ANACON POWER & CONTROLS

Relay Assembly Specialists
An Anacon Electronic Sales, Inc. Company

2254 Main St. Concord, MA 01742 **-** TEL**:** 800-466-9080 **-** 978-287-0715 **- FAX:** 978-287-0952
www.anaconpower.com email: sales@anaconpower.com

APCSSRMON USERS MANUAL

SOLID STATE RELAY MONITOR

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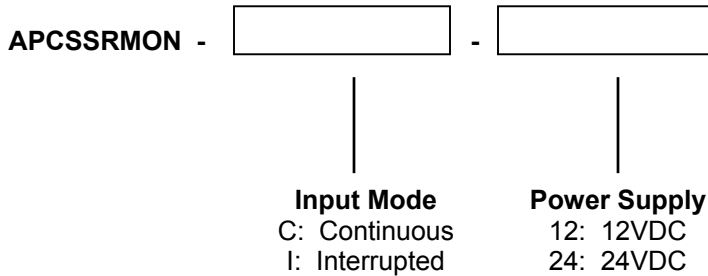www.anaconpower.com email: sales@anaconpower.com

1   Ordering Code (Figure 1)

The following is the ordering code for the Anacon Solid State Relay Monitor series.

ORDERING INFORMATION

APCSSRMON - [   ] - [   ]

Input Mode　　　**Power Supply**
C: Continuous　　　12: 12VDC
I: Interrupted　　　24: 24VDC

For example: A 240 Volt Line Voltage type with a 5-15V input, 12V power Supply and Continuous mode would be ordered as follows:

APCSSRMON-C-12

2   Installation

2.1   Mounting Instructions

The APCSSRMON is designed to mount in a "piggy back" configuration on any standard footprint Solid State Relay module. The unit should be used with the Anacon touch-safe cover to minimize electrical shock hazards.

2.2   Wiring Instructions

The input and output terminals of the SSR should be wired with the board installed, but as if the board is not present. In high current applications (over 40A) we recommend wiring the connection lugs under the APCSSRMON Printed Circuit Board Bushings.

All I/O on the APCSSRMON is available with screw terminal connectors for ease of harness assembly. The screw connectors can accept up to 14 AWG wire.

The power, alarm, and ground wires are wired to the screw terminal block. In the case of the interrupted input version, the control input is wired to the screw terminal connector located at the top left hand corner of the board.

The AC Load Side and Signal connections should be wired as shown in Figure 2 on page 4. It is good practice to keep the AC Load Side wires away from the Control and Alarm wires to prevent any power line noise from coupling into them.
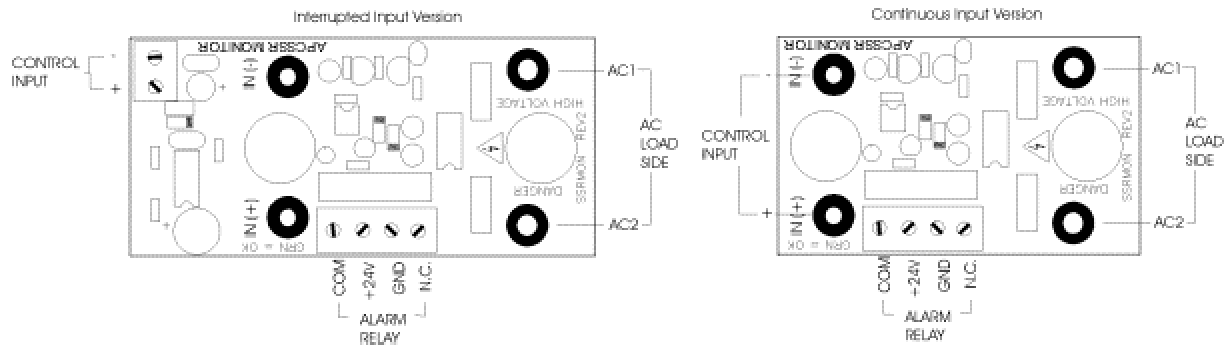
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2.3 Wiring Diagram (Figure 2)

3 Operation

3.1 APCSSRMON Input

The APCSSRMON control input is optically isolated from both the AC output and the DC power supply. The control input has nominal input impedance of ~4 KΩ. The input impedances on the Interrupted input version are typically about one half of the Continuous version, thus requiring more drive current.

