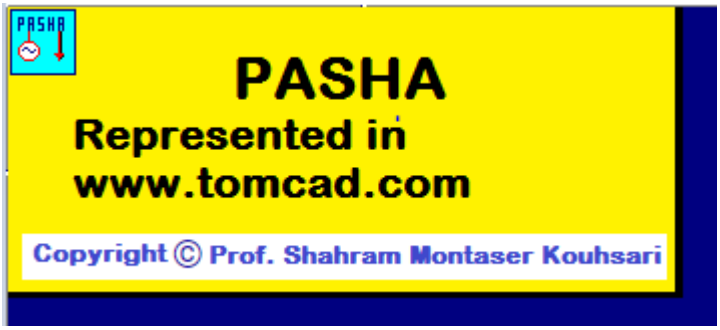

APPENDIX F

MODELLING OF RELAY CHARACTERISTICS

Sachdev's model requires the following equations to represent the family of time-current curves of a relay:

$$T = A0 + A1/(I-1) + A2/(I-1)^2 + A3/(I-1)^3 + A4/(I-1)^4 \qquad (F.1)$$

$$F = B0 + B1(TS) + B2(TS)^2 + B3(TS)^3 \qquad (F.2)$$

$$TOP = F * T \qquad (F.3)$$

WHERE:

T = is the operating time (s) for the curve corresponding to the maximum time setting (max is) specified in page 1.

I = is the current, expressed as a multiple of the plug setting value.

A 0 ... A 4 = are constant coefficients for a given relay.

TS = is the time setting value.

F = is a correction factor for the operating time.

B 0 ... B 3 = are constant coefficients for a given relay.

TOP = is the operating time, in seconds for any time setting.

Equation (F.1) presents the time-current curve for a time setting (TS) of 1.0, and its coefficients (A0 ... A4) are calculated using the least squares curve-fitting routine from the data points (I ,T) entered by the user. These points may be obtained directly from the manufacture's curves.

Equation (F.2) relates the factor F, defined in equation (F.3) as TOP/T, with the time settings for a constant current. It provides a correction factor for the result of equation (F.1) to calculate the operating time for any given time setting.

The coefficients B0 ... B3 are also determined by the curve-fitting routine from the data pairs entered by the user. This process is straightforward, since it uses quantities which can be read directly from the manufacturer's characteristics: time setting and operating time (IS, TOP) for a constant current.

The computer generates the required values of the factor 'F' by dividing the operating times by the operating time corresponding to the maximum time setting and the same current. A current of 3.0 (expressed as a multiple of plug setting) has been found to give the best results for this calculation.