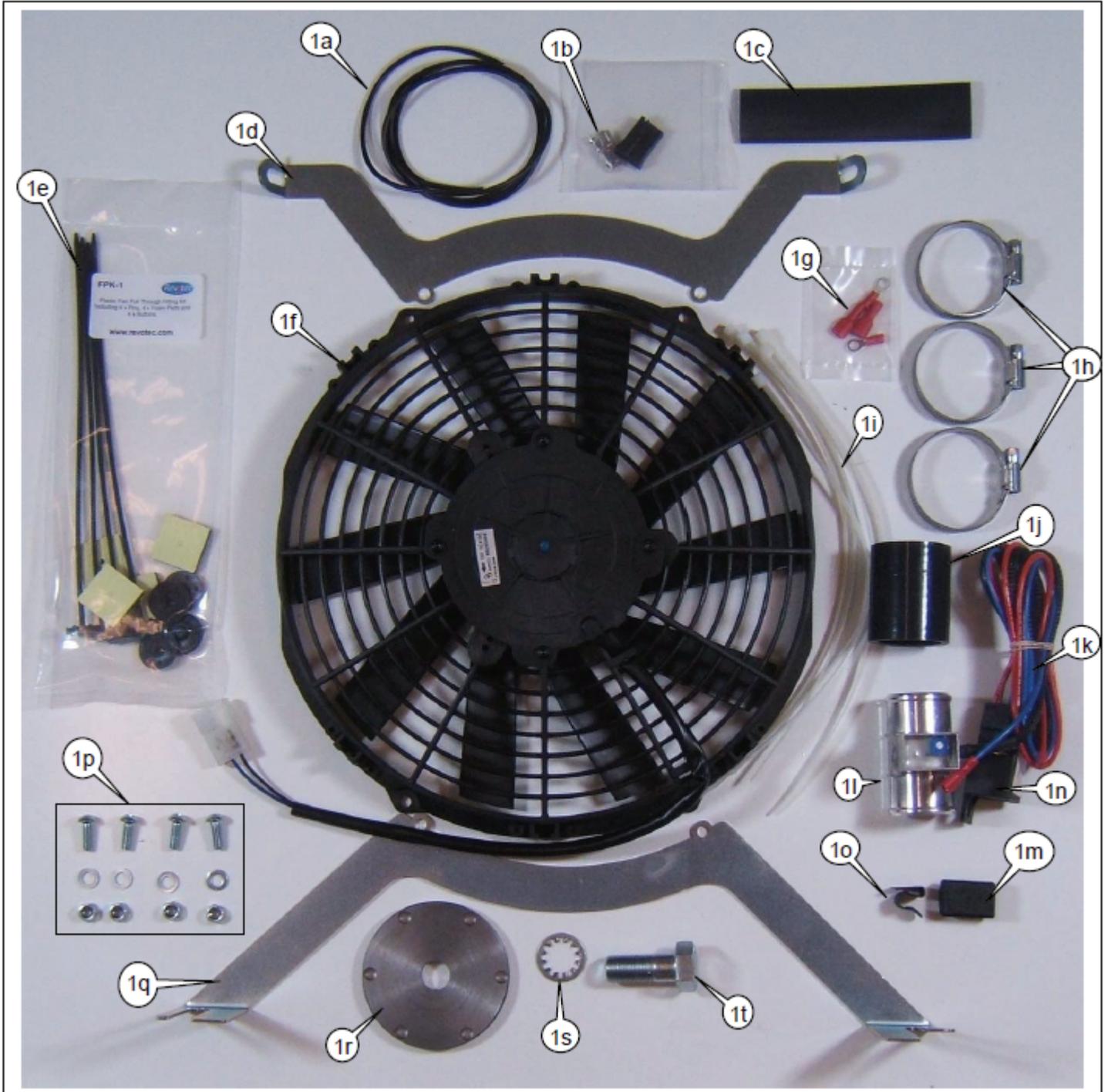


B-TR2-4 Cooling Kit Instructions

As with all instructions, please read through these carefully before you begin. If you feel that this project is outside your "confidence zone", please have the installation done by a professional, or enlist the assistance of a fellow TR Club member. If you are not a member of a Club, consider joining. This is the kind of project that many clubs would take on as a "Tech Session" for the benefit of the members. You still have to do the work, but you will have help and knowledgeable advisors to assist.

