A durable conductive plastic potentiometer. Recommended for use with the PHS Series. It is designed to withstand high temperature and harsh environments. The shaft is slotted for screwdriver adjustment and can be panel mounted.

- Resistance values 100K and 200K +/-10%
- Rated Wattage at 70°C
- Linear taper
- Shaft rotation: 312° +/-3°
(effective rotation 275° +/-5°)

Mechanical View



Inches (Millimeters)

