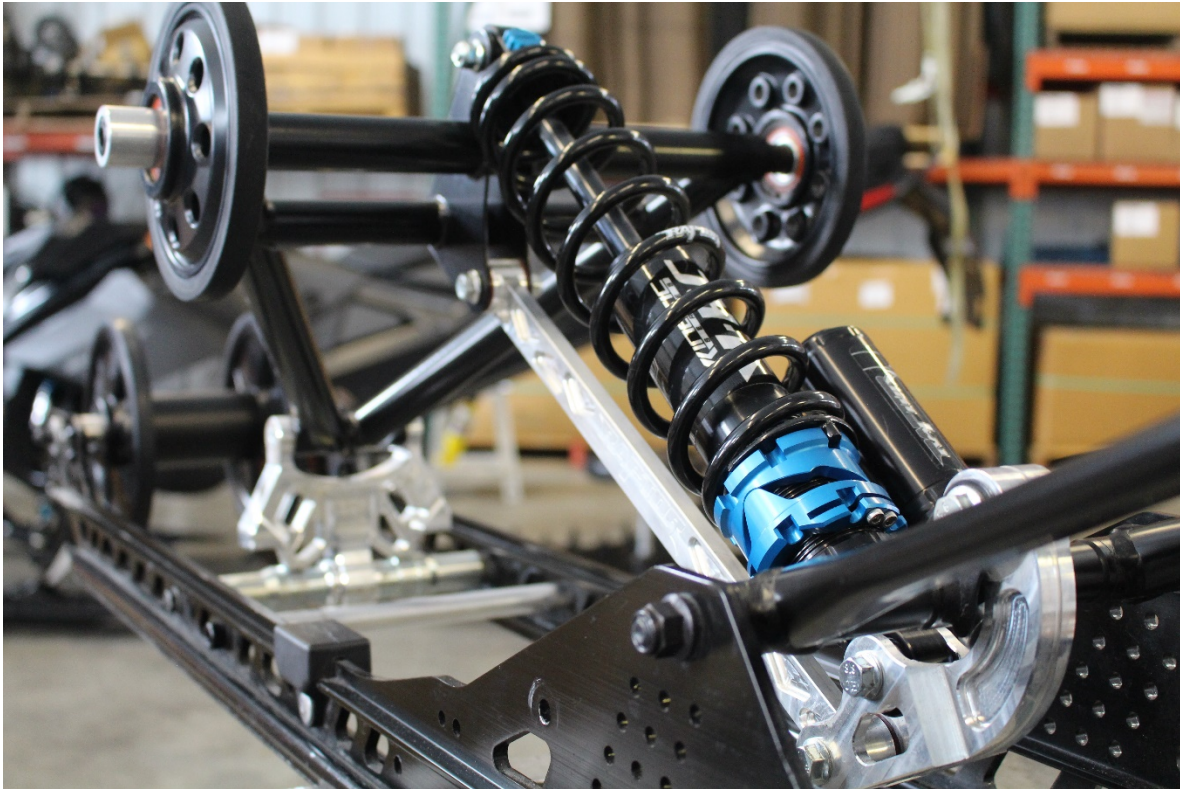




## ***SETUP & TUNING - RAPTOR ACE KIT***

Congratulations! You've just purchased the most tunable rear suspension package available today for the Skidoo XM and Generation 4 rear suspension. The ACE is one of the lightest most technologically advanced suspension packages designed to replace old school torsion spring technology.



As with every suspension package, you will need to tune this package to fit your riding style. With our 20 position compression clickers and near endless amounts of pre-load adjustments,



you will find our shocks have an unrivaled range of adjustability. If you have questions or concerns, contact us at any time. That's what we're here for.

Here are some simple installation and tuning instructions as well as our best practices on how we set our ACE kits up for the way we ride. These settings will likely be close for you, but will have to be dialed in for your particular riding style.

## ***Installation:***

### *Disassembly:*

1. Suspend the rear of the sled until the track is about 10 inches off the ground.
2. Remove the torsion spring guides from the side of the rails. This will take the preload off of the suspension making it much easier to manage.

Note: Take extra caution when doing this. There is an excessive amount of preload on these springs.

