

ELECTRICAL SYSTEM DIAGNOSTIC EVALUATION

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VESSEL NAME		
LOCATION		

Purpose: Structured evaluation of onboard AC and DC electrical systems using measured data and ABYC-referenced practices.
Scope: Non-invasive testing of accessible electrical components, including voltage measurement, load verification, voltage drop analysis, grounding validation, and overcurrent protection review.
Limitations: Findings reflect system conditions at time of inspection.

SYSTEM DOCUMENTATION & TOPOLOGY

- DC source path traced (battery → switch → OCP → panel)
- AC source path traced (shore → ELCI → main → branch)
- Inverter / charger integration path verified
- Bonding system path verified
- Temporary schematic created (if no documentation exists)

DC SYSTEM – STRUCTURAL COMPLIANCE (ABYC E-11)

2.1 Overcurrent Protection

- OCP located within 7" of battery positive (if required per E-11.10)
- OCP rating appropriate for conductor ampacity
- No unprotected conductor runs observed
- OCPs accessible and labeled

Main Battery Cable Size: _____ AWG
 Main OCP Rating: _____ A
 Calculated Conductor Ampacity: _____ A

2.2 Conductor Condition

- Marine-grade stranded conductors verified
- No solid-core household wiring present
- No unsupported spans >18"
- No chafe points observed
- Proper strain relief at terminations

2.3 Termination Integrity

- Properly crimped lugs
- Adhesive-lined heat shrink present
- No exposed copper
- No excessive stacked lugs

Thermal Inspection Under Load:
 Ambient Temp: _____ °F
 Terminal Temp: _____ °F
 Delta: _____ °F

3. BATTERY BANK EVALUATION (ABYC E-11 / A-31 / A-32)

Battery Chemistry: _____

3.1 Resting State (No Charge / No Load)

Total Bank Voltage: _____ V

Individual Battery Voltages:

B1: _____ V
 B2: _____ V
 B3: _____ V

Max Variance: _____ V

- Variance ≤ 0.20 V
- Variance > 0.20 V (investigate)

3.2 Load Test (Non-Destructive)

Applied Load: _____ A
 Pre-Load Voltage: _____ V
 Loaded Voltage: _____ V
 Voltage Sag: _____ V
 Sag Percentage: _____ %

3.3 Charging Profile Verification

Charging Source: _____

Bulk Voltage: _____ V
 Absorption Voltage: _____ V
 Float Voltage: _____ V

Manufacturer Spec Verified:

- Yes
- No

4. VOLTAGE DROP ANALYSIS (ABYC E-11.15)

Measured under actual load.

4.1 Main Feed (Battery → Panel)

Battery Positive: _____ V
 Panel Input: _____ V
 Voltage Drop: _____ V
 Drop Percentage: _____ %

- ≤ 3% (critical load standard)
- ≤ 10% (non-critical standard)
- Exceeds standard

4.2 Bilge Circuit

Source Voltage: _____ V
 Pump Terminal Voltage (under load): _____ V
 Drop: _____ V
 Drop Percentage: _____ %

4.3 Inverter Feed

Battery Voltage: _____ V
 Inverter Input Voltage: _____ V
 Drop: _____ V
 Drop Percentage: _____ %

5. PARASITIC CURRENT ANALYSIS

All known loads off.

Measured DC Current at Battery Negative: _____ A
 Expected Standby Draw: _____ A

- Within expected range
- Excessive draw

If excessive:

- Branch isolation performed
- Fault branch identified

6. CHARGING SYSTEM VERIFICATION**6.1 Alternator Output**

Engine RPM Tested: _____
 Alternator Output Voltage: _____ V
 Charge Current: _____ A

- Proper rise from resting voltage
 Regulator response verified

6.2 Shore Charger

Input Voltage: _____ V
 Bulk Voltage: _____ V
 Absorption Voltage: _____ V
 Float Voltage: _____ V

- Profile matches battery chemistry

6.3 DC-DC / Solar (If Installed)

Input Voltage: _____ V
 Output Voltage: _____ V
 Charge Current: _____ A

7. AC SYSTEM EVALUATION (ABYC E-11 / A-31)**7.1 Shore Inlet**

- No visible overheating
 No discoloration

Thermal Under Load: _____ °F

7.2 ELCI / RCD

Trip Test Performed
 Trip Time: _____ ms

- Within acceptable trip time
 Delayed / failed

7.3 Reverse Polarity

- Indicator functional
 Neutral-ground separation verified

7.4 Inverter Neutral Switching

- Neutral switching verified
 No unintended dual bond detected

8. GROUNDING & BONDING (ABYC E-11.17)

AC Safety Ground Continuity: _____ Ω
 DC Negative Bonding Continuity: _____ Ω

- Continuous
 High resistance

9. STRAY CURRENT CHECK

Voltage to Water (Reference Electrode): _____ mV

- Within acceptable marina range
 Elevated

10. SYSTEM STABILITY TEST

Simulated Operational Load: _____

Voltage Fluctuation Range: _____ V

- Breaker nuisance trip observed
 Network dropout observed
 Inverter instability observed

11. ROOT CAUSE CLASSIFICATION

- Installation deficiency
 Undersized conductor
 OCP misapplication
 Battery degradation
 Charger misconfiguration
 Corrosion-induced resistance
 Parasitic load
 Intermittent mechanical fault

NOTES: