Scorpion Power System
www.scorpion-team.com

Scorpion User Guide for Vanguard S3-Series

S3-140 Modify Kit Set
S3-80 Super Stock Kit Set

V2.0

IMPORTANT
Update the ESC firmware to latest version.

Introduction
Thanks for purchasing Scorpion Vanguard Electronic Speed Controller. An ultimate ready for race ESC give you the most power range and reliable performance even in the extreme conditions.
High power system for RC model can be very dangerous, please read the manual carefully before installing your new ESC.

1.0 Features

- Wide input voltage range 3-14V (1S-3S LiPo)
- Sensored and Sensorless brushless motors (BLDC)
- Drive down to 4.5T motor (Scorpion Vanguard S3-140)
- Drive down to 8.5T motor (Scorpion Vanguard S3-80)
- High current, up to 140A continues current, with current protection (Scorpion Vanguard S3-140 Modify Kit Set)
- High current, up to 80A continues current, with current protection (Scorpion Vanguard S3-80 Super Stock Kit Set)
- Factory driver suggested setting (with using Scorpion RS-3420 motor and Scorpion competition battery pack)
- Profession PC program
- Store up to 8,000 data
- Aluminum heat sinks
- Build-in temperature sensor with adjustable temperature protection
- True DC-DC 3A/6V BEC for servo and receiver
- Multiple protection include over current, over voltage, temperature protection
- Adjustable voltage control and protection (cutoff, motor stop) with LiPo AutoDetect mode
- Motor over temperature protection (for Scorpion RS-3420 motor)
- 2 x hall sensor connectors, each can be used for PC connection either
- Upgradeable firmware
- Wide range of settings for different race course

2.0 Specification

	S3-140-Modify	S3-80-Super Stock
Cont./ Brust Current, A	140/800	80/400
Motor Type Supported	Sensored and Sensorless Brushless Motor	Sensored and Sensorless Brushless Motor
Cars Applicable	1/8th & 1/10th on raod and off road	1/8th & 1/10th on road and off road
Motor Limit	>=4.5T	>=8.5T
Resistance	0.0004Ohm*2	0.00155Ohm *2
Voltage Input	1s-3s LiPo	1s-3s LiPo
BEC	6V@3A DC-DC	6V@3A DC-DC
Footprint	30,6 mm (W) x 35,6 mm (L)	30,6 mm (W) x 35,6 mm (L)
Size (w/o FAN)	35.8 x 35.6 x 21.8 mm	35.8 x 35.6 x 21.8 mm
Weight	40g	40g
FAN	6V@0.2A	6V@0.2A
External Programming Port Output	2	2

2.1 Vanguard Super Booster

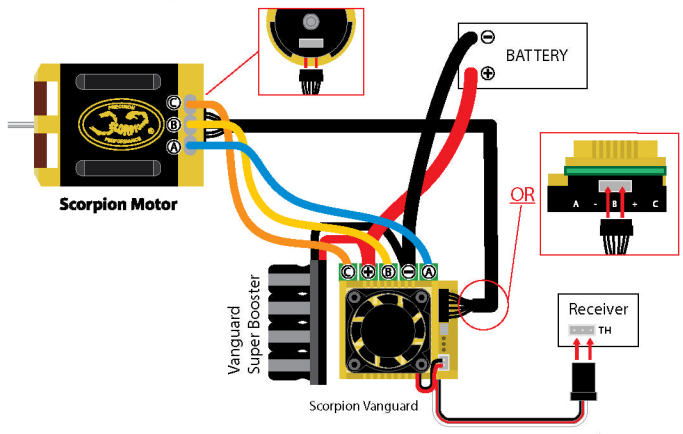
- 470 uf x 4 = 1880 uf total
- Voltage: 16V
- Size: 5mm (L) x 9mm (W) x 15mm (H)
- Working Temperature: 105 °C

3.0 Preparation

- Choose a location for the ESC as close to the motor and away to the receiver and single cable to prevent radio interference
- If using double-side tape, for the best results clean the bottom of the ESC before apply the tape
- To keep the motor wire as shorten as possible for the best electric current efficiency
- Install cooling fan (included)
- Install Scorpion Vanguard Super Booster (included), placing the booster as close as to the ESC, to keep the booster wire as shorten as possible for the best electric current efficiency
  If using double-side tape, for the best results clean the booster before apply the tape
  Booster should be mounted directly to the positive (+) and negative (-) on the ESC, as shown in the below diagram
- To keep the battery wire as shorten as possible for the best electric current efficiency

