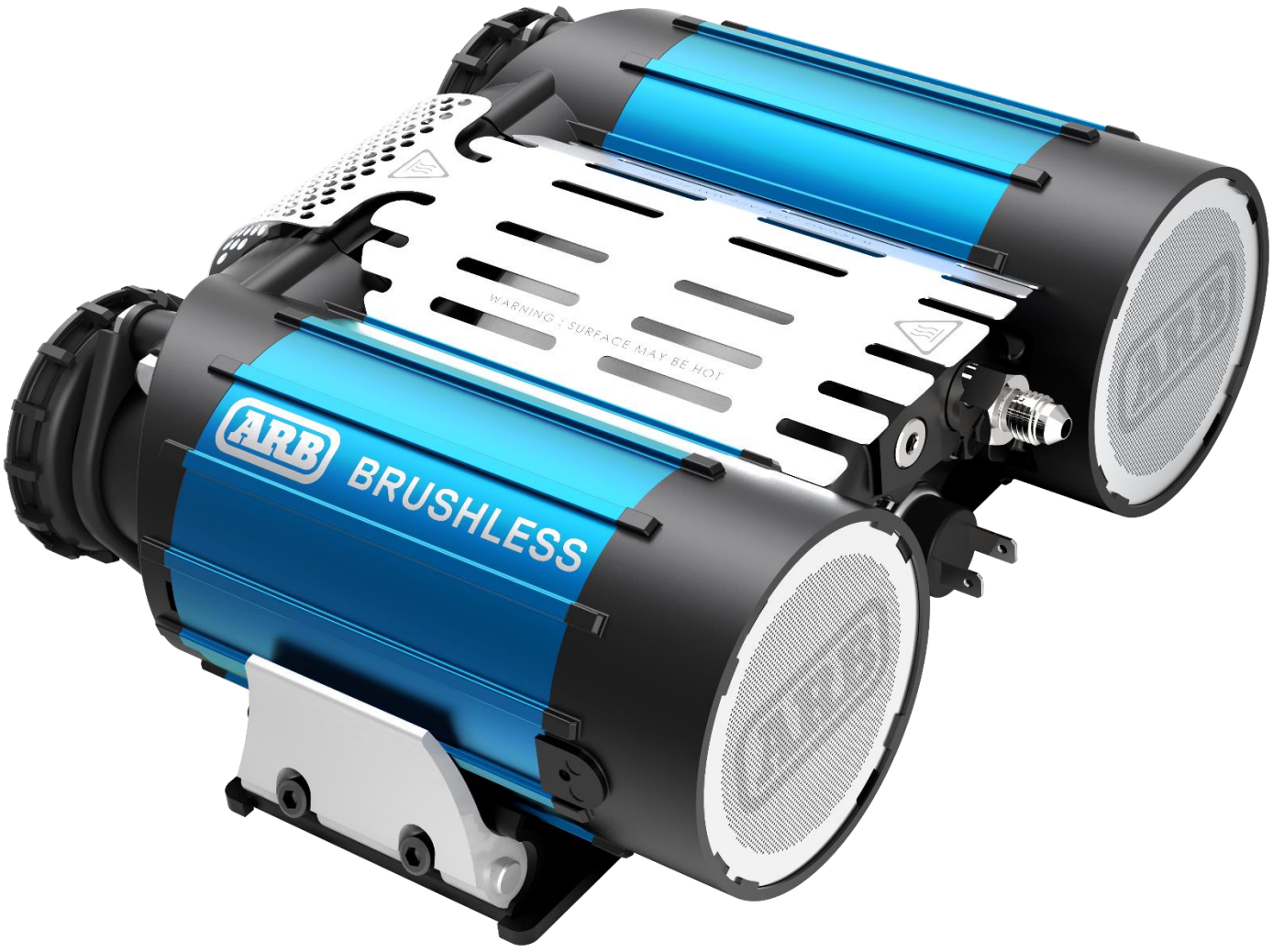
BRUSHLESS TWIN ON-BOARD

INSTALLATION GUIDE



CKBLTA12

Part No. 2102BLTA12
Revision Date 14/02/2025

EU DECLARATION OF CONFORMITY

1. This declaration relates to this product:

1.1 Product name	ARB Brushless Air Compressor
1.2 Model No.	CKBLA12, CKBLP12, CKBLTA12, CKBLTP12

2. Manufacturer

2.1 Company	ARB Corporation Limited
2.2 Address	42-44 Garden St, Kilsyth, Victoria, Australia

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

4.1 Directives	4.2 Applied Harmonized Standards
2014/30/EU	**EN 55014-1:2021**
	EN 55014-2:2021

5. The technical file for this product is kept at the manufacturer's address listed above.

6. Signed for and on behalf of: ARB Corporation Ltd

6.1 Signature	
6.2 Name	Lachlan McCann
6.3 Position	Chief Executive Officer
6.4 Place and date of issue	Kilsyth, December 2024

ARB 4x4 ACCESSORIES

Corporate Head Office

42-44 Garden St
Kilsyth, Victoria
AUSTRALIA
3137

Tel: +61 (3) 9761 6622

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

www.arb.com.au

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1 Introduction

IMPORTANT:

To ensure the highest level of planning and reliability goes into this installation, please read this guide in its entirety before attempting any modifications to the vehicle.

1.1 Pre-Installation Preparation

Although your *ARB Air Compressor* comes complete with all the step by step instructions you will need to install your new air source, ARB recommends that you have your ARB Air Compressor installed by a trained professional. Many ARB distributors around the world have been fully instructed in *Air Compressor* installations by ARB and have gained a wealth of experience and skill from years of performing similar installations.

Make sure your *Air Compressor* kit is the correct model for your application and that it contains all of the parts listed on the 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 minimize vehicle down time.

If installing the compressor together with ARB Air Locker(s) then any Air Locker specific installation notes will be provided herein highlighted in red. You can disregard all red highlighted content if no Air Lockers are being connected to your Air Compressor.

Please refer to your ARB Air Locker Operating & Service Manual for information on operating, servicing, driving technique, or trouble shooting your ARB Air Locker(s).

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!

1.2 Tool-Kit Recommendations

Below is a list of tools and supplies you may need to complete this installation.

1.2.1 Tools

- ☐ Standard automotive sized (metric and/or imperial) sockets, wrenches, Allen keys, and drills
- ☐ A razor knife to cut nylon tubing (if applicable)
- ☐ A multimeter
- ☐ A soldering iron
- ☐ Crimping pliers

1.2.2 Supplies

- ☐ Thread lubricant/sealant compound for pressure fittings (e.g. LOCTITE #567 Teflon paste and/or plumbing supply Teflon tape)
- ☐ A soap and water mixture to test for air leaks
- ☐ Solder and/or automotive crimp fittings for making electrical connections
- ☐ Electrical tape and/or heat shrink tubing for insulating electrical connections
- ☐ Extra cable ties or flexible conduit if required

2 Installing the Compressor

2.1 Identifying the Best Mounting Position

☐ Using the following points as a guideline, identify a position on the vehicle or inside the cabin where the compressor can be safely and conveniently mounted.

IMPORTANT:

The ideal mounting position of the compressor should consider all of the following points

1. The vehicle position of the compressor should allow connection to a power source that is capable sustaining a continuous 90 amp draw while maintaining a supply voltage of 12.5 volts or more (vehicle running).
2. The position should NOT expose the compressor to sources of heat such as close proximity to exhaust system components or directly behind the radiator, etc.
3. The position should be safe from damage or abrasion caused by sand or gravel from the road surface.
4. The position should avoid any extended exposure to direct sunlight.
5. The position should be away from excessive moisture (e.g., directly exposed to road spray or rain runoff).
6. Where possible, the position should be above the highest possible waterline to avoid submerging during water crossings.
7. The position must allow free flow of dry, cool air to the air filter assembly unless Air Filter Relocation Kits (ARB #171319) are to be used, in which case it is the filter assemblies and the extension tubes which must be located accordingly.
8. The position should allow access to the air filter assemblies for filter disassembly and cleaning unless Air Filter Relocation Kits (ARB #171319) are to be used.
9. The position should allow ventilation space around the cooling fans on the back of the motors. (i.e., min 50 mm [2”] between fan screen and any surface.)
10. If Air Filter Relocation Kits (ARB #171319) are to be used, then consideration should be given to the intake position so that the distance (length of tube) between the compressor mounting location and the actual air intake point can be kept to a minimum.
11. The position must allow the compressor motor mounting bracket to firmly secure the compressor using at least four bolts.
12. The position must allow access to the opposite side of the mounting location so that the fasteners and washers may be installed.

13. Parts of the compressor will get hot while running for long periods of time, and therefore the compressor should be located away from where it could be touched by children or pets.
14. The position should permit a short (i.e., close to the battery), protected and accessible route for the wiring harness to follow.
    LONGER POWER WIRES = MORE INLINE RESISTANCE = LESS AIR FLOW RATE
15. The compressor should not be mounted in a position where the running sound might be considered startling or irritating for vehicle occupants.
16. The compressor should not be mounted in close proximity to devices that are sensitive to the electromagnetic fields of DC motors (e.g., compasses, radio/GPS antennas, engine management sensors, etc.).
17. Never mount the compressor in a position where it would be considered un-sprung mass (e.g., mounted directly to the axle or the engine block).

2.2 Trial-Fitting the Air Compressor for the Best Fit

ARB's CKBLTA12 Twin Brushless Air Compressors are the smallest air compressors of their high output performance level available, but you will need to trial fit the target position on or inside the vehicle to establish the best final mounting position, provide best access to the output and intake ports, and look the most attractive once installed and wired.

HINT: **Spend some time experimenting with different positions before drilling the four mounting holes.**

☐ Open the cam-clamp **(A)**, then place the compressor into the clamp in the desired rotational position with the rigid edge of the mount bracket against one of the ribs of the compressor **(B)** as shown in Figure 1.

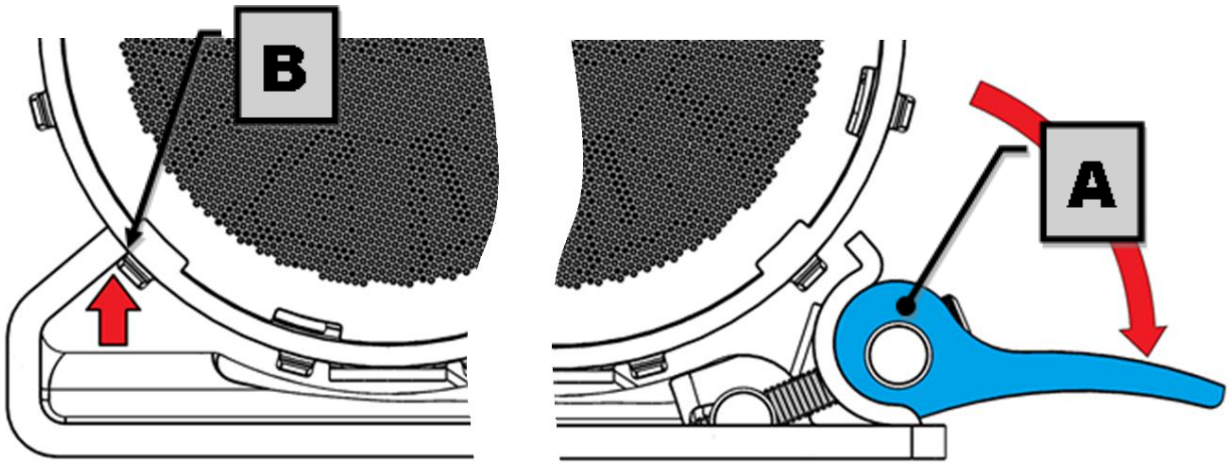


Figure 1. Compressor sitting in unlocked cam-clamp

NOTE: **The cam-clamp mounting bracket can be clamped onto the compressor with the cam-clamp on either side. Choose the side that offers the easiest access for clamping and un-clamping the compressor.**

2 Installing the Compressor

☐ The mount clamp **(A)** MUST be engaged into the base plate **(B)** as shown below, before tightening the cam.

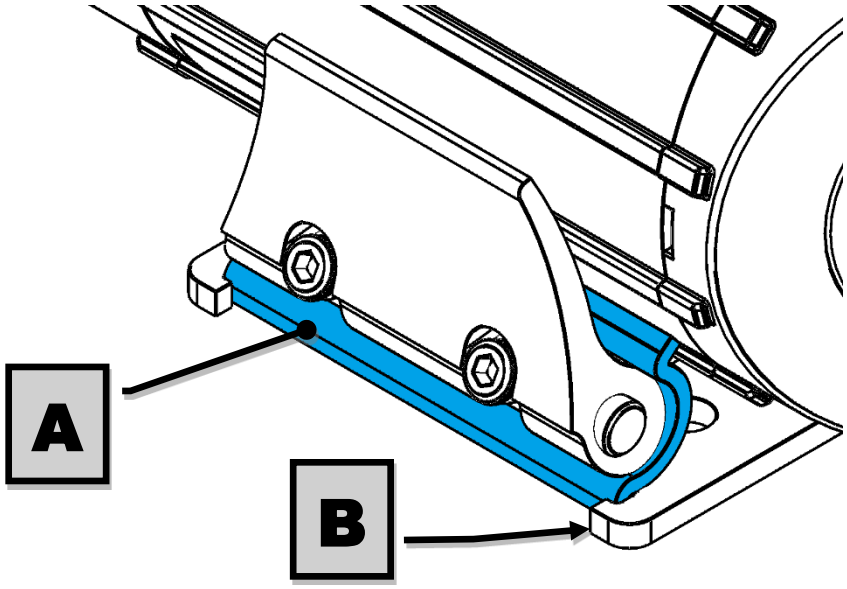


Figure 2. Correct clamp engagement with mount plate

☐ The cam-clamp **(A)** is able to grab the motor tube **(B)** anywhere along its length. This can help the position of the mounting bracket to better suit the position in the vehicle.

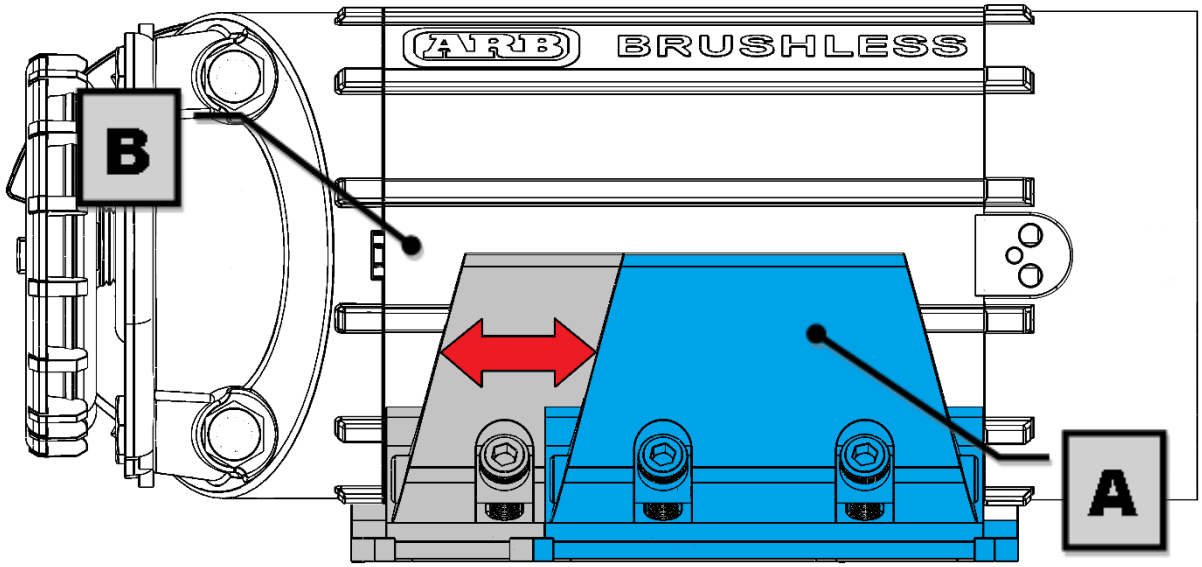


Figure 3. Sliding axis adjustment of mount

2 Installing the Compressor

☐ Close the cam clamp until the clamp touches the motor **(A)** to lock the compressor in place.

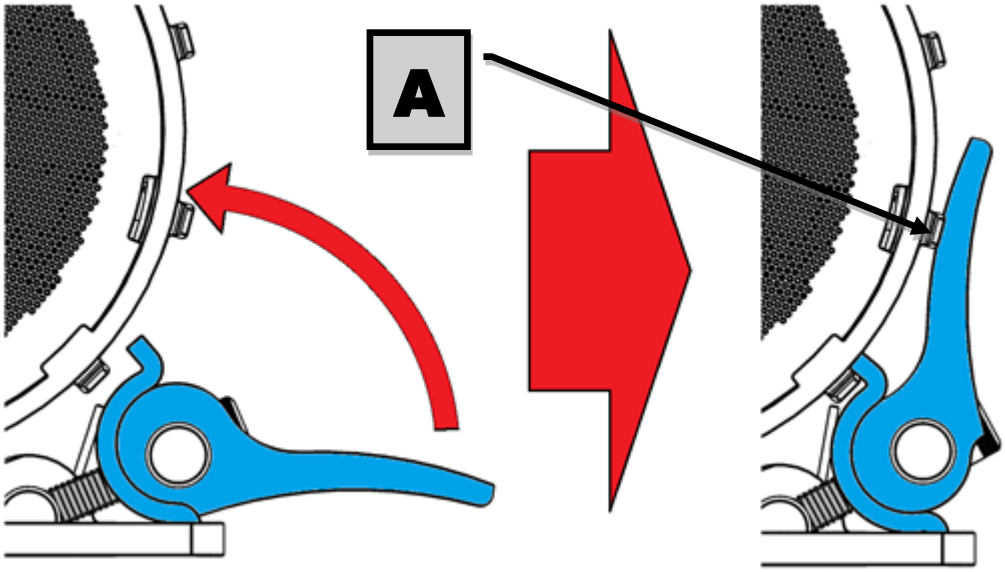


Figure 4. Securing the compressor with the cam-clamp

☐ To ensure enough clamping force for most applications, the cam-clamp **(A)** should be adjusted to be quite difficult to close the clamp fully by hand. Adequate clamping force to suit the application will need to be determined by the installer. If clamp force needs to be increased or decreased then this can be done by adjusting the two mount screws **(B)** using a 4 mm hex hey. Both screws should be equally tight.

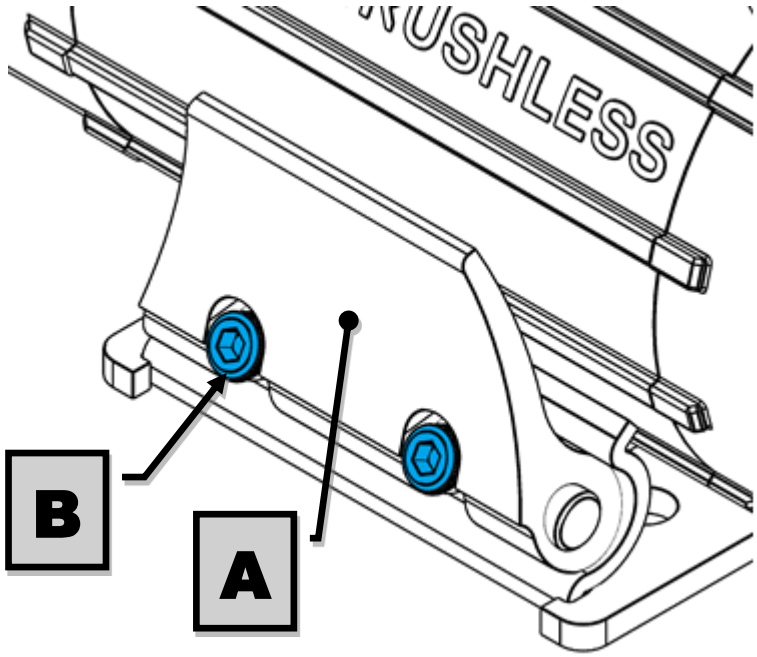


Figure 5. Adjusting the clamping force

2 Installing the Compressor

HINT: **Loosely fitting the pressure switch and output hose can help you to find the best possible configuration for a tight space.**

2.3 Drilling & Mounting the Compressor Mount Bracket

☐ With the configured compressor sitting in place in the vehicle's mounting location, use a pencil or marking pen to mark the desired position of the mounting bracket **(A)**.

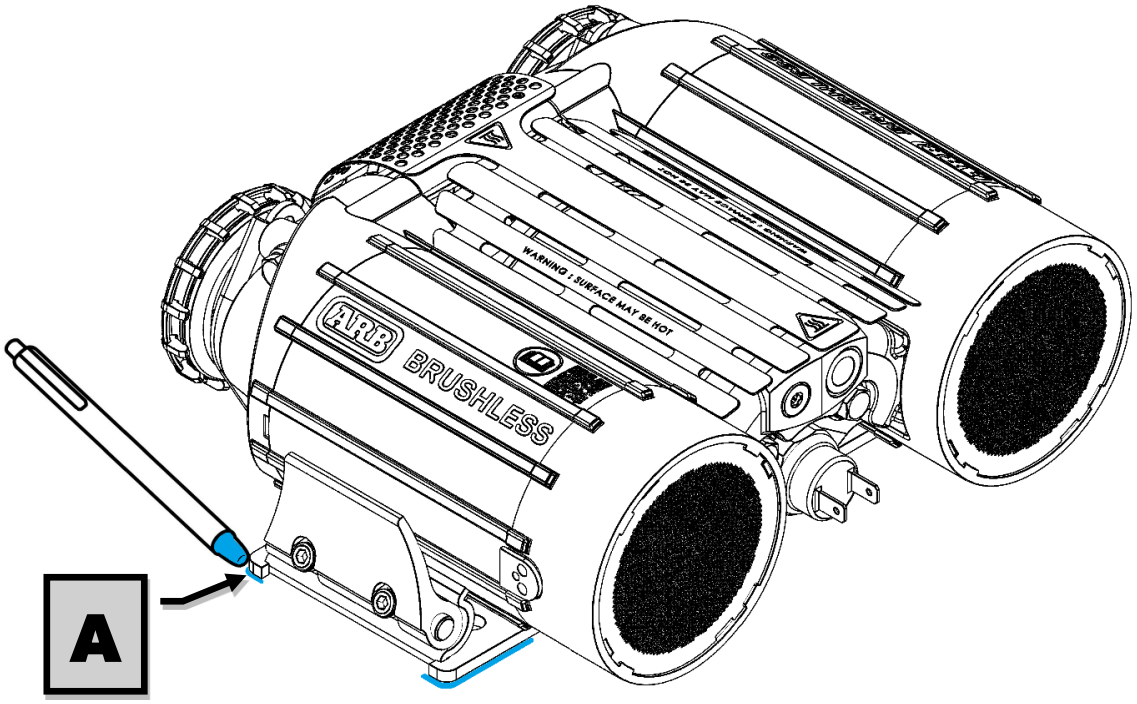
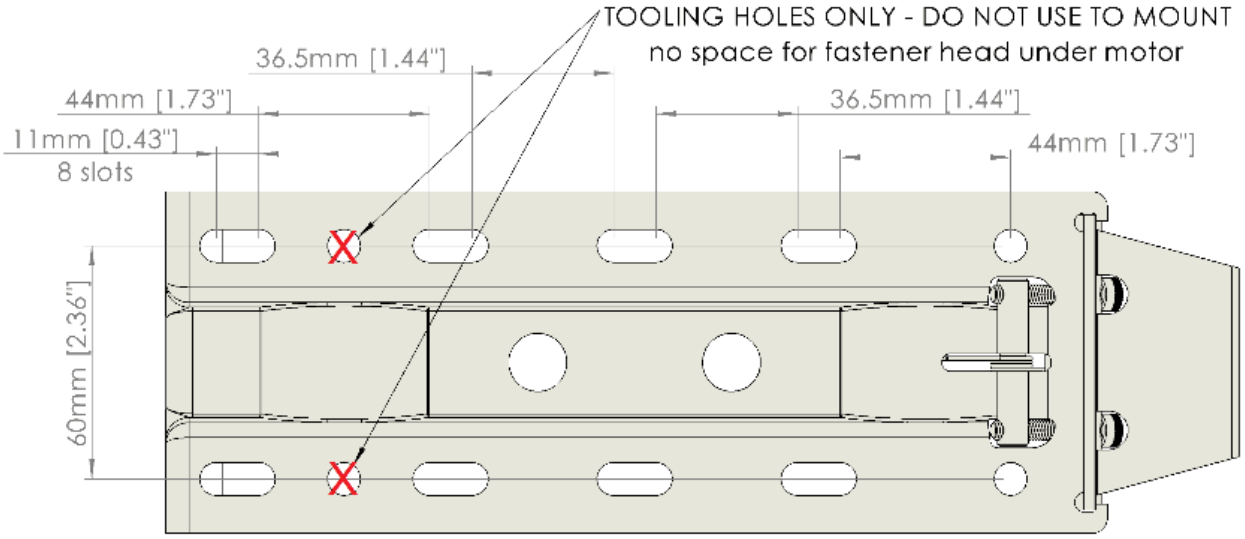


Figure 6. Marking the bracket position

☐ Remove the mounting bracket from the compressor and return only the bracket to its marked position in the car.

2 Installing the Compressor

☐ Assure that the opposite side of the mount location is clear to drill through, and that it supports the nuts and washers used for mounting, and also assure that it provides access to tightening them.



NOT TO SCALE
DO NOT USE AS A TEMPLATE

Figure 7. Mounting bracket hole pattern

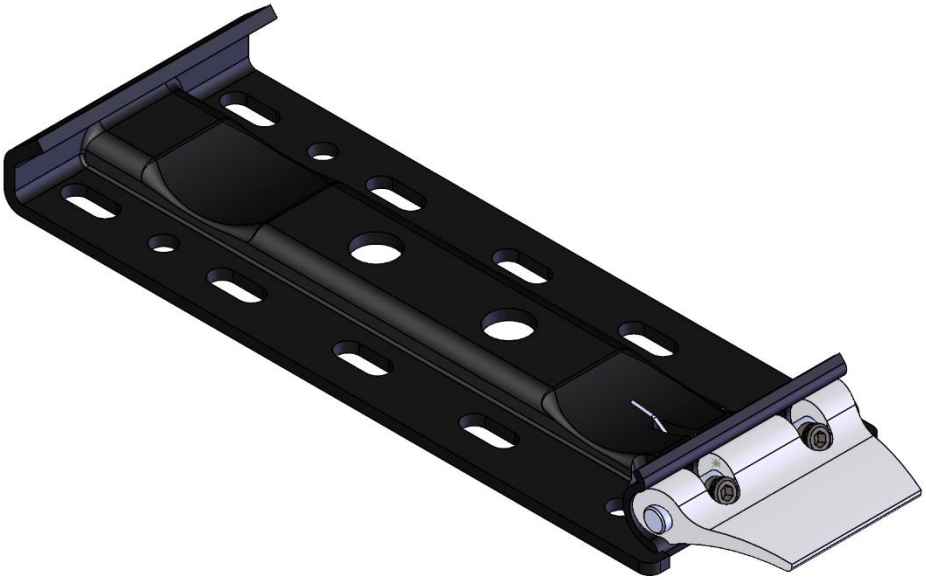


Figure 8. Mounting bracket hole pattern

☐ Using a Ø6.5 mm [1/4”] hand drill, drill through the holes/slots in the mounting bracket.

NOTE: At least 4 bolts M6 [14”] or bigger should be used in holes/slots spread as widely apart as possible to secure the mounting bracket to the vehicle.

2 Installing the Compressor

- ☐ Treat any bare metal edges with paint or grease to protect them from corrosion.
- ☐ Assemble the 4 x M6 hex bolts and washers (included) into the holes/slots of the mounting bracket and drilled holes.
- ☐ Install the locking nuts and washers (included) on the opposite side and using a 10 mm socket, tighten to a torque of approximately 6 Nm [4.4 ft-lb].

2.4 Installing the Pressure Switch

- ☐ Remove the plastic dust plug from one of the two ¼" NPT output ports **(A)** in the compressor manifold cap and discard it. Both ports are suitable for the pressure switch and the output hose, so choose the one that best suits the application.

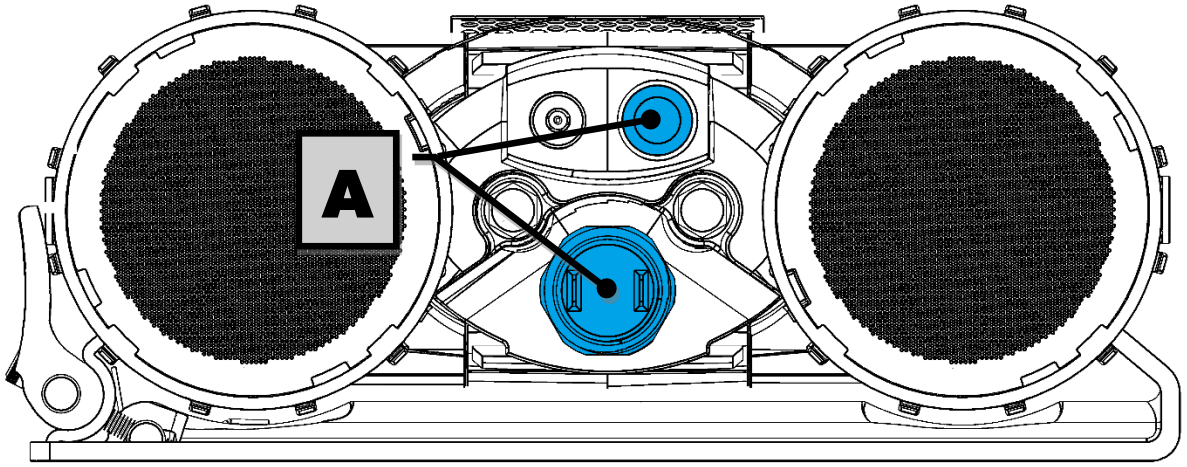


Figure 9. ¼ NPT ports used for pressure switch or output hose connection

- ☐ If the pressure switch has tapered threads (i.e., if it has no O-ring seal) then generously apply Teflon paste or tape to the threads of the pressure switch. Switches with O-ring seals do not require any additional sealant.
- ☐ Assemble the pressure switch (included) into the chosen port and tighten it with a wrench/spanner.

NOTE: **Pressure fittings <u>do not</u> require high torque to form a good airtight seal. Do not tighten any more than hand tight or damage to the manifold may occur. Add more Teflon paste or tape as required.**

2.5 Compressed Air Output Connections

NOTE: **This note applies to connected valves such as the 12V Air Locker solenoids and/or ARB pressure control valves, or hose couplings, etc. (not included)**

The CKBLTA12 Twin Brushless Compressor generates a lot of heat due to its high performance. Any connections made directly to the compressor must be high temperature tolerant and capable of withstanding up to 150°C [300°F].

Valves and hose couplings can be safely attached at external locations (e.g., after an air tank or manifold, or at the end of a length of high temperature hose that is greater than 1.2m [47”] in length).

The JIC-4 male connector (included) can be installed into the remaining ¼ NPT output port (Figure 9) next to the pressure switch.

ARB offers a high temperature external manifold kit for easily making such connections. (171503).

Figure 10. ARB External Manifold Kit (171503)

2.6 Assembling / Installing the Air Filters

☐ The air filter assemblies are to be screwed into the threaded holes in the front of the compressor by hand only. These are already pre-assembled.

NOTE: **If intake extension tubes are to be used to relocate the air intakes then the extension tubes will be screwed into the front of the compressor, and the air filters will then be screwed into the extension tubes (See section 2.7).**

HINT: **If extra tightening force is required, an air filter can be tightened by disassembling the cover, removing the filter disk, and using an 8 mm [5/16”] hex key on the center of the port.**

☐ The air filter cover logos may be rotated by hand as desired.

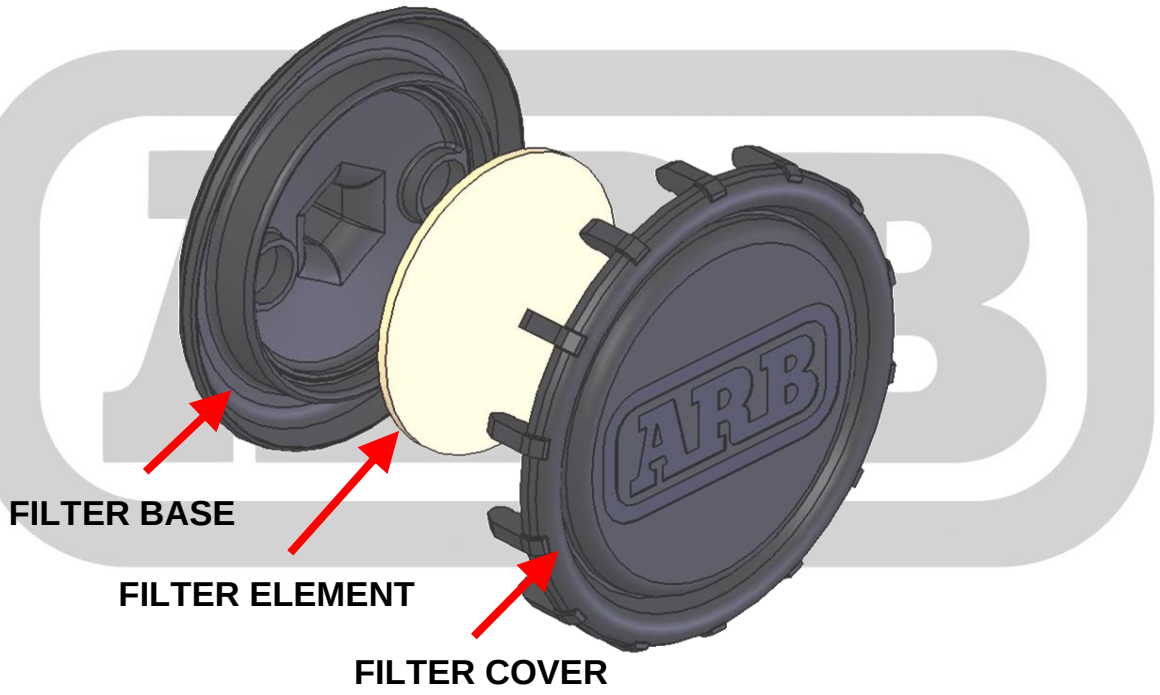


Figure 11. ARB Air Filter Assembly (320501)

2.7 Using Air Filter Extension Tubes (Optional)

The air filters of the CKBLTA12 were designed so that they could be relocated to a more suitable location (if required) using extension tubes.

IMPORTANT:

Using an incorrect length of extension tube to match the inside diameter of the extension tube can restrict the intake flow and negatively affect the performance of the air compressor. In severe cases this could result in overheating and/or damage to compressor components. Use the following chart to make sure that the extension tube will not restrict the intake flow.

Maximum Length of Each Tube		Minimum Inside Diameter of Each Tube
150 mm [5.9”]	=	Ø8 mm [0.32”]
400 mm [15.7”]	=	Ø10 mm [0.39”]
885 mm [34.8”]	=	Ø12 mm [0.47”]
1715 mm [67.5”]	=	Ø14 mm [0.55”]
3065 mm [120.7”]	=	Ø16 mm [0.63”]

NOTE : There is no minimum length or maximum inside diameter for extension tubes.

☐ Measure the intended length of the extension tubes along the path between the compressor mounting location to where the air filters will be mounted and consult the chart above for the recommended minimum inside diameter of the tubes to use.

NOTE: **Running the compressor intake tubes through areas of elevated temperatures will pre-heat the intake air and reduce compressor performance.**

☐ Assemble an extension tube with a ¼” NPT male fitting at one end and a ¼” NPT female on the other. (1.2 m [4’] kit is available as ARB PN 171319)

☐ Install the tubes in line with the air filter.

NOTE: **If the extension tubes are being used due to the possibility of the compressor being exposed to water then Teflon tape or thread sealant should be used on the threads of the tubes at the compressor end.**

☐ Secure loose sections of the tube and the air filter.

HINT: **The air filter assembly may be easily panel mounted if desired by securing the air filter base using the two bosses for countersunk screws located inside the filter base.**

Figure 12. ARB air filter relocation kit (171319)

3 Connecting the Air System

3.1 Running and Securing the Air Line to the Axle

IMPORTANT:

The path taken by the air line from the compressor to the Air Locker is unique to each vehicle and the desired position of the compressor. Plan ahead carefully when running the air line and always follow these guidelines:

NOTE: **The flexible 6 mm air line described here is supplied with each Air Locker kit and NOT with this ARB air compressor kit. If you require air line to complete this installation then contact your ARB Air Locker distributor.**

- ☐ 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. (Not necessary on IFS installations)
- ☐ 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 the flexible brake lines will account for axle travel and should help keep the air 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 air line does not contact sharp edges or abrasive surfaces that may damage the tubing over time.
- ☐ Do not run the air line around tight bends which may kink the tubing and restrict or block the air flow.
- ☐ Keep the air line well away from the 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 or using unusually large diameter hose, etc., will increase drain on the compressor resulting in the compressor running more often than needed.
- ☐ Support and secure the air line by tying it back with cable ties wherever possible (e.g., at least every 40 cm [15 inches] along the harness).
- ☐ At the solenoid end of the air line, always trim the line to length with a sharp knife to avoid distorting the tube where it plugs into the push-in fitting.
- ☐ 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; push the air line into the fitting as far as possible, then press the flange inward, then pull the air line free of the fitting.**

3.2 Connection to the Air Locker Bulkhead Fitting

- ☐ In the case of an IFS axle assembly or in the case that the axle assembly has been completely removed from the vehicle, the assembly will have to be remounted in order to position the bulkhead fitting in its correct location for air line access.
- ☐ 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 14 mm [9/16”] spanner. (Fig.11.)
- ☐ Apply thread sealant to the tapered thread of the compression fitting body and screw into the banjo fitting. Tighten using a 12 mm spanner.
- ☐ Insert the outer compression nut and ferrule over the air line. Ferrule should be oriented as per Figure 13.

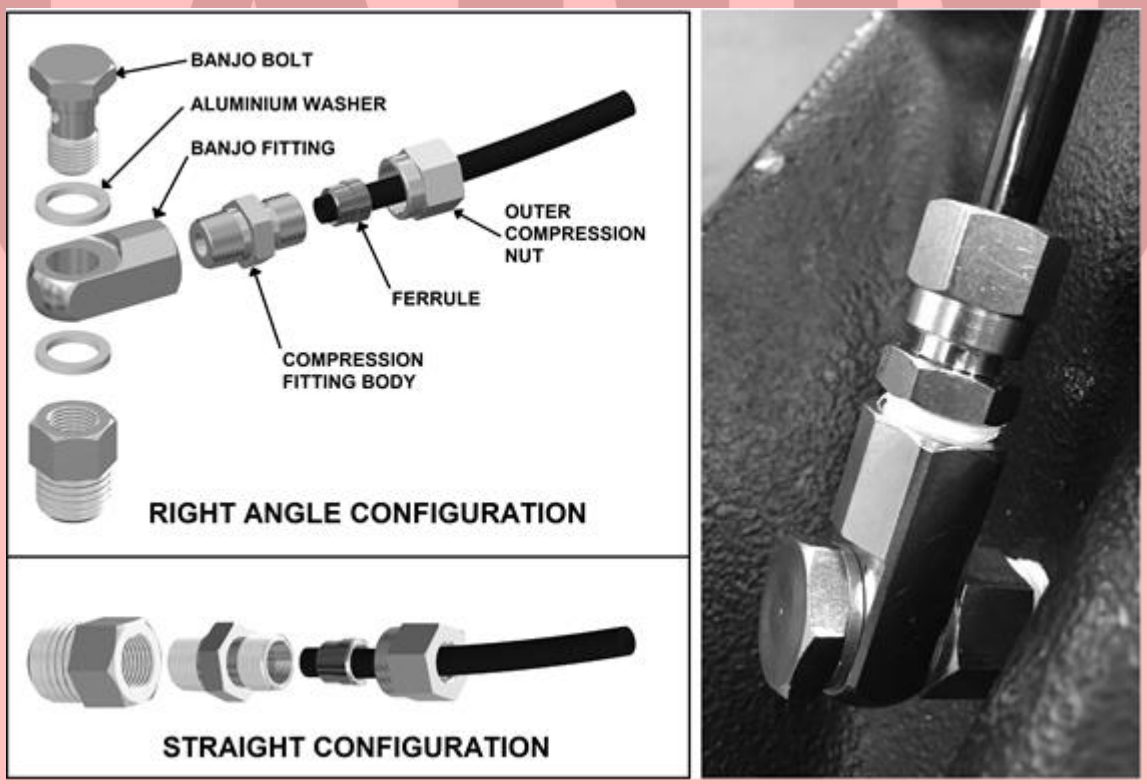


Figure 13. Air Locker bulkhead fitting assembly (170114)

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

3 Connecting the Air System

NOTE: **Some force is required to crush the ferrule, however, the outer compression nut will tighten against a stop. Overtightening this 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 (Figure 13).**

4 Mounting and Connecting the Electrical System

4.1 Mounting the Actuator Switch(es)

ARB dashboard switch(es) can be panel mounted inside the vehicle in a 21.2 x 37.0 mm [0.83” x 1.46”] rectangular cutout in a plastic or metal panel in the vehicle’s interior.

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 harness during vehicle use.
- ☐ Switch(es) should be within easy reach of the driver. Ideally, any 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 50 mm [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).

NOTE: **If no adequate position can be found on existing dashboard panels, a range of surface mounted brackets (Figure 14) may be purchased from your ARB distributor to suit 1, 2, or 3 switches.**

Figure 14. 3 gang switch bracket

4 Mounting and Connecting the Electrical System

NOTE: **Air Locker actuator switches described here are supplied with each ARB Air Locker kit and NOT with the ARB compressor kit. If you require switches to complete the installation then contact your ARB Air Locker distributor.**

NOTE: **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.**

4.2 Wiring the Actuator System

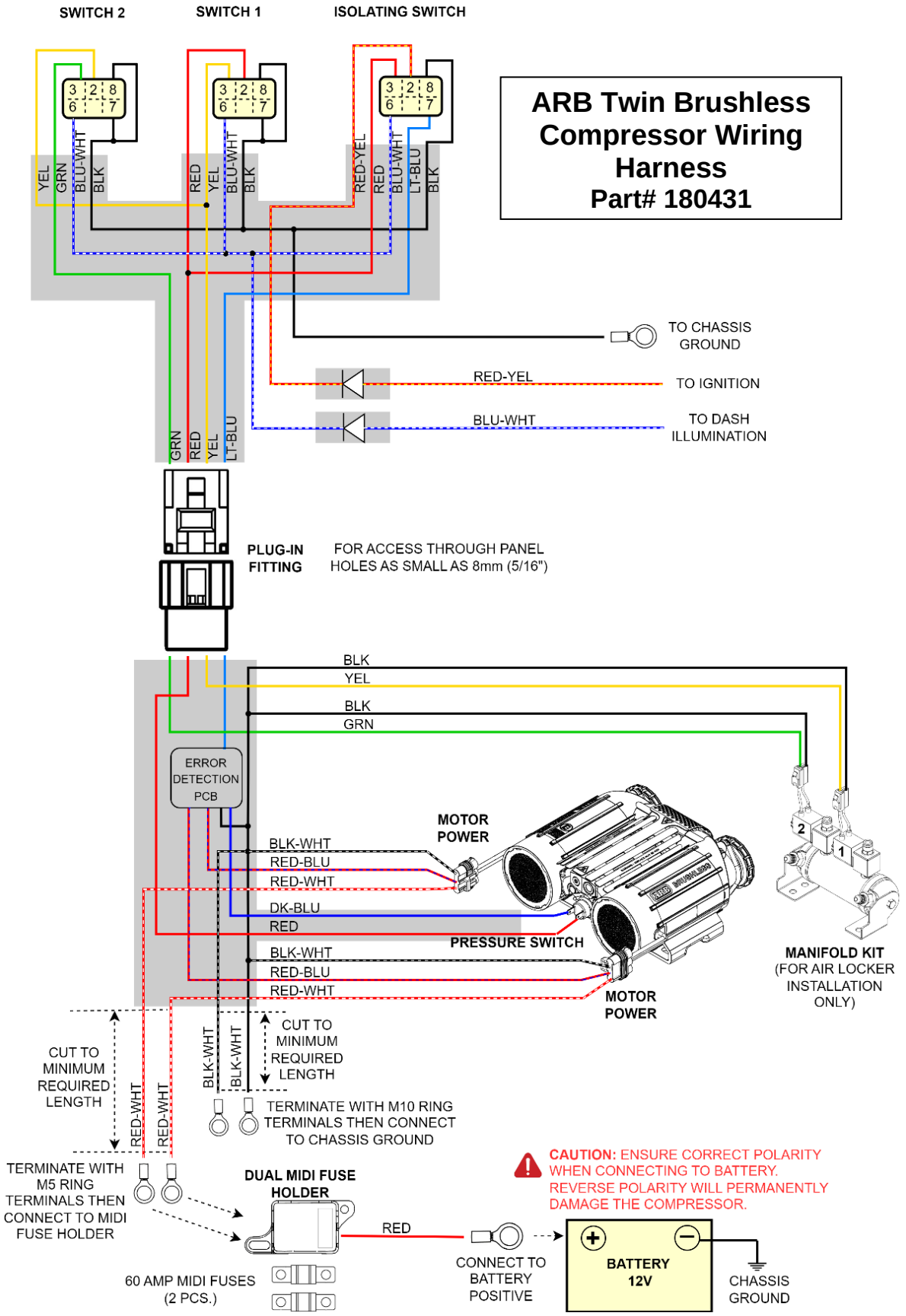


Figure 15. CKBLTA12 Air Compressor wiring diagram (180431)

4 Mounting and Connecting the Electrical System

When connecting an *ARB Air Compressor* isolating switch (included), pressure switch (included), and optional *ARB Air Locker* actuator switch(es) and *ARB Air Locker* solenoid(s) to an *ARB Air Compressor*, all connections can easily be set up using only the supplied wiring harness (**ARB Part # 180431**)

☐ Consulting the wiring diagram (Fig. 13.) for wire colours, and the switch terminal illustration (Fig. 14.), plug each of the female spade terminals onto their appropriate switch terminal.

IMPORTANT:

As a safety precaution, the 'SWITCH 2' position in the wiring harness will not activate unless 'SWITCH 1' is already activated. Therefore, if both front and rear Air Lockers are installed, then the rear MUST be controlled by 'SWITCH 1', and the front by 'SWITCH 2'. This is a safety feature that serves to reduce the risk of accidental / unintended engagement of the front Air Locker.

If only one Air Locker is installed, then it should be wired using the terminals for 'SWITCH 1', regardless of whether it is mounted in the front or rear axle.

