WAKESPEED WS500 AND VICTRON CERBO GX SETUP GUIDE

| Device		18:09
Connected		Yes
Connection		VE.Can
Product	Wakespeed WS500 Alternator Regulator	
Name		WS500-VictronLI
Product ID		0xB080
Firmware version		AREG2.5.0-BETA
Pages		Menu
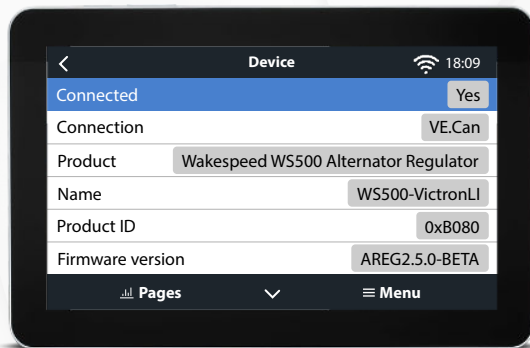
WAKESPEED™

CHARGE ⚡ SMARTER

INTRODUCTION

The WS500 is an external smart alternator regulator with CAN-bus and NMEA 2000 communication, which is especially applicable in Marine and RV applications. The Wakespeed WS500 is supported by Venus OS and offers the possibility to monitor the performance of your alternators via a GX device.

REQUIREMENTS

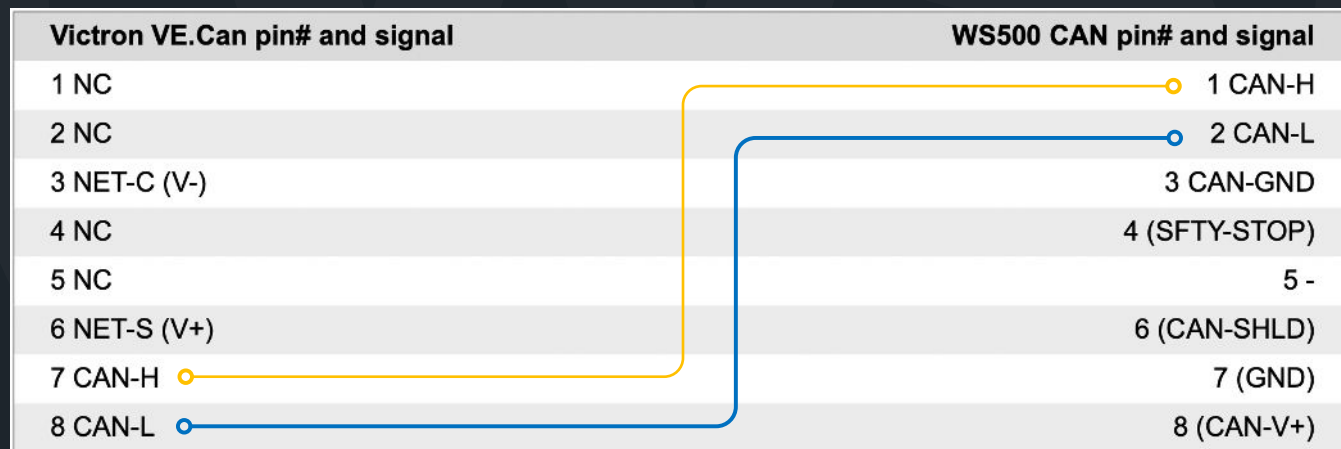Necessary requirements for the integration of the WS500 are:

1. VenusOS firmware v2.90 or higher installed on your GX device
2. Wakespeed WS500 firmware 2.5.0 or higher installed on the WS500 controller
3. The WS500 must connect to the VE.Can port of the GX device. It is not possible to monitor the WS500 when connected to the BMS-Can port of a Cerbo GX
4. In order to allow WS500 to be displayed on a Victron GX, the VE.Can protocol must be selected. Example, on the Cerbo GX using the settings menu select *Settings/Sevices/VE.Can port/CAN-bus Profiles* and then choose one of the two "VE.CAN & xxx BMX (250bits)" options.
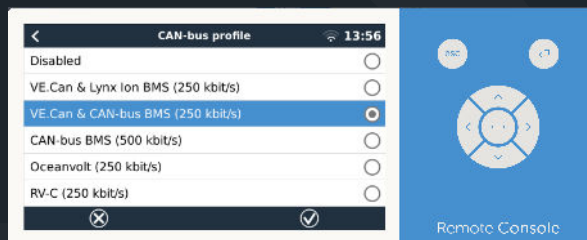
WIRING THE WS500 TO VE.CAN

