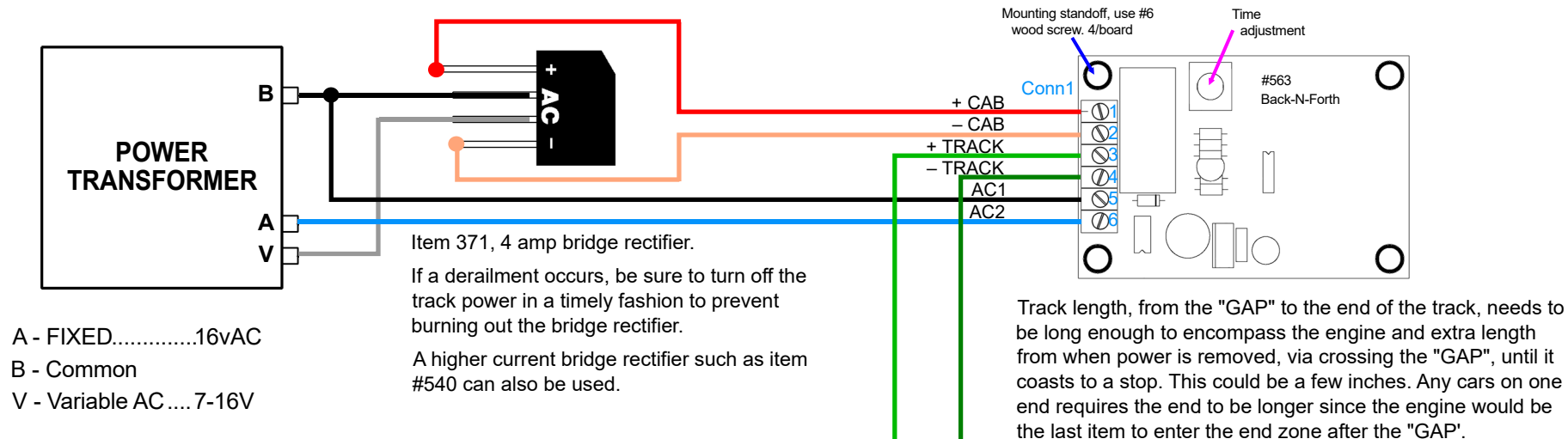


Utilizing a DC Back-N-Forth, such as item 563, for AC trains.

Utilizing a DC Back-N-Forth is not only more reliable but cost effective as well. A dedicated Back-N-Forth track is much better to convert to DC operation than to rely on E-Unit sequence operation. E-Units are very susceptible to track dirt for interruptions in direction control, especially at slow speeds. DC operated trolleys will not change direction when operating over dirty pickup's. The conversion of more modern units is a very simple process. Older series motors can also be converted to DC if necessary as well.

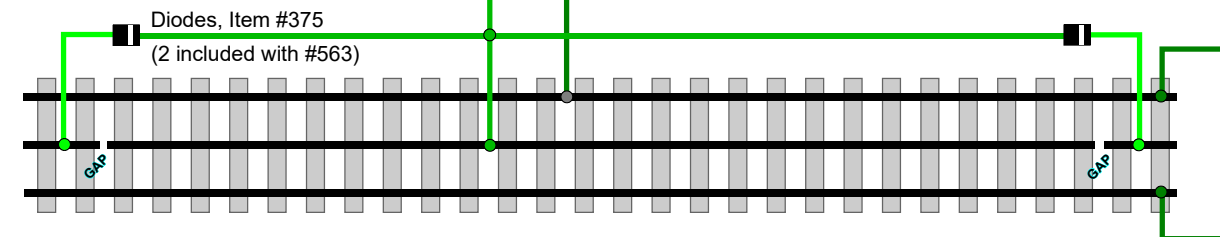


The fixed AC is used to power the Back-N-Forth board while the variable is used to power the track voltage.

If a separate power source, such as item #690, is used, connect the fixed AC directly to the Back-N-Forth board (terminals 5 & 6) without any connection to the variable AC or DC power transformer.

Wire the trolley motor directly to the track pickup's. After this is done, do not operate this unit on AC track power!

If you want E-Unit reversing and DC operation, use a DPDT toggle switch (item 513) to select the operation desired. The center of the switch would be wired to the motor brushes. One side would then be the motor output from the E-Unit, the other side would be the roller and chassis pickup. Make sure to mark which direction of the toggle switch is for which operation.



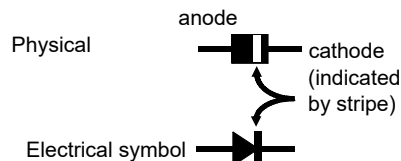
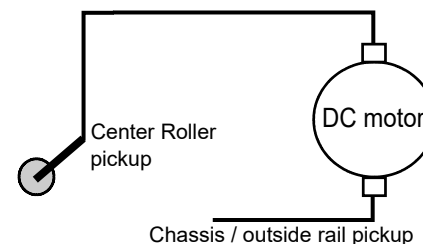
3 rail track shown. As in all 3 rail wiring, it is always a good practice to connect the outside rails to each other. This is shown on the right side of the drawing above.

