WHAT'S IN A FRAME?

When trying to identify a motor, along with horsepower and speed, part of the description is "frame size." There are many frame sizes, but standards do exist for both NEMA standard and IEC (metric) motors.

Until the adoption of standard frame sizes by NEMA (National Electrical Manufacturers Association) many years ago, a motor from one manufacturer would not interchange with the motor of another manufacturer even though both were rated for the same horsepower and speed. With the adoption of standard frame sizes, motors manufactured by different companies became interchangeable.

As production methods and materials improved over the years, frame sizes were re-rated to put more horsepower into smaller frames. In 1952 motors were assigned to smaller frames, most (not all) designated with the letter "U" after the frame number. In 1964 motors became even smaller and these frames were designated with the letter "T" after the frame number. The T frame is the current design for American or NEMA frame motors.

For example: A 15 HP, 1800 RPM motor was originally built in a 326 frame. After 1952 it was built in a 284U frame, and after 1964, in a 254T frame. The frames became progressively smaller, but the shaft size remained the same. (1.625" in this example). Today a 326T frame has the same mounting dimensions as the old 326 frame, except that today a 326T frame would be for a 50 HP motor and would have a 2.125" shaft.

The first two numbers of a NEMA frame indicate the number of quarter inches from the base to the center of the shaft. Within a frame series such as 254T and 256T the only mounting dimension that differs between the two frame sizes is the length of the spacing of the mounting holes on the side of the motor. For production efficiency and interchange, many motor manufacturers now use one frame casting for both sizes in a series and drill both sets of mounting holes.

IEC frame sizes also are standardized, but there is more variation in shaft sizes for a given frame size. The frame number is rarely identified as such on the nameplate and is usually buried in the model number or other identifying number. Look for numbers such as "90L" or "100M" and measure the shaft diameter.

Our next newsletter will contain a discussion of the code letters associated with frame numbers. For more information on frame sizes, ask your EECO salesperson for a free copy of the "Electrical Engineering Handbook."