

RV6 Performance Solid Rear Knuckle Spherical Bearing Kit

Install Guide

This is an install guide written for the RV6 Performance solid rear knuckle spherical bearing kit for the 10th generation 2017+ FK8 Civic Type R. This kit replaces the rubber bushings in the rear knuckles with solid spherical bearings. This makes for a solid connection between the rear knuckles and rear lower control arms. This kit is aimed to remove the excess play and slop in the rear suspension resulting from using compliant rubber bearings to provide a clean, crisp and responsive suspension feel during sport driving.

Included in this kit are 2x solid spherical bearings to assemble in the rear knuckles, 2x snap rings and 2x shims.





Preface:

This guide details the installation of this spherical bearing kit on a 2017 Type R, #00561. Prior to assembly this vehicle had modifications to the rear suspension in the form of an aftermarket rear sway bar, lower control arms, toe links and the addition of a subframe rigid collar kit. Despite these changes the installation steps covered in this document will be identical to the process of working with fully stock components. The process detailed will be the same even if other suspension modifications such as lowering springs, coilovers, camber kits or alternative rear sway bars have been installed.

To install these components in the rear knuckles both left and right rear lower control arms will need to be de-coupled from the knuckle. This will require the 1x bolt connecting the rear sway bar end link to the lower control arm and the 1x bolt securing the lower control arm to the rear knuckles on both left and right sides of the vehicle to be removed. Once these bolts are removed the control arms can be pivoted downward on the remaining bolt securing them to the sub frame to provide access to the rear knuckle bearing.

Note that any time suspension components are installed or altered a vehicle alignment should be performed to ensure the optimum settings are achieved. Also note that in general when moving from compliant OEM style rubber bushings to solid bearings some increase in NVH can be expected.

To maximize the suspension response and the user control over rear tire alignment settings it is recommended to install the RV6 Performance lower camber arms, adjustable rear toe links, rear sway bar and the solid rear suspension bearings as an entire package.

For this document all directions mentioned are the same as if you are seated in the vehicle (IE forward means towards the front of the vehicle.) Also, for this document the terms "bushing" and "bearing" are used interchangeably. The term "heim joint" refers to a spherical bearing and housing used to allow freedom of motion at specific component connections. The term "trunnion" refers to the protruding features integrated in the inner rotating portion of a spherical bearing that provide mounting points to assemble against another component. Unless specifically mentioned when referencing hardware in the document below the size listed is for the tool size required, not the size of the hardware itself.

Always perform auto work in a safe manner. Never work underneath a vehicle without appropriate retention devices (jack stands or a lift.) Always wear proper protective equipment. Safety glasses and gloves are recommended. Other tools may be substituted based on availability or personal preference from the list provided below.

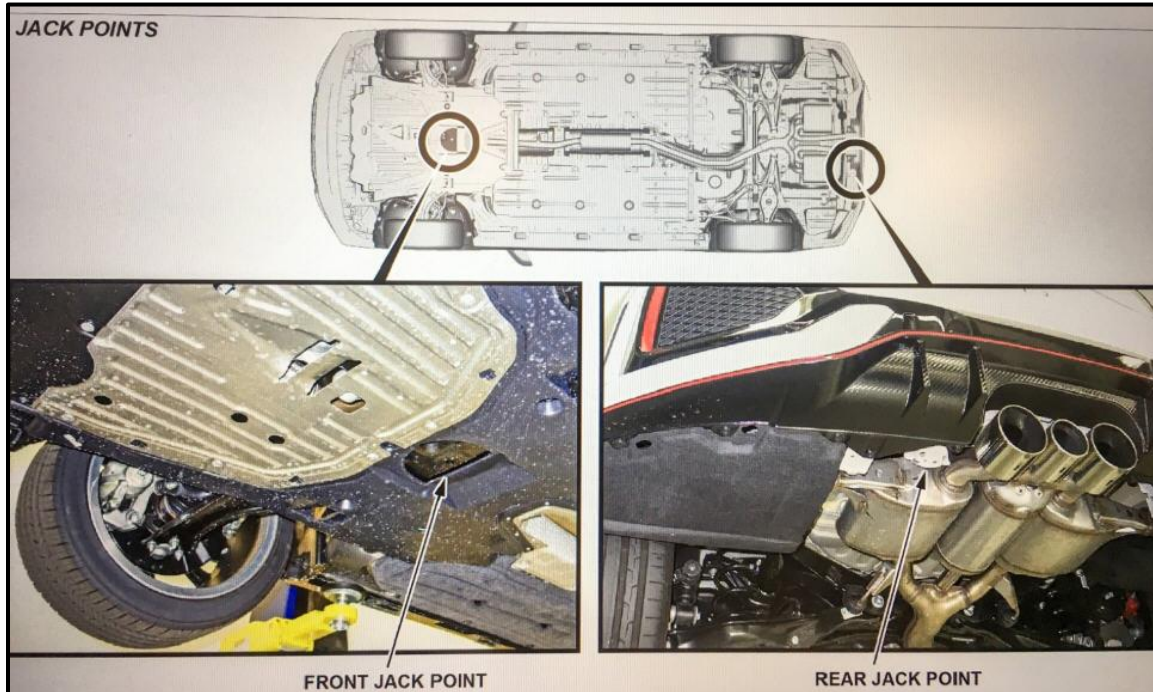
Tools Recommended:

