AIRLOCKER ARB

RD153

TOYOTA 8.9”, C-CLIP, 50MM CARRIER BEARING

AIR OPERATED
LOCKING DIFFERENTIAL
INSTALLATION GUIDE

ARB 4x4 ACCESSORIES

Corporate Head Office

42-44 Garden St
Kilsyth, Victoria
AUSTRALIA
3137

Tel: +61 (3) 9761 6622
Fax: +61 (3) 9761 6807

Australian enquiries	**sales@arb.com.au**
North & South American enquiries	**sales@arbusa.com**
Other international enquiries	**exports@arb.com.au**

www.arb.com.au

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IMPORTANT :

BEFORE ATTEMPTING TO DISMANTLE YOUR VEHICLE FOR THIS INSTALLATION, PLEASE READ THIS INSTALLATION GUIDE IN ITS ENTIRETY, AS WELL AS ALL APPLICABLE SECTIONS OF YOUR VEHICLE MANUFACTURER'S SERVICE MANUAL.

1.1 Pre-Installation Preparation

This booklet is to be used in conjunction with your vehicle manufacturer's service manual. ARB endeavors to account for every possible variation in vehicle model when publishing its installation guides, and guides are updated regularly as new model information becomes available, however, the rapid and globally varied release of some vehicles makes it difficult to insure that your vehicle model has been accurately accounted for. In the case of any technical discrepancies between this guide and your service manual, we strongly advise that you adhere to the specifications and techniques as documented in your service manual.

Although your *ARB Air Locker* comes complete with all the step by step instructions you will need to supplement your vehicle manufacturer's service manual and install your new differential, ARB recommends that you have your *Air Locker* installed by a trained professional. Many ARB distributors around the world have been fully instructed in *Air Locker* installations by ARB, and have gained a wealth of experience and skill from years of performing similar installations.

Once you begin this installation your vehicle will be immobile until all steps of the installation are complete. Make sure your *Air Locker* kit is the correct model for your vehicle and that it contains all of the parts listed on back cover of this booklet. Also be sure you have appropriately equipped yourself with all the necessary tools, parts, and materials to complete this installation (see Section 1.2 *Tool-Kit Recommendations*), and that you have allowed for an appropriate amount of vehicle down time.

HINT : **Place a ✓ mark inside each of the ☐ symbols as you complete each step. It is very important NOT to miss any of the steps!**

2 Removing the Existing Differential

1.2 Tool-Kit Recommendations

Below is a list of tools and supplies you may need to complete this installation. Requirements for your vehicle may vary. Please consult your vehicle service manual for additional recommendations.

1.2.1 Tools

- ☐ Standard automotive sizes (metric and/or imperial) of sockets, wrenches, Allan keys, and drills.
- ☐ A dial indicator or other suitable measuring tool for checking ring & pinion backlash.
- ☐ An adjuster-nut wrench. (e.g., ARB Adjuster Nut Pliers #0770002.)
- ☐ A razor knife suitable for cutting nylon tubing.
- ☐ A torque wrench. (See your vehicle service manual for the required torque range.)
- ☐ A lubricant drain reservoir.
- ☐ A 11.2mm [7/16”] drill and ¼”NPT tap for bulkhead fitting installation.
- ☐ An automotive bearing puller (e.g., ARB Bearing Puller #0770001) or a differential carrier bearing puller.
- ☐ A slide hammer.
- ☐ Needle-nosed Pliers.
- ☐ A bearing press or arbor press.

1.2.2 Supplies

- ☐ Thread lubricant/sealant compound for pressure fittings (e.g., LOCTITE #567 Teflon past)
- ☐ Thread locking compound (e.g., LOCTITE #272)
- ☐ A gasket sealant or replacement gasket for your third member.
- ☐ A sufficient volume of differential oil to completely refill your housing. (See the *ARB Air Locker Operating and Service Manual* for recommended lubricants)
- ☐ A soap and water mixture to test for air leaks.
- ☐ Differential carrier bearings if required to replace or upgrade to the 50mm Toyota bearing type.

2 Removing the Existing Differential

2.1 Vehicle Support

- ☐ Safely secure the vehicle on a hoist. We recommend supporting the vehicle on a chassis hoist to keep the differential area at a convenient working height and to leave the wheels and axles free to be rotated and removed.
- ☐ Once supported off the ground, release the parking brake and leave the vehicle in neutral. Chock the wheels if necessary.

2.2 Differential Fluid Drain

- ☐ Clean around the differential drain plug to prevent dirt from entering the differential.
- ☐ Position a fluid drain reservoir under the differential and loosen the differential drain plug.
- ☐ Completely drain all differential fluid.

HINT : **This is a good time to check for metal particles in your oil and in the bottom of the housing which may indicate a worn bearing or differential component.**

2.3 Removal of the Axles and Differential

IMPORTANT :

Collision damage or heavy off-road use of your vehicle in the past may have resulted in some degree of bending in the axle. Any misalignment of the axle tubes may result in excessive wear and/or failure of your differential and axle shafts. ARB strongly recommends that you have your axle assembly inspected for concentricity and straightness before installing your *Air Locker*.

- ☐ Remove the wheels and brake assembly according to your vehicles service manual.
- ☐ Disconnect the drive shaft from the flange of the differential.
- ☐ Remove the differential cover.
- ☐ Remove the cross shaft retaining pin.
- ☐ Rotate the differential until the ‘C’ clip access window is accessible.
- ☐ Remove the cross shaft, and thrust block.
- ☐ Gently tap the axle ends inward to release the ‘C’ clips.
- ☐ Remove ‘C’ clips with needle nose pliers.

2 Removing the Existing Differential

☐ Gently tap axles outward and remove them from the differential center.

NOTE : **Rubber oil seals can be easily damaged. Support the weight of the axle when extracting it across the edges of the seals.**

☐ Remove all nuts and washers retaining the differential housing.

☐ Carefully remove the differential third member from the axle housing.

NOTE : **Pry bars may be required to split the third member from the axle housing.**

NOTE : **The differential third member is heavy and quite difficult to handle when covered in oil. Do not drop it!**

☐ Secure the third member to a workbench with the differential carrier facing upward.

2 Removing the Existing Differential

2.4 Marking the Bearing Caps

☐ Using a small pointed center punch, gently mark the bearing caps in a way that will enable you to know which cap is ‘LEFT’ and which cap is ‘RIGHT’, which way is ‘UP’ and which way is ‘DOWN’. (Fig.1.)

☐ Mark the right hand cap in a similar way.

HINT : **Many installers choose to make one punch mark on the left hand side of the left hand bearing cap and a similar mark on the housing at close proximity to the cap mark. The right hand side is then designated with two punch marks on the right hand side of the cap and two similar punch marks on the housing.**

Figure 1.

2 Removing the Existing Differential

2.5 Checking the Current Backlash Amount

IMPORTANT:

This step is a precautionary measure recommended by ARB due to the fact that some after market ring and pinion sets have been manufactured to run with different backlash settings than those specified by your vehicle manufacturer. Although ARB must recommend you set backlash according to your service manual guidelines, we also advise that you compare the backlash measurements taken here to the recommended backlash settings in your vehicle service manual. Measurements found to be outside of your service manual recommendations may indicate the need to deviate from those settings in order to achieve quiet running with a good contact mark.

Refer to your vehicle service manual or your local authorized ARB installer for more information.

☐ Set a dial indicator on one of the ring gear teeth. (Fig.2.)

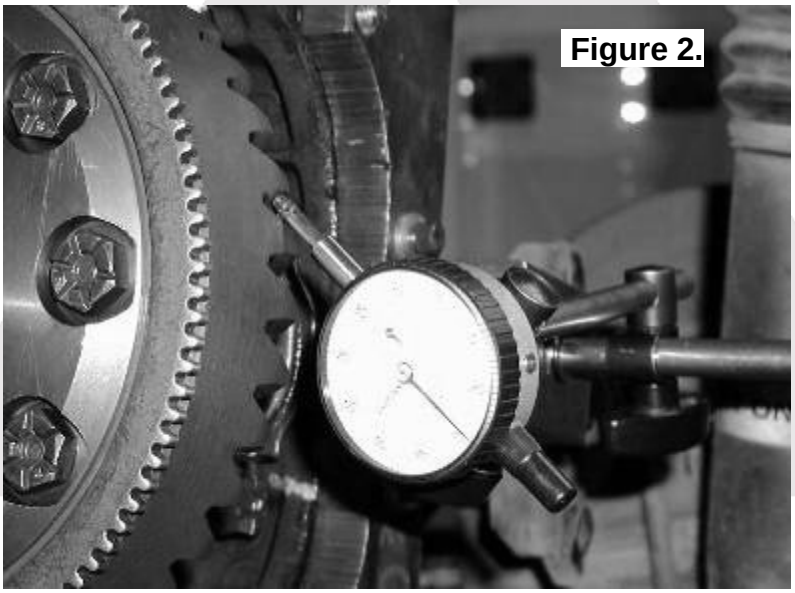


Figure 2.

☐ While supporting the pinion gear by holding the pinion flange, rotate the differential in both directions while observing the maximum variation in depth from the indicator (i.e., the highest value minus the lowest value). This value is referred to as the ring and pinion backlash.

☐ Rotate the differential center 90° and measure again for accuracy.

☐ Record the average of all measurements.

2 Removing the Existing Differential

2.6 Removing the differential carrier

- ☐ Remove the adjuster nut locking tabs.
- ☐ Remove the bearing caps from the third member.
- ☐ Remove the adjuster nuts.
- ☐ Carefully remove the differential carrier from the third member.
- ☐ Remove the tapered roller bearings from the differential carrier with a bearing puller (ARB #0770001). (Fig.3.)

