DATE: April 2015

DESCRIPTION: ARB Alloy Bar

APPLICATION: Toyota Prado non-sensor 2014 On

PART NO.: 7421010 - COMBAR ALLOY PRADO 150|10/13ON GX/GXL AF20 POLISHED

PRODUCT GROUP: 007 – ALLOY ARB BARS

BARCODE: 9332018037206

FITTING: 4 Hours

AVAILABILITY DATE: June 2015

PRODUCT SPECIFICATION

DESIGN & DEVELOPMENT:

With the development of vehicle integrated safety cells, dynamic chassis’ versus traditional ladder frame, vehicle weights increasing but axle weights staying the same and importantly, customer requests, a steel protection bar does not suit all customer’s needs.

From this, the idea of a modern ARB alloy bar was born.

Rather than merely replicating an ARB steel bar in alloy and presenting it to the market, ARB’s engineers have started from the chassis mounts developed for the ARB Deluxe Bars and designed the bar to complement the vehicle, whilst maintaining ARB’s core values of high quality, durable equipment specifically engineered for punishing Outback conditions.

The decision to design and manufacture an alloy bar has been thoroughly evaluated and involved many discussions of the feasibility of such a project.

Whilst widely known as a steel fabricated product manufacturer, ARB have a long history manufacturing numerous alloy products. Tony Brown, ARB’s founder, began making alloy bars in the late 1970’s and early 1980’s responding to market demand for alloy bar work. The quality, design and performance of these products versus cost and weight considerations wasn’t a viable proposition in the early 1980’s so haven’t been offered since that time.
DESIGN & DEVELOPMENT CONT:

The past 10 years have seen ARB re-enter the alloy product market with ARB Alloy Roof Racks since 2008, ARB Alloy Nudge Bars since 2010 and a number of Original Equipment Alloy products. Modern design, the ability to perform FEA simulation testing and the experience, knowledge and skilled workforce in ARB’s factories has allowed a rethink of this product range. A number of key attributes of an alloy bar were considered non-negotiable:

- Weight
- Strength through design
- Complement the vehicles styling
- Couldn’t be a direct copy of an ARB steel bar, but needed its own identity. Key design features include the 30mm radius on the wings and centre section, 60mm outer tube, 48mm centre cross tube, separate bolt in winch mount, pressed top pan with pressed winch cover, buffers and a centre grill have been developed to give the bar a crisp, factory appearance.

TESTING:

The performance and suitability of the ARB Prado chassis mounts have been tried and tested over many years and millions of kilometers travelled around the world. Therefore, ARB engineers have retained the mounts developed for the ARB Deluxe steel bar and included additional brackets to mount the separate winch cradle required for the alloy bar. Considerable testing has been carried out of the alloy bar assembly to ensure that it meets ARB strength through design criteria.

Extensive Finite Element Analysis (FEA) testing and real world physical testing has been conducted. FEA is an engineering method to test structural performance of a product virtually and reduces the number of physical tests during the development cycle.

FEA testing using industry standards has focused on frontal impacts, side/wing impacts and durability.

Frontal animal impacts have been simulated at speeds up to 80 km/h. Results showed that the bar remained intact with no failure. Importantly the vehicle remained mobile after the impact.
Extensive FEA simulation has been carried out to simulate loads experienced in various off road and sealed road conditions. An advantage of initial FEA testing is that durability study’s can be accelerated to provide extensive, long term test results. Additional tests were set up with winch, driving lights and antennas fitted to give a realistic result for general accessories fitted to the Prado 150.

Whilst FEA testing greatly assists with identifying potential areas of concern real world testing is an important aspect of any new product developed by ARB. Real world testing conducted has included highway driving, gravel roads, off road driving, towing to check for over heating concerns. Additional testing has been conducted at the Australian Automotive Research Centre to enable repeatable and controlled testing and hence reliable results.

Winch load tests have been conducted in both FEA and in ARB’s 30T press to simulate loads generated by 10,000lb winches. These have been conducted at various angles to the winch mount to replicate real world situations.

WEIGHT:

Weight was an important consideration when ARB’s engineers developed the ARB Alloy Bar for the Prado. The bar assembly of the alloy bar compared to the bar assembly of the ARB steel bar equivalent is 55% lighter at 21kgs versus 46kg.

Bar chassis mounts and under wing protection panels between the two alternatives are similar at approximately 23kg. The winch mount for the alloy bar is 10kg.

ALLOY & WELDS:

Like with steel, alloy comes in different specifications and different resultant strengths. How alloy is processed through the manufacturing stages can also affect the mechanical properties and strength of the alloy.

Three different alloys and tempers are used in production of the ARB alloy bar. The bar to chassis bracket mounts and uprights use 5083-H116 alloy. Centre pan and wings use 5052-H32 alloy which has been heat treated. The outer and centre tubes use 6063-T4 heat treated to T4 temper for strength and workability.

Specific grades of alloy have been chosen to provide excellent corrosion resistance and high fatigue strength. The wings and centre pan are 4mm, the outer tube is 60mm x 3mm and the centre cross tube is 48mm x 3mm. With any welded alloy product attention to welds is paramount. All visual welds are CMT pulse welds to give what is commonly referred to as “stack of coins welds”.
PROTECTION & STYLING CHARACTERISTICS:

- Vehicle specific design for the 2014 on Toyota Prado GX and GXL.
- Registered design of styling and design components.
- 4mm alloy used for wings and pan.
- 60mm x 3mm alloy outer tube and 48mm x 3mm alloy cross tube.
- 30mm radius on wings and centre section.
- Engineered, air bag compatible mounting system secures to chassis via high tensile bolts and hardware.
- Split pan design for maximum strength and airflow.
- 2 piece grill design for split pan.
- Extensive steel under protection panels on centre and either side.
- Pressed top pan and aluminium winch cover panel.
- Combination style bar to suit both winch and non winch applications. The bar includes a pressed aluminium winch cover panel.
- The lower pan features a knock-out Roller Fairlead panel which is kept in place if no winch is being fitted.
- Durable two piece buffers.
- Will accommodate Warn, Magnum, Bushranger and Smittybilt low mount model electric winches up to 10,000lb.
- Provision to accommodate ARB Intensity LED’s and a range of IPF lights.
- Provision for optional ARB Fog Light kit part no 3500590.
- Includes ARB LED Indicator & Clearance light.
- Two aerial brackets located on the top of the centre frame.
- Bar adds approximately 185mm to the overall length of the Prado.
- No Hi-Lift jack points provided on the ARB Alloy Bar.

PRESSED FORM TOP PAN:

The Alloy Bar features a pressed form top pan. The press form adds strength to the pan whilst allowing for the winch cover panel to be recessed.
BUFFERS, CENTRE PAN GRILL AND FOG LIGHT SURROUND:

This bar features newly designed two piece buffers, centre pan grill and the recently released fog light surround and fog light (optional part number 3500590 – refer following fog light section). All three components have been designed to integrate with each other and the bar design.

The upright section of the buffer has a style line to complement the fog light surround. The top section of the two piece buffer fits around the tube to pan intersection.

To provide access to winch clutch handles and to assist with valuable airflow to the radiator the split pan design has been widened and includes a two piece grill for an integrated, OE style appearance.

The two piece grill has an opening on the left side to allow access to winch clutch handles. The access door is easily opened and closed and overcomes clutch lever access when larger lights are fitted.

FOG LIGHTS:

The Prado Alloy Bar is supplied with ARB’s new fog light surround that accepts ARB’s 51W Fog Light, part number 3500590. The surround is supplied standard with a screw in cover if no fog light is to be fitted.

The fog light surround will be supplied in the natural black finish to complement the buffer design.

ARB Auxiliary Fog Light Loom Part No 3500530 is required if fitting the ARB Fog Light option.

A clear fog light cover is being developed separately under part no 3500680.

LED CLEARANCE LIGHT / TURN SIGNALS:

ARB’s unique LED clearance light / turn signal is fitted into the press form aperture in each wing.
WINCH MODEL FITMENT:

The Alloy Bar fits the following winches:

- Warn M8000, XD9000, XP9.5 and XDC 9.5
- Warn Zeon 8, 8-S, 10 and 10-S
- Warn ZEON Platinum 10, 10-S
- Smittybilt Gen 2 X10K
- Bushranger DV-9TH, DS-9TH and Seal 9.5TH

Unlike traditional ARB bars where the winch mount is part of either the bar assembly or the bar mount, the Alloy Bar has a separate winch mount.

The winch mount supports the full weight of the winch and control box on the bar mounts rather than on the bar assembly itself.

The lower pan of the bar features a knock-out panel for when a winch is to be fitted.

The Alloy Bar winch mount has an integrated control box mount to recess the control box lower in the pan. The control box mount has different mount holes to suit different winches. Please note that all winches nominated will have mount holes pre-drilled.

Having the control box recessed within the bar assists with the airflow requirements of the Prado and exceeds factory airflow. The wider split pan, which accommodates the two piece grill, also contributes to the increased airflow.

Additional fit kits are required depending on the winch fitted:

- 3500730 WINCH INSTALL KIT ALLOY BAR|PRADO 150. This kit includes a newly designed flip up number plate bracket
- Warn ZEON and ZEON Platinum fitment requires P/No W89965 Short Wiring Kit
- Warn ZEON Platinum fitment may require P/No W94288 Enhanced Signal Kit

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<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Product Group</th>
<th>Barcode</th>
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<td>3500730</td>
<td>WINCH INSTALL KIT ALLOY BAR</td>
<td>PRADO 150 10/13ON</td>
<td>012 – Barwork Accessories</td>
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PRESSED WINCH COVER AND LOWER PAN:

For bars not being fitted with a winch the Alloy Bar is supplied with a 4mm aluminium press formed winch cover panel. The winch cover panel fitment is recessed in the press form top pan to give a level and integrated appearance. The cover panel is supplied in a polished alloy finish.

The lower pan of the Alloy bar features a knock-out panel for when a winch is fitted. If no winch is fitted this remains in place covering the Roller Fairlead aperture.

DRIVING LIGHT MOUNTS:

The pressed top pan includes laser cut holes in the top of the pressed centre pan for fitment of a range of compatible driving lights including ARB Intensity and IPF 808, 800 and 900 series lights.

Note: Pinning holes for ARB Intensity lights included.

ANTENNA MOUNTS:

Two aerial mounts are welded to the centre cross tube to allow fitment of UHF/AM radio and mobile phone aerials/antennas.