



RD203

ISUZU IFS, 17 SPLINE

**AIR OPERATED
LOCKING DIFFERENTIAL
INSTALLATION GUIDE**

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1 Introduction

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!

1 Introduction

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.
- A standard automotive feeler gauge.
- A razor knife to cut the nylon tubing.
- A differential housing spreader, to facilitate removal of the carrier (e.g. ARB Differential Spreader #0770003).
- A torque wrench (See vehicle service manual for required torque range.).
- A lubricant drain reservoir.
- Suitable measuring tools to measure a differential for pre-load and/or backlash shimming (See Section 3 *Bench Measurement*).
- An 11.2mm [7/16"] drill and 1/4" NPT tap for bulkhead fitting installation.
- An automotive bearing puller (e.g. ARB Bearing Puller #0770001) or a differential carrier bearing puller.
- A bearing press or arbor press.
- A suitable shim driver (e.g. ARB Shim Driver #0770004).
- A soft hammer (e.g. raw hide or nylon).

1.2.2 Supplies

- Thread lubricant/sealant compound (e.g., LOCTITE #567 Teflon Paste).
- Thread locking compound (e.g., LOCTITE #272).
- 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.

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.
- Once drained, reinstall the drain plug finger tight to prevent drips coming out of the housing and dust getting in.

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

- Remove the front wheels from the vehicle.
- Disconnect the drive shaft from the flange of the differential.
- Remove the front axle assembly according to your vehicle manufacturer service manual.

HINT : Remove the CV retaining clips on the hub assembly, then separate the spindle/knuckle assembly to give way to CV removal later. Do not attempt to pry the CV's out from the diff, as they are securely fastened to the brackets with internal retaining clips. With the differential housing properly supported, remove the 4 bolts on the bracket on each side, and then the 4 (or 2 in newer models) larger mounting bolts on the top.

2 Removing the Existing Differential

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

- Remove the differential housing from the axle case and secure it to a workbench.

2.4 Marking the Bearing Caps

- Using a 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 one similar punch 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.



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 aftermarket 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 depth indicator on one of the ring gear teeth as in figure 2.
- While supporting the pinion gear by holding the drive shaft, 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 Spreading the Differential Housing

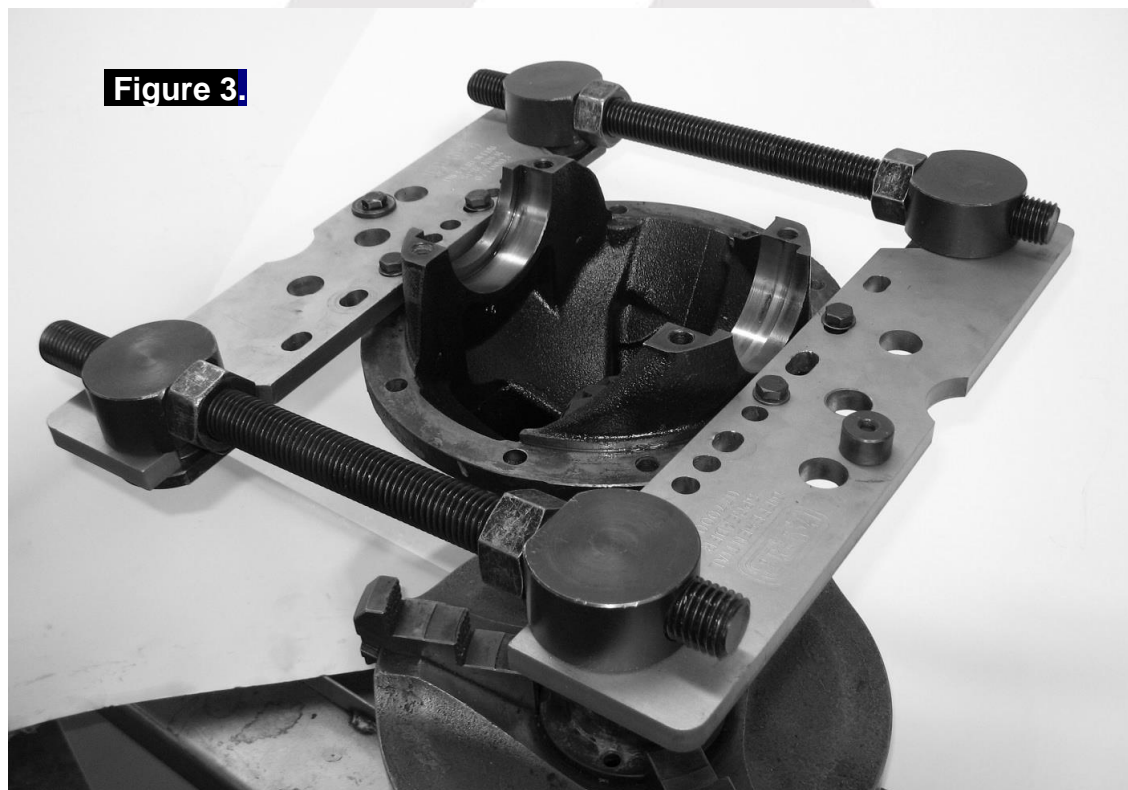
IMPORTANT:

Spreading the differential housing with a differential case spreader is a step which 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.

- Unbolt and remove the bearing caps.
- Setup the differential spreader and a dial indicator and carefully spread the differential housing (Fig.3.) just enough to remove the differential carrier (Refer to your vehicle's service manual).

NOTE : Never spread the housing more than 0.5mm [0.020"].

- Once the housing has been adequately spread, the differential may be removed by pulling forward on the differential center.
- Release all spreader tension immediately after removing the differential carrier.



3 Bench Measurement

3.1 Measurement for Pre-Load Shimming

When fitting an ARB *Air Locker*, the original bearing types are used on both sides of the *Air Locker*, however, in order to reproduce a similar backlash and pre-load to that of your existing differential, measurements need to be taken so that the correct shim thickness can be determined for each side.

- Secure the differential to a workbench.
- 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.
- Remove the original tapered roller bearings and shims from the differential carrier using a bearing puller (Fig 4.).

NOTE : Keep the shims separated so that they can be identified as to which end of the differential they came from.

HINT : Examine the bearing caps and cones for damage or wear, and if necessary, discard them and replace with the same size and type of bearings.

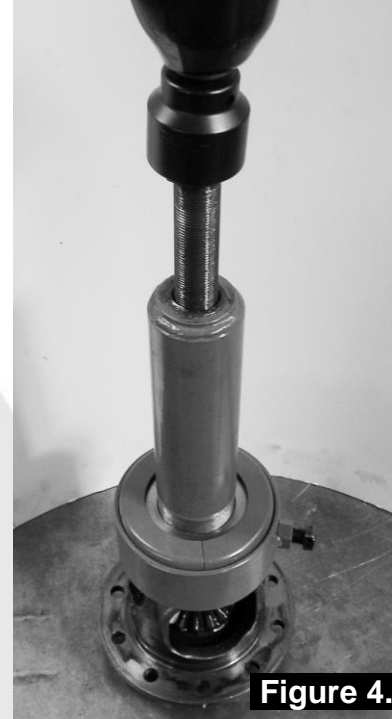
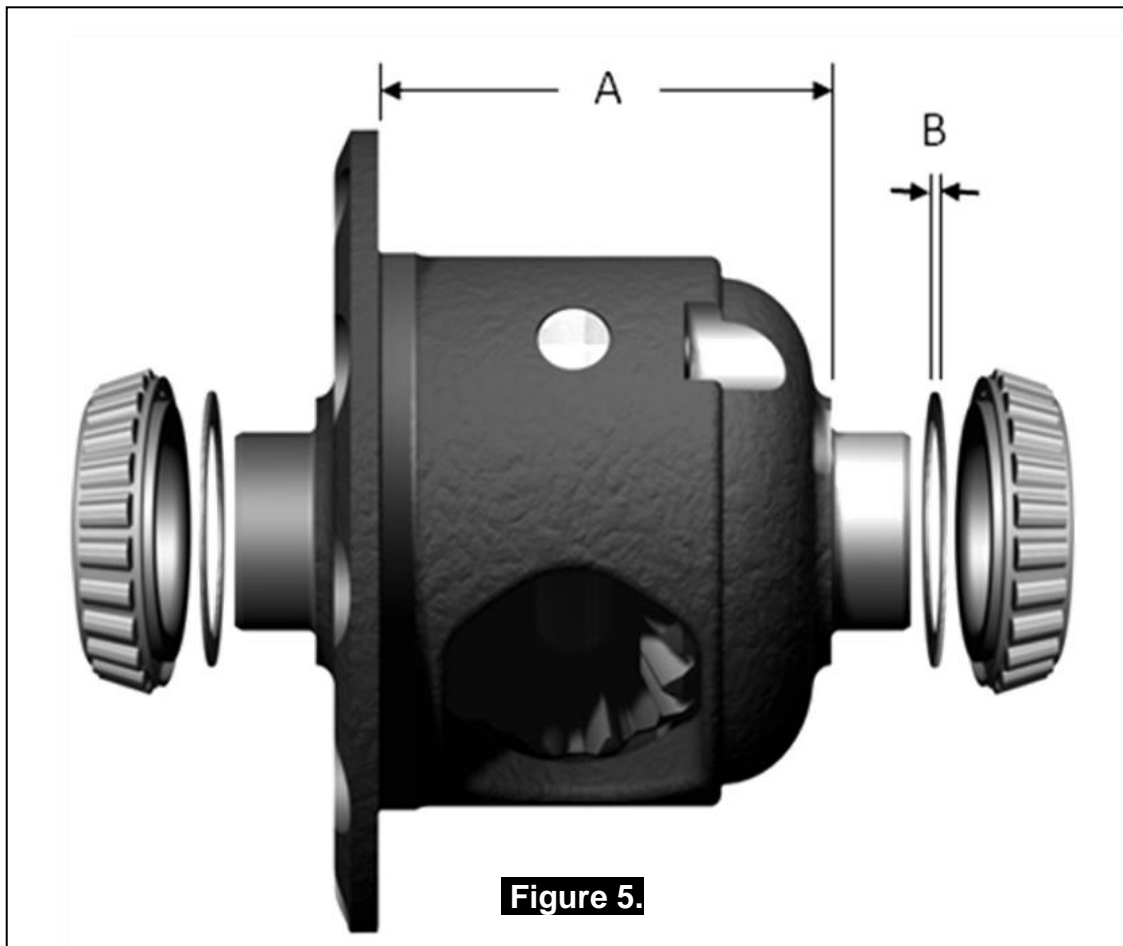


