The Revolution, Rear Air Ride Kit Installation Guide

Compatible with T1 (Beetle) / Type 14 (Karmann Ghia) / Type 3 (Variant), Type 34 (Razor Edge), T181 / 182 (Trekker / Thing)

Contents

Welcome to the Limebug 'Revolution' Cantilever Rear air ride kit.
Enclosed Step-by-Step Guide to Installation / Operation of this system.

NOTE: if running Height Sensors or Heater Pipes insure the sections are all pre-tapped for bolt fixings prior to full installation

Step 1: Removal of factory suspension

1. Disconnect the Battery

2. Remove the rear wheels from the vehicle and jack up or lift on ramps from below the torsion tube housing (directly below where the spring plate meets the chassis).

3. Remove the starter motor main core power cable and solenoid signal wire (just the cable not the whole unit).

   Tip: In some cases it is essential to swap out a 6V starter motor to a 12V unit due to the body length, When first offering up the air ride cradle check the clearance to the body of the starter as some 6 volt starters will still fit, but as a general rule it is best to convert anyway as you will require 12V to power the compressors/ management.

4. Next loosen the 4x 15mm spanner head M10 bolts from the torsion tube cover (note that on some model years [with torsion bar lengths over 24"] the removal of the wing [Beetle Models] may also be necessary).

5. Remove the Stock Damper /Shock and any Bump Stops, if a later model remove also the Z-Bar Anti-roll Bar.

6. Next remove the spring plates, there are several ways of doing this but we find the simplest way is to remove the 3x bolts attaching the spring plate to the axle.

   a. Swing Axle Models:

      Slide the axle towards the rear of the vehicle until it drops down. Note that in some cases the handbrake cables may need to be slackened or released all together in order to do this.

   b. IRS Models:

      IRS models are significantly more difficult to do unfortunately, free the bolts connecting the spring plate to the IRS arm and lift the IRS arm upwards or downwards (depending on if the vehicle is lowered prior) this will allow the spring plate to separate from the arm.

7. Now the spring plate is free, use a pry bar (crowbar) to lift the spring plate away from the lower bump stop and relieve it from the chassis. This will now enable us to fully remove the torsion bar (The revolution air ride system is designed to operate as true air ride, meaning it will not require the torsion bars to be re-installed).

8. You are now ready to install the main Cantilever assembly.

Step 2: Installing the Cantilever Module

For this section, there are a number of combinations of chassis / axle / body style as well as hybrid combinations, we will cover each combination piece-by-piece. The revolution system functions on all platforms however if you are struggling to match your setup to anything below, please reach out to a Limebug team member for assistance with your build, we're here to help!.

So let's jump in, First pass the two main cradle halves over the top of the gearbox, and attach together using the joiner brackets (This can be done more easily with help from a buddy).

Tip: This section of the install can be made simpler by first attaching the joiner plate LOOSELY on one side of each of the cantilever cradles, by doing this, it makes joining the central bolts with the gearbox in place far simpler, meaning only half the bolts have to be added with the cradle above the gearbox.

Tip: Type 3/ 34 owners: Rotate the cradle on its side to give better access to the Nut / Bolt Assemblies (tilting the open bag side to point upwards).

Leave the joiner brackets not fully pinched up, that can be done at the final step of installation.

1. Next install the main hanger tabs. This section varies from model-to-model however the basic method is the same, these mount in place of the original upper damper mount, ensuring the slotted hole faces front-to-back down the length of the car, again, do not over-tighten these at this stage.

    a. T1 Beetle / Karmann Ghia Post 1960 (inc 1302/03 Super Beetle)

        Install the Tubular Tab using the 130mm Bolts, assemble in the standard format of Bolt-Washer, then through the shock mount, then the long 70mm tubular tab to Washer-Nut (M12) Leave slightly loose to allow rotation.

    b. T181 / T182 Trekker, T1 Beetle / Karmann Ghia Pre 1959

        Install the Tubular Threaded Tab using the provided Bolts, install in the Bolt using sprung washer directly behind the head of the bolt,

the bolt will thread into the tab itself once fitted, leave slightly loose to allow rotation.

c. Type 3 (Notchback /Squareback / Fastback) & T34 Razor

Install the Round Spacer Tube into the stock shock position, then the Tubular Tab using the provided Bolts, install in the Bolt using sprung washer directly behind the head of the bolt, the bolt will thread into the chassis itself once fitted, leave slightly loose to allow rotation.

