

Installation Guide

USA Trains SD40-2 & CamPac Components

Ted Doskaris

12/21/2018

**USA Trains SD40-2 fitted with CamPac Box™ and Rear Pilot Plug
CamPac box equipped with Kadee 907 centerset coupler, springs & lid**



Front Snowplow with "knock out" modified for box & remounted higher from railhead.

Installing 3-D Printed Components, including coupler box, pedestal and pilot plug

Overview

- Instructions are provided as a guide for the installer of 3-D printed *CamPac Box™* and components on the USA Trains brand SD40-2 “G” (1/29) scale Diesel locomotive¹.
- What’s done to the front of the loco is also to be done to the rear, except snowplow not applicable. (Revision to loco includes pilots’ cutout to accept coupler box and modification to snowplow center plug “knock out”.) **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 P1 screwdriver, razor saw, sharp pointed scribe or razor knife to mark cut lines, medium & small size files, and drill bit (~5/16”) used to “countersink” small rear hole in coupler box lid. (Measuring tools include machinist scale, caliper preferred.)
- *CamPac* 3-D printed components include coupler boxes (2), pedestals (2) and pilot plug (1). Other items are #2-56 long screw (2) with #2 lock washer (2) and #2-56 flathead screw (4)
- Not included: The installer will need to supply a Kadee 907 kit (1) of which all (but the plastic box) will be fitted onto each *CamPac Box*.

Coupler Box & Pedestal Relationship

Instructions provided to accomplish:

- ✓ Install Kadee kit parts onto *CamPac Box* (coupler box)
- ✓ Cut out notch in front & rear pilot to accommodate box
- ✓ Install mounting pedestal & coupler box assembly on both ends of loco
- ✓ Modify snowplow “knock out” for wider opening to facilitate box, and preferably reinstall higher from railhead than factory
- ✓ Install pilot plug to cover large factory opening on rear of loco if not using snowplow there

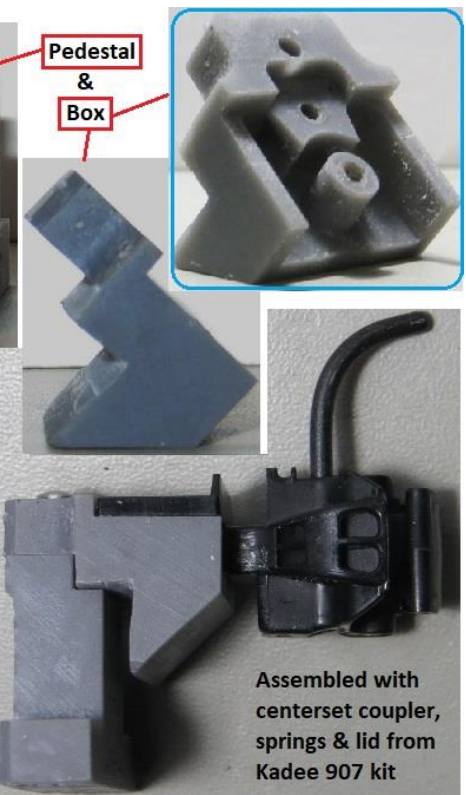
CamPac components used for USAT SD40-2 shown in gray resin. They can be painted whether in gray or black resin.



Box with integrated fairing:



Ted Doskaris, 12-19-2018



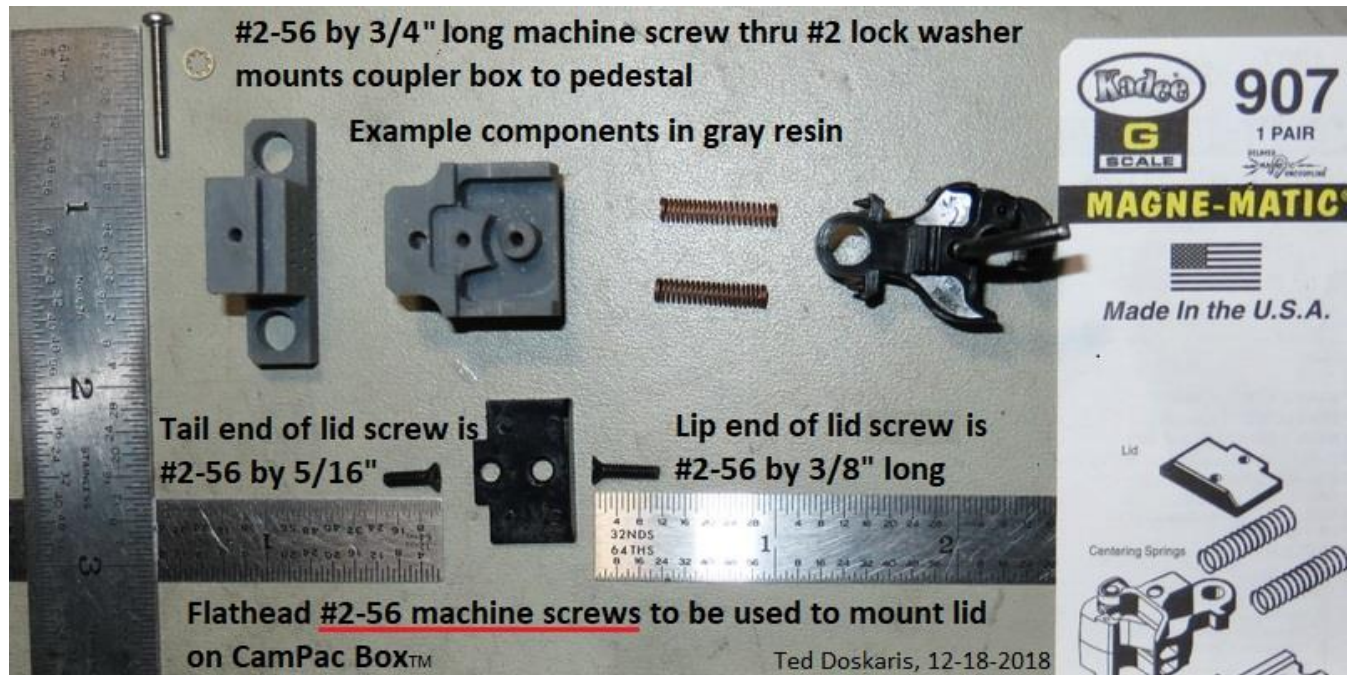
Assembled with centerset coupler, springs & lid from Kadee 907 kit

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- car can/will be pulled off track.

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)



Before fastening lid to box, countersink its rear hole so flathead screw head is flush with lid surface.



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

Step 2 - Loco Placement

Carefully place the SD40 on its back (with underbody facing up) on a soft surface in such a way so that any delicate components (i.e. antenna) are not at risk of damage. Ensure it's braced so not to fall over.

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

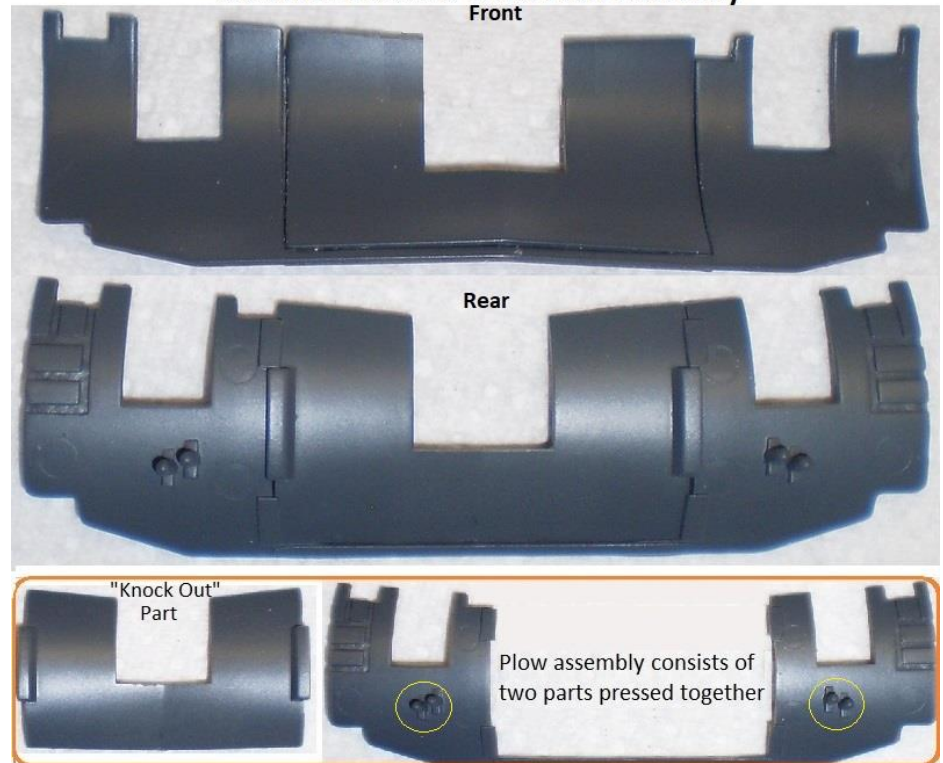
Step 3 - Parts to Remove

Remove the front snowplow

The plow is pressed on the pilot via two staggered pegs at either side on the rear of the plow.

