TIMBERSLED® ARO™/RIOT™ INSTALL KIT

P/N 9928509

APPLICATION

NOTICE
All Timbersled RIOT chassis use the ARO installation kits.

Installation instructions are for all ARO TSS and ARO TFS installation kits required to mount the Timbersled ARO/RIOT chassis to your specific vehicle. The Timbersled ARO and RIOT kits are designed to fit a variety of makes and models of bikes. For specific details on your bikes install kit visit Timbersled.com or scan the QR code if using a mobile device. If viewing on a PC click **HERE**

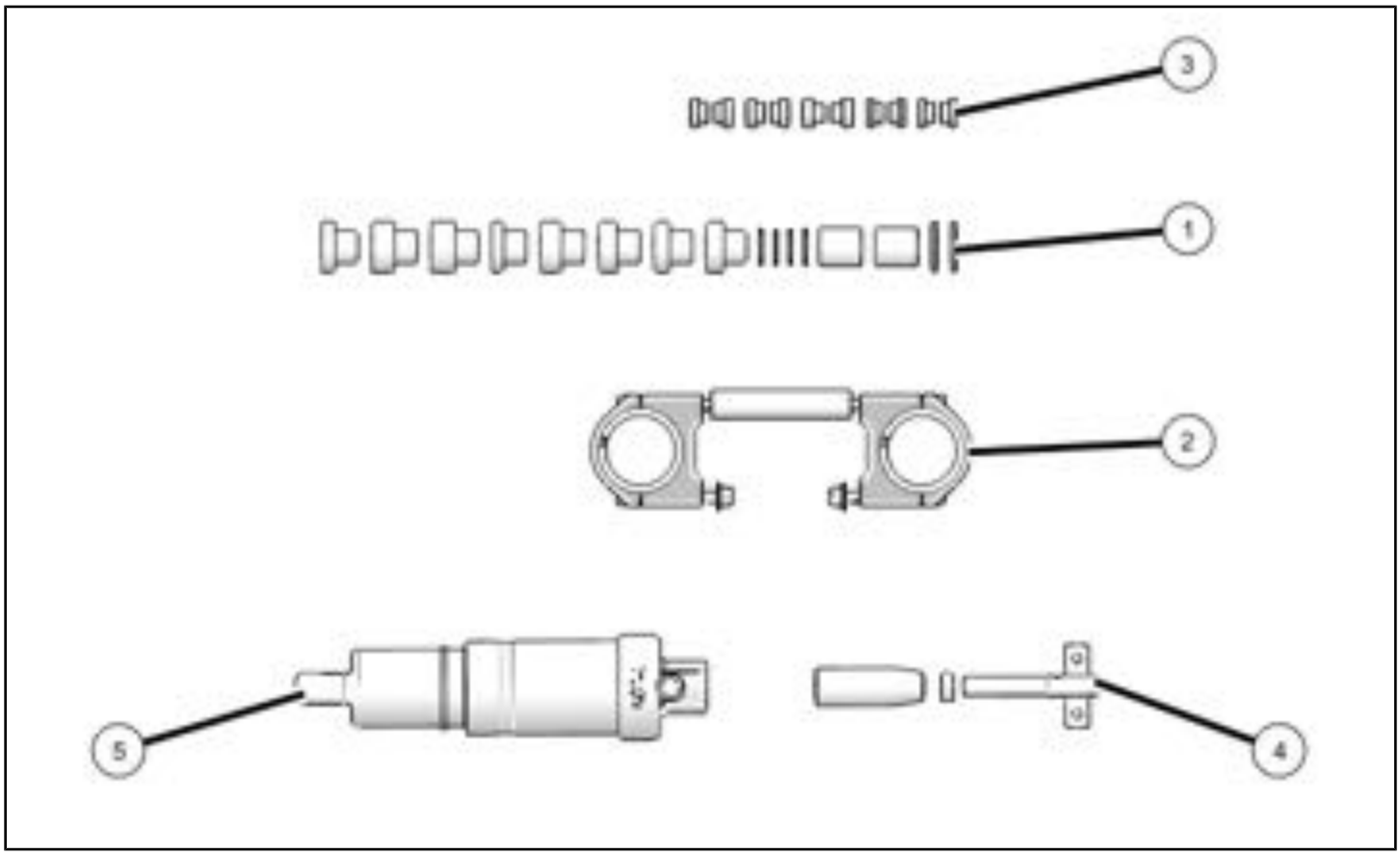
BEFORE YOU BEGIN

Read these instructions and check to be sure all parts and tools are accounted for. Please retain these installation instructions for future reference and parts ordering information.

KIT CONTENTS

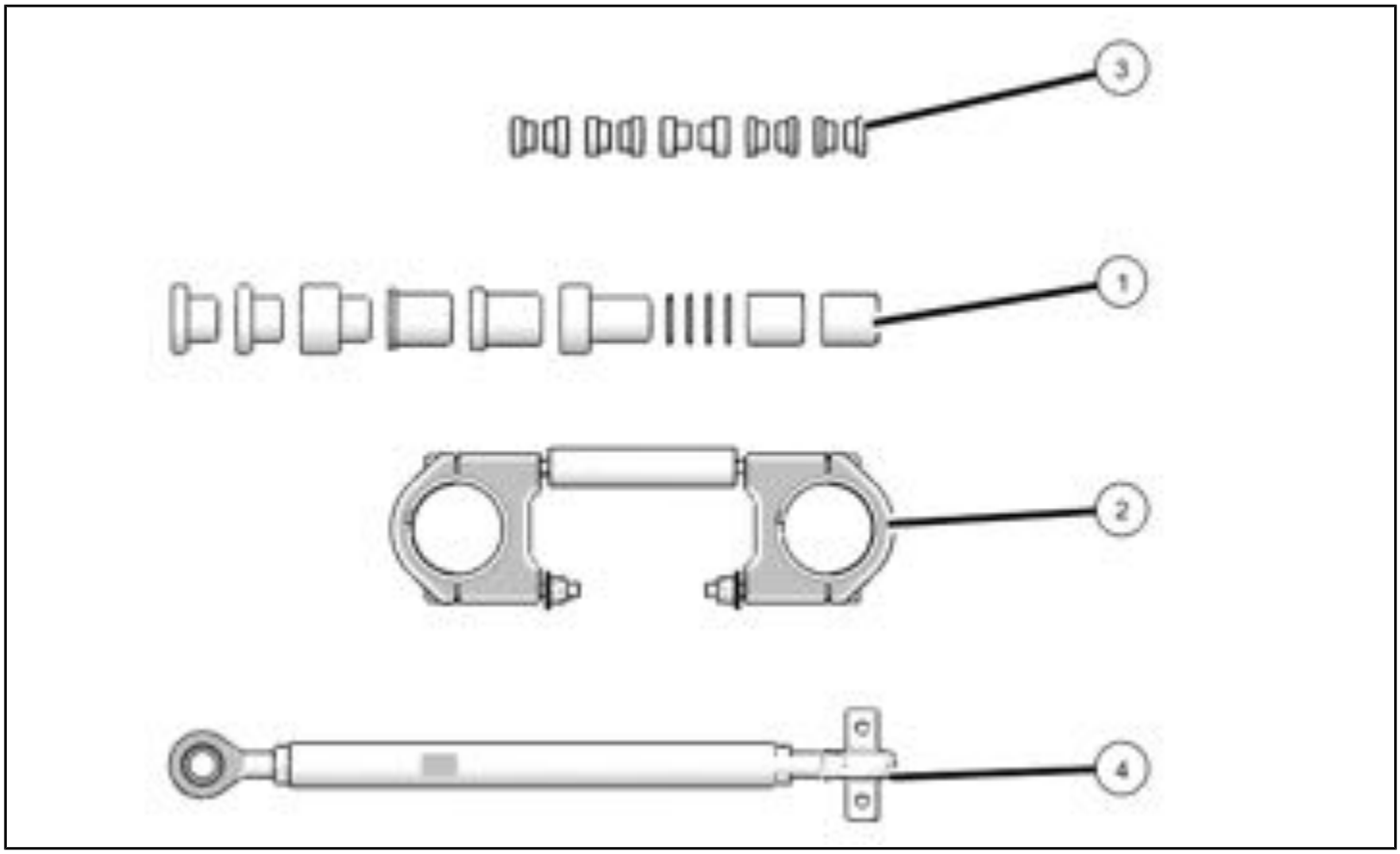
The ARO chassis can be installed using either the ARO TSS (Timbersled Suspension Strut) Install Kit or the ARO TFS (Timbersled Fixed Strut) Install Kit. Refer to the images below for a general overview of what is included in the install kits. Your specific kit may vary slightly depending on make and model.