2. Now the main hanger tabs are fitted, slide the large Cradle Assembly onto them from the front of the vehicle side -> toward the back, on certain models (predominately Type 1 Beetle / Ghia Late models a section of the inner wing will impede the easy fixing of the clevis M10 bolt.

Tip: There are a couple of solutions to this but the simplest way is to slide the bolt halfway up into the Cast section on the end of the cantilever body,

then as you slide the large assembly onto the main hanger tab the bolt will now clear the bodywork, no damage or bending of inner wing panels is required.

3. Next to install the front support hangers

a. T1 Beetle / T14 Karmann Ghia (inc 1302/03 Super Beetle) & T181 / 182 Trekker

Mount the Dog-Legged front support hangers to the torsion bar loosely, the round U-clamps will allow them to be spun round into place.

Ensure these are mounted so the dog leg points outward to the front of the vehicle (this will allow for the heater tube to pass through). Again leave Leave loose currently

Now rotate the support hangers around until the two mounting holes (M10 bolts) are aligned, insert the Bolt->Washer->Front Hanger->Main Cradle ->Washer->Nut Format for both holes, repeat this step on both sides.

Tip: The Hanger will typically sit on the outer most side when securing the M10 Bolts

Now tighten the 13mm Head nuts on the torsion tube clamps, these will come pre-assembled with a small spacer tube, be sure to re-fit these when assembling onto the vehicle.

Now tighten the M10 Hanger Bolts Securely

b. Type 3 (Notchback /Squareback / Fastback) & T34 Razor

Remove the Subframe Mounting Bolt (M10) 17mm Bolt Head just behind and inward of the Spring Plate Cover, this bolt points vertically upwards.

Insert the Support Hangers Bracket in place of the Subframe Washer, and rebuild to original specification. Leave this bolt loose for now.

Slide the bracket until the two mounting holes (M10 bolts) are aligned, insert the Bolt->Washer->Front Hanger->Main Cradle ->Washer->Nut Format for both holes, repeat this step on both sides. Tighten Securely

NOTE: The Hanger will typically sit on the outer most side when securing the M10 Bolts.

Now tighten the M10 Subframe Bolt Securely.

4. Now tighten Fully:

   a. Joiner Plates (The Plates that join the two main cantilever Modules together)

   b. Clevis Joints (The vertical Threaded bolts that join the Main Mounting Tab to the Main Cantilever Module)

   c. The Main Tabs (The tabs in place of the original shock mounts).

Step 3: Pushrod Positioning

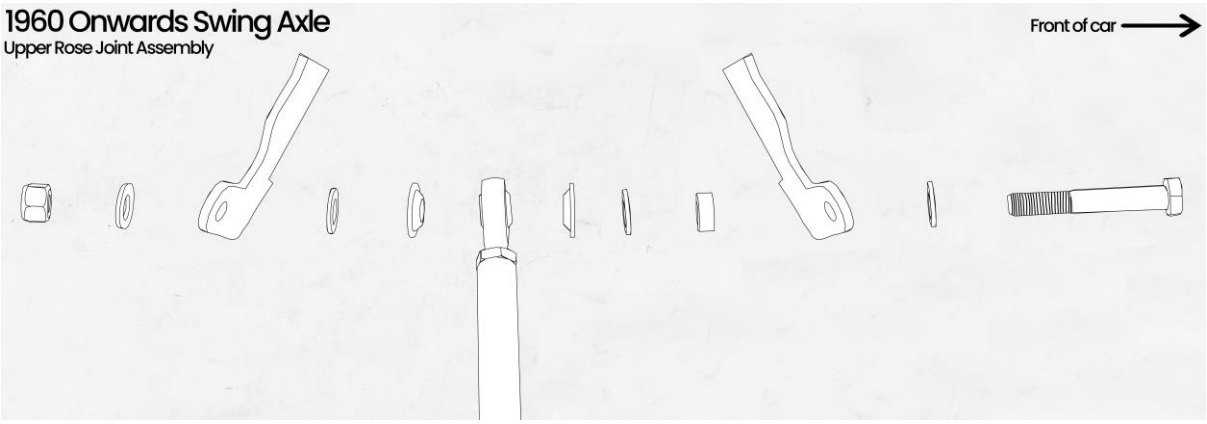
The Main Cantilever is now fully secured and in place, next is positioning the pushrod.

