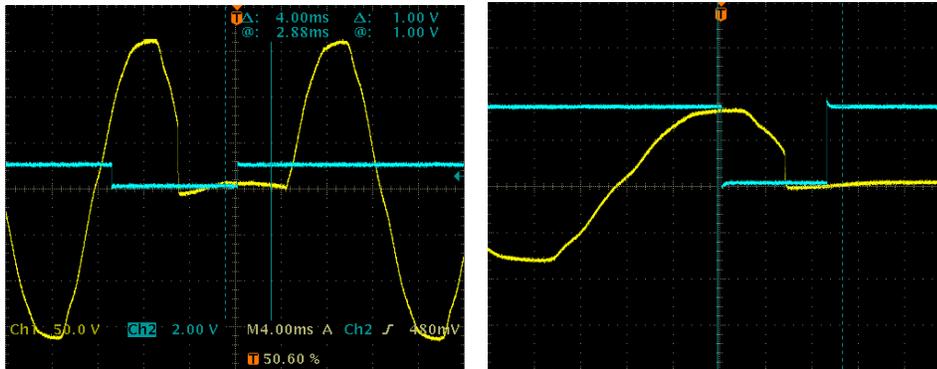


SSRMON AN-6 Fault Reporting in Short Off-Time Applications REV.A 072318

When the SSRMON2 (Rev.5, black boards) is used in time proportioned processes with fast cycle times (< 10sec), and the recommended minimum periodic off-time of 100mS (temperature controller output percentage limit) is not observed, intermittent false fault reporting is possible over a narrow range of duty cycles. The SSR can appear shorted during the measurement cycle due to the SCR remaining on into the measurement cycle. This may occur over a limited range of duty cycle, cycle time, and line frequency combinations.

Control input and heater voltage traces: (BLUE = SSR CONTROL INPUT, YELLOW = HEATER VOLTAGE)



For example: Applications using a temperature controller with one second cycle time and output duty cycles in a narrow region of 98.1%-99.8% (2mS - 19mS off times) may exhibit false fault reporting. The false fault reporting is more likely to occur on 50Hz power systems where the cycle time is evenly divisible by the power line period and a slow beat frequency of false fault reporting can occur. The false fault reporting can appear random in a closed-loop controlled process. This is due to normal fluctuating heater power demand from the SSR as the temperature controller maintains temperature. Typically, the temperature controller will not spend much time in the aforementioned region of duty cycles and will only intermittently transition through the region.

Older SSRMON Products: Older, analog versions of the SSRMON (Rev.3, green boards) respond slower and thus do not report false faults when operating with off-times less than the recommended 100mS. The disadvantage to the older product is that with an example 1 second cycle time, true fault detection is not reliable above 91% duty cycles and as such the interrupted input version had to be used resulting in slower overall fault detection.

Avoiding False Fault Reporting Scenarios (existing installations): Change the settings in the temperature controller so that a periodic minimum off-time of at least 30mS is present (the 100mS minimum recommended in the user manual is conservative). **For a one second cycle time, this would correlate to a duty cycle limit setting of 97%.** This will also provide the fastest possible reporting of actual faults and can be used with the interrupted input wiring for greater reliability.

SSRMON Firmware Update: SSRMONs (Rev.5, black boards) shipping after 072318 have firmware V1.1 to lock-out fault reporting when the minimum off time is below 30mS. When the input has an off-time < 30mS, fault reporting can be achieved via the interrupted input wiring scheme.