TRANE™

General Service Bulletin

CTV-SB-76

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SUBJECT: NUISANCE "DISTRIBUTION FAULT" TRIPS FOLLOWING UNIT SHUTDOWN

INTRODUCTION:

Centrifugal units equipped with Cutler-Hammer solid-state overloads (SSOLs) may experience nuisance "distribution fault" trips when the starter de-energizes during the normal shutdown sequence. This service bulletin explains why these nuisance trips occur, and what can be done to prevent them.

DISCUSSION:

To better understand why nuisance "distribution fault" trips occur, let's first review what a distribution fault is. "Distribution fault" is defined as the total loss of line voltage for a period lasting less than 60 electrical cycles. In this situation, the compressor motor remains on-line and acts as a generator; often, the motor is capable of generating enough voltage to allow the control circuit to remain energized for up to 1 second (i.e., 60 electrical cycles).

By contrast, during a normal shutdown (i.e., when the ON/OFF switch is adjusted to the OFF position). the compressor motor is instantly disconnected from the line. This simultaneously de-energizes the control circuit, dropping out all of its relays and contactors--and effectively eliminating the likelihood of a distribution fault trip.

When a unit is protected by the Cutler-Hammer SSOL motor/starter protection system, existence of a distribution fault condition is detected within 1-1/2 electrical cycles; within 6 electrical cycles, the motor is off-line. SSOL recognition of a distribution fault is based on the status of the S1-S2 circuit (auxiliary on 1M) and motor amp draw: If the S1-S2 circuit remains closed while line current is less than 15% of RLA, a distribution fault exists.

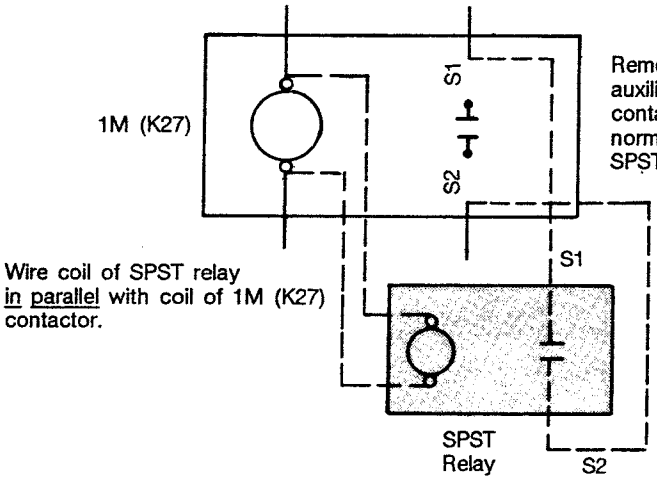
In star-delta starter applications, this situation can occur if the 2M (K28) contactor opens, interrupting current to the motor, while a sluggish 1M (K27) contactor--or unresponsive auxiliary 1M contacts in the S1-S2 circuit--remains closed. As a result, the SSOL interprets what should be a normal, scheduled shutdown (i.e., one initiated with the unit ON/OFF switch) as a distribution fault, and trips the distribution fault indicator.

CORRECTIVE ACTION:

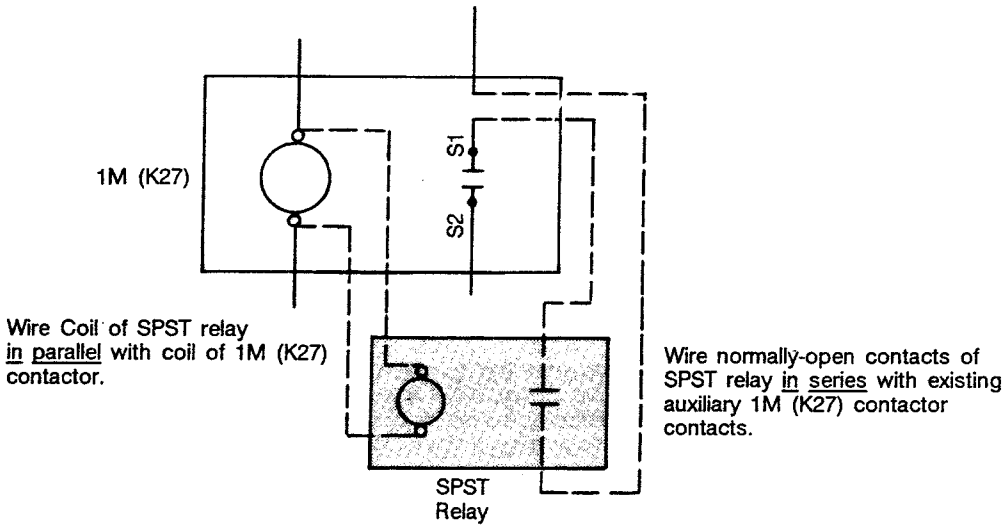
Starter vendors interface their auxiliary contacts with the main contactor in a variety of ways. Depending on the method used, some auxiliary contacts can be adjusted to improve their responsiveness, while others are more easily changed out. In all situations where nuisance distribution fault trips are a problem, however, be sure to determine whether the presence of debris or corrosion is responsible for the sluggish reaction of the 1M (K27) contactor (or auxiliary contacts).

In the event that the 1M (K27) contactor is found to be in good condition--and neither adjustment nor replacement of the auxiliary contactor contacts eliminates the nuisance trip problem, wire a single-pole, single-throw relay into the distribution fault circuit. The addition of this relay ensures that the S1-S2 circuit opens as soon as the coil of the 1M (K27) contactor is de-energized (even though the auxiliary 1M contacts may still respond slowly).

Examples A and B illustrate two alternative methods for adding the SPST relay to the distribution fault circuit.



Example A



Example B

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