When setting the pushrod position the revolution system has been designed to be compatible with several models of VW chassis. However, the positioning and operation varies depending on year and model.

3.1 – 1960 Onwards Swing Axle

Post 60 Swing Axles (later style gearbox) will need to install the pushrod using the misalignment washers (Comes pre-assembled in the box. NOTE: One end of the pushrods will include a spacer (approx. 5-6mm in width) This mounts to the top of the assembly. (The Cantilever Arm.)

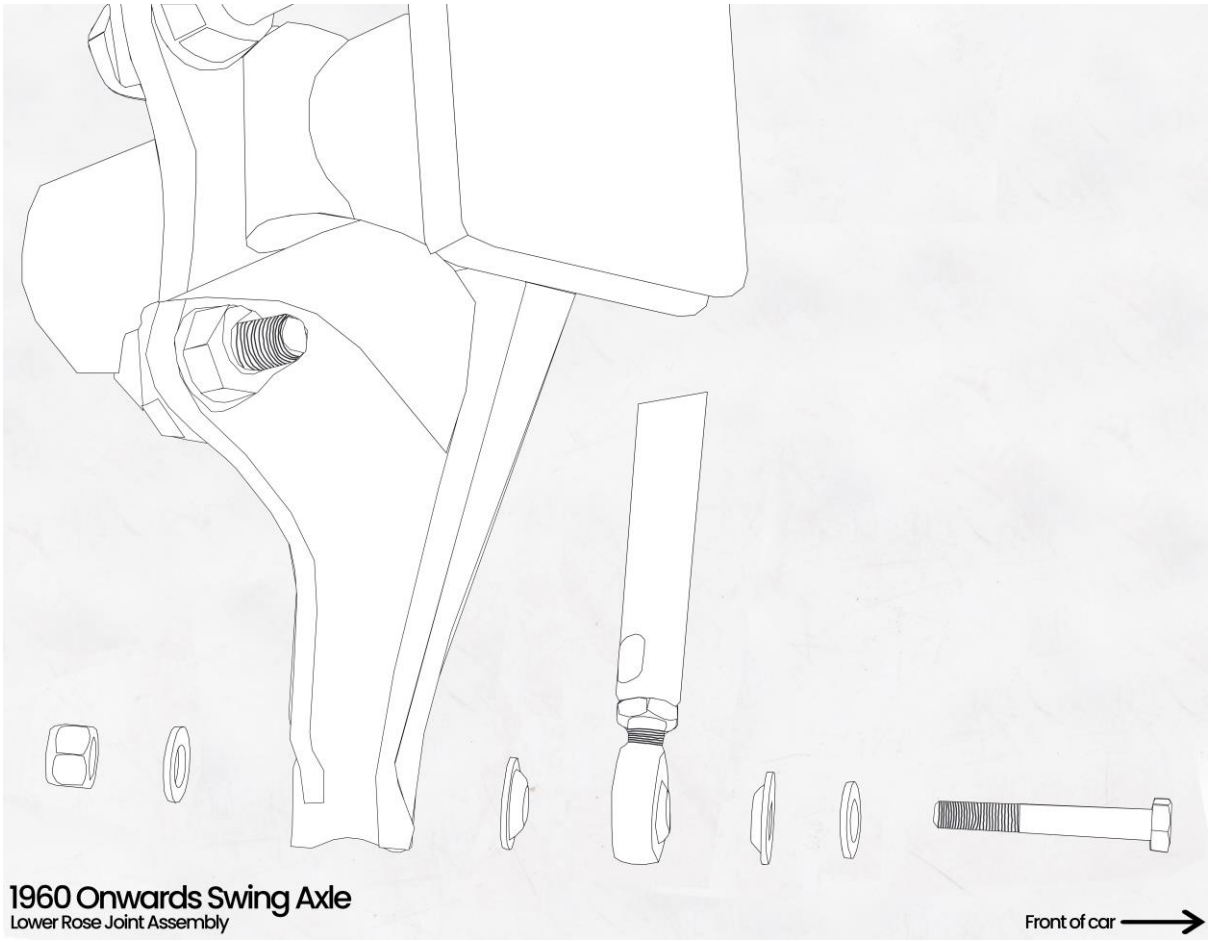
Position the spacer to the FRONT SIDE of the cantilever, this will mean your pushrod sits closer to the rear of the car, this is the correct alignment.



