

QEP Assignment – Eric McMurray – ELE 156

- Following a detailed procedure, students are required to gather the following data, enter gathered data in the table further below, and plot curves from gathered data to determine the Volts per Hertz Characteristics of Variable Frequency Drive (VFD). The VFD is used to vary and to control the speed and torque of a 3-Phase Alternating Current Induction Motor.

Note: Procedure for this exercise is several pages long; therefore, the data table and questions below serve as overview for the assignment used for October 2021 QEP Charrette.

- Once the data is gathered, the students are to make assumptions about the VFD characteristics from correctly following the procedure steps that include changing VFD programming parameters.
- The students are required to answer the following questions, based on assumptions of gathered data.
 - Does the frequency increase or decrease with an increase in set-point voltage of the VFD?
 - Does the speed increase or decrease with an increase in set-point voltage of the VFD?
 - Does the output voltage of the VFD increase or decrease with an increase in set-point voltage of the VFD?
 - Does changing the programming parameters for the drive operation in Reduced Torque provide a “softer” start of the motor?

Note: The required programming parameter change for VFD Reduced Torque operation often is overlooked.

VOLTS PER HERTZ CHARACTERISTICS Plot the curves showing the constant torque and reduced torque V/f characteristics in Figure 1-9.

V/f CHARACTERISTIC				
SETPOINT		n (r/min)	OUTPUT VOLTAGE (V)	
Voltage (V)	f (Hz)		CONSTANT TORQUE	REDUCED TORQUE
1				
2				
3				
4				
5				
6				
7				
8				
9				
10 ⁽¹⁾				

(1) The AVR function of the inverter outputs voltage to the motor correctly even if the incoming voltage to the inverter fluctuates. With this function, output voltage to the motor is limited to 200 V or 400 V depending on your local network.

