Pantera Electronics Radiator Fan Controller Installation Manual

RFC-03, GenR2

IMPORTANT: *Radiator Fan Controller Theory*

It is necessary to understand the theory of the Radiator Fan Controller (RFC will be used throughout the document) in order to realize the importance of following the installation instructions. The RFC is a closed loop controller, this means the temperature sensor converts coolant temperature to an electrical signal that is compared to a reference and operates the fans at a proportional speed to lower the temperature of the coolant.

The slowest fan speed is 45% of maximum speed and is initialized approximately 125F (52C). The 125F (52C) is the reference temperature that the RFC regulates the coolant leaving the radiator. The RFC will continually monitor and adjust the fan speed regardless of the external factors to maintain the 125F (52C) coolant. When the coolant is less than 125F (52C) the fans will be completely off.

When the fans operate at 45% of maximum speed the current is low and the fan speed is slow and may not be noticeable. Fan motors have brushes internally that are consumed at 100% power but at 50% operation reduces brush wear considerably.

Since the coolant temperature is 125F (52C) maximum entering the engine, the engine thermostat will control the engine temperature at 180F (82C). It's important that the engine has coolant below the 180F (82C) so that the thermostat can regulate the engine temperature and not exceed 180F(82C). Engine temperatures exceeding the thermostat temperature would be an engine temperature that is not regulated and can cause pre-ignition detonation if the timing is optimally set for best performance.

The aluminum is an active metal. The higher the temperature the engine is operating the greater the aluminum can react with the coolant.

Radiator Fan Controller Specifications

Recommended Fans:

(2) Spal part# 30102029 (Suction) Type# VA10-AP70/LL-61A.

(2) Fan outputs: 25 Amps each maximum per fan continuous duty.

Controller input power: 0.1 Amps, 11 Volts Min, 18 Volts Max.

Fan input voltage: 18 Volts Maximum.

Air conditioner input control current: 0.01 Amps, 9 Volts Min. 17 Volts Max.

(Contact factory for very high current versions of this RFC)

Radiator Coolant Flow

Determine which radiator tube is the inlet and outlet of the radiator. The direction of coolant enters the drivers' side water pump inlet and exits from the thermostat housing, it is logical to fill the radiator from the bottom to the top. That would mean that the coolant leaving the engine would be connected to the lower radiator connection. This is the best arrangement because it also forces the air out of the radiator by this flow direction. The original de Tomaso radiator was modified by Ford dealers to convert it from the conventional radiator flow to a cross-flow design. The cross flow design can be recognized by the spit in the end tank where the inlet and outlets are located. Sometimes the tank is portioned internally and only a solder joint across the end tank is visible. Many after market including Fluidyne radiators designed for the Pantera are also the cross flow design. The RFC needs to monitor the coolant leaving the radiator after the heat was removed by the fans, ***it is imperative that the temperature sensor is installed in the position where the coolant exits the radiator,*** **this would be in the upper radiator outlet or a in-line TEE connection near the outlet.**

Radiator Condition and Antifreeze

The radiator should be in good condition, free of any sludge, radiator sealant or tube damage. Ethylene Glycol (green) anti-freeze and water mixed to a 50/50 ratio should be used or pre-mixed Ethylene Glycol (green) anti-freeze is a good choice since the water that is used has the proper ionic level.
Coolant should be changed at regular intervals typically every 5 years due to deterioration. ***Glycol controls the temperature and does not deteriorate, it's the corrosion inhibitors that deteriorate.***

For improved heat transfer characteristics, a mixture of 40% Ethylene Glycol antifreeze to 60% water is optimal, additional antifreeze will move less heat and lower efficiencies.

Ethylene Glycol (green) anti-freeze contains wetting agents and does not need additional wetting agents, additional additives upset the proper ratio of water to antifreeze and will change heat transfer characteristics.
********** ***DO NOT USE ANY COOLANT ADDITIVES !*** **********
The temperature sensor used in the Pantera Electronics system is electrically isolated and **does not** introduce electrical potentials to the cooling systems. The RFC operates optimally with either Copper/Brass or Aluminum constructed radiators, and will adjust automatically for the type radiator even if the radiator is changed at a later time.

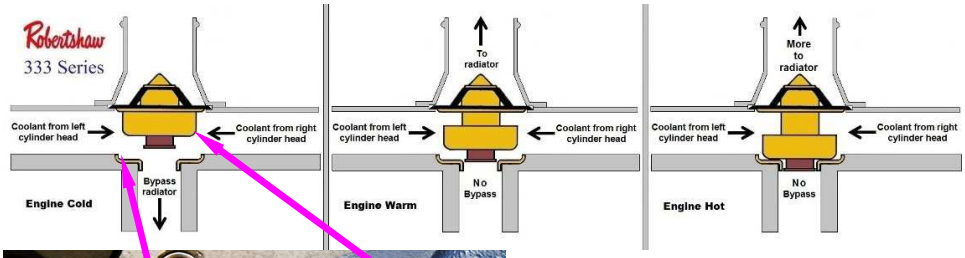
Water Pumps

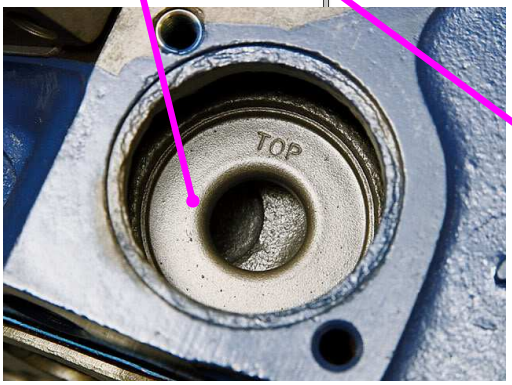
The Ford 351 Cleveland factory water pump should be replaced with a water pump that has an enclosed impeller, this design is more efficient and will pump more coolant for the same engine RPM than the factory water pump.

PE strongly recommends this water pump for the Ford 351 Cleveland:
FlowKooler, P/N-1648 or FlowKooler, P/N-1648S.
Website: https://flowkoolerwaterpumps.com/

Thermostat

Use the proper thermostat, the Ford 351 Cleveland requires a particular thermostat. The factory Ford water by-pass orifice plate is necessary to complete the by-pass valve.

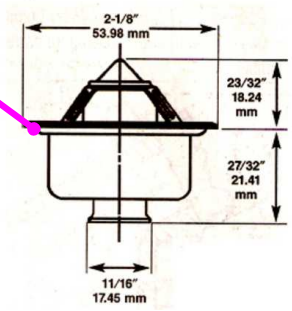




Ford part - Water Pump By-Pass Orifice Plate.