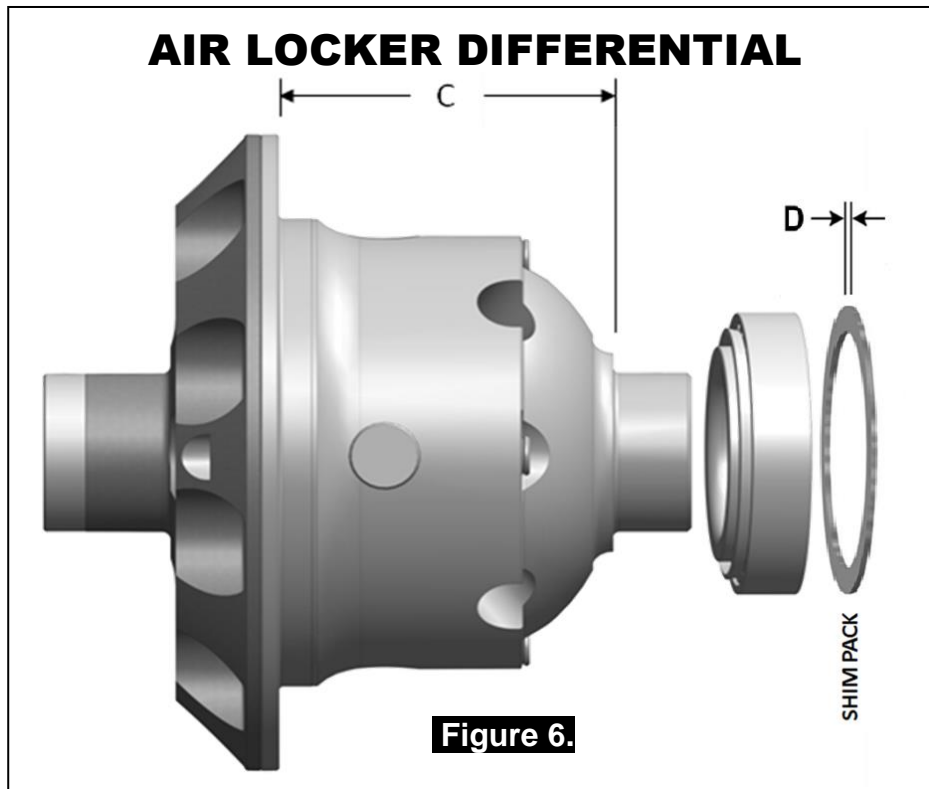
Figure 4.

3 Bench Measurement

- Using a caliper or similarly accurate measurement method (i.e., able to take accurate measurements within 0.04mm [0.0015"]), measure the distance from the bearing shoulder to the ring gear mounting face (shown as 'A' in Figure 5.) and record this measurement as 'A'.
- Measure the thickness of the shim pack removed from the case side of the differential carrier (shown as 'B' in Figure 5.) and record this measurement as 'B'.
- Measure the distance from the *Air Locker* bearing shoulder to the ring gear mounting face (shown as 'C' in Figure 6.) and record this measurement as 'C'.



3 Bench Measurement



3.2 Calculation & Selection of Shims

The thickness of the shim pack required for the *Air Locker* (shown as 'D' in Figure 6.) can now be determined by substituting the measurements taken into the following equation.

$$A + B - C = D$$

HINT : If your calculations are correct then the following equation will also be true:

$$A + B - C - D = \text{ZERO}$$

To make a shim pack to match the measurement you calculated as 'D' you can:

- select shims from the shim kit supplied with your *Air Locker*.
- use a universal shim kit available from most drive train specialists.

NOTE : Never re-use any shims that are damaged or worn.

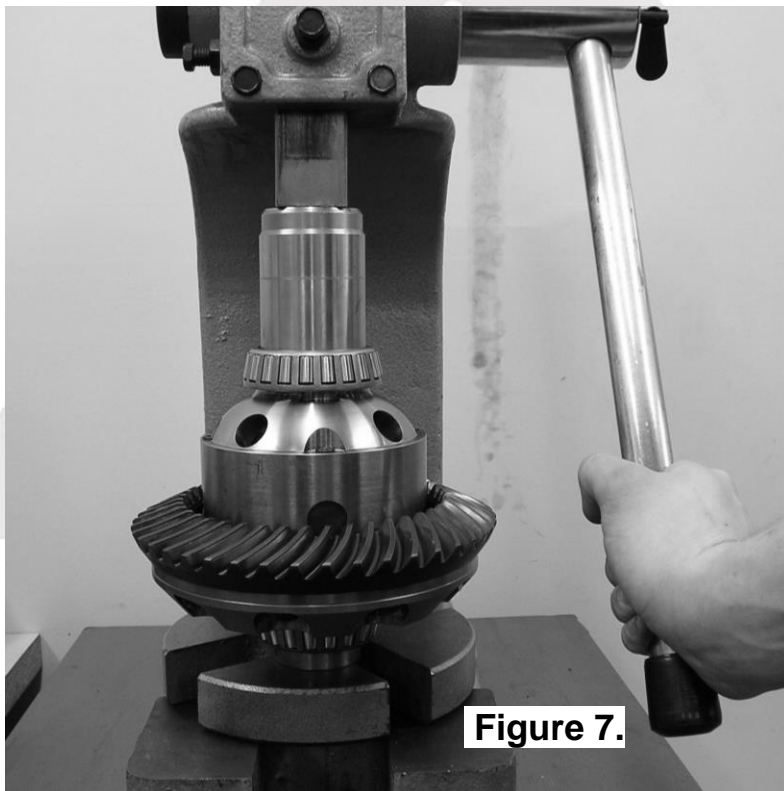
4 Installing the Air Locker

4.1 Installing the Carrier Bearings

- With the *Air Locker* well supported in an arbor press, apply a thin film of high-pressure grease to the case side bearing journal.
- Identify the bearings according to where each was removed from the OE diff, and allocate them to the correct sides of the *Air Locker* respectively.
- Press one of the tapered roller bearing cones onto the bearing journal of the differential carrier until the bearing seats firmly against the bearing journal shoulder. (Figure 7.)

NOTE : Never re-use any bearings that are damaged or worn.

- Invert the *Air Locker* and apply a thin film of high-pressure grease to the ring gear side bearing journal.
- Press an original bearing cone onto the *Air Locker* bearing journal, taking care not to damage the O-ring grooves.



NOTE : Do not add any shims between the ring gear side bearing and the bearing seat.

4 Installing the Air Locker

4.2 Mounting the Ring Gear

- Apply a thin film of high-pressure grease to the ring gear shoulder of the *Air Locker* to prevent seizing.
- Thoroughly clean any thread locking compound or other foreign matter from the holes of the ring gear, the threads of the ring gear bolts, and the mating surfaces of the ring gear and the *Air Locker* flange.

NOTE : 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 an oven or in hot water to slightly expand the gear and facilitate assembly.

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

- Dry the ring gear with compressed air (if wet), paying particular attention to the threaded holes.
- Install the ring gear onto the *Air Locker* by aligning the holes in the flange with the tapped holes in the ring gear, then gently tapping it around in a circle with a plastic or copper hammer.