- Socket Wrenches:
 - 3/8" or 1/2" Socket Wrench / Breaker Bar / Impact Gun
 - 12mm Socket
 - 19mm Socket
 - Various Extensions
 - Universal socket adapter (Flex Joint)
- Open Ended Wrenches
 - 19mm
- Flat Head Screwdriver
- Snap Ring Pliers
- Means to Press Bearings In and Out. Options include:
 - Ball Joint Removal Kit
 - Varying Sizes of Pipe with Bolts, Nuts and Washers
- Floor Jack(s) or Lift
- Jack Stands (2-4x)
- PB Blaster (Or Similar Penetrating Liquid)

Installation Steps:

Step 1: Raise Vehicle, Install Jack Stands and Remove Rear Wheels

- 1.1: Utilize the rear central jack location shown below to raise the rear of the vehicle and install jack stands under both the left and right rear retention points. Although not necessary, the front of the vehicle may also be lifted to maximize working space. If desired, utilize the front center jack location to raise the vehicle and install jack stands under both left and right front retention points.

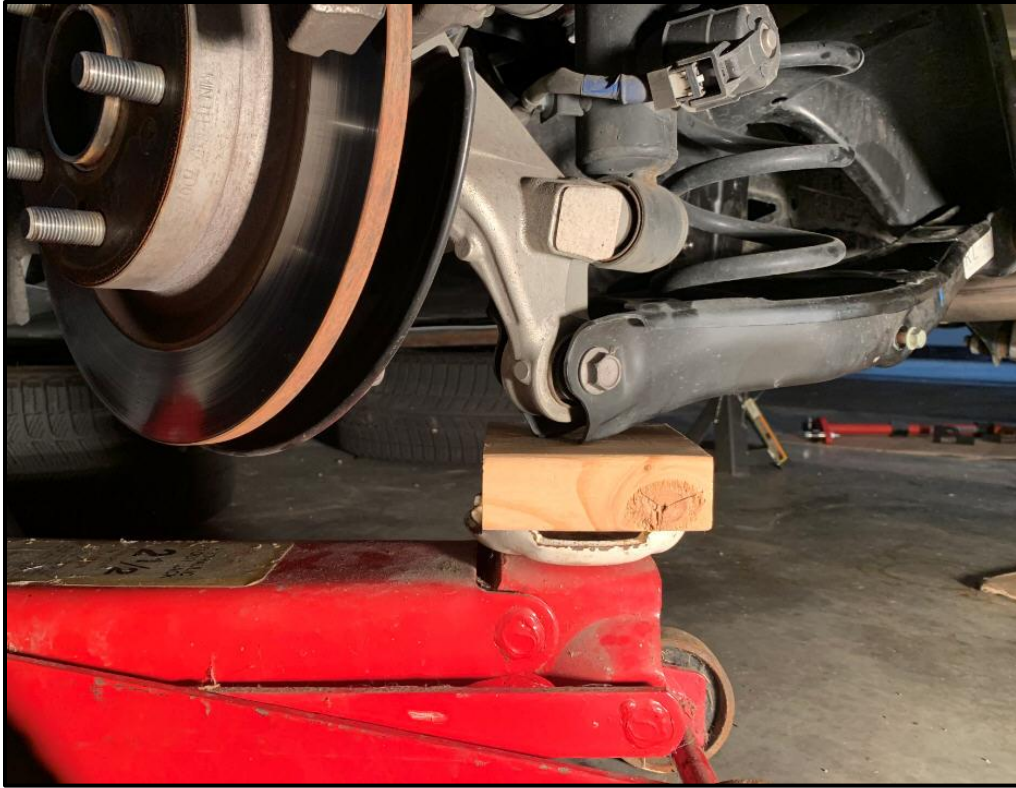


Note: Due to difficulty accessing the front central lifting location a smaller secondary jack may be used to partially raise the vehicle at the front lower retrieval hook (underneath the engine) or at one side jack stand location. Raise the vehicle enough to position the primary floor jack under the central lift location and proceed with raising the vehicle from there. Alternatively, vehicle ramps, low profile car jacks or full lift systems may be used. Install jack stands when enough clearance is obtained underneath the vehicle if not working on a lift system.

