

1. **ABS BRAKING** - The ANTI-LOCK BRAKING option available in the VOLCANO is designed to operate much the same way as do ABS brakes in full-size vehicles. By eliminating brake locking, the VOLCANO will provide improved cornering and stability especially suitable to on-road and touring vehicles.
2. **OVER-TEMPERATURE SAFETY CUT-OUT** - If at any time the temperature of the VOLCANO exceeds maximum ratings, the OVER TEMPERATURE SAFETY CUTOFF will temporarily shut off power to the motor to prevent permanent damage to the unit. If this happens repeatedly, make certain that your vehicle's drive train is free of binding, that the motor pinion is meshed correctly to the spur gear and that there is nothing restricting the rotation of the wheels. If this does not solve the problem, verify that your motor is in good working order and that the brushes are seated properly. Finally, make certain your motor's current requirements do not exceed the VOLCANO'S maximum limits. You may need to increase the number of windings or gear the motor lower.
3. **PUSH-PULL PAUSE PROTECTION** - In a typical ESC, jamming the throttle from full forward to full reverse too quickly can cause damage to the motor and place excess stress on the batteries as well as the drive train of the vehicle. By means of a built in pause timer circuit, PUSH-PULL PAUSE PROTECTION prevents damage to the vehicle by sensing the motion of the wheels, ensuring that the wheels cannot spin backwards before the vehicle has stopped moving forwards. The combination of PUSH-PULL PAUSE PROTECTION and ABS braking greatly enhances handling and control in a racing environment.

• **ACCESSORIES:**

Various rapid chargers, battery conditioning systems, SANYO batteries, receivers as well as a full line of standard and coreless servos are available for use with your FMA / RCLine VOLCANO either direct or from your local FMA dealer.

FMA LIMITED WARRANTY ON ELECTRONIC SPEED CONTROLLER PRODUCTS

THE WARRANTY

FMA, Inc. warrants this speed controller to be free of manufacturing defects for the term of 90 days from the date of purchase. Should any defects covered by this warranty occur, the speed controller shall be repaired or replaced with a unit of equal performance by FMA, Inc., or an authorized FMA service station.

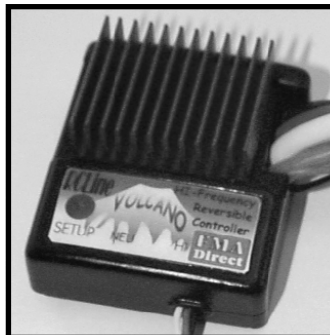
LIMITS AND EXCLUSIONS

This warranty may be enforced only by the original purchaser, who uses this speed controller in its original condition as purchased, in strict accordance with the VOLCANO owner's manual. Speed controllers returned for warranty service to an FMA service center will be accepted for service when shipped post-paid, with a copy of the original sales slip or warranty registration form, to the service station advised by FMA, Inc.

THIS WARRANTY DOES NOT APPLY TO

1. Consequential or incidental losses resulting from the use of this speed controller.
2. Damage resulting from accident, misuse, abuse, neglect, electrical surges, reversed polarity on connectors, lightning or other acts of God.
3. Damage from failure to follow instructions supplied with the product.
4. Damage occurring during shipment of the product either to the customer or from the customer for service (claims must be presented to the carrier).
5. Damage resulting from repair, adjustment, or any alteration to product by any one other than an authorized FMA technician.
6. Installation or removal charges, or damage caused by improper installation or removal.

CALL (301) 668-7614 FOR INFORMATION ABOUT SERVICE AND WARRANTY REPAIRS.



VOLCANO

MODEL SC300 HI FREQUENCY, REVERSIBLE, MICROPROCESSOR CONTROLLED, SPORT SPEED CONTROLLER

OWNER'S MANUAL

NOTE: PLEASE READ MANUAL COMPLETELY BEFORE OPERATION

INTRODUCTION:

Thank you for purchasing the FMA Direct / RCLine VOLCANO reversible, high performance, sport electronic speed controller (ESC). The VOLCANO is one product in a family of quality ESC devices available from FMA, Inc. Designed from the ground up to offer fast and efficient throttle control and standard or ABS braking, the VOLCANO is designed around state-of-the-art, high current / low loss *HYPERFETS*. Capable of turning a 12 turn motor at 30 amps continuous power, the VOLCANO is the perfect step-up from mechanical, less reliable speed controllers. Featuring high-frequency operation and advanced power filtering, this microprocessor controlled ESC will provide you with smoother throttle response, better acceleration and braking in curves or on straight-aways, longer run-times, and improved radio reception through lower noise. Packed with extra features like EZ SETUP, which makes it a snap to interface your ESC with any R/C system, over-temperature safety cut-out, and push-pull pause protection, the affordably-priced VOLCANO has everything you need to stay ahead of the competition without breaking your budget!

