

# COUPLER PRIMER

*The Kadee® coupler primer will better acquaint you with the basics of the Magne-Matic® coupling and uncoupling system. Kadee® Quality Products Company is proud that its Magne-Matic® couplers are regarded as “the hobby’s most respected couplers,” and in fact have become “The Standard by Choice” of model railroaders around the world. Also, we have included a list of terms and definitions used by Kadee® and much of the modeling world.*

Model Railroading is a continually growing hobby beginning sometime in the early 1900’s and has grown to the present day and it will continue into the distant future.

Manufactured models began as basic “toy like” models that could hardly be considered representative of the prototypes. Now days we have models that are so accurate that they are compared directly to the prototypes in almost every detail. Unfortunately, couplers did not advance at the same speed as the models and the industry suffered for a long time without a reliable functioning knuckle coupler. Modelers that have been in the hobby for a long time will remember the situation in the “old days” when, generally, couplers were not very reliable, realistic, or automatic.

When Kadee® Quality Products was formed it was with the idea of providing a reliable, realistic, automatic coupler and since 1947 Kadee® has remained a leader within the hobby.

Our earliest version of a knuckle coupler, the “K” series prototype was the first to combine a realistic looking coupler with a feature where the coupler is never “locked” in a closed position. This allows the coupler to actually be “coupled” to at anytime and because of this feature the knuckle will flex while negotiating tight curves but still remain securely coupled. This was a major achievement, enthusiastically welcomed by the hobby.

Although a big stride forward, the “K” still required physical contact with a mechanical uncoupler. This was quite conventional for its day but not the most satisfactory arrangement. So after arriving at this acceptable “K” style coupler head with its realism and dependability, the next logical step was to eliminate the physical contact with mechanical uncoupling ramps.

This was achieved with the introduction of **Magne-Matic® Uncoupling** and was a major breakthrough utilizing magnetic force to actuate the coupler. The letter “M” was added to indicate a “K” style coupler operated magnetically and these became our “MK” series. Not long after this breakthrough, Kadee® developed **Delayed-Action Uncoupling**. Now it was possible to “spot” cars at most any location without having to actually uncouple them before pulling away. This, however, was not the end of the modelers coupler problems. Now, even with a dependable functioning coupler, the modelers still faced the problems of properly mounting them on the many different types and makes of models, which sometimes required extensive modifications.

Kadee® realized that model manufacturers don’t always agree on standards for coupler mounting. Because of this, we developed and now offer the largest variety of coupler box styles, “offset” couplers, and different shank lengths to help compensate for these coupler mounting variations. Since “all” of our couplers are actuated magnetically we no longer use the “MK” to designate them. We simply use a product number sign such as <sup>NO</sup> 5® coupler or #5 coupler, etc. Kadee® Couplers have become the most respected couplers world wide due to constant research and development and a commitment to quality. We are always striving to improve the standards of the model railroading hobby.

## KADEE® COUPLERS AND UNCOUPLERS

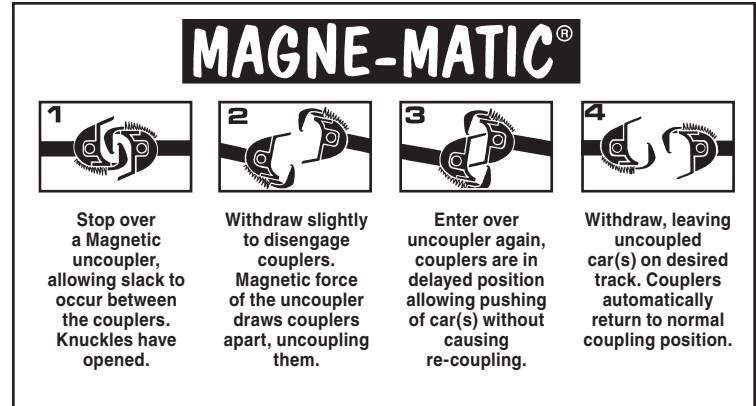
Kadee® Magne-Matic® Couplers with Delayed-Action Uncoupling offer freedom of operation and realistic prototype train movements, with a minimum of uncoupling devices. It is a complete “Hands Off System” and much more automatic than even those on full-size railroads. No actual hand contact occurs during uncoupling, thus assuring smooth, reliable performance. Our couplers can also be set in a “delayed” position that allows you to “spot” cars anywhere on the layout.

## HOW KADEE® COUPLERS AND UNCOUPLERS WORK

The Delayed-Action Couplers are ready to couple at all times—just push two cars together and they automatically “couple up”. As two couplers are pushed together, the knuckles pivot aside to bypass each other, then are returned to the closed position by a coil spring, known as the knuckle spring.