HINT : **Check the condition of the bearing for wear and replace if necessary.**

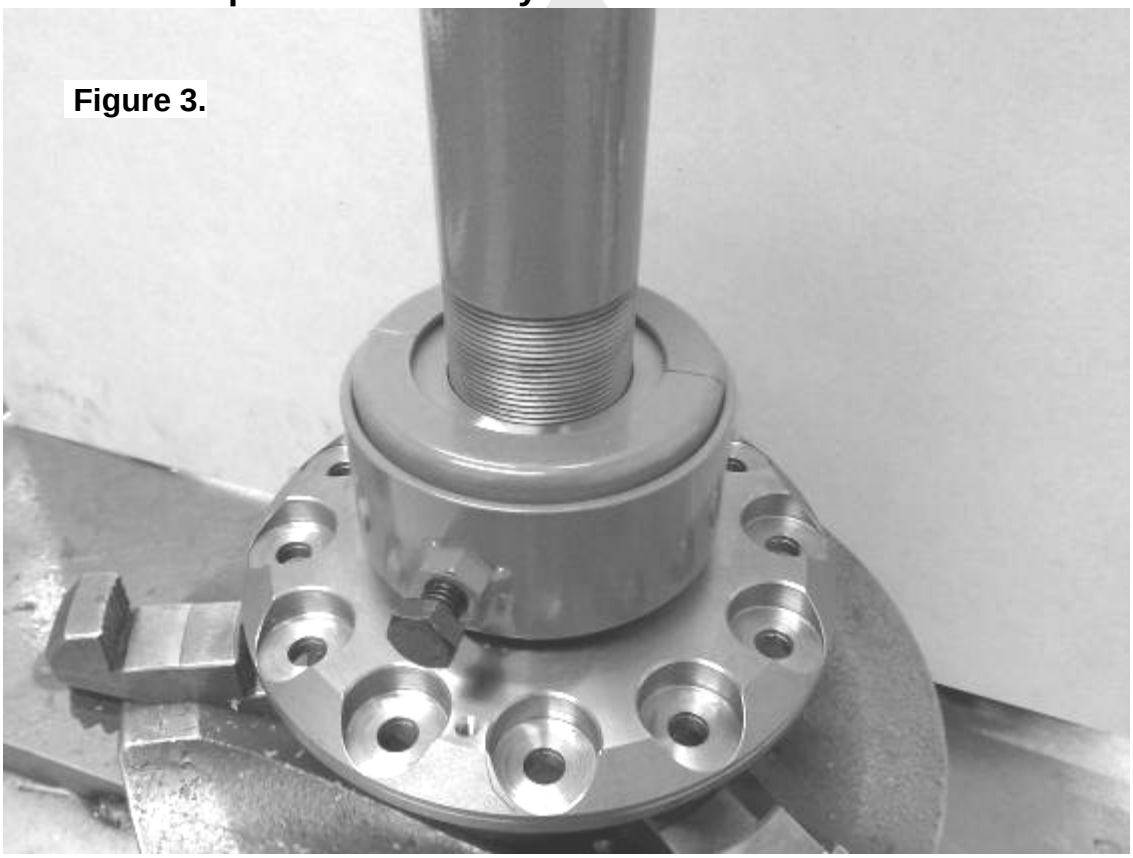


Figure 3.

3 Installing the Air Locker

3.1 Mounting the Ring Gear

- ☐ Remove the bolts that hold the ring gear in place.
- ☐ Using a plastic or copper hammer, tap in a circle around the ring gear to separate it from the differential carrier.
- ☐ Thoroughly clean any thread locking compound or other foreign matter from the holes of the ring gear, the threads of the ring gear bolts, the mating surfaces of the ring gear and the *Air Locker* flange.

HINT : **Rubbing the ring gear mounting face with a flat oil stone before installation will remove any high spots around the threads.**

- ☐ Heat the ring gear to between 80 and 100°C (175 - 212°F) in hot water or in an oven to slightly expand the gear and facilitate assembly.

NOTE : **<u>NEVER HEAT GEARS WITH A FLAME!</u> This could damage the hardened surface of the gear and result in premature wear or failure.**

- ☐ Dry the gear and tapped holes with compressed air (if wet).
- ☐ Apply a thin film of high-pressure grease to the ring gear shoulder of the *Air Locker* to prevent seizing.
- ☐ Install the ring gear onto the *Air Locker* by aligning the tapped holes and then gently tapping it around in a circle with a soft mallet or hammer. Avoid using the bolts to pull the ring gear down as this puts excess strain on the bolts and the differential flange.
- ☐ Apply a thread locking compound to the thread of each ring gear bolt before inserting it. Do not apply locking compound directly into the threaded hole as this could prevent the bolt from reaching its full depth.

NOTE : **On some models, the crown wheel bolts cannot be reused and should therefore be replaced. Refer to your vehicle manufacturer's service manual for details.**

- ☐ Tighten the ring gear bolts in a star pattern with a torque wrench (Fig.4.) set to your vehicle manufacturer's specified torque.

3 Installing the Air Locker

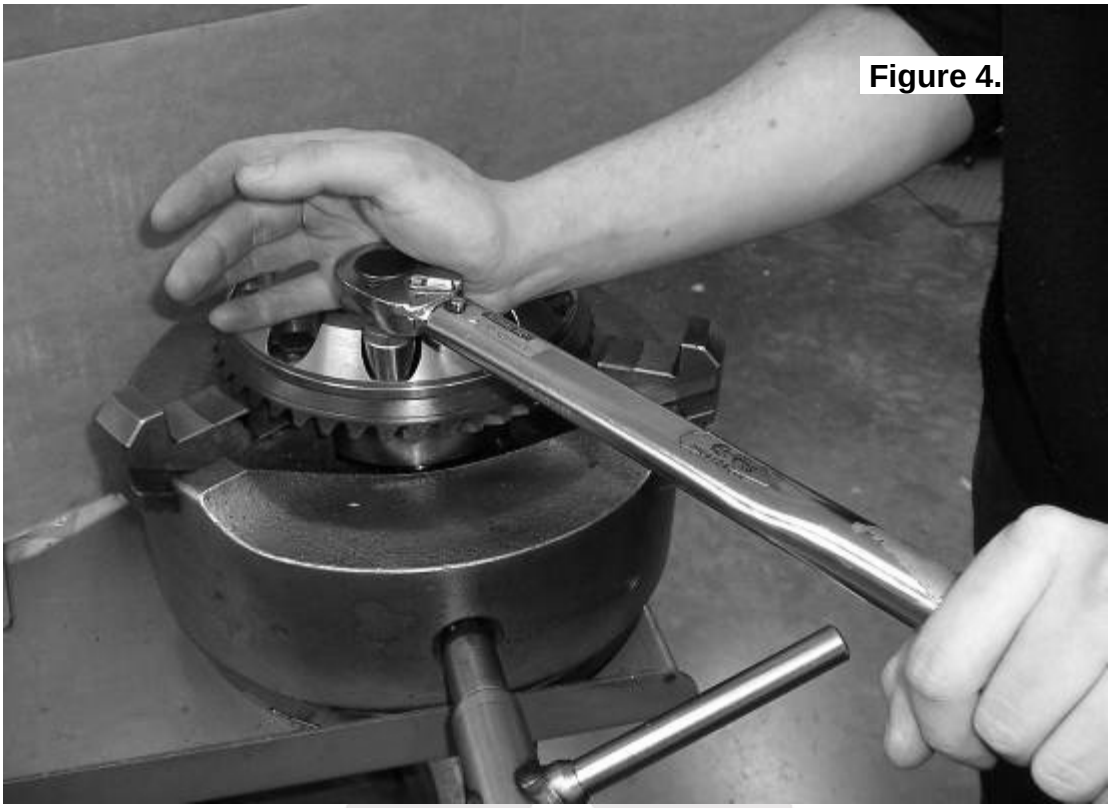


Figure 4.

3.2 Installing the Carrier Bearings

NOTE : **If you are installing an *Air Locker* into an earlier model Toyota with a 45mm differential carrier bearing inside diameter then you will need to use the higher rated later model 50mm bearings:**

Timken # 32010X-32010X
ARB # 160116

If your OE carrier bearings have an ID of 50mm, replace them with new bearings of the same type.

☐ Apply a thin film of high pressure grease to the bearing journals of the *Air Locker*, then press the bearing cones onto the bearing journals as shown in Figure 5.

3 Installing the Air Locker

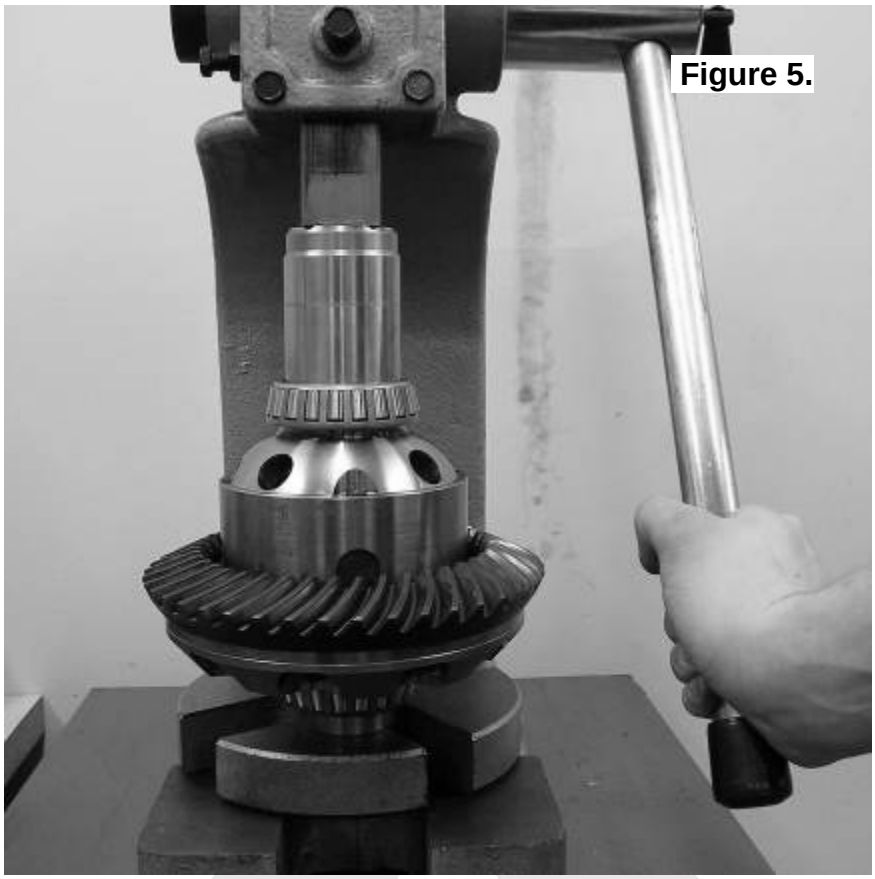


Figure 5.

