

Installation Guide

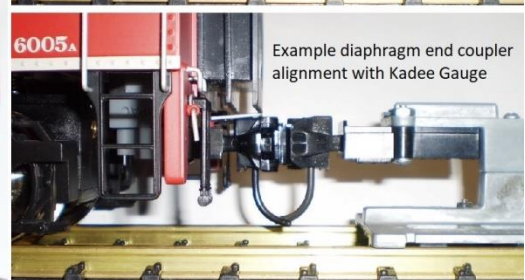
USA Trains ALCO PA & PB CamPac Components

Ted Doskaris

1/28/2020



**USA Trains ALCO PA
Equipped with CamPac Box™
Fitted with Kadee® Centerset
Couplers**



*Kadee is a registered trademark of
Kadee Quality Products Co., White City, Oregon, USA.

Installing 3-D Printed pedestal and coupler box components on ALCO PA & PB Passenger Loco

Overview

- Instructions are provided as a guide for the installer of 3-D printed *CamPac Box™* and pedestal on the USA Trains brand ALCO PA and booster PB “G” (1/29) scale diesel passenger locomotive¹.
With CamPac components properly installed, layout operation with a train coupled at the PA & PB diaphragm end is intended for 8 foot diameter or greater track curves. When coupling a train to the PA nose end, operation is intended for 10 foot diameter or greater curves, but an option is provided for coupler box installation at the PA nose that could extend operation with limitations down to 8 foot diameter curves. **For operation on 8 to 10 foot curves and possibly somewhat greater, a car coupled to the nose of the PA must be about 17 inches or longer - typical of a "40 foot" prototype type car. Cars with 3 axle trucks can bind wheels when entering and exiting from 8 foot diameter curve to a straight track.** **Note: Revisions or modifications made to the loco are irrevocable, which will affect the resale value to the possible detriment or benefit of the loco.**
- The installer is to have access to tools and have adequate skills to make cuts and do finish work.
- Tools needed include Phillips type P2 screwdriver, compact hacksaw holder with blade, razor saw, 6 inch combination square, small right angle flat blade screwdriver desired for prying, sharp pencil or pointed scribe or razor knife (to mark cut lines), medium & small size files. (Measuring tools include ½ inch wide by 6 inch long machinist scale, caliper optional.)
- *CamPac* 3-D printed components include coupler boxes (2) and pedestals (2). Other items are #4-40 long screw (2), #2-56 flat head screw (2), #2-56 pan head screw (2).
- Not included: The installer will need to supply a Kadee 907 kit (1) of which all (but the plastic box & lid screw) will be fitted onto each *CamPac Box*. A Kadee 980 coupler height gauge should also be obtained.

By necessity, installation of the *CamPac Box™* on the front of the PA emulates the prototype, and thus, requires a fairly simple modification to the factory pilot and its “Blank Plate” plug.



¹ **Caution:** When operating the locomotive, abrupt excess force (e.g. collision/yanking) to the coupler may result in damage to coupler, coupler box, or other components. Operating the locomotive coupled to a car with truck mount coupler on tight curve track is incompatible - the car can be pulled off the track and loco may derail. Layout “S” bends must have a straight track between diverging curves with minimum length the greater of longest car or loco to be operated.

Instructions are provided to accomplish:

- ✓ Install Kadee kit parts onto *CamPac Box™* (coupler box)
- ✓ Cut out area in front pilot to accommodate box with centerset coupler
- ✓ Install mounting pedestal & coupler box assembly on both ends of loco

Installation Steps:

Step 1 – Coupler Box Preparation

Install selected parts from a Kadee² 907 Kit in the *CamPac Box*. (Box to be fastened to pedestal & mounted later)

Advisory:

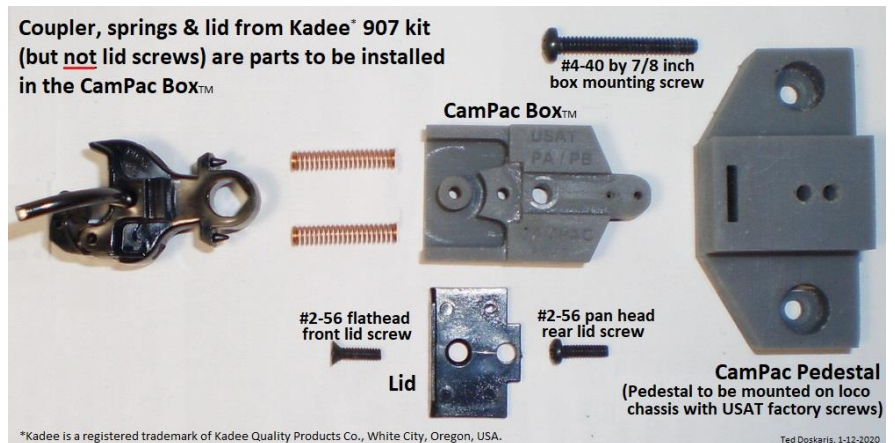
The *CamPac Box™* is optimized for the "G" scale, preferential late version, AAR E type coupler from the Kadee 907 kit not having a completely round shank hole compared to its introduction version or older predecessor coupler from the 789 kit. Both prior version couplers can bind on the box mounting post. (Shank hole would need to be enlarged to fit)



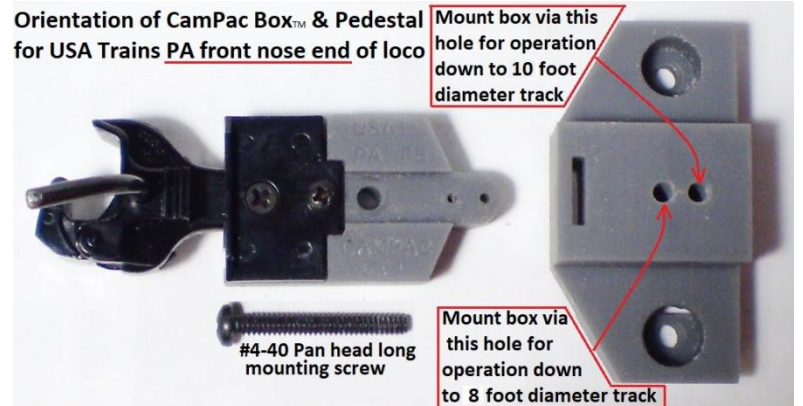
Verify installed coupler freely swings side to side & self-centers. If not, slightly back out lid screws one at a time. Also, try to tighten the lid's tail screw with front screw loosened. Burnishing the coupler shank pivot surfaces can be beneficial, too.