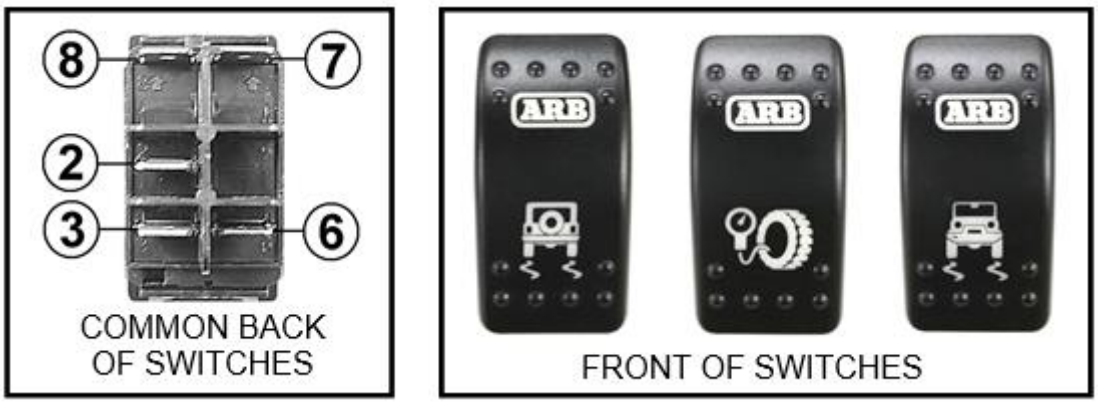


Figure 16. Switch terminal designations

☐ Using a multimeter or an automotive test light, locate an accessory outlet of 'cigarette lighter port' in the vehicle.

NOTE: **The desired outlet should supply positive 12VDC, be fused at a minimum of 8 amps, and be live only when the vehicle ignition key is in either the 'ACC' position or in the 'ON' position.**

☐ Using a soldering iron or automotive quality crimp connector, splice the red wire with a yellow stripe (RED-YEL) found on the separate short section of harness onto the positive wire of the accessory outlet pair.

4 Mounting and Connecting the Electrical System

NOTE: **If shortening the RED-YEL wire, make sure not to remove the heat shrinked inline diode that protects sensitive electronics from current leakage.**

- ☐ Insulate the junction area well with electrical tape.
- ☐ Using a multimeter or an automotive test light, locate an active dash light supply wire.

NOTE: **The desired wire should supply 12 VDC (less if dimmed) and react to the illumination level of the instrumentation / dash light dimmer.**

- ☐ Using a soldering iron or automotive quality crimp connector, splice the blue wire with a white stripe (BLU-WHT) found on the separate short section of harness onto the active illumination supply wire.

NOTE: **If shortening the BLU-WHT wire, make sure not to remove the heat shrinked inline diode that protects sensitive electronics from current leakage.**

- ☐ Insulate the junction area well with electrical tape.
- ☐ Route the four loose male spade terminals of the long section of harness through any panel work that separates the compressor mount position from the switches (e.g. the firewall separating the cabin from the engine compartment).

NOTE: **This connection has been supplied disassembled to assist in the routing of the compressor harness through a minimum 8 mm [5/16'] drilled hole in panels if necessary (e.g. through the firewall).**

NOTE: **If routing through a drilled hole in steel panels, then a rubber insulating grommet should ALWAYS be used to protect the harness.**

- ☐ Assemble the four spade connectors into the supplied plastic connector housing so that each wire colour matches up with the same colour on the matching connector housing of the short harness section when the two halves of the connector are plugged together.
- ☐ Route the remainder of the harness to the compressor mounting position.
- ☐ Plug the two female spade terminals onto the two compressor pressure switch terminals.
- ☐ Connect the motor power terminal of the harness to the motor lead.
- ☐ Plug the female solenoid connector with a yellow wire (YEL) into the solenoid to be controlled by SWITCH 1.
- ☐ Plug the female solenoid connector with a green wire (GRN) into the solenoid to be controlled by SWITCH 2.

NOTE: **If no second solenoid is to be used, then simply secure the remaining solenoid connector onto the harness with a cable tie.**

4.3 Connecting the Positive Power Supply Wires (RED)

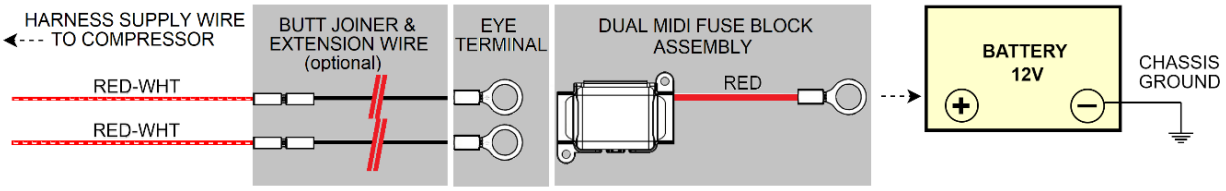


Figure 17. Power supply extension wires

- ☐ Connect the dual-60 A MIDI fuse block assembly (supplied) to the positive (+) battery terminal using the pre-installed eye terminal of the fuse block assembly.

NOTE: **For protection against shorts, the inline fuse block should <u>always</u> be located as close to the battery connection as possible.**

- ☐ Carefully route the two supply wires (RED) from the compressor mount position to the fuse block position using the least possible length of wire along the path.
- ☐ Trim or extend the RED positive wires to the correct length for connection to the fuse block assembly.

IMPORTANT:

Connecting a brushless compressor to any power supply using incorrect polarity will cause immediate and extensive damage to the compressor's brushless motor, so please follow the power connection instructions carefully.

IMPORTANT:

Never connect the power to the compressor while the vehicle key is in the ACC position, as this may result in accidental compressor start-up.

NOTE: **If the power supply wires require extra length to reach the battery, then splice in an extension using ONLY wire that is of a suitable gauge according to the table below.**

NOTE: **Only ever lengthen the positive power supply wires on the opposite side of the fuse from the battery.**

4 Mounting and Connecting the Electrical System

OPTION 1: Adding the wire length below to each of the two existing 2.0 m [79”] of RED 10AWG wire of the supplied harness kit		
Maximum Length of Intended Additional Power Wire Extension		**Smallest Copper Section Area [Gauge] Of Wire To Be Used For The Extension**
Up to 1 m [39”]	=	5 mm² [10 AWG]
Up to 3 m [118”]	=	8 mm² [8 AWG]
Up to 7 m [276”]	=	13 mm² [6 AWG]
OPTION 2: Trimming / removing all of the existing 2.0 m [79”] of RED 10AWG wires of the supplied harness and replacing each with the length of heavier gauge wire below		
Maximum Length of Intended Power Wire Extension		**Smallest Copper Section Area [Gauge] Of Wire To Be Used For The Extension**
Up to 6 m [236”]	=	8 mm² [8 AWG]
Up to 10 m [394”]	=	13 mm² [6 AWG]
There is no minimum length or maximum wire size for extension wires.		
Only join extension wires using suitable butt joiners or solder/heat shrink joining methods.		
For air compressors mounted in the rear of the vehicle and connected to front mounted batteries ARB recommends extension using the 6AWG Rear Power Harness kit (Part# 180441).		

- ☐ Crimp one yellow eye terminal (supplied) onto free end of both of the positive supply wires.

NOTE: **A heavier gauge of eye terminal (not supplied) will be required to terminate extension wires that are larger than Ø6mm [10AWG].**

- ☐ Connect one of the supply wires to each of the two free terminals of the fuse holder by securing the eye terminal under the nut of the fuse clamping bolts.
- ☐ Secure any positive power supply wiring with cable ties along its entire path. Vibration can cause wear to wire insulation over time, which could result in a dangerous electrical short. Where necessary, protect the supply wiring with flexible conduit.

4.4 Connecting the Negative Ground Wires (BLK)

- ☐ ARB Brushless Air Compressors are body grounded. When an effective body ground is made then the inline resistance should be very low and the ground wires do not need to reach all of the way to the battery terminal.
- ☐ Locate a body ground position (e.g., an M6 or M8 bolt that fastens into the body or the chassis of the vehicle) which is close enough to the compressor to make a connection with the two heavy ground leads (BLK-WHT) of the wiring harness.
- ☐ Trim the ground wires (BLK-WHT) of any extra length not needed to reach the body ground position.
- ☐ Using crimping pliers, terminate one of the yellow Ø8 mm eye terminals (supplied) onto each of the ground wires.