3.3 Drilling and Tapping the Bulkhead Port

An air line port must be drilled and tapped through the differential housing to mount the bulkhead fitting into.

☐ Mark a spot on the right hand side (opposite the ring gear) toward the top of the differential housing that is in an area well clear of the differential, the ring gear, and any other obstructions that could snag the seal housing tube. (Fig.6.)

Figure 6.

3 Installing the Air Locker

- ☐ Cover the drive pinion area with a rag to protect it from metal filings.
- ☐ Secure the differential housing to the work bench.
- ☐ Drill an 11.2mm [7/16”] diameter hole through the differential housing square to the outside surface.
- ☐ Tap the hole from the outside using ¼”NPT thread tap.
- ☐ Remove any sharp edges that may chip off from around the hole and fall into the housing.
- ☐ Very carefully, remove the rags and inspect with a service light inside the housing to insure no metal filings are left behind.

3.4 Final Air Locker Assembly

- ☐ Clean all parts of the differential assembly, paying particular attention to the seal housing journal.
- ☐ Place the *Air Locker* into the differential housing and install the bearing caps.

NOTE : **Be sure to check that the bearing caps are on the correct sides of the third member and are correctly aligned.**

- ☐ Insert the bearing cap bolts and hand tighten.

NOTE : **Before attempting to install the adjuster nuts, make sure the threads on the inside of the bearing caps and differential housing are perfectly aligned. If they are not, the threads could be stripped.**

- ☐ Insert and lightly hand tighten the adjuster nut supplied with the *Air Locker* kit into the ring gear side bearing cap.

NOTE : **You should feel no backlash between the ring and pinion gears once the adjuster nut tightens.**

- ☐ Reverse the adjuster nut (counterclockwise) ¼ turn.
- ☐ Insert the original adjuster nut onto the opposite side of the differential and tighten with the appropriate adjuster nut wrench (ARB #0770002).

NOTE : **You should now feel some backlash between the ring and pinion gears. If not, there might be a clearance problem which is binding the carrier. Re-check the clearance.**

3.5 Checking the Backlash

- ☐ Set a depth indicator on one of the ring gear teeth. (Fig.7.)
- ☐ While supporting the pinion gear by holding the drive shaft flange, rotate the differential in both directions while observing the maximum variation in depth from the indicator (i.e., the highest value minus the lowest value). This value is referred to as the ring and pinion backlash.
- ☐ Rotate the differential center 90° and measure again for accuracy.
- ☐ Refer to your vehicle service manual for the specified maximum and minimum amounts of backlash.

IMPORTANT:
It is critical to set up bearing pre-load when a differential is installed. Improper pre-load will result in undue bearing wear, increased stresses in the differential center, increased running noise, and ultimately, ring and pinion gear damage.

- ☐ Adjust the backlash and pre-load using an adjuster nut wrench to tighten or loosen the adjuster nuts as required. (Refer to your vehicle service manual.)
- ☐ Recheck backlash as before, repeating this procedure until backlash is within the specified amount.
- ☐ Tighten the bearing cap bolts with a torque wrench to the torque specified in your vehicle manufacturer's service manual.

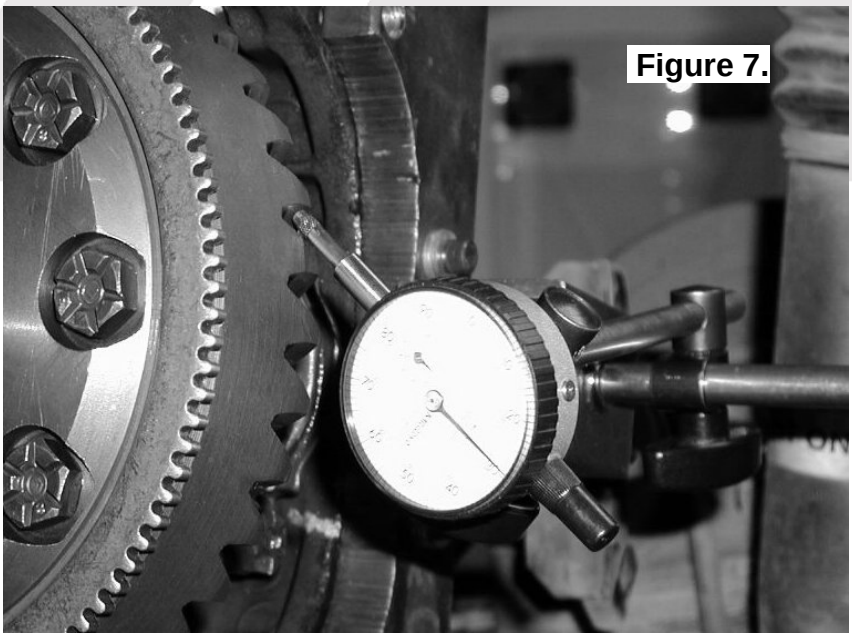


Figure 7.

3.6 Installing the Seal Housing

- ☐ Make sure the grooves and airway of the seal housing are clean and free from any contaminants (e.g. water, dirt, metal filings, etc.).
- ☐ Inspect the seal housing O-rings (supplied) for dirt, damage or other conditions which might cause leaks.
- ☐ Generously lubricate the O-rings with oil prior to assembly, then insert them into the grooves of the seal housing.

NOTE : **When assembling the O-rings, be careful not to leave them twisted when seated in the grooves as this could cause excessive wear and leakage.**

- ☐ Lubricate the seal housing running surface on the *Air Locker* carrier with oil.
- ☐ Carefully install the seal housing by sliding it all of the way onto the bearing journal with a gentle twisting motion until it sits flat against the adjuster nut.

NOTE : **A twisting motion (i.e., a slight rotation while pressing the seal housing on) will allow the O-rings to engage gently and prevent them from twisting. Twisted O-rings will result in pre-mature O-ring wear and oil contamination in the air system due to the helical shape formed by the O-ring mould line.**

- ☐ Rotate the seal housing until the square cutout lines up with the locking tab position at the center of the bearing cap, and then assemble the locking tab. (Fig.8.)

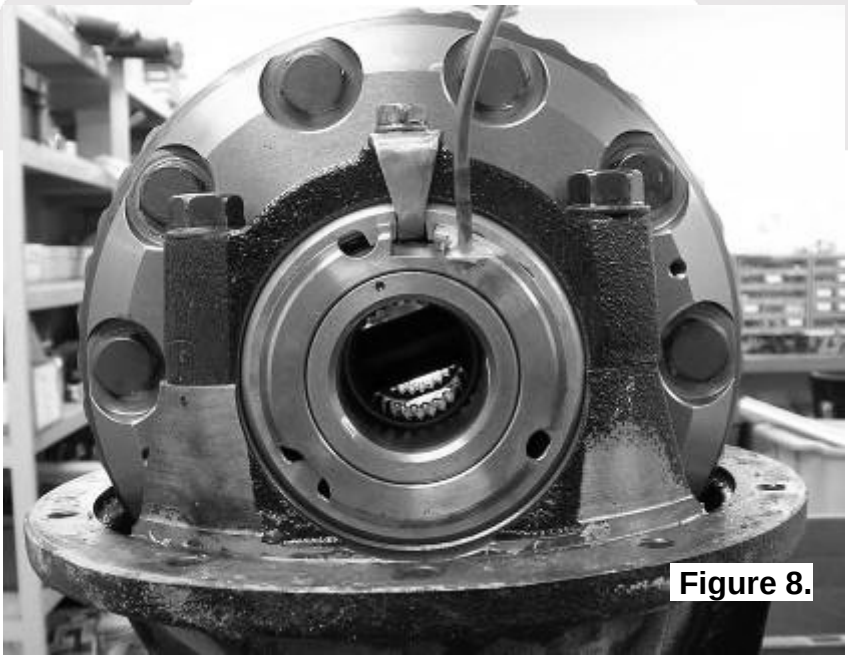


Figure 8.

3 Installing the Air Locker

☐ Install the spring clip by first hooking both ends of the clip into the small aligned cutouts of the seal housing and the adjuster nut, and then snapping the clip into the groove of the seal housing using a screwdriver. (Fig.9.)

