

Developing Technical Autonomy

Phase 3

Phase 3 Overview + Checklists

Phase 3 focuses on how compressors and air treatment systems operate in real service conditions. Technicians will apply their knowledge to dryer operation, motor starting systems, compressor load control, and variable speed drive technology.

Throughout this phase, you'll observe system behavior, interpret operating conditions, and begin making adjustments that affect compressor performance while continuing to practice safe and structured service procedures.

Week 1:

Desiccant Dryer Fundamentals

Understand how desiccant dryers remove moisture from compressed air. Learn dewpoint fundamentals, tower operation, regeneration methods, and how dryer performance impacts system reliability.

Day 1	Day 2	Day 3	Day 4	Day 5	Week 1 Review
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Week 2:

Electrical Controls & Starters

Learn how electrical control systems start and protect compressor motors. Review contactors, control power, and star-delta starting sequences used on Ingersoll Rand compressors.

Day 1	Day 2	Day 3	Day 4	Day 5	Week 2 Review
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Week 3:

Inlet Valves: Oil Free & Flooded

Understand how inlet valves control compressor loading and airflow. Learn how sump pressure, inlet vacuum, and control components affect compressor performance and system operation.

Day 1	Day 2	Day 3	Day 4	Day 5	Week 3 Review
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Week 4:

VFDs, Controls, & Troubleshooting

Understand how variable speed compressors operate using VFD technology. Review drive components, controller logic, and basic troubleshooting approaches used on Nirvana systems.

Day 1	Day 2	Day 3	Day 4	Day 5	Week 4 Review
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Motor Starters & Compressor Control

- Contactor components & operation
- Auxiliary contacts & control circuits
- Control power definition
- IR starter coil voltages
- Star-delta starting purpose
- KM1, KM2, KM3 contactor functions
- Star-delta start sequence
- Electrical vs mechanical interlocks
- Controller start signal timing
- Wiring diagrams & starter documentation

Dryer Operation & Air Treatment

- Adsorption vs absorption principles
- Desiccant dryer tower operation
- Dryer regeneration methods
- Desiccant dryer types (heatless, heated purge, heated blower)
- Purge air consumption differences
- Dewpoint meaning & measurement
- Acceptable desiccant dryer dewpoint
- EMS (Energy Management System)
- Dewpoint monitoring importance
- Verifying dryer performance w/o probe

Compressor Operation, VFDs & Field Adjustments

- Inlet valve operation (oil-free & flooded)
- Load vs unload compressor state
- Blowdown valve function
- Unloaded sump pressure adjustment
- Inlet vacuum measurement & interpretation
- Sierra inlet valve operation
- Stepper motor inlet control systems
- VFD fundamentals & PWM operation
- VFD components (rectifier, DC bus, inverter)
- XE controller pressure & capacity control
- FC51 drive ramp time adjustment
- Nirvana fault tree troubleshooting
- Safe VFD lockout & DC bus verification

Review Topics

Name: _____

Phase Start Date: _____