

Electrical Top 10

Best Products for
2017 and Why
We Like Them
- Jeff Cote



Pacific  acht Systems
marine electronics & electrical

design • installation • service • support

Agenda



- Format of presentation
 - What and why
 - Purchasing tips
 - Installation tips

#1: Battery Monitor



- Fuel gauge for your batteries
 - No more guessing!
- Monitoring for system health
 - State of charge and available capacity
 - Usage patterns, planning
- Information on your system
 - Voltage
 - Current
 - Amp hours



#1: Battery Monitor

- Purchasing Tips



- Minimum 300 amp shunt
- Show battery capacity in percentage
- Popular models
 - Bluesea M2 DC SoC Monitor
 - Victron 702-S
 - Xantrex LinkLite/LinkPRO



#1: Battery Monitor - Installation Tips



- Suited for deep-cycle batteries
- Shunt captures all current going in/out
- Voltage and battery monitor power directly connected at battery
- Configure battery amp-hours & type



#2: Inverter/Charger



- Run AC appliances without shore power or a generator
 - TV
 - Microwave
 - AC outlets
- Charge your batteries at the rate of charge & faster



#2: Inverter/Charger - Purchasing Tips



- Marine models only
- True sinewave
- Low idle power draw
- High efficiency
 - DC to AC
- Remote controlled
- Popular Models
 - Magnum MS
 - Victron



#2: Inverter/Charger - Installation Tips



- Class T fuse
- On/off master DC disconnect
- Inverter-only neutral bus
- Chassis ground wire size
- DC wire size based on voltage drop and amps
- Location of inverter



#2: Inverter/Charger Remote Monitoring



- Newer models allow ability to remote login
 - Loss of AC shorepower
 - Capacity of batteries
 - Inverter status



#3: AGM Batteries



- Greater useable capacity
- Limited venting
- Leak-proof
- Limited self-discharge (1-2% per month)
- Good for deep-cycle and starter applications



#3: AGM Batteries

- Purchasing Tips



- Golf-cart, L16, gr24, gr27, gr31, 4D, 8D, slimline
- Not serviceable
- Similar weight to flooded
- Reputable Brands:
 - Discovery
 - Firefly Oasis
 - Lifeline
 - Odyssey



#3: AGM Batteries - Installation Tips



- Size to handle maximum discharge capacity
- AGM compatible charger
- Don't mix different battery chemistries



#4: Smart Battery Charger



- Charges batteries from AC shore-power
- **Reduce** the charge time
- Three-phase smart charge cycle: bulk, absorption, float
- Right rate of charge for extended battery life



#4: Smart Battery Charger

- Purchasing Tips



- Three Phase
 - Bonus: Custom settings
- Battery type
- Temperature compensated
- Remote panel
- Marine model
- Popular models:
 - Mastervolt ChargeMaster
 - Promariner ProNautic



#4: Smart Battery Charger

- Installation Tips



- Size charger at least 10% of house battery capacity
- Fuse leads at battery
- Connect directly to battery (NOT switched)
- AC breaker to handle bulk mode
- Set correct battery type
- Temp sensor properly mounted



#4: Smart Charger Application - Multiple Units



- Reduce genset runtime by adding 2nd or 3rd charger in parallel
 - E.g. 1 hour morning and evening
- Charge at the right rate
- Min and Max Charge Rate
 - Flooded: 10% to 25%
 - AGM: 10% to 40%



#5: Flexible Solar Panel



- Size panels for
 - Keep batteries topped-off
 - Offset refrigeration
 - An extra day at anchor
 - Daily amp-hour demand
- Mount over canvas or hardtops
- Lightweight
- Durable



#5: Flexible Solar Panels

- Purchasing Tips



- Daily output estimate:
 - Short-hand formula: wattage / 4
- Quality
- Shading
- Popular models
 - Aurinco
 - Gioco
 - Solbian



#5: Flexible Solar Panels - Installation Tips



- Pair with efficient MPPT
- Use MC-4 connectors
- Minimize voltage drop
- Fuse panels at battery
- Connect panels at battery (NOT after switch)



#6: Methanol Fuel Cell



- DC Charging with:
 - No noise
 - No vibration
 - No smoke
- Extends time at anchor
- Great for boats
 - Without genset
 - Limited battery bank
 - Limited alternator output



#6: Ethanol Fuel Cell - Purchasing Tips



- Choose the right daily output:
 - 80, 140, 210
- Carry extra fuel onboard
- Popular model
 - EFOY



#6: Ethanol Fuel Cell - Installation Tips



- Unit needs some ventilation
- Outputs distilled water
- Mount in a locker
- Fuel cartridge needs to be close to unit
- Choose right DC cable based on distance to battery



#7: External Regulator



- Converts alternator to smart 3 phase output
- Significantly increases alternator output
- Properly charges different battery chemistries



#7: External Regulator - Purchasing Tips



- Allows different battery types
- Customizable charge profiles
- Remote battery and alternator temp sensors
- Sealed units



#7: External Regulator - Installation Tips



- Make sure alternator wire is sized properly
- Voltage sense leads needs to be at battery
- Fuse alternator lead at battery