Note: For now, don't mount the box assembly on the pedestal. This will be done in Step 6.

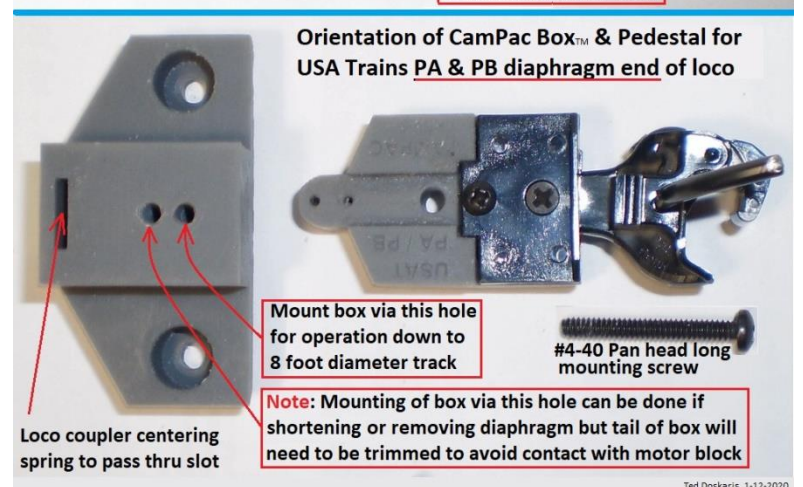
Coupler box mounting and pedestal direction depends on which end of the loco it's fastened to along with user options as described in the illustration. **Note:** The user can opt for a swinging box by not fully tightening the box mounting screw.



Orientation of CamPac Box™ & Pedestal for USA Trains PA front nose end of loco



Orientation of CamPac Box™ & Pedestal for USA Trains PA & PB diaphragm end of loco



² Kadee is a registered trademark of Kadee Quality Products Co., White City, Oregon, USA.

Step 2 – Loco Placement

Carefully place the loco on its back (with underbody facing up) on a soft surface in such a way so that any delicate top components (i.e. horns, vent, steam generator parts) are not at risk of damage. Ensure the loco is braced so not to fall over. **Note:** The PA front pilot is to be modified and can be left in place on the loco to do so, however, it's safer and easier to work on when removed as described in this guide

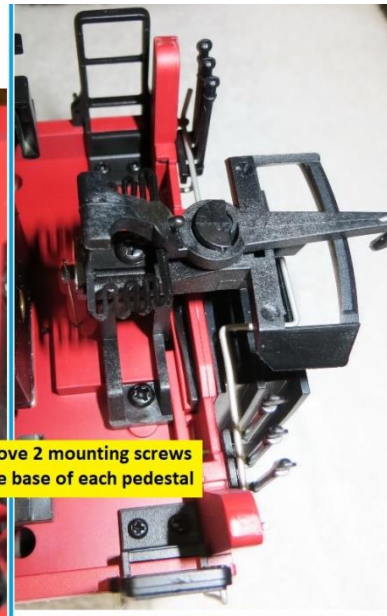
Step 3 – Parts to Remove

Methods for removing existing coupler assemblies and the pilot are described in the following illustrations. Both ends of the PB are like the diaphragm end of the PA.

Remove factory (or aftermarket) pedestals with couplers from both ends of the PA or PB loco



Remove 2 mounting screws at the base of each pedestal

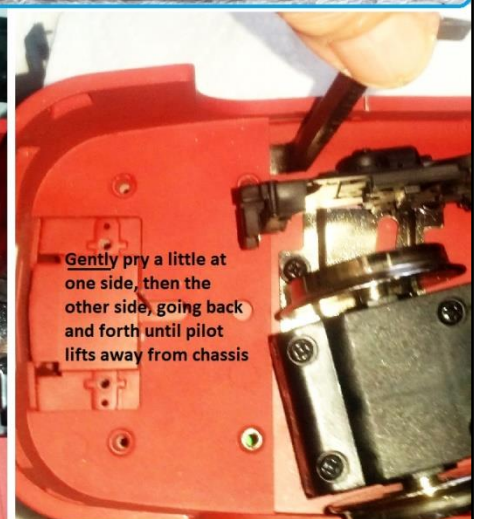
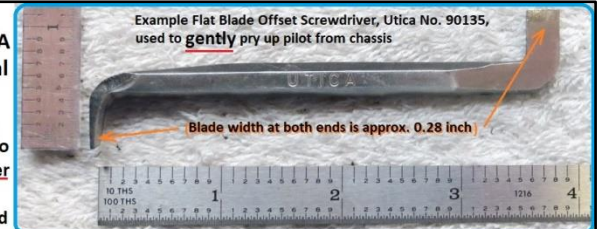


