

Supplement to Rev B Installation Manual

John Deere 120R Loader Sub-Frame Mounts

Applicable Models: John Deere 2013+ X700 “Signature Series” Garden Tractor. *All Wheel Steering (AWS) and 2 Wheel Steering models (2WS).*

1 120R Sub-Frame Installation Supplement – 2WS and AWS

The following are some additional tips for installing 120R sub-frame mounts on the 2013+ X700. Some tips are specific to the AWS tractors.

Removing hood helps with access and is recommended. The hood is easily removed by disconnecting electrical connector on front left (when open). With the hood open, it can then simply be lifted up and off the tractor.

Removal of the battery, muffler and heat shields on the diesel and gas tractors is also recommended. It is not difficult and gives very good access to some of the bolt holes. It also offers a good time to do some extra cleaning as well. The muffler can be removed in about 30min. I do not go into removal details in this supplement. It is pretty self-explanatory. Just take pictures and organize fasteners to aid in reassembly.

Set the air pressure on all 4 tires the same. This will ensure the tractor is level. When I run the loader, I increase the air pressure to ~17psi.

Reminder to make sure there is nothing behind where you are drilling. You don't want to damage any wiring or hydraulic lines.

1.1 AWS Left

To aid in the installation of the AWS left side sub-frame mount, a template has been created. The template allows you to drill a required hole (Orange C) in the left side frame without having to install the heavy AWS sub-frame mount multiple times (to mark hole for drilling). Here are a few tips.

Parts Included: 1 – Template (Qty 1), 2 – Center Finders (Qty 2 – one large and one small)

The CAD drawing in Figure 1 shows the template in light blue overlayed over the left side AWS mount. RED H is an OEM hole that gets enlarged on the frame shown in the picture below.

If you just loosely bolt the light blue template in place (without the primary mount) and install the center finder (optional) in the OEM hole RED H (small center finder if you haven't drilled and large if you have drilled to 15/32"), you can just move the template to get 17.5". Then mark the center of the ORANGE C slot, remove template and drill it with a small pilot drill bit (1/8"-3/16") and then final drill with the 15/32" drill bit. I've found that 2-3 incrementally larger bits makes drilling much easier.

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The drilled hole will be in the right place so the primary mount can be installed only once, and all the holes (Blue A, Blue B, Blue D and “new” Orange C) bolt holes will line up. Without the template, you will need to install the left mount completely, mark Orange C, remove the mount, drill and reinstall the mount again. The template saves a bunch of time. The holes are also defined in the instruction manual.

