

Remote Rectifier Installation Instructions.

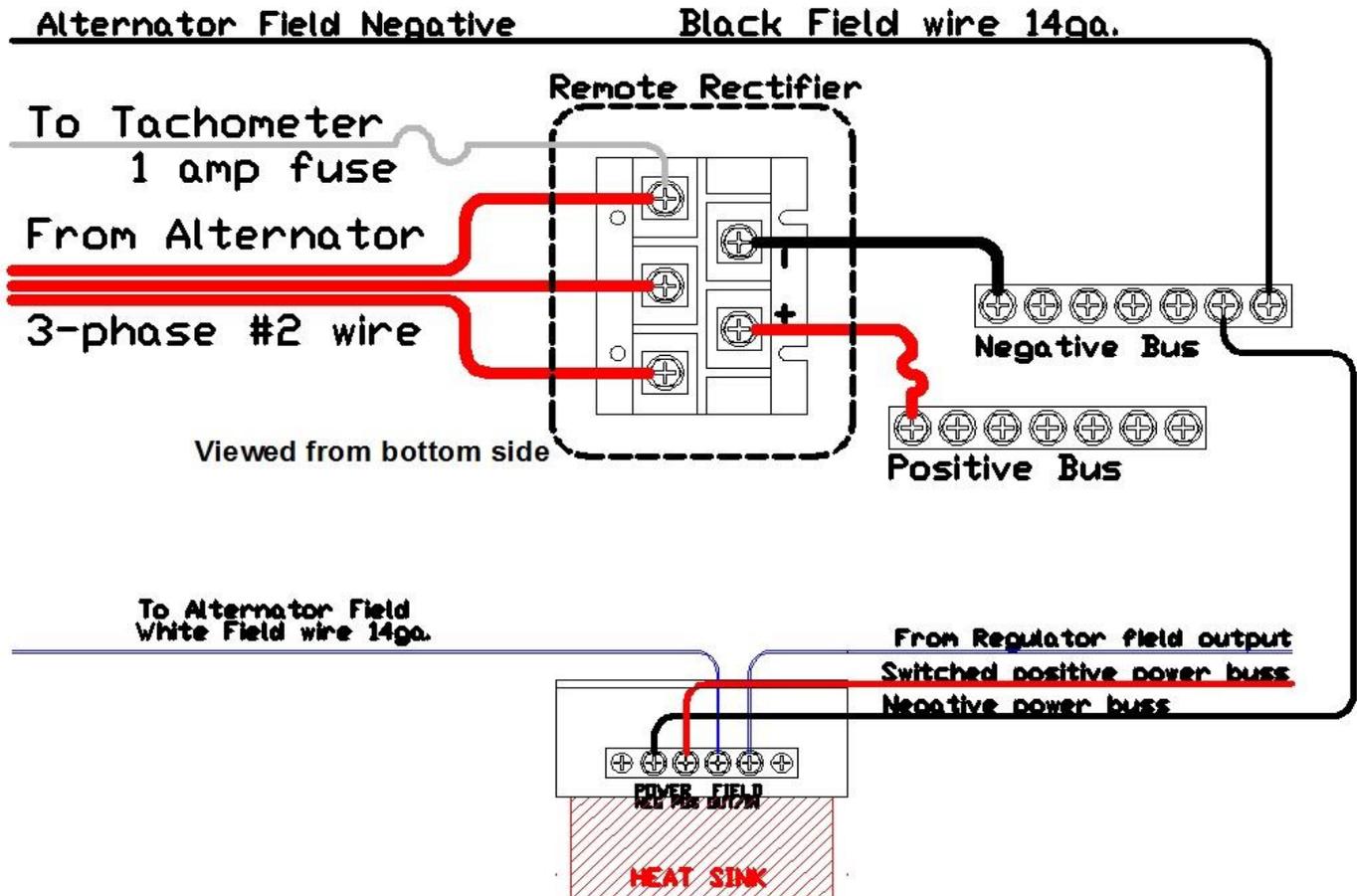
As drawn below it is quite simple but here are things to know.