Withdraw pedestals and couplers



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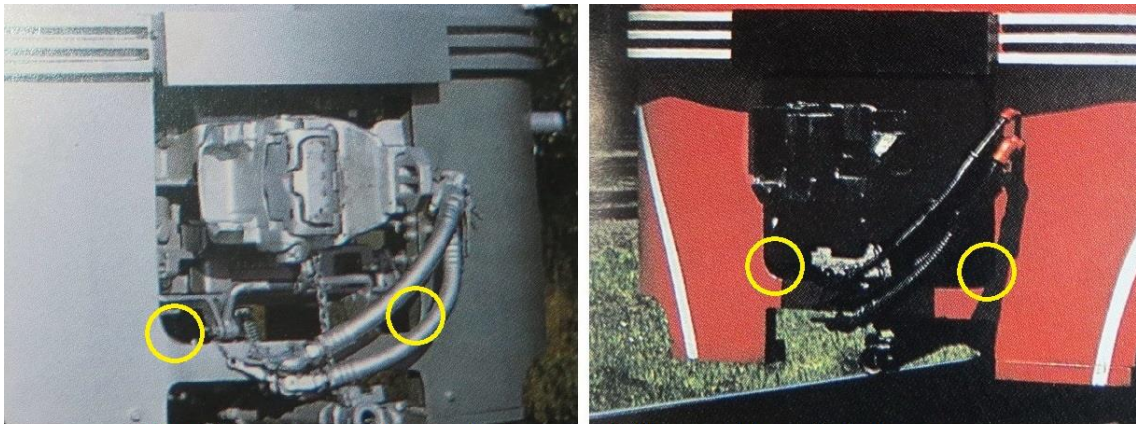
Example USA Trains PA Pilot Removal
Pilot tends to stick to chassis and may need to be pried up after its 4 fastening screws removed



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Step 4 – PA Pilot Cutout

The PA front pilot and its plug must be cut out to resemble a prototype loco to accommodate the CamPac Box™ with centerset coupler.



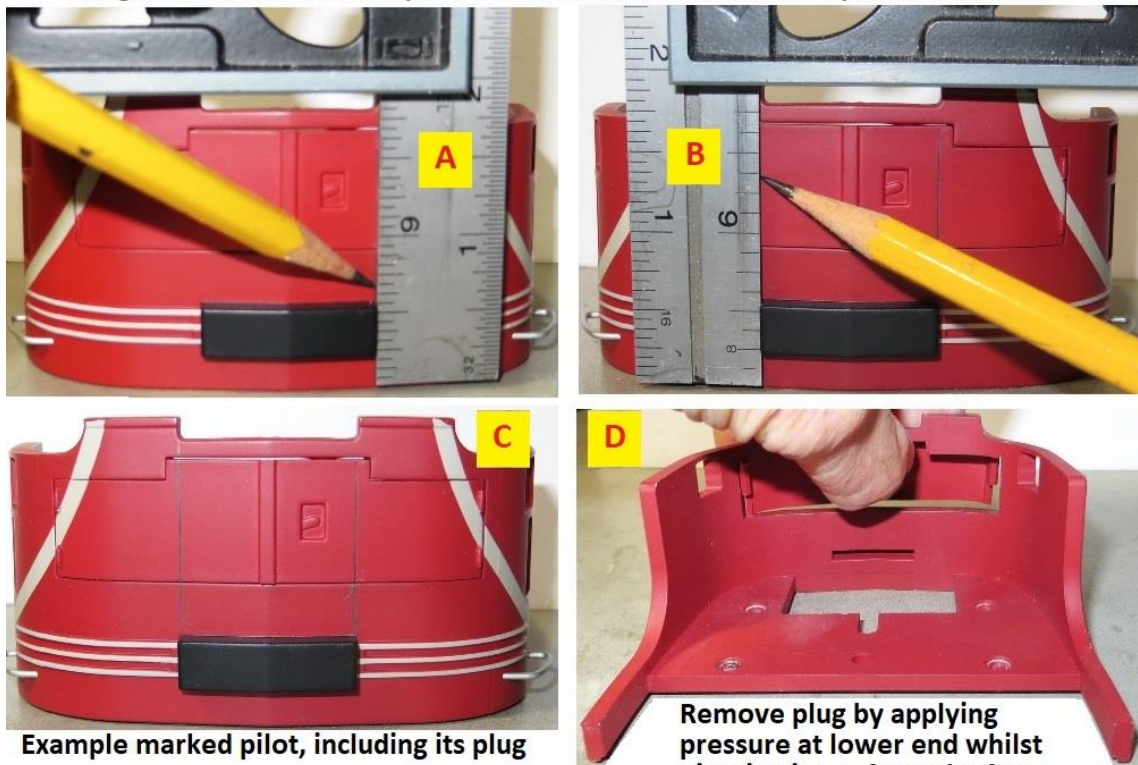
Note: The prototype pilot opening has a small fillet transition at its lower corners. The simple modification method to be shown for the USA Trains PA pilot does not replicate the fillets.

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Both the pilot and its plug, shown upside down below, are to be marked for cut lines as illustrated. A small size combination square is best used to establish accurate marks for cut lines.

Establishing Cut Marks on Pilot and "Blank Plate" Plug

Using small combination square, mark visible lines from bumper on both sides:



Example marked pilot, including its plug

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Remove plug by applying pressure at lower end whilst pivoting it out from the front

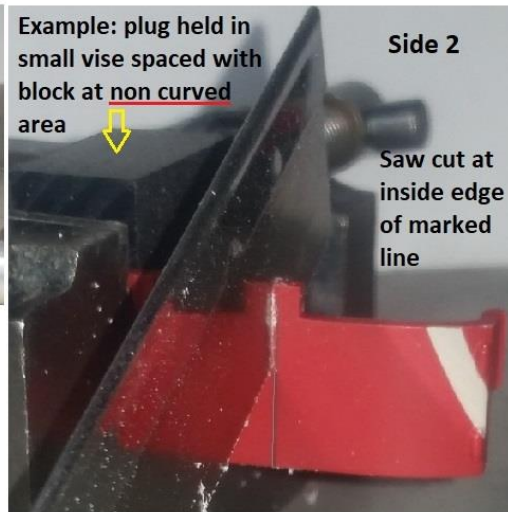
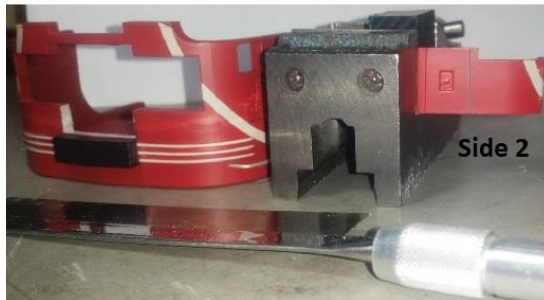
See next page for example method for making the plug cuts.

