



# Under The Ties 309

## DELAYED-ACTION MAGNE-ELECTRIC UNCOUPLER

### ASSEMBLY INSTRUCTIONS

**BEFORE YOU BEGIN CAREFULLY READ THE INSTRUCTIONS AND STUDY THE ILLUSTRATIONS.** Check the package contents and familiarize yourself with each part. If any parts are missing, damaged, or defective please contact Kadee® Quality Products at the address on the package.

**PACKAGE CONTENTS:** 1 each of the following: coil, steel core, bolt and hex nut, field plate divider, upper track mounting plate, bridge rectifier, radial capacitor, 4 each field plates, 3 each 2-56 flat head screws, 4 each 0-48 x 3/8" screws, 4 each 0-48 x 1/4" screws.

### OTHER ITEMS

**NEEDED:** These are to be provided by the modeler. 16 volt DC power source (at least 1.5 Amps) (3 Amps is recommended) or 18 volt AC power source (at least 1.5 Amps) (3 Amps is recommended) converted to DC with bridge rectifier. The Kadee® #166 Transformer meets power requirements, small piece of aluminum foil for ballast, #52 and #55 drill bits, (Kadee® #780 Tap & Drill set) 20 gauge wire, Kadee® #165 Normally Open momentary contact push button switch, light bulbs or LEDs of appropriate voltage, AMP/Voltage meter, general hobby tools, wood working tools for cutting a hole into the layout base (see text) and tools to cut the metal rail if needed and rail joiners if you've cut the rails.

**GENERAL INFORMATION:** The #309 uncoupler is a switch on switch off electrically actuated magnetic uncoupler. It can be used anywhere our permanent magnetic uncouplers are installed (see the "where to place uncouplers" at the end of these instructions). It is designed to be mounted under the "ties" of any code size of HO track and will be recessed below the layout surface (base). This will necessitate cutting a hole in your layout for the coil and field plates to be recessed into, it will need at least 2 inches of depth.

Since this is electrically actuated (powered) you can place it in your "mainline" without the concerns of accidental uncoupling that sometimes happens while moving over or stopping over a permanent magnetic uncoupler. When the electric #309 uncoupler is switched on (or charged) it still has the "delayed" uncoupling feature as do our permanent delayed action uncouplers. Since the uncoupler is under the ties you can hide it completely from view by using a layer of common household aluminum foil between the ties and mounting plate then covering it with ballast.

We recommend a 16 volt DC power source, either DC or AC converted to DC through a bridge rectifier.

**NOTE:** Some inexpensive power packs may not supply the minimum 1.5 Amps necessary. To check the actual voltage measure across the transformers terminals when the uncoupler is energize.

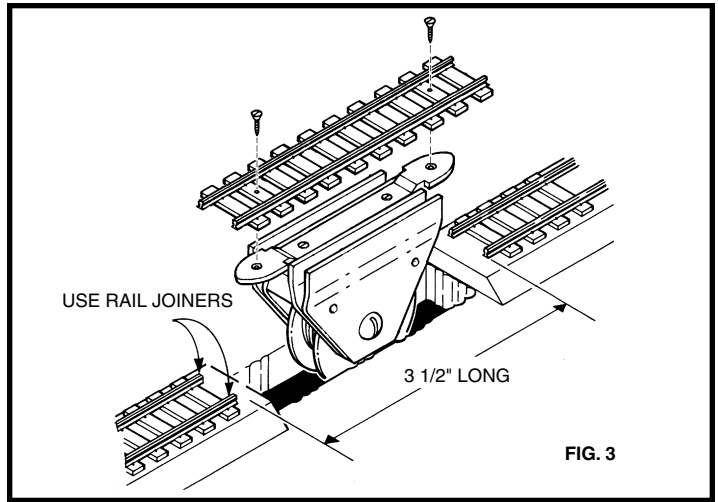
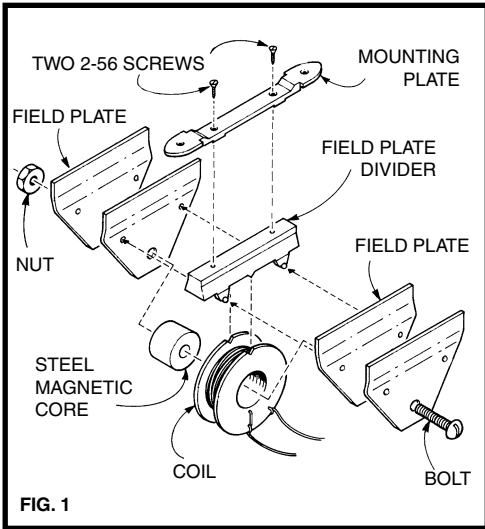