- 1.2: Remove the two rear wheels in order to gain more access to the rear knuckles.

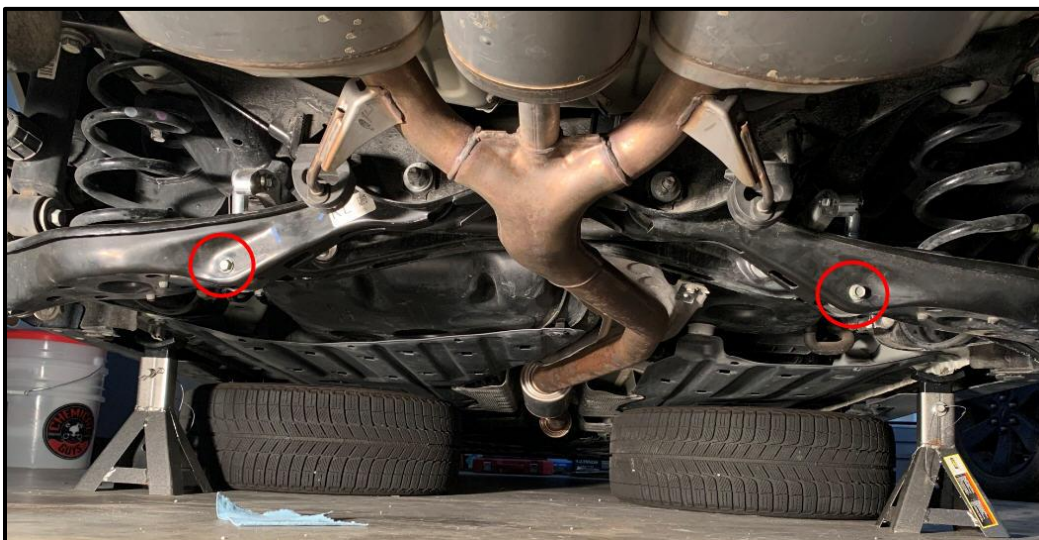
Step 2: De-Couple Rear Lower Control Arms

- 2.1: Position a floor jack underneath the control arms near the outboard mounting locations at the rear knuckles. It is advised to place a flat piece of scrap wood between the jack and the lower control arms to prevent damage to the painted surfaces during this process. Raise the jack until it is just starting to put pressure on the control arms but not so much that the vehicle is raised from the jack stands. Reference the image below.