1. Install the alternator as before. The only connections on the alternator are:
 - a. The three phase output (# 2 wires)
 - b. The positive field wire (#14 white)
 - c. The negative field wire (#14 black)
2. It is suggested that a fire retardant split loom jacket be used to cover the five wires. All five wires will terminate at the remote rectifier.
3. After mounting and positioning the alternator, **the five cables and alternator temp sense wire from the regulator must be clamped to the engine within seven to 12 inches from the alternator.** This is to provide protection from movement at connection points within the alternator.
4. To reiterate Use cable clamps to support the cables on the engine and along the route to the remote rectifier. It is important that the point of cable flexing is not at the alternator as this will lead to premature failure of the insulation and then the wiring itself. The flex point between the engine and engine room must be at a point where it is the cable itself doing the flexing.
5. The remote rectifier can be mounted in any orientation although mounting it with the long direction horizontally mounted. Mounting it in this manner will aid somewhat to cooling due to natural convection.
6. After determining the length of cable and cutting to length remove 0.5" of insulation. Slide on a piece of shrink tubing an inch or more in length over the wire prior to the ring terminal.
7. The supplied ring terminals (found inside the remote rectifier) are then crimped onto the bare wire.
 - a. Please note a perfect crimp is, in my opinion, next to impossible. A perfect crimp is one that when completed there is a point in the crimp where the stranded wire no longer has any air gaps in between the strands. Too loose leads to corrosion and too tight is actually the start of pinching off the cable. I very much like to slightly under crimp and then solder the barrel shut.
 - b. After cooling then slide the shrink tube over the barrel and shrink using an appropriate heat gun.
8. Install the ring terminal to the rectifier assembly. They can be connected in any order to the three terminals of the rectifier package.
9. Tighten the rectifier bolts to 6 lb/ft.
10. The red and black output cables need to be sized appropriately for their length and the current rating of the alternator using the chart below. The length is determined by adding the positive lead length to the negative lead length for a total distance. Please add 25% to the size as it must exceed the rating of the fuse in the positive cable. The polarity of the output from the rectifier is marked on the black module just under the metal tab.
11. To reiterate the positive lead needs to be fused at the battery end of the connection as shown below. It must be greater than the alternator rating but less than the cable rating.
12. The advanced regulator output must wire through the remote rectifier as shown. This is to protect from overheating the rectifier should the fan fail. NOTE: they are ball bearing fans rated at 20,000 hours but you really never know what might happen.
13. The #14 white wire from the alternator is the positive field lead. While it would normally be connect to the advanced regulator, here it must be connect to the barrier strip terminal on the remote rectifier marked FIELD OUT. The field wire from the regulator must be connected to the barrier strip terminal marked FIELD IN. This is done so that the over temp circuit in the remote rectifier can interrupt charging in case of rectifier overheat due to high

engine room temperature or fan failure. While it is anticipated that this will never happen, down the passage of time, anything is possible. These connections are shown below.

14. The #14 black wire from the alternator is the negative field lead. It should be connected as below to the nearest negative buss to the remote rectifier.

STANDARD REMOTE RECTIFIER



15. The remote rectifier has a four post connector on one end. Two of the terminals are for power. Negative to the boat's negative buss and positive to the same location as the regulator's switched 12 volt feed. This power is used to run the fans and to power the over temp circuit that protects the rectifier.

16. The FIELD IN/OUT is used to switch the alternator in case of the remote rectifier overheating and must be used.

17. TEST

- Upon applying ignition and starting the engine both fans should come to life. Depending on the brand of regulator, in a short time the alternator will begin to put out current.
- By removing power from the positive power terminal two things should happen. The fans stop spinning and the alternator stops putting out current. This shows that the field wire is properly routed through the remote rectifier. Reattach the positive power lead.
- Check that all connections are tight and that there is no heat at cable crimps and bolted terminal connections.

Additional Installation Information

Sizing Battery Cables

The addition of a high-output alternator to your charging system may make it necessary to increase the size of your battery cables to increase the current carrying capacity. To determine the proper cable size, consider BOTH cable length and alternator output current capability. Both positive and negative wire runs must be included in your calculations.

In other words, when determining battery cable size, we need to consider the “round trip” distance. Wire size may be calculated with the formula $CM=K \times I \times LE$ (whereas CM represents the circular mil area of the conductor, K represents the mil-foot resistance of copper, I represents current, and L represents the length, in feet, of the round-trip cable run and E represents voltage drop in volts). When using this equation, a K constant of 10.75 indicates copper’s mil-foot resistance and voltage drop should be calculated at 3% (the standard for critical functions affecting the safety of vessel passengers). In most cases, it is much easier to use the following chart as your guide.

FEET	5	10	15	20	25	30	40	50	75
AMPS									
75	8	6	4	2	2	1	0	2/0	3/0
100	8	4	2	2	1	0	1/0	3/0	
125	6	4	2	1	0	1/0	2/0		
150	6	2	1	0	1/0	2/0	3/0		
175	6	2	1	1/0	2/0	3/0	4/0		
200	4	2	0	1/0	3/0	4/0			
225	4	1	1/0	2/0	3/0	4/0			
250	4	1	1/0	3/0	4/0				
275	4	1	2/0	3/0	4/0				
300	2	1/0	2/0	4/0	4/0				
350	2	1/0	3/0	4/0					

Large Bank Cable layout

With battery banks getting larger consideration needs to be made for proper cable routing and additional fusing.

1. Note the ANL fuse on every battery. This protects the wiring from each battery to the bus.
2. Note the CLASS “T” fuse protecting the main feed which then goes to the power panel or in some cases simply to a power inverter. Because of the incredible amount of short circuit current available from a large bank of batteries an ANL fuse will not suffice. This fuse needs to be capable of greater arc suppression. A CLASS “T” fuse is recommended for this application and is available from us at Mark Grasser – DC Power Solutions.
3. Make sure there is no stainless steel hardware being used, especially washers. This will cause high resistance and excessive temperatures.