SPECIFICATIONS:

SIZE:	1.65"L X 1.86"W X 0.83"H
WEIGHT:	2 OUNCES.
FUNCTION:	FORWARD, REVERSE, BRAKE (STANDARD OR ABS), B.E.C.
INPUTS / CONNECTIONS:	4 TO 10 CELL NICAD BATTERY 1 R/C RECEIVER
OUTPUT CAPABILITIES:	1 D.C. MOTOR - 12 TO 36 TURNS
MAIN CONTROL:	MICROPROCESSOR
SECONDARY CIRCUITRY:	OVER TEMPERATURE SAFETY CUTOFF AND PUSH-PULL PAUSE PROTECTION
FREQUENCY:	1 kHz
CONTINUOUS CURRENT:	116 AMP (FET RATING) - 30 AMP (TESTED 3.5 MIN.)
PEAK CURRENT:	400 AMP (FET RATING)
RDS:	.007 OHM FORWARD / .016 OHM REVERSE

FMA, Inc.
5716A Industry Lane
Frederick, MD 21704
Sales: (800) 343-2934 -Technical: (301) 668-7614



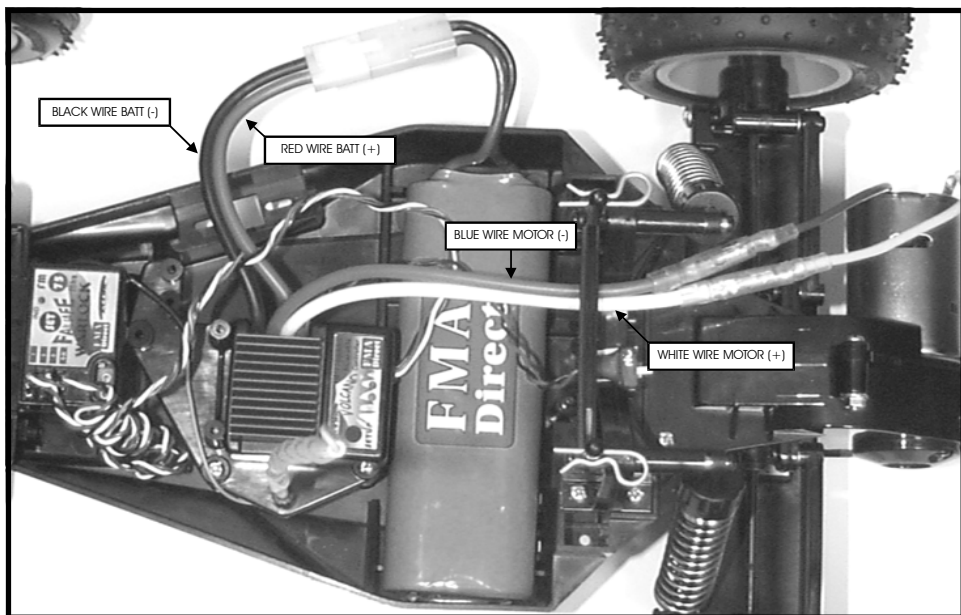


Figure 1 - ESC Installation

INSTALLATION

RECEIVER / MOTOR / BATTERY CONNECTIONS

Refer to figure 1 when connecting the VOLCANO to your R/C receiver, motor, and battery pack. Please read the following section completely making certain to follow the directions in the proper order before applying power to the unit.

1. Plug the three wire servo type connector into the throttle output on your receiver. The VOLCANO comes equipped with a "JR" style connector making it automatically compatible with any standard servo configuration whereby the battery and signal polarity is negative, plus, signal. **CAUTION: DO NOT ATTEMPT TO INTERFACE THE STANDARD CONNECTOR PROVIDED WITH THE UNIT TO AN "OLD STYLE" AIRTRONICS RECEIVER OR DAMAGE WILL RESULT TO THE SPEED CONTROLLER AND THE RECEIVER NOT COVERED BY WARRANTY!** Should you elect to interface the VOLCANO to an "old style" Airtronics receiver, the proper connector shell is provided for this purpose. Follow the directions included with the shell to replace the standard JR type connector shell with the Airtronics shell. Make certain to maintain the proper polarity as indicated in the illustration. Remember, "old style" Airtronics connectors are the reverse polarity of industry standard and are wired positive, negative, signal! If you are unsure of the polarity of your receiver, contact your local dealer or phone FMA Direct immediately at (301) 831-8980 for assistance!
2. Connect the heavy, WHITE wire from the ESC to the positive (+) terminal on your motor. Connect the BLUE wire from the ESC to the negative (-) terminal on your motor. For your convenience, the VOLCANO comes equipped with "bullet" type connectors for this purpose. If your motor is not equipped with the mating "bullet" socket, contact your local hobby dealer or solder the wires directly to the terminals of the motor.
3. Care must be taken when connecting a battery to the VOLCANO. Make certain that the ESC switch is in the off position. Connect the heavy, RED wire from the ESC to the positive (+) terminal on your battery. Connect the heavy, BLACK wire from the ESC to the negative (-) terminal of the battery. Your VOLCANO comes equipped with a standard "TAMIYA" connector for this purpose. If your battery power pack is not equipped with the mating "TAMIYA" connector, contact your local hobby dealer for assistance. Be certain to maintain proper polarity between the battery and the VOLCANO. Failure to do so will result in damage to the unit not covered by warranty!
4. Secure all wiring to appropriate chassis components using wire tie. Fasten the ESC securely to the vehicle chassis using double-sided tape or the like.

