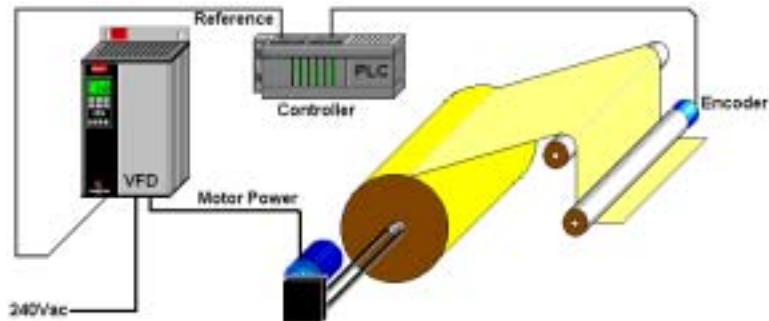


Post-Test

Danfoss



Answer the following application questions based on this diagram.

Multiple Choice

1. What type of application curve must be used inside a VFD to operate this carpet roll correctly?
 - A) Constant Torque
 - B) Variable Torque
 - C) Constant Power
 - D) Variable Power

2. What level of starting torque for the first minute is needed to operate the carpet roll correctly?
 - A) High Overload – 230%
 - B) High Overload – 160%
 - C) Normal Overload – 150%
 - D) Normal Overload – 110%

3. Looking at the carpet roll application above, which of the following is the correct control configuration for the VFD?
 - A) Speed Open Loop
 - B) Speed Closed Loop
 - C) Process Closed Loop
 - D) Both B and C are correct
 - E) Impossible to determine

Post-Test



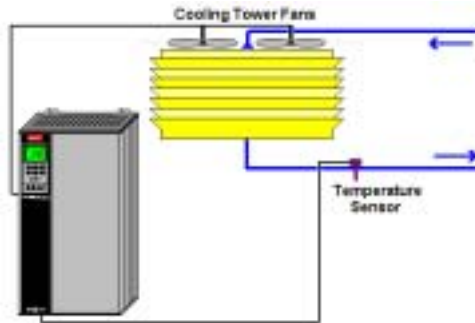
4. Synchronous Speed for a 3-phase, 4-pole, 60Hz, 230Vac motor is which of the following?
 - A) 180rpm
 - B) 240rpm
 - C) 720rpm
 - D) 1500rpm
 - E) 1800rpm

5. The results of "Motor Tuning" for a VFD, are best demonstrated when the motor runs between which of the following frequencies?
 - A) 1 to 10Hz
 - B) 10 to 30Hz
 - C) 30 to 60Hz
 - D) Above 60Hz
 - E) Answers C and D are both correct

- 6) On a Constant Torque application, a VFD is operating a 3-phase 4-pole, 460Vac hoist motor. Which of the following motor voltages would you expect to see on the display of the VFD at 30Hz?
 - A) 60Vac
 - B) 120Vac
 - C) 230Vac
 - D) 460Vac
 - E) It varies from 400 to 500Vac depending on the load.

- 7) The Constant Power (CP) part of the torque curve is associated with which of the following frequencies?
 - A) 1 to 10Hz
 - B) 10 to 30Hz
 - C) 30 to 60Hz
 - D) Above 60Hz
 - E) Answers A and B are both correct

Post-Test



8. What type of application curve must be used by a VFD to operate the centrifugal fans correctly with the most energy savings?
- A) Constant Torque
 - B) Variable Torque
 - C) Constant Power
 - D) Variable Power

9. In the application above, which of the following VFD settings correctly modulates the cooling tower fans? Assume that only Proportional Gain is used; its has a setpoint of 85°F (30°C).
- A) Normal Control; Gain = 0.01
 - B) Inverse Control; Gain = 0.01
 - C) Normal Control; Gain = 1.00
 - D) Inverse Control; Gain = 1.00

10. In the Cooling Tower application above it is desired to have the fans operate as close to 85°F (30°C) as possible. During loads changes, it is not necessary to get the fans to setpoint quickly. Which of the following adjustments are the most common settings to control these fans?
- A) Prop. Gain = 0.01; Integral = OFF; Derivative = OFF
 - B) Prop. Gain = 1.00; Integral = OFF; Derivative = OFF
 - C) Prop. Gain = 1.00; Integral = 10 seconds; Derivative = OFF
 - D) Prop. Gain = 0.01; Integral = 10 seconds; Derivative = ON

Post-Test



11. Breakaway Torque (High Starting Torque) is a rating that lasts for how many seconds?
- A) 0.5 seconds
 - B) 5 seconds
 - C) 15 seconds
 - D) 60 seconds
 - E) 120 seconds
12. If a feedback signal coming from an encoder on the motor it is controlling, is directly wired to the VFD, which of the following control types are used?
- A) Speed Open Loop
 - B) Speed Closed Loop
 - C) Process Closed Loop
 - D) Both A and B could be correct
 - E) All 3, A, B and C could be correct
13. Which of the following is the most accurate and most costly drive used on AC induction motors.
- A) Servo
 - B) Flux Vector Drive
 - C) Voltage Vector Drive
 - D) Voltage Vector Plus Drive
 - E) Volts/Hz Drive
14. A gluing process requires a drive to operate a high speed arm at a speed range of at least 200:1. Which of the following drives are NOT accurate enough for this application?
- A) Voltage Vector Drive
 - B) Voltage Vector Plus Drive in Open Loop
 - C) Volts/Hz Drive
 - D) B is OK but A and C could NOT be used.
 - E) All 3 A, B and C could NOT be used.

Post-Test



Answers

- 1) A Constant Torque
- 2) B High Overload 160%
- 3) A Speed Open Loop
- 4) E 1800rpm
- 5) A 1 to 10Hz
- 6) C 230Vac
- 7) D Above 60Hz
- 8) B Variable Torque
- 9) D Inverse Control; Gain = 1.00
- 10) C Prop.Gain=1; Integral=10; Derivative Off
- 11) A 0.5 seconds
- 12) B Speed Closed Loop
- 13) B Flux Vector Drive
- 14) E All 3, A, B, and C could not be used.

Objectives:

1. Student is able to correctly identify a drive application by its curve type.
2. Student is able to correctly identify an application by its starting torque.
3. Student is able to correctly identify an application as Open or Closed loop.
4. Student is able to briefly explain the action, gain, integral and derivative terms as applied to a Process Closed Loop application.
5. Student is able to identify a drive by its type in terms of accuracy, response and speed range.

For more information, please contact the MCU Training Team.