



# WS500

ADVANCED DC CHARGE CONTROLLER

POWERED BY  
**dragonfly**<sup>®</sup>  
ENERGY



## A BOLD NEW SOLUTION FOR BATTERY CHARGING

The Wakespeed WS500 Advanced Alternator Regulator is the only model on the market that can utilize current, voltage, and temperature to deliver the most precise and effective charging possible. Ideal for 12V, 24V, and 48V battery systems – with configurability for voltages in between – the WS500 is the perfect solution for charging lead acid-based or new generation LiFePO4 lithium-ion battery banks.

This Advanced Alternator Regulator can be connected to a current shunt to monitor current flow to and from the batteries, enabling the regulator to control charging based on a combination of system voltage and amperage delivered from the alternator to the batteries. In addition, the WS500 can also monitor alternator and battery temperatures and modify charging output to ensure optimal safety and charging performance at the alternator and batteries.

- Wide ranging support for a variety of battery technologies
- Advanced, multi-PID engine control provides the most accurate charging available
- Simple to install, configure, and operate
- Best charge control for lithium battery chemistries
- Superior protection for your investment

### Other features of the WS500 include:

- Adaptive Idle Technology minimizes impact of the regulator on smaller engines by controlling alternator loads based on engine RPM
- Zero Output Technology enables the regulator to limit output to loads when batteries require discounted charging
- Provides Multiple Alternator Support without the need for relays or switching device
- Full BMS Compatibility using RV-C and OSEnergy protocols



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# WS500

## ADVANCED DC CHARGE CONTROLLER

| SYSTEM VOLTAGE                                                                                                                                                                                                                                                     |                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12-VOLT<br>24-VOLT<br>48-VOLT                                                                                                                                                                                                                                      | Yes - Auto-detected                                                                                                                                            |
| OTHER FULLY CUSTOMIZABLE FROM 12 TO 48/52V                                                                                                                                                                                                                         | No hardware changes necessary.                                                                                                                                 |
| FIELD POLARITY                                                                                                                                                                                                                                                     |                                                                                                                                                                |
| A-TYPE (N)<br>B-TYPE (P)                                                                                                                                                                                                                                           | Select compatible P- or N-type wiring harness to match alternator polarity.                                                                                    |
| REGULATION CAPABILITY                                                                                                                                                                                                                                              |                                                                                                                                                                |
| Charge controller is uniquely capable of driving alternator output based on a combination of three primary criteria: voltage, current, and temperature goals / limits - making it possible to configure charging to specific battery manufacturer recommendations. |                                                                                                                                                                |
| VOLTAGE                                                                                                                                                                                                                                                            | Yes - Via sense wires included in wiring harness.                                                                                                              |
| CURRENT                                                                                                                                                                                                                                                            | Yes - Via amp shunt. Can be calibrated to support most shunts. 500A / 50mV is default.                                                                         |
| TEMPERATURE                                                                                                                                                                                                                                                        | Yes - Via alternator and battery temperature sensors. Real-time variable charging output based on ambient alternator and battery temperature.                  |
| Battery Temperature and/or current may optionally be supplied via CAN when used with suitable BMS.                                                                                                                                                                 |                                                                                                                                                                |
| CONFIGURATION                                                                                                                                                                                                                                                      |                                                                                                                                                                |
| VIA BUILT-IN SWITCH                                                                                                                                                                                                                                                | Basic charge profile by battery type:<br>Battery capacity<br>Alternator output range<br>Battery ID                                                             |
| VIA WAKESPEED APPLICATION                                                                                                                                                                                                                                          | Fully customized / optimized configuration for battery, alternator, and system through easy to use application.                                                |
| BATTERY CHARGE PROFILES                                                                                                                                                                                                                                            |                                                                                                                                                                |
| EIGHT PRESET PROGRAMS BASED ON BATTERY TYPE SELECTABLE VIA DIP SWITCH                                                                                                                                                                                              | Default (Safe & AGM#1)<br>Standard FLA<br>Deep Cycle FLA<br>HD AGM<br>Gel<br>BattleBorn LiFePO4<br>Custom #1<br>Custom #2 (Preconfigured with LiFePO4 profile) |
| CHARGE PHASE CRITERIA                                                                                                                                                                                                                                              | Flexible charging protocol integrating: system voltage, battery acceptance current, battery temperature, alternator temperature, and / or time duration.       |
| EXTENDED BATTERY TEMPERATURE RANGE SUPPORT                                                                                                                                                                                                                         | Charge controller can be configured to provide safe charging of batteries outside of nominal temperature ranges by dynamically limiting charge current.        |