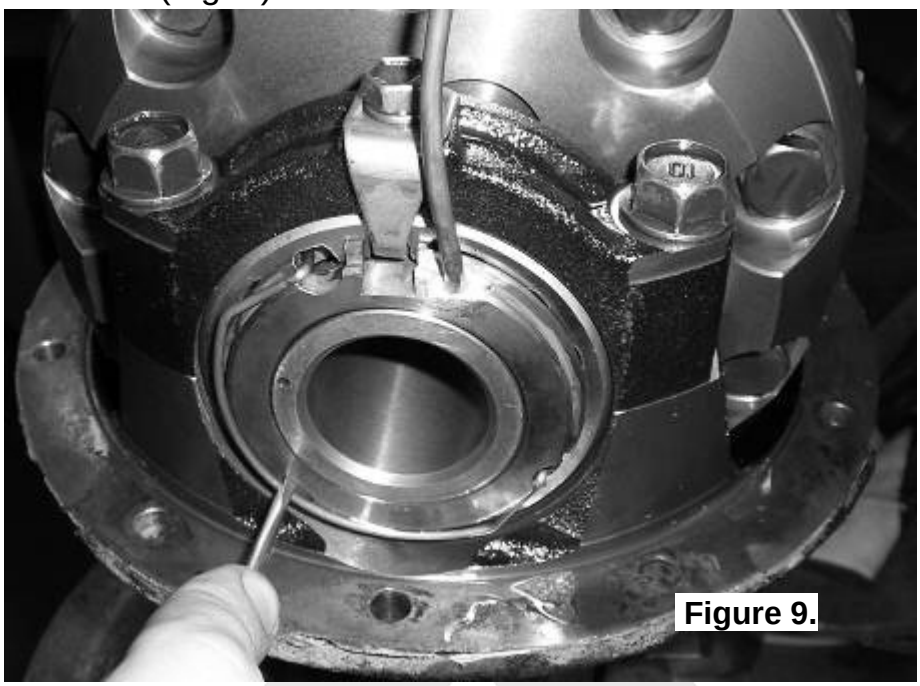


Figure 9.

☐ Check that the seal housing is now secured from rotating and that it is still sitting flat against the adjuster nut.

3.7 Setting up the Bulkhead Fitting

☐ Apply thread sealant to the threads of the bulkhead body.

☐ Screw the bulkhead body into the tapped hole, and tighten.

☐ Wipe the area clean of any excess thread sealant (inside and outside of the housing).

☐ Without using sharp, jagged tools such as pliers (your hands are the best tool for this job), bend the seal housing tube on the outside of the housing to approximate the finished profile. This will allow the tube to be trimmed to a length that would allow it to protrude from the bulkhead fitting. (Figs.11.,12. & 13.)

3 Installing the Air Locker

IMPORTANT:

The seal housing must still be able to freely float after the tube is connected to the bulkhead fitting. Therefore, it is critical to ensure that the tube is not under any tension. To avoid this always leave the tube long enough so that a hook shape can be formed between the seal housing and the bulkhead.

NOTE : **Use an automotive brake line tubing cutter to cut the seal housing tube, never a hacksaw as this will leave metal filings in the air system.**

- ☐ From the inside of the housing, insert the trimmed tube into the bulkhead.
- ☐ From the outside of the housing, assemble the small O-ring over the top of the short length of seal housing tube protruding through the bulkhead fitting.
- ☐ While holding the seal housing tube into the bulkhead fitting, insert the small drilled end of the center compression nut over the extended tube as shown in the assembly diagram (Fig.10.), and screw it into the bulkhead body, and lightly tighten.

3 Installing the Air Locker

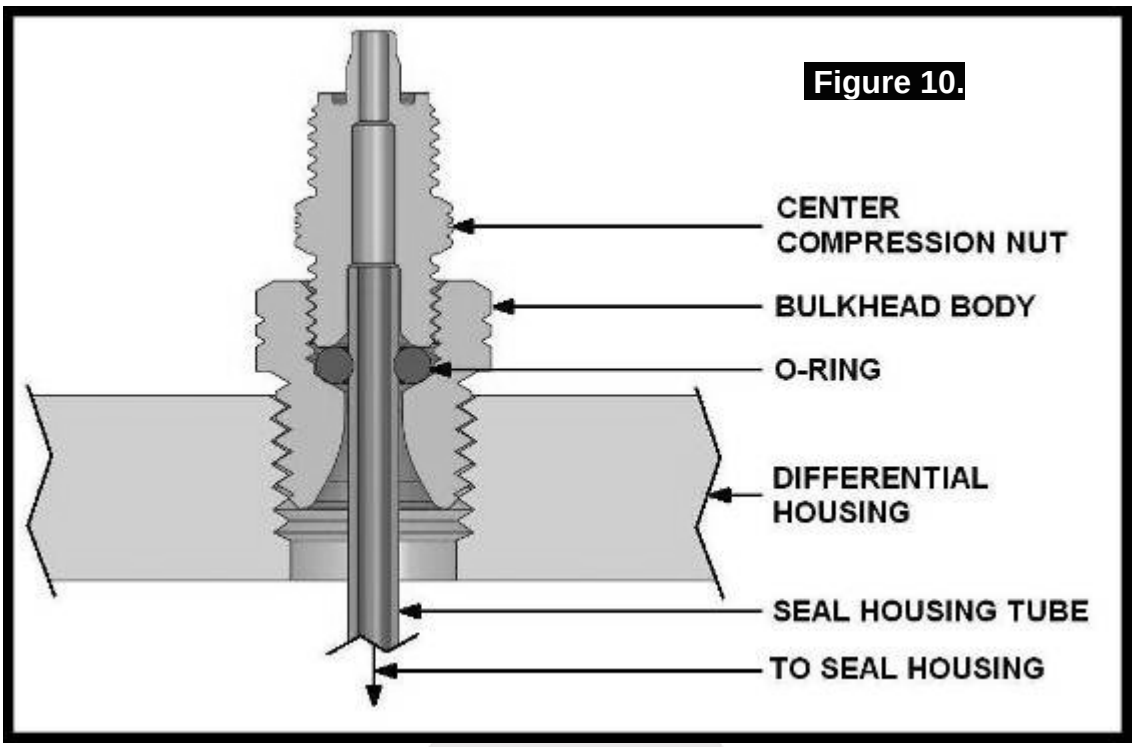


Figure 10.

NOTE : **Excessive tightening of the center compression nut is not necessary to form a good seal around the tube and may damage the O-ring, the seal housing tube, or the threads of the compression nut.**

NOTE : **Make sure the seal housing tube is all of the way into the center compression nut while you are tightening it.**

3.8 Profiling the Seal Housing Tube

- ☐ With the seal housing tube now firmly secured into the bulkhead fitting, bend the tube so that it closely follows the profile of the differential. (Figs.11.,12. & 13.)
- ☐ Check that the contour of the tube will not interfere with the bearing caps, the *Air Locker*, the ring gear or the axle housing.

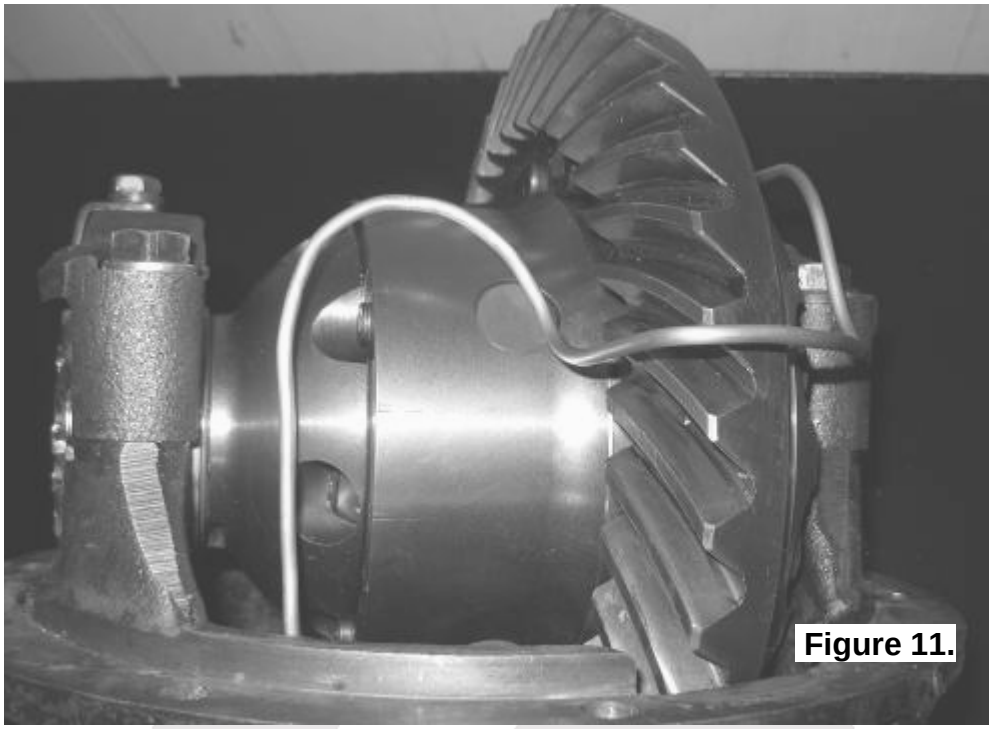


Figure 11.

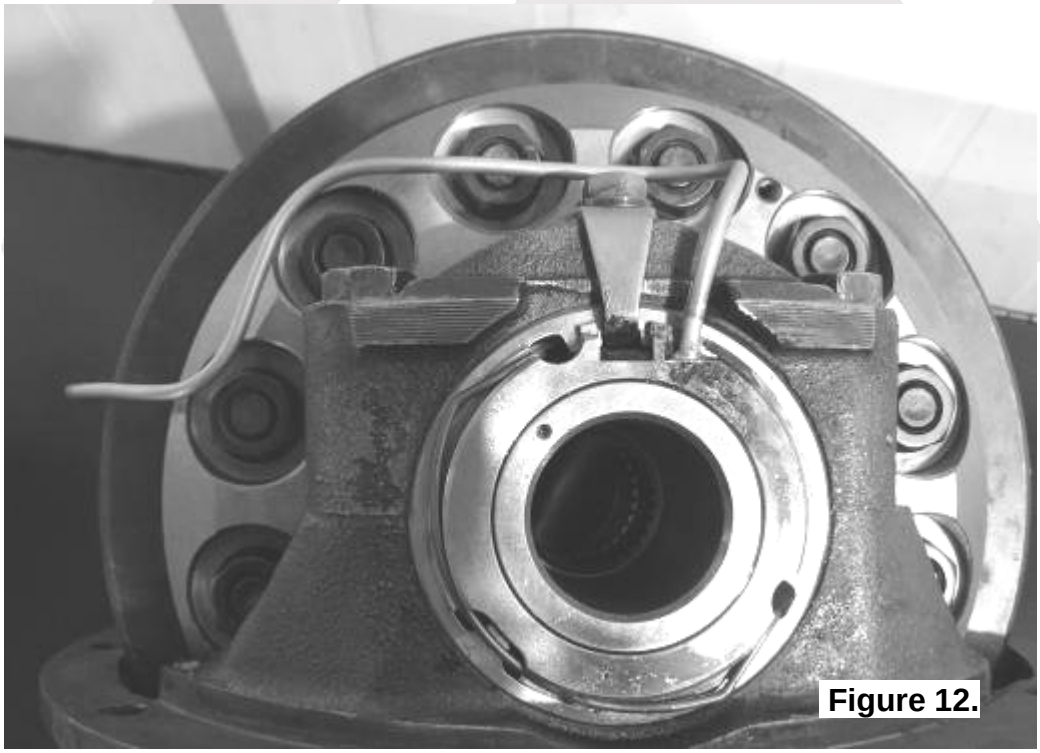


Figure 12.