NOTE : Avoid using the bolts to pull down the ring gear 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.

NOTE : Do not apply threading compound directly into the threaded hole as this could prevent the bolt from reaching its full depth.

- Tighten the ring gear bolts in a star pattern with a torque wrench according to your vehicle manufacturer's specified torque.

4 Installing the Air Locker

4.3 Drilling and Tapping the Bulkhead Port

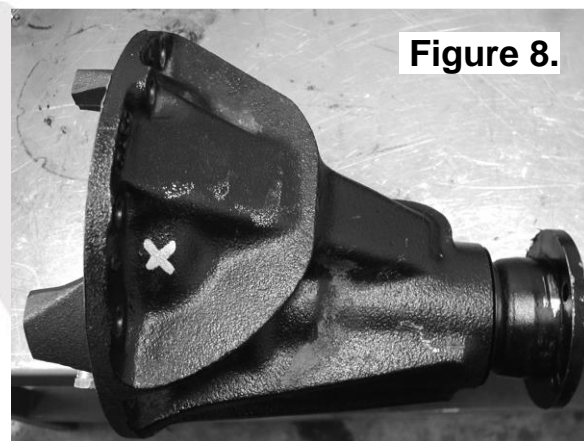
A port must be drilled and tapped through the differential housing to allow the seal housing tube through the housing to connect with the air line from the air compressor.

IMPORTANT:

Some differentials on newer Isuzu models (e.g. 2012 DMax) are assembled with aluminium axle case. Distinguish the material type of the axle case, and then determine the bulkhead port location as suggested below.

Cast Iron Axle Case

- Mark a spot for the bulkhead port on the left hand (seal housing) side toward the top of the differential housing that is in an area that will be well clear of the ring gear, the differential, and any other obstructions that may snag the seal housing tube (Fig.8.).



Aluminium Axle Case

- Mark a spot for the bulkhead port on the lower left corner (opposite the oil fill plug) of the aluminium axle case, approximately 20~25mm from the centerline of the case. Ensure it is reasonably distanced from the raised area (Fig. 9.), so that the bulkhead body can be tightened in place later.



HINT :

The mark shown in figure 8. or 9. (either applicable) should be copied as closely as possible.

4 Installing the Air Locker

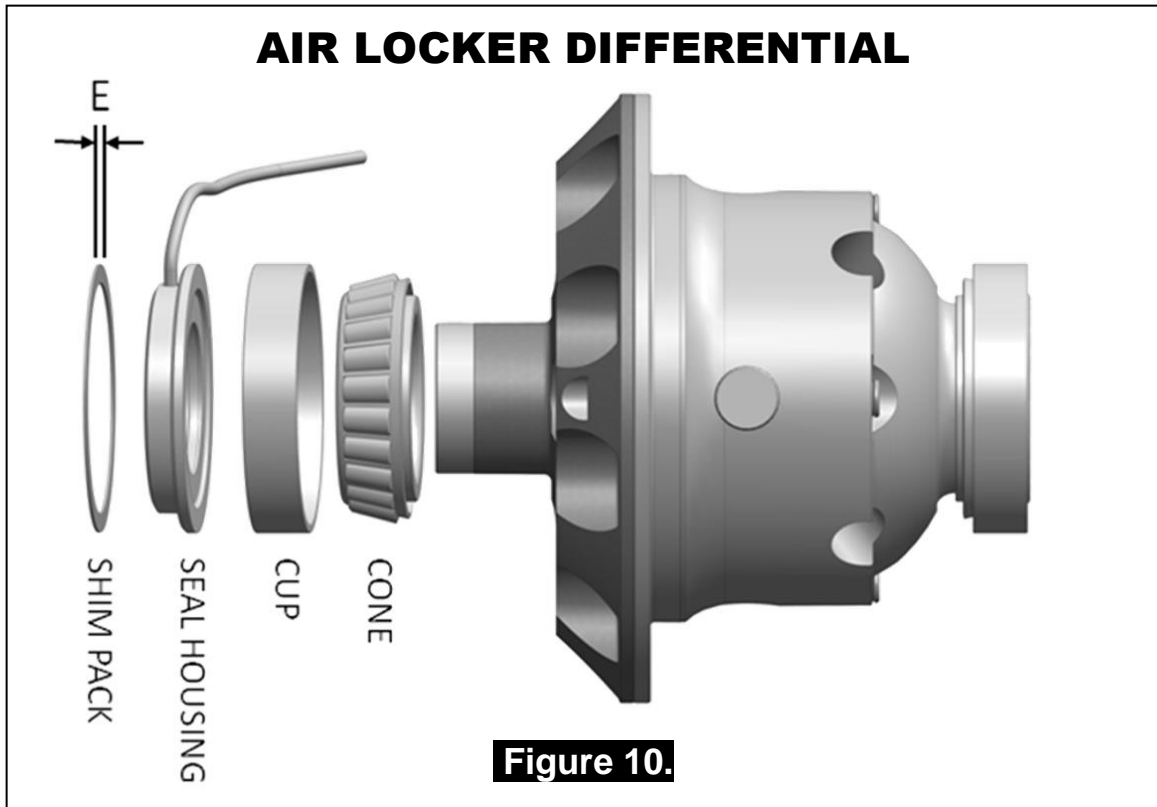
- Cover the drive pinion or axle tube areas with a rag to protect them from metal filings.
- Drill through the housing, square to the outside surface using an 11.2mm [7/16"] drill.
- Tap the hole from the outside using a ¼" NPT tapered pipe thread tap.
- Remove any sharp edges from the hole that may chip-off and fall into the housing.
- Very carefully remove rags and inspect with a service light inside the housing to ensure no metal filings are left behind.



4 Installing the Air Locker

4.4 Assembling the Differential Carrier

- Place the bearing cup over the bearing cone on the seal housing side (Fig 10.)



- Carefully install the seal housing by sliding it all 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.

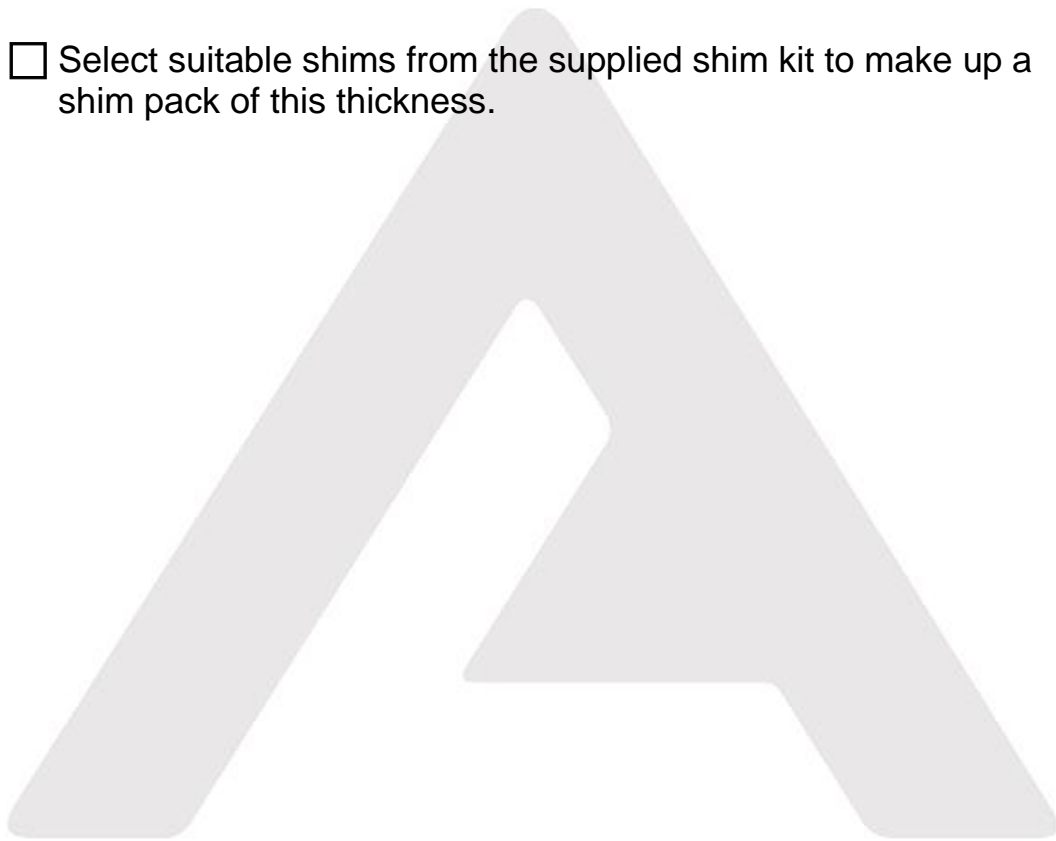
- By holding all assembled components as shown in Figure 10. In place at each end (except the shim pack), insert and hold the *Air Locker* into the differential housing with the seal housing tube pointing straight out of the housing.

