

Northern Lights



NORTHERN LIGHTS

Product Training



Course Catalog 2016 - 17

Northern Lights Training Schedule

Dec. 6-8, 2016: Northern Lights Intermediate Dealer Technician Training	
Seattle, WA	3 day, 24 hours
Jan. 24, 2017: Northern Lights Captains' Class	
Seattle, WA	1 day, 8 hours
Jan. 25, 2017: Northern Lights Captains' Class	
Seattle, WA	1 day, 8 hours
Jan. 26-27, 2017: Hands On Diesel Training	
Seattle, WA	2 day, 16 hours
Jan. 31 - Feb. 1, 2017: Hands On Diesel Training	
Seattle, WA	2 day, 16 hours
Feb. 2-3, 2017: Hands On Diesel Training	
Seattle, WA	2 day, 16 hours
Feb. 7-9, 2017: Northern Lights Intermediate Dealer Technician Training	
Seattle, WA	3 day, 24 hours
Mar. 21-23, 2017: Northern Lights Intermediate Dealer Technician Training	
Deerfield Beach, FL	3 day, 24 hours
May 2-4, 2017: Northern Lights Intermediate Dealer Technician Training	
Deerfield Beach, FL	3 day, 24 hours
May 8-9, 2017: Technicold Dealer Training	
Deerfield Beach, FL	2 day, 16 hours
May 15-18, 2017: Northern Lights Advanced Diagnostics Training	
Seattle, WA	3 day, 24 hours class time 1 day (May 15) registration and configuration

Schedule subject to change. See www.northern-lights.com/ADE200 or contact the factory for most current schedule.

Northern Lights, Inc. is dedicated to manufacturing the industry's best marine product. As part of our commitment, we offer training courses to our dealers, clients and captains to ensure that the world's best built marine generator sets are the best maintained and serviced as well.

Contact your nearest **Northern Lights** branch location to sign up for any of these classes, or for more information. Together, we offer clean power and complete solutions.

Northern Lights Corporate Headquarters/West Coast Branch Office

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Northern Lights Gulf/Inland Waters Branch Office

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- **DEALER COURSES** - The following classes are offered to authorized Northern Lights dealers.

Course No. NLL02E

Intermediate Northern Lights Generators

Part No.

West Coast -	Seattle, WA: December 6-8, 2016	03-00007S
	Seattle, WA: February 7-9, 2017	03-00007S
East Coast-	Deerfield Beach, FL: March 21-23, 2017	03-00007D
	Deerfield Beach, FL: May 2-4, 2017	03-00007D

Course duration: 3 days. Classes begin at 8:00 am and end at 5:00 pm local time each day.

Lunch is provided by Northern Lights, Inc.

Travel arrangements are the responsibility of the student.

Prerequisites: Basic understanding of diesel engines and ability to use a multimeter (DVOM).

Objectives:

Students will be able to understand installation requirements, model nomenclature and operation of Northern Lights generators and diesel engines with both mechanical and electronic fuel systems. For certification, students will demonstrate proficiency in using reference information, performing hands-on component level diagnostics, proper adjustments and repairs.

Description:

This intensive, instructor led, Intermediate Level Course is designed primarily for working technicians. The course will be composed of approximately 60% classroom and 40% hands-on lab activity, using running generator sets. Some homework is required. During performance based skills certification, real world problems are induced into the generators for student technicians to diagnose and repair. Class size is deliberately restricted to ensure the best possible student/instructor ratio.

Cost: \$200 per day per student

Content and Agenda:

Day One –

1. Introduction to Northern Lights products and model nomenclature.
2. Proper installation; diagnosing installation issues.
3. Video: “Don’t Drown Me”; discussion following.
4. Using wiring diagrams, operational schematics; diagnosing the Northern Lights DC Logic based start/stop/safety shutdown and instrumentation system.
5. Video: “There is Logic to DC Logic”; discussion following.
6. Lab activity: Demonstrate how DC Logic works on running genset, solving common issues as well as more unusual diagnostic challenges.
7. Basic maintenance of cooling, fuel, air, exhaust, charging/starting systems.
8. Lab activity: General engine maintenance, tips and tricks.