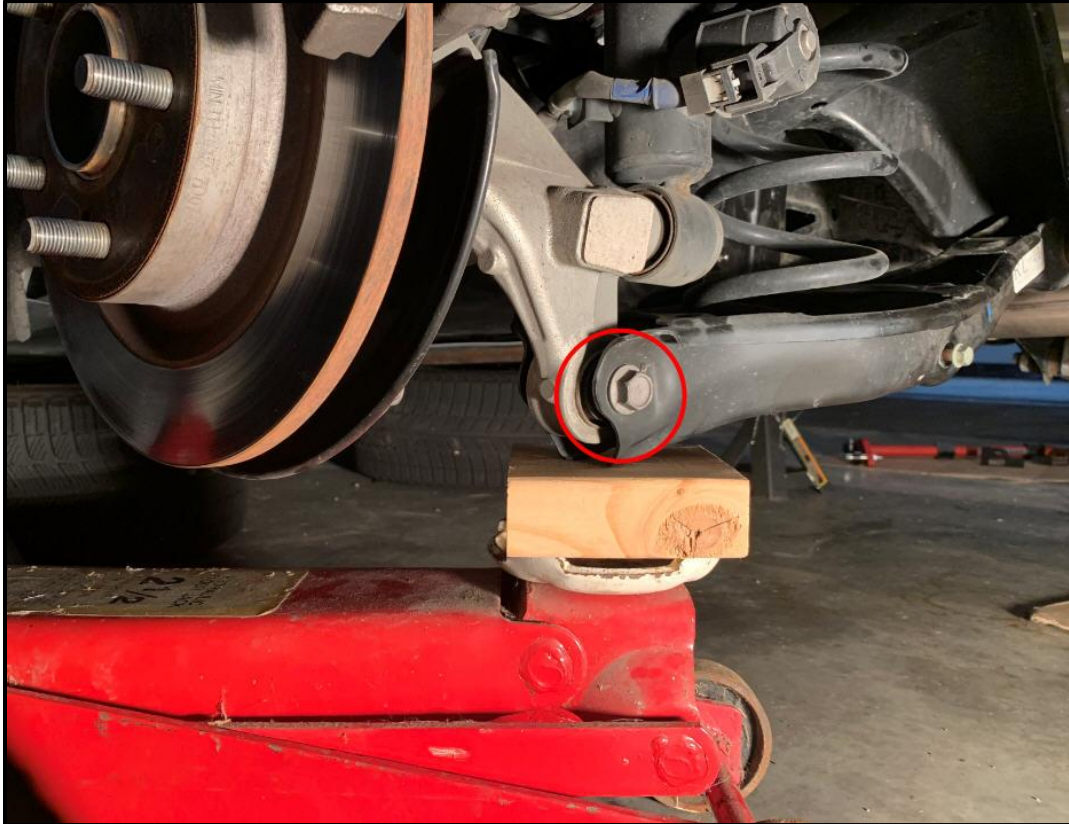


This step is required because the control arms have a load applied to them due to the suspension springs being slightly compressed in the system. Once the bolts described in Step 2.3 are removed the springs will try to release this stored energy and could cause the control arms to move forcefully and unexpectedly.

- 2.2: Remove the 1x 12mm head bolt securing the sway bar end links to the rear lower control arms (Red Circles) on both left and right sides of the vehicle, 2x bolts total. Note that the nuts for the end link connections located on the front side of the OEM lower control arms are welded to the arms directly and should not be rotated.



- 2.3: Remove the 1x 17mm head bolts securing the control arms to the rear knuckles (Red Circle) on both left and right sides of the vehicle, 2x bolts total. The front side of the control arms use an integrated threaded stud for these bolts and as such no backup wrench is needed. It is possible that these bolts may be difficult to remove due to the tension in the system described in Step 2.1. If unable to remove the bolt normally adjust the height of the floor jack to try and relieve any pressure on the bolt. The bolts will slide out of the rear knuckles with little effort once the control arms are in the proper position. Ensure the floor jack is in a locked position before removing these bolts.



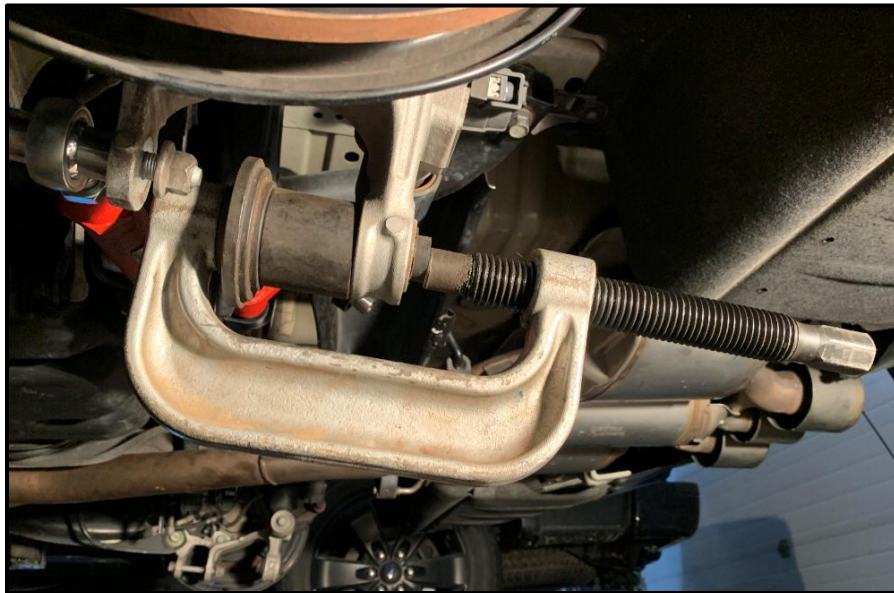
- 2.4: Slowly lower the floor jack to release the stored energy in the suspension springs. The springs should remain attached to the lower control arms once the jack is lowered due to the rubber protrusions in the lower spring caps being seated in the respective features in the lower control arms. Lower the control arms as much as the working area allows. The springs and spring caps can remain attached to the control arms during the remaining steps.
- 2.5: Remove the floor jack from the work area.