FIG. 3

To avoid overheating and to assure reliable operation the uncoupler must have an electrical source of at least 1.5 Amps and no more than 16 volts DC. **Do not energize continuously for more than two minutes, or overheating will occur.**

**ASSEMBLY & INSTALLATION:** It would be best, where possible, to install the #309 uncoupler while you are building your layout. All uncouplers should be placed on a straight piece of track where your two longest models will fit on each side of the uncoupler. We do "not" recommend placing an uncoupler on or near a curve, switch, or turn out, both models need to be as straight as possible with each other for reliable uncoupling.

Assemble the uncoupler as the illustration shows (fig. #1). Insert the core into the coil, fit two field plates opposite to each other, one bent out one bent inward, as shown, slip the bolt through, place the field plate divider into the holes of the field plate, fit the other field plates over the bolt and against the coil. Make sure the prongs of the divider are inserted into the holes on the field plates and the tabs are fitted into notches of the coil where the lead wires are at the bottom of the coil and not under the field plates. Place the hex nut onto the bolt and tighten just snug and turn the assembly upside-down and tap it on a flat surface to get the plates aligned as even as possible, hold it on the surface and tighten the hex nut firmly. Set the top plate onto the divider (between the field plates) and secure with the 2-56 flathead screws, tighten just firm, overtightening will easily strip the plastic holes.

After you have determined the location where you wish to install the uncoupler you will have to cut a hole in the layout surface (base). The hole must be 1 1/16" wide and 2 1/8" long and in-line with the track. If your track is already installed then you must remove a section of track, at least long enough to accommodate the uncoupler, this also includes raised roadbeds. You will need at least 2" depth clearance from the bottom of the ties. As illustrated, drill (use a 1/4" drill) a series of holes around the "inside" of the proposed hole, overlapping where possible. Carefully use a sharp chisel and carve out the hole, then trim and file the edges smooth. (fig. #2)

We recommend using sectional track (9 inch) or flex track to mount the uncoupler to, although you can use hand laid track but the procedures will be more challenging and is up to the modeler. If your track is already in place you'll need to remove or cut a section out that's at least 3 1/2" long. To cut the metal rails use a track cutter, razor saw (hack saw), or a mini power tool (Dremel® type) with a metal cutting disc attachment (always use proper eye protection). File the ends of the rail to remove any burrs, also file the ends of the rail remaining on the layout. After the uncouplers installation, use rail joiners to connect the pieces together. We recommend soldering the gap left by the saw cuts. If you are using a standard piece of 9 inch track then you will not need to cut it any shorter. This also applies to 9 inch pieces already laid. It may be more challenging handling the longer pieces of flex track (usually 36"), but it still can be done without having to cut the track. (fig. #3)

There are two methods of laying or attaching the track to the #309 uncoupler. It is possible to simply lay the uncoupler into the hole in your layout and lay the track over the uncoupler without actually attaching them to each other. However, you'll need to make sure that the plates are aligned properly and both the uncoupler and the track are secured so neither will get misaligned later on. You can recess the extensions of the upper plate into your layout surface so the uncoupler will set flush under the track. If you have raised road bed then you'll have to build up a section to lay the uncoupler into. This is left up to the modeler and depends on your skills and the material you have available and your road bed.