Step 4A – Cutting Pilot Plug - what USA Trains calls the "Blank Plate"

Cuts are to be made from the inside edge of the marked lines

USA Trains PA loco's "Blank Plate" pilot plug must forego its center section in order to accept a centerset coupler. The residual side pieces to be installed in the pilot opening.

Left & right plug pieces saved for installation in the pilot, so cuts must be made at the inside edge of marked lines



Finish file to marked line for each piece



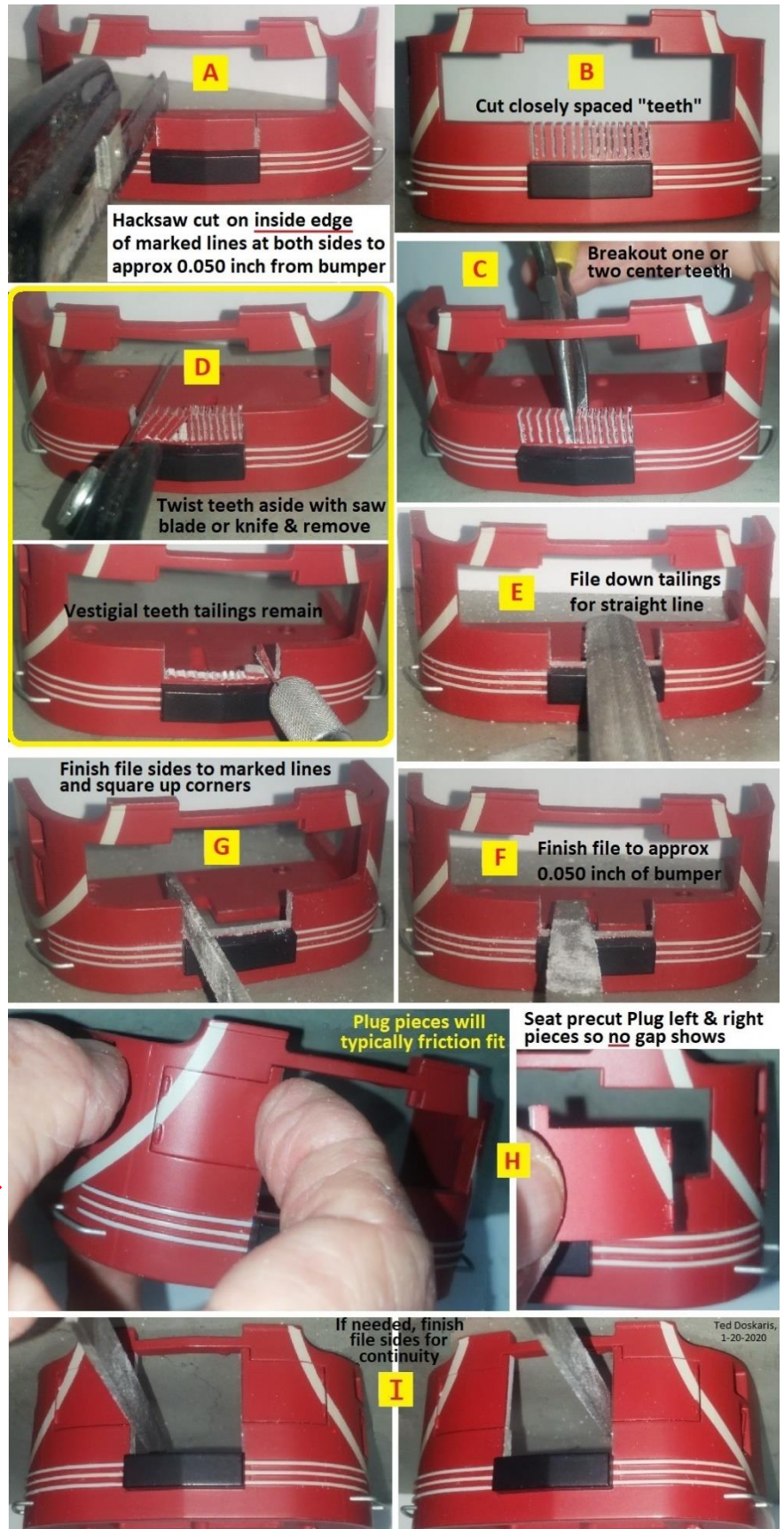
Discard center piece

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Step 4B – Notching the Pilot

The steps for notching the pilot are as illustrated.

Be sure to make cuts from the inside edge of the marked lines like done for the plug.



Illustrated is the installation of the precut plug pieces in the pilot. Ensure the pieces are fully seated having no gaps. They should line up with the notch cutout of the pilot and only may require slight file finishing where they meet. In the event the pieces may fit too loose, they can be glued from the back side.

Note: The finished cut edges can be touch up painted.

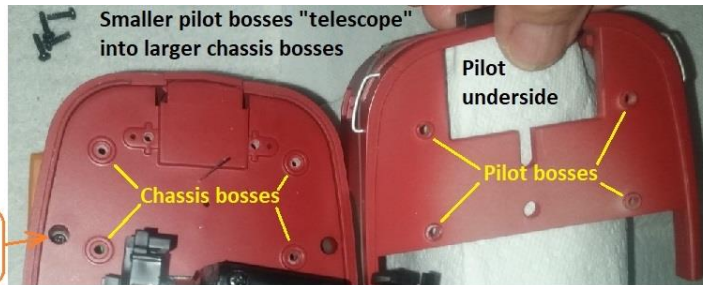
Step 4C – Reinstalling the Pilot

Illustrated are the steps for installing the modified pilot on the loco's chassis.