For the Lower Mount use the mis-alignment washers but NOTE, must mount to OPPOSITE SIDE to the factory location of the factory shock/damper. Do not mount on the factory side as the rod travel will not work as intended. Failure to follow diagrams could result in failure of operation.

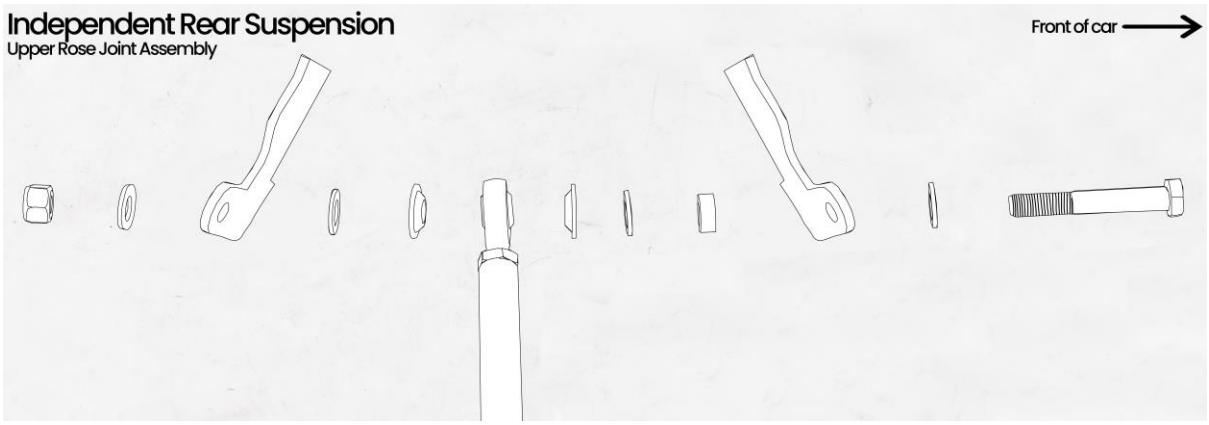
For Extra Low Swing Axle option, the washer layout will be the same orientation. However, to gain optimum drop and clearance the Extra Low option will require the trimming/removal of the Upper Bump stop. Please contact us if you are unsure or need more guidance for this step.

See next page for diagram



3.2 – Independent Rear Suspension

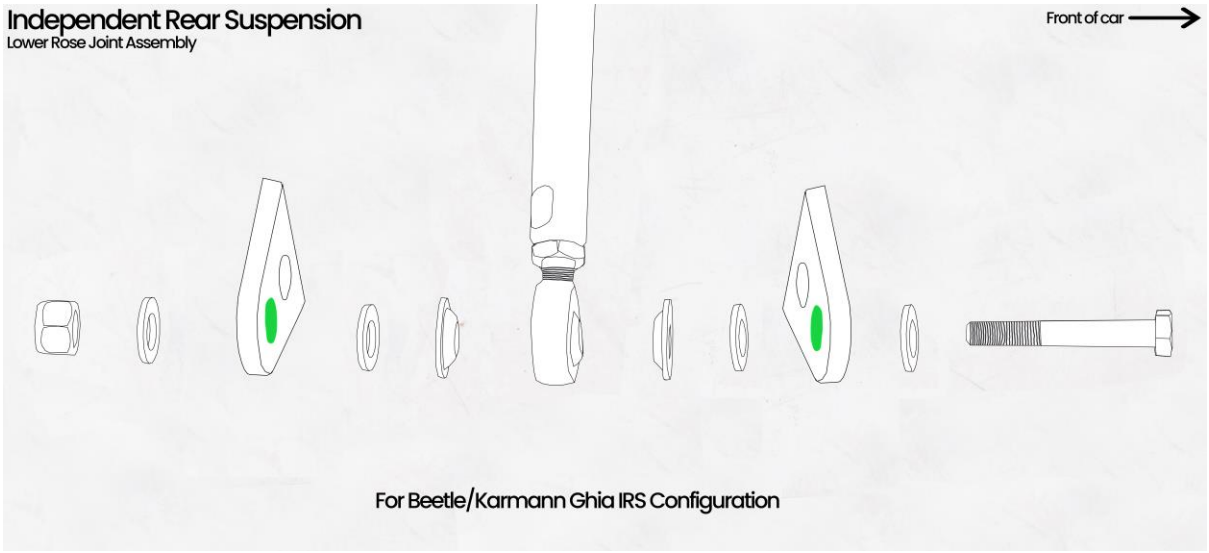
IRS A-Arm Wishbones will need to install the pushrod using the misalignment washers (Comes pre-assembled in the box. NOTE: One end of the pushrods will include a spacer (approx. 5-6mm in width) This mounts to the top of the assembly. (The Cantilever Arm.)

