Above NEMA Motors

Understand the benefits & differences in Above NEMA motors

You've recently received word that one of your larger electric motors -- the technician or repair described it as an "Above NEMA motor" -- is going to have to be replaced. Before you start requesting bids on it, however, you'd like to know a bit more about what you're getting into. What is an Above NEMA motor? What kind of information do you need to request a bid or find one to purchase? How much will it cost? And where is the best place to purchase one?

Quick Review: NEMA Motors

NEMA stands for National Electrical Manufacturer Association, and most standard electric motors are based on NEMA frame sizes and specifications. The frame designation and suffix can tell you a great deal about an electric motor, including the exterior dimensions of the motor for mounting but also the location of the shaft relative to the base, where the bolts are located, and the length and diameter of the shaft.

ANEMA Motors

Large electric motors (those of 400HP or more, Siemens manufactures them up to 18,000 hp in the USA) and medium to high voltage motors are typically referred to as Above-NEMA, ANEMA, A NEMA, or A-NEMA electric motors. The term "Above NEMA" refers to the fact that there is not a NEMA frame to match these motors -- their frames and specifications are not regulated and consistent like NEMA frames are. They do not adhere to standard NEMA frame sizes because they are usually manufactured for a specific application or to specific customer requirements as opposed to general use. This can make them more difficult to find a drop-in replacement for.

Hints for Preparing to Replace an Above NEMA Motors

Investing in a new Above NEMA motor is a big deal, so there are some things to keep in mind before you make that purchase. For example, before you invest in a new motor, take time to figure out why the old motor needs to be replaced. It could be that the original motor simply went past its useful life.

However, if that is not the case then you will save money and downtime by figuring out why it failed before you buy a new one. Failure to do so could result in repeating the same mistakes again with a new motor. Some common reasons for motors to fail, besides wear and tear, could be that it was not the correct horsepower for the application, or the enclosure was not appropriate for the environment it worked in, or perhaps it was on a VFD (variable frequency drive).

Necessary Specifications for Requesting Bids on Above NEMA Motors

In order to make sure that you do get the correct motor, here are some necessary specifications for requesting a bid on an Above NEMA Motor:

- Horsepower
- Speed
- Voltage
- Full Load Amps
- Enclosure type
- Frame (in motors that are 500HP+ there are still some NEMA standard frames -- if there is not a NEMA standard frame, an outline drawing becomes very important)
- Mounting
- Frequency (60Hz in the US & Canada, 50Hz or 60Hz in other countries)
- Service Factor
- Ambient Temperature

- Altitude (only an issue in higher elevation areas where air density prevents motors from cooling efficiently)
- Temperature Rise
- Bearing Type (Anti-friction (Ball or Roller Bearings) or Sleeve (Babbit))
- NEMA Design (NEMA defines 4 basic types of speed/torque characteristics for induction motors: A, B, C, or D)
- KVA Code
- Starting Method

Most of this information can be found on the electric motor's nameplate. Here are some other parameters and requirements to keep in mind as you begin requesting bids for a replacement motor:

- Do any fans/baffle arrangements need to be non-sparking?
- Do the screens/filters need to be reusable and washable?
- Does it require an L-10 bearing life (100,000 hours)?
- Does it need high permeability M19 silicon steel and C-5 insulation for laminations?
- Does it require a Class F insulation system or better?

Optional Manufacturer Specifications for Above NEMA Motors

There are also specifications that you can require manufacturers to meet in connection with your new Above NEMA electric motor, including these:

- API 541 (Form Wound SCIM's 350HP+)
- IEEE 429 (Evaluation of Sealed Insulation Systems)
- IEEE 112 (Test Procedures for Induction Motors)
- IEEE 275 (Recommended Practice for Thermal Evaluation)
- IEEE 522 (Surge Comparison Testing)
- NEMA MG1 (Standards for Motors & Generators)

- ANSI C50.41 (Polyphase Induction Motors for Generating Stations)
- CSA C22.2100 (Motors & Generators)

How Much Should an Above NEMA Motor Cost?

The price of an industrial electric motor depends on the size rating, speed, input voltage, frame size, and whether it is a specialty motor. In general, the larger the output, the higher the price; the larger the frame size, the higher the price. Because Above NEMA motors are usually classified as large, medium or high voltage motors, they will cost significantly more than a standard, lower horsepower NEMA motor.

Surplus ANEMA Motors

One of the best ways to purchase an Above NEMA Motor if you need it quickly or for less money is to consider a surplus motor. Many times you can purchase a surplus Above NEMA motor, completely rebuilt and 100% warrantied for 20-40% less than a new one. This is also many times at a fraction of the lead time. However, there are some risks in purchasing surplus motors and you need to make sure you are buying them from a credible source.

Where to Purchase an Above NEMA Motor

You have several options as to where to purchase an electric motor: online (which is risky -- you can easily get scammed or get a very poor quality motor), power transmission shop or bearing supplier (but they likely won't have quick access to Above NEMA motors), or direct from the manufacturer (which can actually be more expensive than purchasing from a distributor), or from an EASA motor repair shop (which is going to be very familiar with motors). The benefit of purchasing from an EASA repair shop is that their experience in troubleshooting and repairing motors gives them additional insight into how motors work in different applications. That insight can be to your benefit, especially when shopping for an Above NEMA motor.

HECO - Your Source for Above NEMA Motors

HECO is an EASA certified repair shop, but we are far more than just your ordinary electric motor repair shop. We develop and implement predictive maintenance plans, run vibration analysis, perform troubleshooting and repairs, and we also sell new motors, including NEMA and Above NEMA motors.