3.2 Continuous Input Version Applications

The Continuous input version of the APCSSRMON can only detect a failure condition when the control input signal of the Solid State Relay and APCSSRMON become logic low. The control input is required to remain logic low for at least 100mS before the failure will be detected.

3.2.1 Time Proportioned Controlled Processes

The Continuous input version will perform well in the majority of applications where the SSR control input is being cycled periodically (time proportioned P, PI, PD, PID).

We recommend that the process controller or other device used to drive the APCSSRMON be setup to have a periodic off time of at least 100mS. This can usually be accomplished via an output percentage limit function in the temperature or process control. For example: if the cycle time on the process controller is set to 10 seconds and the output limit is set to 99% then the output will cycle off for 100mS every 10 seconds even if the controller output is on "full". As another option, some PLCs may also be programmed to periodically interrupt the SSR control signal.

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3.2.2 On-Off Controlled Process

The Continuous input version may be used in on-off control applications. The trade-off is that no alarm can be detected until the process controller or other device driving the Solid State Relay and APCSSRMON turns its control output off. In most cases if the Solid State Relay becomes shorted this will force the process value to the required setpoint causing the control output to turn off.

3.3 Interrupted Input Version Applications

We recommend the Interrupted input version for on-off control and switched applications where the control input to the SSR and APCSSRMON may not be cycled regularly. The interrupted input version of the APCSSRMON forces the SSR control input off for a brief period 100mS-150mS approximately every 10 seconds. This results in a duty cycle of about 99%. In most processes a forced brief off period (~100mS) of the load is negligible (such as in an on-off temperature control application). The Performance on the control of heaters is negligible; it is approximately equivalent to having a 0.5% change in line voltage, which happens frequently everywhere.

3.4 Alarm Output

The alarm output of the APCSSRMON is a low voltage/current relay contact. Single Relay Contact 200 VDC/0.5 A max. Relay contacts open upon fault or loss of board power. Relay contacts are closed when no faults are present. The alarm output may be used to drive low voltage relay coils, indicators, audible alarms, PLCs, etc. The required output current should not exceed 0.5 Amps. If multiple APCSSRMONs are needed in a given installation such as in a polyphase application, the output relay contacts may be wired in series to "OR" the alarms into one signal. The APCSSRMONs output relays may also be wired in series with other devices normally closed alarm relays.

3.5 Fault Conditions

The APCSSRMON can detect a loss of load/line power, loss of DC power supply, a loss of load, and a shorted solid state relay. The APCSSRMON can detect either half wave or full wave shorted failure conditions of the SSR.

3.5.1 Continuous Input Fault Detection

Failure Condition	When Detected
Shorted SSR	After Control Input remains logic low for 100mS or more, i.e. when an attempt is made to turn the SSR off
Open Load	After Control Input remains logic low for 100mS or more, i.e. when an attempt is made to turn the SSR off
Load or Line Power Loss	After Control Input remains logic low for 100mS or more, i.e. when an attempt is made to turn the SSR off
DC Power Supply Loss	Anytime - Independent of control Input

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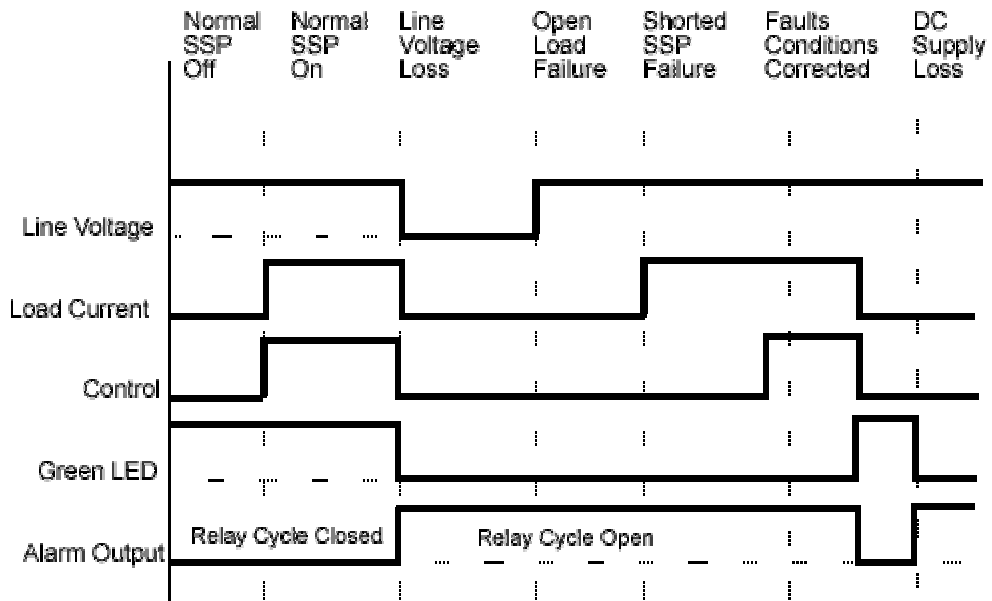www.anaconpower.com email: sales@anaconpower.com