EZ SETUP OF THE VOLCANO TO YOUR RADIO SYSTEM

OVERVIEW

The EZ SETUP feature of your VOLCANO enables it to interface properly with your radio equipment. Performing the following EZ SETUP steps with your specific transmitter/receiver/ESC combination will: **1) SET NEUTRAL** (no motor movement); **2) SET FULL THROTTLE** (full current will be applied to the motor); **3) SET FULL BRAKE AND FULL REVERSE** (a complete stop of the motor, followed by reverse); and **4) ACTIVATE OR DE-ACTIVATE ABS BRAKING FEATURE**. You may choose to complete any one or all four of the steps outlined above sequentially while within EZ SETUP as many times as needed to assure proper setup of your vehicle. Each time you enter EZ SETUP, the new configuration changes you make will replace the current settings. You will also need to perform *all* EZ SETUP steps each time you use a different receiver/transmitter combination with the VOLCANO. **NOTE:** EZ SETUP is initiated by pressing the EZ SETUP button until the GREEN LED begins flashing. If the GREEN LED stops flashing, you are no longer in EZ SETUP mode, you are in RUN mode. If the motor responds to your throttle commands, you are no longer in EZ SETUP mode. For each EZ SETUP step, it is important that you know what the GREEN, RED, or GREEN/RED combinations of flashing LEDs indicate and that you respond with the proper inputs on the transmitter. EZ SETUP progresses rapidly once it is initialized, so it is important that you read the following descriptions of each step several times until you get the hang of it. Then it will become second nature. An EZ SETUP QUICK REFERENCE is provided to assist you as well.

EZ SETUP PREPARATION

1. Verify that the VOLCANO is mounted in the vehicle as illustrated in Figure 1 and described in the previous section, RECEIVER / MOTOR / BATTERY CONNECTIONS.
2. Make certain the battery pack connected is fully charged.
3. **CAUTION:** Before you attempt EZ SETUP of the VOLCANO, elevate the vehicle's wheels above the bench so that it cannot go anywhere when the wheels spin. Although no power is applied to the motor while EZ SETUP is commencing, it will take a little practice before you know when you are in or out of EZ SETUP mode and you will wish to test your settings after you complete any portion of EZ SETUP.
4. Turn on your transmitter and make certain the throttle trim is reset to neutral.
5. Turn on the ESC power switch. With battery power applied to the VOLCANO and the transmitter on, the GREEN indicator LED should glow continuously. **NOTE:** If this is the first time you have used EZ SETUP, the GREEN LED may not glow at all.

EZ SETUP STEPS

1. **SET NEUTRAL** - With the transmitter throttle at neutral, press and hold the EZ SETUP button until the GREEN LED begins flashing. Neutral is now set.
2. **SET FULL THROTTLE** - Make certain you are in EZ SETUP mode; i.e. the GREEN LED is flashing. Push the throttle to full forward and hold it there for 3 seconds. The microprocessor will memorize the full throttle position and the RED LED will glow continuously. Note: If the RED LED does not light when you push the throttle full forward for 3 seconds, you must set the throttle channel reverse switch on your transmitter to the opposite position and begin this portion of EZ SETUP again. Return the throttle to neutral and the GREEN LED will begin flashing again.
3. **SET FULL BRAKE / FULL REVERSE** - Make certain you are in EZ SETUP mode; i.e. the GREEN LED is flashing. Pull the throttle back for full brake / full reverse. Both the RED and the GREEN LED indicators will light simultaneously indicating that the full brake / full reverse point is set. Re-position the throttle to neutral and the GREEN LED will begin flashing again. Within 3 seconds, the RED and the GREEN LEDs will begin flashing in turn.
4. **SET ABS BRAKE** - You can elect to activate the ANTI-LOCK BRAKING SYSTEM while the RED and GREEN LEDs are flashing by setting the transmitter around half throttle until the RED LED begins flashing by itself to indicate ABS has been set. Return throttle to neutral. After about three seconds, the RED LED will stop flashing and the GREEN LED will light continuously. If you elect not to activate ABS braking, simply leave the throttle at neutral while the RED and GREEN LEDs are flashing and standard braking will remain in force.
5. EZ SETUP is complete when the GREEN LED lights continuously. You may test your settings now. **NOTE:** After cruising at full speed, when you apply full brake, the vehicle will automatically reverse after approximately three seconds of braking.

SPECIAL FEATURES OF THE VOLCANO DESCRIBED