For 2 rail, use the center rail as the left rail and the right rail as the outside rail power.

When removing the AC reversing unit to convert to DC operation with DC can motors, the motor should be wired for center rail "+", outside rail "-" = forward. If you want to check your wiring out, simply attach clip leads to the "+" and "-" leads of the bridge rectifier.

If the engine runs off the end instead of stopping, simply reverse the direction of the diodes at the track ends. Both diodes need to point in the same direction.

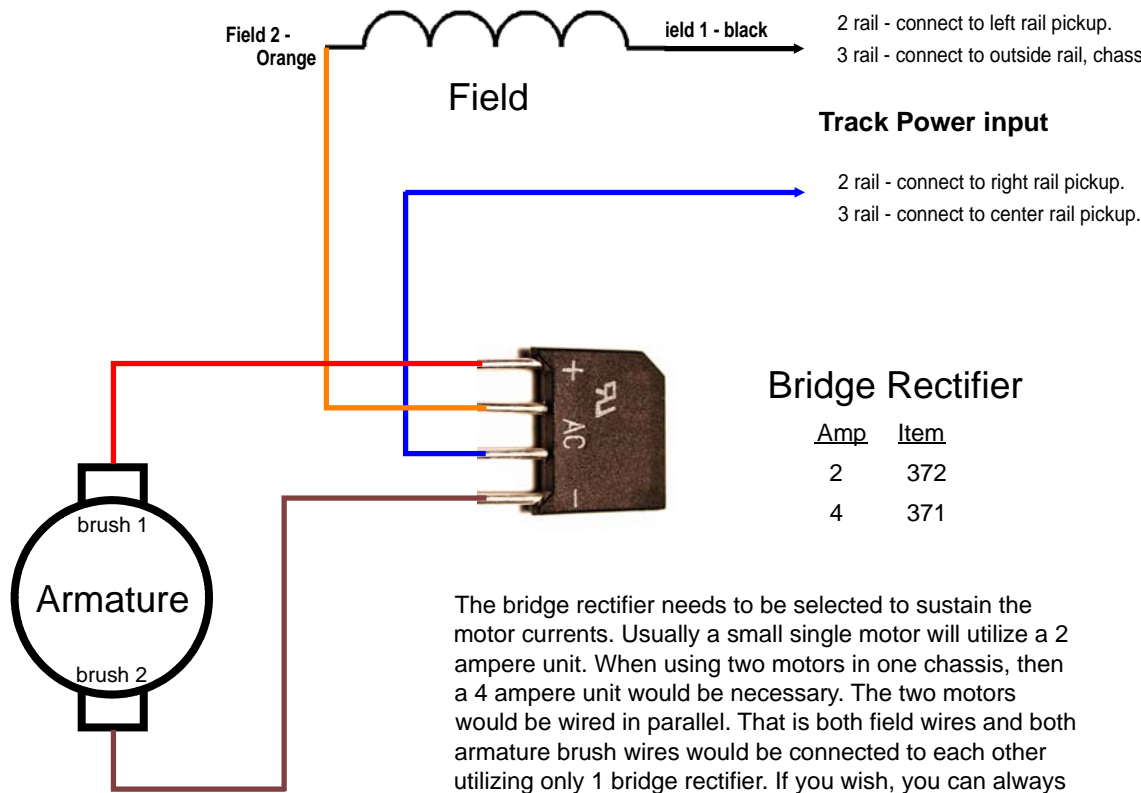
3 rail operators with DC motor modification:



Converting a Series Motor to operate on DC track power.

While a universal / series AC motor will operate on DC power, it will not reverse direction with a change in the motors power. This is why an E-Unit is utilized when operating the motor on AC. When operating on DC it is generally preferable to reverse the motor with the polarity changes on the track instead of utilizing an E-Unit. It is a simple task to change a universal / series AC motor to operate with directional DC power. While some prefer to operate on DC, it is imperative to do so

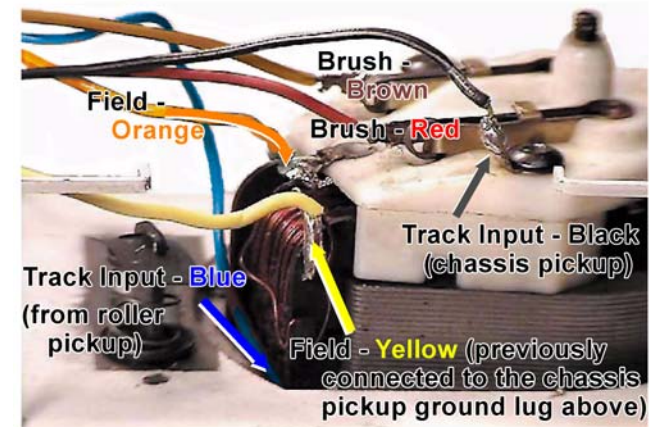
when utilizing some DC type back-n-forth products. This also yields a much better, definitive, directional control of the trolley or locomotive in operation since interruptions of track power from dirt are no longer an issue when setting the direction of the motor. The following instructions were made as a general reference for doing such a change. The wire colors are only used for reference and in general do not reflect the wires found in any particular locomotive. Other pictures were added to help in identifying these items in your locomotive.



