Introduction to Motor Controls Class: 32HR Workforce Training

Introduction to Motor Controls Scholastic Content: 14HR

Hands on application: 18HR

Amatrol Certification: Introduction to Electrical Motor Control

Trainees Will Receive a Copy of UGLY'S Residential Wiring Book

Scholastic Overview

Transformers:

Segment 1 - Introduction to Transformers

- Objective 1 - Describe the function of a transformer and give an application
- Objective 2 - Describe the operation of a transformer and give its schematic symbol
- Skill 1 - Connect and operate a transformer
- Objective 3 - Describe how to calculate the output voltage of a transformer
- Skill 2 - Calculate the secondary coil voltage of a transformer
- Objective 4 - Describe how to troubleshoot a transformer
- Skill 3 - Troubleshoot a transformer by measuring continuity
- Self-Review 1

Segment 2 - Sizing a Transformer

- Objective 5 - Describe how to size a transformer
- Skill 4 - Size a transformer
- Objective 6 - Describe a transformer's input and output power relationship and explain its importance
- Activity 1 - Transformer power loss
- Objective 7 - Describe how to calculate the current load of a transformer
- Skill 5 - Calculate the current load on a transformer
- Self-Review 2

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Segment 3 - Transformer Types

- Objective 8 - Describe the function of two basic categories of transformers
- Objective 9 - Describe the function of a control transformer
- Skill 6 - Design a control transformer circuit to provide a given output voltage
- Objective 10 - Describe the function of a tap on the secondary of a transformer and give an application
- Activity 2 - The distribution transformer
- Self-Review 3

Control Relays and Motor Starters:

Segment 1 - Control Relays

- Objective 1 - Describe the function of a control relay and give an application
- Objective 2 - Describe the operation of a control relay and give its schematic symbol
- Objective 3 - Describe the operation of two types of control relays and give an application of each
- Objective 4 - Describe how detached symbology is used to show a control relay on a ladder diagram
- Skill 1 - Connect and operate a control relay in a circuit
- Objective 5 - Describe the operation of memory logic and give an application
- Skill 2 - Connect and operate a memory logic circuit
- Self-Review 1

Segment 2 - Magnetic Motor Starters

- Objective 6 - Describe the operation of a magnetic motor starter
- Skill 3 - Connect and operate a magnetic motor starter connected to a three-phase motor
- Self-Review 2

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Segment 3 - Two-Wire Control

- Objective 7 - Describe the operation of a two-wire motor control circuit and give an application
- Skill 4 - Connect and operate a two-wire motor control circuit
- Self-Review 3

Segment 4 - Three-Wire Start/Stop Control

- Objective 8 - Describe the operation of a three-wire motor control circuit and give an application
- Skill 5 - Connect and operate a three-wire motor control circuit
- Skill 6 - Design a multiple operator station three-wire control Circuit
- Objective 9 - Describe the function of a push-to-test pilot light and give an application
- Objective 10 - Describe the operation of a push-to-test pilot light and give its schematic symbol
- Skill 7 - Connect and operate a three-wire control circuit with a push-to-test pilot light
- Self-Review 4

Reversing Motor Controls:

Segment 1 - Manual Motor Reversing

- Objective 1 - State the NEMA and IEC standard for reversing the rotation of a three-phase motor
- Objective 2 - List two common control methods used to reverse a three-phase motor
- Objective 3 - Describe the function and operation of a drum switch
- Skill 1 - Connect and operate a drum switch to reverse a motor
- Self-Review 1

Segment 2 - Reversing Magnetic Motor Starter

- Objective 4 - Describe the function and operation of a reversing magnetic motor starter

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- Skill 2 - Connect and operate a reversing magnetic motor starter to reverse a motor
- Skill 3 - Design a motor reversing circuit that uses a drum switch and a magnetic motor starter
- Self-Review 2

Segment 3 - Interlocking for Reversing Motor Control

- Objective 5 - Describe the function of interlocking control and give an application
- Objective 6 - Describe three interlocking methods used in reversing motor control
- Skill 4 - Connect and operate a reversing motor circuit with mechanical and auxiliary contact interlocking
- Skill 5 - Design a reversing motor control circuit that uses pushbutton interlocking
- Self-Review 3

Segment 4 - Modes of Operation

- Objective 7 - Describe the function of manual and automatic modes and give an application of each
- Objective 8 - Describe the operation of two types of motor jogging circuits
- Skill 6 - Connect and operate a control circuit to jog a motor
- Skill 7 - Connect and operate a forward/reverse jog control circuit
- Self-Review 4

Segment 5 - H-O-A Control

- Objective 9 - Describe the operation of a hand-off-automatic motor control circuit
- Skill 8 - Connect and operate a hand-off-automatic motor control circuit
- Skill 9 - Design a hand-off-automatic motor control circuit
- Self-Review

OHM’S law for Circuits:

Segment 1 – Introduction to OHM”s Law

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- Objective 1 – Understanding Current, Voltage and Resistance
- Objective 2 – Measure Current within a Circuit
- Objective 3 - Measure Voltage within a Circuit
- Objective 4 - Measure Resistance within a Circuit
- Skill 1 – Calculate Load for a Circuit using OHM'S Law
- Skill 2 – Analyze and Forecast Service need
- Skill 3 – OHM'S Law Worksheets and Exercises

Learn Lab (8hrs)

Learn Lab

- Wire up electrical circuits and have faults installed to troubleshoot. Do multiple exercises.

Learn Lab (8hrs)

Learn Lab

- Wire up remaining exercises, review schematics and troubleshooting techniques.