4 Installing the Air Locker

- Push the *Air Locker* hard across to the case side, and measure the gap (end float) between the seal housing and the bearing bore edge with a feeler gauge.
- Consult your vehicle manufacturer's service manual to determine the carrier bearing pre-load amount specified for your vehicle.
- Add the specified pre-load amount to the measurement taken with the feeler gauge to determine a shim amount for 'E' in Figure 10.

PRE-LOAD + END FLOAT = SHIM PACK

- Select suitable shims from the supplied shim kit to make up a shim pack of this thickness.

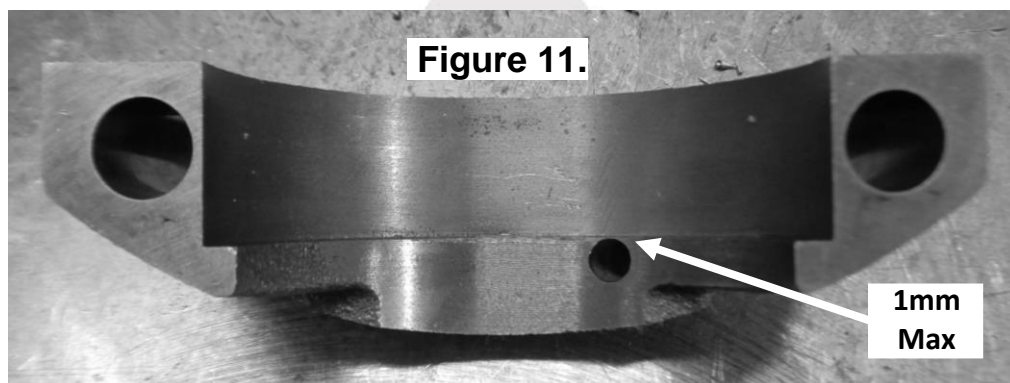


4 Installing the Air Locker

4.5 Modifying the Bearing Cap

NOTE : It is very important to make sure the punch marks made on the differential housing while removing the differential are matched to the punch marks on the bearing cap. The bearing cap must be replaced exactly as it was removed. (Refer to section 2.4)

- Identify the bearing cap for the seal housing side. A hole must be drilled in this cap for the seal housing tube to pass through.
- Measure and mark a location on the bearing cap, off center as shown, that would allow a 6.35mm [$\frac{1}{4}$ "] hole to be drilled with 1mm [0.039"] clearance from the edge of the hole and the machined bearing recess. (Fig.11.)



NOTE : Take time and double check when taking your measurements, as bearing caps are custom fitted to the diff housing and cannot be replaced.

- Hold the bearing cap steady for drilling in a soft jawed vice clamp.

NOTE : Do not apply too much clamping pressure with the vice. The bearing cap may be damaged.

- Using a pedestal drill, drill a 6.35mm [$\frac{1}{4}$ "] hole through the bearing cap where the position has been marked.
- Deburr both ends of the drilled hole to remove any sharp edges.

4 Installing the Air Locker

4.6 Final Air Locker Assembly

- With the seal housing removed clean all parts of the differential assembly. It is very important to make sure the bearing journal is free from any contaminants (eg: water, dirt, metal fillings, etc.)
- Lubricate the O-rings with oil (prior to assembly), then insert them into the seal housing grooves.
- Place the bearing cups onto their respective bearing cones.
- Install the seal housing over the bearing journal by gently applying a downward twisting motion to allow the O-rings to gently engage.
- Spread the differential housing again (Refer to section 2.6).
- Assemble the shim pack over the seal housing tube and onto the seal housing spigot (Figure 10.).
- Point the seal housing tube **straight out** of the housing, hold the shims, seal housing and tapered roller bearing cups in place, and insert and hold the *Air Locker* into the differential housing.

NOTE : If the carrier is too difficult to install with the added shim pack then the spreader tension may need to be increased. Do not spread the housing more than 0.50mm [0.020"].

- Relieve all tension on the housing spreader.
- Install the bearing caps in their respective sides.

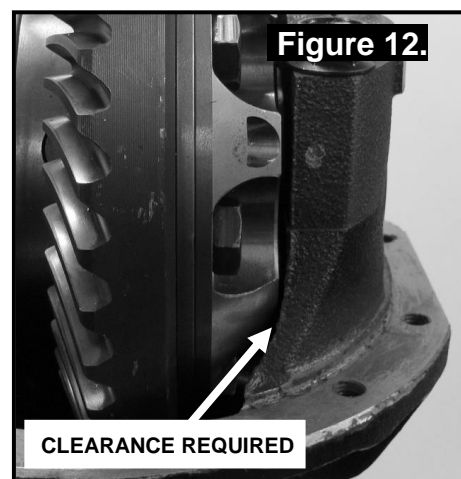
NOTE : When installing the bearing cap be careful not to damage the shims.

- Check to see if the bearing cap on the seal housing side fits over the tube without fouling and fits properly in place.
- Install all bearing cap bolts and torque to manufacturer's specs.

NOTE :

Check to ensure there is running clearance between the flange cap of the *Air Locker* and the differential housing (Fig.12.). If there is no clearance, the differential housing may need to be ground down slightly until some clearance exists.

NEVER MODIFY THE AIR LOCKER.



4 Installing the Air Locker

4.7 Final Backlash Checking

- Set a depth indicator on one of the ring gear teeth as in Figure 13.
- While supporting the pinion gear by holding the drive shaft, 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. If the backlash is not within the specifications then the differential will have to be removed and re-shimmed.

Figure 13.



4.7.1 Re-Shimming the Backlash

NOTE : This step is only necessary when adjusting for incorrect backlash.

- Reapply the spreader to the differential housing.
- Remove the bearing caps.
- Remove the differential.
- To increase the amount of backlash, reduce the shim thickness 'E' (Fig. 10.) and increase the shim thickness 'D' (Fig.6.) by the same amount. Reverse this step to decrease the backlash.
- Remount the differential as before.
- Release spreader tension.
- Check backlash again as before.

4 Installing the Air Locker

4.8 Profiling the Seal Housing Tube

Depending on the axle case material type, the seal housing tube is to be profiled differently. See examples below for suggested profiles that will suit your differential.

Cast Iron Axle Case

- Without using sharp, jagged tools such as pliers (usually your hands are the best tool for this job), bend the seal housing tube so that it closely follows the profile of the differential housing and protrudes through the bulkhead port in the differential housing (Fig.14. & 15.).



Figure 14.



Figure 15.

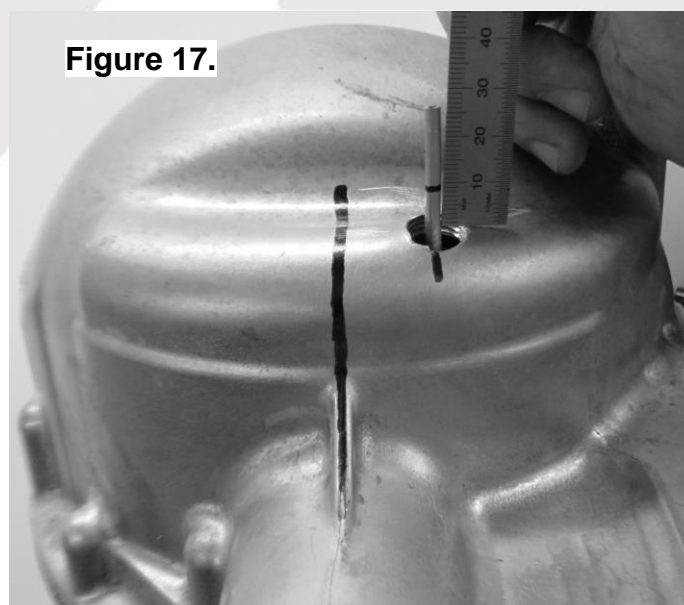
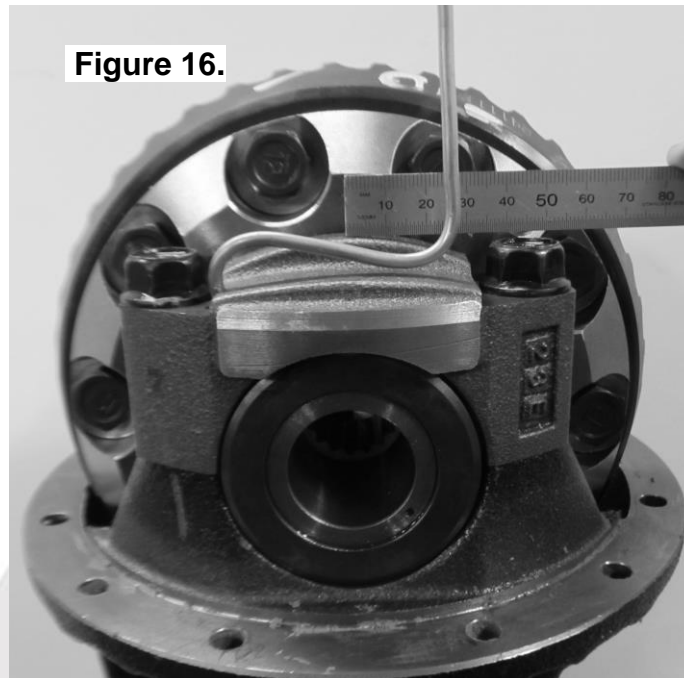
- NOTE :** It is also a good idea to keep the tube away from the bearing caps or any other part of the differential casting as any contact due to vibration or shock may wear the tube and eventually cause a leak.