Both, the WS500 and VE.Can, use RJ45 connectors for their CAN ports.

However, both have different pin outs. This means that a normal (straight UTP cable) network cable cannot be used. A crossover cable is required, contact us today for purchasing or this cable may be made by yourself. The following diagram reflect the pin out of the two devices.

Victron VE.Can pin# and signal	WS500 CAN pin# and signal
1 NC	1 CAN-H
2 NC	2 CAN-L
3 NET-C (V-)	3 CAN-GND
4 NC	4 (SFTY-STOP)
5 NC	5 -
6 NET-S (V+)	6 (CAN-SHLD)
7 CAN-H	7 (GND)
8 CAN-L	8 (CAN-V+)

The important pins to look at are pin 7 and pin 8 for CAN-H and CAN-L on the VE.Can side and pin 1 and 2 for Can-H and CAN-L on the WS500 side.

Therefore a cable is needed where pin 1 and 2 on one side are connected to pin 7 and pin 8 on the other side. Pin 7 goes to pin 1 and pin 8 to pin 2.

The RJ45 connector with pin 7 and 8 on one end connects to the VE.Can port of the GX device. The other end of the cable with pin 1 and 2 connects to the WS500 controller. Both sides must be terminated.

The cable colors do not matter for the do-it-yourself cable. Wakespeed also offers a ready-configured cable with a blue RJ45 connector on one end that must be connected to the VE.Can port.

> *Note: Please note that the black terminators supplied by Wakespeed and the blue terminators supplied by Victron are not interchangeable. Therefore: insert the Victron terminator on the Victron side of the network, and insert the Wakespeed terminator into the Wakespeed.*

WIRING EXAMPLE

The example below shows an overview of the recommended wiring based on an installation with a Lynx Smart BMS, Lynx Distributors and a Cerbo GX.

The correct placement of the alternator shunt (not to be confused with the shunt of the BMV or SmartShunt) is important here for the correct connection of the current sense wire.