If center plug ("knock out") was not installed, locate it for later use.

USA Trains SD40-2 Snow Plow Assembly



The plow is retained by 4 pegs (2 each on each side) on back side that press into pilot holes (Staggered peg pair help prevent plow from twisting, particularly if knock out not used)

Ted Doskaris, 12-20-2018

Remove the factory hook and loop or knuckle coupler and pedestal from loco's chassis.

First, remove the 2 screws at the base of the pedestal, and then extract the pedestal as illustrated:



Ted Doskaris, 12-20-2018

Ted Doskaris 12-20-2018

Step 4 - Pilot Cutout

Example shown without detail parts installed, however, the cutout can be done with them installed using caution.

Do same for both front & rear pilots

Pilot area marked / scribed to be cut to dimensions as shown.

Desired target depth of cutout is 0.220 inch to 0.230 inch.

Establish boundary marks for notch cutout.

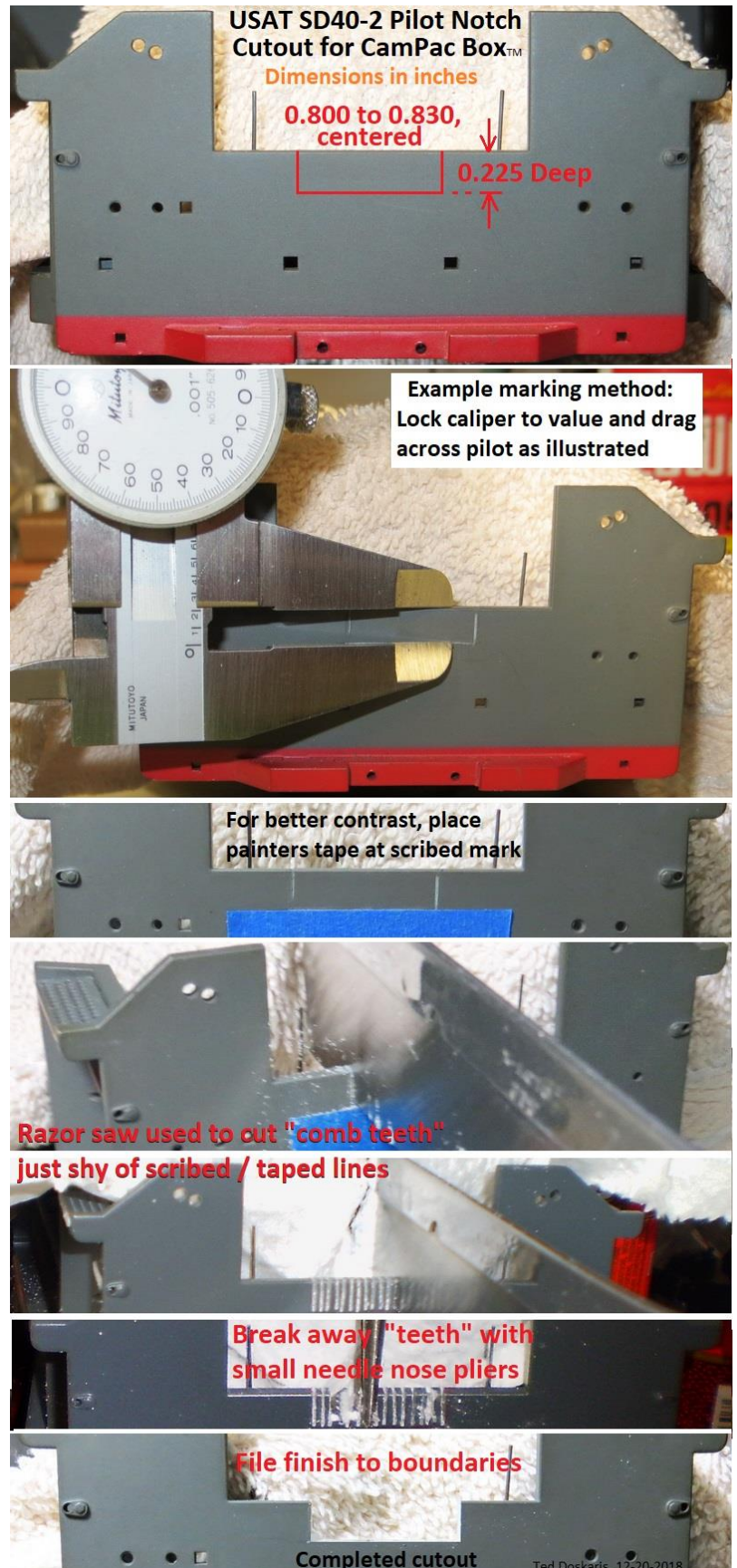
(Ensure marked area is horizontally centered within overall pilot opening.)

For some loco colors, cutout lines may be poor in contrast. Applying painter's tape beside cut lines may be helpful to improve visibility.

Example method illustrated using razor saw to cut closely spaced successive "comb teeth"

Progressively break out "teeth" starting from center to edges with small needle nose pliers.

Finish to marked boundaries and "square up" corners using file.



Step 5 - Pedestal Installation

Orient pedestal with label facing front as illustrated. (The pedestal is only to go in one way.)

(Note that the two prong centering spring used for the original factory swinging coupler can be left in place.)

Seat pedestal base over chassis bosses.

Place factory fastener screws in holes of chassis bosses.

(Using tweezers are helpful in tight confines)

Before final tightening of screws, take advantage of whatever minimal horizontal movement of pedestal to center it within overall span of pilot opening

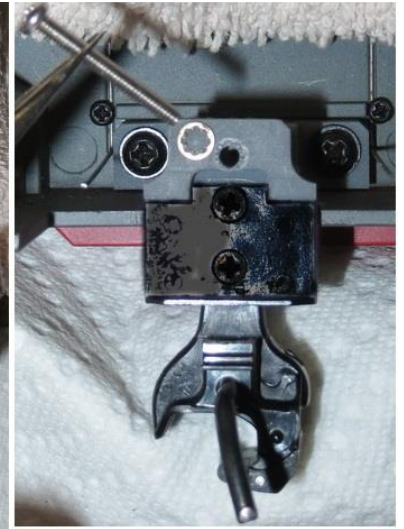
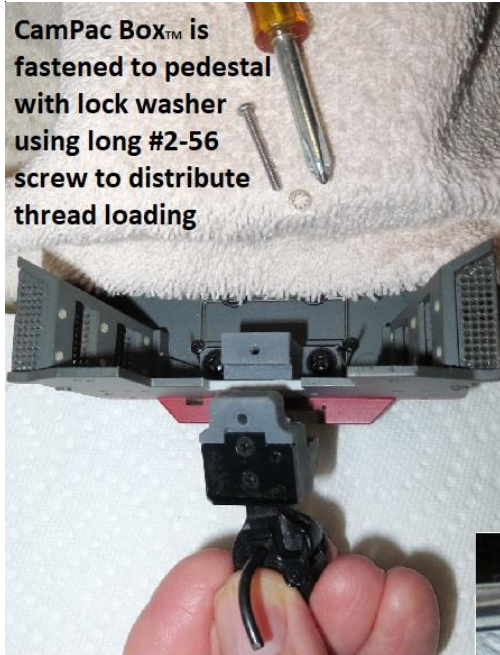
Warning: Torque screws finger tight.
(Too much torque can strip out threads in plastic bosses for such short screws)



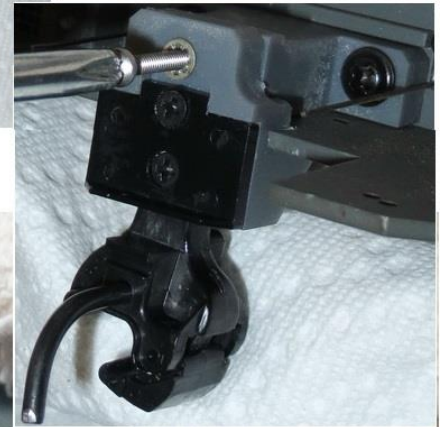
Step 6 - Coupler Box Installation

Illustrated is the fastening procedure for the coupler box with preinstalled Kadee centerset coupler, springs & lid from the Kadee 907 kit previously described in Step 1.