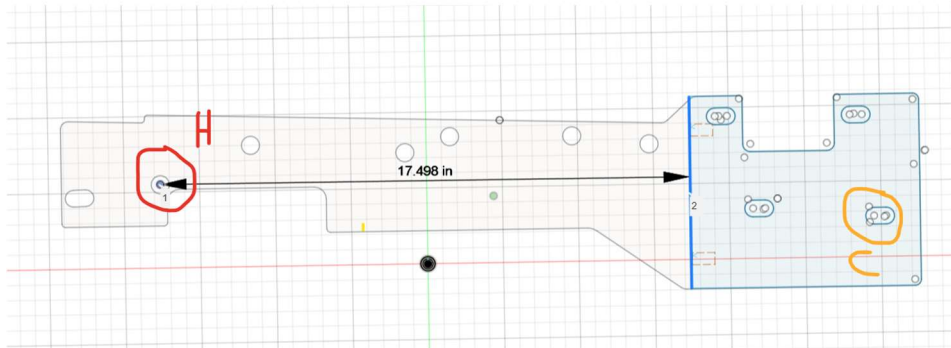


Figure 1: CAD Model



Figure 2: Hole locations as defined in Install Manual

- Tighten bolts on template so it can move back and forth with some resistance.
 - **Tip:** An Air/electric ratchet helps with install of the locking nuts. If not, just take your time and use a ratchet and wrench. If you have a hardware store near by, M12-1.75mm non-locking nuts will speed installation/removal of template.
- Ensure template is pulled down tight against the bolts (not floating up or “clocked”)
- Optional: Install hole center finder (included with template) in hole Red H. Will be a tight fit. The center finder is not required. Visually finding center of Red H is usually good enough.
- Measure from front edge of template to center of Red H. Move template forward or aft until you get 17.5” (template front edge to center of Red H).
- Mark the Orange C hole on the frame in center of template slot (vertical center and horizontal center). Center punch hole, remove template and drill pilot hole and then incrementally larger bits until you get to final 15/32” drill bit.

1.2 AWS/2WS Left

- Consider Enlarging Red H with incrementally larger bits vs going right to 15/32". This will help ensure that the hole stays centered.
- **Tip:** Install edge protector before mount is fully tightened. It will make it easier to install when mount isn't tight against the tractor sheet metal.
- Use a clamp and center punch to align the hole in mount with the hole in frame.
 - The bottom of mount should be flush with frame as shown in Figure 4.
 - Use a large screwdriver or punch in Hole RED J to move the mount up and down and clamp it in place with a bar clamp (can also use a c-clamp, etc). See Figure 3.
 - Keep mount tight against hood hinge. You may have to loosen hinge bolt to move hinge forward or aft. DO NOT overlap hinge plate with the sub-frame mount.
 - The mount should be about 60-62mm (~2-3/8"). Front edge of mount to back edge of hole in front bumper. See Figure 5.
 - When aligned, tighten rear bolts (ABCD) and install Red H bolt. If Red H is difficult to install, you may have to run a 11/32" drill bit through Red H again with sub-frame mount in place.

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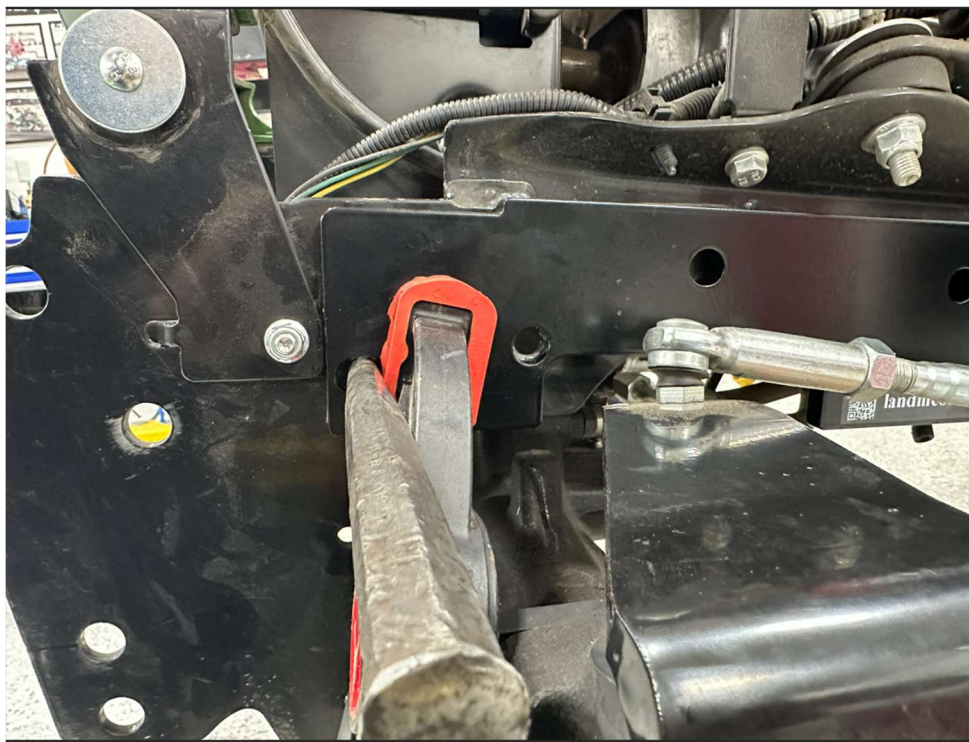


