



AC CONTACTOR SIZING

A “RULE OF THUMB” FOR SIZING SCR CONTACTORS FOR VARIOUS SIZE TRANSFORMERS

$$\frac{\text{Transformer KVA} \times 1000}{\text{AC Line Voltage}} \times 3 = \text{Maximum Current Demand}$$

for example, using a 75 KVA transformer, at 230 VAC:

$$\text{Maximum Current Demand} = \frac{75 \times 1000}{230} \times 3 = \mathbf{978} \text{ Amperes}$$

or, a 250 KVA transformer operating at 460 VAC:

$$\text{Maximum Current Demand} = \frac{250 \times 1000}{460} \times 3 = \mathbf{1630} \text{ Amperes}$$

The multiplier factor of (3) in this formula assumes a reasonable secondary configuration of an 8" x 12" throat to a secondary of 13" to 18", with a poor power factor of about 40%, having a necessary adjustment on the welding control of greater than 50 percent current.

A multiplier factor of (2.5) may be used when a machines power factor is 45% or better. A multiplier factor of (5) or (8) may be required for machines with large secondaries with power factors of 30% or poorer.

When applying the above “Rule of Thumb”, two other parameters must be considered. **Conduction Time** - the time the welding transformer is energized and the **Duty Cycle** - the ratio of Conduction Time to the complete cycle time (including part handling). These are factors that can substantially alter the selection of a contactor with regard to demand current.

The shorter the Conduction Time and Percent Duty Cycle the greater the current switching capability of a contactor. Conversely, longer Conduction time and higher Duty Cycle reduce the current switch capability of the contactor.

Please refer to ENTRON “Demand Current vs. Percent Duty Cycle” chart on the back of this sheet for the suggested relationships for Current Demand, Duty Cycle and Conduction Times. All curves on this chart are shown in 30 cycle (60 Hz) conduction time.

Refer to the chart on the back of this sheet and the above examples:

For the 75 KVA transformer operating at 230 VAC, the recommended contactor size would be the 600 Ampere SCR contactor for a percent duty cycle or approximately 14% or less.

For the 250 KVA transformer operating at 460 Volts, the recommended contactor size would be a 1200 Ampere SCR contactor for a Percent Duty Cycle of approximately 20% or less.

The previous examples assume a maximum 30 cycle conduction time.

Duty Cycle

Duty Cycle is the percent of the time the weld current is “on”. A convenient form for calculating duty cycle follows:

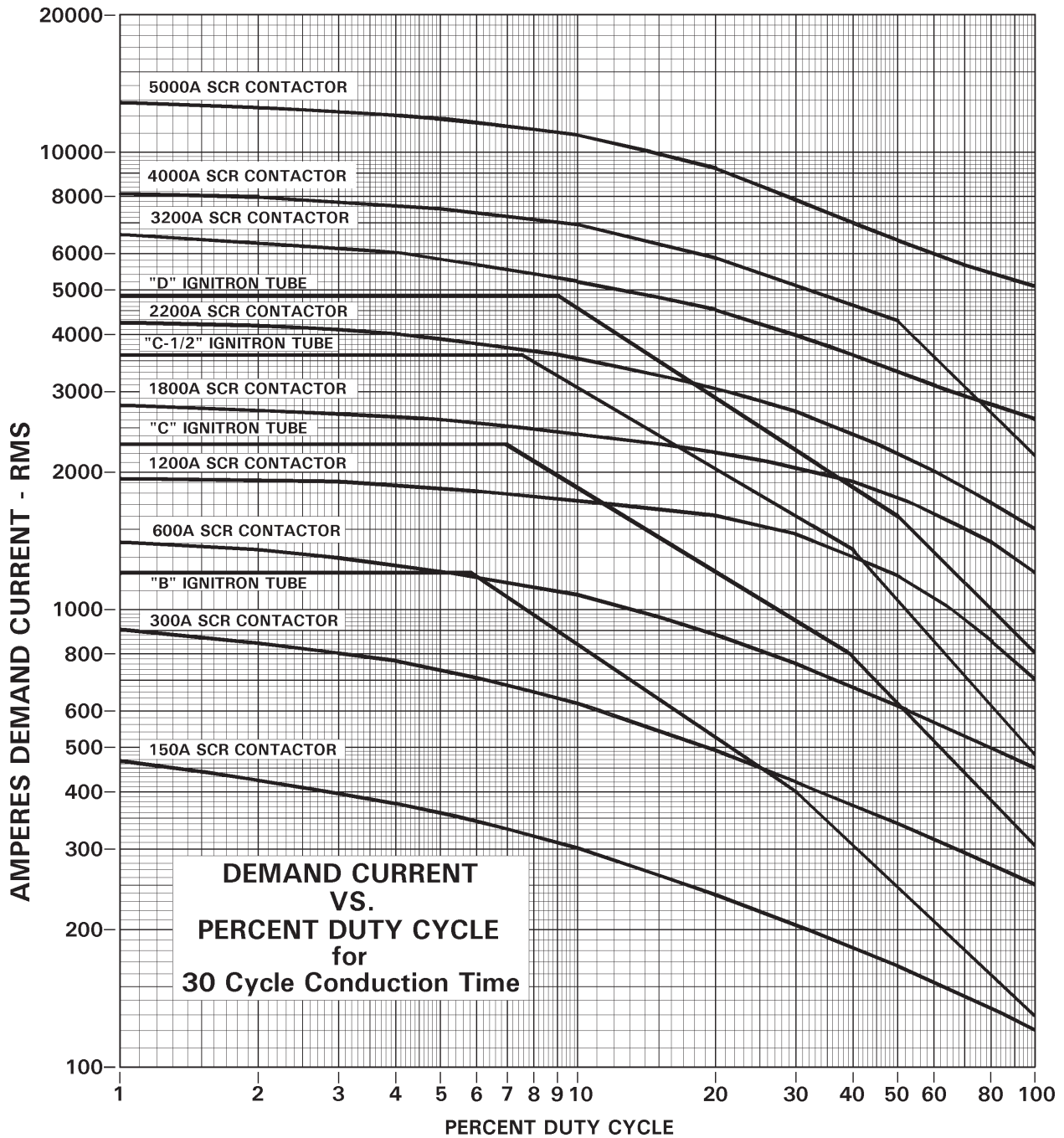
$$\% \text{ Duty Cycle} = \frac{\text{Weld Time (in Cycles)} \times \text{Number of welds per minute}}{36}$$

We suggest you consult the machine manufacturer or your local Resistance Welding Supplier for assistance in selecting the proper contactor size that fits your application.

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REV F - 04/14 ADDRESS CHANGED.

REV E - 01/09 ADDED 4000A SCR CURVE.

REV D - 09/06 NAME & ADDRESS CHANGED.

REV C - 7/99 INCORPORATE APP. NOTE 700027 W/440006; OBSOLETE P/N 700027.

REV B - 8/97 DELETED THYRATRON, 70, 1201, 1600 & 1750A SCR CURVES; UPDATED REMAINING CURVES FOR CURRENT MFR. SCRS; ADDED 1800A, 2200A, 3200A AND 5000A SCR CURVES. (RHL)

REV A - 10/76 ADDED 70, 1201, 1600, & 1750 TYPE SCRS; DELETED 25 & 75 TYPE SCRS; MODIFIED 150, 300, 600 & 1200 TYPE SCRS.

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