333 Series

Robert Shaw P/N 333-180
or equivalent



Fans, Shrouds and Vents

Cutting holes in the front hood to install vents does *NOT* improve air flow and provides no cooling advantage. The Panteras' unibody was designed to extract the air from the back of the radiator to the bottom of the car via the tunnel geometry of the trunk floor. Cutting holes in the front hood defeats the original design.
Fan shrouds are not required for the Pantera engine cooling application and it is recommended *NOT* to use them. Shrouds add air resistance and don't allow augmented air flow around the fans. If your radiator presently has a fan shroud and is easy to remove then remove it.

Fans are available from many sources but the best quality and most efficient fans are manufactured by Spal. These are the optimal fan to use with the RFC, and all thermal and electrical testing was preformed with Spal fans.

Spal USA 1731 SE Oralabor Road Ankeny, IA. 50021 (800) 654-7725 www.spalusa.com	Spal part number: 30102029, Type VA10-AP70/LL-61A (suction) 12" Fan blade diameter, (305mm) 3.5" deep, (87mm) 13.5 Amps @ 13.0 volts

Hoses
High quality Gates Green Stripe hoses are the best choice for the Pantera. These are made of high density material and have very low permeability to Ethylene Glycol (green) anti-freeze, ***far superior to silicon based hoses.***

https://www.gates.com/us/en/fluid-power/engine-hose/

24222 1-3/8" X 3FT GS 2 PLY STRAIGHT

Product # 41681722

Gates Green Stripe® 2-Ply Straight Coolant Hose stick hose is designed for demanding heavy-duty coolant/air applications. The two-ply bias fabric construction maximizes flexibility and strength, with an advanced EPDM tube and cover that resist "cold water leaks" and remain soft and pliable, even under adverse operating conditions.

- Temperature: -40°C to +125°C (-40°F to +257°F).
- Exceeds SAE 20R1 Type EC (Class D-1 Tube, and cover, Standard Wall).
- Cover marked in one-inch increments to facilitate approximate cut lengths.
- Engineered with compounds which resist electrochemical degradation.
- Approved for marine applications.
- Caution: Do not use for fuel or oil transfer applications.
- Note: For a maintenance-free connection, use PowerGrip® SB Clamps.

PRODUCT DETAILS

Part #	24222	Product #	41681722
Description	24222 1-3/8" X 3FT GS 2 PLY STRAIGHT	UPC	072053132984
Centerline Length (ft)	3	Centerline Length (in)	36
Centerline Length (m)	.91	Centerline Length (mm)	914
Hose Inside Diameter (in)	1.375	Hose Inside Diameter (mm)	35
Temperature Range	-40°F to +257°F (-40°C to +125°C).	Working Pressure (psi)	100

23511 1-3/8" X 5" VIBRAFLEX GS HUMP

Product # 31770034

When your heavy-duty applications require a shorter length hose that still needs to absorb vibration, a fitting misalignment, or possibly both, Gates has the perfect solution for you: the Green Stripe® Vibraflex® Hump Hose. Its high flexibility reduces installation time and provides lower cost-per-mile operation.

- Exceeds SAE J20 (Class B Tube and Class C Cover).
- Oil, abrasion and heat-resistant neoprene cover.
- Oil and heat-resistant nitrile tube.
- Two-ply fabric reinforced.

PRODUCT DETAILS

Part #	23511	Product #	31770034
Description	23511 1-3/8" X 5" VIBRAFLEX GS HUMP	UPC	072053062182
Centerline Length (in)	5	Centerline Length (mm)	127
Hose Inside Diameter (in)	1.375	Hose Inside Diameter (mm)	35
Temperature Range	-40°F to +212°F (-40°C to +100°C).	Working Pressure (psi)	60

Workmanship
Wiring and connections have to be of high quality and quality workmanship. Do not twist bare wires together and tape as a connection, use only crimp terminals and the proper crimp tool. Wire should be the proper size for the current in the application. Soldering the wires by an experienced person and using insulation is an optional way to make connections. Use tie wraps to keep wiring organized and retained in position.

Engine Settings
Engine idle speed can have a large effect on proper engine temperature when idling for long periods. Even if the engine can idle at 600 to 700 RPM the volume of coolant moving is insufficient to maintain the proper engine temperature. ***An idle speed of 900 to 1000 RPM is necessary to regulate the proper engine temperature.*** The higher RPM is also needed by the alternator when the fans are operating at higher speeds.

Items needed in addition to the Radiator Fan Controller
Adapters are needed for mounting the temperature sensor to a particular radiator type.

The original factory radiator requires an adapter with 3 mounting holes with a center hole taped 3/8 NPT. This adapter is available from Pantera Electronics, see website.

The Fluidyne radiator and the “HALL” radiator requires a threaded bushing with 22 mm x 1.5 threads on the outside and 3/8 NPT threads on the inside. This adapter is available from Pantera Electronics, see website.

1) Ring lug with hole size for connection to battery and 5mm stud, use #10 yellow screw ring terminal.

2) Use **TXL** automotive insulated wire Do not use solid wire, it is not designed to flex or vibrate. Wire size 14 AWG for 10 -15 amps, 12 AWG for 16 - 20 amps and 10 AWG for 21 - 25 amps.

3) (2) Circuit breakers with holders suitable for supporting the current consumption of both fans. Pantera Electronics part # IFH or equivalent. (see page 4)

4) For factory radiator adapter plate only - Permatex Blue RTV Silicon Gasket Maker 6B.

5) For factory radiator adapter plate only - Qty (3) Stainless steel Nylock nuts, thread M4 x 0.7.

6) Teflon tape.

Re-use the Nylock nuts from the factory relays or purchase qty (3) Stainless steel Nylock nuts, thread M5 x 0.8.

Installation for Temperature Sensor

1) Install the up-graded fans and wires for the fan motors, use the same color wires for each fans polarity.
Example: RED for (+) and BLACK for (-) on each fan motor.

2) If using the factory radiator, remove three screws that retain the top temperature switch.

3) Disconnect original wiring and remove original relays, save the hardware.

4) Remove 3 screws or 3 nuts that retain the factory upper thermal switch from the radiator. Clean the mounting flange of any gasket and sealant.

5) Install the temperature sensor plate using the gasket and Permatex Blue RTV Silicon Gasket Maker 6B or equivalent high temperature sealant. Use the sealant on the screw threads and torque the 3 screws or nuts equally.

