Motor Frame Number & Letters

By: Carl Schmidt

The information below is based on information contained in the NEMA Standards Publication, "Information Guide for the General Purpose Industrial AC Small and Medium Squirrel-Cage Induction Motor Standards". When called upon to replace a motor, one helpful piece of information from the nameplate of the motor that is helpful is the frame number. What does this number mean? When replacing a motor, important mounting information is associated with this number. Motors of the same frame number, regardless of the manufacturer, will replace another motor with the same frame number. It is one of the standards of the National Electrical Manufacturers Association (NEMA). The frame number for small motors (those with just two numbers) when divided by 16, will give the shaft height of the motor. For medium motors (those with three or four numbers), the shaft height is found by dividing the first two numbers of the frame number by four. This may not be essential in replacing a motor, but it can be very helpful in new installations. If one knows the frame number of the motor that is going to be installed, the shaft height can be determined and progress toward proper alignment can be started before the motor is placed in position. They may also be letters associated with the frame numbers. These letters denote variations in the frame and can make a difference in the mounting of the motor. These letters can cause some confusion in knowing whether or not a new motor can be used as a replacement. The letters C, H, Y and Z may immediately follow the frame number in the small motors. These letters are used to denote the following variations of the motor :

C -- Type C face mounting
H -- Indicates a frame having an F dimension (bolt mounting pattern) larger than that of the same frame without the suffix letter H
Y -- Special mounting dimensions (obtained from the manufacturer)
Z -- All mounting dimensions are standard except the shaft extension

On medium motors, the letters C, CH, D, R, S, T, U, V, Y, or Z may immediately follow the frame number in the medium motors. These letters are used to denote the following variations of the motor.
C -- Type C face mounting on drive end (When the face mounting is at the end opposite the drive, the prefix F shall be used, making the suffix letters FC)
CH -- Type C face mounting dimensions are different from those for the frame designation having the suffix letter C (The letters CH are to be considered as one suffix and shall not be separated)
D -- Type D flange mounting on drive end. (When the flange mounting is at the end opposite the drive, the prefix F shall be used, making the suffix letters FD)
R -- Drive end tapered shaft extension
S -- Standard short shaft for direct connection
T -- Included as part of a frame designation for which standard dimensions have been established
U -- Previously used as part of frame designation for which standard dimensions had been established (no longer a part of MG1)
V -- Vertical mounting only
Y -- Special mounting dimensions (obtained from motor manufacturer)
Z -- All mounting dimensions are standard except the shaft extension(s) Also used to designate motor with double shaft extension

If one needs to replace a motor, the frame number on the nameplate will be one of the pieces of information that will ensure that the correct replacement is purchased. Knowing all the information associated with the frame number can make a difference.

This artcicle was compliments of Carl Schmidt.

Carl received his first electrical training in the U.S. Navy. He served eight years as a nuclear trained electrician. As a crew member of the deep submersible Submarine NR-1, Carl operated and maintained navigation, sonar and computer equipment in addition to the nuclear plant equipment. Carl worked for five years in the sensor industry, first as a technician, and then as a design engineer after graduating with a B.S. EET degree from Devry. Before joining the Lewellyn team, Carl worked at Nucor Steel for more than 11 years, first as a maintenance engineer, and then as a maintenance supervisor. He has worked with 34.5 KV SF6 circuit breakers and gas insulated switchgear.