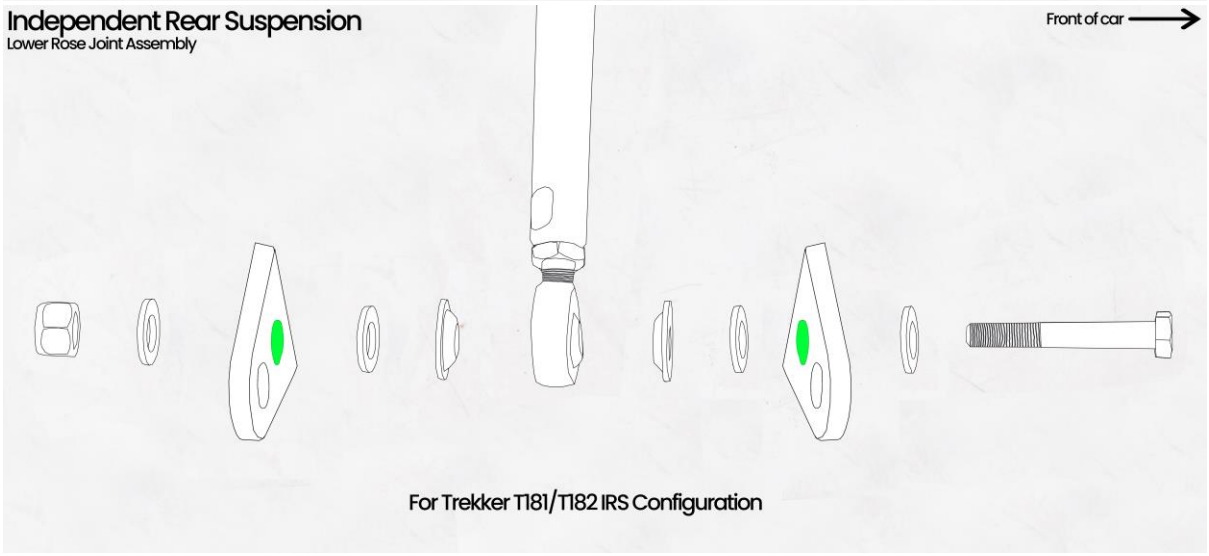


Position the spacer to the REAR SIDE of the cantilever, this will mean your pushrod sits closer to the front of the car, this is the correct alignment in most cases.

Next Install the IRS Strengthener Cup, This cup will drop into the top IRS lower damper mount from the top side, sometimes the tabs may need a light squeeze to ensure an easy drop in fit.

For the Lower Mount, use the mis-alignment washers but assemble as supplied, washers on the outside, Misalignment washers in the centre, note in some cases an additional washer maybe required to successfully space the lower pushrod mount.





Please refer to the above diagrams to ensure the assembly is positioned in the correct fixtures, highlighted in green demonstrates the correct eyelet to use for either T1 Beetle/T14 Karmann Ghia and also for Trekker T181/T182.