Day Two –

1. Performance based skills demonstrations: DC Logic system, classroom & lab.
2. Introduction to basic A.C. electrical theory and how it relates to generators.
3. Video: “Understanding Generators”; five-part, interactive; discussion based on synchronous AC generator theory of operation.
4. Understanding and calculating generator loads, understanding load variables, NEMA locked rotor codes and motor sizing, addressing non-linear load issues.
5. Lab activity: Demonstrate generator end component diagnostics and adjustments.

Day Three –

1. Performance based skills demonstrations: AC generator diagnostics & repairs.
 2. Introduction to electronically controlled engines, theory and basic diagnostics. How electronic throttles work. Installation and maintenance concerns. Brief discussion of paralleling/load sharing specific requirements.
 3. PowerPoint Presentation: “Basic Luger Electronically Controlled Engines”. Discussion following.
 4. Using reference sources: hardcopy manuals, PDF based electronic format manuals on CD, website based manuals, Northern Lights & Deere wiring diagrams.
 5. Lab activity: Diagnostic demonstrations, using hand tools only, using Powerview and using Service Advisor laptop diagnostics.
 6. Performance based skills demonstrations: Diagnosing, adjusting, and repairing Luger electronically controlled engines.
 7. Final review, Q & A, student course evaluation
 8. Certification
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Course No. **NLEE02**

New Products, Updates and Advanced Diagnostics for Northern Lights Generators

Part No.

NLI Corporate Headquarters - Seattle, WA: May 15-18, 2017

SVADVREG

Course duration: 3 days (May 16-18). Classes begin at 8:00 am and end at 5:00 pm local time each day.

Mandatory 1 day registration and configuration session (May 15, 2016)

Lunch is provided by Northern Lights, Inc.

Travel arrangements are the responsibility of the student.

Prerequisites: Intermediate Dealer Training Course No. NLL02E

Objectives: Students will be able to understand and quickly diagnose difficult application and system problems affecting Northern Lights generators and Luger diesel engines. Typically, these issues appear to be machine related, but are not diagnosable using conventional methods. For certification, students will demonstrate proficiency in understanding ECU program, power and control requirements, external system interconnections, performing hands-on component level diagnostics, adjustments and repairs. This course also addresses updates on the latest changes in engine and generator platforms, new technology and product changes.

Description: This intensive, instructor led Intermediate Level Course is designed primarily for working technicians. The course will be composed of approximately 40% classroom and 60% hands-on lab activity, using running engines and generators. Some homework is required. During performance based skills certification, real world problems are induced into the equipment for student technicians to diagnose and repair. Class size is deliberately restricted to ensure the best possible student/instructor ratio.

Cost: \$200 per day per student plus applicable charges for John Deere Service Advisor tool SA 1001. (Consult factory for details and current pricing.)

Content and Agenda:

Day One –

1. Introduction to Northern Lights and Lugger product basic installation and application requirements, identifying potential problem areas.
2. Identifying false, recurring and un-saved trouble codes caused by ECU power/ground installation errors and problems.
3. Identifying false trouble codes caused by errors in ECU programming.
4. Using wiring diagrams, operational schematics and diagnosing the Northern Lights DC Logic based start/stop/safety shutdown and instrumentation system.
5. Identifying trouble codes caused by external system connections.
6. Understanding multiple throttle options and governor programming.
7. New product updates and related changes to diagnostics.
8. Lab activity: Recognizing non-machine problems, solving challenging diagnostic issues, controlling unproductive diagnostic time & expense.

Day Two –

1. Performance based skills demonstrations: Classroom & lab.
 2. Solving the difficult problems without sophisticated diagnostic tools.
 3. Advanced Service Advisor features and flight recording options.
Using PowerView in place of Service Advisor.
 4. Diagnosing engine and generator shutdowns.
 5. Class society variations in generator systems and diagnostics.
 6. Understanding and calculating generator loads, understanding load variables, NEMA locked rotor codes, motor sizing, identifying and addressing non-linear load issues.
 7. Generator voltage and current regulation. Understanding governor control, throttle effects, recirculating current and unequal loading in parallel generators.
NOTE: There is a special factory school for electrical technicians who require in depth training on Automatic Load Sharing and paralleling equipment.
 8. Performance based skills lab activity: Demonstrate generator systems diagnostics, adjustments and repairs.
 9. Certification
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• **CAPTAIN'S COURSES** - The following classes are offered to captains and crews of vessels with Northern Lights generator sets and Lugger propulsion engines.

