



4X4 ENGINEERING

SAFARI ARMAX X-SERIES ECU USER MANUAL (AUSTRALIA)



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1. About your Safari Armax ECU

The Safari Armax Engine Control Unit (ECU) is designed to work harmoniously with your vehicles OE Engine Control Unit resulting in more power, more torque, better throttle response, less fuel consumption and less turbo lag. This is all backed up by Safari's sophisticated engine protection systems which are constantly live monitoring your vehicle for total drivetrain safety and ultimate reliability. The Armax ECU has 5 pre-calibrated maps for all user conditions but can be altered to suit specific applications. The plug and play wiring harness makes installation quick and easy and vehicle specific mounting bracketry complements the installation. The Safari Armax ECU is the total package no upgrades required, no additional units needed, it is a total system solution specifically designed for your 4x4 vehicle.

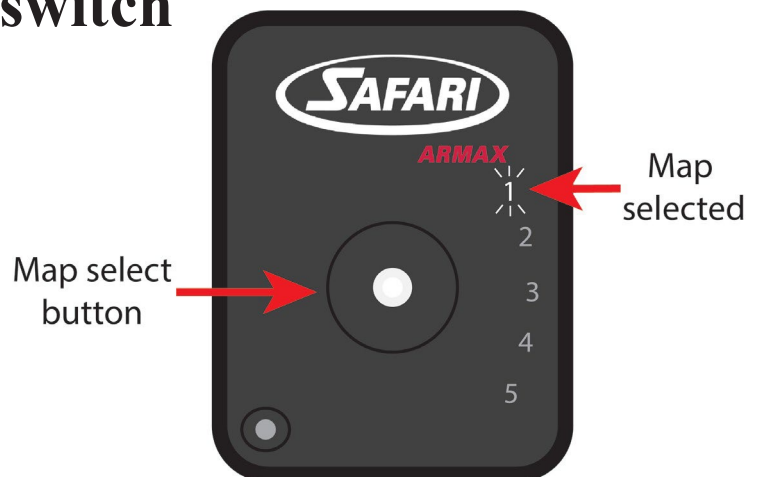
2. How it works

The Armax ECU increases the open duration and the injection timing point of the fuel injector allowing more diesel fuel to enter the combustion chamber. Due to the increase in fuel, the boost pressure the engine receives from the turbocharger is increased, optimizing the air fuel ratio. The result is increased engine power, torque, and better throttle response. In some applications the fuel system pressure is increased at specific engine RPM points and load demands to ensure accurate fuel delivery to the injector. This approach ensures the service life of the mechanical components in the fuel system are not influenced. Another Standard feature of the Armax ECU is the ability to change the throttle sensitivity, this feature can be tailored to individual driver requirements. The Armax ECU blends seamlessly with the factory ECU due to its ability to sense engine load from multiple sources such as Engine RPM, Manifold Pressure, Fuel Pressure, Throttle Position and Exhaust Gas Temperature. From here the ECU very precisely calculates the engine load and accordingly adjusts the parameters to meet the pre-calibrated demand.

The Armax ECU delivers a strong yet very smooth power enhancement, as the driver demands more power the ECU delivers more power.

3. Using the Map select switch

The Safari ARMAX ECU is equipped with a map select switch. A different map can be selected at any time whilst the vehicle is running. Simply push down once on the map select switch button located in the center of the switch to move to the next map. Each map is represented by a number. The number will illuminate when it is selected to indicate which map the ECU is using.



4. Standard Maps

Map position 1

Comfort: The Comfort tuning map delivers maximum power and torque the same as the Sport tuning map but has progressive transition characteristics, this feature ensures optimum drivability in all conditions.



Map position 2

Sport: The Sport tuning map delivers the ultimate in power, torque and response. It has enhanced mid-range torque which produces the ultimate driving experience.

Map position 3

Towing: The Towing tuning map delivers maximum low end torque and response to ensure you have the maximum off idle acceleration. The Towing tuning map also has specific features to safeguard your vehicles reliability in constant high load conditions.