For complete wiring between the WS500 and alternator, see the WS500 and the alternator manual.
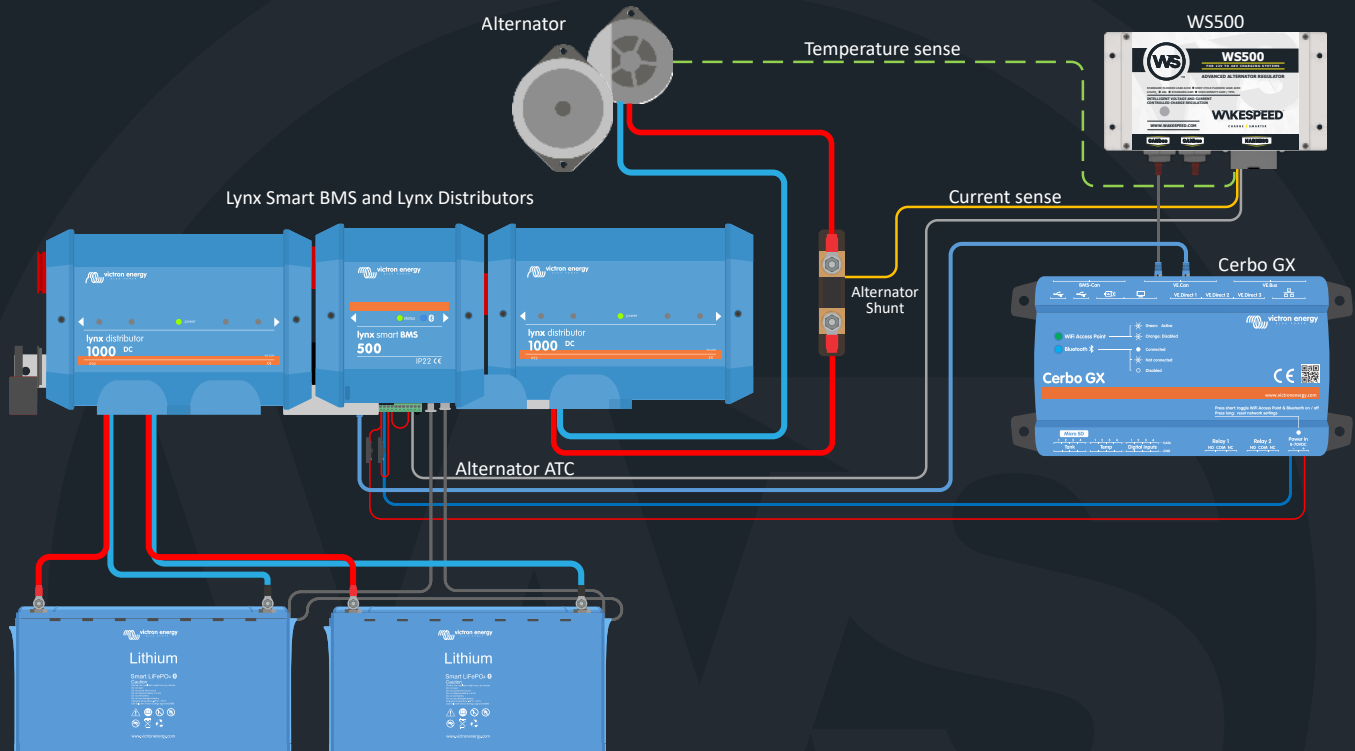
WIRING EXAMPLE

Once the WS500 is connected to the GX device, the Device list contains an entry for the regulator.

The WS500 menu then provides the following information and data:

Output: voltage, current and power as reported from the alternator regulator

> *Note: See "Current field contain two dashes" below.*

Temperature: the alternator temperature as measured by the WS500 temperature sensor
State: the charging state of the WS500
- Off when not charging
- Bulk, Absorption or Float when the WS500 is using its own charging algorithm
- External Control when controlled by a BMS such as Lynx Smart BMS

Network Status:
- Standalone, if the regulator is working on its own
- Group Master, when it is supplying charging targets to another WS500 device
- Slave, when it is taking charging directions from another device such as a WS500 or a BMS

> *Note: There is a subtility here. If the given regulator is not in slave mode, following another regulator or BMS, it can operate either in Standalone or Group master mode. This is determined by the toggle 'Allow device to become Master' in the Expert settings on the System tab of the Wakespeed application. If the regulator is allowed to become a master (Default), and there is no other 'master' who has a higher priority -- then Group master status will be shown. However, if it is not allowed to be a master, then Stand-alone will be shown.*
> *Slave will be shown in any case if the regulator is running under the direction of something else.*

Error: reflects any error state the WS500 might be in. The details of all error codes and messages can be found in the Wakespeed Configuration and Communications guide. Also see below for error #91 and error #92

Field Drive: report on the % of field drive being sent by the WS500 to the alternator on the field connection

Speed: the speed in RPM at which the alternator is spinning. This is as reported by the stator feed and if this is wrong can be adjusted by setting the Alt Poles option within the Wakespeed SCT configuration line

**Engine Speed:** reported in RPM. This is reported by either

- Calculation based on the alternator speed and the calibration of WS500 (See poles/drive ratios on the Alternator tab in the Wakespeed application)
- NMEA 2000, if the WS500 is receiving engine RPM from PGN127488
- J1939, if the WS500 is receiving engine RPM from PGN61444