3 Installing the Air Locker

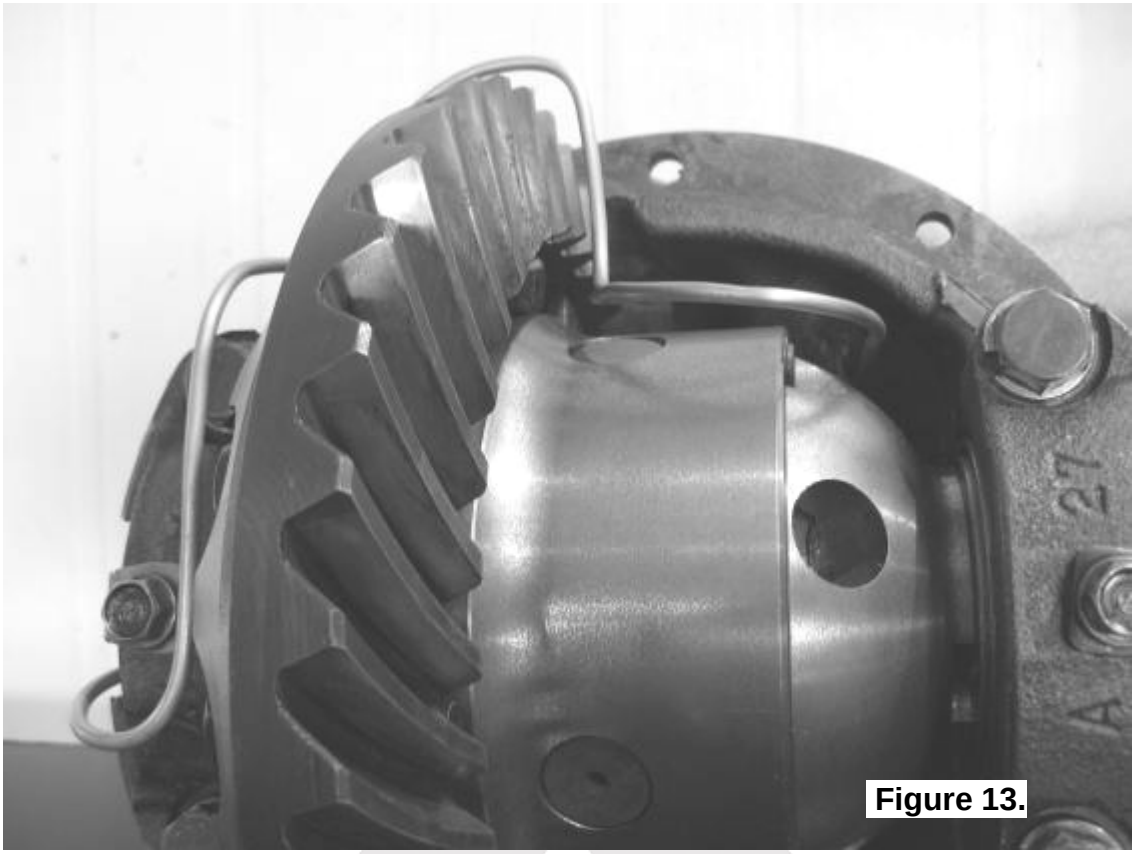


Figure 13.

IMPORTANT:

In order for the seal housing to float and self center on the bearing journal, the seal housing tube must not be pulling against the seal housing. To check this, rotate the drive flange back and forth while observing the seal housing movement. The seal housing should rotate slightly against the spring clip, but it should not appear to pull away from the face of the adjuster nut.

IMPORTANT:

Check that the tail of the adjuster nut locking tab does not push on the seal housing. Bend it up away from the seal housing with a screw driver if necessary.

3.9 Bench Testing the Air Locker

- ☐ To test the *Air Locker*, when 620kPa [90 PSI] shop air is applied to the seal housing tube, the *Air Locker* should engage.
- ☐ Check all fittings and the seal housing for air leaks.
- ☐ Rotate the differential carrier by turning the pinion flange whilst applying air pressure.

NOTE : **An accurate way to test for air leaks is to fit a shut-off valve to an air pressure gauge (Available as ARB part #0770005). Charge with shop air until 620 KPA [90 PSI] is reached, shut the valve off, disconnect the air hose, and watch to see if there is any drop in pressure. Any gradual pressure drop indicates an air leak. (Fig.14.)**

Figure 14.

- ☐ If a leak is found to be present, spray a soap and water mixture onto the bulkhead air fitting. Bubbles should appear at any leak points.

NOTE : **Do not spray this soapy mixture inside the differential**.

- ☐ Check that leaky fittings have been adequately tightened.
- ☐ Disassemble, clean threads, and reapply thread sealant if leaking persists.
- ☐ If a leak is found at the seal housing, carefully remove and refit. Be very careful with the O-rings and check they have not been damaged during installation.

3.10 Reinstalling Differential and Axles

- ☐ Undo the retaining pin on the long cross shaft, and remove the long cross shaft, spider block and thrust block from the *Air Locker*.
- ☐ Replace the paper gasket on the axle housing flange.
- ☐ Reinstall the third member to the differential housing according to the vehicle service manual.
- ☐ Replace the axle seals if necessary.
- ☐ Rotate the differential until the access window in the *Air Locker* is in view and accessible.
- ☐ Insert both axles fully into the housing, engaging splines, and then gently tap them inwards.

NOTE : **Be careful not to damage the axle shaft oil seals when installing the axle. Support the axle's entire weight where possible.**

- ☐ Select the two 2.8mm [0.110"] C-clips from the C-clip kit supplied with your *Air Locker* and install them onto the axles.

NOTE : **Your kit comes with 8 clips of 4 different sizes, 2.80mm [0.110"], 3.00mm [0.118"], 3.40mm [0.134"], and 3.55mm [0.140"] and your original C-clips should be 3.20mm [0.126"].**

- ☐ Gently tap both axles outward until both C-clips are fully seated into the side gears of the *Air Locker*.
- ☐ Insert the thrust block between the ends of the axles and hold it against one axle.
- ☐ Using an automotive feeler gauge (take note as to whether your feeler gauge is in Metric or Imperial), measure the remaining gap between the thrust block and the other axle and record this measurement as '**A**'.
- ☐ Calculate the thickness of the required C-clips using the equation below that corresponds to your feeler gauge measurement:

METRIC : A ÷ 2 + 2.8

IMPERIAL : A ÷ 2 + 0.11

3 Installing the Air Locker

☐ Select the two C-clips which are closest to the thickness you calculated above without going over, and replace the ones you measured with.

NOTE : **The objective here is only to attain a slip fit between the thrust block and the axles without any slop (too loose) or binding (too tight). You may find that the smallest 2.80mm [0.110”] clips are the best size. Leave them installed in this case.**

☐ Insert the thrust block into the center of the spider block and then insert them both onto the short cross shaft.

☐ Insert the long cross shaft maintaining alignment between the cross shaft retaining pinhole in the differential and its corresponding hole in the cross shaft.

NOTE : **Make sure the pinion thrust washers are not misaligned with the cross shaft holes when inserting the cross shaft.**

☐ Insert the cross shaft retaining pin and tighten.

☐ Reinstall the drive shaft.

☐ Reassemble the brakes and wheels according to your vehicle’s service manual.

4 Installing the Air System

4.1 Mounting the Solenoid

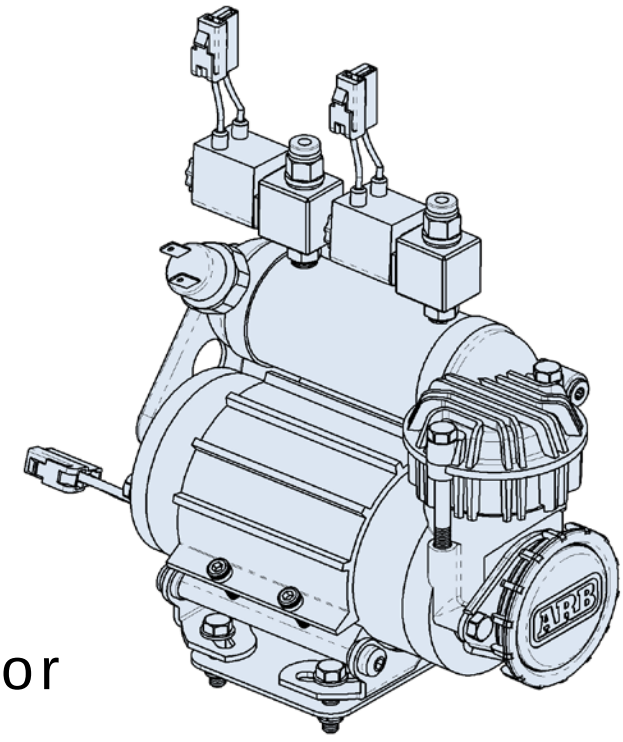
4.1.1 Connection to an ARB Air Compressor (Fig.15.)