Map position 4

Traction assist: The Traction assist map allows smooth modulation of power and torque delivery in low traction applications. It gives the driver precise control in difficult terrain such as off road, wet weather, snow and icy conditions.

Map position 5

Standard: The Standard setting returns the vehicle to its original configuration. The Safari ARMAX ECU has no influence over the performance of the vehicle.



5. Bridge out connector

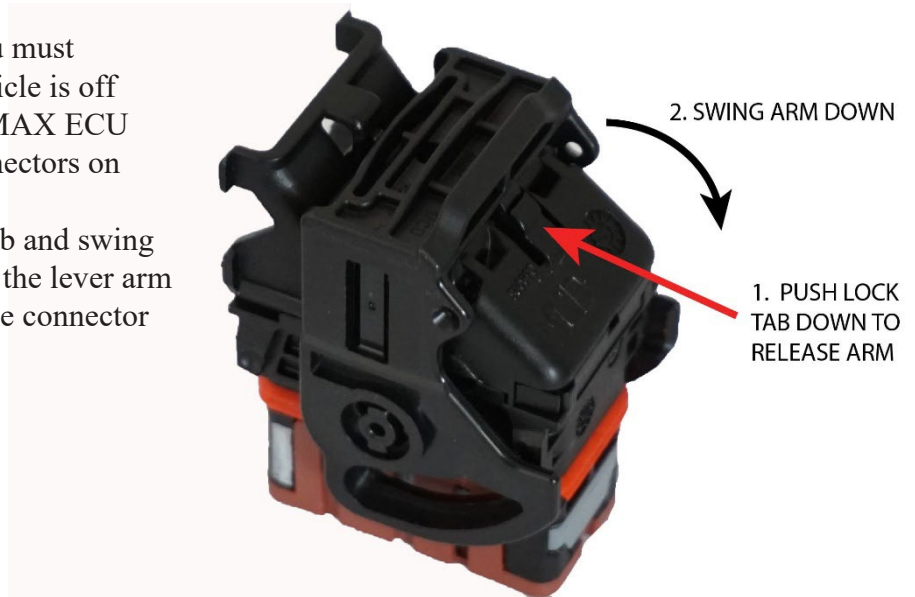
Every Safari ARMAX ECU is sold with a bridge out connector. The bridge out connector allows the vehicle owner to bypass the Safari ARMAX ECU in the unlikely event of a unit failure. It also allows workshops to eliminate the ECU during diagnostics operations.



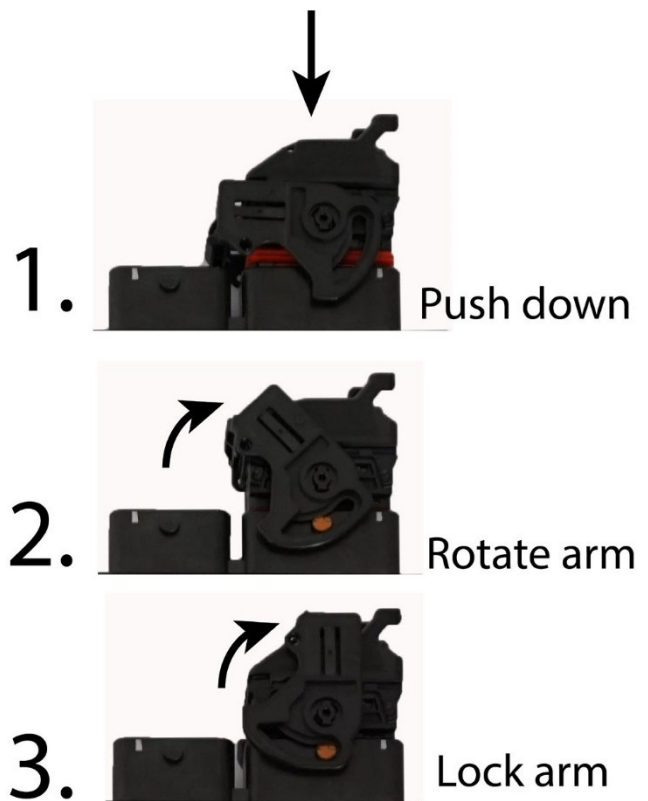
Installation

To install the bridge out connector you must first turn the vehicle off. Once the vehicle is off you will need to locate the Safari ARMAX ECU and disconnect the 2 main header connectors on the ARMAX loom.