TSS Kit



REF	QTY	PART DESCRIPTION	PART NUMBER
1	1	Spacer Pack	-
2	1	Fork Clamp	-
3	1	Strut Rod Reducer Pack	-
4	1	Strut Rod TSS	-
5	1	TSS Shock Body	-
	1	Instructions	9928509

TFS Kit



REF	QTY	PART DESCRIPTION	PART NUMBER
1	1	Spacer Pack	-
2	1	Fork Clamp	-
3	1	Strut Rod Reducer Pack	-
4	1	Strut - Solid, Adjustable	-
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TOOLS REQUIRED

- Safety Glasses
- Hammer, Soft Face
- Hex Key Set, Metric
- Pliers, Slip Joint
- Screwdriver, Standard
- Tin Snips, Straight Cut

- Socket Set, Hex Bit, Metric
- Socket Set, Metric
- Wrench Set, Metric
- Vehicle Lift/Support Equipment
- Model Specific Timbersled ARO Fitment Table
- Torque Wrench

IMPORTANT

Your TIMBERSLED® ARO™/RIOT™ Install Kit is exclusively designed for your vehicle. Please read the installation instructions thoroughly before beginning. Installation is easier if the vehicle is clean and free of debris. For your safety, and to ensure a satisfactory installation, perform all installation steps correctly in the sequence shown.

INSTALLATION INSTRUCTIONS

The instructions listed are universal for all bikes using the Timbersled ARO/RIOT snowbike kit. The process in the instructions may vary slightly between makes and models. Refer to your host bike's owner's manual for specific references and assembly/disassembly procedures.

You will also need a copy of the Timbersled Fitment Table for your specific bike model. The Timbersled Fitment Table can be found and printed at Timbersled.com or by contacting your local Timbersled dealer.

MOTORCYCLE REAR DISASSEMBLY

1. Place bike on a stand or suitable support where both wheels are off the ground. Secure properly to prevent bike from tipping when wheels are removed.

NOTICE
An adjustable stand is helpful for reassembly.

2. Remove the seat, side panels, frame guards, and exhaust silencer. Retain these parts for later re-installation.
3. Remove the air filter, roost guard, chain, upper and lower chain rollers and chain guides from bike frame. These parts will not be needed while the Timbersled kit is installed on the bike.

NOTICE
Do not start or operate motorcycle while air filter is removed. Timbersled recommends plugging your air intake with a clean lint-free towel while air filter is removed to prevent any debris from entering the motorcycle's air intake system.

4. Remove the foot-brake master cylinder and lever from the bike frame.
5. Remove the upper shock bolt from frame and retain for later installation.
6. Remove the suspension linkage bolt from the frame if your bike has one. This will not be used with the Timbersled kit.
7. Remove the swing arm pivot bolt. You will re-use this with your Timbersled kit installation later.
8. Remove the shock, tire, brake, and swing arm assembly from the bike as a complete assembly. These parts will not be needed while the Timbersled kit is installed on the bike.

NOTICE
It is recommended to cable tie all bushings, spacers, etc. to their corresponding parts at all pivoting points to prevent losing any parts during storage.

9. Remove the complete front brake system keeping the entire system intact. Their is no need to disconnect the brake line from the master cylinder or brake caliper.

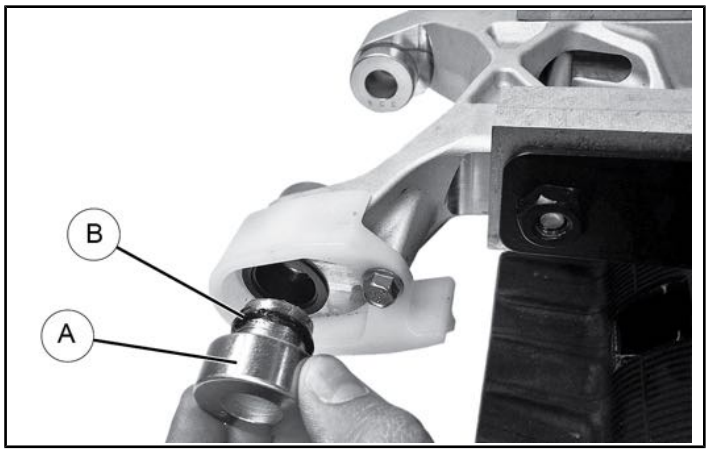
   First remove the front caliper from the motorcycle's lower front fork tube. Next remove the front brake lever and master cylinder from the motorcycle's handle bars and remove the entire front brake system as a single unit.

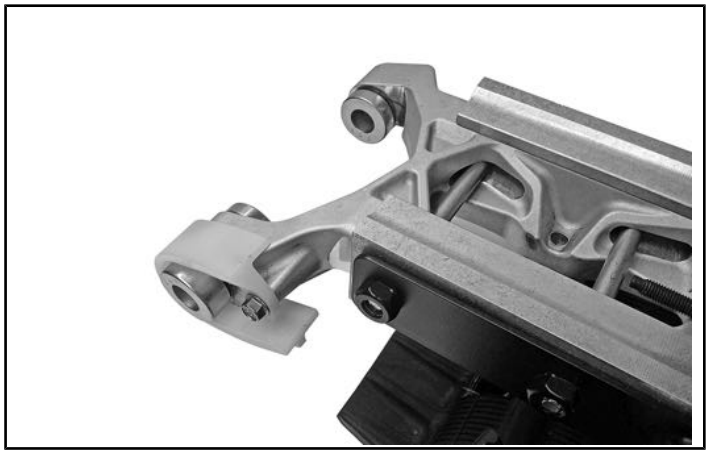
FRAME BUSHING AND SUB-FRAME REDUCER INSTALLATION

There are two different types of ARO/RIOT install kits available. The TSS (Timbersled Suspension Strut) install kit and the TFS (Timbersled Fixed Strut) install kit. Installation procedures for the sub-frame bushings and reducers are universal for either kit.

