



B A S Dealer Service Note 06/18/96

RSC Type 3 Digital Output Failure

Description of Problem

A Digital Output at the RSC will indicate ON by LED but the load is not energized and there is no AC voltage at the output terminal.

Extent of Problem

This problem has the potential to affect any inductive load switched by a digital output. At this time, only digital outputs that are switching water source heat pump compressor contactors at Stevens Hospital have been affected. Since this is not a widespread problem, it is likely that the design and/or age of the contactors is the cause. The problem should be limited to contactors that meet the following criteria:

1. Rated for loads of more than one phase or more than 20 amps.
2. Old or otherwise in poor mechanical condition.

Cause of Problem

Digital Output snubber circuits have been damaged. This will prevent proper operation of the digital output triac. Initial indications are that this is caused by contactors which generate AC voltage spikes in excess of the rating of the snubber circuit.

Solution

The safest solution is to use a pilot duty switching relay, installed between the between the RSC and the load, to operate the contactor. A properly sized snubber, installed at the coil leads of the contactor, should also prevent failure. The contactor should be inspected for mechanical condition and replaced if necessary.

Background

Inductive loads generate AC voltage spikes when energized. Most electronic switching circuits, including triacs, can be affected by these spikes. These spikes are typically limited by a resistor/capacitor combination, referred to as a snubber, installed in parallel with the load. The RSC has a snubber circuit installed across each digital output. The size of the spike that can be handled is determined by the ratings of the snubber components. The resistor component of the RSC's snubber is failing open. The circuit will sense the loss of the snubber and will not activate.

Since these RSC's functioned for several months prior to failure, the spike is probably slightly above the rated capacity of the circuit. The published digital output limit of 1 A @ 24 VAC continuous current is supposed to take into account the spike that can be generated by that size of load. Assuming that this limit is not exceeded, a better means of identifying damaging inductive loads must be found.

Permanent Solution

Extensive testing will have to be performed to determine the reason for failure with this particular contactor. We will then either engineer a permanent solution for the RSC or we will determine a means of identifying contactors likely to cause failure. The solution will be distributed as an Application Note. Any RSC that fails for this reason in the interim will be replaced under warranty at no charge.