CamPac Box™ is fastened to pedestal with lock washer using long #2-56 screw to distribute thread loading



Screw with lock washer at box tail hole & threaded into pedestal



"Square up" box against pilot face when tightening down screw



Kadee 980 Gauge



Coupler alignment to Kadee gauge may or may not need shim from Kadee 907 kit's capsule

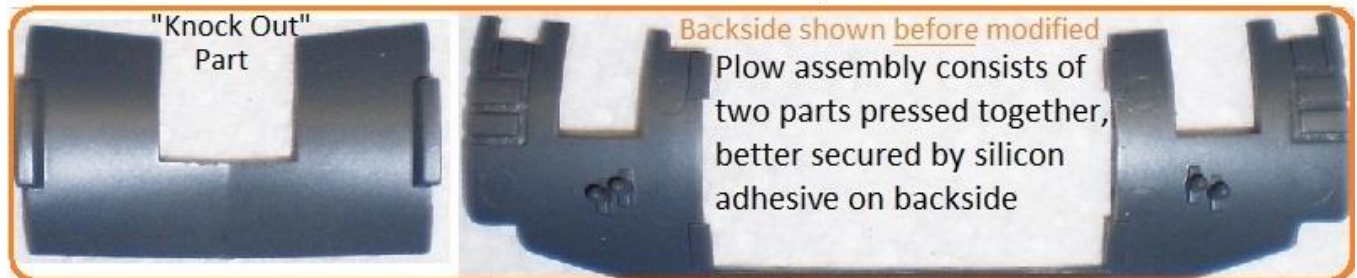
Ted Doskaris, 12-21-2018

Step 7 - Snowplow Modification

Comment: In place of the snowplow on the front pilot, an additional *CamPac* pilot plug can be requested for more prototypical appearance by covering the large factory opening otherwise obscured by the snowplow

For center plug “knock-out”, cut & trim to dimensions as shown. If knock out not used, skip to next step.

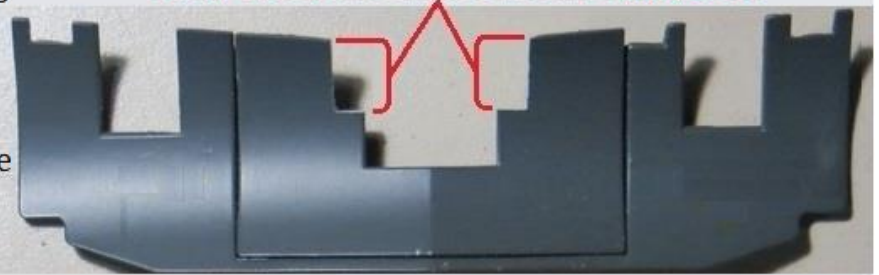
USA Trains SD40 Snow Plow Cutout for Body Mount CamPac Box™



Enlarge dept of existing opening from the top of the plow:

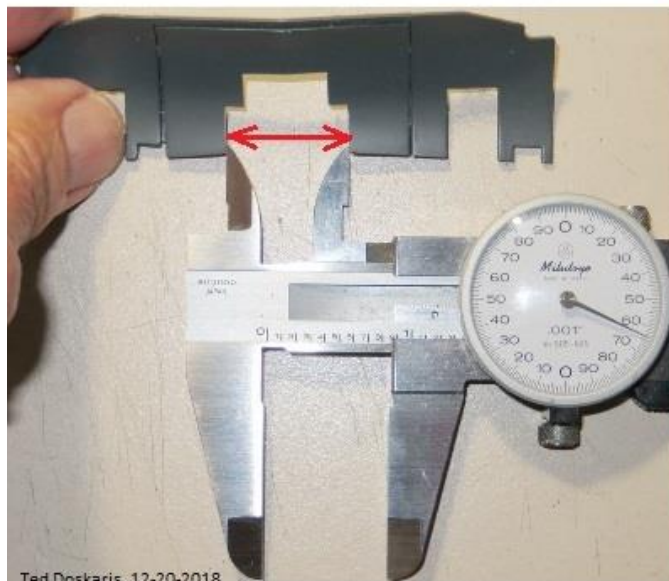
- 0.25 inch if installing plow at factory height location
- 0.35 inch if choosing to relocate plow higher since too low for practical layout operation