It is also possible to create a custom name for the WS500 in the Device menu. This triggers the WS500 to update the regulator in the Wakespeed application.
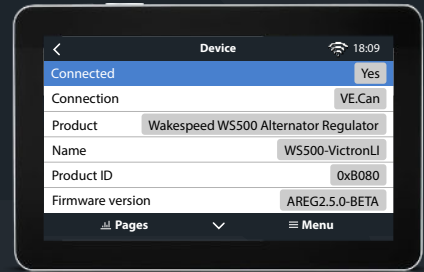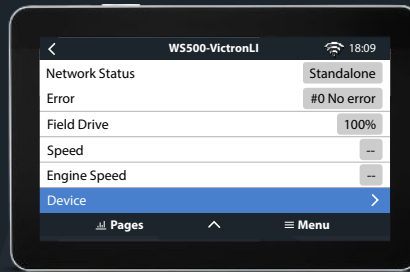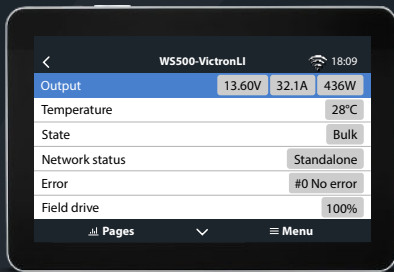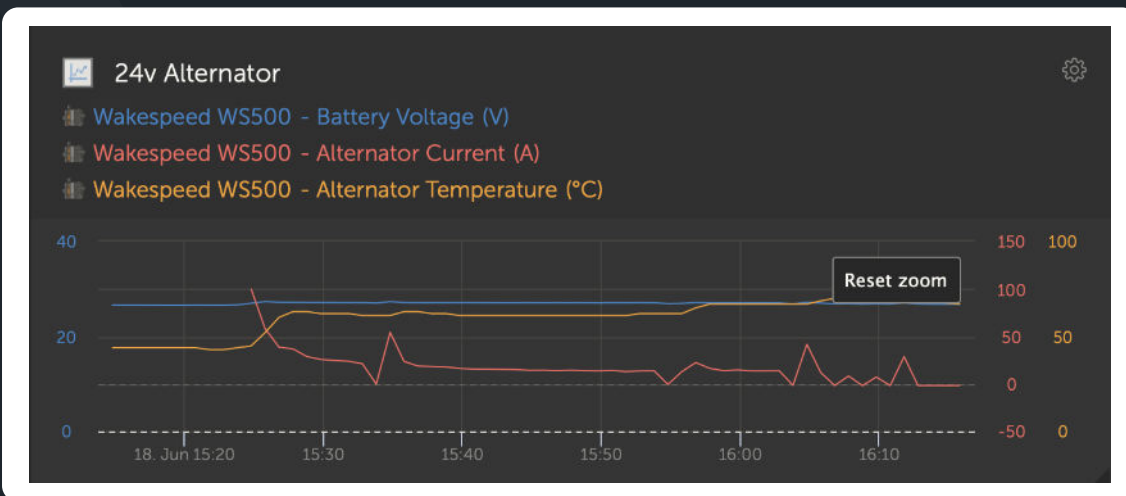

VRM PORTAL

The data from the WS500 that can be displayed on our VRM portal, is current, voltage and temperature. As well as Alternator RPM's (if enabled),and field drive %.
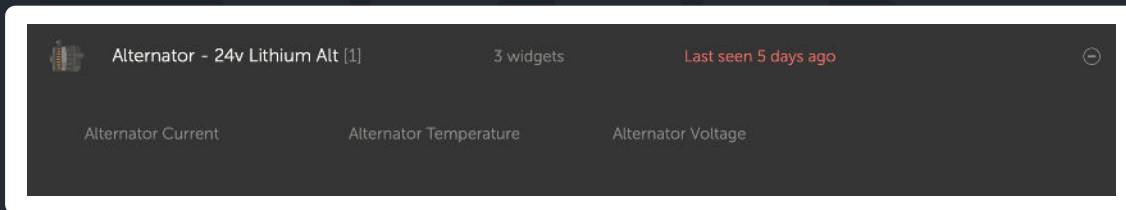
Currently 3 widgets are available on VRM

VRM custom widget showing WS500 voltage, current and temperature

UTILIZING VICTRON DVCC

With Wakespeed Firmware 2.5.2 and higher, the WS500 offers support to follow Victron Energy's DVCC (Distributed Voltage and Current Control) method. By default, the WS500 will follow the DVCC direction issued to it via the Cerbo. Users are able to disable this function by toggling 'Support Victron DVCC' in the Wakespeed App with Expert Mode enabled.

