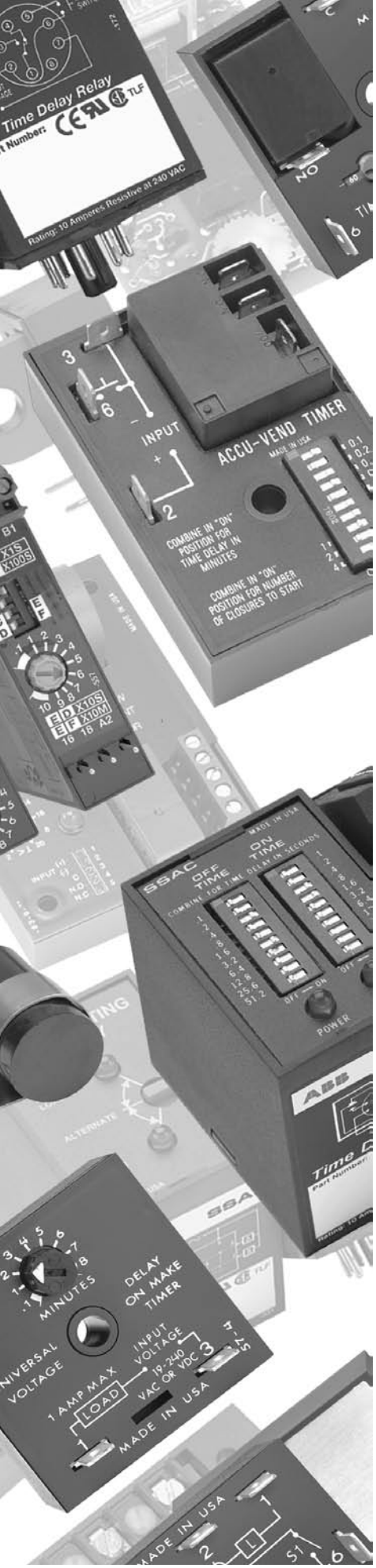
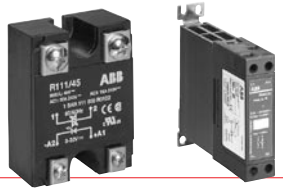


Section 11
Solid State Relays

Solid State Relays

PHS Series

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]

11

1TRC 001 009 C0202

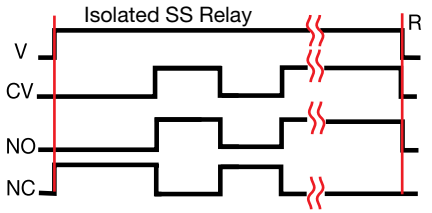
Isolated
SIR1/SIR2 Series
Solid State Relay

- SIR1 - Random Switching for Inductive Loads
- SIR2 - Zero Voltage Switching for Resistive & Incandescent Loads
- Normally Open or Normally Closed Output
- 3 ... 20 A with up to 200 A Inrush
- Encapsulated Circuitry
- Optically Isolated Output
- 0.25 in. (6.35 mm) Terminals with Single Hole Mounting

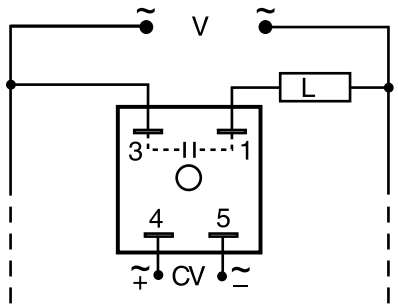
Approvals:

Description
Designed for industrial applications requiring rugged reliable operation. Provides an optically isolated high capacity solid state output, with power switching capability up to 20 A steady state, 200 A inrush. Zero voltage switching SIR2 extends the life of an incandescent lamp up to 10 times. Random switching SIR1 is ideal 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 3, and is normally open or normally closed without control voltage applied to terminals 4 and 5. When control voltage is applied to terminals 4 and 5, the solid state output opens or closes respectively.
Reset: Removing control voltage resets the output. The unit is also reset if output voltage is removed.

