

# Electronic E-Unit

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The Electronic E-Unit (EEU) is designed to replace the mechanical E-Unit in AC-powered engines. It sequences through the four states like the mechanical unit, and will resume at the next state when power is restored, regardless of how long power has been off. It uses 10 amp mechanical relays to control motor current, so there is no dissipation issue running higher power 2-motor engines. A customer provided lock-out switch to the chassis will retain the prior state - forward, neutral, or reverse - just like the mechanical unit. DC motors can also be controlled, but an external full-wave bridge must be added to rectify the track AC waveform.



## Connections Left to Right:

- 1 - Optional direction lock switch to chassis frame
- 2 - Ground to chassis frame
- 3 - Track AC power in
- 4 - Motor armature terminal 1
- 5 - Motor armature terminal 2
- 6 - Motor field

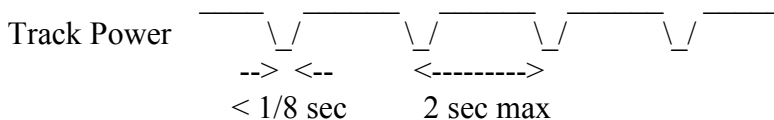
The Electronic E-Unit may be mounted with double-backed foam tape or a mounting flange to the chassis. It must be isolated from the chassis when controlling a DC motor. When mounted to the chassis by the metal flange, the removable FRAME GND jumper can be pulled to isolate the EEU from the chassis.

A double-sided adhesive mounting pad is provided along with a mounting flange. Use either mounting method appropriate for your engine. It is essential that no portion of the printed circuit board contacts the chassis when using the pad. The mounting flange may be attached at either screw location on either side of the EEU. It may be easiest to first mount the flange to the chassis using the screw that held the original E-Unit. Then attach the EEU to the flange with the 4-40 machine screw.

It is possible to control directional headlights that switch along with the motor. Just connect the headlight lead to the "hot" armature terminal for the respective direction. The other headlight terminal normally connects directly to the chassis. For AC motors the opposite direction headlight may glow dimly, depending on the impedance of the field winding. If this is undesirable, the second headlight terminal can be connected to the field terminal instead of the chassis. But that may require a lower voltage headlight bulb to achieve the desired brightness.

## Power-Up Default Mode

Firmware version 2.1 adds the ability to determine how the EEU will resume following power interruptions longer than 2 seconds. It can resume either in forward or in the last state it was in when power was shut off. The mode is selected by issuing a series of 4 brief (1/8 second max) power interruptions while locked in neutral. Each interruption opens a 2 second window for the next one.

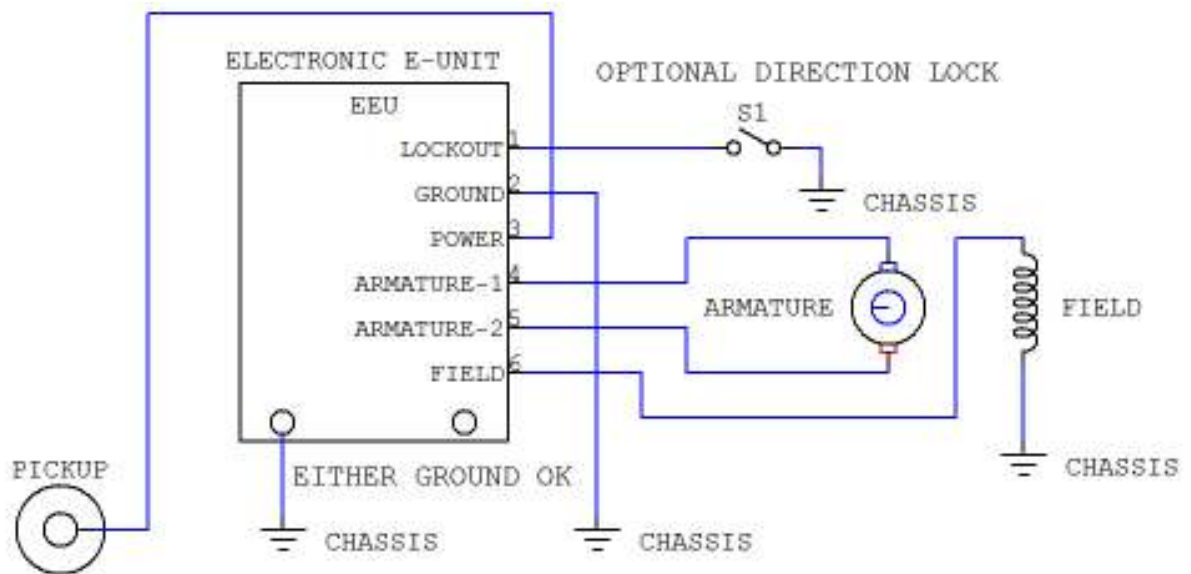


The count is cleared if the interrupt is longer than 1/8 second or it does not occur within the 2-second window. The headlights will flash to acknowledge each interrupt if they are wired for directional control. After the 4th interruption the motor will run briefly either forward for the power-up default mode, or forward & reverse for the mechanical e-unit mode. Another sequence of interruptions while locked and in neutral will change the mode back. Note that the engine will remain locked in neutral until the direction lock is opened when returning to the normal mode.