Push down on the lever arm locking tab and swing the lever arm all the way down. When the lever arm is all the way down you can remove the connector from the ECU.



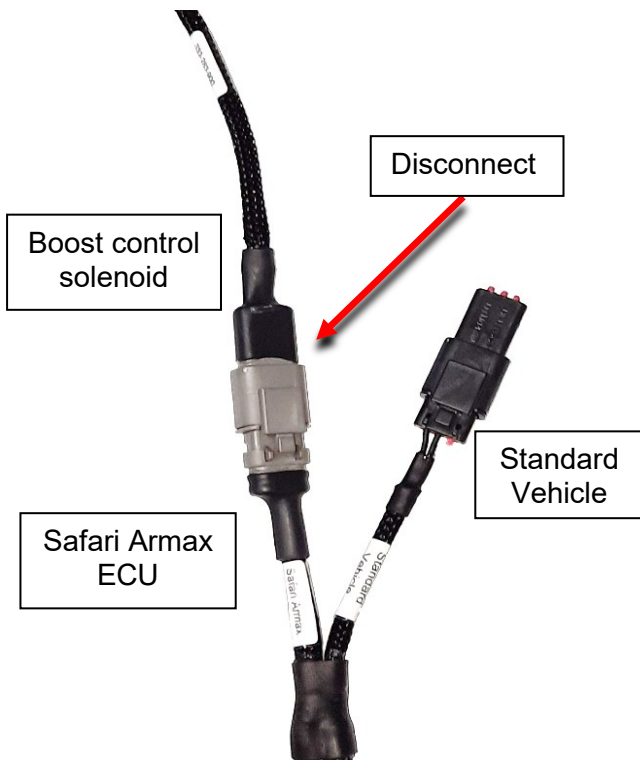
Now connect the 2 header connectors to the Bridge out connector as shown in the diagram. The inner connector has to be fitted first. The connectors only fit in one way and the lever arm must be all the way down. Push the header connector down into the bridge out connector until the lever arm covers the spigot. Then rotate the arm up towards the top of the connector until it locks. The connector will pull itself into location. Once fitted the vehicle will operate as factory. (70 series vehicles follow DVVC steps below before starting vehicle)



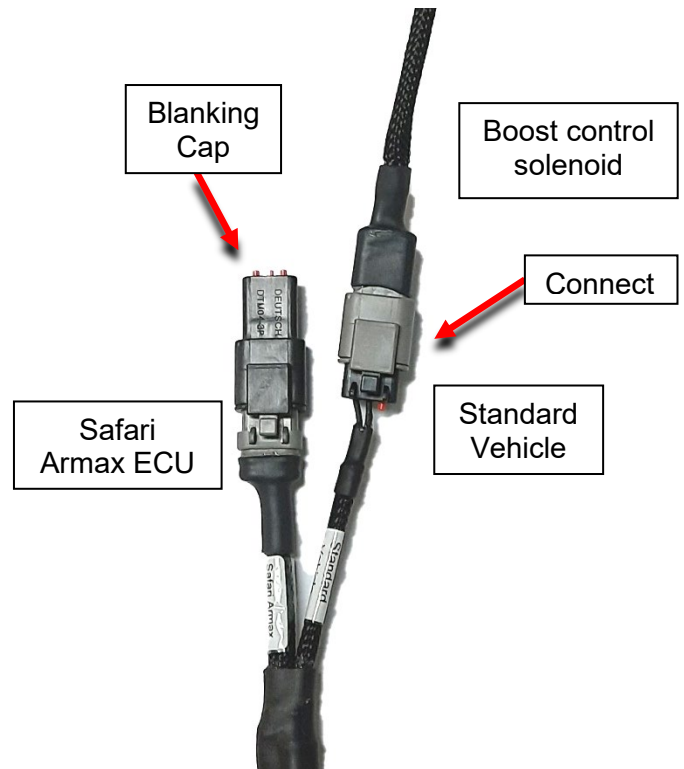
DVVC Equipped Vehicles (70 series only)

Locate the DVVC loom located next to the Safari ECU header connector. Disconnect the BOOST CONTROL SOLENOID branch of the DVVC loom from the SAFARI ARMAX ECU connector. Connect the BOOST CONTROL SOLENOID connector to the STANDARD VEHICLE CONNECTOR. Install the BLANKING CAP onto the SAFARI ARMAX ECU connector.