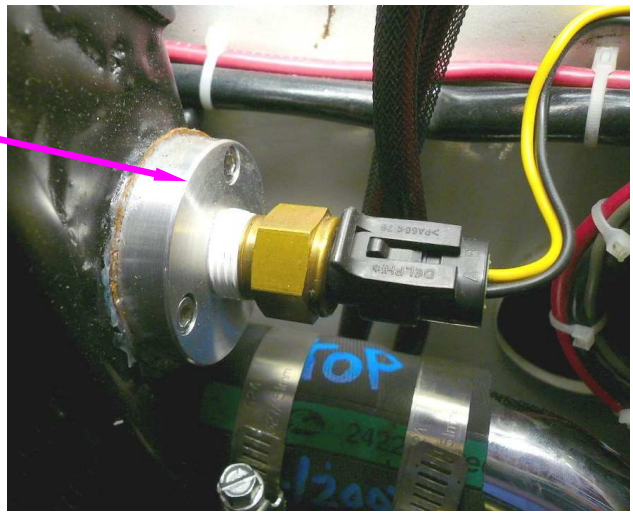
6) If installing temperature sensor in a Fluidyne radiator, install 22mm adapter into the top radiator position ***without*** Teflon tape, the **O-ring seals the fitting.** (the adapter has straight threads, not pipe threads)

7) Wrap Teflon tape about 2 turns around the temperature sensor threads, and install the temperature sensor. Do not over-tighten, the Teflon tape will seal the threads.

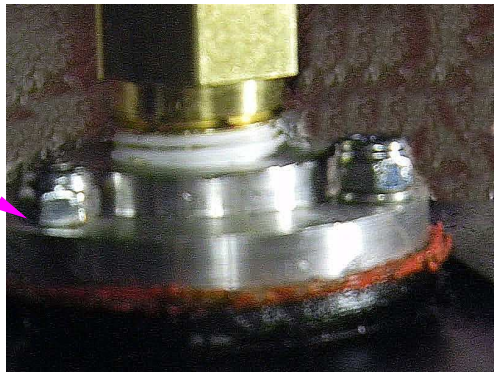
The factory sensor switch can be left installed as a “plug” for the lower sensor port. In this picture a custom blocking plate was fabricated.

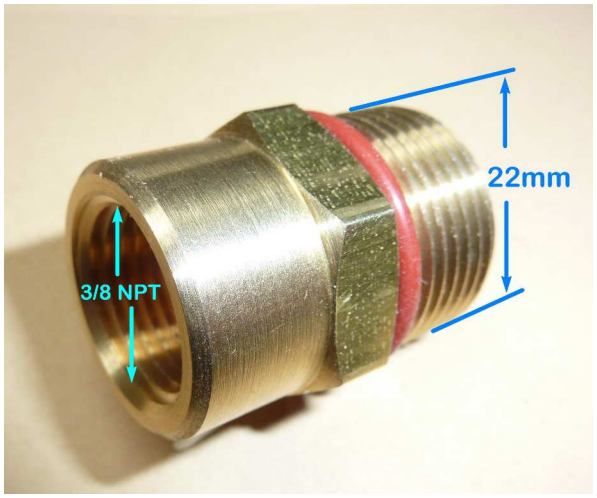
Adapter for factory radiators. P/N - TSA-1

Factory radiator with sensor plate installed for temperature sensor.
In this image the factory sensor had screws.



Factory radiator with sensor plate installed for temperature sensor.
In this image the factory sensor had studs with nuts.





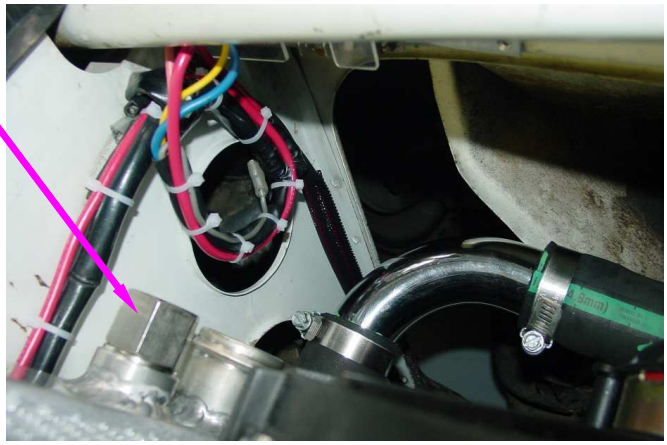
P/N - 32mm-22-6 Sensor Adapter for Fluidyne and Hall radiators.

Note the 22mm threads are straight, not tapered.

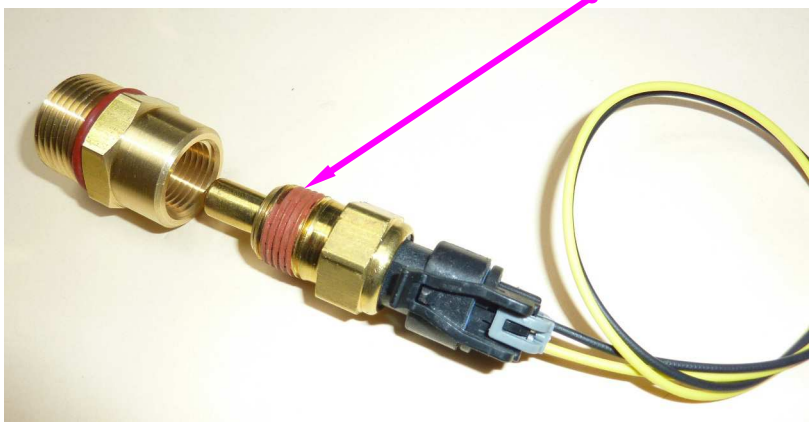
Sealing is accomplished by the "O" ring.

DO NOT USE ANY TYPE OF SEALING TAPE OR SEALANT ON THE 22mm THREADS.

22mm radiator sensor adapter installed for temperature sensor.



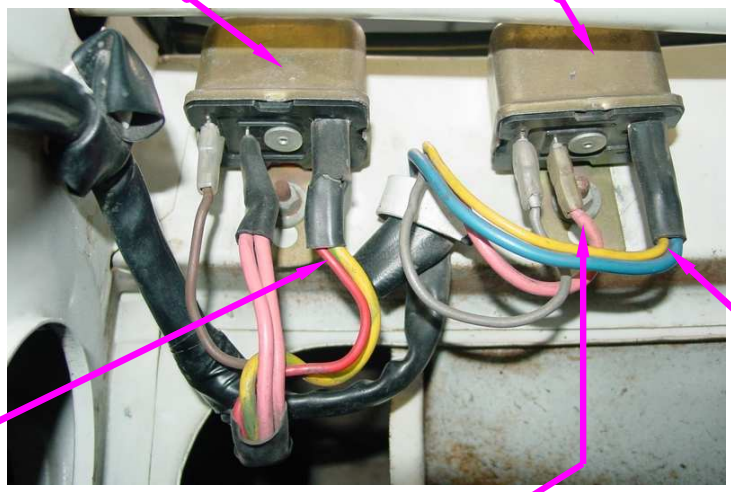
If the sensor does not have a coating of sealant on the threads,
then use Teflon tape on the threads of the temperature sensor to seal in the sensor adapter. The sensor in this picture has a red coating of sealant.