- ☐ Remove one of the 1/8” BSP plugs from its port in the compressor tank.
- ☐ Apply Teflon paste to the nipple (1/8” X 1/8” BSP) and insert it into the port and tighten.
- ☐ Apply Teflon paste to the free end of the nipple.
- ☐ Assemble the inlet port side of the solenoid (stamped with a ‘1’) onto the nipple and hand tighten it. The solenoid should be rotated into a position that does not obstruct any other ports on the compressor tank.

NOTE : **The solenoid exhausts compressed air through the center of the black retaining cap when the *Air Locker* is disengaged. Make sure this orifice cannot be obstructed.**

- ☐ Apply Teflon paste to the threads of the 5mm push-in fitting and assemble it into the solenoid outlet port (stamped “2”) and tighten.

Figure 15.



ARB

Air Compressor

4.1.2 Connection to an Alternate Air Source

For ease of installation, quality of air supply, and a high level of dependability from your *Air Locker(s),* ARB strongly recommends use of a genuine ARB Air Compressor, however, the *Air Locker* air system can be operated on any alternate air source that meets each of the following guidelines:

- ☐ Must supply a minimum of 586 kPa [85 PSI].
- ☐ The supply must never exceed 724 kPa [105 PSI].
- ☐ The air source should have a tank capacity which enables it to actuate the *Air Locker*(s) in one charge so that no hesitation is experienced when locking one or two differentials.

HINT : **A good way to insure that you have the necessary capacity is to make sure you can engage, disengage, and then reengage your *Air Locker(s)* without the air source having to regenerate (e.g., without the compressor turning on to refill the tank).**

- ☐ Must supply clean air, free of rust, dirt, water, or other foreign matter.
- ☐ Must match the 1/8” BSP porting of the *Air Locker* solenoid.
- ☐ Mount solenoid within close proximity of the air supply and secure it from the effects of vibration and shock.
- ☐ Connect the air supply to the 1/8” BSP inlet port of the solenoid (stamped “1” on the solenoid body) using thread sealant.

IMPORTANT :
ARB cannot warrant your *Air Locker(s)* against damage caused as a result of using an alternate air supply. If you have any doubts as to the suitability of your air system to use in an *Air Locker* system, consult your ARB distributor.

4.2 Running and Securing the Air Line

The path taken by the air line from your air source (i.e., compressor) to your *Air Locker* is unique to your vehicle and the position of your air source. Plan ahead carefully when running the air line and always follow these guidelines:

- ☐ Account for axle travel when running the line from the axle to a fixed point on the vehicle. Leave enough slack in the air line to allow for maximum suspension travel in both directions.
- ☐ Avoid leaving large lengths of air line hanging underneath the vehicle where they may get tangled on rocks, sticks, etc.

HINT : **Cable tying the air line to one of your flexible brake lines will account for axle travel and should help keep your line from getting snagged.**

- ☐ Run the air line all the way from the compressor to the differential before trimming either end of the line to length. This will save complications that may arise if the air line has to be removed.
- ☐ Make sure the line does not contact sharp edges or abrasive surfaces that may damage the air line over time.
- ☐ Do not run the air line around tight bends that may kink the air line and restrict or block the air flow.
- ☐ Keep the air line well away from your vehicle's exhaust components. Air lines will melt if subjected to extreme heat.
- ☐ Do not run more air line than necessary. Excess line volume created when coiling the left over hose, using unusually large diameter hose, etc., will increase drain on the compressor tank resulting in the compressor running more often than needed.
- ☐ Support the air line by tying it back with cable ties wherever possible.
- ☐ At the solenoid end of the air line, trim the line to length with a sharp knife.
- ☐ To attach the air line to the push-in fitting of the solenoid; insert the line firmly into the fitting, pull outward on the flange of the fitting while holding the line as far into the fitting as possible, and then gently pull outward on the air line to clamp the line in place.

4 Installing the Air System

NOTE : **To remove the air line from the push-in fitting; pull outward on the flange of the fitting, push the air line as far into the fitting as possible and hold, push inward on the flange, and then pull the air line free of the fitting.**

4.3 Connection to the Bulkhead Fitting

- ☐ Trim the air line to length using a sharp knife.
- ☐ Insert the support spring over the end of the air line - small end first. (Fig.16.)
- ☐ Insert the outer compression nut over the air line.
- ☐ Push the airline onto the barb on the center compression nut, ensuring that it is pushed all the way to the end.

Figure 16.

HINT : **If the tube is too difficult to push on, place the end of the air line into a cup of boiled water to soften the tubing.**

☐ Screw on the outer compression nut and tighten, while supporting the center compression nut with a 3/8” spanner. The airline is now attached to the center compression nut.

NOTE : **The outer compression nut will tighten against a stop. Over tightening will not create a better seal.**

☐ Assemble the support spring over the outside of the outer compression nut.

☐ Secure any loose sections of tube with a cable tie.

5 Mounting & Connecting the Electrical System

5.1 Mounting the Actuator Switch(es)

Air Locker actuator switch(es) can be easily panel mounted inside the vehicle in a 21mm x 36.5mm [0.83” x 1.44”] rectangular cutout.

NOTE : **Only attach the cover plate to the face of the switch once the switch has been mounted and wired correctly as the cover plates are designed to be difficult to remove.**

For reasons of safety and for ease of operation, the *Air Locker* actuator switch(es) should be mounted in a location picked to best suit the operator. Make sure you have taken the following points into consideration:

- ☐ Switch(es) MUST be mounted and should never be allowed to simply dangle from the wiring loom during vehicle use.
- ☐ Switch(es) should be within easy reach of the driver. Ideally, any *Air Locker* switch should be able to be operated without physical effort or distraction to the driver.
- ☐ Switch(es) should be mounted within the line of sight of the driver so that switch position (‘ON’ or ‘OFF’) can be visually determined by the rocker position and the illumination state.
- ☐ The position of the switch(es) should best eliminate any possibility of accidental operation by the driver or one of the passengers.
- ☐ Switch cutout position(s) must be located in an area with a minimum of 50mm [2”] of clearance behind the face of the cutout.
- ☐ Switch(es) should not be mounted where they will be exposed to water (e.g., in the lower section of an inner door panel).
- ☐ ARB recommends that you apply the *Air Locker* Warning Sticker (ARB part # 210101) within close visual proximity of the switch location.

NOTE : **If no adequate position can be found on existing dashboard panels, a surface mounted bracket (Fig.17.) may be purchased from your ARB *Air Locker* distributor to suit 1, 2, or 3 switches.**

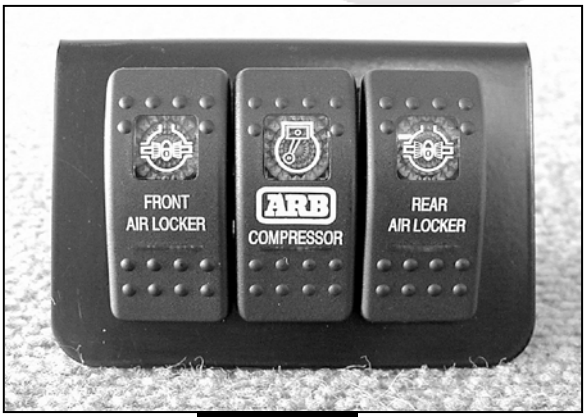


Figure 17.