3. Remove the rear bolts that hold the suspension in the tunnel. Impact wrench works the best here due to the excessive amount of Loctite on the bolts.
4. Once you have the rear of the suspension free from the rear of the tunnel, remove the lower front pivot bolt from the front torque arm assembly.
5. Next remove the rear pivot bolt from the rear pivot that attaches it to the rails. Loosen the rear axle bolt along with any cross shaft bolts. This will help in spreading the rails during the re-assembly process. You should now be able to remove the torque arm assembly from the vehicle.



## Assembly:

Assemble the ACE rear torque arm assembly with parts supplied in the kit as follows:

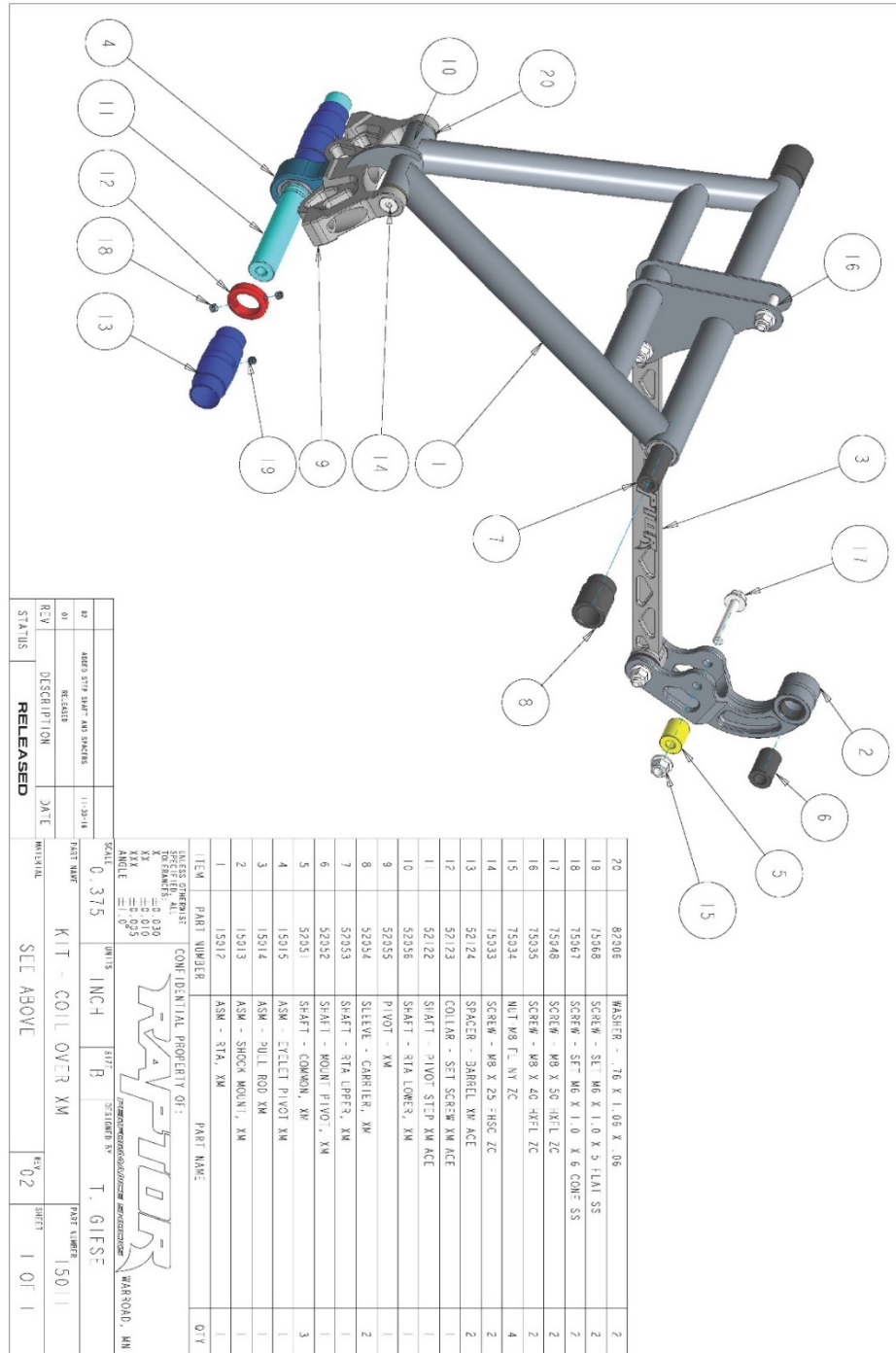
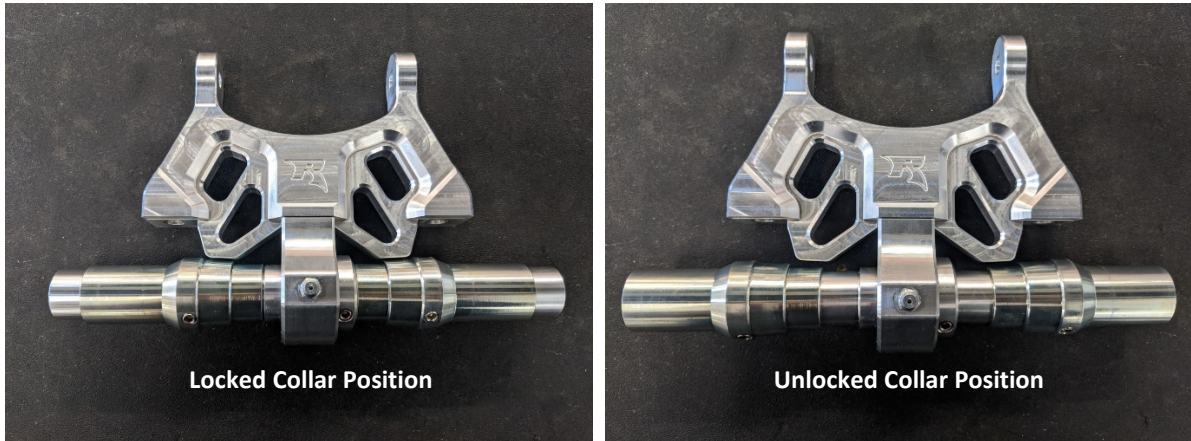


