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Variable Frequency Drive Buying Guide

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If you are looking for a specific model number or want to find specific variable frequency drive, the search box at the top of the page is your best option. The dropdown menu next to the search box allows you to search specific sections of JustVFDs.com. To use the search box, type in the keywords for your search criteria, and then click Go. For example, type "G+ Series 4" or "Magnetek 5 HP" or "25 FLA".

How do I choose a drive?

1. **Choose Supply Voltage**

Figure out what supply voltage you will need. In the United States, 208 V, 230 V, and 460 V Three Phase are the most common. In Canada, the supply voltage is usually 575. 380-415 V Drives are available for European and South American Customers.

2. **Determine Motion**

It is important to know whether the VFD will be controlling a traverse motion (horizontal) or a hoist motion. Examples of traverse motion are trollies, bridges, and monorails. Hoist motion is broken down into two sections: with mechanical load brake, and without mechanical load brake. It is very important to know which type of hoist you have, this information can be found in you hoist manual.

3. **Determine FLA**

Full Load Amps (FLA) is published on the motor nameplate. It measures how much power the motor draws when fully engaged. This is related to horsepower. **Always size VFDs based on FLA!** Horsepower (HP) is only an estimate. VFDs must be rated greater than or equal to both the motor FLA and HP.

4. **Determine Resistors Needed**

Regeneration resistors are required for almost every VFD. They can be found listed in the product details, and are also shown below each item as accessories.

If you have any questions, please contact us:
E-mail: info@JustVFDs.com
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Open Loop and Closed Loop Systems

Open Loop Systems There is no feedback for the motor speed. The motor magnetic flux and shaft torques are estimated/ calculated based on the nameplate ratings on the motor. The VFD uses this information to change its output in order to control the motor.
Closed Loop Systems Torque regulation comes directly from speed feedback from the motor through an encoder. This closed loop system allows the VFD to know what the motor is doing in real time and can immediately change its output to compensate for any motor operation. Motors with encoder are required for closed loop systems.

Regenerative Resistors

Regeneration resistors are required on all variable speed drives controlling horizontal motion (bridge, trolley, monorail) and hoist with no mechanical load brake. Hoists with Weston type mechanical load brakes or internal load brakes are not always required to have regeneration resistors. Some of the VFDs we offer have regeneration resistor bands built into the drive. Others require external regenerative resistor banks.

See our “Regeneration Resistors” document for more information.

What is EMI/RFI?

RFI is radio frequency interference. EMI is Electromagnetic interference frequencies. A variable frequency drive will generate both RFI and EMI. RFI can travel through the wires and can also be radiated through the air. This RFI can cause distortion of power to other equipment in the facility. It is important to isolate RFI and EMI so they do not travel through the entire building grounding system. Most of these interference problems can be corrected by using RFI filters in the drives and shielded (screened) cable. RFI filters can be ordered with most drives. These filters protect the motor and reduce power line distortion.

More Details about RFI filters An EMI/RFI filter located close to the drive or wired at the input terminals of the drive will utilize its load end capacitors to remove the noise from the ground grid and return it to source in the shortest possible route. The filter

capacitors on the line side will serve to return to ground any noise coming in from other sources. The filter inductors will provide high impedance for incoming noise, thus preventing the noise from entering the drive.

Motor Types

Squirrel Cage AC Motor: Most common, simplest, most reliable, least expensive, most readily available and easiest to maintain AC motor. These motors are named after their winding style that looks like an animal exercise cage.

Wound Rotor AC Motors: Uses slip rings and brushes to transfer the energy. More maintenance is required for wound motors. This type of motor is used for larger applications where a heavier starting torque is required. These used to be the standard for variable speeds, but not squirrel cage motors are advanced enough to handle the variable frequency drives.

DC Motors: Not used much anymore. The basic premise is a permanent magnet is positioned around a loop of wire connected to a D.C. power source. Uses brushes to make electrical contact while it spins.

NEMA Motor Ratings

The four NEMA (National Electrical Manufacturers Association) designs have unique speed-torque-slip relationships making them suitable to different type of applications:

NEMA design A
- maximum 5% slip
- high to medium starting current
- normal locked rotor torque
- normal breakdown torque
- suited for a broad variety of applications - as fans and pumps

NEMA design B
- maximum 5% slip
- low starting current
- high locked rotor torque
- normal breakdown torque

•suited for a broad variety of applications, normal starting torque - common in HVAC application with fans, blowers and pumps

NEMA design C

•maximum 5% slip
•low starting current
•high locked rotor torque
•normal breakdown torque
•suited for equipment with high inertia starts - as positive displacement pumps

NEMA design D

•maximum 5-13% slip
•low starting current
•very high locked rotor torque
•suited for equipment with very high inertia starts - as cranes, hoists etc.