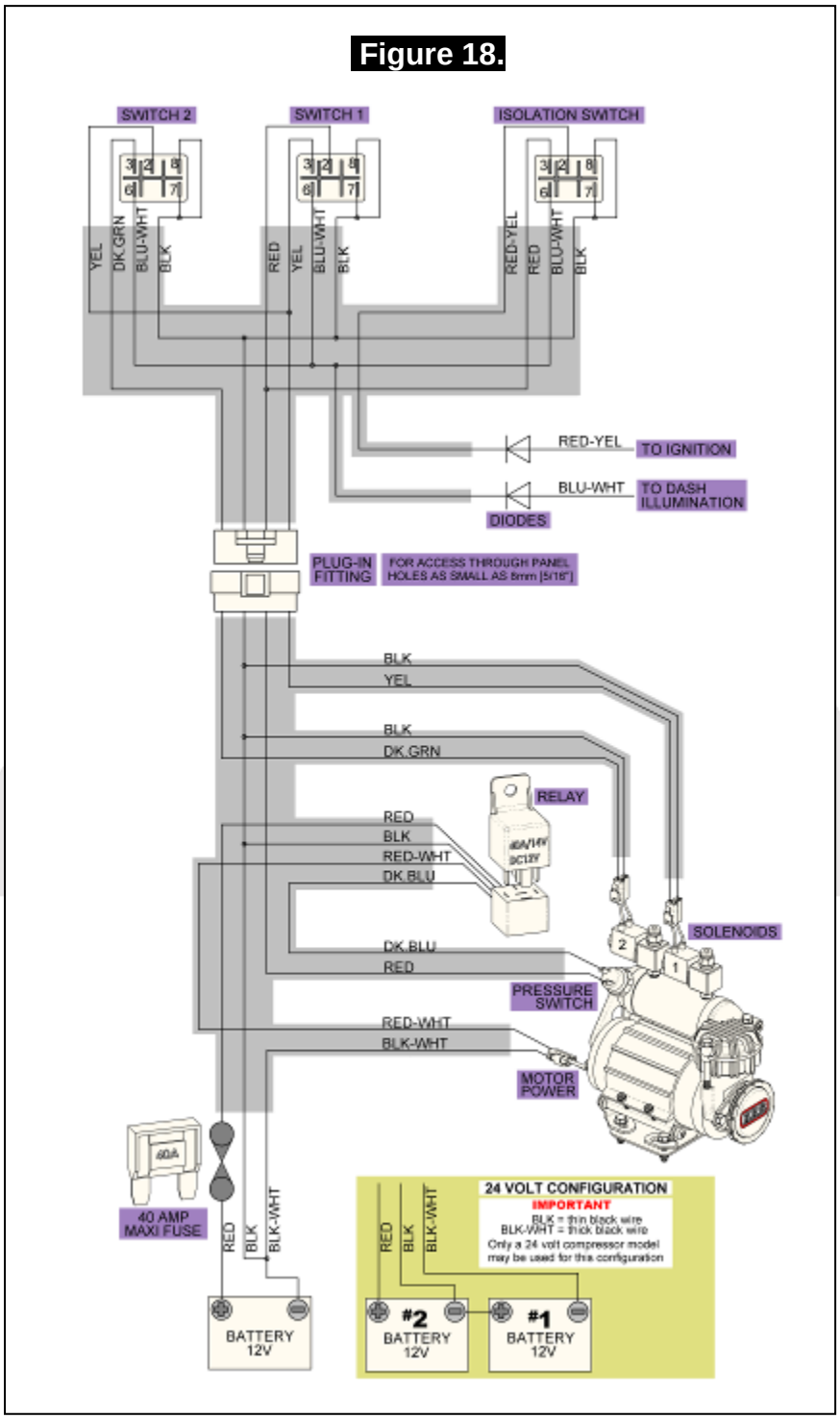
5.2 Wiring the Actuator System

5.2.1 Connection to an ARB AIR COMPRESSOR

When wiring the *Air Locker* actuator switch(es) and solenoid(s) to an ARB Air Compressor, all connections can easily be set up directly from the supplied wiring loom. (Fig.18.)

NOTE : **180409 model loom shown for reference only. Refer to your ARB Air Compressor Installation Guide for details on configuring your installation.**

Figure 18.



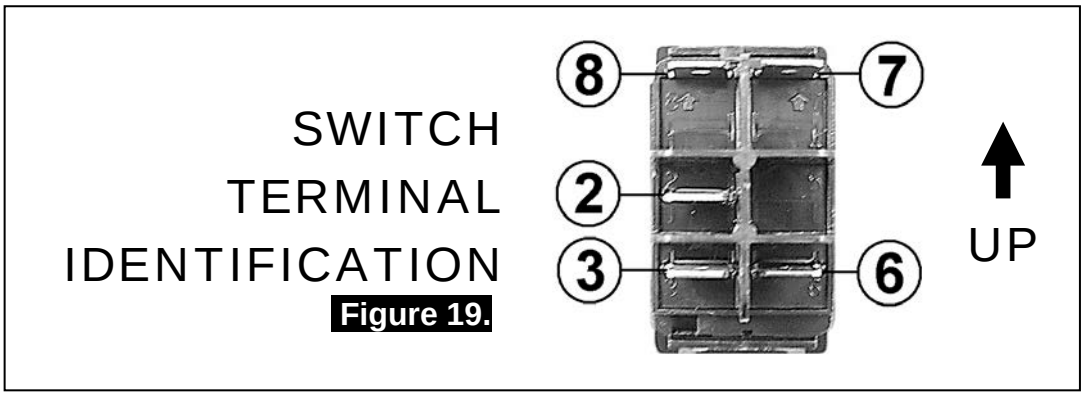


Figure 19.

5.2.2 Connection to an Alternate Air Source

When connecting the actuation switch to an alternate air source, the switch(es) should be wired according to figures 20. and 21. depending on whether one or two *Air Lockers* will be installed in the vehicle.

5.2.2.1 Single Air Locker System

- ☐ If only one *Air Locker* is to be installed in the system, the switch and solenoid should be wired according to figure 20. regardless of whether the *Air Locker* has been installed in the front or rear axle of the vehicle.
- ☐ Attach the appropriate switch cover (i.e., 'FRONT' or 'REAR') to the switch.

NOTE : **Refer to figure 19. for the correct switch terminal identification and switch orientation.**

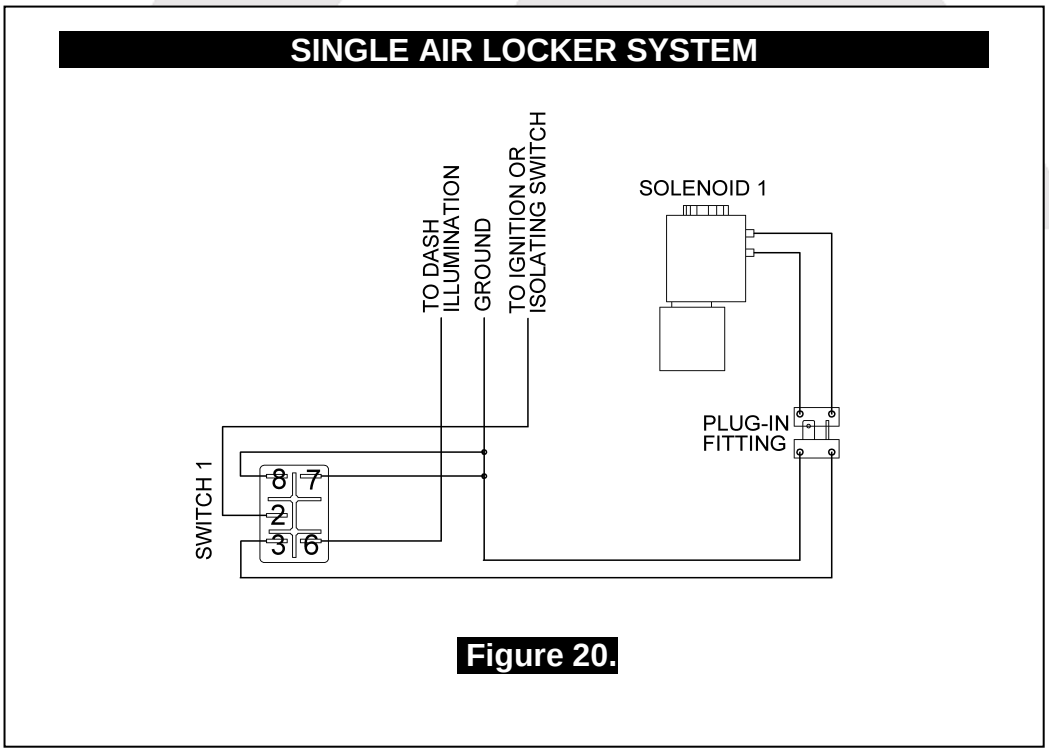


Figure 20.

5.2.2.2 Dual Air Locker System

☐ If two *Air Locker*s are to be installed in the system, ARB recommends that the switches and solenoids be wired according to figure 21. For safety reasons, this configuration allows SOLENOID 2 to be actuated only if SOLENOID 1 is already on.

☐ Attach the “REAR AIR LOCKER” switch cover to SWITCH 1, and the “FRONT AIR LOCKER” switch cover to SWITCH 2.

NOTE : **Refer to figure 19. for the correct switch terminal identification and switch orientation.**

☐ Configure SOLENOID 1 as the air line leading to the rear axle *Air Locker*, and SOLENOID 2 as the air line leading to the front axle *Air Locker*.

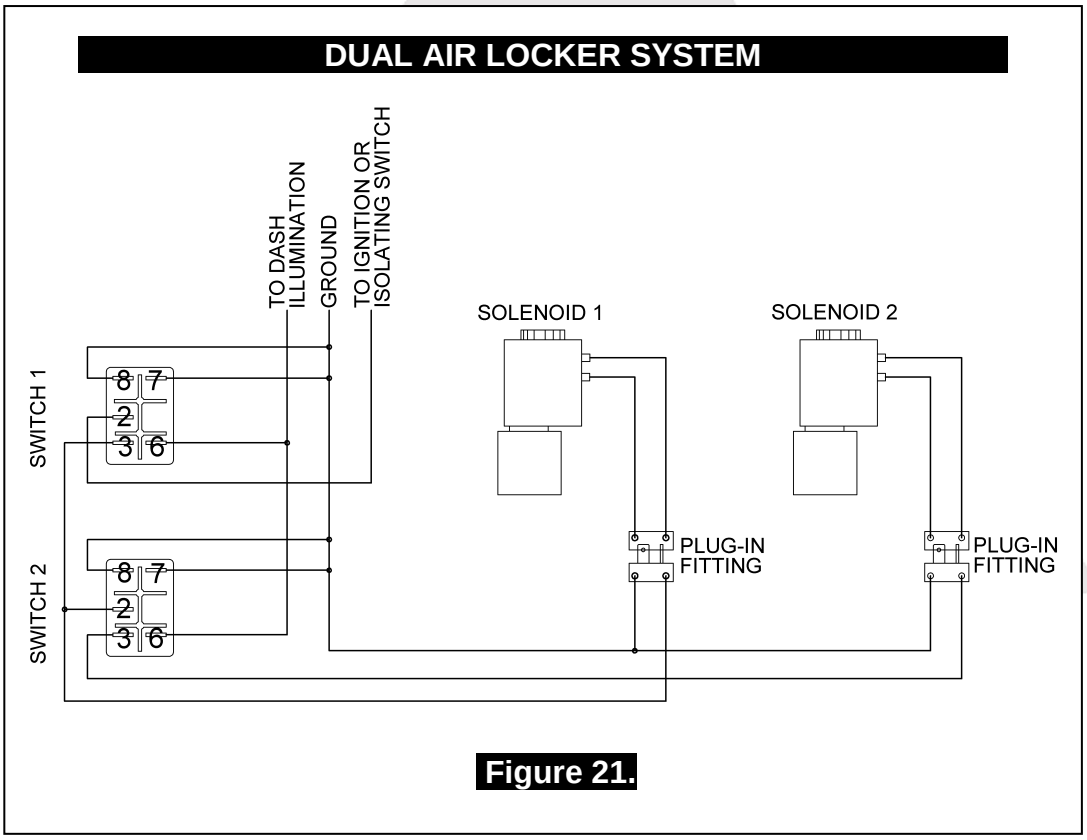


Figure 21.

