Carrier® INTER-OFFICE LETTER

TO 19 SERIES SERVICE ENGINEERS (B)

REGIONAL SERVICE MANAGERS (C)

MR. D. ENDRIES - TR-1 (C)
MR. R. KIMMERLE - TR-1 (C)
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FROM MERRILL LEWIS DATE 6/27/73

OFFICE MSD SERVICE ENGINEERING-SYRACUS

SUBJECT CIRCUIT BREAKERS AND OPEN TRANSITION STARTERS

FIELD EXPERIENCE REPORT 73-4

Over the past several years, we have been experiencing nuisance problems with circuit breakers when applied to open-transition Star Delta starters. In most cases, nuisance tripouts have occurred during transfer on a random, unpredictable basis. Because it is our chiller which is removed from service, Carrier is most often put on the defensive by the owner or contractor.

This problem has been on the increase in recent years. The prime reasons for this increase are as follows:

1. Industrywide, distribution systems are getting larger; that is, fewer and larger transformers serve multiple loads.

2. To provide more protection against faults in these larger distribution systems, circuit breakers have been designed with faster and faster instantaneous trips.

3. Motors have been designed with higher starting torques and thus a higher locked rotor-to-full load ratio.

4. Recent National Electric Code revisions have provided more stringent requirements for short circuit and ground fault protection.

Until recently, Carrier permitted the use of molded case circuit breakers with open transition starters with the caution that the breaker must be capable of withstanding the high peak currents encountered with these starters at transfer.

It has been our recent experience, however, that due to the above mentioned factors, standard commercially available moulded case circuit breakers do not have this capability in many cases. The recently issued starter application data sheet, Form 19-3XA, now simply states that the use of these breakers with open-transition starters is not recommended.

FILING INSTRUCTIONS: CENTRIFUGAL FER MANUAL -- CONTROLS-WIRING

FORM G-34 A - ACTION NECESSARY B - CONTENTS ESSENTIAL C - INFORMATION ONLY

The Marketing Department will take steps to inform the field sales force of this situation, and we will no longer sell these standard circuit breakers with open transition starters. The obvious problem is in getting the word to the electrical contractors who generally select circuit breakers, but this problem should diminish with an informed sales force.

In the meantime, the problem remains of what to do when this situation comes up on existing machines. There are various avenues of approach which have various probabilities of success:

1. Convert the starter to closed transition. The approach is the most expensive but has the highest probability of success.

2. Replace the circuit breaker with a properly coordinated fused disconnect. This is again costly and usually impractical, but does have a high probability of success.

3. Replace the instantaneous trip coil with one of a higher rating. This usually involves a manufacturers "special" but is least costly. It has a good possibility of success, but less than the above two.

4. Remove and bypass the instantaneous trip coil. This can only be done when the circuit breaker is backed up by properly coordinated fuses.

5. On a per job basis, depending on individual job circumstances and requirements, alternate and adequate solutions may be offered by the circuit breaker vendors. These may include "programmed" breakers, trip time adjustments, or larger frame breakers.

The natural question which next arises is "Okay, who pays for all this?" On future jobs, the answer is easier, because we have put people on notice that this practice is not recommended. For the present, however, there is somewhat of a gray area. In general, breaker manufacturers recognize this problem as being one of a "too fast acting trip coil" and our experience to date has been that in most cases they accept the responsibility for correcting the problem. To date, this has been the attitude of General Electric and Westinghouse. Because breaker vendors are in most cases also starter vendors, we have been able to work with Syracuse starter representatives in resolving some problems. We intend to continue to work with these vendors to insure that they recognize that the problem is basically theirs to solve. In any case, individual jobs have their own circumstances and will have to be handled based on these circumstances.

A few case histories may be in order here:

CASE I

A 208 volt 19DG machine with a General Electric open transition starter (supplied by Carrier) had a long history during its warranty period of tripping the General Electric breaker (supplied by the contractor) at

transfer. The frustrating part of this problem was that in most cases, these tripouts would only occur late at night when the equipment room was not manned. Carrier and General Electric were called in many times and several "gimmicks" (such as time delay relays, etc.) were tried to no avail. Finally the customer put Carrier on notice to get this problem resolved or face a lawsuit.

A big meeting was held with all concerned an eventually the following facts came to light:

1. The characteristics on the motor and starter were approved on our submittal drawings.

2. That portion of the specifications dealing with circuit breakers called for the protection to be selected based on closed transition starter.

3. A General Electric engineer in their circuit breaker department was contacted and he stated that had he known that the starter was open transition, that the breaker in question should not have been selected for the job. He cited possible transient currents well in excess of the trip coil rating.

These revelations shifted the burden from Carrier (and even General Electric) to the party responsible for writing the job specifications and approving the submittal drawings. This job was resolved by "others" paying for a conversion from open to closed transition.

Incidently, the reason why the nuisance tripouts only occurred at night was that during the day, the supply voltage was lowered (in conjunction with the "energy crisis") which caused a lower inrush "spike." At night, when full voltage was available, the "spike" was greater; thus the tripouts.

CASE 2

A machine had a history of nuisance tripouts throughout its warranty period and was eventually obtained under PMC contact. Customer complaints of this problem led us to convert the starter to closed transition using PMC monies. We hope a situation like this does not reoccur.

CASE 3

A 575 volt 19EA machine with a General Electric open transition starter had problems from initial start-up. The General Electric breaker (supplied by the electrical contractor) tripped every time a transfer was attempted. To compound the problem, this customer has many other (but smaller) machines (Carrier and competitive) with open transition starters and circuit breakers on which he has had no problems. The individual characteristics of each component (motor, starter, and breaker) seemed to check out, but the combination wouldn't work. The big finger, as usual, was pointed at Carrier.

We got the Syracuse General Electric starter representative into the act in an attempt to cut through General Electric's interdepartmental red tape (the starter division is not connected to the breaker division is not connected to their field service division, etc) and place the problem in its proper perspective. At the present time, larger trip coils have been ordered by General Electric, and hopefully, Carrier's hands can be washed clean.

There have been several other recent cases involving Cutler-Hammer and Westinghouse, and so far, the vendors have been involved in solving the problems with a little push from their Syracuse offices.

The lessons to be learned from the above are:

1. Get the facts; who specified what, who supplied what, what are the model numbers and ratings of the components involved.

2. Act quickly; the longer a job drags on, the more money Carrier spends needlessly and the more the customer feels that Carrier is at fault and dragging our feet.

3. Do not accept "fixes" such as time delays offered by local vendor representatives without checking them out through the Regional Service Engineer.

4. Get the sales force involved. In most cases, especially on new jobs, the problem may be in misselection. Get our internal sales-service issues resolved before presenting our case to the customer.

With these guidelines, we hope that some of these problems can be nipped in the bud with minimum Carrier expense and maximum customer satisfaction.

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