Fig. 1 – Assembly print for reference.



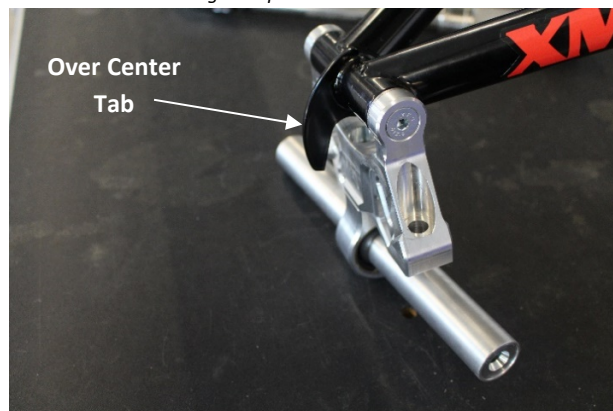


*Fig. 2 - The eyelet on the pivot has Loctite applied and the bolt has been torqued to 40 Ft Lbs here prior to shipping. Note the collar positions above showing the locked and unlocked pivot motion.*

1. Install the rear pivot to the rear torque arm using aluminum pivot shaft along with spacer shims on each side of arm as shown in Fig 3. Make sure to have the over center tab on the rearward side of the pivot (see Fig 4). Apply Loctite to these bolts and torque them to 20 lbs.



*Fig. 3 – spacer shim location*



*Fig. 4 – Over center tab location*





2. The lower pivot shaft has been pressed into the bearing and lock collar installed here for ease of assembly. (see Fig 2)
3. Slide lock out spacers over pivot shaft and lock them in place with supplied set screws remember to use a small amount of blue Loctite on these screws. (see Fig 2)
4. Next attach lower front pivot to the control rod and attach this assembly to rear Ace arm assembly and torque these to 20 Ft Lbs.
5. Now install the Raptor coilover shock using supplied reducer spacers. Use supplied O-rings on the upper and lower attachment (four in all). Torque upper and lower bolts to 20 Ft Lbs.
6. Install the rear Ace assembly back into the suspension. Spread rails slightly to get the rear pivot shaft into position (note you will not use washers between rail and pivot shaft like the production pivot)
7. Now install the production rear pivot bolt that was removed earlier and torque it to 20 Ft Lbs.
8. Install the front lower pivot to front torque arm using supplied spacer and stock bolt that was removed earlier. Torque bolt to 30 Ft Lbs.
9. Remove the rear carrier wheels from the stock torque arm and install supplied spacers into these wheels they will have a light press and may require the use of a mallet to install. See fig



*Fig. 5 – rear carrier wheel with kits spacers*



10. For those that purchased the front track shock, install it now. Remove limiter strap, upper shock bolt as well as lower shock bolt. On models that have bogie wheels pressed on the lower shock shaft you will need to press the shaft through one of the wheels to remove the shock. Install your Raptor shock with the reservoir up and to the R.H. side of the sled. (see



*Fig. 6 – front track shock mounting position*

Fig 6) Before you install your limiter strap make sure there is NO preload on the spring as this shock compresses about 5/8 of an inch once the limiter is set. After you have the limiter strap set back to factory specs, now set the spring preload to 8-1/8 inches. See charts under the “Suspension Setup” section.

**Note: Make sure to lock the locking screw on the spring adjuster once preload is set.**

11. Next slide carrier wheels on the upper cross shaft. Now attach rear torque arm to chassis using supplied bolts with Loctite and torque them to 40 Ft Lbs. Note: You may need a ratchet strap along with a pry bar to get the bolts lined up in the tunnel.
12. Double check that all fasteners are properly tightened. Now is a good time to check track tension and set to Mfg. spec.



## ***Suspension Setup:***

1. Refer to your vehicle owner's manual and set your limiter straps (we recommend starting with the production settings).
2. With the suspension installed, lift the rear of the sled off the ground or roll your sled on the side and set the shocks to Raptor specs. See chart below.

### ***NOTE:***

\* Installed length (spring) is defined as the length of the spring measured from end to end with the vehicle off of the ground (suspension at full extension).

\* Riding styles and the height of the rider make a significant difference in rider position on the sled. Rider position drastically affects the weight distribution, which affects vehicle suspension dynamics and will change how you tune the suspension. The recommended settings are a good starting point, but are for reference only.

**DO NOT PRELOAD THE REAR TRACK SPRING TO LESS THAN A 9.5 INSTALLED LENGTH OR SEVERE DAMAGE WILL OCCUR...**

Initial Suspension Settings 146, 154, 163, 165"				
	175-225 lbs (On Trail)	225-240 lbs (On Trail)	175-225 lbs (Off Trail)	225-240 lbs (Off Trail)
Skidoo F/T Spring Preload	Refer to Vehicle Owner's Manual	Refer to Vehicle Owner's Manual	Refer to Vehicle Owner's Manual	Refer to Vehicle Owner's Manual
Raptor F/T Spring Preload	1/4" Preload (Installed Length 8-1/8")	1/4-1/2" Preload (Installed Length 8 to 8-1/8")	1/4" Preload (Installed Length 8-1/8")	1/4-1/2" Preload (Installed Length 8 to 8-1/8")
R/T Spring Preload	1/4" Preload (Installed Length 11")	1/4-1/2" Preload (Installed Length 10-1/2 to 10-3/4")	1/2-3/4" Preload (Installed Length 10-1/4 to 10-1/2")	1/2-3/4" Preload (Installed Length 10-1/4 to 10-1/2")
F/T Compression Clicker	6	8	2	4
R/T Compression Clicker	6	8 to 12	2	4 to 6