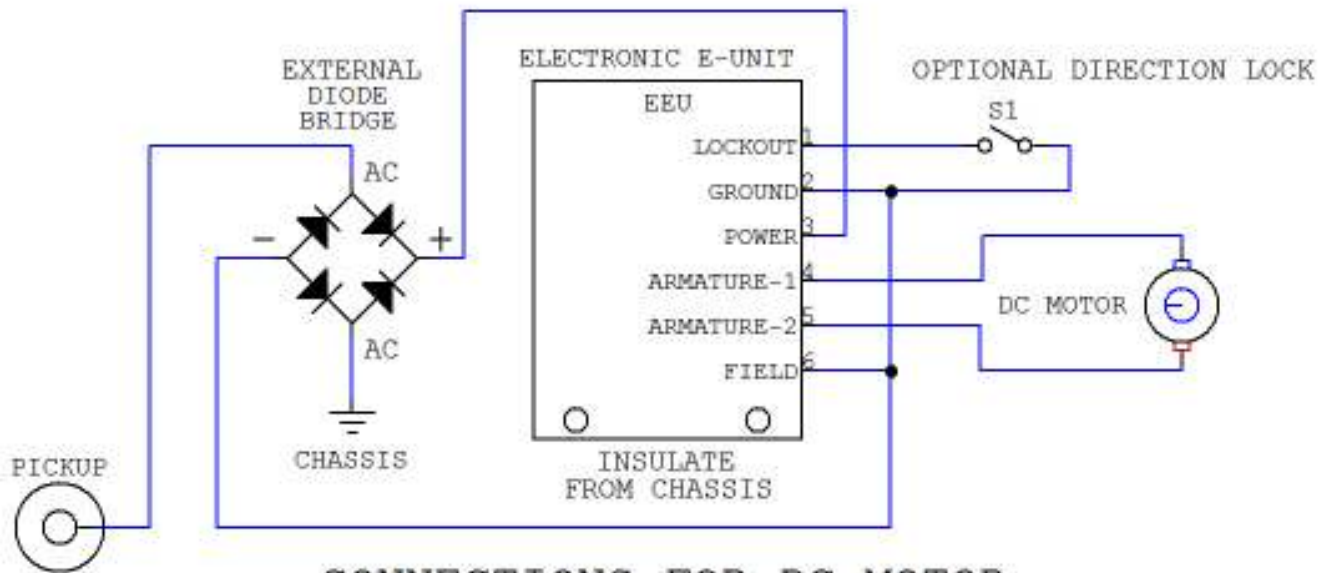
The direction lock determines how the engine will resume in the power-up default mode. The four possible modes are:

- M - unlocked: Mechanical E-Unit mode normal sequencing
- M - locked: Mechanical E-Unit mode locked in state
- D - unlocked: Power-up default into last operational state
- D - locked: Power-up default into forward

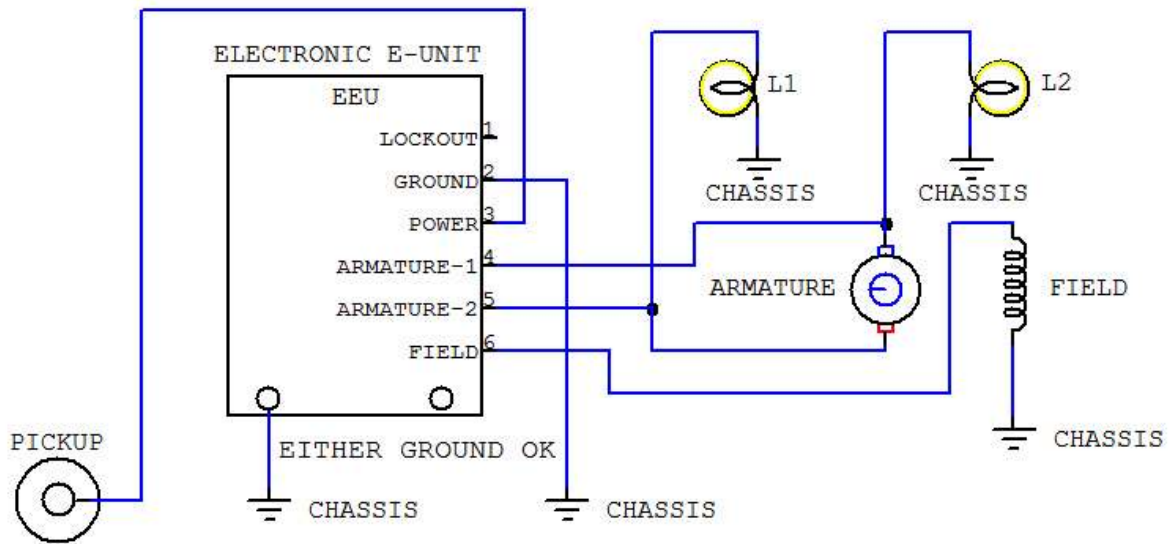
The armature wires must be flipped if it defaults to reverse. A jumper can be used instead of a lock switch if you just want default forward. Install the jumper when already in neutral. After resuming in the selected mode, the EEU will behave like a mechanical e-unit until power is shut off again for more than 2 seconds, regardless of whether the direction lock is open or closed.



CONNECTIONS FOR AC MOTOR



CONNECTIONS FOR DC MOTOR



ADDING DIRCTIONAL INCANDESCENT HEADLIGHTS  
 (FLIP LIGHT CONNECTIONS IF DIRECTION IS REVERSED)