Function


V = Voltage CV = Control Voltage
R = Reset NC = Normally Closed Output
NO = Normally Open Output
= Undefined time

Connection


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

Dashed lines are internal connections.
Load may be connected to terminal 3 or 1.

L = Load CV = Control Voltage

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.

Ordering Table

X	X	X	X	X
Series	**Control Voltage**	**Rating**	**Form**	**Voltage**
SIR1 (Random Switching)	A - 9 ... 30 V AC or DC	1 - 3 A	A - Normally Open	2 - 24 V AC
SIR2 (Zero Voltage Switching)	B - 90 ... 150 V AC or DC	6 - 6 A	B - Normally Closed	4 - 120 V AC
	C - 190 ... 290 V AC or DC	10 - 10 A		6 - 230 V AC
		20 - 20 A		

Solid State Output Contact

Example P/N: SIR1A10A6, SIR2B10B6

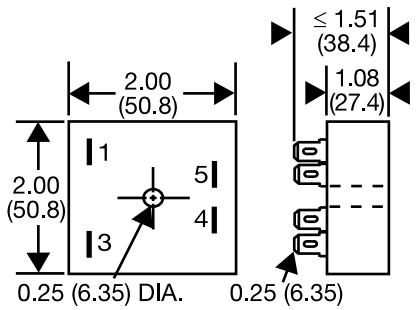
SIR02B01 06.10.04

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	**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.
	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)			

Mechanical View



Inches (Millimeters)

11

SIR02B01 06.10.04

Notes

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Notes

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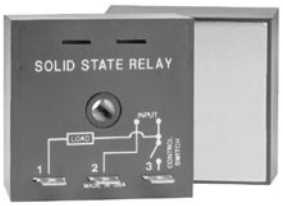
Non Isolated
SLR1/SLR2 Series
Solid State Relay

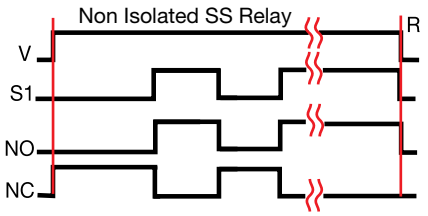


- SLR1 - Random Switching for Inductive Loads
- SLR2 - Zero Voltage Switching for Resistive & Incandescent Loads
- Normally Open or Normally Closed Output
- 1 ... 20 A with up to 200 A Inrush
- 0.25 in. (6.35 mm) Termination with Single Hole Mounting
- Noiseless Switching, Reliability, and Long Life

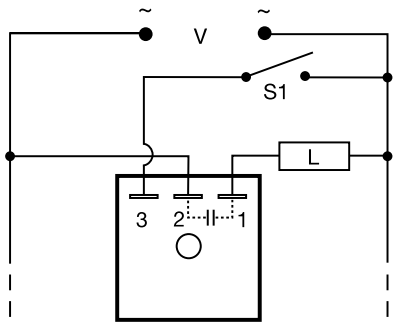
Approvals:

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

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.

Ordering Table

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

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

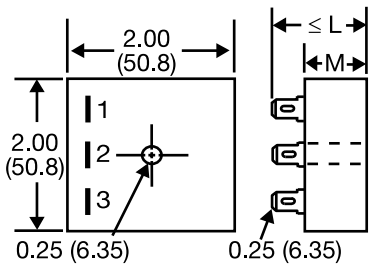
SLR02B01 02.11.05

Non Isolated
SLR1/SLR2 Series
Solid State Relay

Technical Data

Output (Contact)				
Type	Non-isolated solid state			
Form	SPST, normally open or normally closed			
Voltage	24, 120, or 230 V AC			
Tolerance	+/-20%			
Ratings	**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.
	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				
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			
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)			

Mechanical View



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

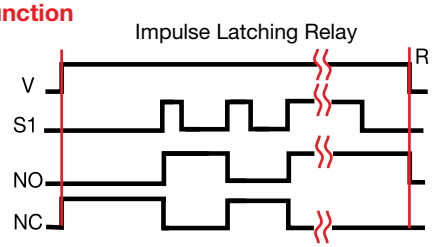
Inches (Millimeters)