Remove factory relays or upgraded relays

Factory radiator fan relays mounted on 5mm studs in factory location. Remove the factory relays and carefully disconnect the wires.

Drivers side fan relay Passengers side fan relay



The PINK wire connects to fuse #11 or #12

The YELLOW or RED connects to speedometer FAN amber light.

Note, early 1971 Panteras have the relays in the relay box in the passenger foot well. The colors of those wires can be different from 1972 through 1974 Panteras.

Many 1974 Panteras may not have the wire for the FAN light even though the lamp socket is in the tachometer. In this case a wire should be added to make the light operational.

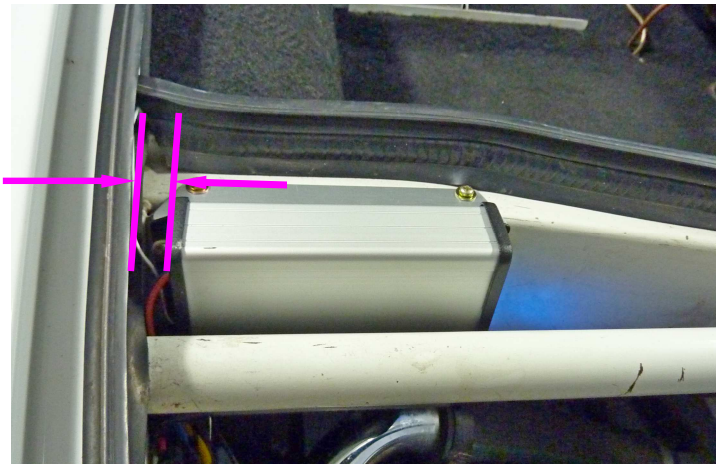
Mounting the Radiator Fan Controller

Mounting of the RFC near the fans is the best location so that the fan wires are not excessively long, this minimizes electrical losses and electrical noise. location of the original of the fan relays is best. The box size is designed to fit behind the headlight actuator tube and the horizontal support beam.

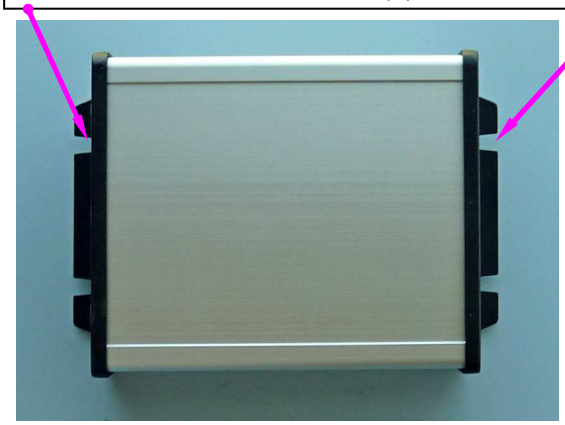
The RFC box should be mounted with the grommet close to the left side of the fender but still must allow for the wires to exit.

Other mounting places can be used but the RFC box should not be exposed to direct water pressure such as a hose or intense rain as the wire grommet is not sealed. Inside the trunk is a possible location as well but consider drilling holes for wires in the trunk wall is not desirable.

Leave a space between the fender and the RFC box for the wires. In this picture a space of 0.75" (19mm) at the closest point was left for the wires.



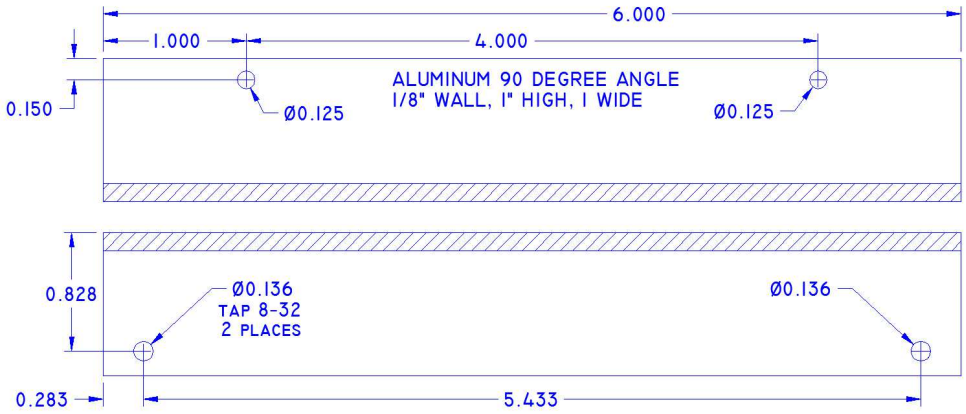
The RFC can be mounted with (2) 8-32 screws and lock-washers.



The mounting holes in the Top View are 0.125” and should be used a pilot holes to locate the holes in the support beam. The drilling does not have to be completely through just enough to guide the drill bit.

1. Mount the RFC on the bracket with 8-32 screws and lock-washers.
2. Position the bracket with RFC on the support beam and drill through the bracket in the hole closest to the fender.
3. Enlarge that hole in the bracket that was just used a guide to 5/32” (0.156”)
4. Install the self-tapping screw and mount the bracket with RFC.
(this keeps the bracket in location while the other hole is drilled)
5. Drill through the bracket in the other hole.
6. Remove the first screw and bracket with RFC.
7. Enlarge that hole in the bracket to 5/32” (0.156”).
8. Mount the bracket with RFC using the self-tapping screws and lock-washers.

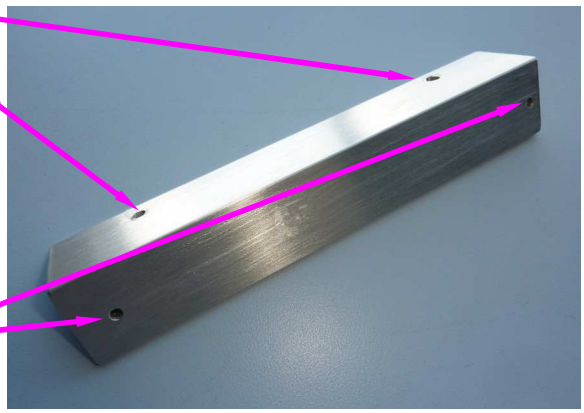
An easy way to mount the RFC is to use a mounting bracket that adapts the RFC housing to the support beam.
Only the top 2 holes in the RFC case for the 8-32 screws and lock-washers.
2 additional holes are used to mount to the bracket to the support beam with self -tapping screws. The drawing below is the design for such a mounting bracket.
Pantera Electronics can also provide this finished aluminum mounting bracket available for purchase. Consult with factory. See page 22.