USA Trains PA Pilot Installation

Example
technique
illustrated

FYI, "Hidden" recess for
chassis to body shell
fastener on each side

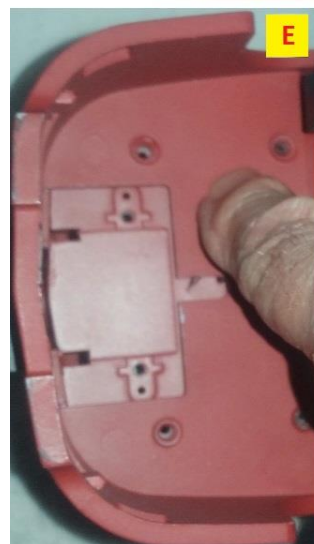
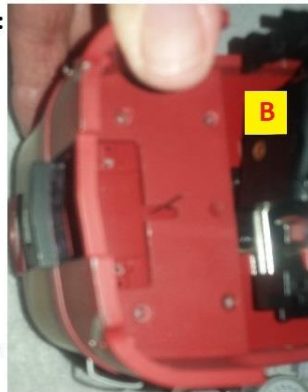


Seating Pilot:

Place pilot
on chassis
and seat all
the way
around by
pinching as
illustrated

Then press
down on the
pilot's
interior area
to ensure
bosses are
fully seated

The pilot
may "snap"
in place
during this
process

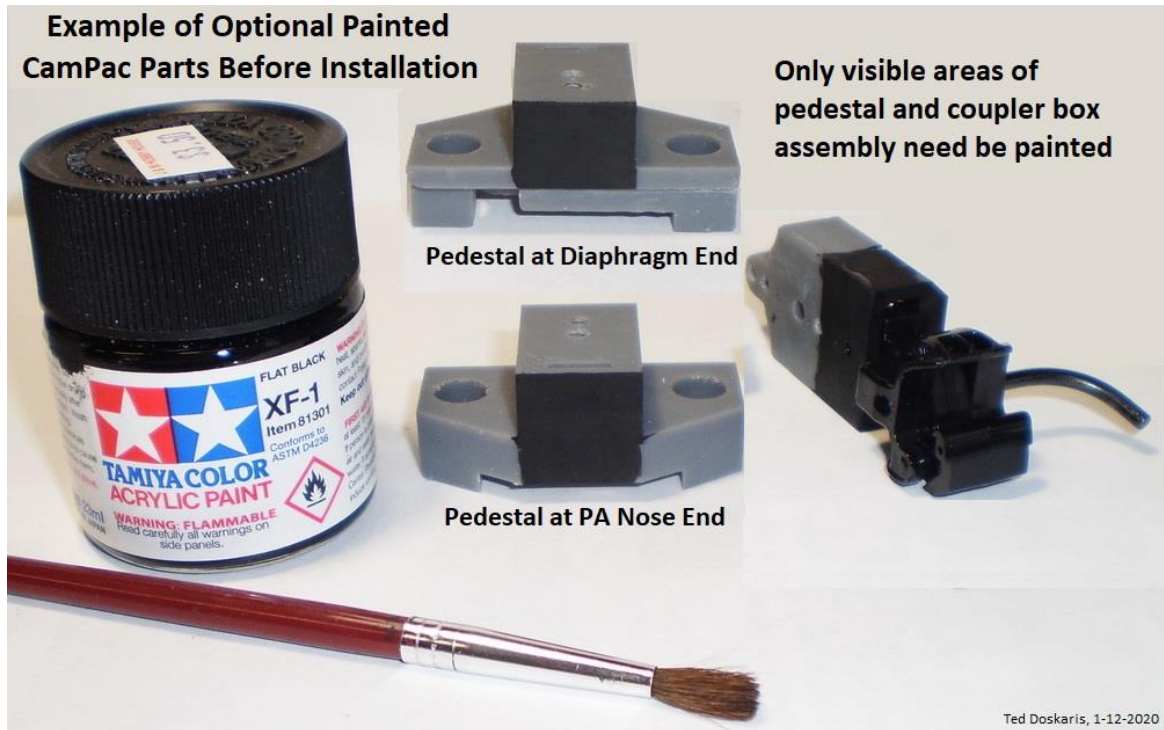


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Step 5 – Preparing CamPac Components

The CamPac components plastic resin can be painted.

If desired, the preassembled coupler boxes and pedestals are best prepainted to be less conspicuous in accordance to a prototype loco before installation.