Initial Suspension Settings 174", 175"				
	175-225 lbs (On Trail)	225-240 lbs (On Trail)	175-225 lbs (Off Trail)	225-240 lbs (Off Trail)
Skidoo F/T Spring Preload	Refer to Vehicle Owner's Manual	Refer to Vehicle Owner's Manual	Refer to Vehicle Owner's Manual	Refer to Vehicle Owner's Manual
Raptor F/T Spring Preload	1/4" Preload (Installed Length 8-1/8")	1/2" Preload (Installed Length 8")	1/4-1/2" Preload (Installed Length 8 to 8-1/8")	1/4-1/2" Preload (Installed Length 8 to 8-1/8")
R/T Spring Preload	1/4" Preload (Installed Length 11")	1/2" Preload (Installed Length 10-3/4")	1/2-3/4" Preload (Installed Length 10-1/2 to 10-3/4")	1/2-3/4" Preload (Installed Length 10-1/2 to 10-3/4")
F/T Compression Clicker	6	6 to 8	2 to 4	2 to 4
R/T Compression Clicker	6 to 8	10 to 12	6 to 8	8 to 10

The **QuickCam(QC)** feature in the Ace kit shock makes it much easier to adjust the spring preload from trail to off-trail use and vice versa.

The cam has three preload settings; initial or trail setting (which is adjustable), and two off trail settings of 1/4 and 1/2 inch which can be achieved by simply turning the spring a 1/4 of a turn.



This is a very effective feature that will increase the performance of your sled exponentially off trail, keeping the ski lift to a minimum and give you much better control.

The QC, combined with the LOC feature gives you the flexibility to lock out the T-motion within seconds and will help harness the power of that new 850.





We encourage customers to not be afraid to try the compression clicker at full hard or full soft to see the wide range of adjustability in our shocks and get a better understanding of the effects of tuning.



**COMPRESSION ADJUSTER:**

All compression adjustments are from full soft (click one) (S) to full hard (click 20) (H). We typically set the compression clickers on click 5 depending on the application.

**REBOUND ADJUSTER:**

All rebound adjustments are from fully firm (clockwise) (+) being the stiffest to 20 clicks out (-) being the softest. Anytime you adjust your rebound clicker go full stiff (clockwise) and back them out. We typically set the clickers on 5-10 clicks out depending on the application.



***NOTE:*** *There are two full rotations of adjustment on the compression clicker. It can sometimes be difficult to feel the clicks in the field. What we do is turn the knob in quarter turn increments. One full turn equals 10 clicks.*

***Fine Tuning:***

Knowing what to do in given situations and snow conditions will help you school your buddies on a day-to-day basis. This is totally up to you with your setup and the more you mess with it the more you learn. Here are some basics.



**Event Type:** *Sled bottoms too easy on larger 2.5ft to 3.0 ft events.*

**Tuning Tips:** Always start with the compression clickers in these types of situations.

- A. If you are feeling the impact in your wrists, stiffen up ski shocks two clicks at a time until acceptable.
- B. If the impact is in your heels, make clicker changes to the front track shock. Two clicks at a time until acceptable. You may also want to add two turns on the front track spring to help this issue.
- C. If you feel it in your back or you can physically feel the rear arm bottom, adjust the rear track shock clicker two clicks at a time until it goes away. Spring preload can also help this issue increase preload to help bottoming.

**Event Type:** *Sled is too firm over small events wants to dance/ricochet off of everything and getting excessive feedback in the bars.*

**Tuning Tips:** This is a good indication you that you need to soften up all your settings. It's ok to open all four shock compression clickers and set them on one. I personally do this every time I ride and it's usually when I'm headed back to the truck and I'm shot from digging my Polaris loving buddies out all day!

**Event Type:** *Sled has too much pitch (transfer/ski lift) and wants to trench after the skis get three feet in the air or you simply can't drive it straight up a hill side.*

**Tuning Tips:** This can be a culmination of things but we recommend starting with the following:

- A. Add preload to the rear shock this will not allow the rear arm to collapse as easy wanting to cause lift.
- B. Add clicks to the rear shock. Our shocks adjust at very low velocities and this will slow down the event.
- C. Soften front track shock springs all the way off this will also help keep the front arm from pushing out.
- D. If you have to take it to this level, tighten the limiter strap one hole location making sure to adjust spring preload after you tighten the strap (back it off).

We hope that this helps you adjust for the most common events. If you have more questions with setup e-mail [info@raptorshocks.com](mailto:info@raptorshocks.com) and we can talk you through it.

Thank you for choosing Raptor shocks!



**WWW.RAPTORSHOCKS.COM**