Figure 3: Center Punch and clamp for alignment



Figure 4: Bottom of Mount flush with Bottom of Frame (Right side shown - same for left side)

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Figure 5: Alignment measurement front to back

- Drill and install Left Red J
 - Hold drill steady and drill Red J. It may be challenging because the slot in the frame (interrupted cut), take your time.
- Center punch and install Orange G
 - This hole takes the most time because of the thickness of the steel.
 - Make sure you use new drill bits. I recommend Cobalt M42 drill bits. If you don't have Cobalt bits, highspeed steel/titanium coated will also work, but it will take longer. Drill a pilot hole (~1/8"-3/16") first. Then use 2-3 incrementally larger bits until you finally get to 15/32". Use oil and drill on slow speed.
- Install and torque all the bolts to 100lb-ft. (As tight as you can with hand tools (if you don't have a torque wrench)...think lug nut tight.



Figure 6: All bolts installed and torqued. AWS shown. 2WS the same.

1.3 AWS/2WS Right

1.3.1 Removal of SCV tips

- Screw lockout valve all the way in.
- Remove bottom front hydraulic line from SCV and from lockout valve.
- Remove lockout valve from SCV by loosening lock nut. Then you can spin the lockout valve out. It may interfere with hydraulic lines the first couple of rotations. Just push the lines out of the way.
 - NOTE: There is an o-ring that can get stuck and keep the lockout valve from spinning free. It sometime helps to pry the washer away from SCV (under locknut) with a small screwdriver. Use a wrench if needed to spin lockout valve out and reposition large o-ring if it moved during the removal of the lockout valve.

- Remove SCV bolts
- **Tip:** It may be easier to pull the SVC away from frame to remove top hydraulic lines from the outside vs removing the lines from inside the frame. Either method should work.

1.3.2 Installation of Right Mount

Cover any open hydraulic lines if drilling. You don't want metal shavings getting into the hydraulic system.

Consider removing muffler to access Red J if you don't have a right angle die-grinder/shorty drill bit. It takes about 30min to remove battery box, muffler shields and muffler.

Consider enlarging Red H in steps vs going right to 15/32". This will help ensure that the hole stays centered.

Install edge protector before mount is fully tightened. It will make it easier to install when mount isn't tight against the tractor sheet metal.

- Reminder to take pictures of VIN
- Install mount with rear bolts. Loosely tightened at first. Mount should be able to move but be close to the frame.
- Insert a large screwdriver or punch into Red H and move the mount up and down until the front bottom of mount is flush with bottom of frame. See Figure 7.

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Figure 7: Align bottom of mount with bottom of frame.

- The front of the mount should be approximately 60-62mm (~2-3/8") from hole in bumper. See Figure 8.



Figure 8: Right side mount alignment front to back.

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- Tighten the rear bolts.
- Check alignment of SCV bolt holes – Green E and Green F.
 - You should be able to get a bolt in Green F, but may have problem getting a bolt into Green E. The hole placement in the mount is slightly off in early designs. This has been corrected in later designs. Kits purchased since 12/2025 have either been pre-elongated or the hole is already moved. See Figure 9.
 - If needed, you can either move the SCV hole in the frame using the mount as a guide or you can elongate the hole in the mount with a carbide burr or a die grinder.

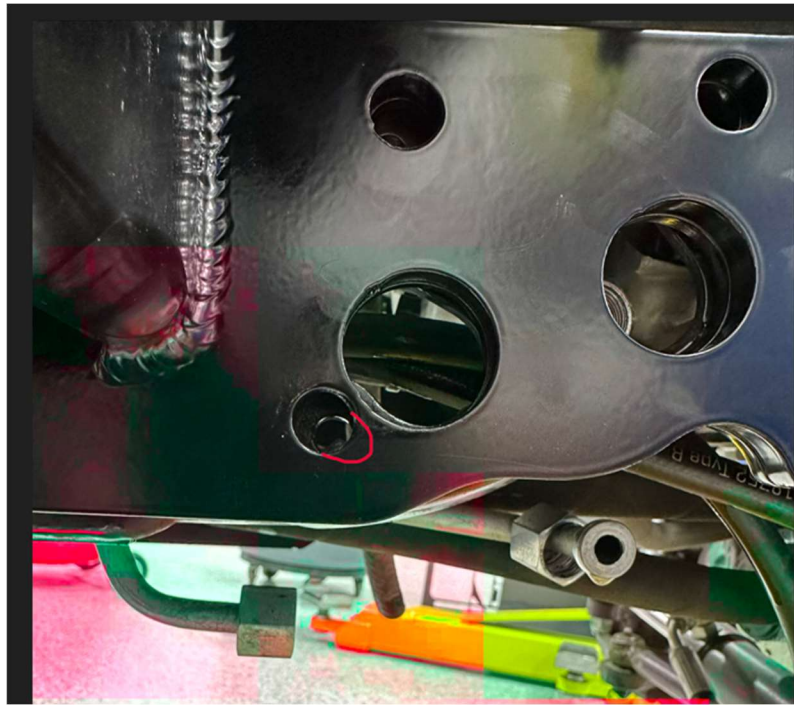


Figure 9: Bottom SCV hole alignment modification.

- Check alignment of Hole Red H. You may need to run a drill bit through Red H again if bolt doesn't go through cleanly.
- Center punch and drill Orange C

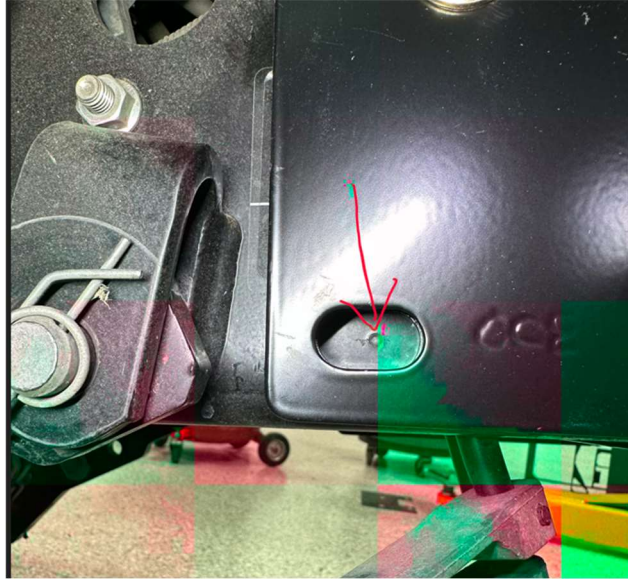


Figure 10: Example of good center punch

- Drill and install Left Red J
 - If you removed the muffler, drill Red J from the outside. Hold drill steady and drill Red J. It may be challenging because the slot in the frame (interrupted cut), just take your time.
 - If you did not remove muffler. Use a right angle die grinder and carbide burr to grind a larger hole into Red J slot from the inside of the frame (behind front bumper.)
- Center punch and install Orange G
 - This hole takes the most time because of the thickness of the steel.
 - Make sure you use new drill bits. I recommend Cobalt M42 drill bits. If you don't have Cobalt bits, highspeed steel/titanium coated will also work, but it will take longer. Drill a pilot hole (~1/8"-3/16") first. Then use 2-3 incrementally larger bits until you finally get to 15/32". Use oil and drill on slow speed.
- Install and torque all bolts (Pretty much as tight as you can with hand tools (if you don't have a torque wrench)...think lug nut tight (~100lb-ft).
- Install the SCV
 - Test threading the bottom bolt into the SCV before installing (clean hole if necessary). It should go in easily and thread with no resistance.
 - Install the SVC with the bottom bolt first. This one is challenging because it is a blind bolt. Lay under the tractor and insert the bolt through the frame. Line it up with the SCV by looking between the frame and the SCV and install bolt. It should not thread in hard. If it is difficult, it is not going in straight.