STEP 1



STEP 2



NOTE: SAFARI ARMAX ECU CONNECTOR- GRAY
STANDARD VEHICLE CONNECTOR- BLACK

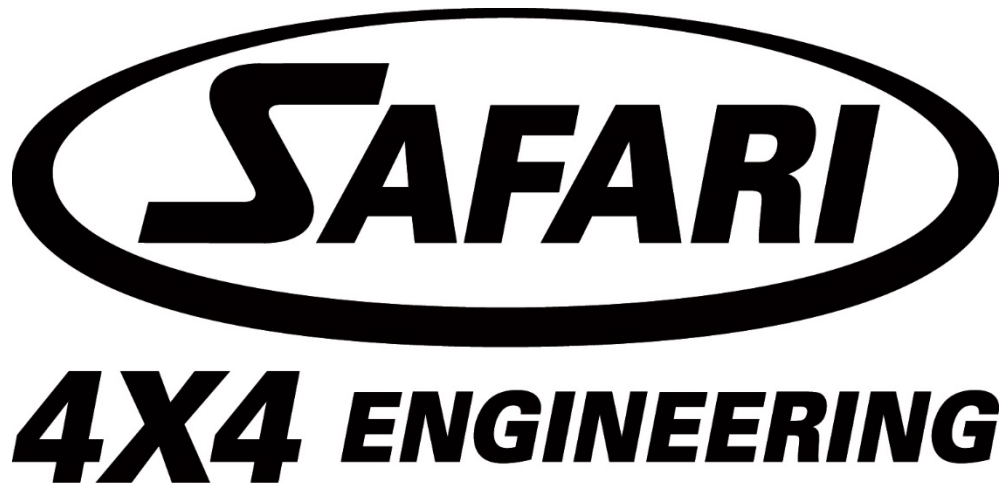
Once both the Bridge out plug and the Standard vehicle connector have been installed then the vehicle is ready to operate in the Bridge out configuration and will operate as a standard vehicle.

If both the bridge out connections aren't connected and the vehicle is started then the vehicle will display a spanner light and will be stuck in limp home

6. Trouble shooting guide

- Vehicle does not start**
- Check all connected components are installed as per the vehicle instructions.
 - Check Safari Armax wiring harness fuse.
 - Are the wiring harness adaptor plugs connected correctly.
 - Has the correct file for the application been installed.
- The vehicle delivers no extra performance**
- Check all connected components are installed as per the vehicle instructions.
 - Is the EGT thermocouple connected.
 - Is the EGT thermocouple depth correct.
 - Do you have the desired tuning program selected.
 - Has the appropriate configuration file been selected for the vehicle.
- The vehicles engine check light is displayed. (limp home mode)**
- Check all connected components are installed as per the vehicle instructions.
 - Are the wiring harness adaptor plugs connected correctly.
 - Contact a Safari Armax dealer for further assistance.
- How can I return the vehicle to OE ECU operation**
- Select Map 5 on your Map select switch.
 - Install bridge out connector (see section 4)
- No LED's illuminate on the Safari Armax switch**
- Check all connected components are installed as per the vehicle instructions.
 - Check the in car loom has been pinned out correctly.
 - Check Safari Armax wiring harness fuse.
 - Check Safari Armax wiring harness battery connection.
- The vehicle blows black smoke**
- Check all connected components are installed as per the vehicle instructions.
 - Has the appropriate configuration file been selected for the vehicle.
 - Check and/or replace fuel filter.
 - Check and/or replace air filter.
- The engine is making a loud noise**
- Check all connected components are installed as per the vehicle instructions.
 - Are the wiring harness adaptor plugs connected correctly.
 - Has the appropriate configuration file been selected for the vehicle.
 - Contact a Safari Armax dealer for further assistance.

