

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

April 14, 1978

IE Bulletin No. 78-05

**MALFUNCTIONING OF CIRCUIT BREAKER AUXILIARY CONTACT MECHANISM -
GENERAL ELECTRIC MODEL CR105X**

Description of Circumstances:

The Sacramento Municipal Utility District recently reported a problem encountered with the operation of the GE Model CR105X auxiliary contact mechanism installed in a 480 volt circuit breaker. Investigation into the cause for the inability to shutdown a booster supply fan (SF-A-7) in the control room emergency air conditioning system revealed that an auxiliary contact (GE Model CR105X) had failed in the closed position, preventing the fan's power supply circuit breaker from opening. The specific cause for failure was binding of the plunger arm due to burrs and nicks on its surface.

An investigation was conducted by the licensee to determine the extent of usage of this type auxiliary contact in other circuits throughout the reactor power plant. Approximately fifty (50) positions in the nuclear service motor control centers were identified as having a similar type auxiliary contact mechanism. It was also determined that many of the affected systems which require contact operation similar to that described above, either permit or provide a safety feature function during emergency conditions. An example of this type application is auxiliary contacts that must open to permit closing of certain safety related valves from 480 volt motor control centers.

The attached GE Service Advice Letter and associated instruction/drawing sheet were sent to all nuclear power reactor facilities by GE Field Service Offices. The letter, together with the instruction/drawing sheet identifies the problem and provides the recommended corrective action.

Action To Be Taken By Licensees:

For all power reactor facilities with an operating license or construction permit:

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1. If you have received the enclosed General Electric letter and instruction/drawing sheet addressing the auxiliary contact mechanism problem, and if you have these devices in use at your facility, it is requested that you describe what corrective action you have taken.
2. If you have not received the enclosed GE documents before, it is requested that you describe what action you plan to take if the GE CR105X auxiliary contact mechanism is in use or planned for use in safety systems at your facility(ies).
3. Facilities having an operating license should report in writing, within 45 days, and facilities with construction permits within 60 days, the results of action taken or planned with regard to Items 1 and 2 above. Your written reply should also include the date when such actions were or will be completed. Reports should be submitted to the Director of the appropriate NRC Regional office and a copy should be forwarded to the U. S. Nuclear Regulatory Commission, Office of Inspection and Enforcement, Division of Reactor Operations Inspection, Office of Inspection and Enforcement, Washington, D, C, 20555.

Approved by GAO, B180225 (R0072); clearance expires 7/31/80. Approval was given under a blanket clearance specifically for identified generic problems.

Attachments:

1. GE Letter
2. GE Control and Instruction
Sheet

It has been brought to our attention that a potential binding problem may exist with the 100 Line CR105X... auxiliary interlocks mounted on NEMA size 00, 0 and 1 contactors, starters, or reversers used in control equipment manufactured by General Electric Co. (including 7700 Line motor control centers) and other control equipment manufacturers. The interlocks involved are used on the following devices.

CR105A, -B, -C, -H, -J, -K, -R, -S with additional suffix letters and numbers (contactors)

CR106A, -B, -C, -H, -J, -K, -R, -S with additional suffix letters and numbers (starters)

CR109A, -B, -C, -H, -J, -K, -R, -S with additional suffix letters and numbers (reversing starters)

If any of these devices are currently used in your installations, you should obtain replacement parts to correct this condition by forwarding the following information to my attention:

1. Complete catalog (CR) numbers on device nameplate.
2. Quantity of each device catalog number.
3. Are the auxiliary interlocks mounted on the left side, right side, or both sides of the device? How many are there at each location?

Since the General Purpose Control Department of the General Electric Co. does not know all applications of these interlocks; it is assumed that some may be in "critical" applications and should be changed out as soon as possible, while those in non-critical applications may be changed out at some routine maintenance period.

Since these interlocks are on devices which have been in service for over one (1) year and are out of our normal warranty period, we feel a fair and equitable solution would require that the necessary parts and instructions for the suggested changeout be provided by GE at no expense to the user. At your earliest convenience, please provide me with the information requested in paragraph 2 of this letter so that the necessary parts may be provided.

This information should be forwarded to:

General Electric Company
P. O. Box 2913
Bloomington, Illinois 61701

Attention: Mr. John E. Corbitt
Product Service

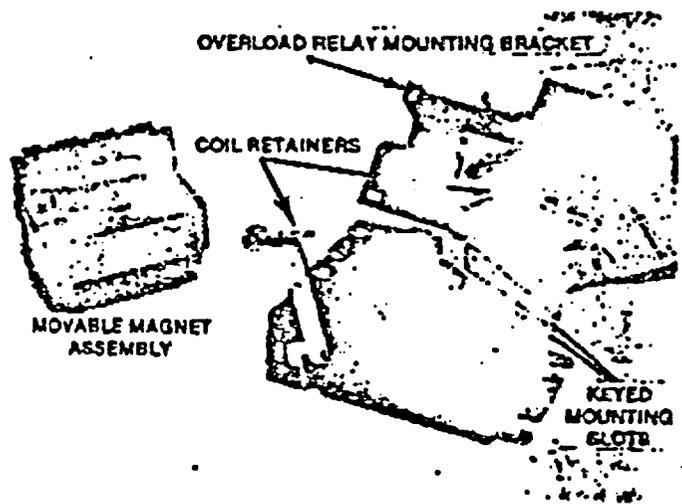
(Dial Comm: 8*325-4416, or 4294)