3.3 – Pre 1959 Chassis

Pre-59 Axles (Early style gearbox) will need to install the pushrod using the misalignment washers (Comes pre-assembled in the box. NOTE: One end of the pushrods will include a spacer (approx. 5-6mm in width) This mounts to the top of the assembly. (The Cantilever Arm.)

Position the spacer to the FRONT SIDE of the cantilever, this will mean your pushrod sits closer to the rear of the car, this is the correct alignment.

The Lower Mount now again using the mis-alignment washers must mount to INSIDE edge aka the factory location of the factory shock/damper. Note in some

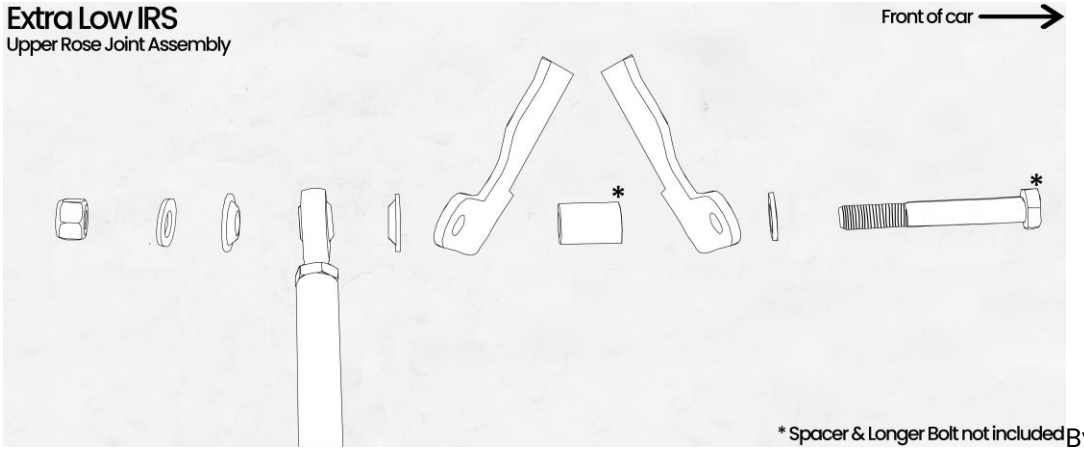
cases and additional tab maybe required, contact a Limebug Team Member for more info

3.4 – EXTRA LOW Independent Rear Suspension

To allow the airbags to fully compress and stop the drop links from binding on the main cradle. The fixing point is offset for the bolt to the outside of the cradle housing.

A sleeve will also need to be added, this will act as a spacer between the housing and for the bolt to locate through.

The bolt length needs to be increased to 100mm. We always recommend using 12.9 tensile rated bolts.



By moving the fixing point outside of the cradle housing it allows more free movement and stops the drop link binding against the main cradle.

The overall length of the pull down bar/drop link rod is to be reduced to 100mm and will need to be re tapped.

Please refer to 3.2 Independent Rear Suspension for Lower Rose Joint Assembly Diagram. Other modifications to the chassis are required in order for this configuration to be optimally effective. Please find our guide online for additional modification work or reach out to a team member for any additionally required components or for more guidance.

IMPORTANT

Once installed, lift with a jack the axle up and down to check limits, the pushrod must have the ability to slightly rotate at the upper extreme and lower extreme limits. If this is not the case, please contact a Limebug team member to ensure correct installation.

Step 4: Optional (Heater Tube Fitting)

If heater pipe has been selected as an option you will need to follow this step, if not bypass this step:

- T1 Beetle / T14 Karmann Ghia (inc 1302/03 Super Beetle) & Trekker

  Install the supplied heater pipe in the factory inlet and outlet points, be sure to route the pipe BELOW the Cantilever air cradle, supplied also will be an air feed pipe clamp which will help secure the heater pipe to the cradle. Be sure to ensure the heater pipe is clear of pneumatic and electrical cables.

- Type 3 (Notchback /Squareback / Fastback) & T34 Razor

  Install the supplied heater pipe in the factory inlet and outlet points, be sure to route the pipe OVER the Cantilever air cradle, supplied also will be an air feed pipe clamp which will help secure the heater pipe to the cradle. Be sure to ensure the heater pipe is clear of pneumatic and electrical cables.

