



You are about to start a class. Make sure that there are no distractions such as cell phones, texting, or workplace disruptions. Each time there is a distraction, there is a period of time that the student will not hear or learn what is being taught. It is to "Your" advantage as an instructor to make sure that the environment is conducive to learning. In fact, it is your responsibility. Lay down the "Ground Rules" at the first of the class, such as when you will take breaks, how student are to ask questions. Etc...

### Why AC Drives?

**5 HP TEFC DC Motor with 180 volt armature and 200/100 volt field:**  
Price = \$3175.00

**5 HP TEFC Three Phase AC Premium Efficiency Severe Duty Motor:**  
Price = \$527.50

Most slides will contain footnotes for you to understand what is to be discussed at each slide. While you are encouraged to add discussion and real world stories as each opportunity arises. However, you should try to include the content suggested as each slide is designed to fit into a bigger picture, that will yield the students understanding about the subject matter.

This slide:

Discuss the cost of an AC motor compared to a DC motor. Discuss the differences in maintenance costs and procedures with each motor. DC motors have brushes and other high maintenance items. The DC motor has historically been used in application that speed control was necessary. But with the introduction of the VFD, an AC motor become very effective. And costs less to maintain.



### Common Terms

**Local** – The motor/drive operation is controlled by the keypad. No outside connections will work.

**Remote** – The motor/drive is being controlled by a remote(distant) location. The remote control can be accomplished in many ways. The most common is by wires connected to a terminal strip

Read and discuss every term and definition and question the class for input.

### AC Drive Internal Flow

**Converter** - Changes AC to DC.

**DC Bus** - The DC portion of the VFD. Typically a test point is available to read the DC bus.

**Inverter** - The inverter section uses the DC voltage from a previous circuit stage (intermediate DC circuit) to produce an AC current or voltage of a desired frequency.

The types of components used in the rectifier, filter, and inverter sections will differ with the different types of drives and applications.

You should spend some time on this slide discussing the flow of power through a VFD. Starting with the power input. Note that this circuit shown shows a three phase input, point out that the VFD on the training panels use a single phase 120vac input. However the output being produced is three phase 240vac. Show how the AC is converted to a DC "bus" voltage that is basically used to produce a new Alternating Current by means of the microprocessor. Follow through the text on the slide and discuss the circuit.