NOTICE

Your ARO/RIOT pivot forging sub-frame comes with the pivot bushings pre-installed. If install kit spacer packs come with extra sub-frame pivot bushings you will not need them for the ARO/RIOT installation.





1. Install the sub-frame reducers into their proper location in the pivot forging.

   If reducer bushing is black in color, first place an O-ring Ⓑ on each of the sub-frame reducers Ⓐ used. Put a coating of grease on the inside of the bushing and the outside of the spacer/reducer and install them into the frame. They should slip in without interference.

   If the bushings are white in color and do not have a step in them for the O-ring, DO NOT install the O-ring, Grease is not needed on the white/creme bushings.

NOTICE

To locate the sub-frame reducer positioning for your specific bike, **refer to the Timbersled Fitment Tables**. Fitment tables can be found and printed at **Timbersled.com** or by contacting your local Timbersled Dealer. Each of the sub-frame spacers/reducers will have a part number stamped on the end that will be its reference number on the fitment table to show their location.

REAR TRACK ASSEMBLY INSTALLATION

1. Insert the rear track assembly into the bike between the engine and the frame. It may be a snug fit due to the O-rings holding the spacers out. It should squeeze in as you firmly push the assembly into place. Visually make sure everything looks correct and is aligned properly.

NOTICE
It may be helpful to gently squeeze the reducers with an adjustable pliers or clamp in the frame eyelets prior to installation to ensure proper seating of the O-rings.

2. Install the previously removed swing arm pivot bolt and nut.

TIP
Adding a light coat of grease on the swing arm pivot bolt will aid in assembly and disassembly of the Timbersled kit.

TORQUE
Torque swing arm pivot bolt to OEM manufacturers specifications.

3. Next you will need to install either the TSS shock strut or the fixed strut rod depending on which installation kit you have. The Timbersled install kits come with all necessary reducers and spacers to install the Timbersled chassis to your motorcycle.

   The Timbersled ARO/RIOT chassis only requires installation of the upper strut rod reducers. Install the upper strut rod reducers into the upper shock body ball joint for the TSS kit or into the upper ball joint of the strut rod for the TFS kit.

   The lower rod ends on the ARO/RIOT strut rods utilize a trunnion ball-joint that bolts directly to the forged pivot frame using two M8 x 1.25" bolts Ⓐ included with your Timbersled ARO/RIOT unit. These bolts will be located in a zip-loc bag with your owner's manual and drive chain. Their is no need for lower strut rod reducers.

NOTICE
TSS and TFS use different upper strut rod reducers for the same bike.

NOTICE
The side in which your strut rod reducers will be located will depend on their proper alignment into the bikes shock bracket. For further reference, **refer to the Timbersled Fitment Table** for specific locations.

4. Install the TSS or TFS onto the bike and rear track assembly.

a. **TSS Models:**

For TSS installation, first ensure that the TSS shock is correctly oriented with the shock body toward the top and air valve cap towards the bottom facing the rear of the bike as shown. Now place the lower trunnion ball end ④ of the TSS into the strut cradle in the rear pivot forging frame Ⓑ. Rotate the trunnion cross-shaft so the threaded bolt holes line up with the bolt holes in the pivot forging. Insert both M8 x 1.25" bolts and torque to the specifications listed below.

TORQUE
30Nm (22 Ft. Lbs)

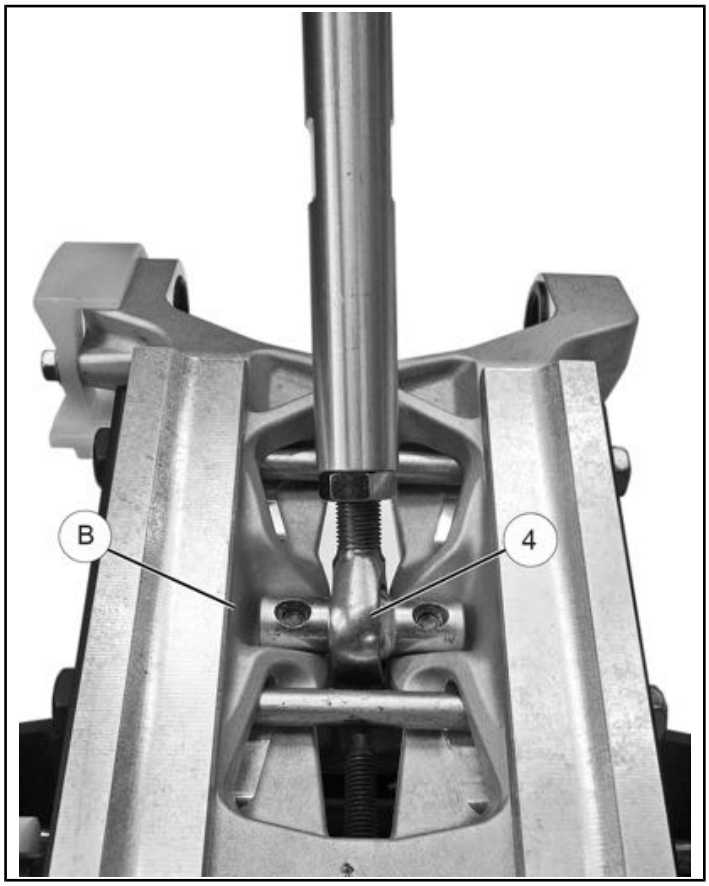
b. Next, place the shock body end into the bike frames shock mounting bracket Ⓒ and install the original bolt and nut and torque to specifications listed below

TORQUE
See bike manufacturers OEM torque specifications

c. **TFS Models:**

For TFS installation, first ensure that the TFS strut rod is correctly orientated with the trunnion ball-joint ④ indicating the lower end of the strut rod. Install the strut rod onto the bike and rear track assembly. First place the lower trunnion ball end ④ of the strut rod into the strut cradle in the rear pivot forging frame Ⓑ. Rotate the trunnion cross-shaft so the threaded bolt holes line up with the bolt holes in the pivot forging. Insert both M8 x 1.25" bolts and torque to the specifications listed below.

Next place the upper ball joint into the bike frames shock mounting bracket Ⓒ and install the original bolt and nut. Tighten both upper and lower nuts and bolts to specification listed below.



TORQUE
Lower: 30Nm (22 Ft. Lbs) **Upper:** See bike manufacturers OEM torque specifications

BRAKE SYSTEM INSTALLATION

Timbersled brake systems come pre-blead and fully assembled, there is no need for disrupting the sealed brake system on your motorcycle or your brake system for installation.

1. Route your brake line and master cylinder through the motorcycle chassis up to the front handle bars securing with cable ties when needed..

⚠ WARNING

Ensure all sections of brake line are a minimum of 2" away from all hot engine and exhaust surfaces and free from all possible pinch points. Failure to comply will adversely affect the brake system and may cause damage to equipment/property or may lead to severe injury or death in an accident.