Step 5: Optional (Height Sensor Fitting)

To install height sensors. Mounts should be pre-drilled and tapped into your cradle,

The main unit will secure to the body of the Cantilever, Holes are tapped to standard M6 thread size, note the angle of the height sensors to match operational range to manufacturer specifications.

When installing the pushrod sensor this will need to be at the shortest length, and possibly skim off an additional 2-4mm approx. off the base to allow good clearance to the boot floor deck height (Mainly applies to T1 Beetle / Ghia and Trekker Models).

Now tie the electronics up using the supplied cable tie fixing holes along with the pneumatic lines.

Step 6: Air Lines / Wiring / Fit Up

Now all Hardware is installed.

Connect the air line to the cantilever cradle, each cradle has pre-cut cable tie fixing holes to guide your pneumatic and electrical (for height sensor) cables.

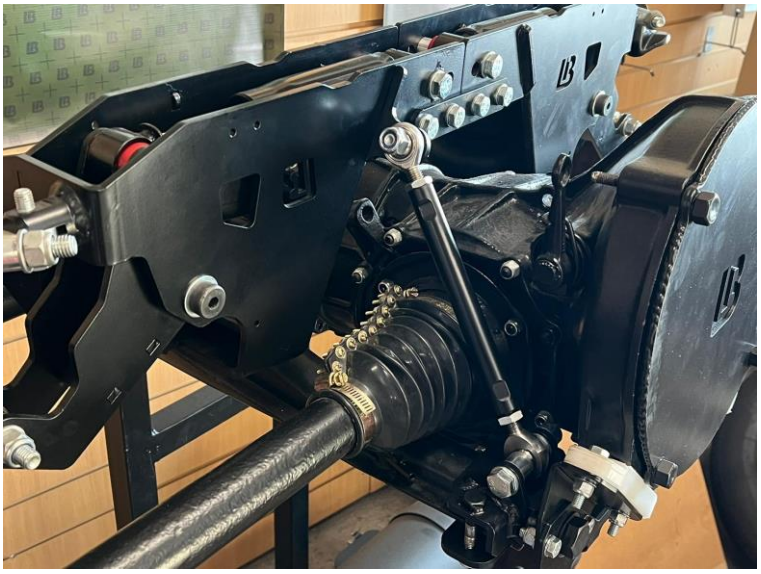
Air Line (and optional electrics) Typically is routed through the central spine (central chassis tube), avoid running airline under the vehicle.

We would recommend drilling two small holes either side of the shift rod and then thread the air line through and out the frame head at the front of the vehicle to the most common mount area for the air management.

Step 7: Pull-Down Bar Install

The Last component to fit is the pull-down bar.

This single bar is always mounted to the left rear of the cantilever cradle as pictured below (excluding Type 3 IRS)

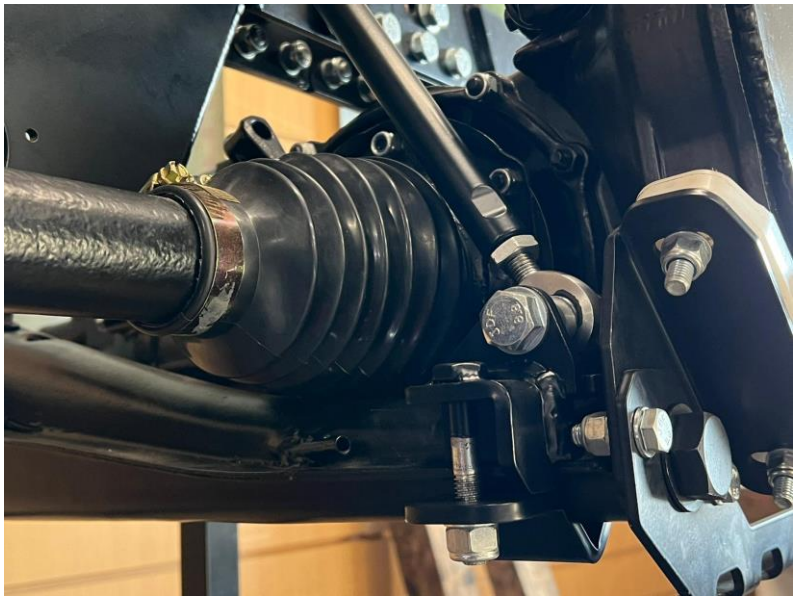


The pull-down bar consists of a single rod and a bolt-on clamp.