Area Cutout for Coupler Box for CamPac Box

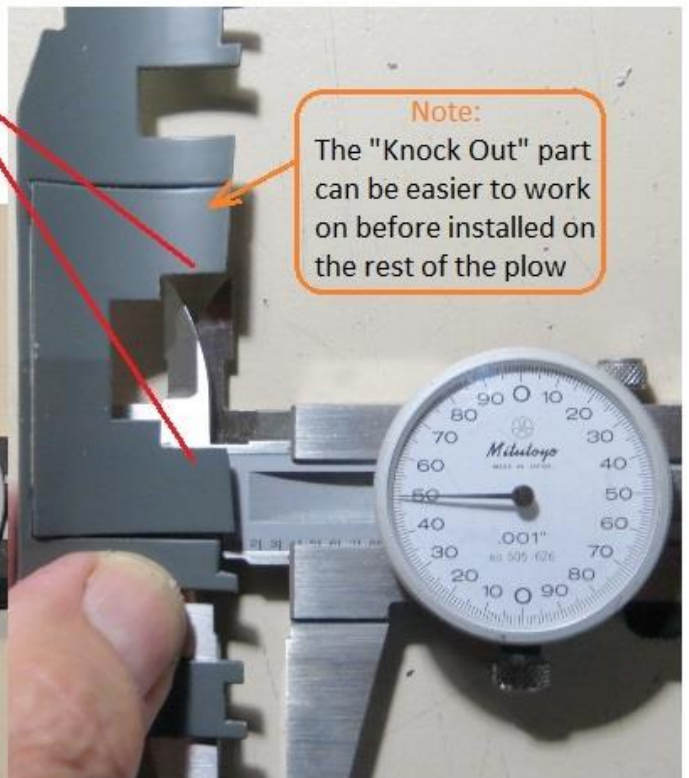


Enlarge the dept of the existing opening from the top of the plow here

Widen existing opening to 0.865 inch



Ted Doskaris, 12-20-2018



Advisory: If electing to relocate (raise up) the snowplow on the pilot for practical layout clearance & operation, bypass Step 8 and follow the instructions given in “vignette” on Greg Elmassian’s Web site since there are additional modifications to be done.

See vignette title: “[USA Trains SD40 Snow Plow Relocation for Pragmatic Layout Operation](#)”

If having done those modifications described in that vignette, then skip to Step 9.

Step 8 – Installation of Snowplow, at factory height

USA Trains SD40-2 Snow Plow with Modified "Knock Out"

Below is Rear View without knock installed

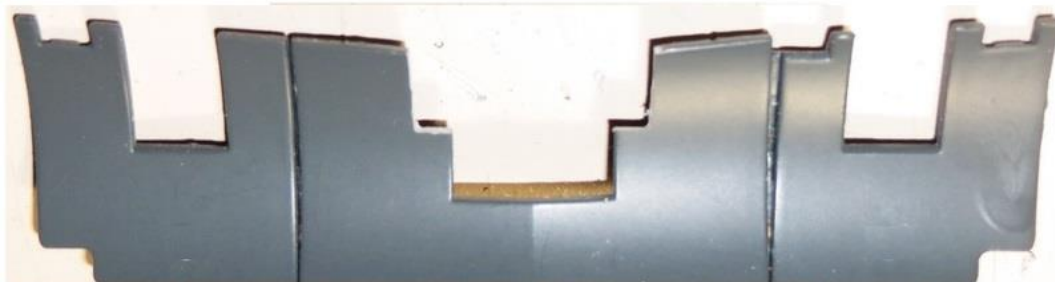


The plow is factory retain on the pilot by the pair of staggered pegs on each side when pressed into the pilot

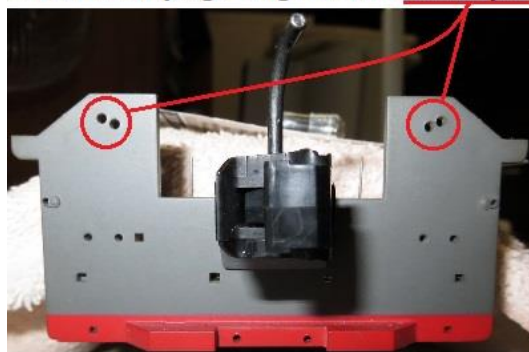
The knock out plug snaps into the rear of the plow, after which applying some silicone glue will serve to solidify the whole assembly



Below is Front View with knock out installed



The snowplow assembly is to be slid between pilot & installed hoses until rear pegs align with corresponding holes in pilot, then pressed in.