To attach the uncoupler to the track, which is actually easier than leaving both separate, you need a #55 and #52 drill (Kadee® #780 Tap & Drill set) for the 0-48 screws. If you are going to cover the uncoupler with ballast then you'll need to place a piece of aluminum foil between the ties and the top plate of the uncoupler before you secure them together. Note, the top plate has end extensions that should be cut off so you can set the uncoupler into a hole in your layout where the track actually sets flush on the surface. Set the track over the hole and mark the particular ties that cover the hole, these are the ties you'll attach the uncoupler to. Set the track onto the uncoupler and note where the two assembly screws are in relation to the tie locations so you don't try to drill mounting holes into the screws. If you have cut the ends off the top plate then choose two ties, with at least one tie between them, and use a #52 (1/16") drill and drill a hole dead center in the two ties. If you have left the end pieces attached to the upper plate, drill a hole into the center most tie and a hole in a tie that aligns with the end pieces that misses the original end holes. Set the track onto the uncoupler again and carefully align the uncoupler where the outside plates are just on the outside of the rail and aligned as straight as possible, hold this in place secure enough to mark the top plate through the holes in the ties. Now using the #55 (3/64") drill, drill the holes through the top plate. Set the track onto the uncoupler and secure with the self-tapping 0-48 screws. Use the longer 3/8" screw in the center section and the 1/4"

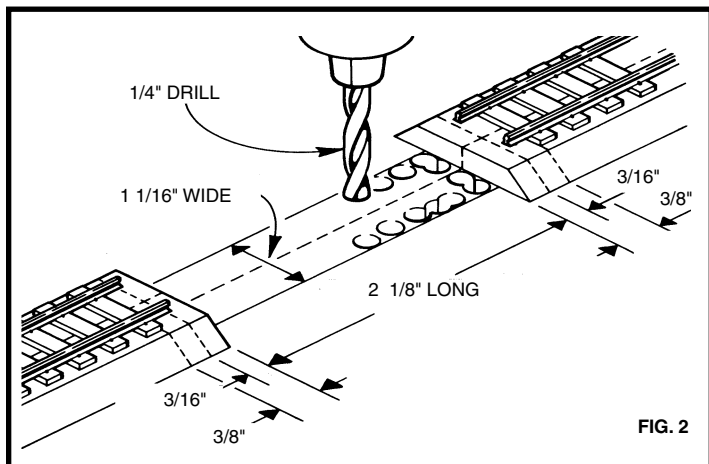
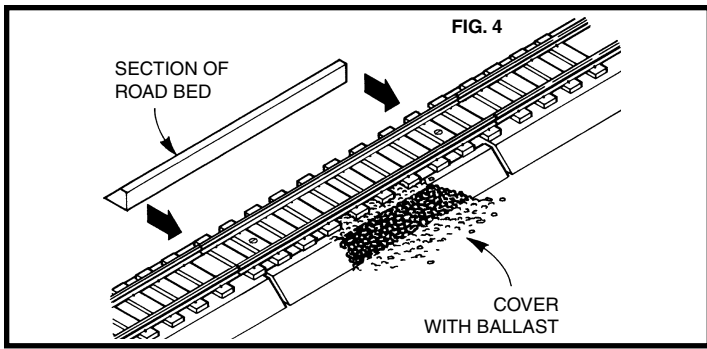


FIG. 2



screws in the ends. Tighten the screws just snug and not too tight. Check the rail and plate alignment. It is very important that the plates are in the correct position to the rail for the most reliable performance.

If you removed a section of track from an existing layout then place rail joiners onto the ends of the rail on the layout and slide them back far enough to lay the assembly in place. You may have to trim the ties under the ends to be able to slide the rail joiners back enough. Set the assembly into the hole in your layout and connect the rails with the rail joiners. Make sure the wires are accessible and the assembly is secure, use a method appropriate for your particular layout. If your layout has a raised roadbed you will have to build it up around the uncoupler and fill in with ballast to match the layout. (fig. #4)

**POWER SOURCE:** We recommend using an electrical source of at least 1.5 AMPs (3 AMPs is recommended) providing 16 Volts DC or 18 volts AC. Please note that the quality of power packs (transformers) vary from manufacturer to manufacturer and, again, inexpensive power packs may not supply the minimum 1.5 Amps necessary. The distance from the uncoupler to the power source and the coil itself will decrease the actual applied voltage. We recommend using a separate power source for the uncoupler/s and a separate transformer for the track.

