Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Partner: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Bonus lab – Double points, if responses are typed and documented well. Regular points for written responses.

We have a number of VFDs (Variable Speed Drives) in the lab. Some are older models and some are quite new. Examples include:

* Allen-Bradley 1305-BA04A
* Saftronics CIMR-G3
* Reliance Electric MD 60
* Woods E-Trac XFC4001-0B
* Woods E-Trac XFC1000-5B
* WEG USCFW Series
* Automation Direct GS1-20P5
* Automation Direct GS1-10P5
* IDM PowerMaster CIMR-PCU20P4
* KB Genesis KBE2-1150-4

There are literally hundreds of different makes and models of drives having different input voltage requirements (120 VAC 1φ, 230 VAC 3φ, 460 VAC 3φ), different output power capabilities and, to some extent, different programming capabilities (mostly some are just friendlier than others). The idea is to determine how to connect & program enough of these so that you start to see them as all being basically the same rather than all being different.

The overall task is to determine how to get several up and running, which involves:

1. Finding the documentation,
2. Reading (skimming) through the documentation,
3. Connecting the VFD to power (1φ & 3φ) and to the motor (3φ), and,
4. Demonstrating that the drive functions as it should.

Wire and program as many different drives as you have time for (two is considered minimum effort); the idea is to provide you with “rapid experience” so that when you’re in the field you can quickly acclimate yourself to a situation with unfamiliar equipment (in this case freq. drives).

Locate (internet or hard copies) operating/user/programming manuals (PDFs) for the each of the variable speed drives that you choose to wire and have them available on your laptop, smart phone or one of the lab computers.

Read (skim) the manual. Most manuals cover more than one model. Make sure you know how to read the model number; each number and letter making up the model number has a specific meaning.

Note the input voltage and phase requirements as well as the output voltages. Note the output power in horsepower and in watts. Note the tolerance requirement between voltage phases. Does the drive have overload protection or does it rely on external fuses or circuit breakers? Note the operating temperature range. Does the drive need to be mounted in a NEMA rated box? Can it be?

You will need to find a motor to match; it may have to be rewired for high or low voltage depending on the drive. Sometimes the output voltages on the drive are selectable as well. Note: If a drive has been previously programmed it may need to be reset to factory settings; this involves setting a code.

**!! IMPORTANT !!**

**THE FIRST STEP IS TO WIRE UP THE FREQ DRIVE AND RESET IT TO FACTORY DEFAULTS.** This is important because, for example, the drive may have been previously programmed to provide 460 volts out and the motor you are using requires 230 volts. Then get the drive up and running using only the panel on the front of the drive. Then figure out how to:

* Make it run in forward and in reverse.
* Adjust the speed.
* Adjust the ramp rate (acceleration, deceleration time).
* “Jog” the motor.

What else can you do from the panel? Does the drive have dynamic braking? Can you program speed changes in steps? Does it have S-curve selection? What is an S-curve anyway?

Answer the questions below for each of the drives you wired & programmed (two minimum).

1. Drive Brand \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Drive Model # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Input voltage \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Output voltage \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Describe the steps involved in returning the drive to factory defaults.
4. Describe the steps required to change the acceleration / deceleration rate(s).
5. Describe the steps required to get the drive to operate off of an external start / stop station.
6. Describe the steps required to get the drive to operate in jog mode.
7. Make any other (helpful) comments about the operation of this drive
8. What other information did you learn about this drive?