



WARNING

Before troubleshooting any CEN products, the service technician should:

- read, understand, and agree to follow all information contained in this troubleshooting guide.
- understand the operational characteristics of the electrical charging system components to be tested.
- be proficient at the use of tools and test equipment used in troubleshooting CEN products.

Hazard Definitions

These terms are used to bring attention to presence of hazards of various risk levels or to important information concerning product life.

WARNING

Indicates presence of hazard(s) that can cause severe personal injury, death, or substantial property damage if ignored.

CAUTION

Indicates presence of hazards that will or can cause minor personal injury or property damage.

NOTICE

Indicates special instructions on installation, operation or maintenance that are important but not related to personal injury hazards.

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Testing Guidelines

Professional service technicians rely on the following guidelines when testing electrical components.

Dynamic/Live testing:

Definition: Connecting power and ground to a component to test operation/function out of circuit.

1. Be sure to connect jumper leads directly and securely to source contacts of the component being tested.
2. Be sure to make any connection to power and ground at the power supply or battery source terminals. Do not make connection at component source terminals as that may create an arc and damage component source terminals.

Voltage testing:

- Set meter to proper scale and type (AC or DC).
- Be sure to zero the meter scale or identify the meter burden by touching meter leads together. Meter burden must be subtracted from final reading obtained.
- Be sure the meter leads touch source area only. Prevent short circuit damage to test leads or source by not allowing meter leads to touch other pins or exposed wires in test area.

Voltage drop testing:

- Measure voltage between B+ on alternator or source and B- (ground) on alternator or source. Record obtained reading. Move to batteries or other source and measure again between B+ and B- terminals on battery or other source. Difference between the two readings represents voltage lost within the circuit due to but not limited to inadequate cable gage or faulty connections.
- Voltage drop measurements must be taken with all electrical loads or source operating.

Resistance (ohm) testing:

- Set meter to proper scale.
- Be sure to zero the meter scale or identify the meter burden by touching meter leads together. Meter burden must be subtracted from final reading obtained.
- Be sure the meter leads touch source area only. Prevent altering the reading by not allowing fingers or body parts to touch meter leads or source during reading.
- Be sure reading is taken when source is at 70°F. Readings taken at higher temperatures will increase the reading. Conversely, readings taken at lower temperatures will decrease the reading.
- Be sure to test directly at the source. Testing through extended harnesses or cable extensions may increase the reading.

CAUTION

When testing field coil or stators, most shorts to ground will measure 0-100 ohms. Test readings may also show higher, other than OL, typically in the megaohm range, when windings are dust-covered, wet, or oily from environment. Be sure to distinguish between defective readings and surface debris readings when determining test results.

Section A: Component Description



CEN NI205 and NI206

Alternator Description and Operation

NI205 and NI206 200 A (28 V) alternators are internally rectified. All windings and current-transmitting components are non-moving, so there are no brushes or slip rings to wear out. Energize switch activates regulator. Field coil is then energized. Alternator output current is self-limiting and will not exceed rated capacity of alternator.

N3019 remote-mounted regulator used with these units:

- is negative temperature compensated according to voltage adjustment located on top of regulator. Regulator voltage is adjustable between 26 and 30 volts. Voltage position is set at the factory to 28 ± 0.1 volts. Regulator voltage should not exceed ± 0.5 volts from the setpoint over the normal speed, ranges, loads, and ambient temperatures.
- maintains alternator output voltage at regulated settings as vehicle electrical loads are switched on and off.
- provides overvoltage cutout (OVCO). Regulator will trip OVCO when system voltage rises above 32 ± 0.1 V for longer than 3 seconds. OVCO feature detects high voltage and reacts by disconnecting field and turning off alternator. Restarting engine will reset OVCO circuit.