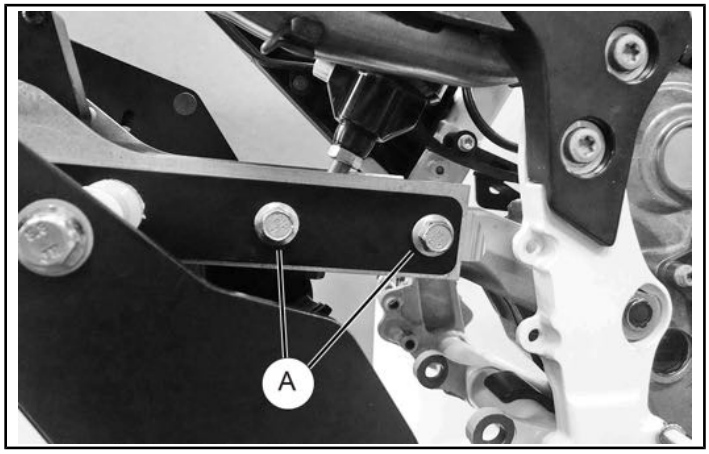
2. Install the master cylinder and brake lever to the handle bars in the same location of your motorcycle's OEM front brake master cylinder and lever.

ENGINE CHAIN INSTALLATION

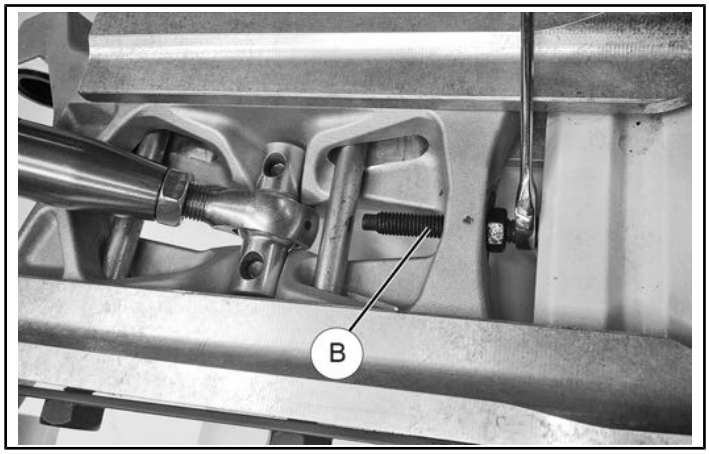
On some bike models, in order to fit the wider supplied O-ring engine chain, the engine sprocket may need to be removed and turned around or require a supplied spacer be placed behind the engine sprocket to provide more clearance between the chain and engine case. See fitment tables for details on your specific bike model.

1. Install the engine chain and master link. First run the engine chain over the rear chassis chain guide slider then under and around the countershaft sprocket and the jackshaft sprocket. Next position the chain so you can wrap the two ends of the chain onto the jackshaft sprocket utilizing the sprocket teeth to hold the two ends of the chain in place. Thoroughly grease the master link pins and O-rings with the supplied grease before installing. If the chain is too tight to get the master link in:

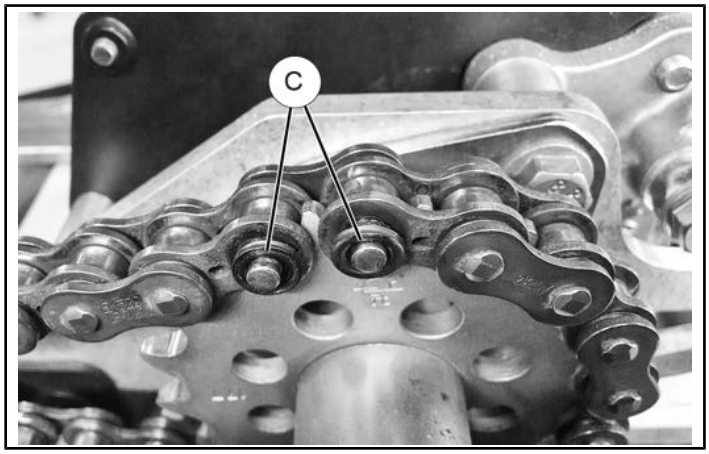
a. First, loosen the two 15mm sub-frame pinch bolts Ⓐ located on the right-hand side frame rail.



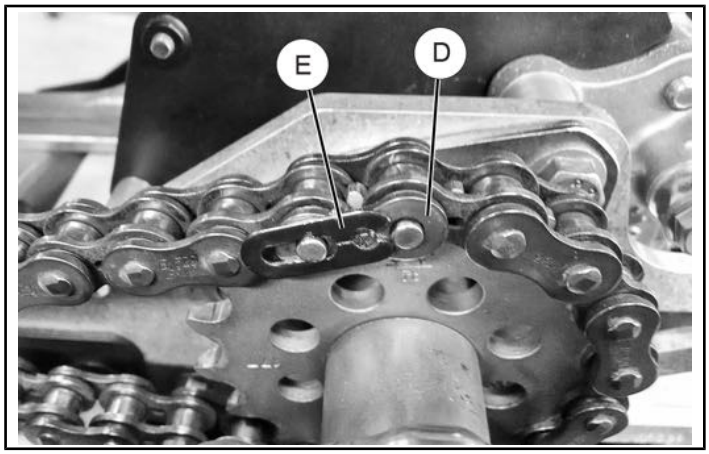
b. Next, loosen the 13mm jam nut on the chassis's tensioner bolt. To achieve less chain tension thread the tensioner bolt Ⓑ in a clockwise direction. This will pull the forged pivot forging into the frame rails to give you more slack in the chain making it easier to install the chain master link. To achieve more chain tension, thread the tensioner bolt out in a counter-clockwise direction.



2. Install the O-rings Ⓒ and outer plate Ⓓ by placing it on the pins and pressing it together with pliers.



3. Install the retaining clip Ⓔ so that it is facing backwards of rotation.



DRIVE CHAIN TENSION

For long chain life and reliability, it is extremely important that you keep the drive chain adjusted properly. Always check drive chain tension before riding.

IMPORTANT

TIMBERSLED SUSPENSION STRUT (TSS) MODELS: The TSS **MUST** be at full extension and set to at least 200 PSI to measure and adjust drive chain tension properly. To ensure the TSS is at full extension, remove all weight from the shock. Inspecting and adjusting a chain without the suspension at full extension will indicate a loose chain and lead to over-tensioning and excessive chain stretch and wear.

NOTICE

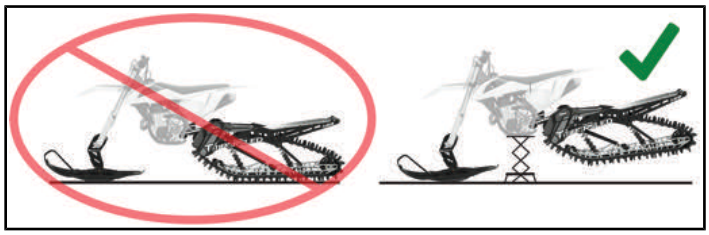
The drive chain may loosen on the first ride due to initial chain stretch and slider break-in. Retighten drive chain after the first few rides. If the problem persists, your dealer can assist.

MEASURING DRIVE CHAIN TENSION

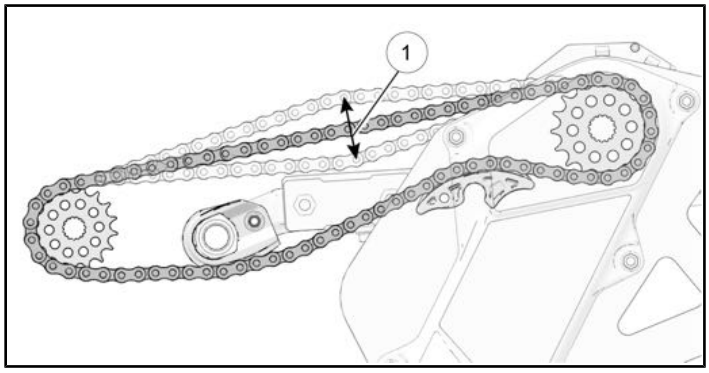
To measure drive chain tension before riding:

1. Ensure your snow bike is free of all snow and debris, positioned on a flat even surface, and has no wheel kit positioned under it.