Contents of the Kit



Contents of the Kit (October 2010)

Ref	Description	Qty
1a	Wire, black	39"
1b	Female spade connectors	2
	Black plastic plug for female spade connectors	1
1c	Sleeve, black plastic	1
1d	Bracket #1 (smaller of the 2)	1
1e	Fasteners, for securing fan directly to radiator core	4 sets
1f	Fan Assembly	1
1g	Female Spade connectors, insulated	2
	Ring Connectors, insulated	2
1h	Hose clamps, 32-50mm "Jubilee" (solid band, not perforated)	3
1i	Zip-Ties, 10"	5
1j	Hose, 1 1/2" ID x 2" long	1
1k	Wiring, temp sensor/controller & fan power relay	1
1l	Temp Sensor & Adjustable Electric Fan Controller (EFC)	1
1m	Black Plug, for Controller	1
1n	Relay, fan power	1
1o	Wiring Clip	1
1p	Screws, securing fan to brackets	4
	Washers, for screws	4
	Nyloc nuts, for screws	4
1q	Bracket #2 (larger of the 2)	1
1r	Spacer, Pulley to Crank	1
1s	Washer, Star, internal tooth, 5/8	1
1t	BOLT 5/8 UNF X 1.5IN	1

Converting your Triumph from Positive to Negative Ground

In order install an electric fan, your car will need to be converted to negative ground..

- Disconnect the battery cables and remove the battery
- If you have an original radio, remove it.
- If you have an ammeter, you'll need to reverse the wires connected to it.
- Some non-original distributors may have a diode across the points rather than a condenser. Reverse the connections to the diode.
- If you have converted to an electric fuel pump, make certain it can be reconfigured to work in a negative ground electric system.
- Reverse the connections going to the ignition coil: Connect the (-) side of the coil to the wire going to the distributor and the (+) side of the coil to the wire going to the ignition switch.
- Check the output of the heater fan; if it is reduced after the conversion, reverse the connections to the heater fan motor.
- Take a look at the battery terminals, noting which one is negative. Replace the battery so that the negative battery terminal is closest to the cable strap that attaches directly to the body/chassis. This will be 180° from the orientation of the battery when you removed it.
- Re-polarize the Generator. Look at the two wires connected to the generator. Locate the F terminal on the generator; it is the one the smaller brown with a green stripe wire is connected to. Disconnect the two wires from the generator. Temporarily connect one end of a spare piece of wire to the positive terminal of the battery. Touch the other end of this wire to the F terminal on the generator several times, very briefly. You'll get a few small sparks and that's ok. This re-polarizes the field windings so you get the proper output for a negative ground vehicle.
- Reconnect the battery, and reconnect the two wires to the generator they way they were before your disconnected them. Verify that the charging system is functioning properly.

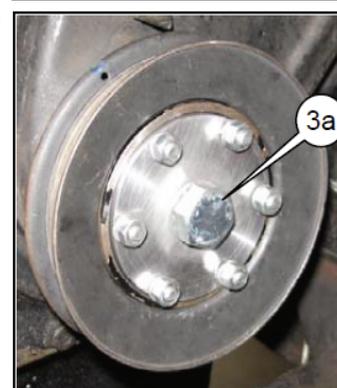
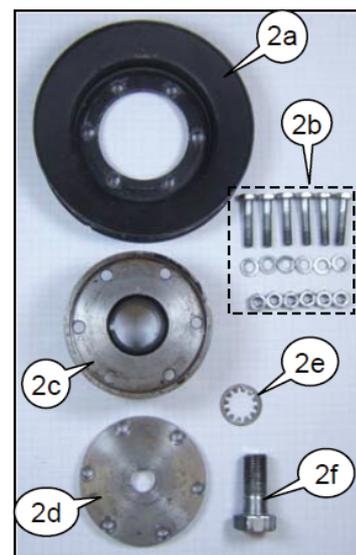
Note: It is not necessary to change the leads at the starter motor. The starter uses a series-wound motor that will always rotate the correct way with either polarity.