Impulse Latching Relay
NLF1/NLF2 Series
Solid State Relay

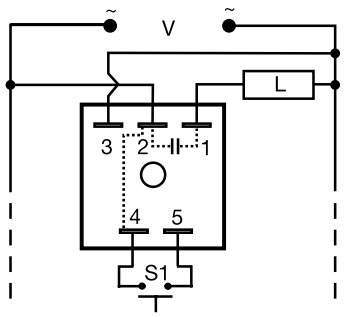
- Totally Solid State Latching Relay--Encapsulated
- Non-Isolation to Reduce Cost
- 1 ... 20 A with 200 A Inrush
- 24, 120, or 230 V AC Input Voltages
- NLF1--Random Switching for Inductive Loads
- NLF2--Zero Voltage Switching for Lamp and Resistive Loads

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**

See accessory pages for specifications.

Ordering Table

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

Example P/N: NLF1410A, NLF261B

NLF02B01 06.09.04

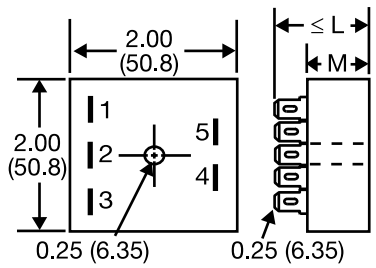
Impulse Latching Relay
NLF1/NLF2 Series
Solid State Relay

Technical Data

Output			
Type	Non-isolated solid state		
Form	SPST, normally open or normally closed		
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			
Type	Non-isolated, switch contact (customer supplied)		
Voltage	24, 120, or 230 V AC +/-20%		
Power Consumption	≤ 0.5 W		
Operations Per Second	≤ 5		
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 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)		

*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.

Mechanical View



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

Inches (Millimeters)

Phase Control
PHS Series
AC Phase Control

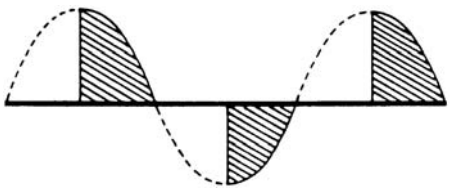
- External Adjustment - 230 V AC Rated Potentiometer
- 120 or 230 V AC Input Voltages Available
- Up to 20 A Steady State - 200 A Inrush
- Single Hole Surface Mounting

Approvals:

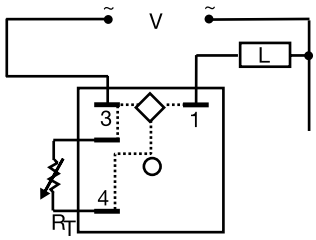
Description
The PHS Series is an ideal method of changing lamp intensity, varying the speed of a fan/motor, or controlling the temperature of a heater. The effective output voltage is adjusted with an accessory external potentiometer suitable for line voltage applications.

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.

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.

Ordering Table

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

Example P/N: **PHS120A10, PHS230A6**

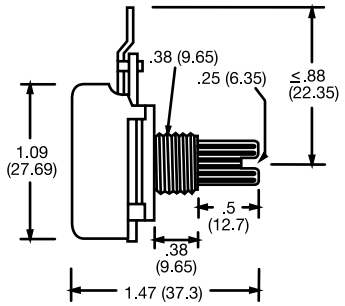
PHS02B01 06.09.04

Phase Control
PHS Series
AC Phase Control

Technical Data

Output			
Type	Variable voltage phase angle control		
Rating	**Steady State** (at 100% On)	**Inrush***	*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.
	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		

Potentiometer

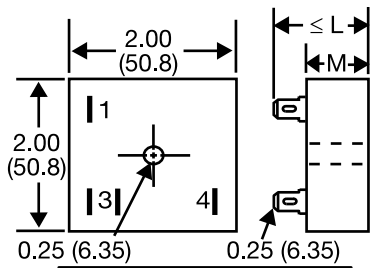


Part Number	Value (Ohms)	Wattage
P1004-174	100K	1 W
P1004-175	200K	2 W

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



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

Inches (Millimeters)