3.5.2 Interrupted Input Fault Detection

Failure Condition	When Detected
Shorted SSR	Anytime - Independent of control Input (forced off period)
Open Load	Anytime - Independent of control Input (forced off period)
Load or Line Power Loss	Anytime - Independent of control Input (forced off period)
DC Power Supply Loss	Anytime - Independent of control Input

3.6   Input / Output Logic

Once a fault condition is detected, i.e. loss of load/line power, loss of load, or a shorted solid state relay, the relay contacts are opened and held open until the fault condition is corrected and the control input of the APCSSRMON is toggled or DC power is removed and applied again. For further details, see the status diagram in figure 3.

3.7   Status Diagram (Figure 3)

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4   Electrical Specifications

|	
Monitoring Modes	Monitors SSR Output and Input for shorted SSR output, loss of line voltage, loss of load, short external to SSR, loss of DC power.
Power / Status Indication	Green LED energized when power is applied and normal operating conditions are present, i.e. status OK.
Power Supply	10-14 VDC (12VDC) or 20 to 32 VDC (24VDC), less than 1.5 Watts power consumption.
Input Mode	**Interrupted:** Input to SSR and APCSSRMON is forced off for ~ 150-200mS every 10 seconds to test SSR VO logic. **Continuous:** Input to SSR and APCSSRMON is based on drive signal.
Control Input Impedance	~4 KΩ
Control Voltage	**Continuous**: 5-32 VDC. **Interrupt**: 5-15 VDC.
Alarm Output	Single Relay Contact 200 VDC / 0.5 A max. Contacts open upon fault or loss of board power. Contacts are closed when no faults are present.
Alarm Response Time	Typically less than 50 mS from the last control input cycle. Up to 10 seconds on Interrupted Input version with control input on 100%.
AC Line Voltage	100-660 VAC50 / 60 Hz.
Input / Output Isolation	4000 Vrms (25° C for 1 second).
Off State Leakage Current	6mA rms max across SSR output.
Off State Blocking Voltage	1200 Vpk (max 1 minute duration).
Operating Temp. Range	0 to 60° C

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5   Mechanical Dimensions

Interrupted Input Version

Continuous Input Version
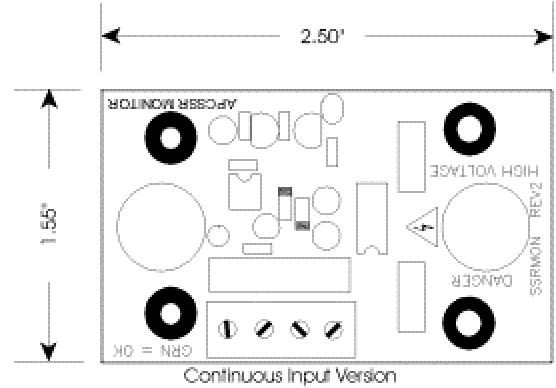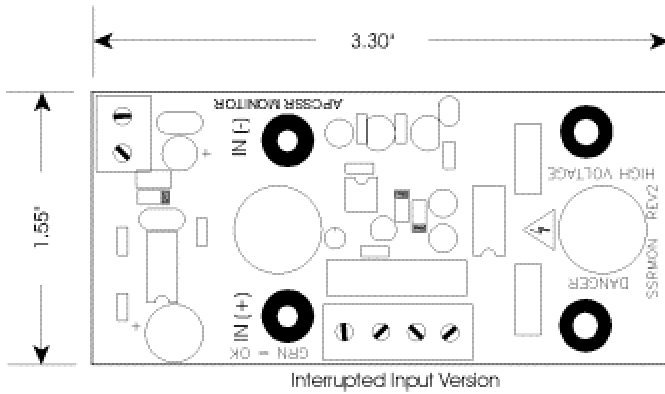
6   Contact Information

Anacon Power & Controls
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