Installing the Fan

For any TR2-4, the radiator must come out before you can remove the original fan and fan extension. Pulling the radiator means the front apron of the TR2-3B body will have to be removed. Once the original fan is gone, the electric fan can be mounted on the radiator.

Preparation – Removing the Original Fan (refer to your workshop manual)

- Disconnect the battery and drain the cooling system.
- TR2-3B: remove the front apron, bonnet & radiator.
- TR4: remove the radiator.
- Remove the mechanical fan and fan extension. You will need a 1 1/8" socket for the large bolt on the end of the fan extension. Once the center bolt is loose, you can pull the entire assembly out and put it on the bench.
- Loosen the six nuts securing the pulley (2a) and fan extension to the hub (2c) using a 7/16" socket and combination wrench. *New bolts (320-080) and nyloc nuts (310-100) are available if needed.*
- Install the spacer (2d), lock washer (2e), and new center bolt (2f) supplied in the kit.
- Reinstall the six bolts, lock washers and nuts (2b), securing the two halves of the pulley (2a) and the spacer (2d) to the hub (2c).
- Refit the pulley & hub assembly to the front of the engine.
- Thread the center bolt (3a) into the nose of the crank. Tighten the center bolt to 40 lbs /ft.



This kit includes the pieces necessary to mount the fan two different ways. The more generic "through-the-core" pins can be used to install the fan (Method 1), or the laser-cut steel brackets specifically designed for the Triumph may be used (Method 2).

Method 1: Mounting the Fan Using the Through-the-Core Pins (Fig 4)

- Hold fan in desired position on rear face of radiator. Push the mounting pins through the lugs on the fan and through the core.
- Push the four foam pads and the ratchet buttons onto the tail of each pin which are now protruding through the front of the radiator core.
- Pull the tip of the pin toward you as you push the ratchet buttons home. Pull tight until the fan is solidly mounted.

With the fan mounted, follow the instructions for fitting the Electronic Fan Controller. They begin immediately below the instructions for mounting the fan using the laser-cut brackets on the next page.



Method 2: Mounting the Fan Using the Laser-Cut Brackets

- When reinstalling the radiator, leave the top radiator stays off and leave the bottom radiator mounting bolts loose.
- Mount the brackets to the fan using the four bolts, washers and nuts supplied in the kit. Note that the brackets are mounted on the **rear** of the fan lugs so the fan will be as close to the radiator as possible.
- Slide the bottom bracket between the lower radiator mounting points and the chassis mount points (making sure the fan is on the engine side of the radiator!) and push the fan flat up against the radiator.
- Pinch the lower mount bolts to hold the assembly in place.
- Re-attach the upper stays with the upper fan bracket sandwiched between them and the radiator.

With the fan mounted, follow the instructions for fitting the Electronic Fan Controller.

REVOTEC ELECTRONIC FAN CONTROL

This unit is intended for use on **Negative Ground** vehicles only. As with all instructions, read through these carefully before attempting to install the controller on your vehicle.

INTRODUCTION

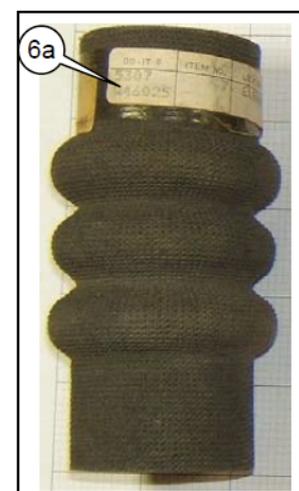
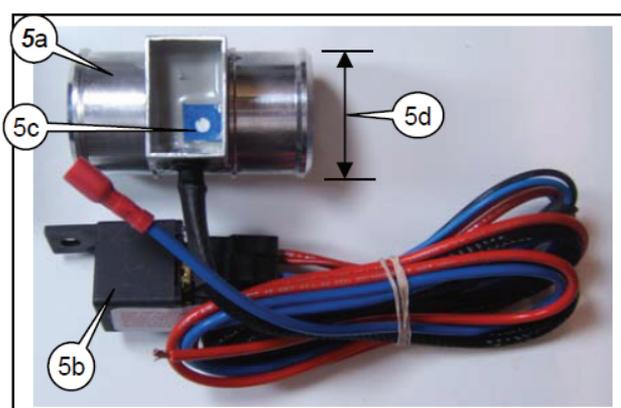
This sub-kit contains all of the necessary parts to ensure a professional quality installation. There are two main parts which are connected by a wiring harness. The **Electronic Fan Control, or EFC** (5a) will be mounted in a coolant hose, and the harness connects it to the **Fan Power Relay** (5b), which will supply the switched 12V feed for the electric fan. The temperature setting is fully adjustable (5c) to suit the requirements of your particular vehicle.