- Check that the contour of the tube will not interfere with the *Air Locker* or the ring gear.

4 Installing the Air Locker

Aluminium Axle Case

- Without using sharp, jagged tools such as pliers (usually your hands are the best tool for this job), bend the seal housing tube at a right angle, immediately where it protrudes through the bearing housing, and then another sharp bend upwards, at approximately 25mm from the centre line (Fig. 16.).
- The tube can be adjusted more accurately by positioning the aluminium case in place (Fig. 17.).
- When the tube profile is finalized, apply gasket sealant on the sealing face of the axle case and finger tighten it to the differential housing.

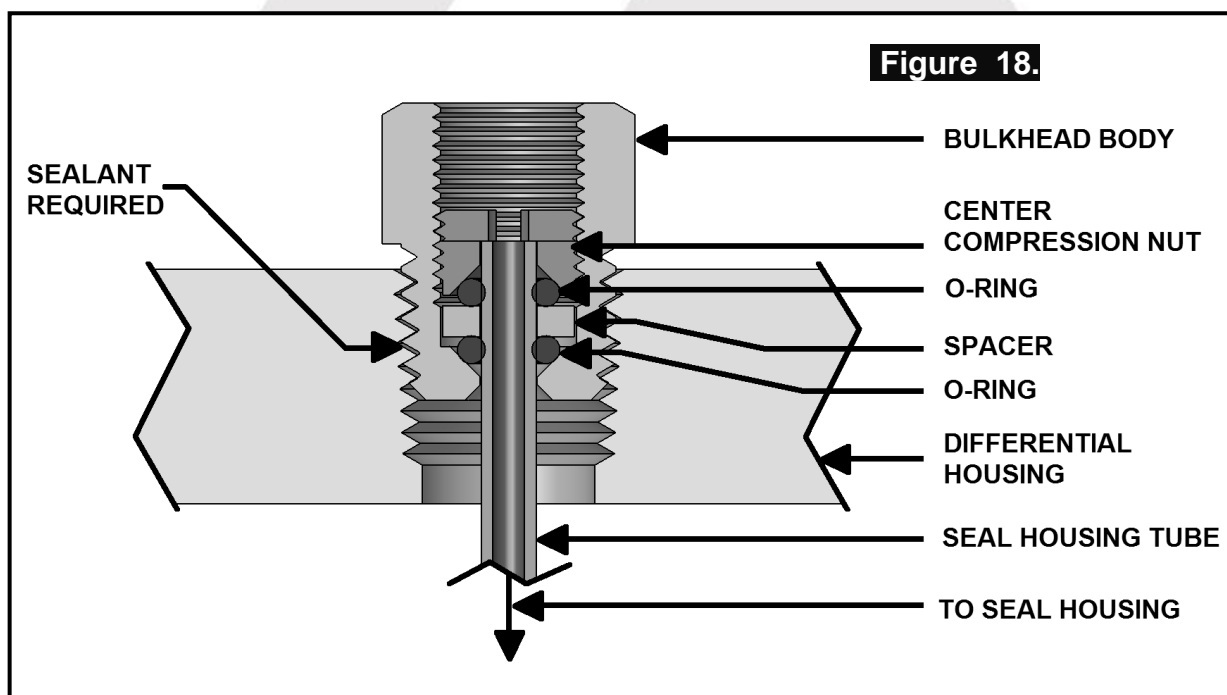


4 Installing the Air Locker

4.9 Setting up the Bulkhead Fitting

NOTE : Use an automotive brake line tubing cutter to cut the seal housing tube. Never use a hacksaw for trimming the steel tube as this will leave metal fillings in the air system.

- Apply thread sealant to the outside threads of the bulkhead body.
- Screw the bulkhead body into the tapped hole, and lightly tighten using a 14mm [9/16"] spanner.
- Wipe the area clean of any excess thread sealant (inside and outside of the housing).
- Insert the free end of the seal housing tube into the bulkhead fitting until it protrudes approximately 8mm [5/16"] through the other side.
- From the outside of the housing, assemble one of the small O-rings over the top of the short length of seal housing tube protruding through the bulkhead fitting.
- Install the brass spacer.
- Install the second small O-ring after the spacer.
- While holding the seal housing tube into the bulkhead fitting, insert the chamfered end of the center compression nut over the extended tube as shown in the assembly diagram (Fig. 18.), and screw it into the bulkhead body, and tighten using Pozidriv #3 screwdriver.



4 Installing the Air Locker

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

NOTE : Firmly tighten the center compression nut so that a good seal is formed around the tube.

- Again check that no part of the seal housing tube comes in contact with the moving differential components. Less than 8mm [5/16"] should be considered too little clearance. Gently bend the tube away from moving parts if necessary.

4.10 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. (ARB part # 0770005 shown in Fig.19.). Once 620 KPA [90 PSI] is reached close the valve, disconnect the air hose, and watch to see if there is any drop in pressure. If so, this will indicate an air leak.

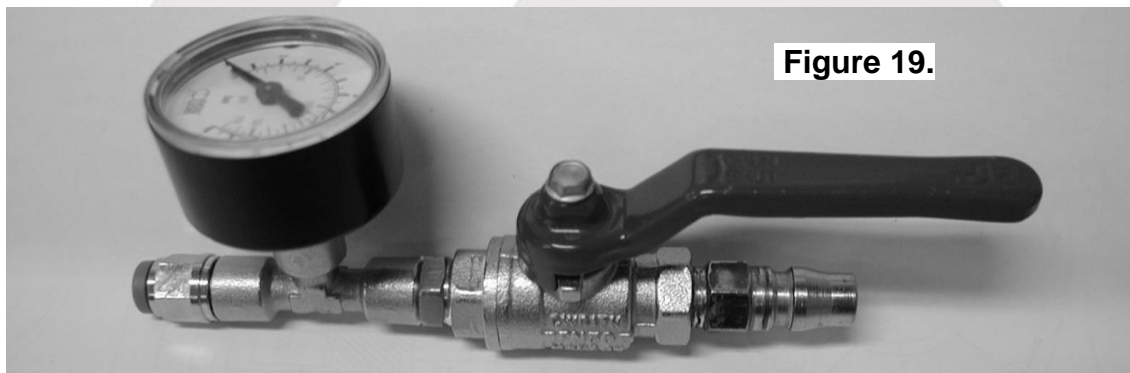


Figure 19.

- 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.

4 Installing the Air Locker

- 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.

4.11 Reinstalling the Axles

- Reinstall the differential housing into the axle case using gasket sealant where necessary.
- Reinstall the front axle assembly according to your vehicle manufacturer's service manual.

NOTE : Be careful not to damage the axle oil seals with the spline of the axle.

- Reconnect the drive shaft onto the flange of the differential.
- Reassemble the brakes and wheels to the vehicle according to your vehicle manufacturer's service manual.

5 Installing the Air System

5.1 Mounting the Solenoid

5.1.1 Connection to an ARB Air Compressor (Fig.20.)

- Remove one of the 1/8" BSP plugs from its port in the compressor tank.
- Apply Teflon paste to the 1/8" BSP nipple on the solenoid and insert it into the port and tighten. The solenoid should be rotated into a position which does not obstruct any other ports on the compressor tank.