PATENT PENDING



SAFARI 4X4 ENGINEERING PTY LTD (ACN 606 457 372)

(SAFARI)

DRIVELINE AND ENGINE WARRANTY

1. Product

This Warranty applies to all Safari Armax Performance Devices (and any Part thereof) when operated in Australia and used in Vehicles less than five (5) years old.

2. Duration

The duration of this Warranty shall be for a period of 5 years from the date of the Vehicle's manufacture or until the Vehicle has travelled 100,000km whichever date is the earlier **(Warranty Period)**.

3. Your rights under the Australian Consumer Law

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

4. Scope of Warranty

Safari warrants to the Owner that, subject to **paragraph 5**, during the Warranty Period, it will at its option and free of charge, repair, replace or adjust to pre-delivery standards at the premises of the Repairer any Safari Armax Performance Device (or Part thereof) which it finds to be materially defective (**Breakdown**), under normal use and operation within Australia, where:

- (a) such Breakdown is directly caused by a defect in the Armax Engine Control Unit (**AECU**);
- (b) the AECU has not become defective as a result or consequence of the Owner's failure to properly maintain, install, use or operate the AECU in accordance with the recommendations and instructions, and the capacity and operating limitations, specified for the AECU by Safari (**Safari Instructions**); and
- (c) the Vehicle or Safari Armax Performance Device (as the case may be) is under normal circumstances delivered at the Owner's expense to the Repairer for the carrying out of the required Warranty Service as soon as possible after the need for such Warranty Service becomes apparent.

5. Conditions

The Warranty shall be subject to the following conditions:

- (a) (**Claims Procedure**) the Owner must follow (and ensure their Repairer follows) the procedure set out in **paragraph 7** and any failure to do so may result in a decline and non-payment of the Owner's claim;
- (b) (**Repair Authorisation**) Safari is permitted to authorise the initial investigation (**Diagnosis**) including any dismantling of the Owner's Vehicle (and the Safari Armax Performance Device) as may be required for a Diagnosis to be undertaken. Safari will only cover the costs of the repairs if the Breakdown is assessed by Safari as being within a valid claim. Safari reserves its right to examine the Vehicle and have the Safari Armax Performance Device (or Part thereof) expertly assessed, should such Parts be considered faulty. Should the Owner give permission to the Repairer to commence repairs, without an authorisation claim number being obtained from Safari, the Owner acknowledges that Safari is entitled to deny the Owner's claim due to Safari not being given an opportunity to inspect the Owner's Vehicle (or the Safari Armax Performance Device) prior to its repair;

- (c) **(Use of Engineers)** upon notification of any claim, Safari shall be entitled to instruct an independent engineer to inspect:
- (i) the Owner's Vehicle before authorising any claim;
 - (ii) any insured Vehicle Parts that have failed and have been removed; and/or
 - (iii) any original documentation after any repair or replacement has been carried out authorised.

In addition, Safari shall have no liability for any loss suffered by the Owner arising under or in relation to any delay in commencing repairs. Safari may charge the cost of any failed engineer's inspection against any subsequent authorised amount, due to the Repairer being unable to present the Vehicle as required at the pre-determined place, time and date.