Before you begin, ensure that the Revotec controller tube size (5d) is correct for your radiator hose. Note: The direction of coolant flow through the controller is not important. Failure to use the controller with the relay included will void the warranty.

Which Hose?

Normally, Revotec suggest installing the EFC in the upper radiator hose. However, in the Triumph TR2-4 the upper radiator hose is quite short, and the OE type upper hose (6a) has very pronounced ridges. In addition, the outlet on the engine and the inlet on the radiator are often not perfectly lined up.

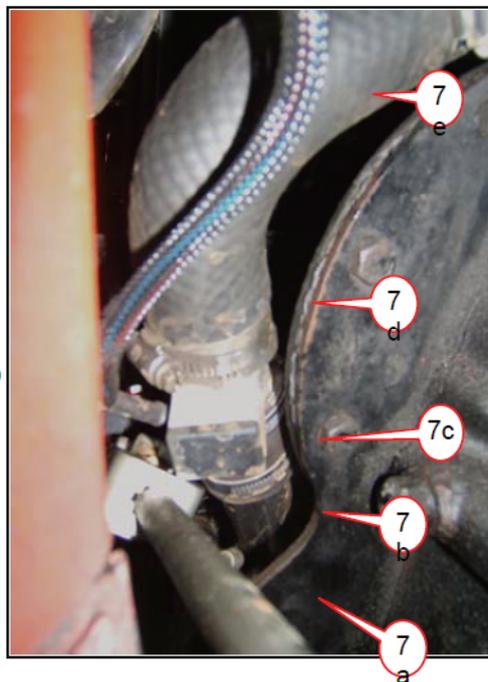
These factors (individually or collectively) make installing the EFC in the upper hose virtually impossible. The lower hose installation is altogether neater and less obtrusive.