**105X AUXILIARY CONTACT
(CHANGEOUT OF PLUNGER ARM AND INSULATION)**

for nema size 0 & 1 magnetic starters and contactors

REMOVING OVERLOAD RELAY BRACKET (SEE FIG. 1)

1. Remove all electrical power from device.
2. Disassemble device by pressing on the coil while pulling out on the coil retainers. Move retainers back and away from coil.
3. Grasp movable portion of magnet and pull out, removing magnet assembly, coil, molded cover and movable arm in one motion. (NOTE: On reversers or multispeed starters, this magnet assembly is linked to the mechanical interlock arm between contactors and should be tipped toward interlock arm to facilitate easy removal.)
4. Remove overload relay bracket by sliding it out of the keyed slots in the molded base. (NOTE: If any wires are too short to allow easy removal, temporarily disconnect these.)
5. Remove overload relay from bracket by loosening screw on bottom of overload bracket.



**FIGURE 1
REMOVING OVERLOAD RELAY MOUNTING BRACKET**

CHANGING PLUNGER ARM & INSULATION (SEE FIG. 2)

1. Slide plunger assembly out of auxiliary contact block, by lifting up and out.
2. Select the new plunger arm that is bent the same way as the one installed.
3. Loosen screw on plunger to release metal arm but **DO NOT REMOVE SCREW FROM PHENOLIC PLUNGER (OR PLUNGERS)**.
4. Mount new plunger arm on plunger. Fasten arm to plunger with screw (or plunger post if installing double aux blocks).
5. Apply thin coat of aeroshell grease along plunger guides.
6. Reinstall plunger assembly in contact block.
7. Reassemble overload to mounting bracket. Remove overload insulation and install new. (NOTE: Overload insulation must be removed and replaced with new insulation supplied with kit.)
8. Remount complete assembly on contactor base.
9. Reconnect any wires previously removed.
10. Reassemble magnet assembly to contact base (on reversers or multispeeds be sure to interlock this assembly with mechanical interlock arm. Check for free movement of armature assemblies and mechanical interlocks).
11. Observe that auxiliary contact plunger assemblies are operating properly.

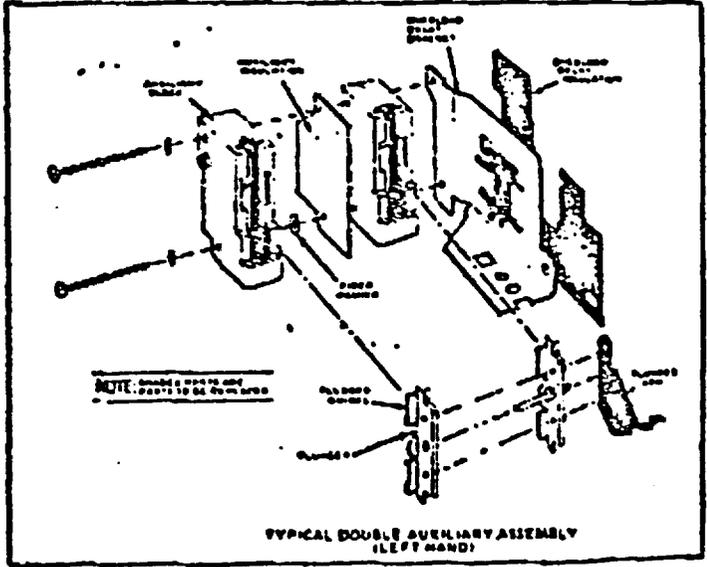


FIGURE 2

IE Bulletin No. 78-05
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LISTING OF IE BULLETINS
ISSUED IN 1978

Bulletin No.	Subject	Date Issued	Issued To
78-01	Flammable Contact - Arm Retainers in G.E. CR120A Relays	1/16/78	All Power Reactor Facilities with an Operating License (OL) or Construc- tion Permit (CP)
78-02	Terminal Block Qualification	1/30/78	All Power Reactor Facilities with an Operating License (OL) or Construc- tion Permit (CP)
78-03	Potential Explosive Gas Mixture Accumula- tions Associated with BWR Offgas System Operations	2/8/78	All BWR Power Reactor Facilities with an Operating License (OL)
78-04	Environmental Quali- fication of Certain Stem Mounted Limit Switches Inside Reactor Containment	2/21/78	All Power Reactor Facilities with an Operating License (OL) or Construc- tion Permit (CP)