- (d) **(Servicing the Vehicle)** the Owner must ensure that their Vehicle has been correctly serviced as frequently as required by the Vehicle manufacturer as detailed within the Servicing Handbook (**Service Interval**) using a reputable Repairer validly registered for OST purposes. Proof of servicing will be required to support any claim. Safari agrees to allow for 30 days and 1,500km in excess of the recommended Service Interval;
- (e) **(No Refund or Rebate)** this Warranty has no surrender value and no refund or rebate will be made under any circumstances;
- (f) **(Fraud)** in the event that a false or dishonest statement or claim is made by the Owner, Safari may immediately cancel this Warranty and no refund will be made;
- (g) **(Salvage and Disposal)** Safari does not accept liability for the disposal of the Owner's Vehicle, any covered Part or salvage;
- (h) **(Cancellation)** Safari may cancel this Warranty immediately if:
- (i) the Owner's Vehicle is written off, stolen or if the Owner has failed to carry out the necessary servicing; or
 - (ii) if the AECU is removed, tampered with, damaged or suffers from any defect due to negligence on the part of the Owner or on the part of any Repairer; or
 - (iii) if the AECU is used in conjunction with any aftermarket electrical device, micro controller or altered/reflashed OE control unit which influences the operation of the OE control unit and/or the operation of the vehicles drivetrain, without specific written consent from Safari. The granting of such consent will be at the discretion of Safari and failure to seek written consent will void all claims against vehicle drivetrain warranties which Safari offer as part of this system.
- (i) **(Limits on Claims)** if the Owner's Vehicle and any claim is covered by any other warranty, Safari need only make payment of its proportionate share of the claim (if any); and

- (j) **(General)** Safari is not liable for any statement or representation which conflicts with any of the conditions set out in this **paragraph 4**, unless such statement or representation is supported in writing by Safari.

6. Additional Limitations

Unless expressly agreed to by Safari, this Warranty will not apply where:

- (a) the Vehicle in question has recorded usage in excess of 100,000 kilometers;
- (b) any serviceable items ordinarily replaced during the manufacturer's recommended servicing of the Vehicle or items with a limited life span including, but not limited to, oils, grease, fluids, filters, fan and drive belts, batteries, alternators, starter motors, injectors, heater plugs, sensors, catalyts, exhaust system and any other parts listed within the Vehicle's manufacturer service manual (unless any such items are authorised within the costs of a valid claim);
- (c) any Breakdown of the Safari Armax Performance Device (or Part thereof) which Safari deems to be due, solely or in part, to fair wear and tear;
- (d) Parts of the Safari Armax Performance Device are suffering from fair wear and tear but are yet to suffer a Breakdown, including such Parts which are reported or recommended for replacement by the Owner's repairer during the Vehicle's routine servicing;
- (e) repairs, alterations or replacement of the Safari Armax Performance Device (or Part thereof) not authorised by Safari or in circumstances where such Parts have been modified from the manufacturer's original specification or any Modification to the AECU or its installation;
- (f) the Safari Armax Performance Device (or Part thereof) has:
 - (i) corroded, rusted up or has otherwise suffered damage specifically due to flooding, freezing, melting, lack of or incorrect coolant, lack of or use of incorrect lubricant, lack of or use of incorrect fuel, blockage or sludge
 - (ii) electrically overloaded due to incorrect use of welding, starting or charging equipment;
 - (iii) been damaged due to the inappropriate introduction of foreign objects or debris;
 - (iv) been deemed by a qualified engineer appointed by Safari, to have only suffered damage due to being driven on after the fault was more than likely to have been apparent to the driver;
 - (v) suffered any oil leak, fuel or fluid leak; or
 - (vi) been replaced in pairs (or in greater numbers) when only one Part has failed.
- (g) any claim for the Safari Armax Performance Device (or Part thereof):
 - (i) which are in the process of, or have been, recalled, modified or altered in specification to improve any previous design fault by the Vehicle's manufacturer: or
 - (ii) which have well recognised, common and published design faults.

- (h) the Safari Armax Performance Device (or Part thereof):
 - (i) has been the subject of a previous validated claim;
 - (ii) has suffered damage due to criminal damage, theft or attempted theft, accident, negligence, misuse, incorrect servicing; or
 - (iii) suffers damage at the hands of the Owner's Repairer during the strip down or rebuild process and such damage was not reported at the time of claim.
- (i) the Safari Armax Performance Device (or Part thereof) has not been specifically listed or described as being included within the cover or where any claim for the Safari Armax Performance Device (or Part thereof) is covered in whole or in part by any other warranty, guarantee or settlement;
- (j) any claim is made against this Warranty before the commencement of the Warranty Period or after the Warranty Period has expired;
- (k) any claim made against the Warranty is one such that the person making the claim is not the Owner as named on the Warranty Application Form;
- (l) any secondary claim is made against this Warranty;
- (m) any loss, damage or failure which a qualified engineer appointed by Safari believes could or should have been avoided or was totally or partly caused by a lack of previous routine service and/or maintenance as recommended by the manufacturer or within the Safari Instructions;
- (n) for any claim of loss, damage or failure of the Vehicle's clutch where the Vehicle has a manual transmission;
- (o) any claim, damage or fault which is due to any type of accident or which is negligent or otherwise in contravention of the laws of Australia;
- (p) the cost of any diagnostic work is in excess of one (1) hour and/or the cost of any dismantling work are not within the costs of a valid claim; or
- (q) any liability for death, bodily injury, consequential loss or damage to other property, out of pocket expenses or any other loss is caused (whether directly or indirectly) by the claim or event giving rise to a claim under this Warranty.