Installing the EFC

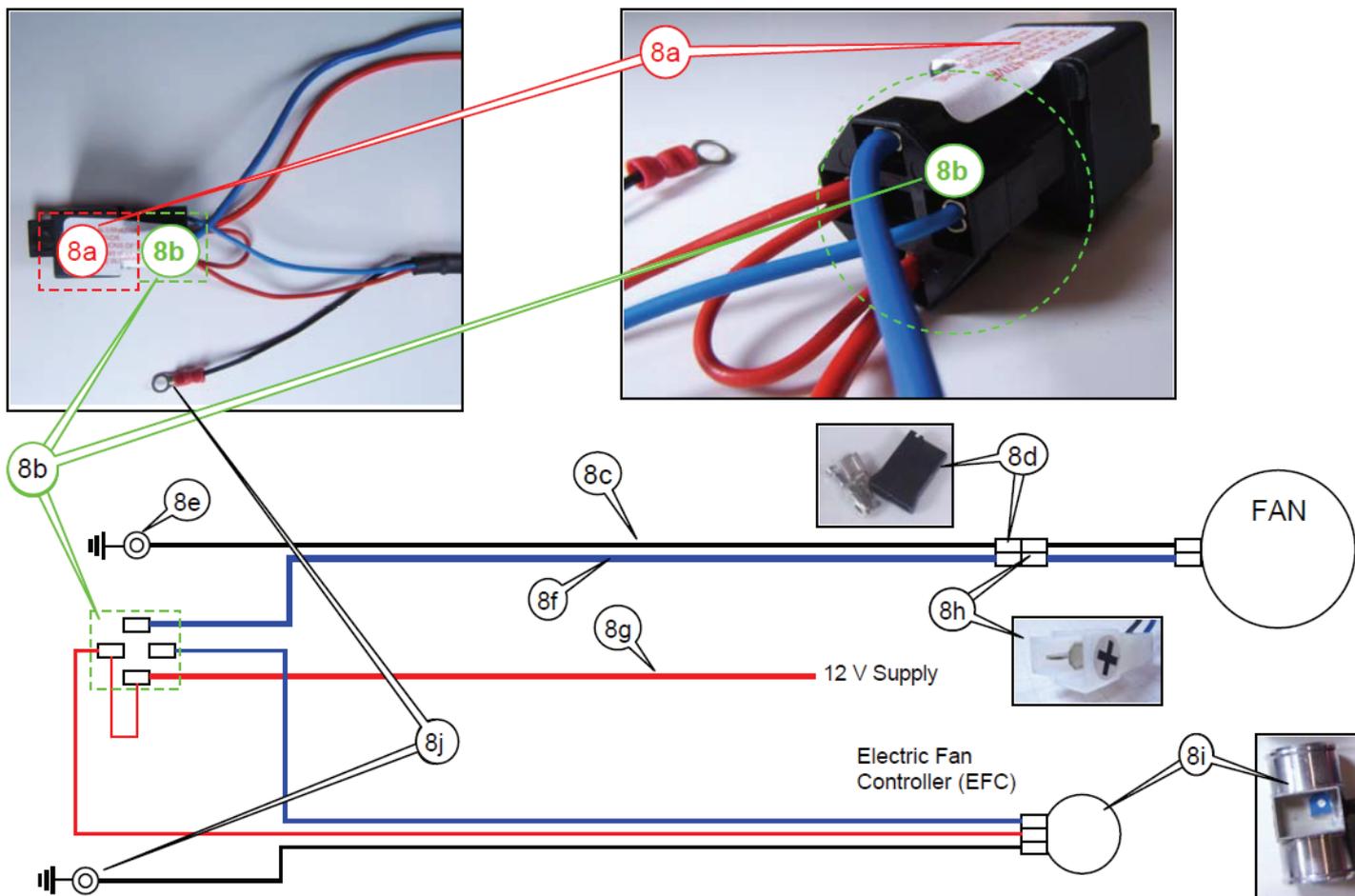
The cooling system was drained as the first step in installing the fan; unless you have refilled it, you can begin.

- Remove the steel water return pipe.
- Measure 2 ½ inches (65 mm) from the top lip of this pipe and mark it.
- Cut the pipe on your mark with a hacksaw.
- De-burr the cut edge of the pipe with a suitable file.
- Refit the steel tube (7a).
- Fit the 2 inch long piece of hose supplied in the kit onto the lower end of the EFC. Secure it with one of the hose clamps supplied in the kit.
- Attach the EFC (7c) with the short section of hose (7b) to the shortened steel tube.
- Attach the upper hose (7d) between the EFC and the water pump housing.
- Tighten all the clamps.
- Top up the coolant and check for leaks.



Understanding the Wiring and Electrical Connections

Before you begin hooking up wires, it will be helpful to understand how this system works.



The power relay (8a) for the fan comes with the electrical plug (8b) attached, and the plug comes with the wiring attached at the relay end. The kit comes with a 39" long piece of black wire (8c), and a bag containing a black plastic plug (8d) and two metal female spade connectors for that plug. The 39" long piece of black wire is simply the ground for the fan. Suitable ring connectors (8e) are included in the kit so you can terminate the ground wire. The terminals are not installed so you can trim the wire to the exact length you need for your installation. The thick blue wire (8f) from the relay is the power wire for the fan. The thick red wire (8g) supplies 12V to the fan relay when the ignition switch is on. The fan is pre-wired with a blue (power) and a black (ground) wire that terminate in a plug with two male spade connectors (8h). The plug is usually marked with a "+" indicating which male spade is attached to the blue power wire; it is a good idea to identify the blue-wire spade before you connect the fan. The Electric Fan Controller or EFC (8i) is the "switch" that trips the relay, sending power to the fan when the temperature reaches the level you set, and cutting the power off when the temperature drops. By powering the fan through the relay, the control unit is protected from the current that would otherwise flow through it on the way to the fan. The control unit is grounded to the chassis through a black wire with a ring connector (8j).