**Bridge Rectifier:** For AC voltage ONLY. The rectifier actually converts AC in to DC current. The long leg of the Bridge Rectifier is the (+) Positive DC leg and the short outside leg is the (-) DC leg. The two middle legs are the AC input legs. (+) or (-) AC voltage is wired to either of the two middle legs it doesn't mater which one.

**Capacitor:** Is optional and may not be needed if using 16 to 18 volts. The capacitor is more or less a voltage booster or voltage stabilizer. It will improve the performance of the uncoupler. **ONLY** use capacitor with DC current, be sure it is wired in after the Bridge Rectifier. **Warning: The long leg of the Capacitor is the (+) Positive leg and the shorter leg is the (-) leg. If it is wired incorrectly the capacitor will overload and may explode!**

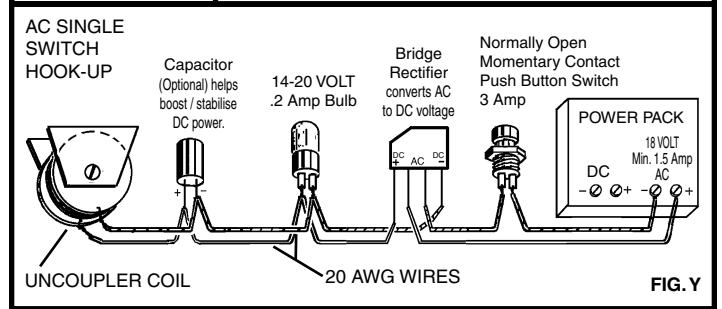
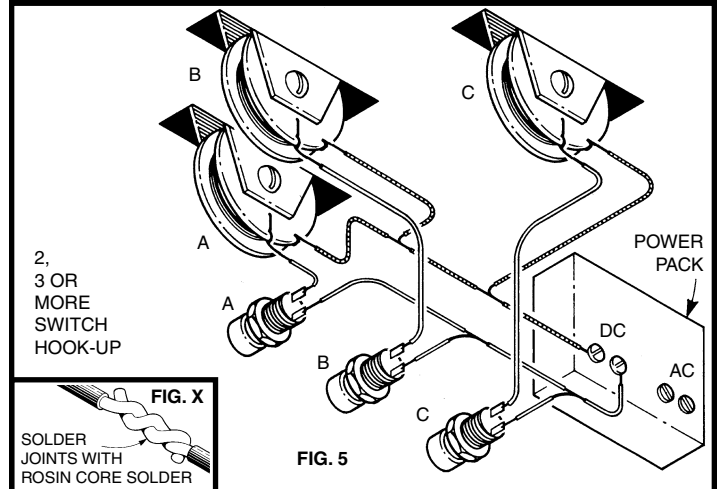
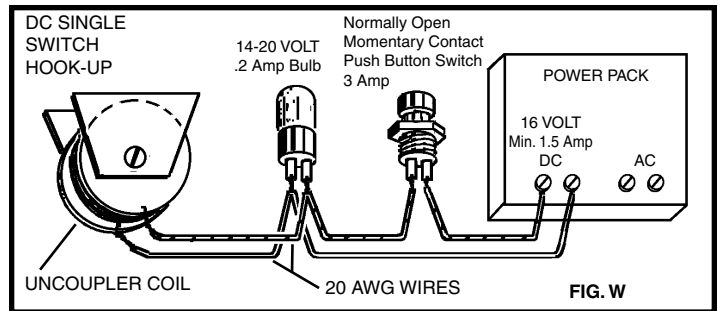
**WIRING:** Use 20 gauge color coded wire, a Kadee® #165 Normally Open momentary contact push button switch, and a light bulb (or LED) of appropriate amperage to indicate power is on when push button switch is engaged. If you are using more than one #309 **do not** wire them where more than one is energized (powered) at the same time. If more than one is powered the voltage draw would be too much for proper uncoupling. If you have more than one unit in the same circuit then use a Kadee® #165 Normally Open momentary contact push button switch and light bulb for each individual unit (fig. 5). These items are available at most hobby shops & radio/electronic stores. Also helpful are the books "Wiring Basics", "Easy Model Railroad Wiring", and "Basic Wiring for Model Railroaders" published by Kalmbach Publishing Co.