#8: Alternator Output Distribution



- One alternator charging multiple battery banks simultaneously
- Replaces diode combiners
- No paralleling of batteries



#8: Alternator Output Distribution - Purchasing Tips



- High efficiency model
- Prioritization of batteries
- Popular models
 - Promariner Prolsocharge
 - Victron Argo FET Battery Isolators



#8: Alternator Output Distribution

- Installation Tips



- Fuse alternator leads at batteries
 - Size to wire & to avoid nuisance tripping
- Size alternator cable to minimize voltage drop
 - E.g. 3% is good target
- Some models require ignition power alternator field



#9: Battery Combiners



- Batteries automatically in parallel when charging voltage sensed
- Replaces manually turning switch to all/both when charging



#9: Battery Combiners

- Purchasing Tips



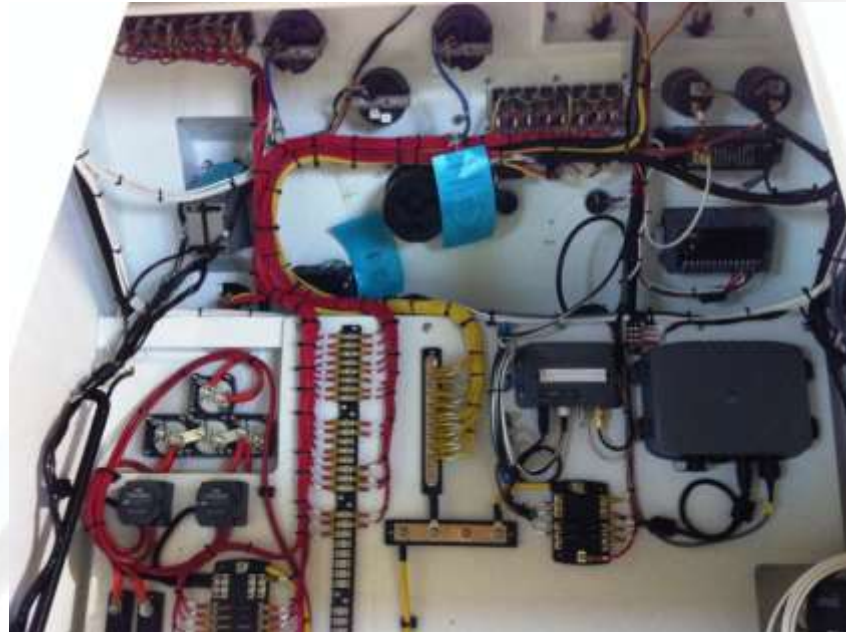
- Amperage for application, e.g. 55, 120, 250, etc...
- Ability to activate manually
 - Local & remote
- Popular Models
 - Bluesea ACR
 - BEP VSR



#9: Battery Combiners - Installation Tips



- Fuse for maximum amperage at each battery
- Connect at batteries (Not after switch)
- Fuse ground sense connection



#10: Galvanic Isolator



- Reduce stray low voltage currents
 - Between AC and DC grounds
- Protect against destructive galvanic corrosion
- Reduce the likelihood of damage to underwater metals



#10: Galvanic Isolator - Purchasing Tips



- Choose based on size: 30 or 50 amp
- Fail-safe models
- Popular models
 - Newmar GI-30 & GI-50

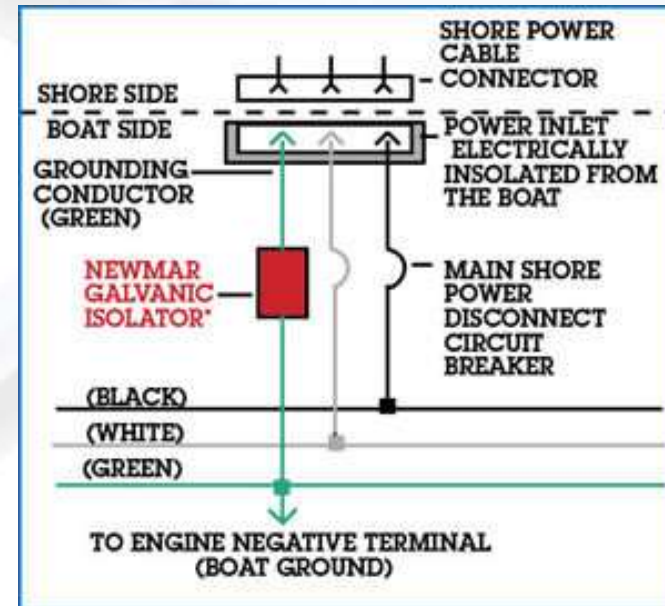


#10: Galvanic Isolator

- Installation Tips



- Intercept AC grounding wire (green) as close to AC shorepower
- Make sure no AC grounding bypasses unit



#11: Handheld Multi-Meter



- Measure voltage, amps, and resistance
- Use measurements to troubleshoot circuits



#11: Handheld Multi-Meter

- Purchasing Tips



- Digital auto-scale
- DC and AC clamp-on
- Popular meters
 - Bluesea
 - Fluke



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