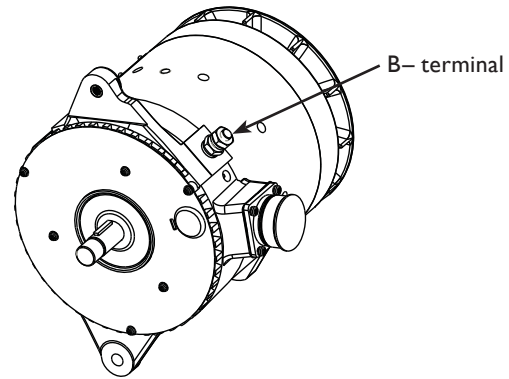


Figure 1 — NI205 Alternator

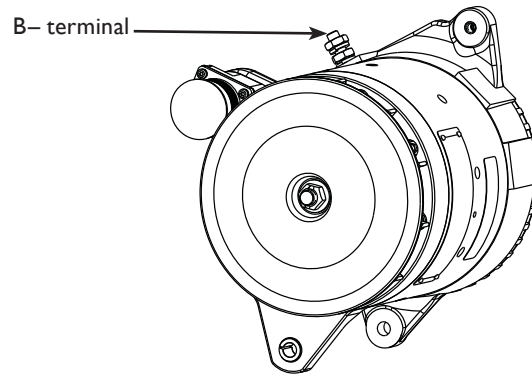


Figure 2 — NI206 Alternator

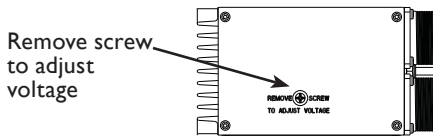


Figure 3 — N3019 Regulator Connections

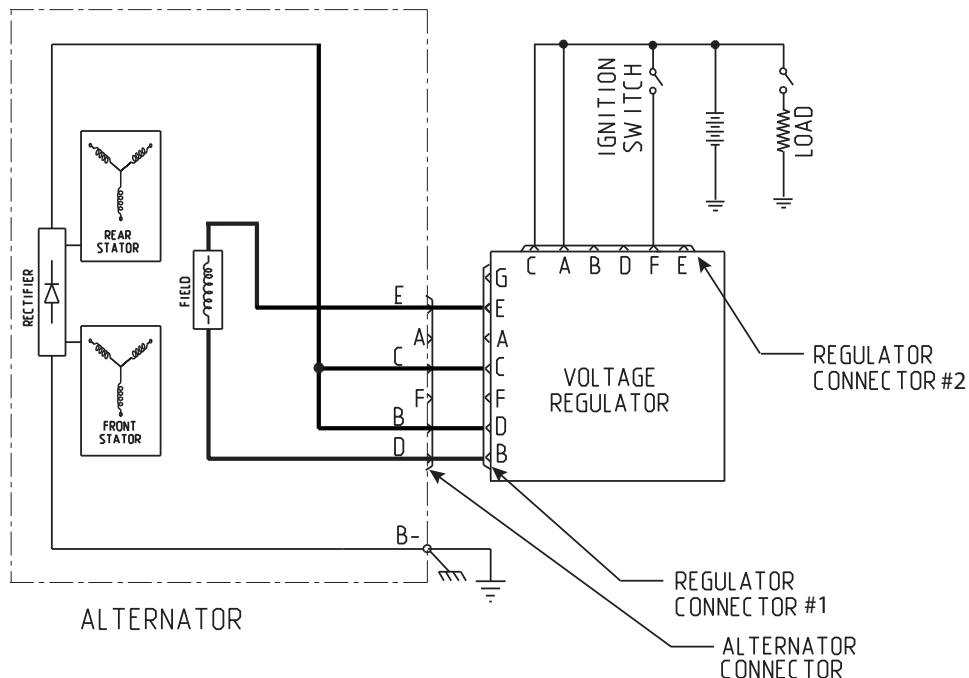


Figure 4 — Schematic Diagram of NI205/NI206 Alternator



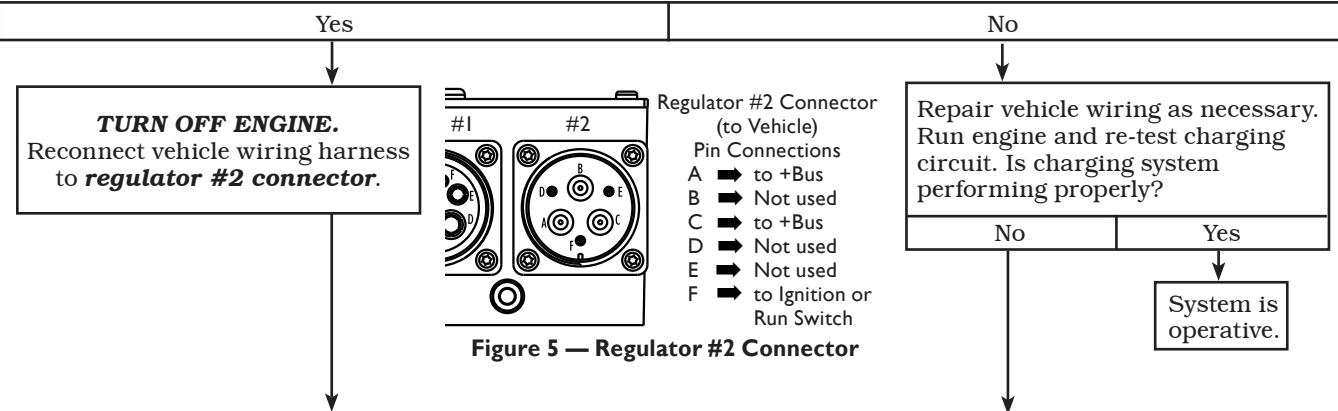
No Alternator Output – Test Charging Circuit

- **Remote-mounted regulators: Check condition of fuses and pin-to-pin continuity in extended wiring harness before troubleshooting.**
- **Before starting diagnostic sequence, verify the following and repair/replace if not to spec:**
 - batteries for state-of-charge (24.5-25.5 V), condition, and secure connections
 - master battery switch for function

MASTER BATTERY SWITCH ON, KEY ON, ENGINE OFF:

Disconnect vehicle wiring harness at **regulator #2 connector**—see Figure 5.

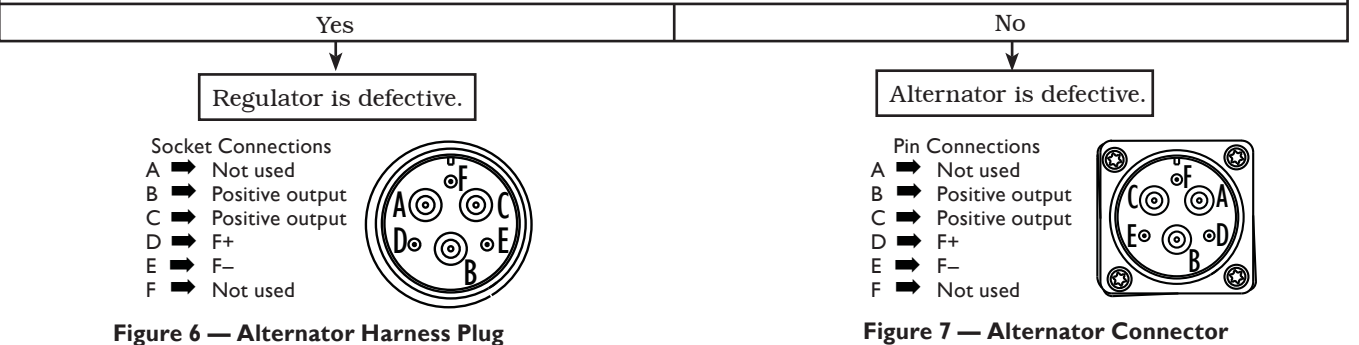
ENGINE ON: At regulator #2 connector, test for battery voltage at pin A to B– terminal on alternator, then pin C to B– terminal on alternator, and then pin F to B– terminal on alternator. Does battery voltage exist at all three locations?



MASTER BATTERY SWITCH ON, KEY OFF, ENGINE OFF: Disconnect wiring harness at **ALTERNATOR.**

1. Battery voltage test: On the **alternator harness plug** (see Figure 6), test for battery voltage at socket B to B– terminal on alternator and then socket C to B– terminal on alternator. Battery voltage should exist at each socket on **alternator harness plug**.
2. Field coil resistance test: Set DMM to ohms test. On the **alternator connector** (see Figure 7), test for field resistance between pins D and E. Field resistance should measure nominal 2.8 ± 0.2 ohms on **alternator connector**. Field coil is defective if reading is less than 1.5 ohms or greater than 4 ohms.
3. Significant magnetism test:
 - a. Securely connect one jumper wire between socket B or C on **alternator harness plug** (see Figure 6) and pin D on **alternator connector** (see Figure 7).
 - b. Insert one end of **second** jumper wire in pin E on **alternator connector**. Momentarily (1 sec.) touch other end of **second** jumper wire to B– terminal on alternator. Spark will occur at B– terminal.
 - c. Touch steel tool to shaft to detect significant magnetism.
 - d. Remove both jumper wires after test 3 is complete.

DID ALL THREE TESTS ACHIEVE LISTED RESULTS?



If you have questions about your alternator or any of these test procedures, or if you need to locate a Factory Authorized Service Dealer, please contact us at: C. E. Niehoff & Co. • 2021 Lee Street • Evanston, IL 60202 USA

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