General Electric Company Relays

General Electric Company Type Rpm Relays

At one of our facilities, false tripping has been attributed to overtravel in a General Electric Type RPM timer relay. The cam assembly overtravelled while resetting, and this allowed the TU2 contact to close. This happened just as the fault was reestablished and allowed the backup distance relay to trip without delay.

Some newer RPM relays are provided with a cam to maintain the TU2 contacts closed, after its time delay, until the RPM is deenergized. When a long-time delay is required, the back edge of the cam is near the TU2 contacts at the reset position; and any overtravel during resetting can cause the cam to bump the TU2 contacts closed.

The photographs below show a type RPM relay with the setting of its TU2 near its maximum. Figure 1 shows the position of the cam at reset. Figure 2 shows the cam's position with the relay energized. Figure 3 shows TU2 contact closed due to overtravel during reset.

At locations were this is found to be a problem, a small portion of the cam's surface can be removed from the back edge. Only that portion of the cam that is causing the problem should be removed, since a shorter time delay setting may be required in the future.

All type RPM relays should be checked to see that this problem does not exist during the next scheduled routine test.
Potential Problems With General Electric Type HFA, HGA, HKA, and HMA Relays

The following information was received in a letter dated October 15, 1973, from the General Electric Company, Installation and Service Engineering Department, Denver, Colorado.

In 1954, a program was initiated to improve the mechanical and electrical properties of paper-based spools used for General Electric Type HFA, HGA, HKA, and HMA relay coils. Heat-stabilized nylon was selected for the spool material because it well suited for Class A coils, and the material provided the desired improvement in electrical and mechanical properties. Manufacturing of HMA relays with the nylon spools started in 1955. After 3 years of successful experience, the change to nylon spools was implemented in HFA, HGA, and HKA relays in 1958.

In the mid-60's, a few failures of HMA coils utilizing the nylon spools for d-c applications were reported. As a result of these failures, an investigation was undertaken to determine the cause of the failures. It was found from this investigation that the heat stabilizing element of the nylon coil spool contained halogen ions which could be released over a period of time. When combined with moisture, the halogen ions form hydrochloric acid and copper salts which could cause the eventual open circuit failure of the coils.

The most significant contributing factor in the reported failures is high humidity. Other contributing factors are the small wire size used in HMA relays and in d-c relays, and the release of halogen ions is accelerated by d-c potential. Relay coils which are continuously energized are not subject to this phenomenon because the coil temperature is maintained considerably above ambient, thus minimizing the probability of moisture getting into the coil.

After the spool material was changed to nylon in 1955-1958, a new material, Lexan, became available. Lexan has the desired chemical, mechanical, and electrical characteristics for use in spools. The change to the use of Lexan for spools was started in 1964 and completed in 1968. The first relay change was the HMA followed by the HGA, and HFA. Black was chosen for the color of the Lexan spools to make them distinguishable from the nylon. Since the initial reports of open circuited HMA coils, the failures of auxiliary relays have been very limited. However, recently one customer reported an accumulation of open circuit failures of a significant number of HGA relays with nylon spools which were used in X-Y closing circuits of breakers. As a result of this recent report and in keeping with our procedure of informing you of potential problems, we are bringing this matter to your attention, even though the overall rate of failure continues to be extremely low.

The relays covered by this letter have been in service a number of years; however, in recognition of the potential for shorter than normal life, replacement relay coils will be furnished at 60 percent of the normal price of the coils. If it is preferable to replace entire relays rather than coils, a credit of 40 percent of the normal selling price of new relays will be allowed against the purchase of replacement relays at the time old relays are returned to Philadelphia. Note that it is not practical to change the coils of HMA relays in the field; any replacements should be complete relays.

If you have applications of HFA, HGA, HKA, and HMA relays in areas of high humidity, intermittent operation, d-c power, and with white nylon spools, you may wish to consider replacing the coils or relays.

Further instructions regarding replacement relays or coils can be obtained from the General Electric Company.