For Timbersled Suspension Strut (TSS) models, set TSS shock air pressure to at least 200 PSI. Then ensure TSS suspension is at full extension (i.e. no weight is on the shocks) by tipping the bike on its side or by using an appropriate stand to lift the bike under its engine ensuring the track is suspended off the ground.



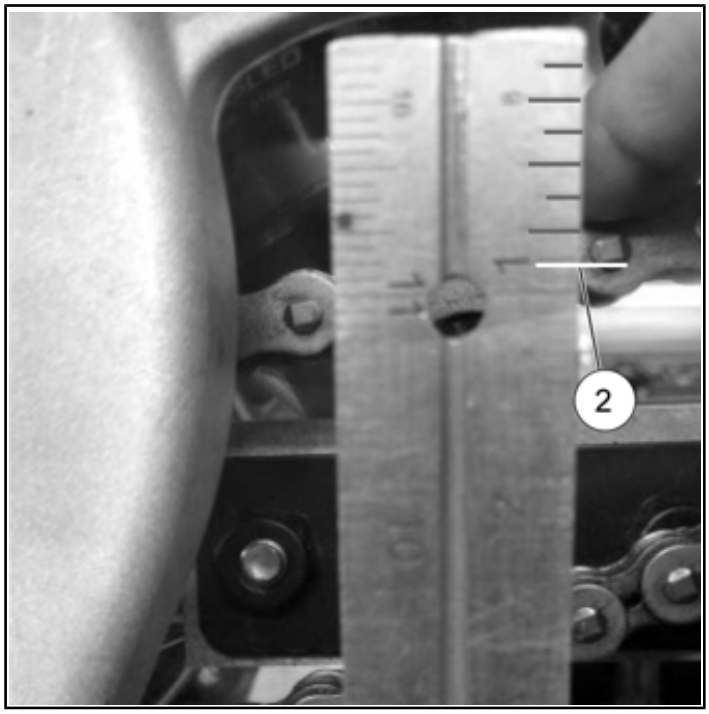
2. Position a ruler behind or in front of the top chord of the drive chain, halfway between the counter shaft sprocket and the jack shaft sprocket (this is where drive chain displacement should be measured) ①. Steady the ruler so it does not move as chain displacement is measured.

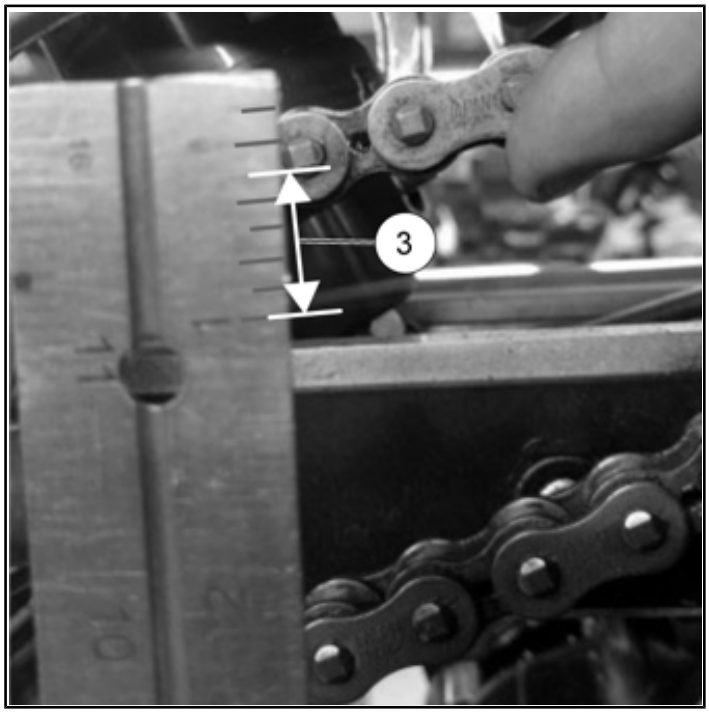


3. Choose a single chain link pin close to the ruler to use as a reference point for measuring chain displacement. Push down on the top chord of the chain with one finger and line up the 1 inch mark on the ruler with the chosen chain pin ② (see photo).

4. Then, without moving the ruler, push up on the top chord of the chain with one finger in the same location and count the number of 1/8th in. marks between the 1 inch mark and the new position of the chosen chain pin ③.

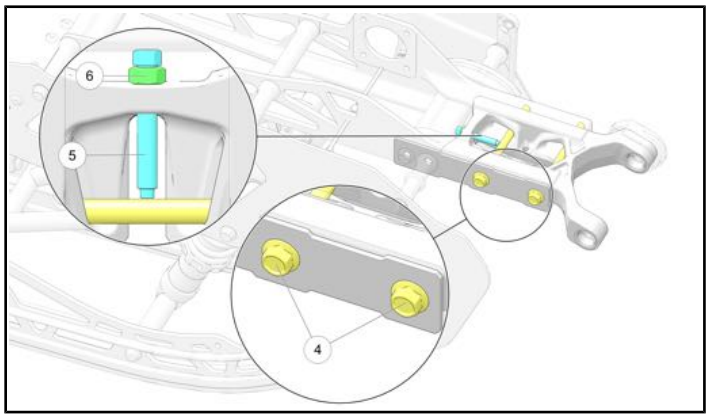
   If the chain is properly tensioned, there should be between 0.75 in. and 0.25 in. between the 1 inch mark (the position of the chosen chain pin when pressed down) and the current position of the chosen chain pin (when pressed up). This is the drive chain's displacement measurement. If the drive chain's displacement measurement is less or more than 0.75 in. and 1.25 in.the chain needs to be adjusted (see *Adjusting Drive Chain Tension*).





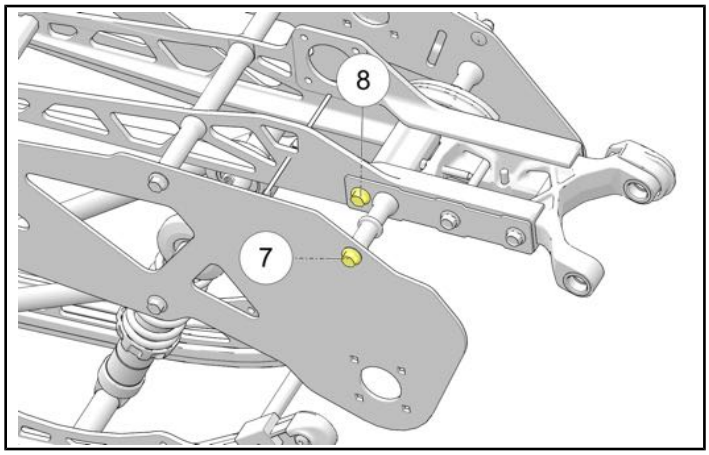
ADJUSTING DRIVE CHAIN TENSION

To adjust drive chain tension, follow the steps below.