7. No Extension or Re commencement

Any repair, replacement or adjustment made by Safari for the benefit of the Owner under this Warranty, shall not entitle the Owner an extension or recommencement of the Warranty Period.

8. Making a Claim

- (a) To make a claim under this Warranty, the Owner must take his or her Vehicle to a Repairer of their choice. The Repairer should request approval for repairs by contacting Safari and by providing the following information:
 - (i) the Vehicle's registration and VIN numbers;
 - (ii) the Owner's name and address; and
 - (iii) a detailed estimate of the cost of repairs.

- (b) Safari will then issue the Owner a Warranty Application Form to be completed (and returned to Safari) and issue the Repairer with an Assessment Form.
- (c) The Repairer must complete the Assessment Form and return it to Safari. Should Safari accept the Assessment Form, they will provide authorisation to the Repairer to commence repairs and the Repairer must:
 - (i) make a note of the claim number issued by Safari; and
 - (ii) undertake the repairs and issue Safari with a GST invoice, claim number and copies of any GST service receipts (if applicable).
- (d) The Repairer must not in any circumstances carry out repairs without first obtaining Safari's authorisation.

9. General

- (a) The Warranty shall cover only the repair, replacement or adjustment of the Safari Armax Performance Device (or Part thereof). No other type of claim or compensation of whatsoever nature (including labour costs or incidental, indirect, special or consequential damages such as, without limitation, loss of use, inconvenience, rental vehicle charges, towing charges or accommodation), notwithstanding that the same may have resulted from, or have arisen in consequence of, a defect in materials or workmanship in the AECU, will be recognised under this Warranty. The rights and remedies available to the Owner are available under any relevant Legislation or otherwise at law and any claim for compensation must be pursued outside the ambit of this Warranty.
- (b) This Warranty is in addition to other rights and remedies conferred upon consumers under any applicable Commonwealth, State or Territory Legislation, and otherwise all other warranties and representations as to the characteristics, performance, fitness or suitability for purpose and merchantability are hereby expressly excluded.
- (c) The meaning of words printed in bold is set out under the heading 'Definitions' on the following page of the guide.

Definitions

Assessment Form means the form provided by Safari to the Repairer which the Repairer is required to complete and return in order to obtain authorisation to commence repairs on the Owner's Vehicle;

Breakdown is defined in **paragraph 3**;

Legislation means the Competition and Consumer Act 2010, and any other statutory enactment of the Commonwealth of Australia, or of any Australian State or Territory, and includes and law, by-law, rule, regulation, or ordinance made pursuant to any such legislation;

Modification means any addition, deletion or alteration made to or from the Safari Armax Performance Device (or Part thereof) not approved Safari;

Owner means the owner of the Vehicle for the time being during the Warranty Period;

Part means any part, component or assembly of the Safari Armax Performance Device;

Repairer means such person who has performed, or who is expected to perform any repair, replacement or adjustment on the Safari Armax Performance Device (or Part thereof) as required by this Warranty;

Safari Armax Performance Device means Safari ARMAX ECU;

Safari means Safari 4x4 Engineering Pty Ltd (ACN 606 457 372);

Safari Instructions is defined in **paragraph (3)(b)**;

Servicing Handbook means the service handbook provided to the Owner by the Vehicle's manufacturer;

