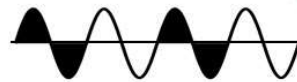
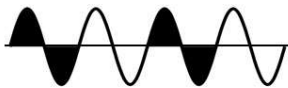
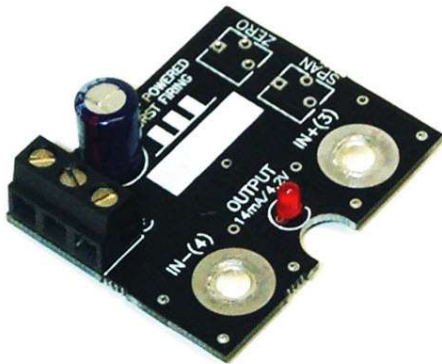


## SSRMAN-1LP SERIES USERS MANUAL

### 4-20MA LOOP POWERED SOLID-STATE RELAY BURST FIRING MODULE



TPLP A Series Proportional Output (Burst-Fire)  
Solid State Relay Power Controller

## TABLE OF CONTENTS

1.	Ordering Code .....	2
2.	Description .....	2
2.1	Features .....	2
3.	Installation / Safety Information .....	2
3.1	Mounting Instructions .....	3
3.2	Limited Warranty .....	3
4.	Operation .....	3
4.1	Command Input .....	3
4.1.1	Input Fail-safe Protection .....	3
4.2	Control Output .....	4
4.2.1	Cycle Time .....	4
4.2.2	Linearity .....	4
4.2.3	Zero and Span Pots .....	4
4.3	Three Phase Operation .....	4
4.4	Wiring of Multiple SSRMAN-1LPs .....	5
5.	Electrical Specifications .....	5
6.	Mechanical Dimensions & Connection Diagram .....	5
7.	Contact Information .....	5
8.	WIRING DIAGRAM .....	6

## 1. Ordering Code

Part#	Description
<b>SSRMAN-1LP</b>	SSR Mount Power Control Module, Burst Firing Output, 4-20mA Input
<b>SSRMAN-1LP-ZS</b>	SSR Mount Power Control Module, Burst Firing Output, 4-20mA Input With Zero and Span Pots

## 2. Description

The SSRMAN-1LP is a power control module designed for use with industry standard zero-cross or random fire SSRs (solid-state relays). The module mounts directly on the SSR's input terminals and derives its power from the 4-20mA command input. The module operates by burst firing the SSR's control input. The power delivered to the load is proportional to the command input signal.

### 2.1 Features

- Provides precise time proportioned 0-100% output
- Loop powered - no external power supply required
- 4 to 20mA command signal input
- Drops only 6.3 Volts of total loop voltage
- Drives multiple solid-state relays (SSRs)
- Installs in seconds - mounts on SSR input terminals
- On board LED Indication
- Limited Two-Year Warranty

## 3. Installation / Safety Information

Responsibility for determining suitability for use in any application / equipment lies solely on the purchaser, OEM and end user. Suitability for use in your application is determined by applicable standards such as UL, cUL and CE, and the completed system involving this component should be tested to those standards.



**WARNING: FIRE HAZARD!!** Even quality electronic components can fail! Ensure that separate (redundant) over temperature and short circuit protection is installed to disconnect power to the solid-state relay if a fault occurs.



**WARNING: HIGH VOLTAGE!!** The SSRMAN is designed to be installed on a solid-state relay connected to a high voltage AC source. This product must be installed in a grounded enclosure by a qualified electrician in accordance with applicable local and national codes, including NEC and other applicable codes. A safety interlock should be installed on the access door to disconnect power before gaining access to the device.

### 3.1 Mounting Instructions

The SSRMAN-1LP mounts directly to the control input terminals of an SSR. Some relays have short input screws and longer screws will be required to reach through the contacts on the SSRMAN-1LP. Be sure to observe the correct polarity when mounting the module.

### 3.2 Limited Warranty

HBControls, Inc. warrants this product to be free from defect in workmanship and materials for a period of two (2) years from the date of purchase.

1. Should unit malfunction, return it to the factory. If found to be defective, it will be repaired or replaced at no charge.
2. There are no user serviceable parts on this unit. This warranty is void if the unit shows evidence of being tampered with or subjected to excessive heat, moisture, corrosion, or other misuse / misapplication.
3. Components which wear or damage with misuse are excluded (e.g. relays).
4. HBControls, Inc. shall not be responsible for any damage or losses however caused, which may be experienced as a result of the installation or use of this product. HBControls, Inc. liability for any breach of this agreement shall not exceed the purchase price paid E. & O.E.

## 4. Operation

### 4.1 Command Input

The SSRMAN-1LP can accept a 4-20mA input. If more than one SSRMAN-1LP is to be used from the same drive signal, the SSRMAN-1LP inputs should be connected in series. The command input is direct acting, meaning that as the input value increases, the control output increases in direct proportion.