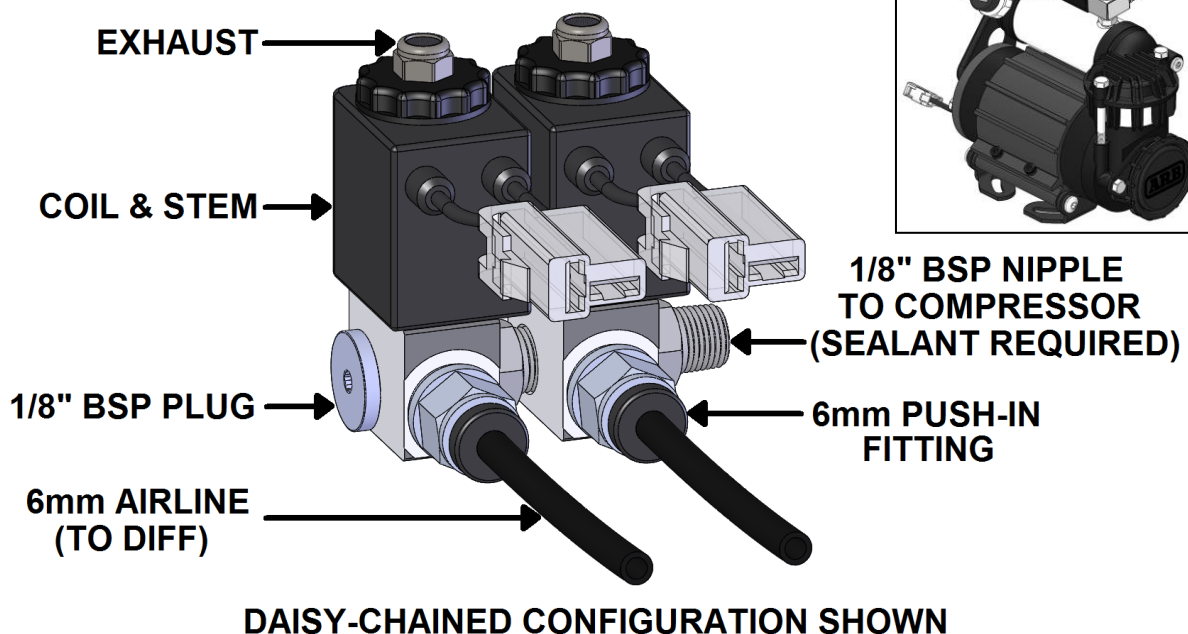
NOTE : The coil and stem of the solenoid can be removed to make installation easier.

NOTE : The solenoid is marked with two #1 ports. If space is tight, a second solenoid can be "daisy-chained" off the first one by removing the plug from the redundant #1 port and screwing the nipple from the second solenoid into it (Fig. 20.).

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.

- Assemble the 6mm push-in fitting into the solenoid outlet port (stamped "2") and hand tighten.

Figure 20.



5 Installing the Air System

5.1.2 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 Air source should have a tank capacity that 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 re-engage 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.

5 Installing the Air System

5.2 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.

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.**

5 Installing the Air System

5.3 Connection to the Bulkhead Fitting

- Trim the air line to length using a sharp knife.
- Assemble an aluminium washer onto the banjo bolt and insert through the banjo fitting. Assemble second aluminium washer and tighten into bulkhead fitting using a 14mm [9/16"] spanner. (Fig.21.)
- Apply thread sealant to the tapered thread of the compression fitting body and screw into the banjo fitting. Tighten using a 12mm spanner.
- Insert the outer compression nut and ferrule over the air line. Ferrule should be orientated as per Fig.21.

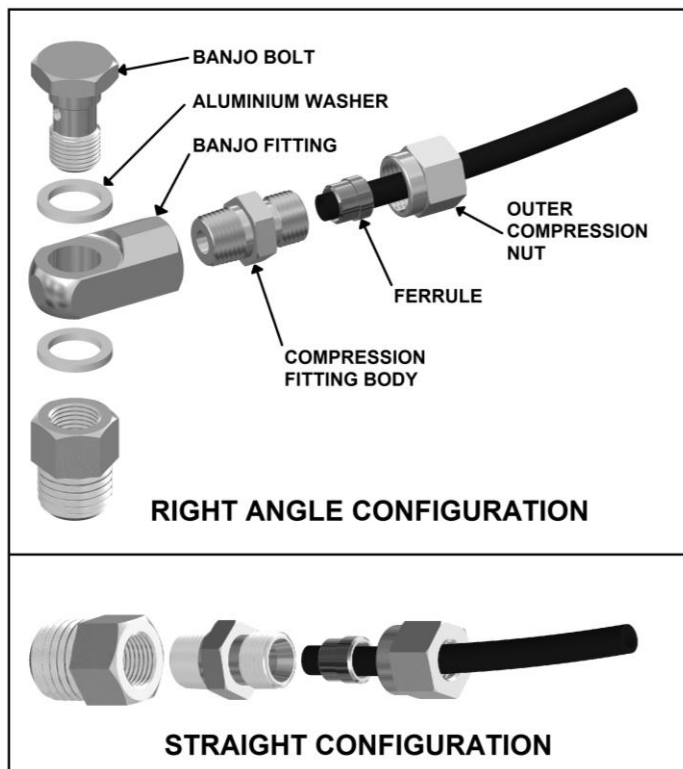


Figure 21.

- Push the airline into the compression fitting body and screw the outer nut down onto it. Using a 12mm spanner, tighten the outer nut onto the compression fitting body.

NOTE : Some force is required to crush the ferrule, however the outer compression nut will tighten against a stop. Over tightening will not create a better seal.

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

NOTE : When right angle routing of the tube is not required, screw the compression fitting body straight into the bulkhead fitting body (Fig.21.).

6 Mounting & Connecting the Electrical System

6.1 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.

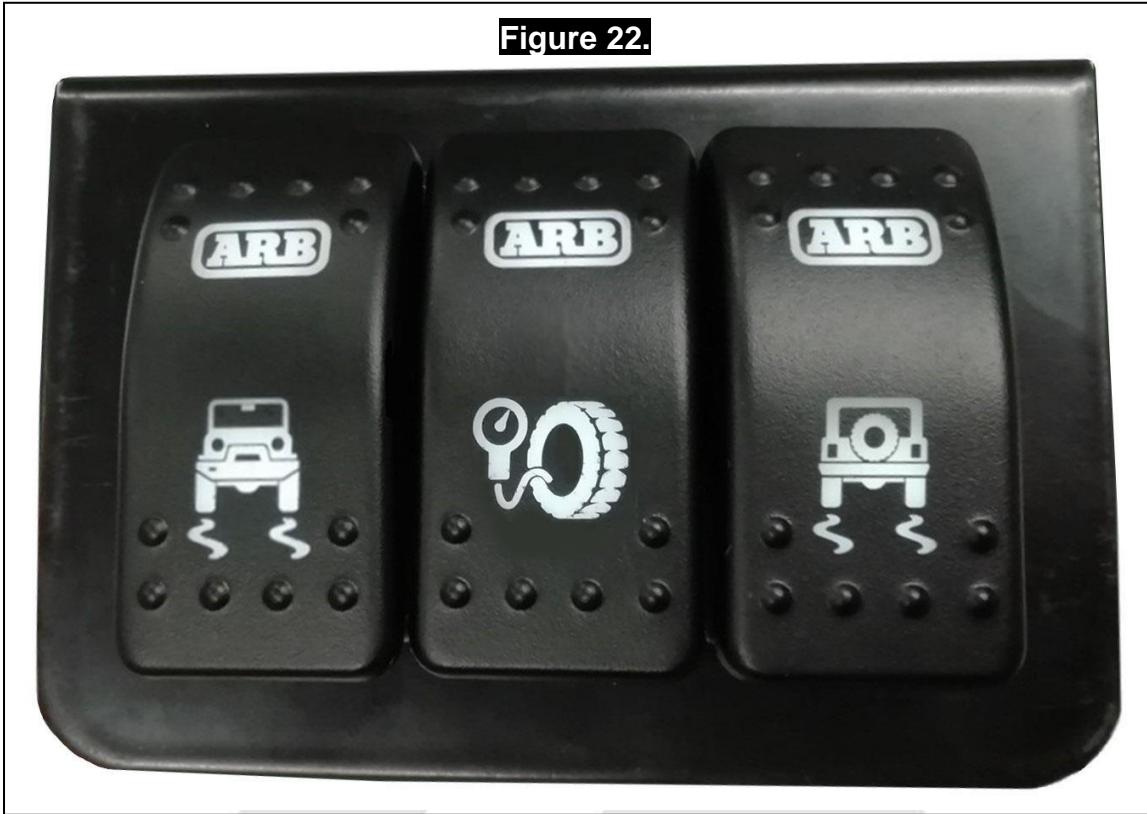
For reasons of safety and for ease of operation, the *Air Locker* actuator switch(es) should be mounted in a location picked to best suit the operator. Make sure you have taken the following points into consideration:

- 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.

6 Mounting & Connecting the Electrical System

NOTE : If no adequate position can be found on existing dashboard panels, a surface mounted bracket (Fig.22.) may be purchased from your ARB *Air Locker* distributor to suit 1, 2, or 3 switches.

Figure 22.



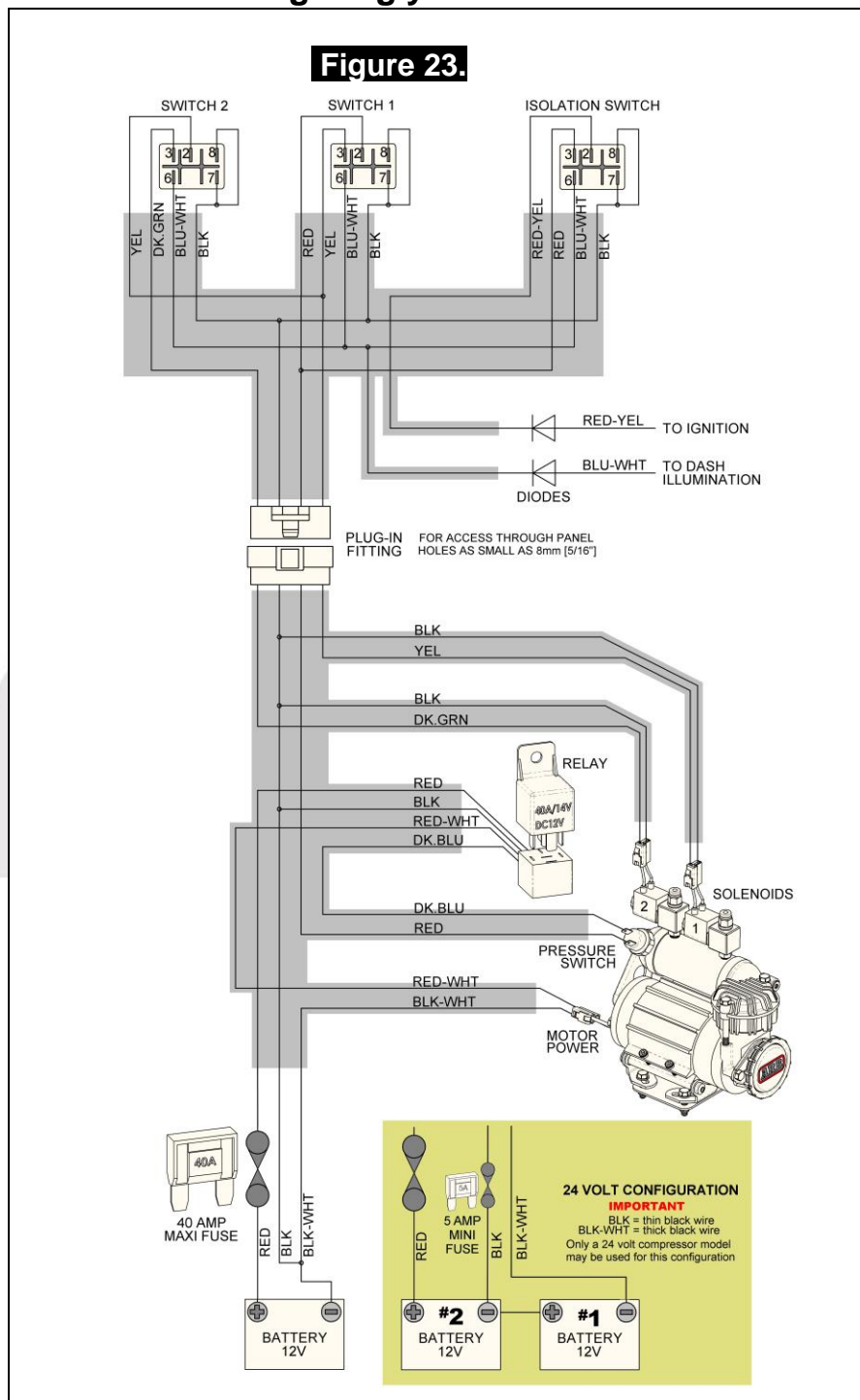
6 Mounting & Connecting the Electrical System

6.2 Wiring the Actuator System

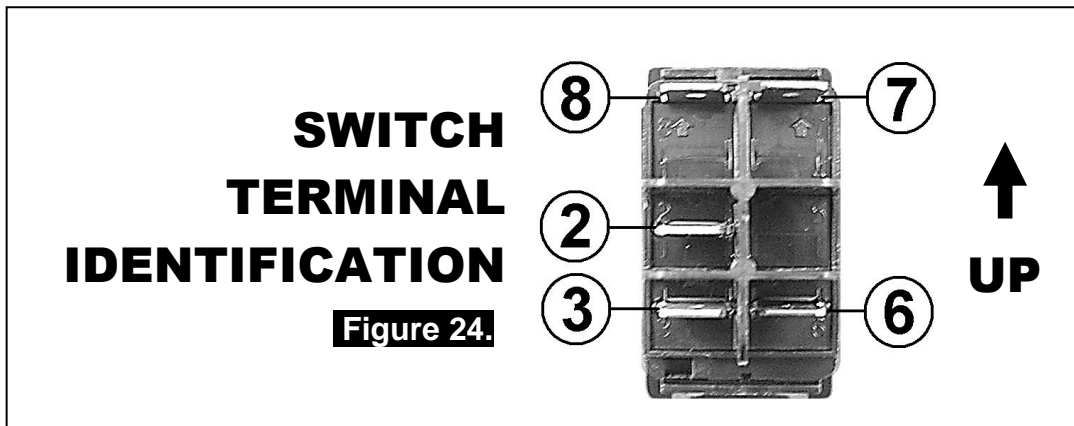
6.2.1 Connection to an ARB Air Compressor

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.23.)

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



6 Mounting & Connecting the Electrical System



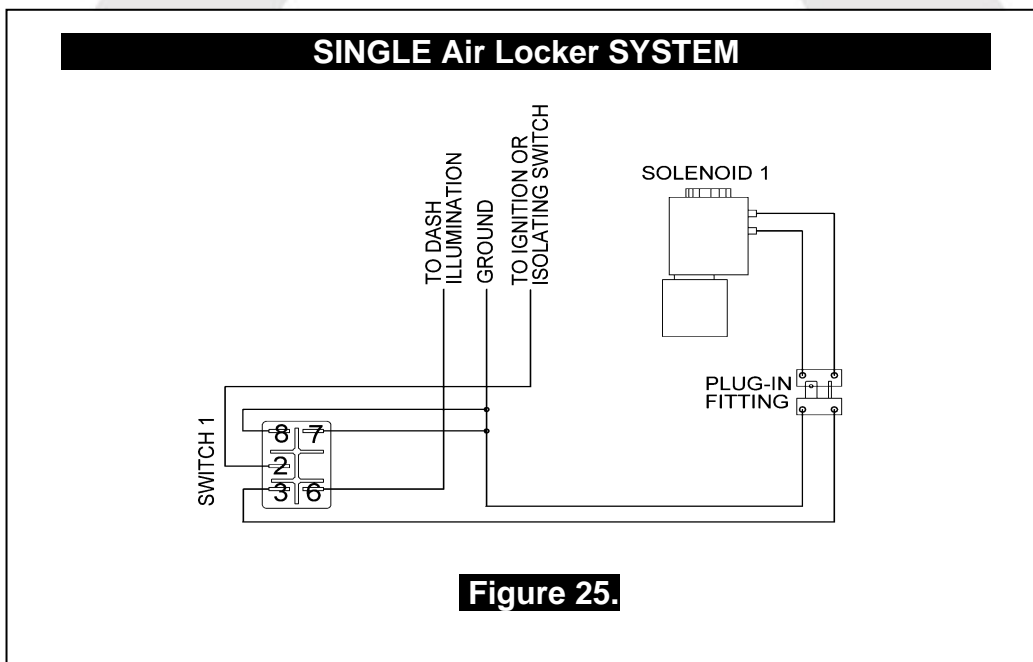
6.2.2 Connection to an Alternate Air Source

When connecting the actuation switch to an alternate air source, the switch(es) should be wired according to figures 25. and 26., depending on whether one or two *Air Lockers* will be installed in the vehicle.

6.2.2.1 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 25. 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 24. for the correct switch terminal identification and switch orientation.