6 Testing & Final Assembly

6.1 Leak Testing

☐ With the vehicle parked and the engine off, turn the compressor on and wait until the air system is fully charged.

NOTE : **With the *Air Locker(s)* disengaged, the air source (i.e., compressor) should not have to recharge over time. Intermittent recharging without *Air Locker* use usually indicates a leak at the solenoid fittings or at the compressor tank O-ring seal.**

☐ Actuate the *Air Locker*(s).

☐ The compressor should not come on again for a period of at least 15min. Air system recharging within that time period would indicate that a leak is present in the system.

NOTE : **If an alternate air source (e.g., an air cylinder or a belt driven air pump) is used instead of a compressor, the air system will have to be leak tested with a pressure gauge and a shut-off valve in series before the solenoid input. (Fig.14.)**

☐ If a leak is found to be present, spray a soap and water mixture onto all air fittings in the system while the compressor is fully charged. Bubbles should appear at any leak points.

☐ Check that leaky fittings have been adequately tightened.

☐ Disassemble, clean threads, and reapply thread sealant if leaking persists.

6.2 Testing the Air Locker Actuation

To test that your air system, electrical system, and your *Air Locker* differential is functioning correctly:

☐ Support the vehicle such that the wheels are free to rotate (e.g., on axle stands, a chassis hoist, etc.)

☐ Leave the parking brake off, the transmission in neutral, and the *Air Locker* switch ‘OFF’.

☐ Turn the ignition to the ‘ON’ position (leaving the motor off). The large illuminating symbol on the *Air Locker* switch cover should be ‘OFF’.

6 Testing & Final Assembly

- ☐ Turn the compressor (or alternate air source) on to charge the air supply up to its maximum pressure.
- ☐ Rotate one wheel by hand.
- ☐ The wheel should rotate freely and the opposite wheel should be turning in the opposite direction without any resistance or mechanical noise from within the differential.
- ☐ Turn the *Air Locker* switch to the 'ON' position. The illuminated symbol on the switch cover should light up.
- ☐ Rotate the same wheel again.
- ☐ Both wheels should rotate together.
- ☐ Turn the switch off again.
- ☐ Rotate the same wheel.
- ☐ The wheels should again rotate in opposite directions.

6.3 Filling the Differential

NOTE : **Consult the *ARB Air Locker Operating & Service Manual* for recommendations on differential lubricant specifications.**

- ☐ Refill the differential until level with the filler hole.
- ☐ Rotate the differential center 2 full turns.
- ☐ Check the oil level and add oil if necessary.
- ☐ Apply thread sealant to filler plug before inserting.
- ☐ Replace the filler plug.
- ☐ Clean the differential housing of any oil or grease that may collect dirt or other abrasive particles.

6.4 Post-Installation Check List

Now that the *Air Locker* installation has been completed, ARB recommends that you take the time to complete the following check list just to insure that you haven't missed any of the vital steps.

- ☐ The air system has been leak tested.
- ☐ Thread locking compound was used on the ring gear bolts.
- ☐ All torque settings comply with the vehicle manufacturer's specs and were set with an accurate torque wrench.
- ☐ Differential fluid complies with ARB recommendations and has been filled to the correct level.
- ☐ All air lines and wiring have been securely cable tied to resist snagging.
- ☐ Switch(es) have been securely mounted within operator reach, yet well away from danger of accidental engagement.
- ☐ Switch(es) function properly and illuminate to indicate *that Air Locker*(s) are engaged.
- ☐ All operators who are to use the *Air Locker* have read, and fully understand the *ARB Air Locker Operating & Service Manual*.
- ☐ The *Air Locker* Warning Sticker has been located within close proximity of the actuator switch(es).

INSTALLATION PERFORMED BY: _____

DATE OF INSTALLATION: _____

ODOMETER READING: _____

ARB AIR LOCKER SERIAL No.: _____

6 Testing & Final Assembly

7 Parts List

7.1 Exploded Assembly Diagram

(See itemized parts list overleaf)

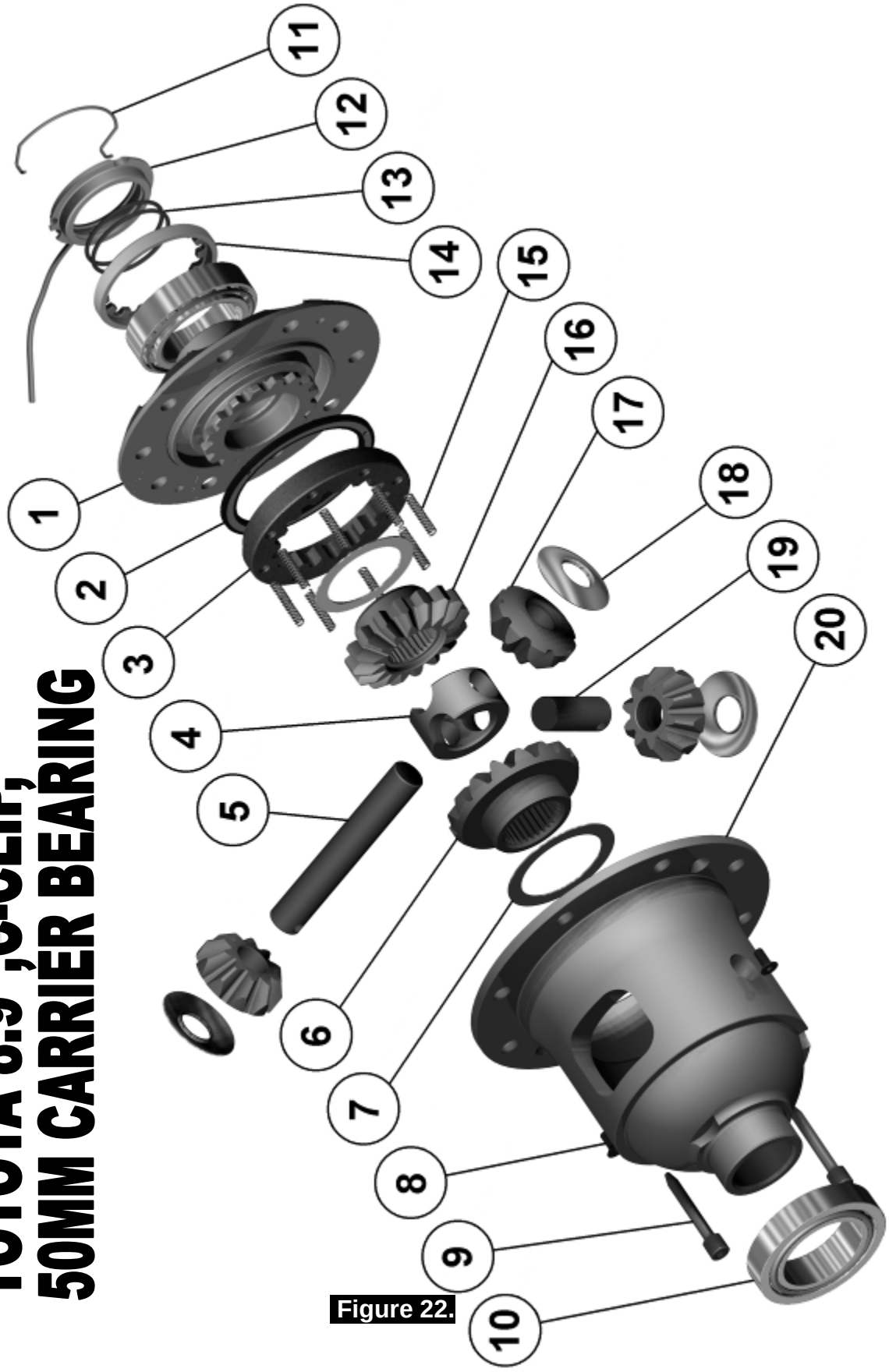


Figure 22.

7 Parts List

7.2 Itemized Parts List

(See exploded diagram Figure 22.)

AIR LOCKER MODEL No. : RD153			
ITEM #	QTY	DESCRIPTION	PART #
01	1	FLANGE CAP ASSEMBLY	027318
02	1	BONDED SEAL	160702
03	1	CLUTCH GEAR	050806
04	1	SPIDER BLOCK	070902
05	1	LONG CROSS SHAFT	060204
06	1	SIDE GEAR	131318R
07	2	SIDE GEAR THRUST WASHER	151010
08	2	COUNTERSUNK SCREW	200213
09	2	RETAINING PIN	120601
10	-	TAPERED ROLLER BEARING	NOT SUPPLIED
11	1	SEAL HOUSING RETAINING CLIP	150601
12	1	SEAL HOUSING ASSEMBLY	081901
13	2	SEAL HOUSING O-RINGS	160207
14	1	ADJUSTER NUT	100101
15	8	RETURN SPRINGS	150113
16	1	SPLINED SIDE GEAR	131418R
17	3	PINION GEAR	140701R
18	3	PINION THRUST WASHER	151110
19	1	SHORT CROSS SHAFT	060403
20	1	DIFFERENTIAL CASE	013020
*	1	THRUST BLOCK	110102
*	1	BULKHEAD KIT, O-RING TYPE, 3.5-5mm	170105
*	1	5mm PUSH-IN FITTING (RI 5 1/8”)	170201
*	1	NIPPLE, 1/8” BSP, MALE TO MALE	170501
*	1	NYLON AIR LINE (5mm Dia X 6m long)	170301
*	1	SOLENOID VALVE	180103
*	1	ON/OFF SWITCH	180209
*	1	SWITCH COVER ‘REAR’	180211
*	10	CABLE TIE	180301
*	1	WARNING LABEL	210101
*	1	BUMPER STICKER	210102
*	1	OPERATING & SERVICE MANUAL	210200
*	1	INSTALLATION GUIDE	2102153

* *Not illustrated in exploded view.*

Part No. 2102153
Revision 7/10/2013