#### 4.1.1 Input Fail-safe Protection

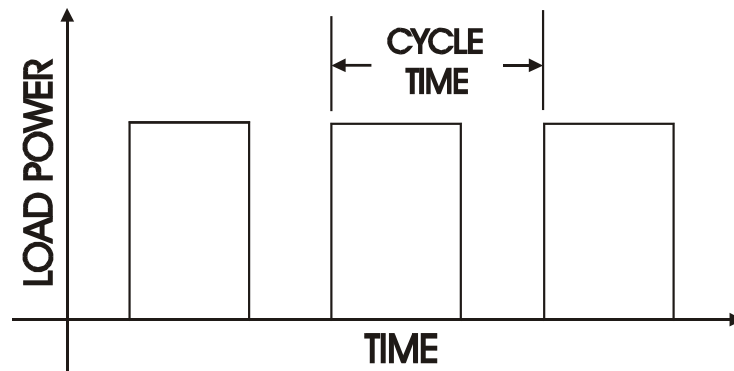
If the signal sent to the SSRMAN-1LP's command input should become electrically open, the module's output will be forced to an off state since power will be lost.

## 4.2 Control Output

The SSRMAN-1LP's SSR output drive is a DC pulsed, current limited 4.2V@14mA drive signal. This is suitable for driving most 3-32Vdc input standard SSRs. However, it is still important to review the data sheet for the SSR you would like to use to determine compatibility with the SSRMAN-1LP's output drive.

### 4.2.1 Cycle Time

The SSRMAN-LP has one available cycle time of 350mS (@50%). Custom cycle times are available upon request.



Cycle Time Example

The SSRMAN-1LP is designed to provide the maximum control resolution and response time using a varied output cycle time. While the cycle time is specified at 350mS, this is at 50% power or 12mA input. As 4mA or 20mA is approached, the cycle time varies to limit the minimum on / off times to 100mS. This advanced approach maximizes the control resolution when the module is used with a zero cross fired SSR.

The cycle times change with the command input as follows:

Command	5mA	6mA	8mA	12mA	16mA	18mA	19mA
Cycle Time	1.3s	0.7s	0.4s	0.35s	0.4s	0.7s	1.3s

### 4.2.2 Linearity

The control output linearity is +/-2% for the version without the zero and span potentiometers. Much tighter linearity can be achieved by adjusting the zero and span pots to optimize the linearity over the control range of the process.

### 4.2.3 Zero and Span Pots

The SSRMAN-1LP can be ordered with Zero and Span pots as the SSRMAN-1LP-ZS. This version allows the user to calibrate the low and high ends of the control range for the best possible linearity over the control range. It will also allow use of the module in load balancing applications and to skew the output response to meet specific needs.

## 4.3 Three Phase Operation

One SSRMAN-1LP can be used to control two poles of a three phase load using two SSRs with their control inputs wired in parallel. The Module should be wired as shown in the wiring diagram, but with separate load circuits for each leg. Make sure that the total input current requirements of the two SSRs can be achieved with the SSRMAN-LP.

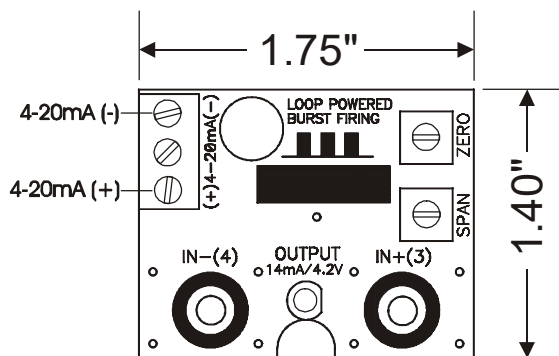
## 4.4 Wiring of Multiple SSRMAN-1LPs

If more than one SSRMAN-1LP is to be used from a single command signal, the command inputs should be wired in series, not in parallel.

## 5. Electrical Specifications

<b>Command Input</b>	- 4 to 20mA.
<b>Control Output</b>	- 4.2V/14mA. Short Circuit Protected.
	- Control output is direct acting.
<b>Cycle Time</b>	- 350mS at 50% output.
	- Cycle time greater at ends for optimal output resolution.
<b>Output Linearity</b>	- +/-2% of Full Scale. (+/-1% with zero and span pots)
<b>Zero Pot Adjustment</b>	- +/-2% of full scale.
<b>Span Pot Adjustment</b>	- +/-8% of full scale.

## 6. Mechanical Dimensions & Connection Diagram



Max Height is 0.6"

## 7. Contact Information

HBControls, Inc  
800.879.7918

[www.hbcontrols.com](http://www.hbcontrols.com)

### 8. WIRING DIAGRAM

SSRMAN-1LP WIRING DIAGRAM