- When you have the bottom bolt started (not tight), you can then install the top bolt.
- Tighten both SCV bolts evenly. Do not overtighten.
- Connect the hydraulic lines by installing the top ones first. They will be close, but not perfect because of the extensions added to the SCV. You will have to bend the lines slightly. This can be difficult, but you should be able to do it by hand. Try to get them as close as possible with the flat flanges lining up. Don't lose or damage the o-rings. Don't kink the hydraulic lines by bending too much or using sharp edges to bend against.

1.4 Post mount installation (Air Pressure, Hydraulic Fluid and Sub-Frame Shimming)

- Check tire air pressure
 - Check the sidewall of your tires for max air pressure in PSI. Maximum pressure gives you the maximum load capacity of the tire. When using the loader for heavy work, it is best to run at max PSI in the front and the rear. Generally this is 22psi in the front and 20psi in the rear for X700 HDAP tires. Please check your sidewalls for max tire pressure. I personally have been running 20psi in the front and 18psi in the rear.
 - It is important to have the pressure the same from left to right to help level the loader.
- Park the tractor on level ground (a concrete floor or driveway is best)
 - Measure from the ground to the top of the loader mast pin on both sides of the tractor. The measurement should be the same on each side (within 1/8" is ideal).
 - If they are not the same, the sub-frame mounts may need to be shimmed. See next section
- Install the loader, bleed system and top off hydraulic fluid
 - Bleed the system and Fill hydraulic cylinders completely with hydraulic fluid by doing the following. The system is self-bleeding, so cycling the cylinders is all that is needed.
 - Lift the loader fully up and down a few times
 - Curl the bucket fully a few times
 - Check the hydraulic fluid level (under the seat) and top off if necessary.
 - Check level with dip-stick NOT screwed in.

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- If this is a new loader, you will likely need to add a 2-4 quarts of low viscosity Hy-Gard.
- Lift bucket off “level ground” (concrete driveway/garage floor is best) approximately 2 feet. Tip the bucket down so the leading edge is pointing down slightly.
 - Measure from the leading edge to the ground on each side of the bucket. If you see less than ½” difference between the two sides, I don’t recommend shimming.
 - Note the clearance you have between the parking stand and the bottom of the front bumper (to help with determining where to shim if needed).
- Shimming the sub-frame mounts to level the loader bucket – ONLY IF NEEDED