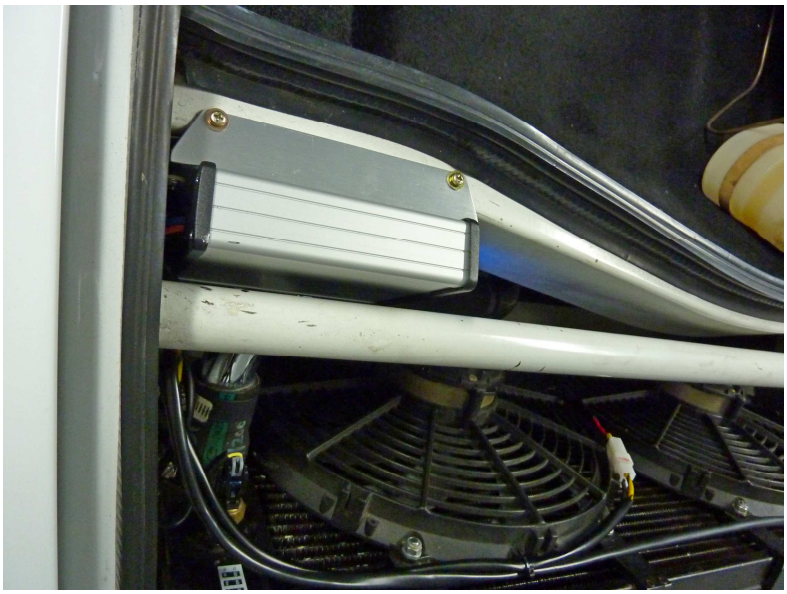


Pantera Electronics Aluminum Mounting Bracket Including:
(2) 8-32 screws, (2) #6 Lock-washers and self-tapping #6 screws

(2) Under-sized mounting holes for a guide while drilling the support beam.

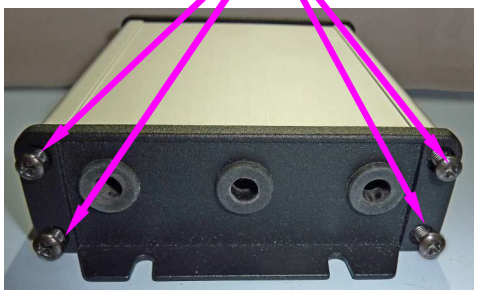
Mounting holes tapped (2) 8-32 for RFC case.





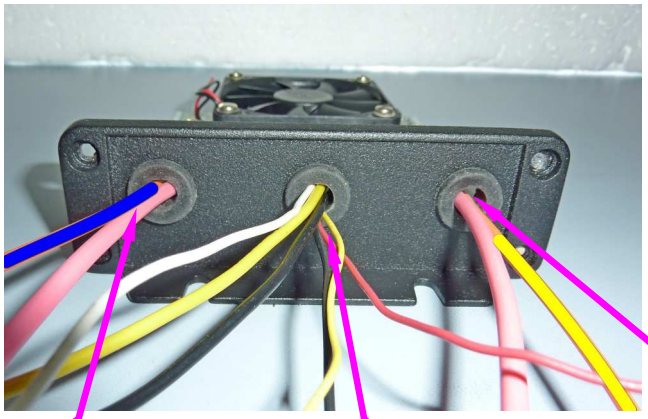
Disassembling the RFC Housing

Remove (4) screws from the end plate with the wire grommet.
Slide out the control board.



RFC wire gauge size and grommet locations.
DO NOT DEVIATE FROM THE WIRE ARRANGEMENT IN THE PICTURE.

If TXL insulation wire is not used the wires might not fit through the grommets.



DO NOT DEVIATE FROM THE WIRE ARRANGEMENT IN THE PICTURE.

The motor and motor power wires are electrically noisy and effect the other wires.

Spal 15 Amp Fan

+LT-FAN 14 awg
+BAT 14 awg

Note all wires are TXL insulation.

Spal 20 Amp Fan

+LT-FAN 12 awg
+BAT 12 awg

Note all wires are TXL insulation.

LITE/RED -18 awg

IGN/PINK -18 awg

GND/BLK -14 awg

A/C WHT -18 awg

SNR/BLK -18 awg

SNR/YLW -18 awg

Note all wires are TXL insulation.

Spal 15 Amp Fan

+RT-FAN 14 awg
+BAT 14 awg

Note all wires are TXL insulation.

Spal 20 Amp Fan

+RT-FAN 12 awg
+BAT 12 awg

Note all wires are TXL insulation.

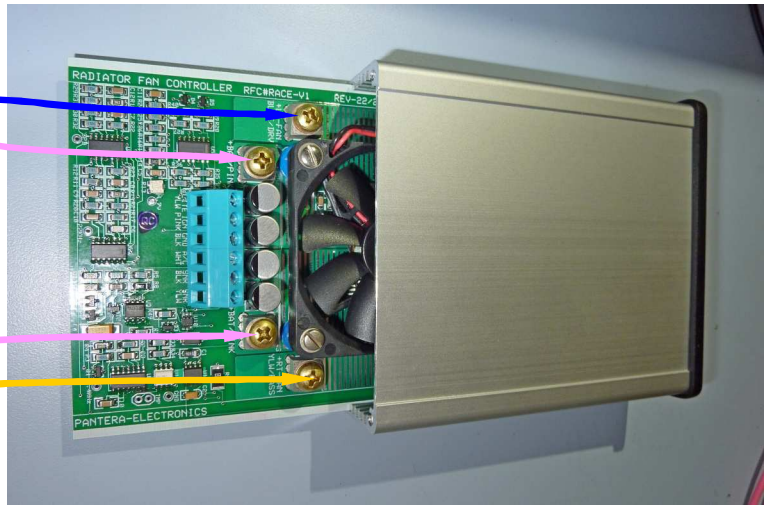
Connecting wires to the RFC, 15 amps per Fan

It is best to connect all wires directly from the Pantera wire harness to the RFC board but this is not always possible due to wiring changes by previous owners.

Crimp a blue ring terminal to a 14 AWG PINK wire and connect to a 15 AMP circuit breaker near the power source, either the (+) terminal of the battery or to the ammeter.

(there are (2) +BAT/PINK terminals use separate 14 AWG wires and separate circuit breakers for each +BAT/PINK terminals)

Crimp a blue ring terminal to the 14 AWG BLUE wire that was connected to a factory relay and connect to terminal LT-FAN, BLUE/DRV. Connect the other end to the driver side RED fan wire.



Crimp a blue ring terminal to the 14 AWG YELLOW wire that was that was connected to a factory relay and connect to the terminal RT-FAN, YELLOW/PASS. Connect the other end to the passengers side RED fan wire.

Crimp a blue ring terminal to the 14 AWG PINK wire and connect to the terminal labeled +BAT/PINK. The other end connects a 15 AMP circuit breaker near the power source, either the (+) terminal of the battery or to the ammeter.