Step 3: Replace OEM Bushings in the Rear Knuckles with the RV6 Performance Solid Bearings

This step requires pressing out the factory rubber bushing from the rear knuckles. The method used to remove or install bearings should be the process a user is most comfortable with. Tools such as a ball joint removing kit or bolts, washers and pipe sections are likely the two best options

to remove these bearings. Regardless of the method used exercise extreme caution when applying the large amounts of force required to press bearings in and out

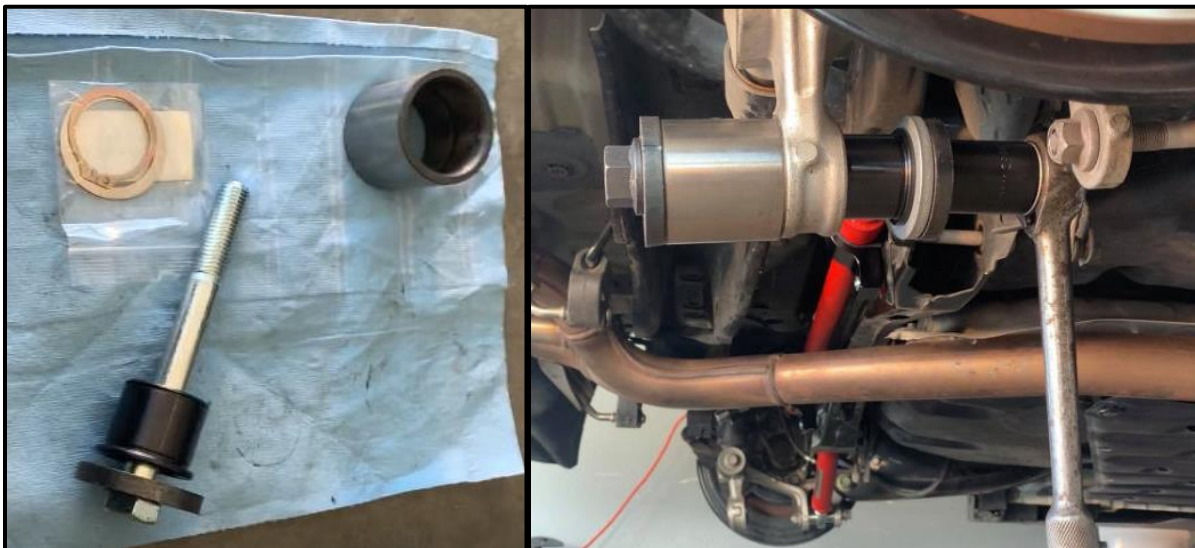
- 3.1: Press out the OEM bearings from both left and right rear knuckles. The bearings can be pressed out towards either the front or rear of the knuckles. A ball joint removal kit was utilized to push out the bearings, but it should be mentioned that this method is cumbersome to perform by yourself as multiple adapter pieces need to be positioned and aligned properly before the clamp can be tightened. Also be mindful that the image below shows pressing directly against the inner member of a bearing rather than the bearing housing, which does run the risk of tearing the rubber components and leaving the bearing shell still pressed into the housing. A properly sized adapter on the driving side would have the same or slightly smaller diameter than the bearing shell outer diameter. The removed OEM bearing is also shown below.



- 3.2: Inspect the knuckle bores for any nicks or burrs. If any high points are found they must be gently filed down until smooth. Wipe any debris from the bore once ready to install the RV6 Performance bearings.
- 3.3: Prepare the RV6 Performance bearing by removing the spacers and making sure the bearing is clean and free of debris.