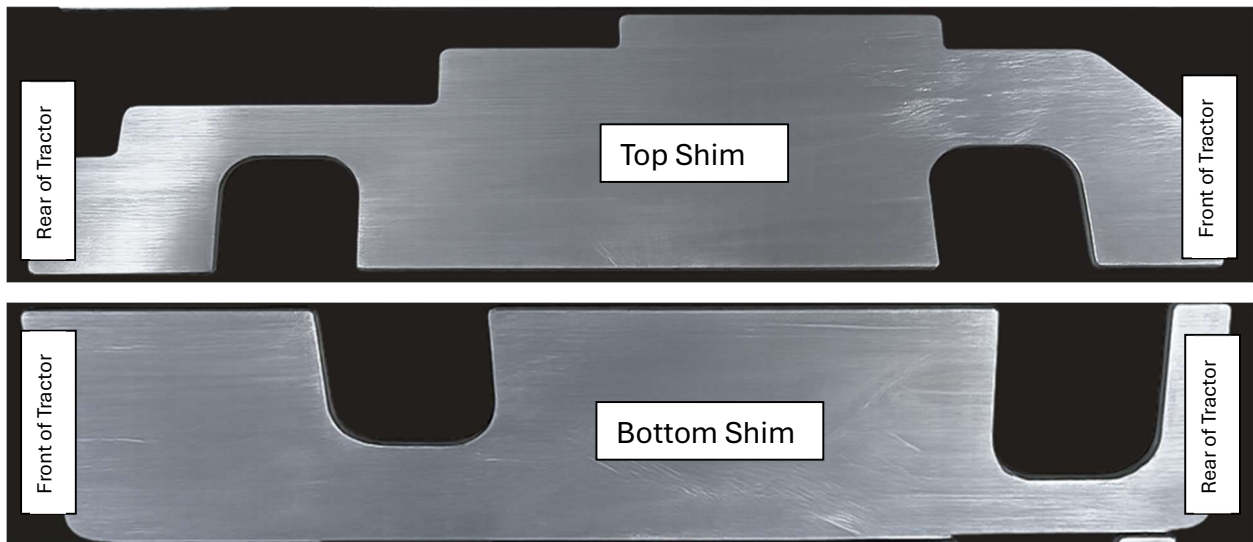


Figure 11: Sub-Frame Shim



Figure 12: AWS side top shim

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- It has been determined that some of the X700 frames rails are not perfectly “parallel” to each other or perfectly “perpendicular” to the ground. A 1 degree difference can result in ~3/16” difference at the masts. 3/16” at the mast can result in 1/2” or more difference at the edges of the bucket (because of the width of the bucket. To address this the sub-frames can be shimmed to either tip the vertical mast up or down depending on what is needed.
- As of 3/1/2026, your kit should have come with a “top shim” and “bottom shim.” The shims are approximately 0.060 thick and are made of stainless steel. If you bought your kit before 03/1/2026 and need to level your loader, contact us for a free set.
 - The shims are installed between the rear portion of the sub-frame and the tractor frame. The shims straddle the 2 rear mounting bolts (at the top or bottom) and are held in place when the bolts are tightened.
 - The shims cause the bottom (or the top) of the sub-frame to tip up (when installed at the bottom) or down slightly (when installed at the top).
 - Simply loosen the sub-frame bolts on the sub-frame you are working on. If you are shimming the right sub-frame (SCV side), you will also need to loosen the SCV bolts.
 - If shimming the top of either sub-frame, you may need to remove the rear most bolt to be able to get the shim in.
 - Ensure that the shims are straddling the bolts.
 - Retorque all the bolts as you did in the original installation. Don’t forget the SCV bolts.
 - If you have an AWS tractor, I recommend only using the small AWS shims if you can’t level with the other shims. The AWS shims are more difficult to put in because the bolts have to be removed completely.
- Valid shimming configurations
 - 1 shim
 - Installing 1 shim at the top OR the bottom of one of the sub-frames.
 - When using 1 shim, it is easier to shim the bottom than it is to shim the top because of access. If you have sufficient clearance between the parking stand and the bottom of the bumper, you can shim the bottom. Shimming the top will give you additional clearance between the parking stand and the bottom of the front bumper if needed.

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- 2 shims
 - Installing 1 shim at the top of one sub-frame mount AND 1 shim at the bottom of the other sub-frame.
- 2 shims installed at the top of one sub-frame or bottom of one sub-frame (extra shims will need to be requested).
 - I've not seen a set of sub-frame mounts that has needed more than one shim on each side (top of one and bottom of the other), but in extreme cases, this could be necessary. Watch for clearance issues with spacing of the loader on the masts (top pin or bottom saddle).
- Invalid configurations
 - Shims installed at the top and at the bottom of one(or both) of the sub-frames. This would just move the mast(s) outboard, but would not help level the loader.
 - Shims installed at the top(or bottom) of BOTH sub-frames. This would lower(raise) the loader, but would not help level the loader.