1. If the chain needs to be adjusted, loosen both 15 mm frame rail slide bolts ④ located on the right side of the Timbersled.
2. Next, loosen the 13 mm inner jam nut ⑥ on the inner frame tension adjuster bolt ⑤.
3. Adjust the tension adjuster bolt ④ in or out to achieve the correct chain tension.
4. Re-torque the jam nut ⑥ to 25 Nm.
5. Re-torque the frame rail slide bolts ④ to 50 Nm.
6. Measure the drive chain's displacement once again to ensure it is properly adjusted.

   If the chain is too tight and the frame is difficult to compress, you may loosen the front right-hand side panel bolt ⑦ and the front right-hand frame bolt ⑧ to allow the frame to slide easier. Re-torque both bolts to 60 Nm prior to tensioning the chain.



REAR ASSEMBLY

1. If provided, install the pre-filter onto the stock foam air filter.

NOTICE
Pre-filters can be purchased separately for your specific motorcycle. See Timbersled.com for details.

2. Reinstall the exhaust system and frame guards if your bike has them.
3. Reinstall the side panels, seat, and required engine chain guards.

FRONT END DISASSEMBLY

1. Remove the axle nut. Loosen the front axle pinch-clamp bolts and remove the front axle bolt.
2. Remove the wheel from the bike. The wheel will not be needed while the Timbersled Kit is installed.
3. Remove the fork guards. Retain for later use.

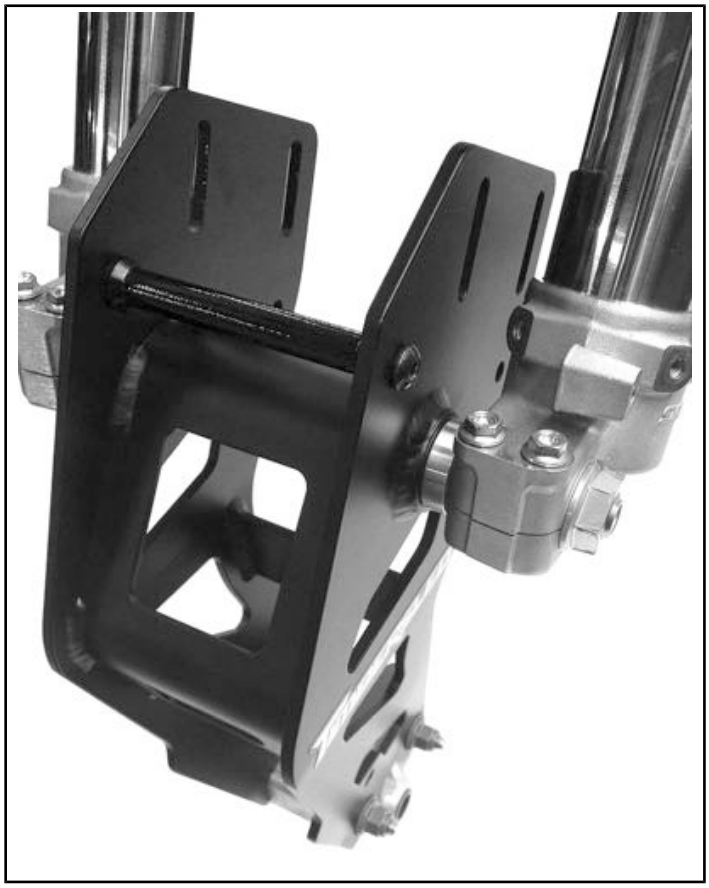
SPINDLE INSTALLATION

NOTICE
The Timbersled spindle is universal for all models of bikes.

1. Install the correct spacer/reducers for your make and model of bike into the left and right side of the spindle cross tube.

NOTICE
See the **Timbersled Fitment Tables** for your exact bike model to see the correct spacer/reducer placement. Some models have a 3-piece setup with a spacer/reducer on the left hand side with a tube style spacer that will fit into the center of the spindle and a washer style spacer on the right hand side.

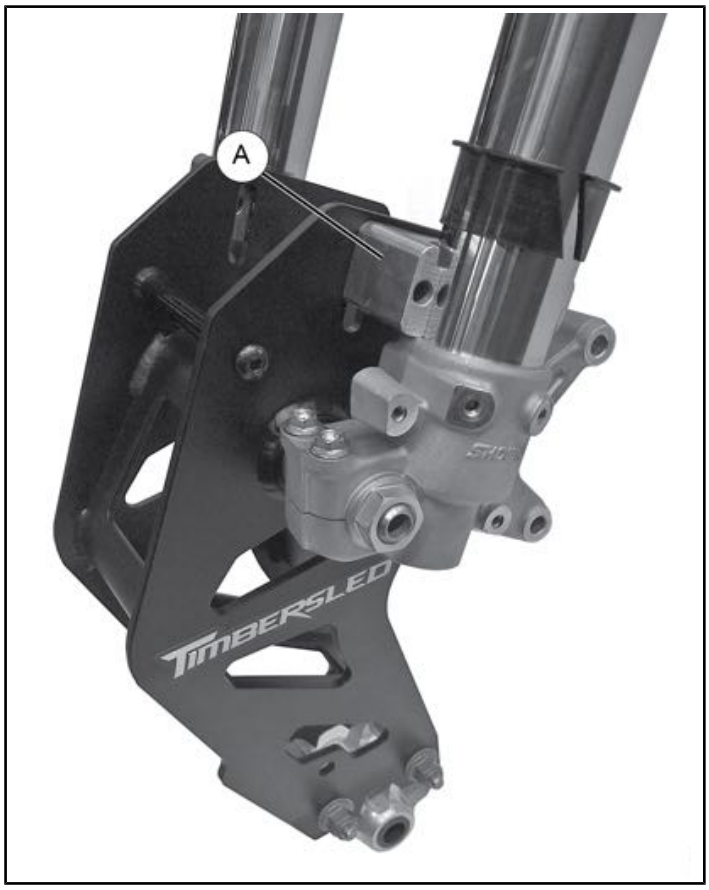
2. Place spindle assembly into position with the concave side of the spindle facing towards the rear of the motorcycle. Slide in the stock front axle bolt (unless the fit kit is supplied with a Timbersled machined axle) and install the nut. **DO NOT TIGHTEN** any of the front end fasteners at this time.



3. Locate the inner fork clamps Ⓐ and place them onto the inside face of the fork tubes in between the fork tube and the spindle with the fork seal relief groove facing up.

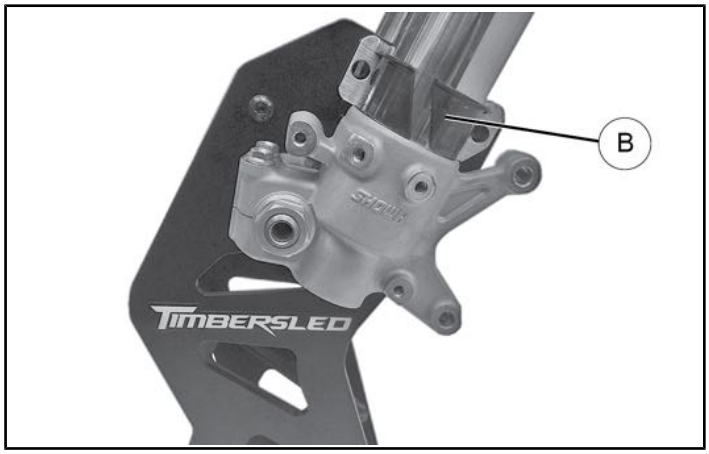
NOTICE
Some models require a shim washer between the spindle and the inner fork clamp. See notes in the fitment tables and install as necessary for your specific bike.

