

ASSEMBLY & INSTALLATION - DIRECT DRIVE (ECS 1)

OVERVIEW

Hands-on course designed to develop and strengthen the mechanical skills required to achieve world-class precision maintenance®. While most craft technicians have foundational abilities, precision principles are often untaught, forgotten, or inconsistently applied. This course addresses that gap by teaching reliable, repeatable methods that improve equipment performance, reduce failures, and increase manufacturing profitability.



Why This Training Matters

- ✓ Reducing failures at their source.
- ✓ Increasing asset life & production throughput.
- ✓ Lowering maintenance cost per horsepower.
- ✓ Empowering the craft workforce by driving a culture of precision.

Who Should Attend?

- ✓ Maintenance Craft Personnel (mechanics, millwrights, technicians).
- ✓ Operations & Production Personnel.
- ✓ Engineers responsible for asset reliability.
- ✓ Front-line Supervision & Maintenance Leaders.

Subject

- 1. Introduction to Precision**
Maintenance philosophies, cost drivers, failure sources.
- 2. Vibration & Dynamic Measurement Tools**
Failure indicators, vibration and IR tools.
- 3. Fitting Of Housings And Shafts**
Precision measurement, correct fits.
- 4. Assembly Errors & Corrections**
Keys, couplings, torque, heating, retention.
- 5. Practical Lubrication**
Grease selection, intervals, failure prevention.
- 6. Precision Shaft Alignment**
 - Pre-alignment checks
 - Soft foot, pipe strain, bolt-bound corrections
 - Plotting alignment, optimum move calculations
 - Reverse dial method applied to laser alignments

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TYPICAL DAILY OUTLINE

DAY 1

Foundations Of Precision & Initial Measurements

- > Introductions & course overview
- > Maintenance philosophies & vibration tools
- > "As-found" demonstrator hands-on exercise
- > Operating context & maintenance requirements
- > Rough alignment and pre-alignment practice
- > Precision measurement labs & report-outs

DAY 3

Precision Shaft Alignment

- > Alignment Plotting and exercises
- > Introduction to "Optimum Move"
- > Thermal Growth Discussion
- > Precision Alignment Exercises
- > Report-out and class wrap up

DAY 2

Fits, Tolerances, & Assembly Error Correction And Pre-Alignment

- > Fits & tolerances
- > Bearing fit measurement lab
- > Soft foot & shim consolidation exercises
- > Keys, set screws, pulled threads, torque issues
- > Assembly error correction labs
- > Pre Alignment checklist
- > Rough in Alignment
- > Angular soft foot

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LEARNING OBJECTIVES & EXPECTED POST-TRAINING CAPABILITIES

Upon successful completion, participants will be capable of:

Precision Measurement & Installation

- Determining proper bearing and shaft fits
- Using micrometers, dial indicators, gauges, torque wrenches, calipers, and alignment systems
- Documenting all installation results for "as found/as left" validation

Dynamic Condition Assessment

- Using vibration meters, stroboscopes, and infrared tools to verify machine health
- Applying dynamic measurements to improve reliability

Correcting Assembly & Alignment Errors

- Fixing soft foot, pipe strain, bolt-bound and base distortion problems
- Completing precise cold alignment and calculating thermal growth
- Plotting alignment conditions and determining the "best move"

Participants are expected to:

- ✓ Perform all hands-on alignment, measurement, lubrication, and assembly exercises
- ✓ Complete daily report-outs documenting findings and corrections
- ✓ Demonstrate competency with vibration tools, alignment plotting, and precision measurements
- ✓ Apply newly learned precision techniques immediately back in their facility