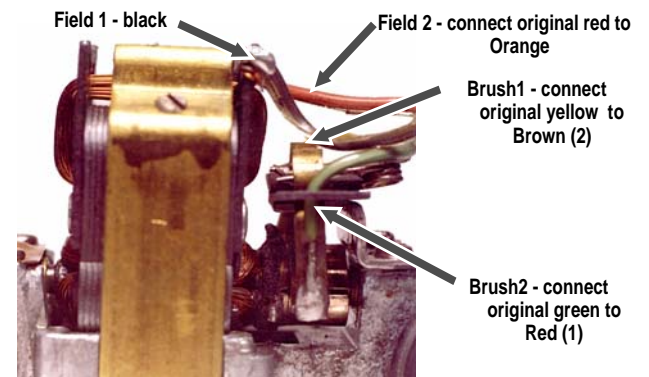
The bridge rectifier needs to be selected to sustain the motor currents. Usually a small single motor will utilize a 2 ampere unit. When using two motors in one chassis, then a 4 ampere unit would be necessary. The two motors would be wired in parallel. That is both field wires and both armature brush wires would be connected to each other utilizing only 1 bridge rectifier. If you wish, you can always use just one bridge rectifier for each motor.

If the engine runs in the opposite direction from desired, simply reverse the brush wire connections.

Help for Lionel series motors. This picture shows where the grounded field wire is located. Colors indicated are those that match the wiring diagram and not the locomotives existing wires.

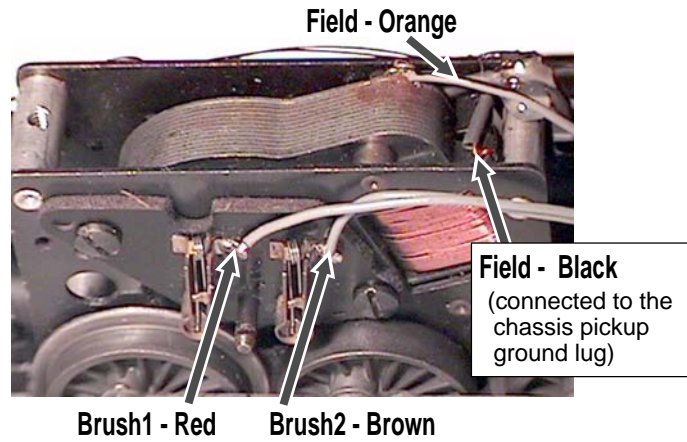


Help for Am Flyer series motors. This picture shows where the wires are normally terminated. Colors indicated are those that match the wiring diagram and not the locomotives existing wires.



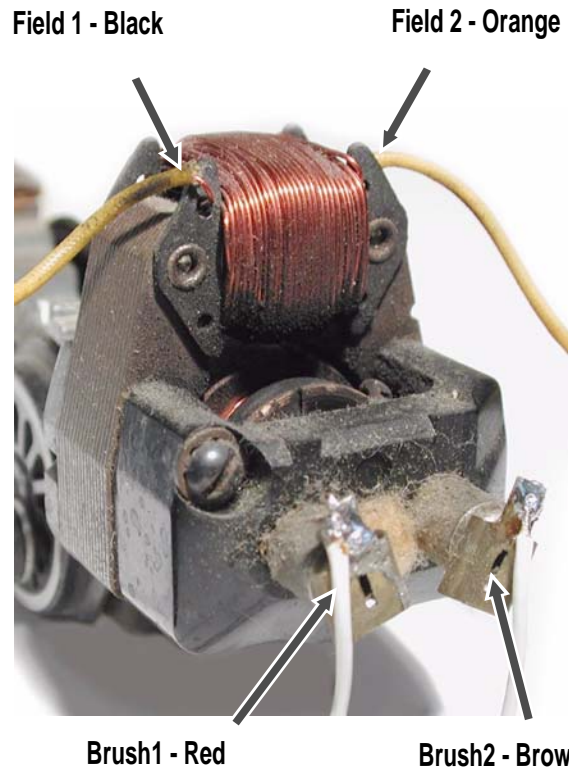
Help for Lionel series motors. These pictures show where the grounded field wire exists. Picture is early Lionel. It is always better to add a ground wire to both outside rail pickups and the chassis. When more than one center roller is available always connect to both.

Colors indicated are those that match the diagram and not the locomotives existing wires.



Help for Am Flyer series motors. This picture shows where the wires are normally terminated. Colors indicated are those that match the diagram and not the locomotives existing wires.

Original type series motors.



Newer type series motors. Make sure the ground / chassis plates **do not** touch the brush motor tabs.