4.0 Soldering and Connection

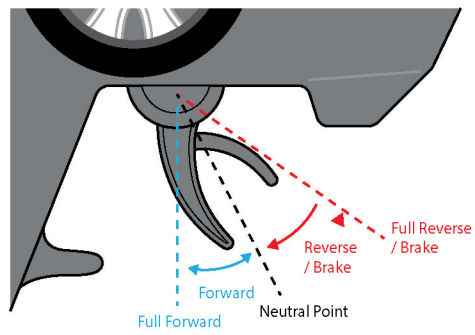
- Always provide a steady working area and easy access to the solder posts
- Do not connect the car battery while working on soldering
- Cut the motor wires to desired length and strip the insulation about 3.2mm-6.35mm from the end. Apply solder to the exposed wire until it is thoroughly covered. Caution: not to get injure with hot solder and iron tip
- Place the iron tip in the notch on top of the post and apply small amount of solder to the post
- Hold the tinned wire contact with the notch of the post, use the iron tip to heat up the tinned wire and the post about 2 second for the solder to flow, then remove the iron and hold the wire in position about 1 - 2 second to let the solder set
  Caution: do not overheat the ESC
- Refer to the below diagram for proper connection
- Check with battery supplier for the battery connectors (excluded)



5.0 Radio Throttle Calibration

Calibration is necessary for the first use of the ESC, or whenever used with a new/ different transmitter or new firmware updated

- Make sure the ESC on/off button is " Off "
- Connect the battery, receiver and motor
- Turn on the transmitter
- Move and hold throttle trigger to full reserve/brake
  Important: if not hold full reserve/brake the ESC would not activate to calibration mode.
- Press on/off button once to turn on the ESC
- Wait for first beep sound (Beep….), then the full reserve / brake been set
- Pull and hold the throttle trigger to full forward
- Wait for second beep sound (Beep….Beep….), the full throttle been set
- Hold the throttle trigger in neutral position
- Wait for third beep sound (Beep….Beep….. Beep……), the neutral been set
- Calibration finish, ESC will restart automatically

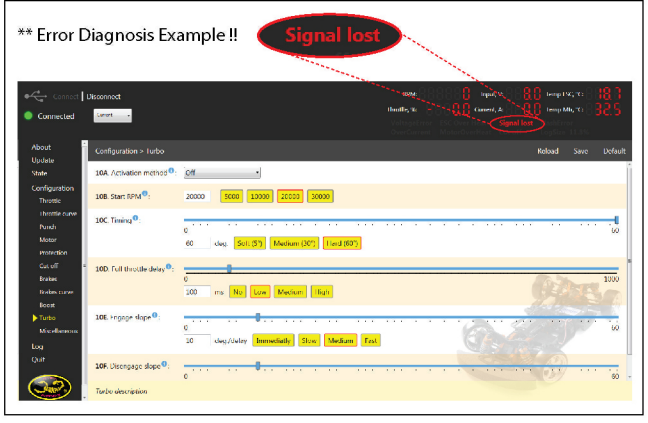


6.0 Led & Motor Sound Indication

ESC turn on	Yellow / Green / Red - On
Calibration	• Neutral: Red - On / Green & Yellow - Off • Full Reverse / Brake: Yellow On / Green & Red - Off • Full Forward: Green-On / Red & Yellow - Off
Throttle Trigger in Neutral Position	Red • Off if no errors, On if errors Yellow • Blinks if zero timing (no boost, no turbo) Off if zero timing, boost, turbo any of these setting is on • Battery voltage Green • On if voltage is OK • Off if voltage is low Motor Sound • ESC over heat - beep…beep…beep… • Motor over heat - beep beep…beep beep…beep beep… • ESC & Motor over heat - beep beep…beep beep…beep beep…
The motor is running or braking	Red • Off if no errors, On if errors Yellow • On Green • On if voltage is OK (according to program setting value) • Off if voltage is low (according to program setting value)
Firmware Update Mode	When ESC in Update Mode - Yellow, Green, Red - On When Updating - Yellow, Green, Red - Blinks Update Fnish - ESC Restart, Yellow, Green, Red - On.
Example of error indication	Conditions • Red LED is ON • Throttle in natural position Example • Green LED off - low voltage or cut off (according to program setting value) • ESC over heat - beep…beep…beep… • Motor over heat - beep beep…beep beep…beep beep… • ESC & Motor over heat - beep beep…beep beep…beep beep… Others • Red LED is ON