(there are (2) +BAT/PINK terminals left and right, use separate 14 AWG wires and separate circuit breakers for each +BAT/PINK wires)

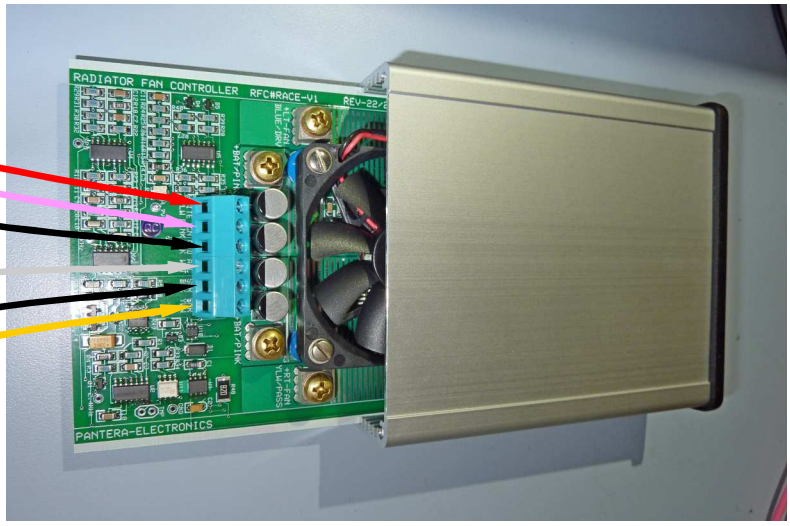
Connecting wires to the RFC Terminal Block

Connect the BLACK wire that was connected to a factory relay to GND BLK.

Connect the PINK wire that was connected to a factory relay to IGN PINK. There may be 2 PINK wires use either one.

Connect the RED wire, that was connected to a factory relay to the LITE YLW. This is connected to the FAN light wire in the speedometer. Note in some Panteras this might be a YELLOW wire.

Later 1974 Panteras did not have a RED or YELLOW wire. Add a 18 AWG wire to the FAN light.



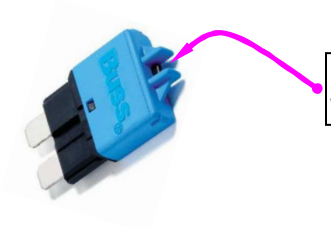
SNSR YELLOW is a temperature sensor wire, it does not matter which wire of the temperature sensor. Strip and insert a 18 AWG wire into the terminal.

SNSR BLACK is a temperature sensor wire, it does not matter which wire of the temperature sensor. Strip and insert a 18 AWG wire into the terminal.

A/C WHT is the over-ride function that forces the RFC to operate the fans at maximum speed. Connect to the A/C thermostat if the Pantera has a FRONT mounted A/C condenser. Strip and insert a WHITE 18 AWG wire into the terminal and connect to the A/C thermostat switch on the same terminal that the factory WHITE/BLACK is connected. The other end of this wire is connected to a relay on the relay plate and is easier to connect at that end.

Fuses and Circuit Breakers for the RFC

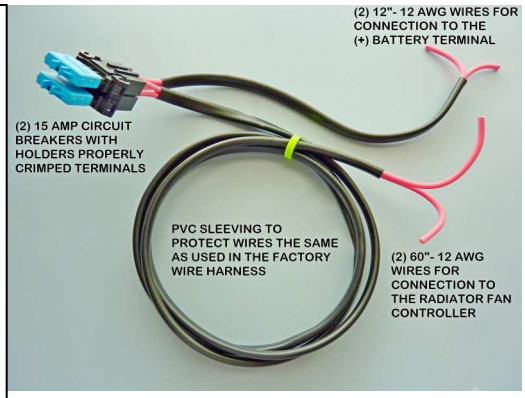
ATO fuses are fast opening automotive fuse, a 15 amp fuse will open in 1/2 second at 70 amps.
A fan motor current is rated at full speed, in the case of the Spal specified fan current is 13.5 amps. Start-up current for a fan motor is approximately 8 to 10 times the rated current. A 13.5 amp fan will require 108 Amps for approximately 1/2 to 3/4 seconds to reach full speed. This is enough time and current to open a ATO fuse. In most cases the RFC ramps the speed of the fan slow enough to allow the fuse to survive the high current at start-up.
There are many things that can vary in an after-market installation of high power electric fans that can effect the fuse survival at start-up.
An option is to use a ATC circuit breaker which has a long time constant before tripping. The ATC circuit breaker that Pantera-Electronics provides can withstand start-up current greater than an ATO fuse. ATC circuit breaker are included with the Pantera Electronics part # RFC-PH harness kit and is a good solution for random fuse openings yet still provide a safety mechanism for the RFC and fans.



Circuit breaker from Pantera Electronics with over-current reset button.

This circuit breaker harness will be needed to connect from the source of power to the RFC.
It can be fabricated or can be purchased as an option from Pantera Electronics.

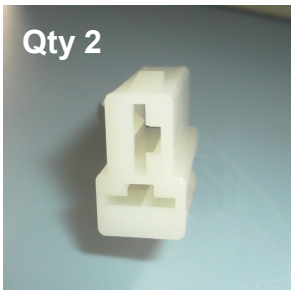
Pantera Electronics part # RFC-PH harness with circuit breakers for the high current connection from (+) battery or (+) ammeter terminal to RFC.
This harness is rated for (2) 20 amp fans and separate power wires for each of the RFC power terminals.



This is the mating connector and terminals for the connector that is on the Spal fan.

Both are available from Pantera Electronics

Qty 4



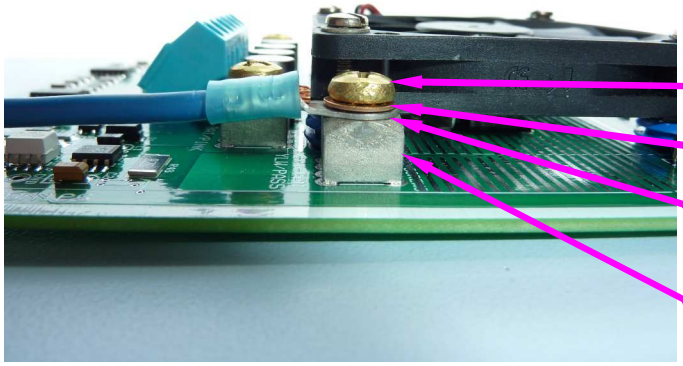
For 15 Amp Fans -> Screw, Ring, Insulated terminal, Blue, 14-16 AWG, #10 Stud, Copper/Tin PE part # SRB.

(note, this termnial from Pantera Electronics will also fit 12 AWG wire as well)

Qty 4

Qty 4

For 20 and 30 Amp Fans -> Screw, Ring, Insulated terminal, Yellow, 10-12 AWG, #10 Stud, Copper/Tin, PE part # SRY.