| ADVANCED CONFIGURATION                                                                                                                     |                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VIA USB PORT                                                                                                                               | 100+ advanced adjustments accessible via Wakespeed Application in Expert Mode                                                                                                                            |
| VIA APP                                                                                                                                    | Basic license to third-party app is provided - enabling access to monitoring, programming and diagnostic functions via computer or mobile device.                                                        |
| COMMUNICATION                                                                                                                              |                                                                                                                                                                                                          |
| CAN (CONTROL AREA NETWORK)                                                                                                                 | J1939-based CAN provides access for system integration and monitoring. Several industry standard CAN cabling systems are supported, including RJ45/CAT5, M12-5 (NMEA, Device-Net), RV-C cabling systems. |
| ENHANCED CAN PROTOCOL SUPPORT INCLUDE:                                                                                                     | RV-C, NMEA2000, Victron VReg, SMA, LUX, as well as several proprietary CAN communications protocols with selected BMS manufacturers.                                                                     |
| FIELD OUTPUT CONTROL                                                                                                                       |                                                                                                                                                                                                          |
| DEFAULT VALUES                                                                                                                             | Large Alternator Mode (10%)<br>Small Alternator Mode (75%)<br>Halt Power Mode (50%)                                                                                                                      |
| ADVANCED CONFIGURABLE                                                                                                                      | Maximum field bandwidth adjustable from 10% to 100% in one percent increments.                                                                                                                           |
| FIRMWARE UPDATES                                                                                                                           |                                                                                                                                                                                                          |
| YES                                                                                                                                        | Charge controller firmware updatable via built-in USB connector.                                                                                                                                         |
| REGULATOR DISPLAY                                                                                                                          |                                                                                                                                                                                                          |
| ONBOARD LED                                                                                                                                | Operational and troubleshooting/ fault data via built-in USB connector.                                                                                                                                  |
| REMOTE DISPLAY                                                                                                                             | Via CAN to remote displays using commonly-accepted marine and RV protocols.                                                                                                                              |
| ADAPTIVE IDLE TECHNOLOGY                                                                                                                   |                                                                                                                                                                                                          |
| YES                                                                                                                                        | Allows charge controller to dynamically reduce alternator output to prevent stalling, sluggish performance and match engine power curves at lower RPMs.                                                  |
| WHITE SPACE                                                                                                                                |                                                                                                                                                                                                          |
| Customizable alternator loading vs. RPMs to match available engine power, optimizing alternator output while preventing engine overloading |                                                                                                                                                                                                          |
| ZERO OUTPUT TECHNOLOGY                                                                                                                     |                                                                                                                                                                                                          |
| YES                                                                                                                                        | Enables charge controller to use current monitoring capability to limit output to match house loads only when batteries are fully charged.                                                               |

| ADVANCED CONFIGURATION                  |                                                                                                                                                                                                                                                                         |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| YES - ON MULTI ENGINE APPLICATIONS      | Allows multiple charge controllers to communicate via the CAN to ensure balanced output and charging efficiency when supporting a single, large battery bank. Device hierarchy establishes master / support relationship between charge sources.                        |
| YES - DUEL ALTERNATORS ON SINGLE ENGINE | Field output can be split from single charge controller to drive dual alternators charging common ban.                                                                                                                                                                  |
| BMS COMPATIBILITY                       |                                                                                                                                                                                                                                                                         |
| YES                                     | Compatible with multiple BMS brands using RV-C and OSEnergy protocols, as well as a select list of Proprietary BMS protocols. Configurable to many available systems.                                                                                                   |
| TEMPERATURE SENSING                     |                                                                                                                                                                                                                                                                         |
| ALTERNATOR TEMPERATURE SENSING          | Sensor included in wiring harness. Active regulation based on ambient alternator temperature, ensures optimal output and alternator safety, versus simple capping typical of most voltage dependent regulator models.                                                   |
| BATTERY TEMPERATURE SETTING             | Battery temperature monitoring protects the battery from over / under temperature situations, as well as adjust voltage targets based on temperature. Temperature sensor enables regulator to adjust charging voltage to compensate for changes in battery temperature. |
| INTERNAL TEMPERATURE SENSING            | Protects charge controller's internal circuitry from damage due to out-of-range values.                                                                                                                                                                                 |
| PHYSICAL DATA                           |                                                                                                                                                                                                                                                                         |
| ENCLOSURE DIMENSIONS                    | 160mm x 100mm x 60mm<br>6.75"L x 3.875"W x 2.375"H                                                                                                                                                                                                                      |
| FOOTPRINT                               | 190mm x 100mm<br>7.50"L x 3.875"W                                                                                                                                                                                                                                       |
| ENCLOSURE                               | Diecast Aluminum Alloy - designed for IP67 designed                                                                                                                                                                                                                     |
| FINISH                                  | Powdercoated                                                                                                                                                                                                                                                            |
| WIRING HARNESS                          | Color coded tinned wire. Expandable sheathing.                                                                                                                                                                                                                          |
| TERMINAL CONNECTORS                     | Ampseal 23-pin waterproof Ruggedized RJ45 (CAN).                                                                                                                                                                                                                        |
| USB CONNECTOR                           | USB Type B                                                                                                                                                                                                                                                              |
| WARRANTY                                | 2-Year<br>Limited Warranty                                                                                                                                                                                                                                              |