Step 6 – CamPac Components Installation

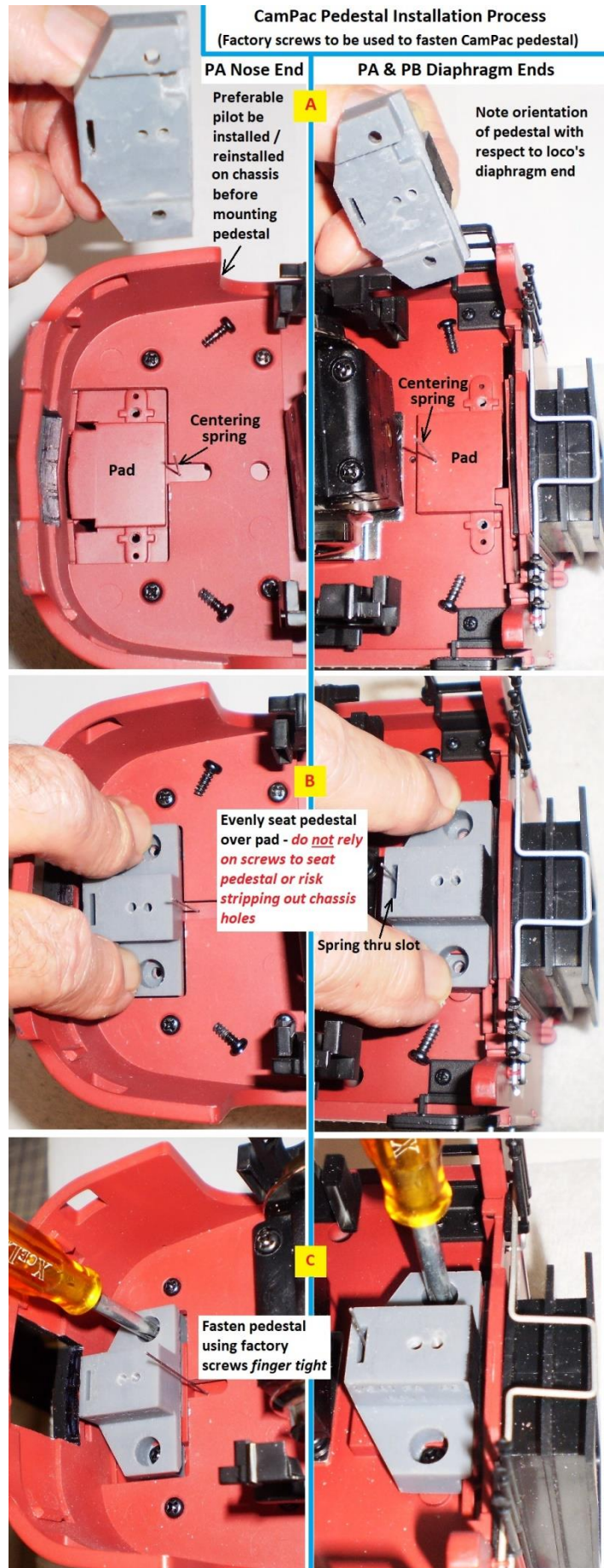
Step 6A CamPac Pedestal mounting

The installation of the CamPac pedestal for both PA & PB is illustrated.

Position the pedestal with its mounting holes aligned with the chassis holes.

Advisory: Ensure pedestal is evenly seated on the chassis pad by looking for any uneven gaps at its base. When installing factory mounting screws, progressively tighten them a little at a time from side to side of the pedestal until equally seated and then finger tighten.

Factory chassis threaded holes are at risk of stripping if using too much torque on the screws.



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Step 6B

CamPac Box™ PA Pilot nose mounting

The installation of the preassembled CamPac Box™ with coupler is illustrated.

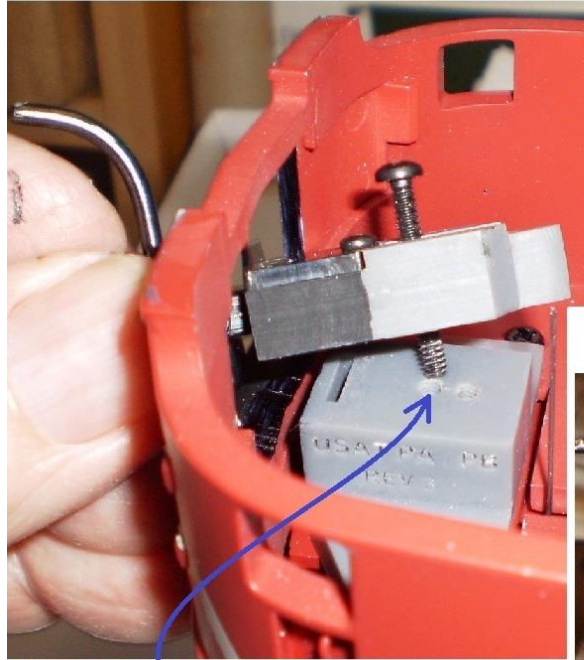
Limitation Advisory:

When operating the PA with a train coupled at its nose on 8 to 10 foot diameter curves, and possibly somewhat greater, the car coupled to the PA nose must be about 17 inches or longer. (Being the PA is a passenger loco, a typical "head-end" type passenger car should be more than sufficient.)

Be advised that cars with 3 axle trucks can bind wheel flanges against the side of the railhead when entering and exiting from 8 foot diameter curve to/from a straight track.

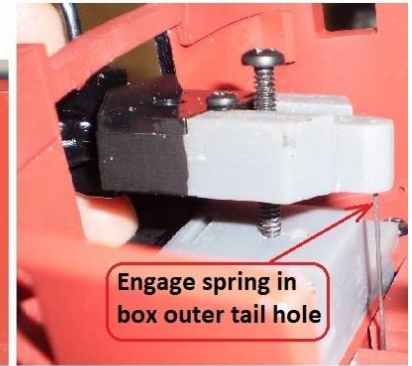
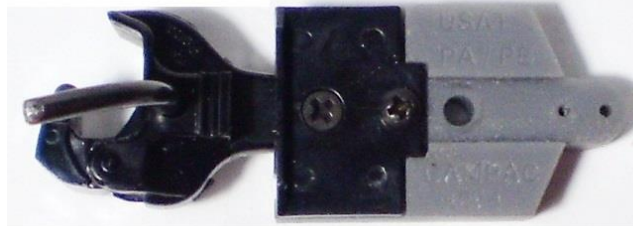
The swinging box feature could help depending on coupled car and track work.