Uncoupling with Kadee® Couplers is done over a magnetic “uncoupler” (uncoupling ramp). Uncoupling takes place when mated couplers are pushed to a stop over a magnetic uncoupler. Kadee® Couplers are equipped with a metal wire “trip pin” that curves down from the knuckle of the coupler head.

The trip pins are slightly off center so when a pair of couplers are stopped over an uncoupler and slack occurs between the two couplers, the magnetic force of the uncoupler pulls the two trip pins in opposite directions out towards the rails thus opening and “uncoupling” the couplers. If you push or pull the cars away from the magnet, each coupler will automatically snap back to its centered position. (Knowing this, you realize that you “cannot recouple” over a magnetic uncoupler.) This operation is known as “**slack uncoupling**”, a very simple and reliable principle. Kadee® Couplers are designed so that it requires two conditions to be met for them to uncouple: **1.** Positioning the couplers over an uncoupler; and **2.** Slack being caused between the couplers. Therefore a train can be pulled over the uncoupler while keeping a steady tension and the cars will not accidentally uncouple.



## WHAT IS DELAYED UNCOUPLING?

It is a unique way of keeping the couplers open and uncoupled while you push the cars to be dropped off (or spotted) at most any location. The Delayed Uncoupler is mounted just ahead of the leading turnout (switch) in any track serving a number of spurs and sidings. Couplers can be automatically set in the “delayed position” by first uncoupling (see illustrated uncoupling steps) then pulling forward to completely disengage couplers. The couplers are now in the delayed position, offset in opposing directions and will remain this way over the magnet. Now push back into the couplers and as long as there is “constant” pressure against the delayed couplers the cars now can be pushed or “spotted” to any location beyond the uncoupler without recoupling. Once at the desired location, simply pull away leaving the car/s at that location. The couplers will now snap back to center and are ready to be coupled again. **Kadee® Magne-Matic® Couplers** are usually easy to install and can be adapted to almost any locomotive and rolling stock. Our couplers come with complete assembly instructions and, upon request, we provide special instructions and drawings for installations not covered in the couplers instructions, usually ones requiring some modifications.

In HO, to uncouple without Delayed-Action you must use our non-delayed #312 uncoupler mounted in correct position in your track. For HO Delayed-Action uncoupling, you must use one of our delayed uncouplers, #321 or #322 between the rails, #308 under the ties or #309 Electric Uncoupler.

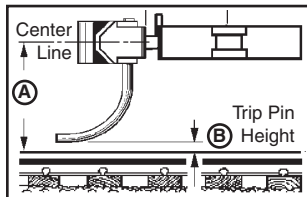
## STANDARDS

**The National Model Railroad Association, Inc. (NMRA)**, is an organization formed in 1935 to bring order out of chaos caused by the lack of standardization in the fledgling hobby of model railroading. It is made up of hobbyists like yourself, who have set down the *standards* accepted and used by the majority in the hobby. **Official NMRA “Standards”**: Cover basic scale specifications and information on items which are critical to the functioning of model railroads and necessary to the interchange of equipment between layouts.

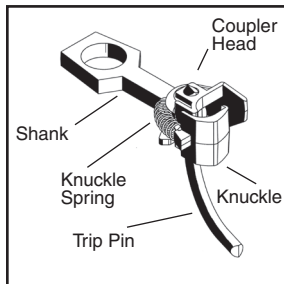
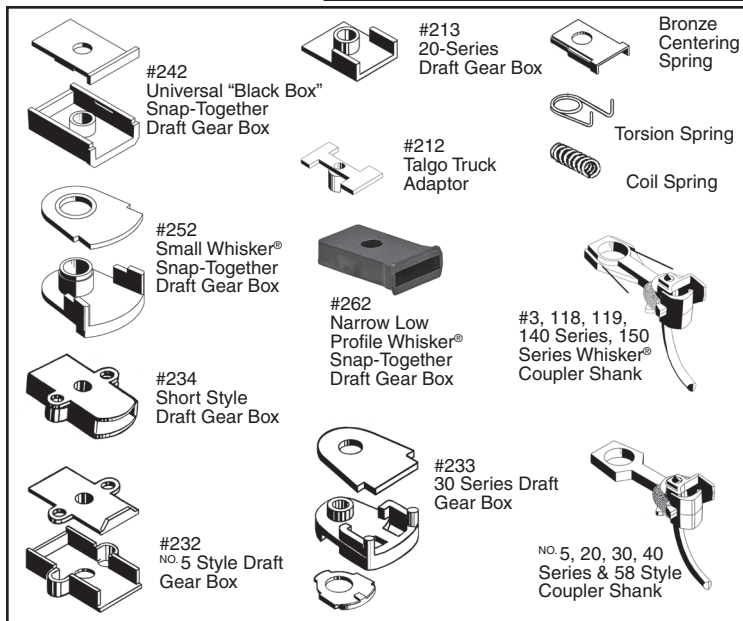
**NMRA “Recommended Practices”**: Cover items of preferred design that are slightly less critical than those in *standards*, but are desirable for improved performance and maximum interchange between components.