4. Slide both inner fork clamps Ⓐ (less fork clamp cap) down between the spindle and fork tubes. Position them as low as possible on the fork tube.



NOTICE
Slide the brake-side clamp down on the fork tube as low as it will go first, then set the opposing side. Ensure that both left and right fork clamps are sitting at the same height.

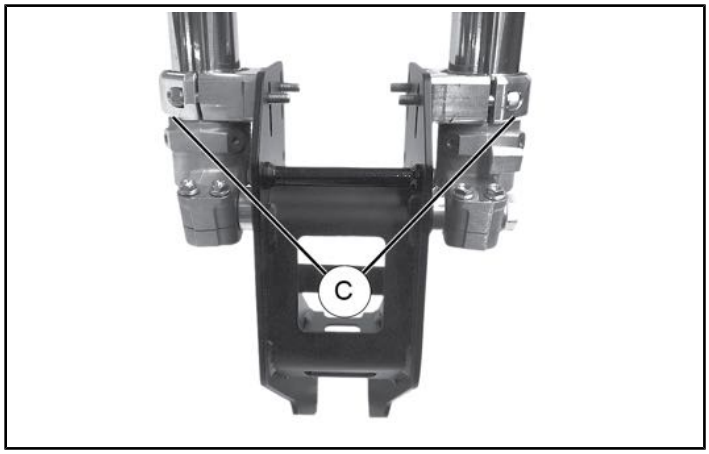
5. Install the plastic split bushing Ⓑ onto the fork tubes above the clamps with the bushing flange on the top. Slide the bushing down into the fork clamps so that bushing flange is all the way down inside the relief groove.



6. Rotate the spindle forward and back until the fork clamp bolt holes line up with the slotted spindle holes. This will properly set the correct amount of trailing the ski will have in relation to the axle bolt.

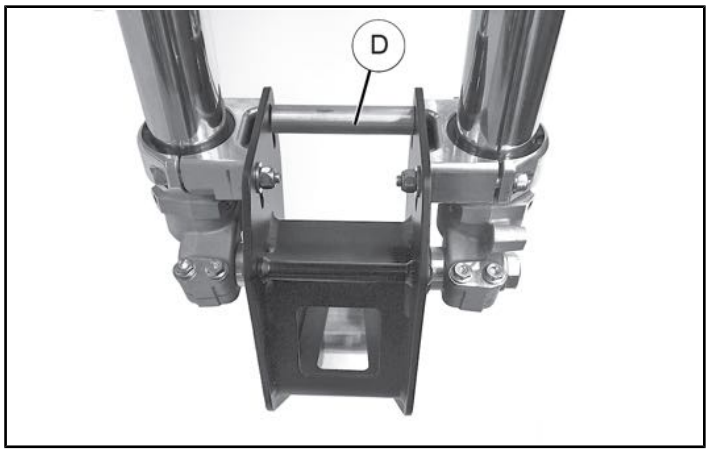
NOTICE
To help hold the spindle in place while you work on it you can snug the axle nut and set the spindle on the ground. You can then tap the spindle back and forth to get the correct positioning.

7. Place the outer fork clamps Ⓒ onto the lower assembly with the fork seal relief groove facing up and so that the split fork bushing flange is not pinched or crushed.



8. Insert the 2.75” x 5/16” bolt in the front fork clamp bolt holes and the 3.0” x 5/16” bolt in the rear fork clamp bolt holes on both left and right fork clamps.
9. On the rear fork clamp bolts, you will use the included spindle support cross shaft Ⓓ that the 3” bolts will thread into. This cross shaft will fit in-between the ears of the spindle and will provide support to the assembly. Use the provided flat washer and 5/16” lock nut on the inside of the spindle to secure the front fork clamp bolts. Torque the front and rear fork clamp bolts evenly to the specification listed below.

TORQUE
25Nm (18 Ft. Lbs)



10. If re-installing bike’s stock front axle, see your bike manufacturers owner’s manual for proper torque specifications. If using a front axle provided in your Timbersled Install Kit, torque the axle bolt to the specifications below.

TORQUE
45Nm (33 Ft. Lbs)

11. Tighten the lower fork tube pinch bolts to your bike manufacturers specified torque settings.
12. Reinstall fork guards.

NOTICE
This step is optional as the fork guards will need to be modified if you choose to reinstall them.

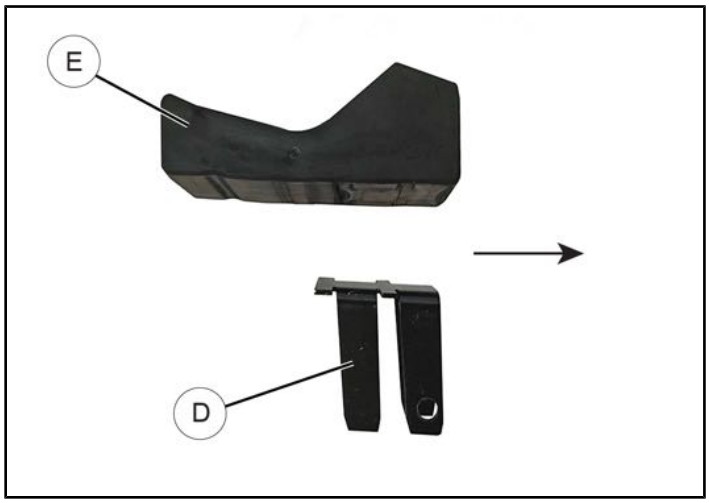
13. To reinstall the fork guards, first hold the fork guard up into place and free hand draw a line where they will need to be cut to provide enough clearance between the fork clamp and the fork guard for reinstallation. Use tin snips to cut out this portion of the fork guards. Reinstall them on the bike using only the two outside screws. The inside screws will not be used due to the portion being cut away. Refer to the following three images for fork guard modification and installation.

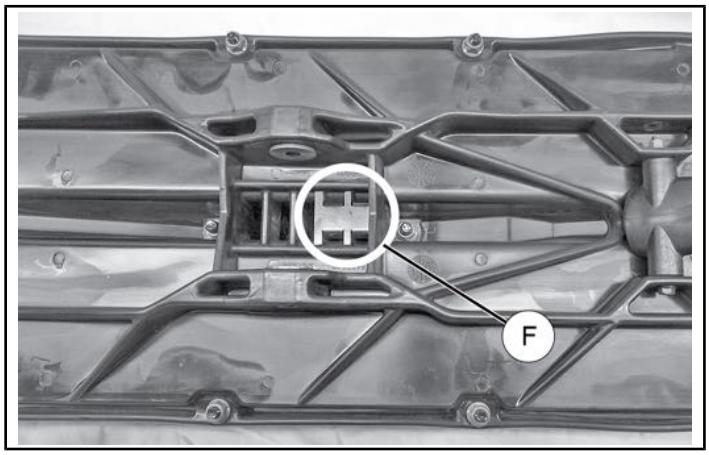
(Step 13 Cont'd.)