The bolt-on clamp mounts on to the left rear gearbox horn as pictured to secure the pull-down bar to the gearbox frame horn.

This method reduces the need to remove frame horn bolts, by simply clamping around the frame horn itself using the bolts provided. Once the pull-down bar is fitted, pinch lightly then secure the two lock nuts

NOTE: It is **NOT** necessary to tension this pull-down bar, it is only a support brace.



Step 8: Final Checks

Almost there, but first there are some key checks to carry out.

1. Check the fuel line / pipe exit from the chassis has good clearance to the inner air bag, this can be easily held to one side with a tie wrap should it be encroaching on the bag position.
2. Check the Starter Power Cable is not snagging or tugging anywhere around the cantilever cradle, ensure all terminals are secure and in good condition then re-fit.
3. Check all brake lines are in good condition and that through the full range of travel with adequate slack and space for movement.
4. Check the cantilever pushrods have motion for slight rotation at **Upper** most and **Lower** Most limits. Also **ENSURE the spring plate has adequate clearance to the LOWER bump stop.**
5. Ensure all fixings and hardware are secured, double check all fixings twice/ three times and one more for good luck.
6. Always insure to use PTFE Paste, NEVER PTFE tape, this is one of the biggest causes of air leaks.
7. Test fit with wheels before dropping to the ground, this step helps ensure limit settings are correct to the desired ride height and wheel / tyre combo.
8. If running height sensors, ensure optimal travel range and does not exceed the limit of the sensors, particularly on the boot floor.
9. Use the integrated tie wraps fixtures to secure all pneumatic pipe/ wiring components securely.
10. Last re-connect the battery, test the system, and inspect for leaks, and good smooth operation.
11. Enjoy the “Revolution” Cantilever Air Ride system, and be sure to Share with us on social media ☺

Step 9: Operation

Once installed recommended approximate operating pressures are as follows.

- Type 3 (Squareback / Notchback / Fastback) – Lift at 40PSI, Ride 60PSI
    - IRS Models will lift approx. 5 PSI under stated Values
- Type 1 (Beetle / Ghia) including 1302/03/ Super Beetle – Lift at 35 PSI, Ride 55PSI (Swing Axle)
    - IRS Models will lift approx. 5 PSI under stated Values

Do not over Limit

- If using larger valving (3/8" / ½") be aware of limit positions particularly on pressure-based setups. The kit will allow extremity limits well below tank typical operating pressure (150psi). Typical extremity achieved at 80PSI. Do not continue to add pressure once limit extremities are met. Familiarise yourself with air suspension operation on your vehicle prior to use.

Height Sensors

- Height Sensors will in general achieve set heights will operate as intended on auto-calibration. Note that using manual overrides will still allow the possibility over exceed.
- Height Sensor Bars for the rear will be (assuming use of common manufacturers of air management) will require to be at the shortest length when fitting to the pre assigned holes in the cantilever air cradle. In some cases the body with the Heim/ Rose joint will require an additional skim of around 2-5mm in order to give good clearance to the boot floor. Cable tie fixing points for wire tidying are pre cut into the cantilever Cradle.

Maintenance.

- Moisture build up can be routinely purged from the system by simple removal of the air line from under the vehicle, it has good easy access without removal of any parts, this can be performed roughly every 6 months depending on usage. Always leave the system with no compressed air in the bags if stood for long periods.

Disclaimer and Legal

All air ride systems are installed/ operated and used entirely at the user's discretion. All systems are sold as off-road use item only. No liability of any kind for damage to person/ self and/or property will be extended to Limebug Ltd or and subsidiary / individual following any incident.

You hereby accepting these terms when installing /operating any system on a vehicle. Should you not wish to accept the terms of use / installation immediately return the goods to your vender prior to fitment.

No certification is extended to this system, for materials list for government body applications please contact your vender.