CamPac Box™ Assembly Installation on PA Loco Pilot Nose End



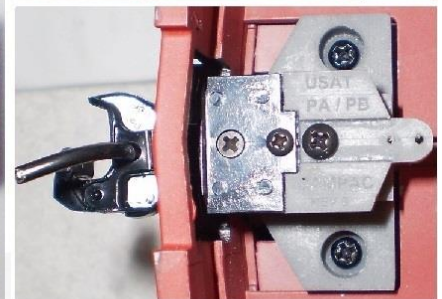
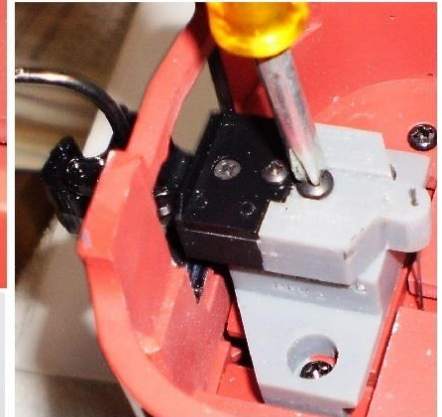
Box mounted at this hole is intended for operation (with some limitation) down to 8 foot diameter track curves

For more prototypical appearance, box can be mounted via this hole for operation down to 10 foot diameter track, but if opting to utilize swinging box, travel is limited



Engage spring in box outer tail hole

Align box straight & then torque screw tight (See Note*)



Orientation of CamPac Box™ & Pedestal for USA Trains PA front nose end of loco

#4-40 Pan head long mounting screw

***Note:** To avail use of swinging box function should track work dictate, burnish box and mating pedestal surfaces with powdered graphite lubricant, and mount box with mounting screw tightened just enough so box freely swings. This may affect coupler alignment with Kadee gauge, thus, restricting placement of leveling shims under pedestal at chassis pad.

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Step 6C

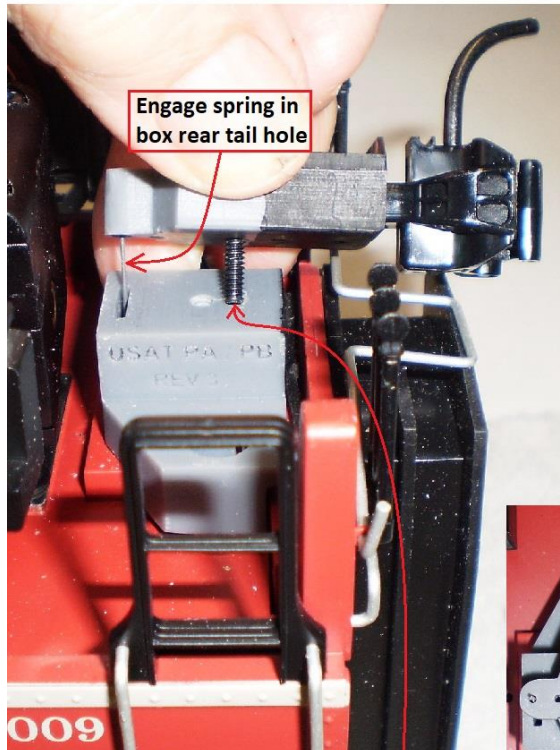
CamPac Box™ PA & PB Diaphragm end mounting

The installation of the preassembled CamPac Box™ with coupler is illustrated.

Note

Operation can be down to 8 foot diameter track curves when the PA and /or PB is coupled to a train at its diaphragm end.

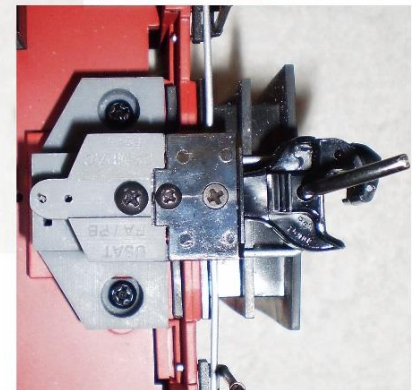
CamPac Box™ Assembly Installation on PA & PB Loco Diaphragm End



Engage spring in
box rear tail hole

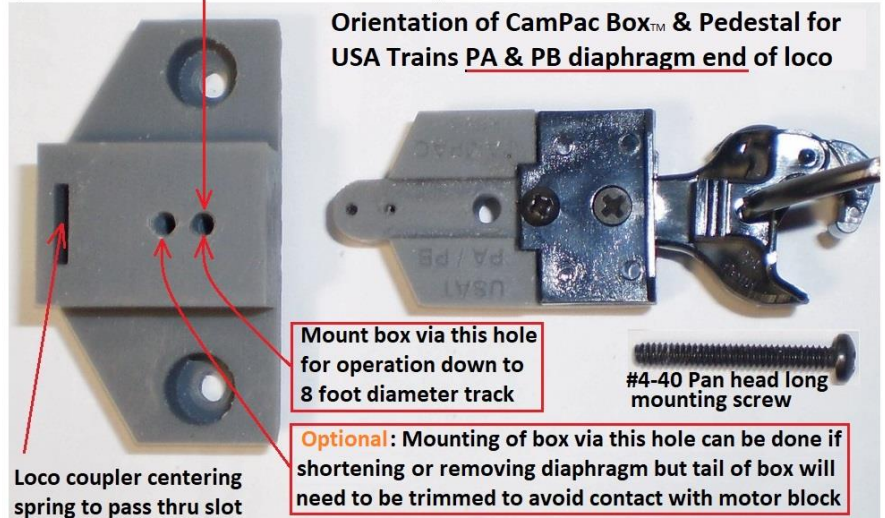


Align box
straight &
then torque
screw tight
(See Note*)



The box is normally mounted in this hole. This accommodates operation down to 8 foot diameter track curves for diaphragm clearance when coupled to another PA/PB or passenger car with diaphragm.