Install detailed parts on pilot before plow



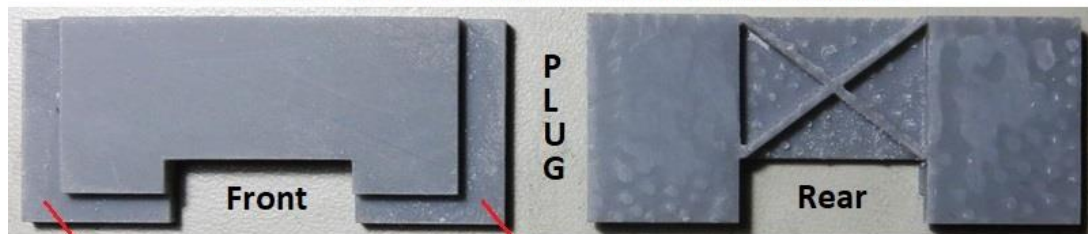
Ted Doskaris, 12-21-2018

Step 9 – Install Rear Pilot Plug

One *CamPac* plug is supplied to cover the large factory opening at the rear pilot that would otherwise be obscured by a snowplow. (Certain railroads used a snowplow on both pilots, only front pilot, or neither pilot.)

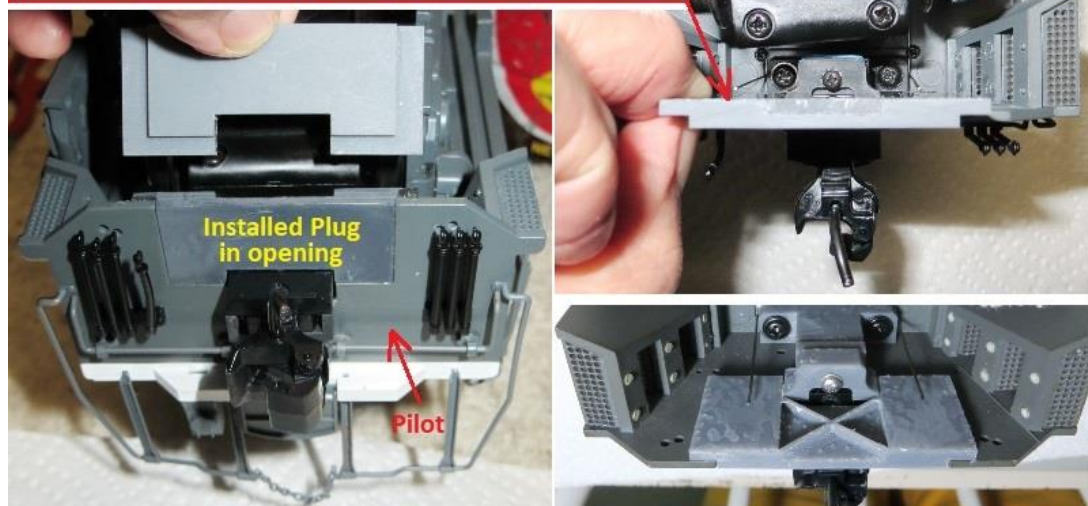
The *CamPac* pilot plug may, or may not, friction fit. However, it's best to be glued in place, preferably with a tacky adhesive, on the side "ears". (Another pilot plug could be installed at the front pilot in the same way in place of using the snow plow.)

USA Trains SD40-2 CamPac Pilot Plug Installation



Apply adhesive to plug paddle surrounds

Slide plug into opening; press "ears" against pilot interior



Completed installation, SD40-2 front & rear CamPac Box with integrated fairing



Operational Advisory:

Layouts with "S" bends having tight curves (8 to 10 foot in diameter & possibly greater) are to have a straight track section the length of an SD40-2 or greater between opposite diverging paths or risk the SD40-2's coupled car to derail.

!!!*Done*!!!

Congratulations

The USA Trains SD40-2 now looks more like the prototype with capability to perform on tight curves when coupled to other body mounted locos or rolling stock having *properly equipped* Kadee centerset type couplers.