The *standards* set down by the **NMRA** help to standardize the industry, so to speak. They are the basics that most manufacturers try to follow when making model railroad equipment. This enables you to use equipment from different manufacturers and be assured that it will match up. We at **Kadee®** follow these **NMRA Standards and recommended practices** as closely as possible in all of our products. Our couplers are very close to prototype appearance, so they do require a different approach to adapting and mounting on your equipment. For this reason we included the illustrations for *standard* dimensions for HO<sub>n</sub>3, HO, S, On3, O, #1 and G couplers. **It is very important that you mount the couplers (in all scales) at the proper height and exactly centered on your equipment.** If the manufacturer of a particular car or locomotive has followed the **NMRA** standards for height of the coupler pocket or draft gear box on their model, you should be able to adapt the **Kadee® Coupler** and Draft Gear to their equipment without difficulty. If they have not, you may have to do some custom work to adapt Kadee® Couplers.

## NMRA STANDARD COUPLER HEIGHTS



| NMRA COUPLER HEIGHTS | A       | B     |
|----------------------|---------|-------|
| HOn3 Scale           | 9/32"   | 1/32" |
| HO Scale             | 25/64"  | 1/32" |
| S Scale              | 17/32"  | 1/32" |
| On3 Scale            | 9/16"   | 1/16" |
| O Scale              | 11/16"  | 1/16" |
| #1 Scale             | 1 1/16" | 1/8"  |
| G Scale              | 1 1/8"  | 1/8"  |



### NMRA

If you are not already a member, there is much that you are missing, so we urge you to join. Write to NMRA, Inc., 4121 Cromwell Rd., Chattanooga, TN 37421, web site [www.nmra.org](http://www.nmra.org), e-mail [hg@hgnmra.org](mailto:hg@hgnmra.org), phone (423) 892-2846, fax (423) 899-4869.

### TERMS USED WHEN WORKING WITH

#### KADEE® COUPLERS

**Automatic Coupler:** The device by which the coupling of one car to another is automatically accomplished and

maintained and by which cars can be disconnected. This means they should always be ready to couple with another under any condition. (All Kadee® Couplers are automatic).

**Boss:** A post where the coupler or trucks directly attaches and can pivot.

**Centering Spring :** The spring that serves as the centering device for the couplers.

**Centerset Coupler:** A coupler shank attached to the middle of the coupler head.

**Clearance Drill:** Drill used to provide hole large enough for screw to pass easily through material without the use of screw threads.

**Coil:** Insulated copper wire wound around a metal spool which, when current flows through, will create a magnetic force passing through the spool, as used in our #309 electric uncoupler.

**Coil Spring:** A spring made in the shape of a coil or spiral.

**Coupler:** A device by which a locomotive and cars can be attached to one another. Old style couplers were called "Link and Pin" as they used a link to connect and a pin to hold the link on each end. Today's common U. S. style is referred to as a Knuckle Coupler.

**Coupler Box:** The unit that is attached to the car or truck in which the coupler and its centering device are mounted. Also, coupler pocket or draft gear box.

**Coupler Centering Device:** An arrangement for maintaining the coupler in its normal centerline position, but allows for the movement from side to side when rounding curves coupled to another car. Centering Spring in the #5, #58, #9, 20-Series and 40-Series couplers; Coil Spring in the #2100 couplers; Torsion Spring in the 30-Series couplers; Whisker® Spring built into in the #3, #118, #119, 150-Series & 140-Series couplers.

**Coupler Centering Spring:** The spring used as a centering device in all Kadee® Couplers.

**Coupler head:** The portion of the coupler that houses the knuckle pivoting mechanism.

**Coupler Jaw (lip or lock):** The offset hooked edge on the coupler head opposite the knuckle that keeps the knuckles coupled.

**Coupler Pivot Post:** The part of the Coupler Draft Gear Box where the coupler directly attaches and can pivot.

**Cow Catcher:** The sloped grate front end of a steam locomotive nearest the track designed to deflect objects from the tracks. Also referred to as a road pilot.