SKI INSTALLATION

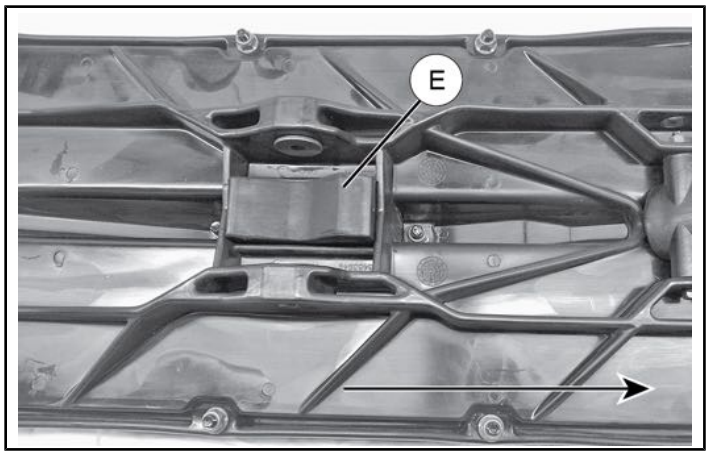
1. Place the ski rubber support plate Ⓓ into the center cradle of the ski. Make sure the four lower plate fingers drop fully down into the front two slots Ⓕ in the ski cradle. The top T-shaped ears of the plate should face towards the rear of the ski.

NOTICE
Arrows indicate forward (front) direction.

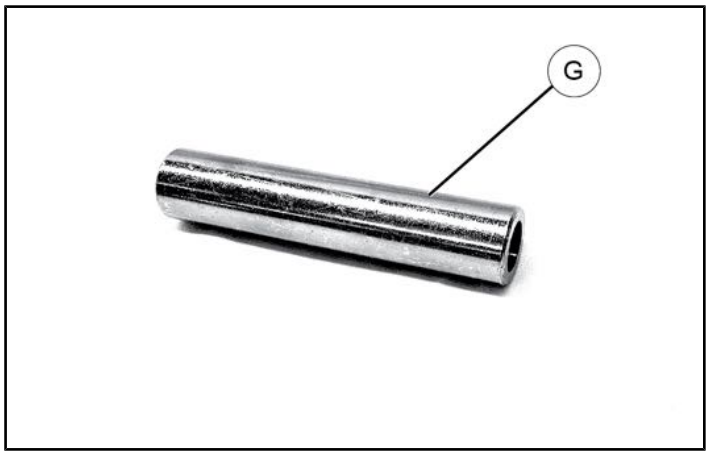




2. Next, place the ski rubber Ⓔ into the ski cradle with the large thick portion of the ski rubber facing the front of the ski.



3. Place a coating of waterproof grease on the outer diameter of the ski collar Ⓖ. Install the ski collar into the lower ski bolt hole of the spindle block.

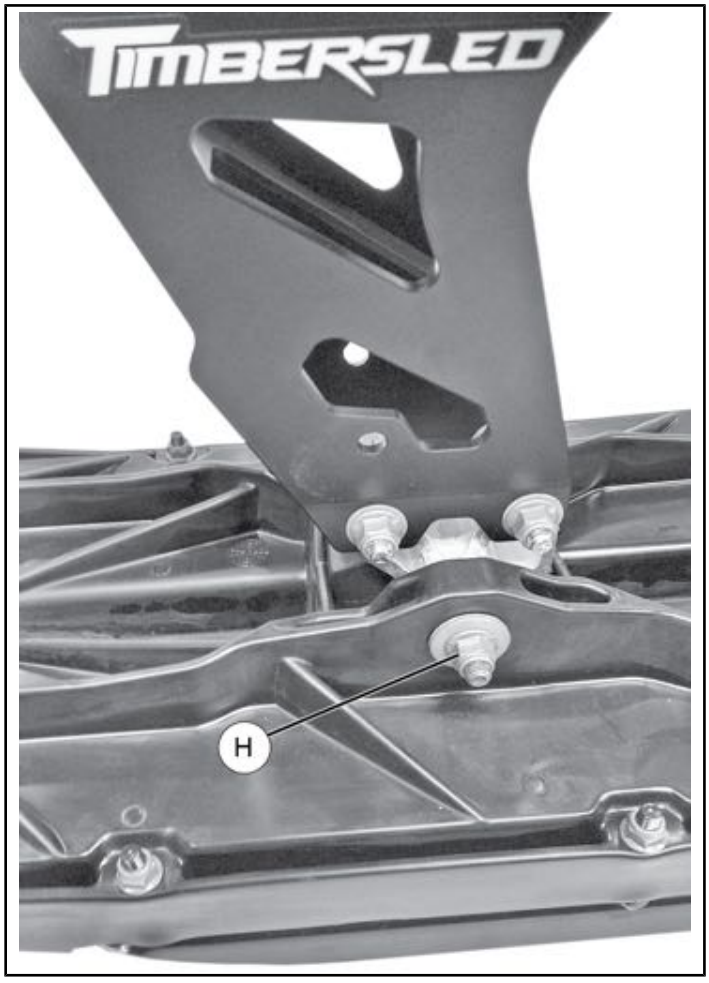


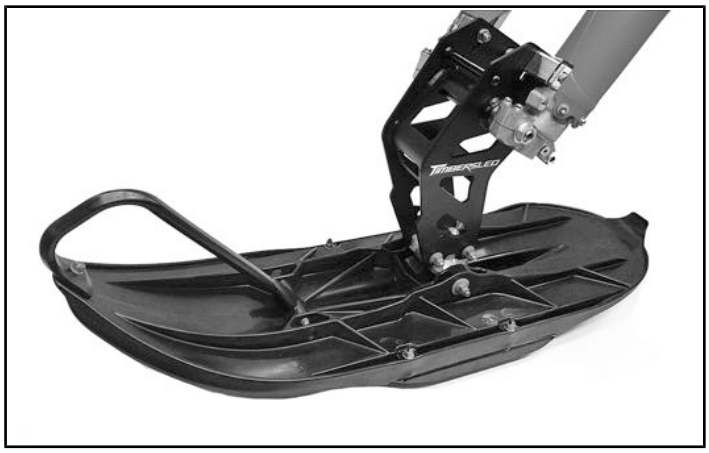
4. Place ski, with ski rubber and ski rubber support plate installed, under the spindle. Lift up on the front of the ski to pull it up into place. Once in place, push the ski bolt through belleville washers, ski cradle ears, and spindle cradle to hold the ski in place. Make sure the concave surfaces of the belleville washers are facing in against the ski cradle ears.

NOTICE
It will be a tight fit between the ears of the ski bracket.

5. Secure ski by installing the locking nut Ⓗ onto ski bolt and tighten. Torque nut Ⓗ to specification listed below.

TORQUE
45 Nm (33 ft/lbs)





⚠ WARNING
Failure to torque fasteners as directed will adversely affect the steering system and may lead to severe injury or death.

6. Ensure all tools are accounted for and all steps have been completed in the correct order.

FEEDBACK FORM

A feedback form has been created for the installer to provide any comments, questions or concerns about the installation instructions. The form is viewable on mobile devices by scanning the QR code or by clicking **HERE** if viewing on a PC.

FEEDBACK FORM