Electrical & Controls Fundamentals

Phase 2 Overview + Checklists

Phase 2 shifts focus from foundational habits to the technical systems that power compressed air equipment. You'll apply safe work practices with greater independence, take the lead on SLAM & Lockout/Tagout, & support hands-on service work under mentor guidance. This phase introduces electrical & control fundamentals & how components function within complete systems.

Week 1:

Refrigeration Fundamentals & Dryer Operations

Week 1 shifts from observation to applied refrigeration fundamentals. Learn how refrigerated dryers operate, interpret pressures & temps., apply inspection best practices, and lead SLAM and Lockout/Tagout.

Day 1	Day 2	Day 3	Day 4	Day 5	Week 1 Review
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Week 2:

Controls, Components & Signal Basics

Week 2 introduces electrical & control components used in compressed air systems. Learn device functions, basic electrical principles, common signal types, & continue SLAM and Lockout/Tagout.

Day 1	Day 2	Day 3	Day 4	Day 5	Week 2 Review
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Week 3:

Electronic Components & Controls in Systems

Week 3 builds on electrical fundamentals by showing how control components work together in compressor & dryer systems. Perform electrical inspections, test components, & practice safety practices.

Day 1	Day 2	Day 3	Day 4	Day 5	Week 3 Review
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Week 4:

Motors, Control Signals & System Testing

Week 4 focuses on applied testing & signal interpretation. Perform motor & component testing, validate system signals, apply trouble-shooting workflows, & demo readiness during final assessment.

Day 1	Day 2	Day 3	Day 4	Day 5	Week 4 Review
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Review Topics

Refrigeration & System Fundamentals

- ☐ Electrical safety & arc flash
- ☐ Required PPE for electrical inspections
- ☐ SLAM leadership & Lockout/Tagout
- ☐ Electrical & refrigeration Hazards
- ☐ Job-site communication during testing
- ☐ Customer interaction during diagnostics
- ☐ Inspection documentation & escalation procedures

Controls, Signals & Diagnostic Tools

- ☐ Refrigeration cycle & boiling point
- ☐ Matter, temperature & pressure
- ☐ Refrigerant compressor function
- ☐ Condenser, evaporator & metering
- ☐ Refrigerated dryer (cycling vs non-)
- ☐ Source of cooling in refrigerated dryers
- ☐ Glycol systems & pump health verification
- ☐ Dew point, humidity & moisture control
- ☐ Refrigerated dryer inspection procedures
- ☐ Compressor & dryer shutdown thresholds

Electrical Controls, Signals & Verification

- ☐ Electrical units, AC current & frequency *(V, A, Ω, Hz, W, HP, kW)*
- ☐ Pressure & flow principles and differentials
- ☐ Conductors vs insulators
- ☐ Switches, fuses, breakers & overloads
- ☐ Contactors, aus. contacts (NO/NC), relays
- ☐ Transformers & control voltages
- ☐ Sensors & transducers (pressure, temp.)
- ☐ 4–20 mA & 0–5 V signals & signal generators
- ☐ Motor fundamentals & megger testing
- ☐ Electrical & control component testing
- ☐ Schematic reading, system tracing & multimeter use

Name: _____ **Phase Start Date:** _____