**Delayed Uncoupling:** A term unique to Kadee® Magne-Matic® Couplers which allows the couplers not to couple while *spotting* cars on a siding.

**Diameter:** A straight line segment passing through the center of a circle. See *radius*

**Draft Gear (Box):** The unit that houses the coupler shank and centering device and connects to car or locomotive. Also, coupler pocket or coupler box.

**Draft Gear Box Lid:** The cover that encloses the Draft Gear Box, retaining the centering device (spring).

**Draft Gear, Cast-on:** The draft gear pocket that is made as part of the car, locomotive underframe or truck.

**Draft Spring:** A spring attached to the coupler to give elasticity when pulling (slack action). The Kadee® #4 centering spring acts as a "draft spring" giving prototype elasticity.

**Draw Bar:** A term that designates the old link and pin type coupling used primarily between locomotives and their tenders. An actual bar used as the connection in place of a coupler.

**Draw Head:** The head of the AAR style coupler, without the knuckle.

**Dummy Coupler:** A coupler having the AAR standard design and outline, but no working knuckle. It can only be coupled and uncoupled manually, by lifting one coupler out of the other. Also used mostly on the pilots of steam locomotives for "looks" only.

**Electromagnetic Uncoupler:** An electrically activated uncoupling ramp.

**End Sill:** The section of the car underframe extending across the entire width of the car. On passenger cars, the end sill is the area directly under the door or platform. The flat end panel or bumper of a car or locomotive.

**Flash:** Unwanted cast metal, or plastic, forced into the parting line between the halves of the mold. Flashing should be removed to insure the proper fit of mating parts.

**Glad Hand:** Railroad term for air line hose and fitting hanging down at the end of a car or locomotive. Also used to define Kadee's *Trip Pin*, see *Trip Pin*.

**Knuckle:** The pivoting coupling hook by which coupling is affected when the knuckle is closed and held under spring tension, or locking pin.

**Knuckle Spring:** The coil spring on the side of the coupler head that allows the knuckle to open and close when mating with the knuckle of another coupler and holds it closed after coupling is completed.

**Offset Coupler Shank:** A coupler shank attached to the top or bottom of the coupler head instead of the middle. (The #27 Kadee® coupler has a .050" underset shank.)

**Overset Coupler:** A coupler shank attached to the top of the coupler head, raising the knuckle height.

**Pocket:** The recess in which the coupler is installed.

**Pilot:** Front end of steam or diesel locomotives.

**Pin Vise:** A handle or holder used to grip small drills and taps for hand drilling and tapping procedures.

**Prototype:** An original or model after which anything is formed. In the case of model railroading, the prototype is the real thing. (Also prototypical)

**Radius:** (radii) 1/2 the diameter of a circle. See *diameter*

**Shim:** A thin piece of wood, metal or plastic used to reposition one part or unit in relation to another. (Used between a coupler box and mounting surface to alter the coupler height.)

**Spacer Dowel:** A small metal dowel (wire) installed in the centering spring of the #4 and #15 couplers to prevent the spring from collapsing or compressing too far.

**Shank:** The neck or shaft part of the coupler extending behind the coupler head (drawbar on real Couplers).

**Spot:** Setting of rolling stock at a particular spot. Dropping off.

**Stepboard (pilot):** A step or board running part way or all the way across the width of a car or locomotive for a person to stand on. Usually found on switcher types locomotives, some tenders, and certain types of rolling stock.

**Tap:** A tool for cutting an internal thread in a drilled hole.

**Tap Drill:** Drill used to provide sufficient thread material for tapping.

**Torsion spring:** A centering spring for 30-Series couplers made of phosphor bronze wire looped with angled legs.

**Truck mounted coupler (Talگو truck):** A coupler mounted on a plate or draft gear box attached to the truck bolster and pivots with the truck.

**Trip pin:** The curved steel wire projecting down from the coupler head, attached to the pivoting knuckle. This pin causes the knuckle to swing open when slack occurs over a magnet.

**Uncoupler:** A device to uncouple couplers; either magnetically or manually. The magnet can be permanent or electrically energized. The #241 "Dual Tool" Manual Uncoupling Tool is a very effective tool for manually uncoupling couplers where a uncoupling magnet is not present.

**Underframe:** Includes all of the framing below the floor and includes the sills, "chassis". See *end sill*.

**Underset Coupler:** A coupler shank attached to the bottom of the coupler head, lowering the knuckle height.

**Whisker® Spring :** The integrated centering spring on the shank of Whisker® couplers.

**Working Coupler:** A coupler based on the American Association of Railroads (AAR) standard design with a working knuckle. From the closed position the knuckle must be opened to couple.

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