Installing the Relay, Connecting the Fan

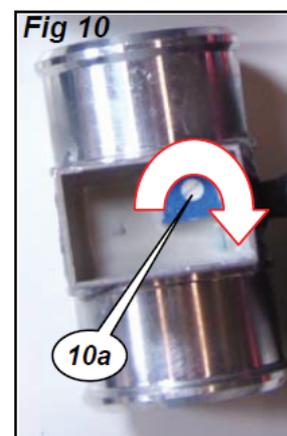
For safety reasons disconnect the vehicle battery when you are carrying out this installation procedure. While there are any number of alternate ways of wiring the fan, bear in mind that this is an engineered package, with components carefully selected to provide the best possible results. Failure to adhere to the recommended wiring instructions will necessarily void the warranty.

- Choose a position for the relay. *Ensure that the wire harness with the relay connector will reach your chosen position allowing you route the harness with no strain on the wiring. Keep the wiring away from excessive heat. We mounted the relay to the firewall below the pedal assembly.*
- Mount the relay (8a) using an existing screw, or drill a hole for a suitably sized self tapping screw.
- Connect the black wire (8j) from the control unit harness to the vehicle chassis. *If the mounting screw for the relay is suitable, the ground wire may be secured there.*
- Connect the RED wire (8g) to a fused and switched 12v power supply. *It is recommended that the feed is from a "switched" (meaning an ignition switch controlled power supply) so that the controller will not operate when the engine is switched off. If the red wire is connected to an unswitched supply, the controller will continue to operate after the engine is switched off. The fan will either stay on after the key is switched off, or come on if the temperature rises above the temperature set in the controller. This is not unusual as the hot engine will continue to dump heat into the coolant after shut down. The water will continue to circulate slowly, driven by the temperature differential. This may drain the vehicle battery if the fan runs for a long time.*
- Look at the plug attached to the fan motor. (Fig 9) The blue wire is power, the black is ground. Find the bag with the two female spade connectors and the plastic plug. This male plug will plug into the female plug attached to the fan. Connect one of the female spade terminals to the BLUE wire (8f). Pop the connector into the plastic plug (8c) so that the BLUE wire from the relay will connect to the blue wire going to the fan motor. Connect the second female spade terminal to the length of BLACK wire (8c) supplied loose in the kit. Pop this connector into the plastic plug (8d) so that the BLACK wire will connect to the black wire going to the fan motor.
- Determine where you will ground the black wire (8c). Trim it to length, strip the end, and crimp on one of the ring connectors provided. Secure the fan ground wire.
- Secure the wiring harness with the cable ties provided.
- Reconnect the vehicle battery.



Adjusting the Controller

The operating temperature for the fan is adjusted by turning the small screw (10a) inside the body of the unit. The adjustment screw has a total rotation of just over 3/4 of a turn, which corresponds to a temperature range is 70°C to 120°C (158° F to 248° F). It increases as you rotate the screw in a clockwise direction. Turn the adjuster by hand, using a suitably sized flat bladed screwdriver. Do not use excessive force! You can easily damage the controller.



- Rotate the screw slowly counterclockwise until it stops.
- Start the vehicle and allow the engine to warm up. The fan will come on when the engine coolant temperature reaches about 70°C (158 ° F).
- Verify the fan controller is working properly by slowly rotating the adjustment screw clockwise until the fan stops.
- Continue to increase the setting until the fan remains off when the engine is at normal running temperature. The fan will then come on when the engine temperature exceeds normal. When the temperature recovers, the fan will shut off. *Note: This procedure assumes that you have a functioning and accurate temperature gauge; it won't hurt to verify your temp readings with an infrared temperature sensor or a thermometer in the top tank.*
- When you have finished with the adjustment and the fan control is operating at the desired temperature fit the black plastic dust cap into the rectangular opening, covering the controller.

PLEASE NOTE

This fan kit **will** move enough air to keep a TR2-4 within normal operating temperatures under normal conditions. The premise of this kit is that you have an engine properly tuned and a cooling system that is in good working order. An electric fan is being installed because

- a) you are installing components (alternator conversion, rack & pinion steering) that require the removal of the stock crank-mounted fan or
- b) the stock engine driven fan is not capable of moving enough air at idle or in stop-and-go traffic (possibly due to modifications that have boosted the power output).

An electric fan absolutely **will not** cure a chronic overheating problem due to a mechanical problem, tuning issue, or other defects. The Revotec fan and controller **cannot** compensate for fundamental problems with the engine and/or cooling system.