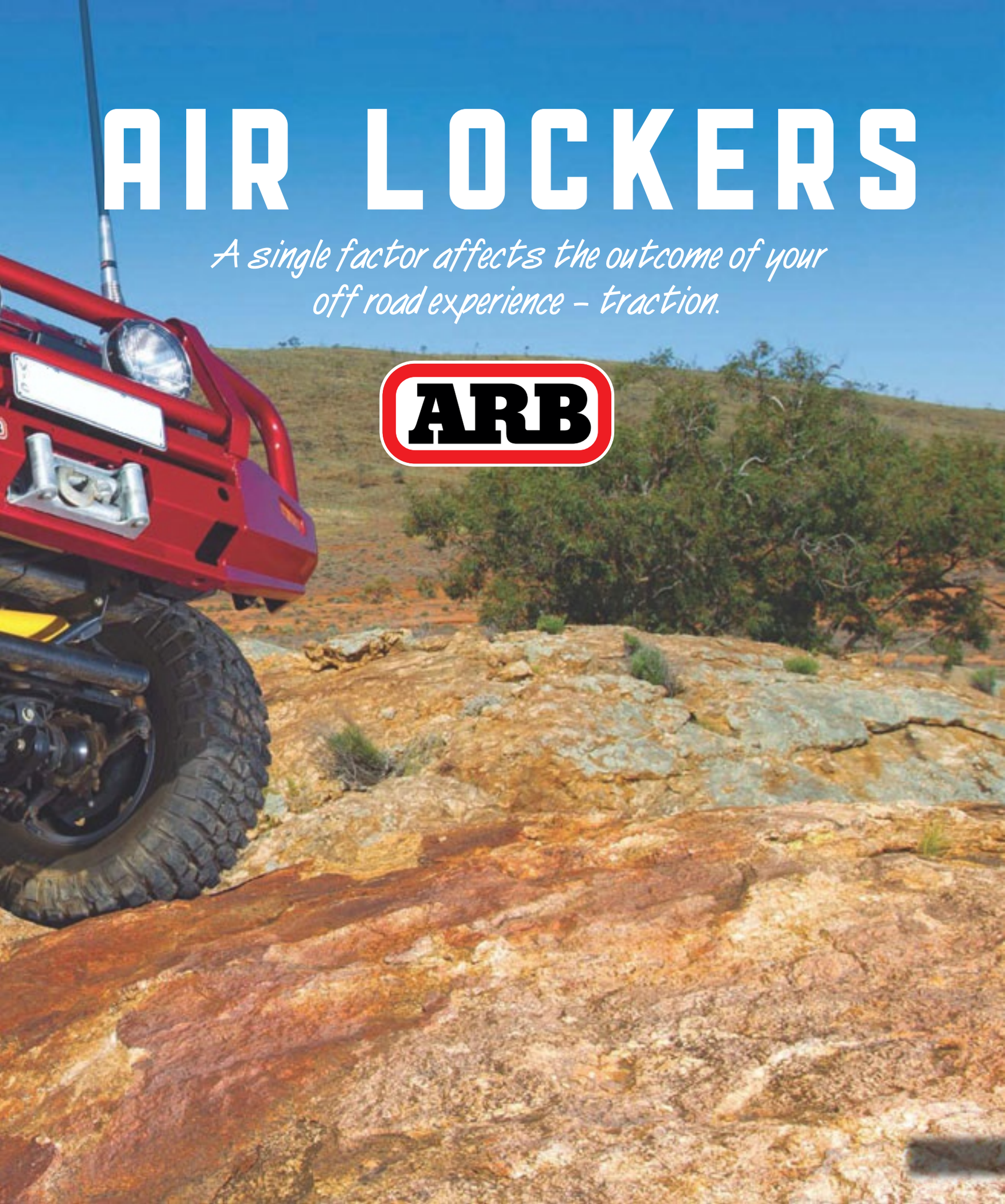

AIR LOCKERS
A single factor affects the outcome of your off road experience – traction.
ARB

AIR LOCKERS

In the toughest terrain, ARB Air Lockers give you the traction you need, precisely when you need it, and all at the flick of a switch.

Venturing off road is an exhilarating way to discover remote and unique locations, but when one (or more) of your vehicle's wheels loses traction in difficult terrain, a great adventure can quickly turn into a difficult and sometimes dangerous journey never to be repeated.

The problem is quite simple – when your vehicle's wheels lose traction, the highway minded factory differential directs all of your vehicle's power to those spinning wheels. On road, the standard open differential allows each of your wheels to turn independently, thus eliminating any binding during turns. Off road, this becomes a major burden as engine power will take the path of least resistance, which occurs at the wheels with little or no traction, resulting in no forward movement.

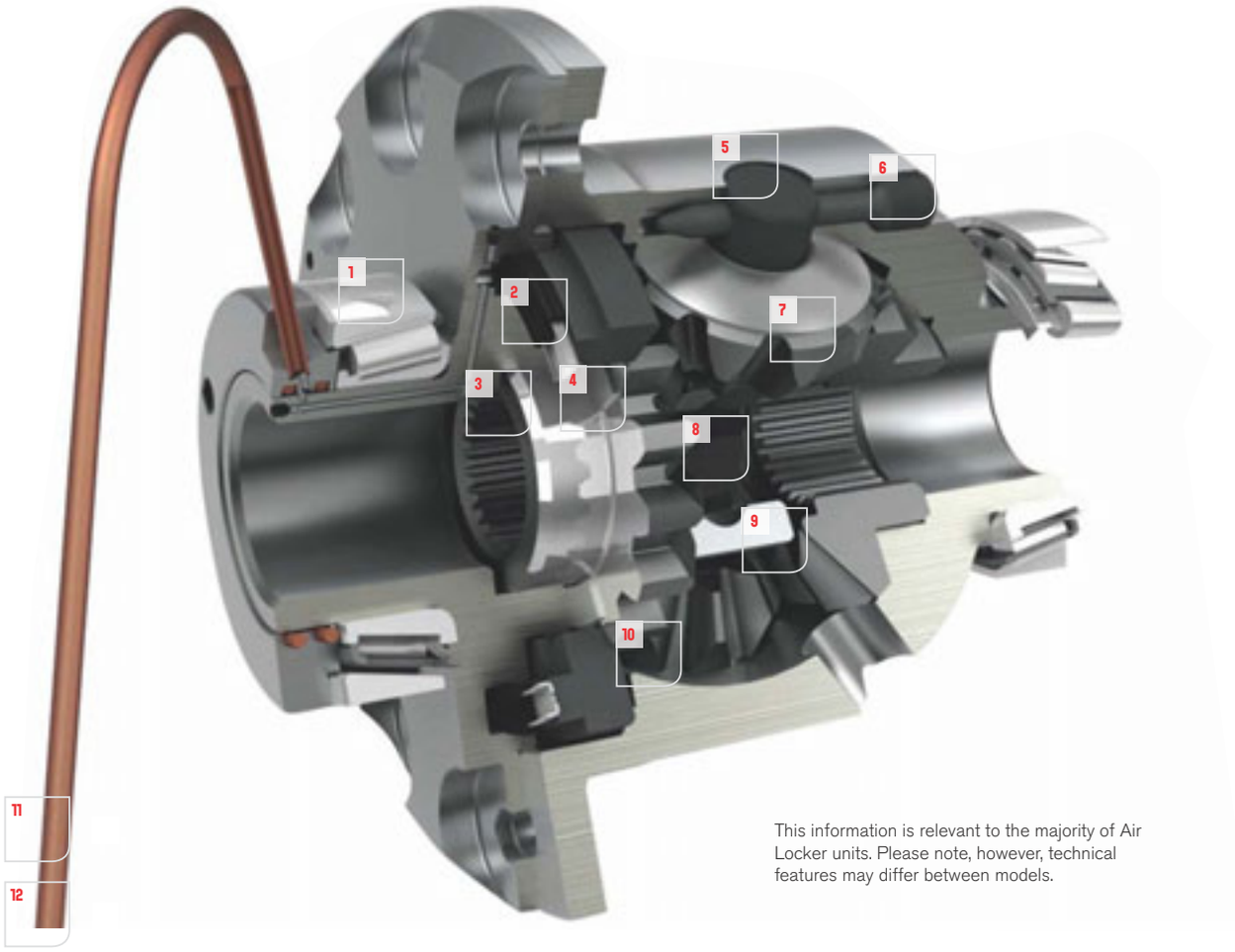
Newer 4WDs now come fitted with an array of traction aids to improve off road performance in a variety of situations and are superior to vehicles with just standard open or even LSD differentials. Most of these new electronic systems seek to limit speed or wheel spin by applying braking force to the wheels with the least amount of traction. While this does have the effect of transferring some engine power to the wheels with traction, it is no substitute for a mechanically locked differential.

Created to provide 100% traction without sacrificing any of your vehicle's highway driving performance, ARB Air Lockers employ a 12 volt air compressor designed to activate (and deactivate) a solid and durable locking mechanism within the differential. This mechanism essentially 'locks' the two front or two rear wheels to ensure they don't turn independently, allowing equal power to be sent to both wheels so they turn together.

In addition to providing outright improvements to a 4WD's off road capabilities, Air Lockers offer significant environmental benefits. Air Locker equipped vehicles can be driven in a slower, safer and more controlled manner as a result of vastly improved traction, with less reliance placed on momentum when approaching difficult terrain. This style of driving greatly reduces the likelihood of incurring vehicle damage and lessens the environmental impact as well.

ARB Air Lockers are sold in over 100 countries around the world. In addition to four wheelers, typical users include fishermen, farmers, hunters and tradesmen. Air Lockers also provide traction solutions for numerous government departments, aid agencies and military organisations. With over 250,000 units in use globally, Air Lockers are proven tough.

ARB AIR LOCKER
AIR OPERATED LOCKING DIFFERENTIALS



This information is relevant to the majority of Air Locker units. Please note, however, technical features may differ between models.

FLANGE CAP ASSEMBLY

Fully machined nodular iron flange cap incorporates the stationary side of ARB's tough, proven and patented timed locking mechanism.

CLUTCH GEAR

ARB's patented locking system actually supports the side gear teeth, giving you more torque handling exactly when you need it.

BONDED SEAL

Steel reinforced, elastomer bonded annular seal has been proven to handle 20,000+ cycles under the most extreme temperatures on earth.

RETURN SPRING

ARB Air Lockers use up to 12 return springs to support the entire profile of the locking gear for a fast, positive and independent disengagement.

DIFF CASE

Fully machined one piece nodular iron diff carrier case offers the rigidity of a one piece factory differential with twice the standard number of pinion gears to cope with the torque.

CROSS SHAFT RETAINING PIN

Custom made one piece hardened retaining pins lock into the assembly using a tapered thread junction.

PINION GEAR

ARB has redefined differential gear tooth geometry to yield structural advantages of up to 30% over commercially available high strength gears.

LONG CROSS SHAFT

Alloy steels and performance surface technology make for a high pressure running fit that can handle an enormous amount of punishment.

SPIDER BLOCK

A billet machined alloy steel spider block supports the cross shafts, using the torque applied at each shaft to support the next shaft along.

SPLINED SIDE GEAR

High grade surface treatments, nickel alloy steel and ARB's patented timed locking system make this the most 'lockable' gear in the industry.

AIR SUPPLY

At the flick of a dash mounted switch, compressed air is delivered to a seal housing assembly via a nylon air line.

SOLENOID VALVE

Manufactured from a machined and anodised billet, and sealed against moisture and dust to IP54 standards, ARB's heavy duty solenoid controls the air actuation.

DESIGN AND MANUFACTURING

ARB Air Locker's patented design has proved ultra reliable, even under the most arduous conditions. The Air Locker is extremely strong, with structural components manufactured from aerospace grades of high alloy steels. ARB engineers increase the number of differential pinion gears, where possible, to distribute torque loads evenly, thus adding to the overall strength of the differential. The incredibly simple yet effective design employs minimal moving parts, thereby ensuring maximum reliability. Many recent Air Locker designs utilise timed gear sets, which further improve strength. This latest introduction to our design and manufacturing process has led to the acquisition of a second US patent on the product.