Course No. **NLLC1**

Captains' Class, Northern Lights generators

West Coast -

Seattle, WA: January 24, 2017

Seattle, WA: January 25, 2017

Course duration: 8 hours. Classes begin at 9:00 am and end at 5:00 pm local time each day.
Travel arrangements are the responsibility of the student.

Prerequisites: None.

Objectives:

Students will be able to understand installation requirements, model nomenclature, operation, maintenance and basic diagnostics of Northern Lights generators.

Description:

This course is designed primarily for vessel owners, captains and crew, using running generators for demonstration. Students will learn basic operation and maintenance procedures, including important cooling, fuel, electrical, and exhaust system service. Basic diagnostics and technical terms helpful in discussing service concerns with professional technicians are covered.

Cost: There is no cost for this course for Captains on Northern Lights-powered vessels.

Content and Agenda:

Captains' Class seminars address Preventive Maintenance, routine maintenance and problem solving techniques in these areas:

Preventive Maintenance -

1. Fuel system & primary (Racor) filters
2. Cooling system(s) & pumps
3. Exhaust system: elbows, mounting, leaks
4. Air Intake: Air filters, turbocharger, ventilation
5. Electrical: starting, charging, fuses & breakers
6. Chafe, wear & vibration issues: cables, bolts, hoses, wiring, belts
7. Why any leak is bad - early warnings
8. Corrosion, erosion & rust
9. Proper startup and shutdowns
10. Control systems: Cables, mounts, hydraulics, electrical
11. Look, Listen, Smell, Feel

Routine Maintenance - How To's

1. Changing fuel filters
2. Priming and bleeding: low and high pressure systems
3. Changing engine oil and filter; finding the O-ring
4. Anti-siphon loops - drowning prevention
5. Checking pumps and thru hulls

Problem Solutions - What you can fix under way

1. Electrical: Alternator & starter issues, finding fuses & breakers
How to read a multimeter - what to look for
Easy \$7 relay diagnostics/repairs
2. Cooling system: Pumps you fix, pumps you replace; how to do it
Replacing impellers, where to find the pieces when they fail
All you need to know about heat exchangers
Where the thermostat is hidden & why you probably don't need to fix it.
Drip pan diagnostics - why seawater leaks are bad
3. Fuel System: Fuel rack solenoids, lift pumps
4. Lube system diagnostics
5. Smoke-ology: diagnosing smoke by color

• **PRODUCT OWNER'S COURSES** - The following classes are offered to vessel owners with Northern Lights generator sets and Lugger propulsion engines.

Course No. **NLHO1**

Part No. **03-00006**

Hands-On Diesel Engine Class

West Coast-

Seattle, WA: January 26-27, 2017

Seattle, WA: January 31 - February 1, 2017

Seattle, WA: February 2-3, 2017

Course duration: 2 days. Classes begin at 8:00 am and end at 5:00 pm local time each day.

Lunch is provided by Northern Lights, Inc.

Travel arrangements are the responsibility of the student.

Prerequisites: None.

Objective:

Students will gain first hand knowledge of marine diesel engines, systems, proper operation and routine maintenance. Students will learn to diagnose and resolve the most common mechanical and electrical challenges encountered when cruising.

Cost: \$450 per person

Course payment is fully refundable if cancellation is received within 14 days of the beginning date of the course. Course payment is 50% refundable if cancelled within 7 days of beginning date of the course.

Refunds will not be issued for cancellations received less than 7 days before the beginning date of the course, or for no-shows.

Content and Agenda:

- How diesel engines work
- Strategies for Reliability – treating your engine right
- Understanding diesel systems
 - Fuel
 - Air/exhaust
 - Cooling
 - Lubrication
 - Electrical/electronic
 - Emissions
- Engines disassembly and assembly – a look inside
- Maintenance – avoiding repairs and problems
- Safety – protecting yourself & preventing injuries
 - Fuel system
 - Air and exhaust system
 - Cooling system: freshwater & seawater
 - Lubrication
 - Electrical
 - Emissions
- Diagnostics, trouble shooting tips, tricks, and things you can do yourself
 - Smoke & steam in the exhaust
 - Leaks – what they mean, what to fix
 - Vibration & chafing problems – preventing surprises
 - Work arounds when you don't have the special tool