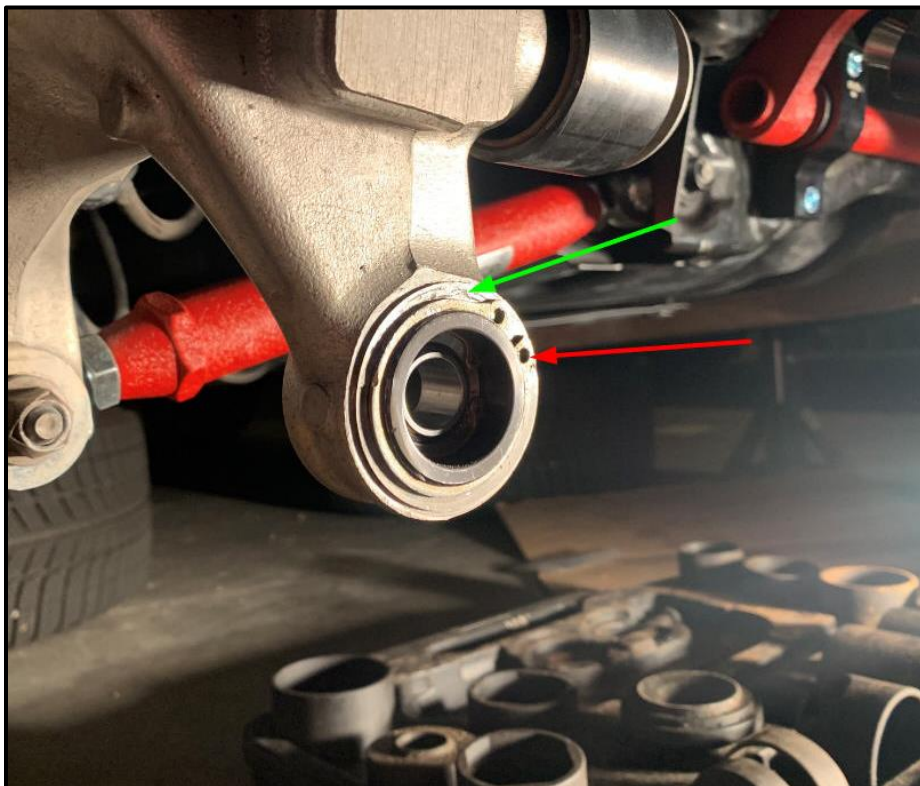
- 3.4: Place the RV6 bearings in the front side of the rear knuckle bores along with the preferred pressing tool. The bearings must be inserted from the front towards the rear of the vehicle (the flanged side of the bearings face the front of the vehicle.) For this step it was decided to utilize a bolt, pipe section and series of washers to press in the new bearings. This method was utilized only due to the ease of being able to manipulate all pieces into place without any additional help. A ball joint removal kit would also work to perform this step. The components used to create this press are shown below and are also shown properly assembled on the vehicle prior to tightening the bolt.



- 3.5: Begin tightening the components chosen to press the bearings into the rear knuckles. Ensure the bearings are centered and aligned in the bores prior to pressing. If there is any misalignment between the components the bearings could damage the bores as they are pressed through. Continue pressing until the flanges on the bearings are fully seated against the rear knuckles. The image below shows the final press setup when the bearing is fully seated.



- 3.6: Place 1x of the provided shims between the rear face of the knuckle and the bearing snap ring grooves (Green Arrow) on each left and right bearing, 2x shims total. Spread 1x retaining ring with snap ring pliers and insert into the respective bearing groove to retain the shim in place (Red Arrow) on each left and right bearing, 2x retaining rings total. A flat head screwdriver can be used to help position the snap ring and ensure it is fully seated into the groove.



Step 4: Re-Install the Rear Lower Control Arms to the Rear Knuckles

Note: The images shown in this step depict aftermarket camber arms rather than the OEM lower control arms. The process is identical regardless of which components are present on the vehicle. The process detailed references OEM components, hardware and tool sizes, which may be different than what is present based on any aftermarket components installed.