Use this stack-up order when connecting wires with terminals on the RFC power terminals.

Brass screw

Copper lock washer

Copper/Tin wire terminal

Non-removable terminal base

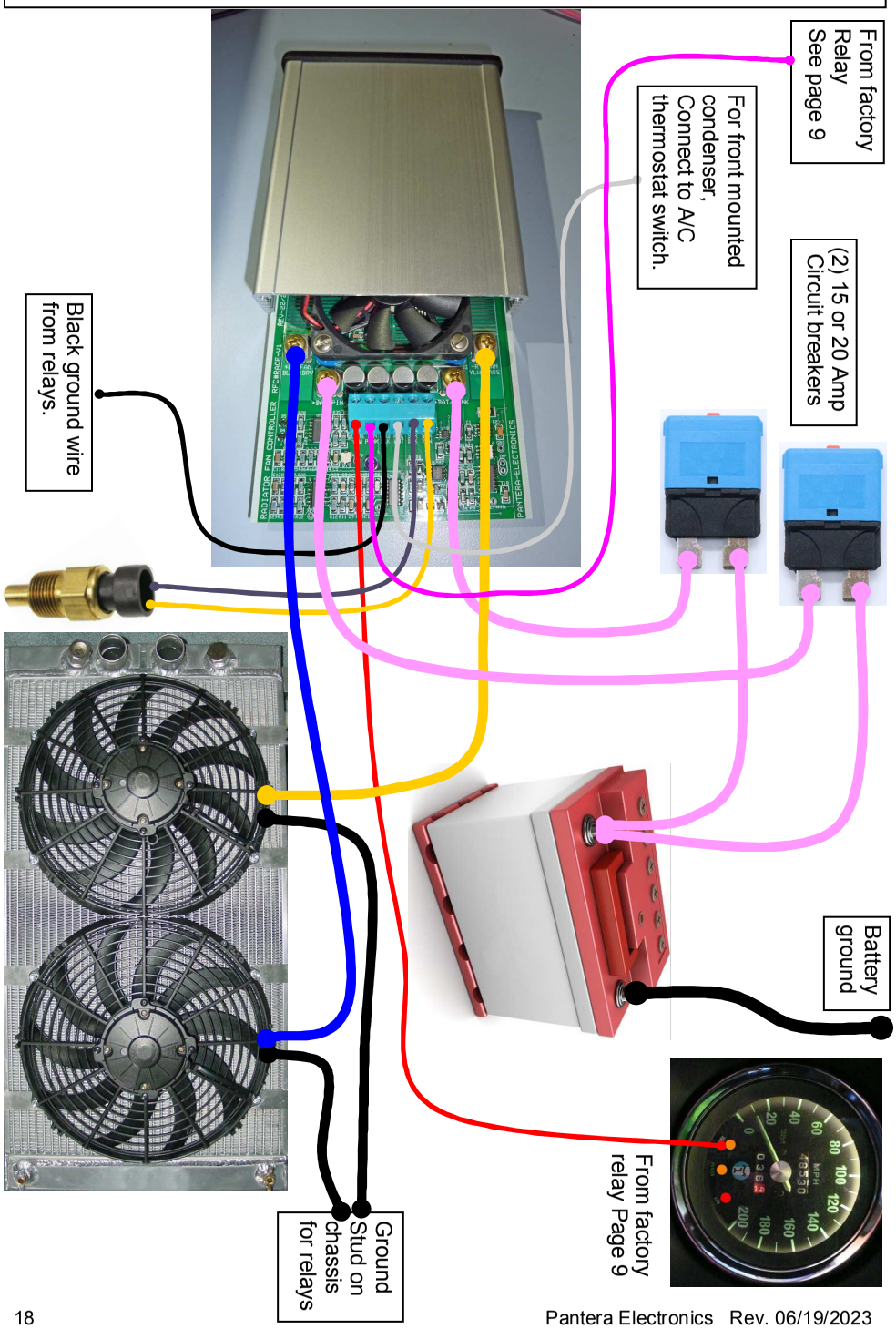
Enclosure IP65 Rating and the Grommets

Silicon adhesive or RTV sealant can be used around the wires into the grommet to improve water resistance. The recommend mounting position in this installation is intentionally placed close to the fender wall to avoid direct water impact. The reason is to not require the RTV sealant used to seal the wires in the grommet.
Enclosures that are considered “sealed” have the problem of condensation that is difficult to avoid and will lead to early failure of electronics.

It is of the opinion and experience of Pantera Electronics engineering that vented enclosures offer a long term life for electronics.

Adding RTV sealant to the wire grommet is the installers option based on the final enclosure location and use of the vehicle.

Radiator Fan Controller Wire Diagram, Standard Connection for
(2) Fans at 15 amps each maximum. (Preferred upgrade)

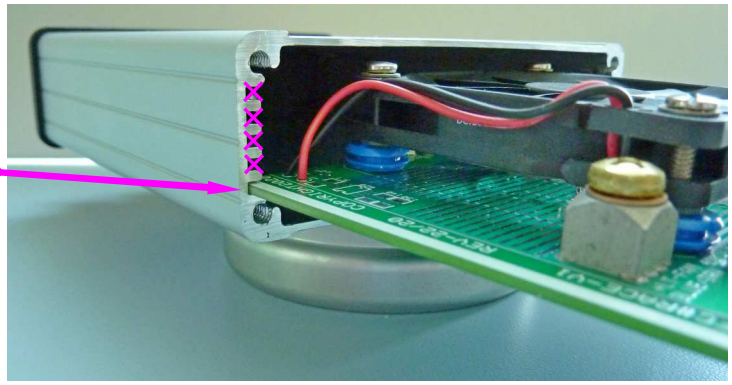


DO NOT ATTEMPT TO WIRE THE POWER TERMINALS TOGETHER IN THE ENCLOSURE. BOTH POWER WIRES MUST RETURN THE BATTERY.

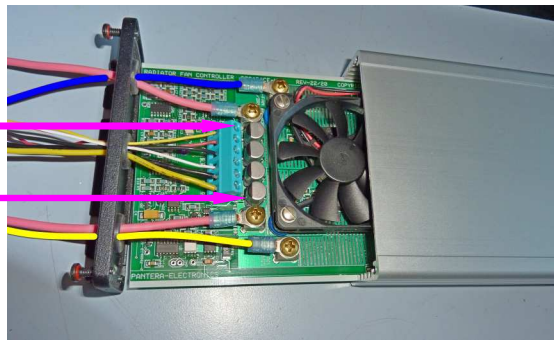
DO NOT ATTEMPT TO WIRE THE FAN TERMINALS TOGETHER FOR MORE CURRENT CAPABILITY, IT WILL NOT FUNCTION PROPERLY

Assembling the RFC Housing

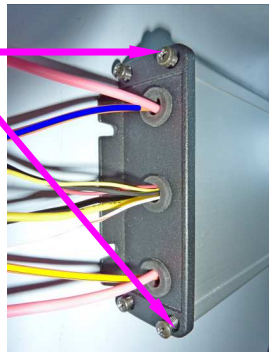
Install the control board ***only*** in this slot.