Study the illustrations of the wiring diagrams in fig. 5, W, X & Y. **NOTE:** The wire on the coil has a thin insulation which needs to be scraped back for the connection. Use the Bridge Rectifier **ONLY** if you are using AC and **NOT** for DC. If you have 16 to 18 volts AC power then you may not need the capacitor but only the Bridge Rectifier. The rectifier actually converts the current to DC and the capacitor is more or less a voltage booster and can be used if needed to boost insufficient voltage.

**WIRING for AC:** (fig. Y) First make sure your power source is turned off or, better, unplugged. Connect a wire from one of the AC terminals on the power pack to the Kadee® #165 Normally Open momentary contact push button switch then to the light bulb, and to one of the two "inside" leads of the bridge rectifier. Next connect another wire from the other AC terminal to the other inside lead of the bridge rectifier. Second, connect a wire from the outside positive lead (longest) to one of the leads on the coil of the uncoupler then another wire from the negative lead to the remaining lead of the coil. For multiple uncouplers wire them according to the illustration. Check the voltage to the uncoupler and if it drops below 16 then you will need to attach the capacitor to the bridge rectifier. Simply connect the positive lead (longest wire) of the capacitor to the outside positive lead of the rectifier (also the longest) then connect the negative leads together. Now there are four wires coming off the outside leads of the rectifier. This should boost the voltage to the uncoupler to the recommend operating level. **Do not** wire more than one uncoupler to be energized at the same time (fig. 5). Each uncoupler must have it's own Kadee® #165 Normally Open momentary contact push button switch and light.

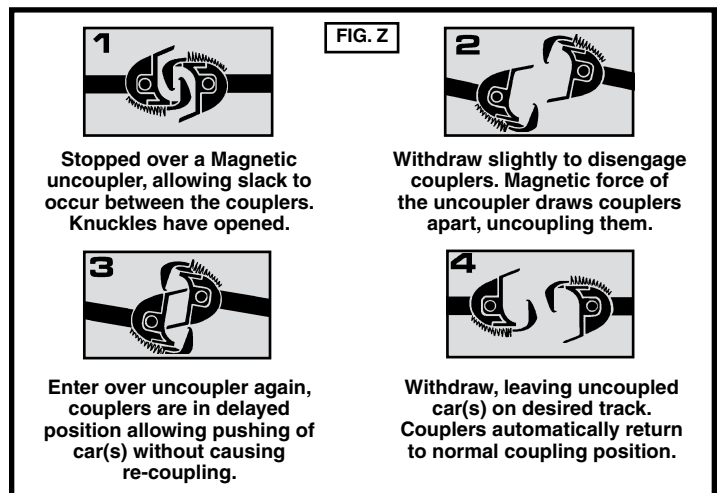
**Wiring for DC:** (fig. W) As with the AC wiring instructions make sure your power source is off or unplugged. With DC current you **do not need** the bridge rectifier. Connect a wire from the DC terminal to the Kadee® #165 Normally Open momentary contact push button switch then to the light and then to the coil. Next connect a wire from the other DC terminal directly to the coil. As with the AC wiring, **do not** wire more than one uncoupler to be energized at the same time (fig. 5). Each uncoupler must have it's own Kadee® #165 Normally Open momentary contact push button switch and light.

**For both AC and DC:** check and make sure that all the connections are made and tested. Then solder the connections and cover with insulated tape or instead of using solder use insulated electrical connectors. Check the voltage to the uncoupler & make sure it is in recommend operating levels.



**OPERATION:** "WARNING" do not use the uncoupler continually, but rather intermittently with periods of time between uses. **"DO NOT" activate the uncoupler for longer than "2 MINUTES" at one time.** This will avoid possible overheating which will damage the uncoupler.

To uncouple, pull or push coupled cars/locomotives to a stopped position at a point where the connected couplers are directly over the uncoupler. Energize the uncoupler (switch on) and with the slightest slack between the couplers they will pop open. They will stay open in the "delayed" position as long as the uncoupler is activated (energized). Now you can back into the open couplers and "spot" the car as long as you continue the pressure against the open couplers. Release the switch after uncoupling.



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**WARNING:**  
CHOKING HAZARD - Small Parts  
Not for children under 14 years.

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