Or connect to PC program locate the problem

** Error Diagnosis Example !!



7.0 Connect ESC to Computer

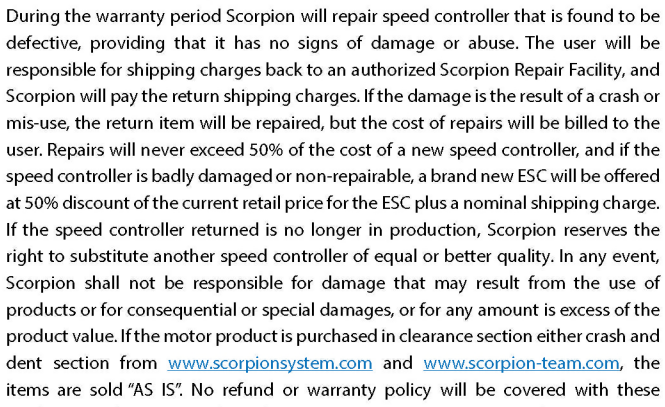
Team Scorpion provides the most advance setting features or simply download factory driver setting form www.scorpion-team.com

- Download **RC Car ESC Program Installer** from www.scorpion-team.com, program available for Windows XP, Windows 7, Windows 8
  Double click the exe file to start the installation

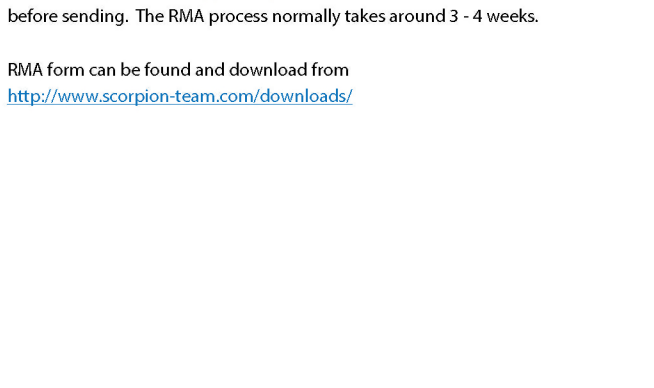
- Download "**Extension USB Cable Drivers**" from www.scorpion-team.com
  Double click the "**PL2303_Prolific_DriverInstaller_v1.5.0.exe**" to install the USB driver
  If you have problem install the USB driver, please read the manual thoroughly or ask for administrator advice

- Follow the below diagram connect the ESC to computer with using Scorpion V-link USB Cable(included)

- After the connection has been made successfully, the "Connected" display notification and the green light appears



To know more about each setting description, simply point the mouse cursor to the blue exclamation mark next to the each setting item



8.0 Trouble Shooting

Trouble	Possible Reason	Solution
After powered on, the motor does not rotate and there is no signal light	Poor power connection	Check the power connections, replace the connectors if necessary.
After power on, the motor does not spin, but there is signal light	Wrong setting	Refer to **LED INDICATION** to indentify problem
Motor stops halfway	Multiple protection including • Over Current • Over Voltage • Low Voltage • Temperature Protection	Refer to **LED INDICATION** to indentify problem
No signs of recognizing from computer program	• ESC off • Cable failure • Poor connection • USB driver	• Turn on the ESC • Change a new cable • Check all the sockets • Replace the Windows® default USB driver with Scorpion provided USB driver

9.0 Warranty and Service

Scorpion Vanguard Speed Controller is guaranteed to be free from defects materials or workmanship for a period of 1 year from the original date of purchase (verified by dated, itemized sales receipt). Both are against defects in materials and workmanship. During the warranty period Scorpion will repair speed controller that is found to be defective, providing that it has no signs of damage or abuse. The user will be responsible for shipping charges back to an authorized Scorpion Repair Facility, and Scorpion will pay the return shipping charges. If the damage is the result of a crash or mis-use, the return item will be repaired, but the cost of repairs will be billed to the user. Repairs will never exceed 50% of the cost of a new speed controller, and if the speed controller is badly damaged or non-repairable, a brand new ESC will be offered at 50% discount of the current retail price for the ESC plus a nominal shipping charge. If the speed controller returned is no longer in production, Scorpion reserves the right to substitute another speed controller of equal or better quality. In any event, Scorpion shall not be responsible for damage that may result from the use of products or for consequential or special damages, or for any amount is excess of the product value. If the motor product is purchased in clearance section either crash and dent section from www.scorpionsystem.com and www.scorpion-team.com, the items are sold "AS IS". No refund or warranty policy will be covered with these products. It is because we do not have parts anymore to repair or replace.

The RMA form must be sent in with any Scorpion Product that is sent back for repair or replacement. Please obtain an RMA number by submitting a request by email to our RMA Department support@spihk.com or our distributors for the RMA number before sending. The RMA process normally takes around 3 - 4 weeks.

RMA form can be found and download from
http://www.scorpion-team.com/downloads/

The Power System of Champions!!