

UNDERSTANDING & TROUBLESHOOTING ELECTRIC MOTORS

Participants learn the basics of electric motors including how to maintain and troubleshoot common problems found in the workplace.

This course covers the operation and maintenance of AC and DC motors, including 3-phase, dual voltage and multiple speed motors. For each motor application, factors such as driven load, environmental conditions, power availability and performance capabilities will help determine what type of motor is the best fit for a given purpose.

Participants will become familiar with the National Electrical Code® (NEC) requirements for motor operation and installation. Course content progresses logically from basic operational theory to the actual operation of various types of AC and DC motors. The training includes numerous hands-on lab exercises designed to help participants operate, test and troubleshoot electric motors.

CLASS FORMAT:

Hands-on and Lecture

The participant is able to “learn-by-doing” in the course; this knowledge can be transferred to the workplace.

STANDARD CLASS SIZE:

NTT recommends a course size of 12 participants to obtain the best results.

NTT PROVIDES:

- Two-days (16 contact hours) of on-site instruction
- Textbooks and lab manuals
- Classroom consumables
- Completion certificates
- Shipping and instructor travel logistics

CLIENT PROVIDES:

- Classroom, with easy access, of 750 square feet or greater
- Projection screen, white board and/or flip chart(s)
- A dock facility or a forklift to unload the training equipment
- A pallet jack to move the crates around after they have been unloaded may also be needed.
- The equipment should be placed in the training room for the NTT instructor to test and set up prior to the start of training

SHIPPING:

Three Crates, 3,600 lbs. total:

- 2 crates @ 52" x 40" x 73" (2,400 lbs. each)
- 1 crate @ 52" x 45" x 73" (1,200 lbs)



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COURSE AGENDA

BASIC MOTOR THEORY

- Horsepower, torque and loading
- Construction
- Electrical principles—voltage, current, impedance
- Magnetism, induction, propulsion
- Frequency, speed, and slip
- Power factor

NAMEPLATE DATA

- Voltage, phase, FLA, frequency
- RPM, duty, design, code letter
- Service factor, insulation, temperature
- Frame, connections, efficiency
- Horsepower

THREE-PHASE MOTORS

- Wyes and deltas
- 3, 6, 9, and 12 leads
- Dual voltage connections
- Squirrel cage, synchronous, wound rotor

NATIONAL ELECTRIC CODE® & MOTORS

- Sizing conductors
- Overload protection
- Motor starters
- Short-circuit protection
- Disconnects
- Design E motors
- Exercises on using the NEC

SINGLE-PHASE MOTORS

- Capacitor-start, permanent-split, shaded-pole, split-phase, repulsion and universal
- Dual voltage connections
- Multiple speed connections

DC MOTORS

- Series, shunt, compound and permanent-magnet

MAINTENANCE & TROUBLESHOOTING

- Motor inspection criteria

MOTOR SELECTION

- Advantages and disadvantages
- Enclosure types
- Accessories
- Terminology

HANDS-ON LAB EXERCISES

- Inspection—Three-Phase Motor
- Megohmmeter Measurements

THREE-PHASE MOTOR

- DC Injection Braking
- Split-Phase Motor
- Capacitor-Start Motor
- NEC Sizing Calculations
- Permanent-Split Capacitor Motor
- Two-Value Capacitor
- Shaded-Pole Motor
- Universal Motor
- Compound DC Motor