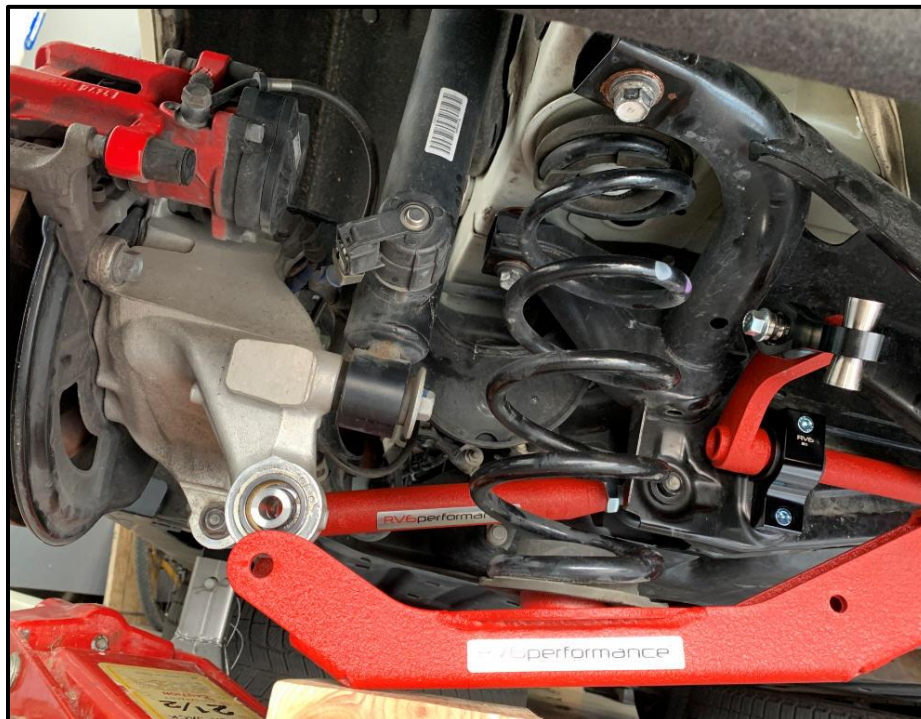
- 4.1: Insert the metal spacers into the front and rear ends of both left and right spherical bearings. These spacers are machined with very tight tolerances and as such must be aligned perfectly before they will fully seat into the bearings. Do not force these components into position - if resistance is felt try gently moving the parts to align them. Very little effort will be required once proper alignment is achieved. A small amount of grease may be used to help retain the spacers during assembly of the control arm.



- 4.2: Position a floor jack underneath the control arms near the outboard mounting locations. It is advised to place a flat piece of scrap wood between the jack and the lower control arms to prevent damage to the painted surfaces during this process.



- 4.3: Raise the jack enough such that the upper spring caps can be correctly positioned around the retention features in the chassis on both left and right sides of the vehicle. Raise the jack slightly once the correct alignment is achieved to hold the springs in place while the outboard bolts securing the control arms to the rear knuckles are installed. See the image below.



- 4.4: Ensure that the ends of the bearing spacers are parallel to the faces in the rear control arms before attempting to raise the arms into the final position. Due to the tight fit if there is improper alignment the components will bind and could lead to damage. A screwdriver can be inserted into the bearing and used to move the inner spherical portion as needed to properly align the bearing spacers with the control arm surfaces.
- 4.5: Continue to raise the jack as needed so that the outboard mounting locations of the lower control arms align with the mounting location in the rear knuckles. Secure the lower control arms to the rear knuckles using the 1x original 17mm head bolt on both left and right side of the vehicle, 2x bolts total. Note that the image below shows new hardware being used. This hardware was supplied with the rear camber kit. If re-using the OEM lower control arms replace with the original hardware as specified.



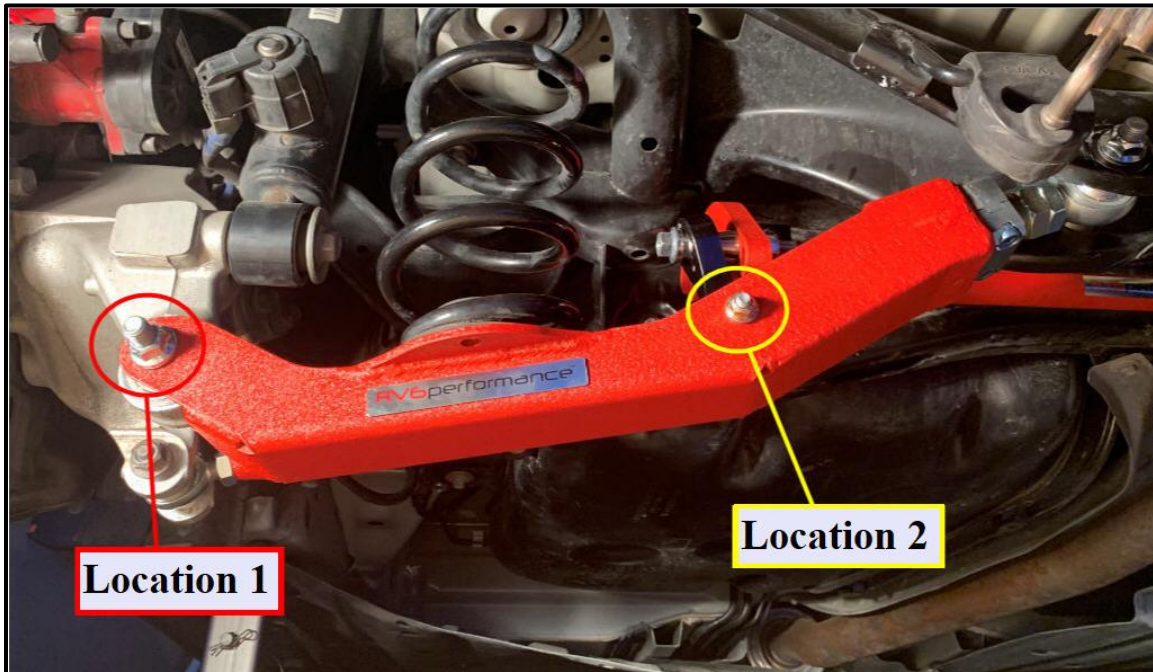
The rear knuckles may require some slight manipulation to align the mounting holes with the lower control arms. A pry bar can be used to leverage the knuckle itself until alignment is achieved. Alternatively, a pin / punch can be partially inserted into the mounting holes and used to move the components into alignment with each other so the hardware can be inserted from the opposite side of the joint. Take care to not damage any components if either of these methods are used.