The design process of an Air Locker involves countless hours of testing. Computerised Finite Element Analysis (FEA) allows the designer to subject each Air Locker design to 'virtual' off road driving stress simulations much more extreme than those experienced in real life. Destructive laboratory testing is carried out on prototypes to ensure the strength of the Air Locker exceeds that of the axles or other driveline components. Environmental test cells subject prototype models to high temperature running conditions (120˚C), low temperature running conditions (-24˚C), and harsh wheelspin engagement, for cycle durations of more than 20,000 actuations. Finally, field-testing is carried out with units being fitted to test vehicles operating in the harshest environments imaginable.

Once this exhaustive design phase is complete, Air Lockers are manufactured in ARB's state of the art factory in Melbourne, Australia, and sold throughout the world.

RANGE AND INSTALLATION

Available for 4WD and 2WD applications, the ARB Air Locker range comprises of over 100 configurations to suit a wide range of vehicles from around the world. Because the Air Locker is only engaged when needed, it can be installed in the front and rear axles, with separate switches independently controlling the lockers from within the vehicle.

Installation should be performed by a qualified differential technician, although no special tools or skills are required apart from those necessary for fitment of a standard differential. When installed with an ARB air compressor, the Air Locker system is supplied as a complete kit which contains all of the parts necessary for proper installation, including industrial grade control switches, air lines and fittings. ARB offers three compressor models suitable for Air Locker operation. A dedicated air activation system is available which is extremely durable and compact. Alternatively, a larger compressor can be specified, which is also perfect for inflating tyres, air mattresses and a host of other applications where compressed air is required.

A dedicated workforce, many of whom are off road enthusiasts, maintain a very high standard of workmanship throughout the assembly and distribution process.

ARB's locker test rig statically tests the Air Locker's strength against the axle. ARB tests both standard and aftermarket axles, with our goal being to always have the axle break before causing damage to the Air Locker.

An ARB air compressor is an integral part of any Air Locker installation, and like all components, undergoes a significant amount of testing prior to reaching our production lines. During the development of our high output compressor range, this prototype CKMA12 model was mounted underneath the tray of a LandCruiser ute and subjected to a 5,000km Outback trip. Whilst we do not recommend you subject our products to this kind of abuse, it is interesting to note that a year later, this air compressor was still mounted to the vehicle, working flawlessly.

ARB DIFFERENTIAL COVER

ARB's Differential Cover will protect your diff against the hazards of competition or extreme off road use.

When off road, it is inevitable that obstacles and off road hazards will be encountered that could potentially inflict expensive damage to your differential. To prevent this, ARB manufactures the Differential Cover. Using high tensile nodular iron, it has been engineered to protect the differential and ring and pinion set from any off road hazards.

The Differential Cover is perfect for both competition and 4WDing use where harsh off road work is to be encountered. Coming in a red powder coat finish, the Differential Cover is available to suit a select range of differentials with further details available from ARB.

FEATURES

- Computer optimised cross brace design increases the structural rigidity of the whole axle
- Additional housing strength helps keep the ring and pinion gears meshing on the flat faces of the teeth, greatly increasing ring and pinion life and overall maximum load strength
- Top quality, high power neodymium magnets are used in both the drain plug and the dipstick to collect metallic wear particles as the vehicle moves
- Magnet location in the end of the dipstick allows the oil to be checked for tell-tale signs of internal damage
- Prolonged carrier bearing life due to extra support to the bearing alignment
- Approach/departure angle optimised by angled exterior surfaces
- Unique dipstick/filler cap design allows differential oil level to be adjusted for customised high driveline angles

PERFORMANCE MODEL RANGE

ARB Air Lockers are available for the vast majority of 4x4 vehicles from around the world. In addition, a number of high performance models are available for specialist applications such as drag racing, competition rock crawling and heavy tank-track type snow equipment.

Designing locking differentials for applications such as these presented our engineering team with some significant challenges. Not only must the locker be able to withstand more traction torque than a standard differential, but it must also tolerate massive amounts of torque handling facilitated by the substitution of custom made high alloy aftermarket axle shafts, which are cut with larger than standard diameter splines. This is particularly difficult owing to size constraints dictated by the original axle assembly. ARB met this challenge using a combination of aerospace grade materials, and a design guided by the results of high torque testing using computer simulations and destructive testing.

Discover other performance driveline and axles on our website.