Orientation of CamPac Box™ & Pedestal for USA Trains PA & PB diaphragm end of loco



Loco coupler centering
spring to pass thru slot

Mount box via this hole
for operation down to
8 foot diameter track

#4-40 Pan head long
mounting screw

Optional: Mounting of box via this hole can be done if shortening or removing diaphragm but tail of box will need to be trimmed to avoid contact with motor block

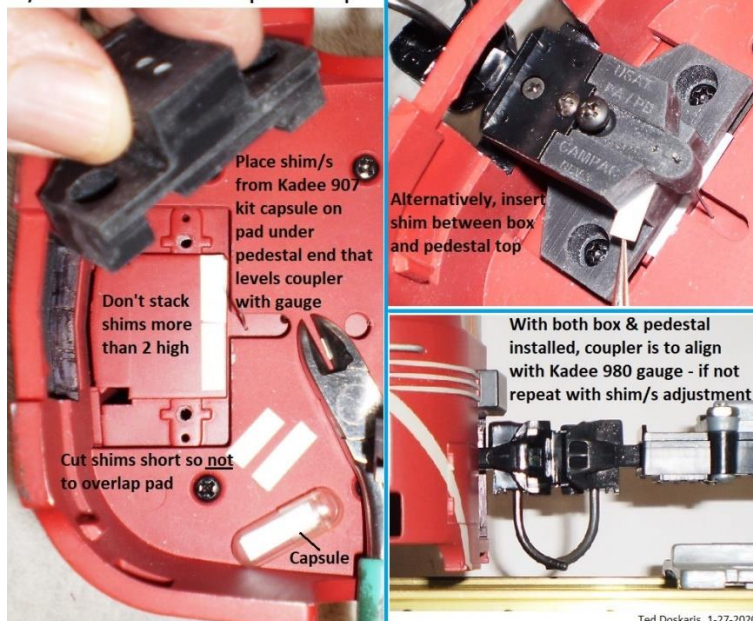
***Note:** To avail use of swinging box function should track work dictate, burnish box and mating pedestal surfaces with powdered graphite lubricant, and mount box with mounting screw tightened just enough so box freely swings. This may affect coupler alignment with Kadee gauge, thus, restricting placement of leveling shims under pedestal at chassis pad.

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Step 7 –Coupler Alignment

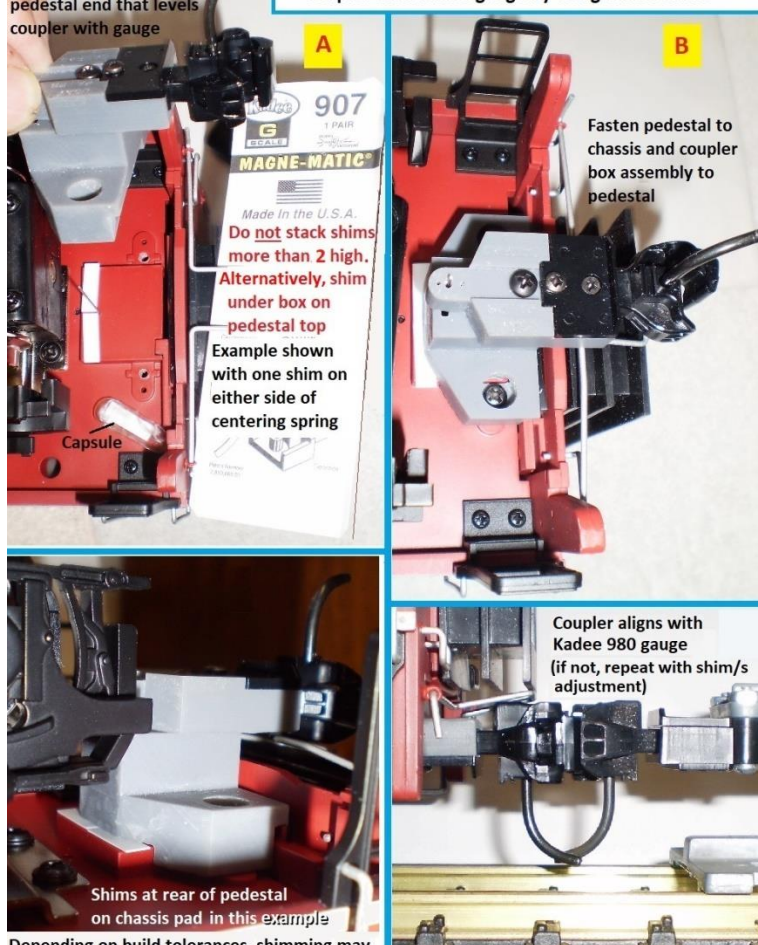
- At both ends of the loco, check the coupler alignment with a Kadee 980 gauge.
- Adjust if needed using shims. The white shims from the Kadee 907 kit capsule are about 0.010 inch thick.
- Shimming methods are virtually the same for both PA nose end and PA & PB diaphragm ends.
- Shimming can be done at either or both pedestal base and under the CamPac Box™
- Shimming under the CamPac Box™ negates the use of the swinging box function.
- **Caution:** Stacking shims more than 2 high under the pedestal risks fastening integrity or possible damage.

Example method to align PA nose coupler with Kadee gauge by shimming under pedestal or/and at CamPac Box™ and pedestal top



Place shim/s from Kadee 907 kit capsule on pad under pedestal end that levels coupler with gauge

Example method to align PA & PB diaphragm end coupler with Kadee gauge by using Kadee shims



Depending on build tolerances, shimming may or may not be needed, or shimming may be needed at opposite end of pedestal than in examples

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Illustrated below is an example PB coupled to a PA nose with different positioning of the PA coupler box.



Operational Advisory:

Layouts with "S" bends having tight curves (8 foot diameter & greater) are to have a straight track section at least the length of your longest car / loco between its opposite diverging curves or risk derailing the loco's coupled car and possibly the loco, too.



USA Trains ALCO PA



USA Trains ALCO PB

!!!*Done*!!!

Congratulations

The USA Trains PA and or PB now looks more like the prototype with capability to perform on reasonably tight curves when coupled to other body mounted locos or rolling stock having *properly equipped* Kadee centerset type couplers.