- 4.6: Once the lower control arms are retained in place lower the floor jack and remove it from the work area.

- 4.7: Ensure the rubber protrusions on the lower spring caps are still seated in the lower control arm holes.

Step 5: Apply Final Torques

- 5.1: Reference the below images for the locations requiring specific torques during re-assembly. Note this image shows aftermarket rear camber arms and the associated hardware provided with that kit. The torques listed below are for the OEM hardware. The torques to apply are as follows:
 - Location 1 (Lower Control Arms to Rear Knuckles - 2x Bolts Total): 51 ft*lb
 - Location 2 (Sway Bar End Links to Lower Control Arms - 2x Bolts Total): 30 ft*lb



Step 6: Wrap Up the Installation

- 6.1: Re-install the rear wheels onto the respective hubs.
- 6.2: Lower the vehicle to the ground after removing the retention method used to keep it elevated.
- 6.3: Ensure proper torques are set at each lug nut. Stock lug nuts must be torqued to 94 ft*lb.

Step 7: Complete a Vehicle Alignment

- 7.1: After the installation has been completed have a 4 wheel vehicle alignment performed by your preferred auto service shop to ensure the proper wheel settings are obtained. It is

recommended to have an alignment completed immediately after installing these components. No issues should arise from driving short distances without an alignment (such as driving to the location performing the service) but care should be taken to not drive in an aggressive manner. Driving the vehicle aggressively prior to having an alignment completed could result in abnormal or excessive component and tire wear.

Tips and Tricks:

- Unless specifically mentioned the order of the instructions to remove the above components is arbitrary. The parts discussed in this document can be removed in any order.
- PB Blaster or a similar penetrating liquid can help reduce the effort required to initially loosen bolted joints that may have seized over time and reduce the risk of shearing hardware during removal. Spray a small amount on the joints to be removed and let sit for at least 15 minutes before attempting to break hardware loose.
- When initially breaking hardware loose in a given joint by hand exercise a smooth and steady application of torque to minimize hardware failure. Avoid sudden bursts of force applied to the socket wrench (no "jerking" motions.) Alternatively, use of an impact gun is an effective way to remove stubborn hardware due to the hammering style of rotary torque the tool generates.
- If using an impact gun, ensure that you are utilizing impact grade sockets and extensions. These generally have a black finish instead of chrome. Damage to non-impact grade hardware is likely if used with an impact gun. This is especially relevant regarding universal (flex) socket joints.
- To minimize the risk of lost hardware it is recommended to loosely re-install any bolts or nuts in their respective housings or studs once the components are disconnected.
- Anti-seize compound may be applied to any hardware to prevent the threads from becoming seized and aid with future disassembly. If chosen, take note that this lubricates the bolted joint and less torque is required to obtain the same bolt clamping force. The above dry torque values should be reduced by roughly 15-20% when utilizing anti-seize.
- When re-torquing joints that utilize a pattern of bolts (3 or more) apply the torque evenly across all bolts. To ensure proper joint clamping it is not recommended to fully torque one connection then move on to the next, but rather to gradually torque all connections in an alternating pattern until the full torque is achieved at each connection.
- For purchasing and additional details on the above described kits please visit RV6 Performance's website at:
 - <https://www.rv6-p.com/rv6-17-civic-type-r-2-0t-fk8-rear-knuckle-spherical-bushing.html>

Rev	Description	Date	Writer
A	Initial Release	02/28/2020	B. Shatto
B	Updated Introduction Photos	02/28/2020	B. Shatto
C			
D			