5 Testing and Troubleshooting

NOTE: **Do not crimp both ground wires into the same eye terminal as this will not suit the current handling of just one terminal.**

☐ Tightly secure both of the eye terminals to the body ground position.

5.1 Understanding the Built-In Protection Devices

An air compressor can be a complex tool, dependent upon maintaining safe levels of temperature, supply current, and air pressures. This compressor has been equipped with active protection devices in the interests of personal safety and to protect the unit from unnecessary internal damage.

NOTE: **Never disable or modify any of the compressor's built-in protection devices.**

5.1.1 Over Pressure Safety Valve

This compressor is equipped with a pressure operated electric switch which has been factory set to turn off the compressor at a safe level of pressure, and then turn it back on again once the pressure has been exhausted down to a lower level. Should this switch fail for any reason the compressor is capable of producing pressure well beyond its safe shut off limit.

A compressor which has reached its safe pressure maximum that has been left in direct sun or inside a hot vehicle may build up additional pressure past the safe working level.

Connecting your compressor up to any air system which might already contain a residual pressure that is higher than the compressor's safe pressure limit may raise the internal pressure of the compressor past the safe pressure limit.

This compressor is equipped with a mechanical over pressure safety valve which has been factory set to bleed off to atmosphere any excessive pressure build up (i.e., from any of the situations above) before it can pose any personal danger or cause damage to compressor components.

5.1.2 Electronic Thermal Protection

The process of compressing air is a natural generator of heat. This heat generation is increased accordingly by compressing air at a high flow rate or by increasing the pressure level of the air flow (i.e., filling at a high pressure).

The large brushless electronic speed controllers inside the CKBLTA12 compressor are also a source of heat which increases with the amount of work being done by them.

The CKBLTA12 compressor is equipped with dual brushless cooling fans pushing hot air out through a connected system of heat ducts, and in this way it has been designed to naturally disperse this heat into the air around it. However, obstructed ventilation or increased ambient temperature outside will

have a negative effect on the cooling air, and therefore affect the rate at which this heat can be dispersed.

If excessive levels of heat are allowed to build up inside the compressor, the unit may be put at risk of internal damage. For this reason this CKBLTA12 is electronically thermally protected. When excessive levels of heat are detected in any of multiple zones within the compressor, it will attempt to reduce heat generation by intentionally slowing down the compressor's run speed. If the lowest effective run speed still cannot mitigate high temperature related damage then it will simply turn the compressor off until the temperature returns to a safe temperature level. This off-time may last anywhere from just a few minutes up to half an hour depending on conditions around the compressor. The cooling fans will continue to run during this off-time.

Any motor that has stopped due to a fault condition will show a series of blinks/flashes of the isolation switch, and also play an audible series of beeps.

Once stopped, the motor will remain in this blink/flash/beep state until the isolation switch is cycled OFF/ON where it will again attempt to run at full speed.

The number of blinks/flashes/beeps pertains to a code, the meaning of which can be identified in Section 5.1.4 (System Fault Codes).

5.1.3 Electronic Overload Protection

The CKBLTA12 Air Compressor was designed to run on 12 volts of power at 90 amps of continuous draw. Connecting the compressor to power sources that cannot supply 90 amps at 12 volts may result in voltages being pulled down or amperages increasing beyond the safe level of 90 A (45 A per motor).

NOTE: **To reduce wear on the motors and your vehicle's charging system, one motor on the CKBLTA12 has an intentional staggered start. The secondary motor will wait for the primary motor to get up to speed before starting.**

If the compressor is allowed to continue to run at low voltage or at high amperage then eventually damage will be done to the motors or wiring, or one of the motors may suffer a stall when trying to start up. For this reason this CKBLTA12 is electronically overload protected. When excessive loads are detected then it will attempt to reduce amp draw on the power source by intentionally slowing down the compressor's run speed. If the lowest effective run speed still cannot bring amp draw under control then it will turn off just one of the two motors, allowing itself to run as a single compressor, to see if that reduces the load on the power source enough to get the amps and volts to within acceptable levels. If the power source still cannot support running as a single compressor then it will simply turn the remaining motor off.

Any motor that has stopped due to a fault condition will show a series of blinks/flashes of the isolation switch, and also play an audible series of beeps.

Once stopped the motor will remain in this state until the isolation switch is cycled OFF/ON where it will again attempt to run at full speed.

The number of blinks/flashes/beeps pertains to a code which can be identified in Section 5.1.4 (System Fault Codes).

5.1.4 System Fault Codes

When an ARB Brushless Air Compressor stops running for any reason other than the preset pressure being achieved, the motor should communicate the reason for the stop using a sequence of 'beeps' produced within the motor. The same sequence will also be visible in the flashing of the illumination of the dashboard Air Compressor switch.

Below is the fault indicated by each sequence:

NUMBER OF BEEPS	SYSTEM FAULT CODE	POSSIBLE CAUSE(s) OF FAULT
1	Electronic speed controller is over temperature	Ambient temperature too high / cooling system blockage / cooling fan fault / too little ventilation around compressor
2	Compressor head is over temperature	Ambient temperature too high / cooling system blockage / cooling fan fault / too little ventilation around compressor
3	Compressor stalled or failed to start-up	Mechanical fault prohibiting rotation / blockage or fluid in compression chamber
4	Power supply is under voltage (V)	High resistance in power supply wiring / insufficient power supply (battery/alternator) / poor body ground
5	Power supply is over voltage (V)	Vehicle charging system fault / incorrect body grounding
6	Current draw (A) is too high to continue	Supply voltage is too low / output pressure too high (blow-off valve fault) / mechanical fault
7	Motor position hall sensor fault	Magnetic disturbance / circuit board fault
8	Compressor free run time limit	Compressor was running free for too long so an air system failure was suspected and compressor stopped
NOTE : All fault stoppages can be reset by turning the switch OFF then ON again.		

Figure 18. Fault Codes

5 Testing and Troubleshooting

5.2 Leak Testing

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

NOTE: **Without using any air, the air compressor should not have to recharge the air system over time. Intermittent recharging without air use generally indicates a leak somewhere in the air system hoses/fittings.**

- ☐ The compressor should not come on again for a period of at least 15 minutes. Air system recharging within that time period would indicate that a leak is present in the system.
- ☐ 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 point.
- ☐ Check that leaky fittings have been adequately tightened.
- ☐ If leaking persists, disassemble fittings, clean threads, and reapply thread sealant or tape.

5.3 Testing the Air Locker Actuation

To test that the air system, electrical system, and the 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 switch to the 'ON' position (leaving the engine off). The symbol on the *Air Locker* switch cover should not be illuminated.
- ☐ Turn the compressor on to charge the air supply to maximum pressure.
- ☐ While supporting the driveshaft flange, 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 symbol on the switch cover should light up.
- ☐ Rotate the same wheel again and check that both wheels rotate together.
- ☐ Turn the switch off again.
- ☐ Rotate the same wheel again.

The wheels should again rotate in opposite directions.

5 Testing and Troubleshooting

5.4 Post-Installation Check List

Now that the compressor installation has been completed, ARB recommends that you take the time to complete the following check list just to ensure that you have not missed any of the vital steps.

- ☐ The vehicle's charging system has been load tested and has been found to be suitable for a 90 A continuous load.
- ☐ The air system has been leak tested and has been found to be free of leaks.
- ☐ The air filter position will not be exposed to moisture, dust, or dirt.
- ☐ 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 activation.

For warranty and service purposes, please fill in the following fields and supply a copy to the customer (if applicable).

ARB PRODUCT MODEL NUMBER: **CKBLTA12**

SERIAL NUMBER (scan QR code): _____

POINT OF SALE (NAME/LOCATION): _____

DATE OF PURCHASE: _____

INSTALLATION PERFORMED BY: _____

DATE OF INSTALLATION: _____

VEHICLE MAKE: _____

VEHICLE MODEL: _____

VEHICLE YEAR OF MANUFACTURE: _____