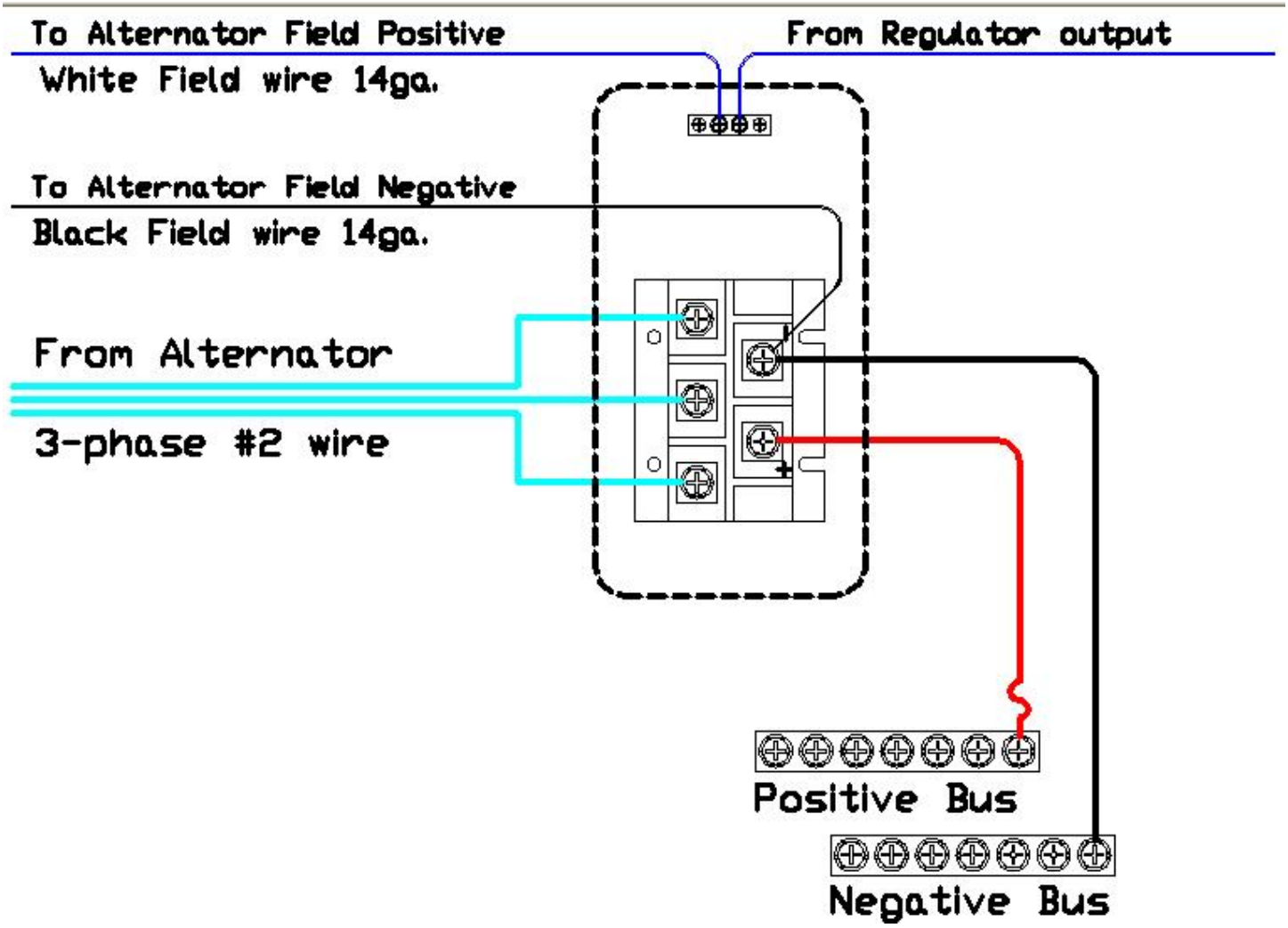
Preliminary Remote Rectifier Installation Instructions.

Quick notes for install:

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 terminate at the remote rectifier.
3. 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.
4. The rectifier can be mounted in any orientation although mounting it with the long direction mounted vertically will aid somewhat to cooling due to natural convection.
5. 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.
6. 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.
7. Install the ring terminal to the rectifier assembly under the existing ring terminal for the fan supply. It is important that the high current ring terminals are in contact with the metal surface on the rectifier. They can be connected in any order to the three terminals of the rectifier package.
8. Tighten the rectifier bolts to 6 lb/ft.
9. 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. As added assurance, the black fan wire is connected to the negative terminal and the red fan wire is connected to the positive terminal.
10. 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.
11. 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: It is a ball bearing fan rated at 20,000 hours but you really never know what might happen.

12. The #14 white is the positive field lead. While it would normally connect to the advanced regulator it must in this installation connect to the barrier strip on the remote rectifier. The field wire from the regulator connects to the opposite terminal in the barrier strip. This is done so that the over temp sensor in the rectifier can interrupt charging in case of rectifier overheat due to fan failure. While it is anticipated that this will never happen, down the passage of time, anything is possible. These connections are shown below.



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 x I x 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.