Slide the control board in until it seats.



Insert (4) screws from the end plate with the wire grommet and tighten the screws.



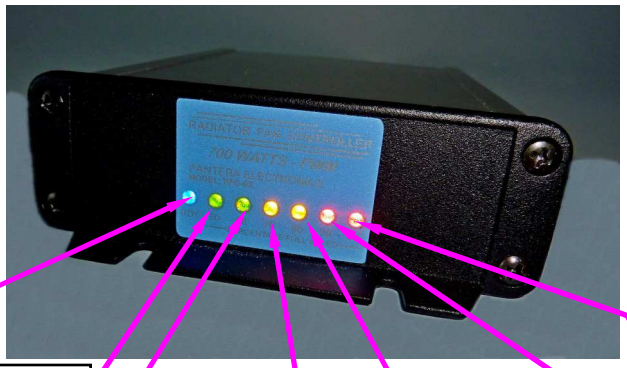
Fan Ground Connections

The stud that was used to support the factory relays is used for the common ground connection and mounting plate.

Wiring Behind the Console

The RFC needs to have a circuit breaker connected in line or in series with the (+) battery or (+) ammeter terminal. The circuit breaker must be equal to the combined current of both fans. The circuit breaker holder should be of high quality and be rated for at least 30 Amps. There are 2 possibilities when connecting to the (+) battery or (+) ammeter, if connected directly to the battery use a large ring terminal and connect to the (+) battery clamp. This connection will not allow the ammeter to indicate the current that the fans are using during high current demand on hot days. Some Pantera ammeters are not in very good condition and connecting the directly to the battery is still the best decision. If the ammeter has been rebuilt or replaced by a modern gauge that can support the additional fan current then it can be used to monitor the current. There are 2 terminals on the ammeter a large cable connects to the battery and the other connection to the wire harness. The RFC can be connected to the terminal that connects to the wire harness allowing the ammeter to display the current consumed by the fans.

RFC Indicators



BLUE
Ready for operation

GREEN
Fans active at 50%

GREEN
Fans active at 60%

YELLOW
Fans active at 70%

YELLOW
Fans active at 80%

RED
Fans active at 100%

RED
Fans active at 90%

Using the RFC Bargraph

The RFC bargraph is a display of fan speed that can be related to heat dissipating capacity.
If outside temperature is 70F and the bargraph level is at 60% speed that means if the outside temperature increases there is another 40% of the fan speed to keep the radiator temperature low enough the engine temperature can be maintained at the proper temperature.

If the fan speed is at 90% and the ambient is 70F degrees it's likely that there isn't enough fan speed to compensate for a day that has an ambient of 85F. The fans would be at 100% and the radiator could not dissipate enough heat to maintain a low enough coolant exit temp to keep the engine temperature stable.

This would suggest fans with a higher CFM rating or a larger radiator.

Power-up Test:

It is assumed at this point that the coolant has been re-filled and all mechanical items are completed.
After checking wiring to confirm correct connections to the RFC, install the circuit breakers in the holders.

Re-connect negative battery cable and note that there will be a faint spark during this connection. This is normal and this is caused by electrical storage devices in the RFC. When the ignition key is “OFF” none of the indicators on the RFC should be illuminated.

Turn ignition key switch “ON” wait for approximately 12 seconds then the “READY” BLUE indicator will illuminate.

After the engine is running but before the *radiator* is hot only the ready indicator will be illuminated. When the radiator reaches 140 degrees a GREEN indicator will illuminate for 50% fan speed.

As the temperature of the radiator increases the fans will increase in speed to compensate to keep the coolant exiting the radiator no more that 140 degrees. As the radiator increases in temperature the fans should increase in speed, indicated by proceeding lights illuminate.

At idle engine speed coolant circulation is low is due to the water pump is operating slowly. Occasionally increase the engine speed to 1,500 to 1,800 RPM for 1 to 2 seconds this will cause a “slug” of hot coolant to enter the radiator and increase the speed of the fans. The speed of the fans varies slowly and may not be readily apparent but the indicators will react.

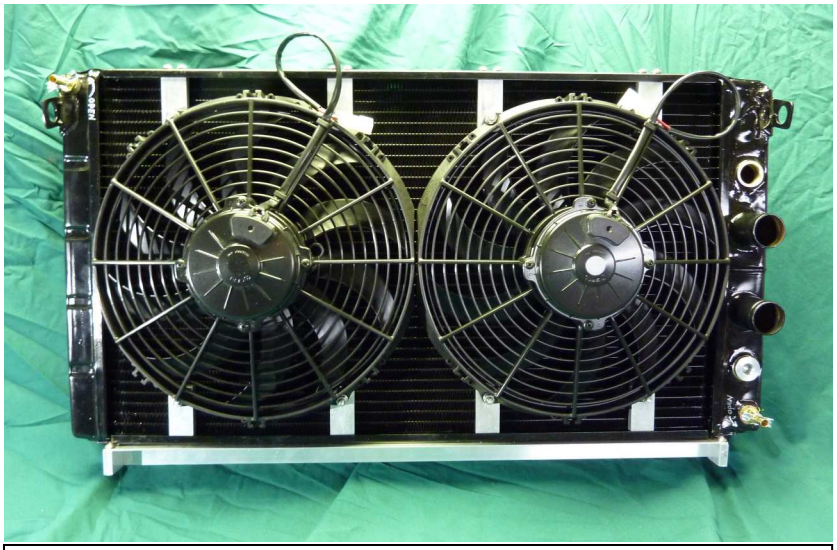
If there is a stone in the radiator fan and causes either of the circuit breakers to open, all of the percentage indicators will flash 2 times per second. This will also flash the orange indicator in the speedometer. This can be tested by removing the circuit breaker during operation.

Testing complete.

NOTE: It’s important to keep this installation manual for future reference since revisions to this product change the contents of the installation manual.

Spal fans are the fans of choice and are easily powered by the RFC.
They provide are very high air flow, high quality bearings and low noise blades in a compact envelope.

Below are Spal fans installed on modified factory copper/brass radiator to Pantera Electronics specs.
More efficient and weighs less than the factory core yet retains the same appearance. This design also outperforms the Fludyne radiator as well.



The Spal fans are mounted on the factory modified radiator to Pantera Electroncs specifications and PE design mounting brackets.

The Spal fans are mounted on the Fluidye Radiator with PE design brackets.