Dependencies for allowing DVCC to be utilized include:

- Cerbo firmware must be v3.30.
- Wakespeed firmware must be v2.5.2 or higher.
- Current Shunt must be located at the alternator.
- WS500 must be configured with "Shunt at Alternator" toggled on (Wakespeed application: System tab on the Configuration screen.)
- Define the Alternator Capacity in Amps on the Alternator Tab.
- NMEA2000 Support (System > Expert Mode) must be enabled.

The defined Alternator Capacity will be transmitted to the Cerbo as the capability to use for its calculations. If no value is set, 200A is used by default.

> *Note: Please note that while using DVCC, interaction with the BMS (if enabled) is not ignored. The other alternator management parameters, including max temperature and derate values, are not ignored—all continue to function as before. Utilizing DVCC simply adds an additional ability for the Cerbo to provide direction. This guide references details around the CAN connection between the WS500 and the Cerbo (and similar devices).*
> **Do not configure your system to utilize ONLY DVCC for WS500 control.**

While under DVCC control, the regulator will receive directions from the Cerbo to consider other directions it has (ala, a remote BMS while in Slave Mode). If the DVCC is more restrictive in conjunction with what otherwise would be used for Alternator Current and Battery Voltage, those limits will be used.

Please note that after any configuration changes to the WS500, you will need to power off the WS500 for 30 seconds to allow the Cerbo to time out and resend DVCC commands. Until this is complete, the Cerbo will simply remember any prior communications. Power-cycling the WS500 for 30 seconds will cause the Cerbo to reset itself.

> **IMPORTANT!**
> DVCC is not a replacement for CAN-locked WS500/BMS communications. Users still need to set up any battery BMS as usual to ensure the safety during alarm and fault conditions. Do not depend solely on DVCC to provide safe integration with a BMS.

TROUBLESHOOTING

For further assistance and troubleshooting please contact Wakespeed support directly.

Error code #91 and #92

Venus OS will report all errors that can be generated by the WS500 as defined within the Wakespeed Communications and Configuration guide. In systems with integrated BMS, the following errors may require special attention (Reference Appendix).

- #91: Lost connection with BMS; the WS500 has lost communication with the BMS and will drop into Off (Standby) Mode, or get Home mode, depending on capabilities of BMS. As soon as communication is restored with the BMS, it will revert to following the charging goals as set by the BMS.

- #92: ATC disabled through feature IN; the BMS has signaled a charge disconnect event through the feature in wire and the WS500 has therefore reverted to an Off status.

Current field contains two dashes

If the current field and power field contain two dashes, then the system is not receiving any alternator current readings from the WS500. Many BMS's are able to report Battery current via the BMS/Wakespeed CAN connection, and in those cases the current sensing lines on the WS500 are not needed. By installing a current shunt into the Alternator output power wire, and connecting up the WS500 Gray/Purple wire to that shunt, the WS500 will be able to Alternator current and Wattage for display.

In addition to physically installing a current shunt, the configuration will need to be modifier telling the WS500 that its local shunt is on the alternator, not the battery. Using the Wakespeed Application on the System Tab, togle on "Shunt at Alternator."

WS500 is not displaying on Victron display

If the WS500 is not displayed at all on the Cerbo, some areas to check are:

- Make sure the WS500 contains firmware 2.5.0 or better
- Make sure the Cerbo contains firmware 2.9.1 or better
  Confirm the CAN wiring, making sure the WS500 is connected to the VEcan port.
- Assure the VEcan port is configured to support VEcan protocol.