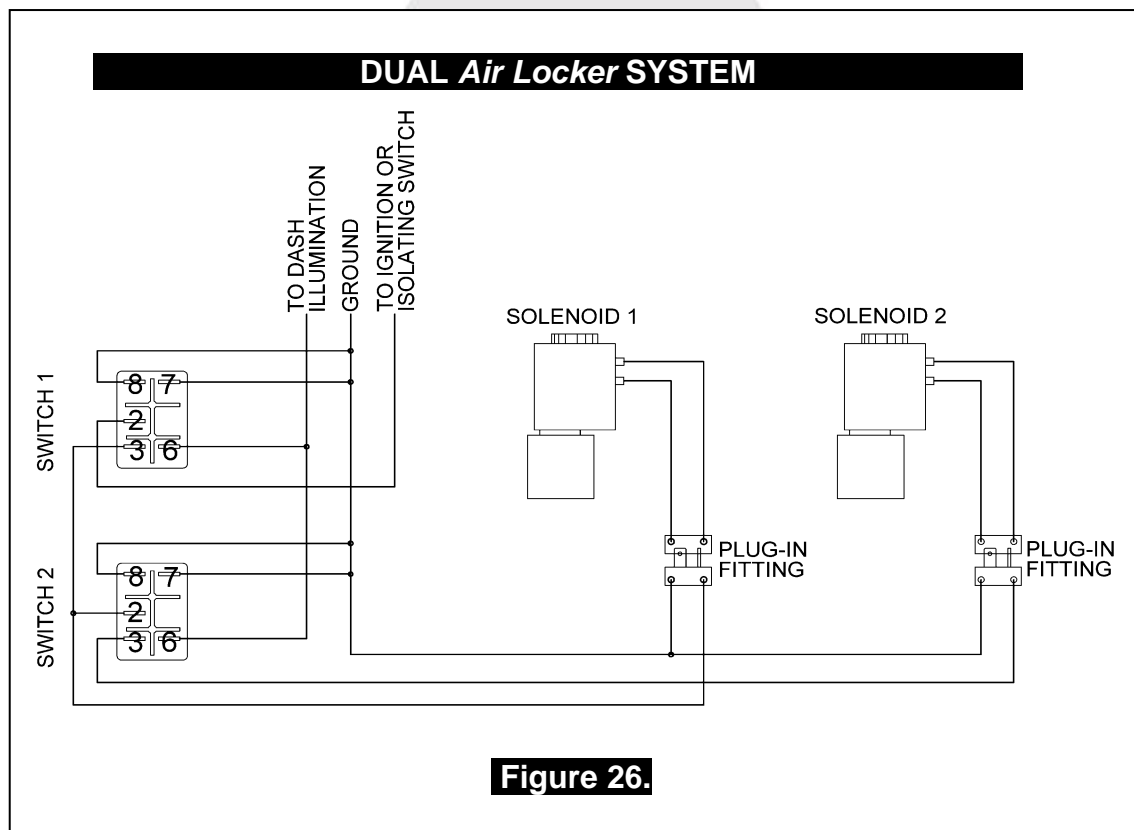
6 Mounting & Connecting the Electrical System

6.2.2.2 Dual Air Locker System

- If two *Air Lockers* are to be installed in the system, ARB recommends that the switches and solenoids be wired according to figure 26. 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 24. 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*.



7 Testing & Final Assembly

7.1 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.

- 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.

7 Testing & Final Assembly

7.2 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'.
- 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.

7.3 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.
- Replace filler plug (apply thread sealant to filler plug before inserting if it is a threaded type plug).
- Wipe differential housing clean of any oil or grease that may collect dirt or other abrasive particles.

7 Testing & Final Assembly

7.4 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: _____





8 Parts List

RD203

Isuzu IFS,17 SPL

8.1 Exploded Assembly Diagram

(See itemized parts list overleaf)

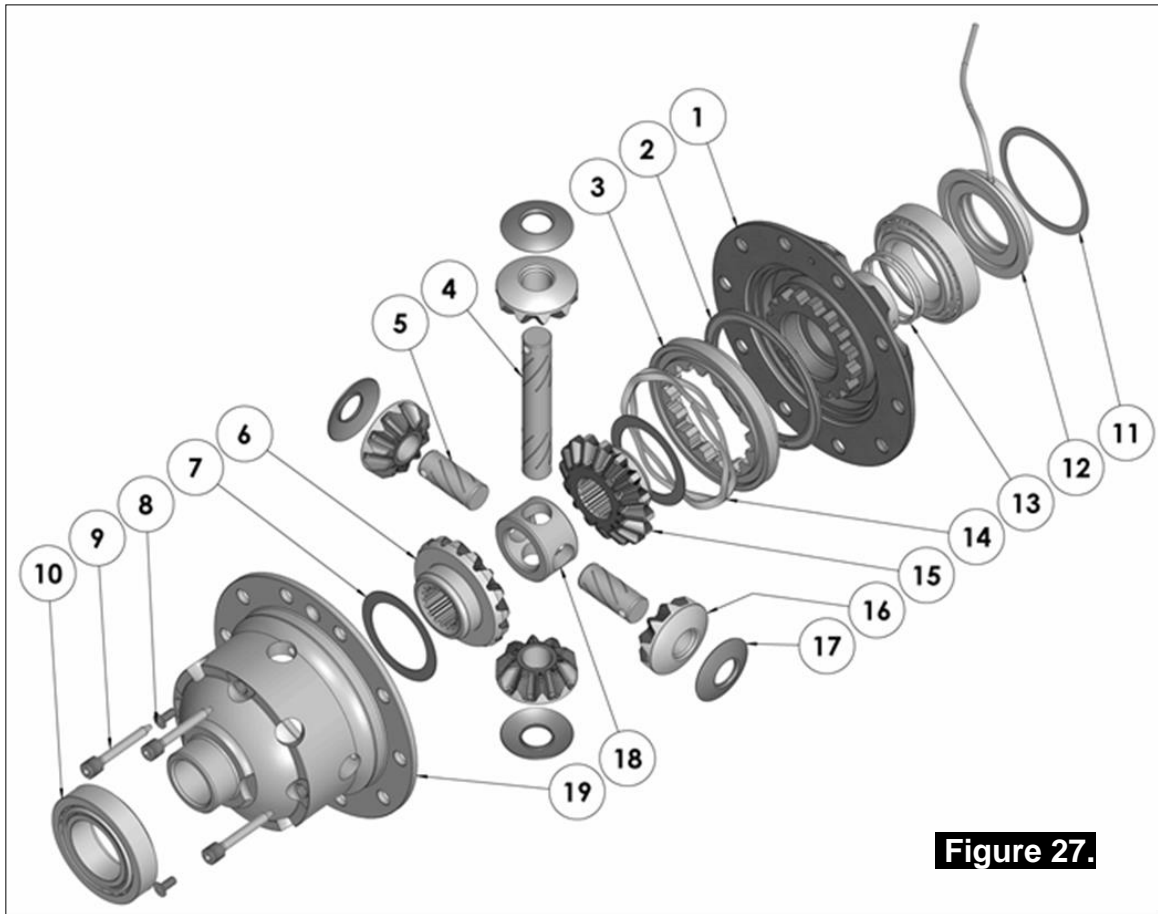


Figure 27.

8.2 Specifications

Axle Spline	17 tooth, Ø28.4mm [1.12"]
Ratio Supported	All
Ring Gear ID	121.9mm [4.80"]
Ring Gear Bolts	10 bolts on Ø144mm [5.67"]
Ring Gear Torque	107 Nm [79 ft-lb]
Backlash	0.15-0.20mm [0.006-0.008"]
Bearing Cap Torque	98 Nm [72 ft-lb]

8 Parts List

8.3 Itemized Parts List

(See exploded diagram figure 27.)

ITEM #	QTY	DESCRIPTION	PART #	NOTES
01	1	FLANGE CAP KIT	028510SP	
02	1	BONDED SEAL	160701SP	
03	1	CLUTCH GEAR & WAVESPRING KIT	050902SP	
04	1	LONG CROSS SHAFT	061302SP	
05	2	SHORT CROSS SHAFT	061402SP	
06	1	SIDE GEAR	SEE NOTE	2
07	2	SIDE GEAR THRUST WASHER	SEE NOTE	3
08	1	COUNTERSUNK SCREW (PK OF 2)	200213SP	
09	1	RETAINING PIN SET (PK OF 4)	120601SP	
10	-	TAPERED ROLLER BEARING	NOT SUPPLIED	
11	1	SHIM KIT	SHK003	
12	1	SEAL HOUSING KIT	081606SP	
13	1	SEAL HOUSING O-RINGS (PK OF 2)	160206-2	1
14	1	WAVESPRING	150702SP	
15	1	SPLINED SIDE GEAR	SEE NOTE	2
16	4	PINION GEAR	SEE NOTE	2
17	4	PINION THRUST WASHER	SEE NOTE	3
18	1	SPIDER BLOCK	070503SP	
19	1	DIFFERENTIAL CASE	013110SP	
*	1	BULKHEAD FITTING KIT (BANJO TYPE)	170114	4
*	1	AIR LINE (6mm DIA X 6m LONG)	170314SP	4
*	1	SOLENOID VALVE (12V)	180103	
*	1	SWITCH FR LOCKER	180223	
*	1	CABLE TIE (PK OF 25)	180305	
*	1	OPERATING & SERVICE MANUAL	210200	
*	1	INSTALLATION GUIDE	2102203	

* *Not illustrated in exploded view*

NOTES

- 1 For replacement O-rings, use only BS130 Viton 75.
- 2 Available only as complete 6 gear set # 728J071
- 3 Available only as complete thrust washer kit #730J01
- 4 All diffs produced before serial #17070001 came with 5mm air connection system.
For information contact ARB.

Part No. 2102203
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