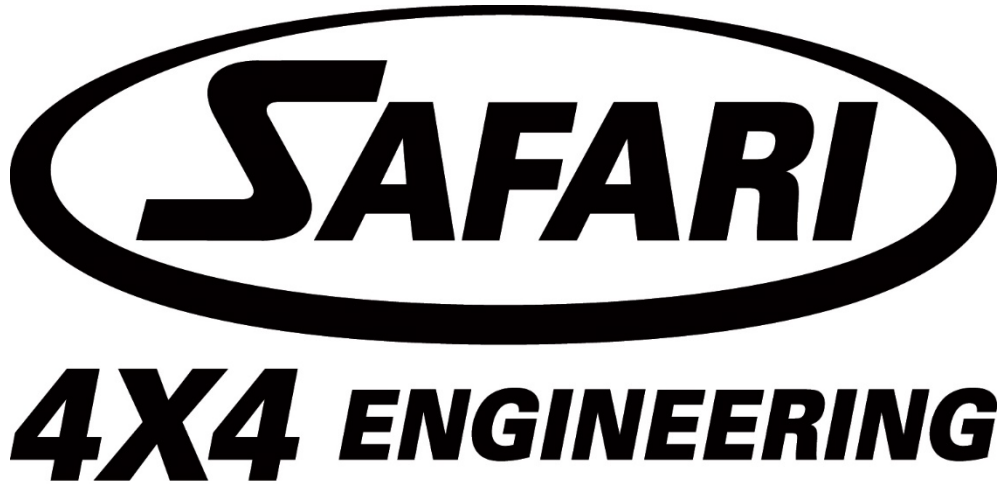
Vehicle means the vehicle containing the Safari Armax Performance Device and owned by the Owner for the time being during the Warranty Period, in respect of which any claim is to be made under this Warranty;

Warranty means this warranty;

Warranty Application Form means the form provided by Safari to the Owner which the Owner is required to complete and return in order to initiate a claim against this Warranty;

Warranty Period means the earlier of 5 years from the date of the Vehicle's manufacture or when the vehicle has travelled 100,000kms; and

Warranty Service means any repair, replacement or adjustment which is to be, or which has been, performed by the Repairer under this Warranty.



TERMS AND CONDITIONS OF WARRANTY

SAFARI ARMAX ENGINE CONTROL UNIT

1. The following warranties are given by Safari 4x4 Engineering Pty Ltd (ACN 606 457 372), the terms of which are accepted by the *Owner* upon placing an order for the *Product*.
2. *Safari* warrants to the *Owner* that, subject to **paragraph 3** below, during the *Warranty Period*, it will at its option and free of charge, repair, replace or adjust to pre-delivery standards at the premises of the *Repairer* the *Product* or any *Part* of the *Product* which it finds to be materially defective, under normal use and operation within Australia, provided that:
 - (a) the *Product* or any *Part* of the *Product* has not become defective as a result or consequence of the *Owner's* failure to properly maintain, install, use or operate the *Product* in accordance with the recommendations and instructions, and the capacity and operating limitations, specified for the *Product* by *Safari* (***Safari Instructions***); and
 - (b) the *Product* is under normal circumstances delivered at the *Owner's* expense to the *Repairer* for the carrying out of the required *Warranty Service* as soon as possible after the need for such *Warranty Service* becomes apparent.
3. Unless expressly agreed to by *Safari*, the *Warranty* will not apply to any defect in, or which is attributable to:
 - (a) any *Modification* made to the *Product* unless such *Modification* has been made by or at the direction of, *Safari*;
 - (b) the dismantling or removal of any *Part* not otherwise in accordance with *Safari Instructions*;
 - (c) vibration or collision damage or fair wear and tear to any *Part*, arising from incorrect installation not otherwise in accordance with *Safari Instructions*; and

(d) deterioration of the *Product* or any *Part* of the *Product* due to fair wear and tear including without limitation, deterioration to paint, polymer, acrylic or any decorative coatings.

4. For the avoidance of doubt

(a) any repair, replacement or adjustment made by *Safari* for the benefit of the *Owner* under this *Warranty*, shall not entitle the *Owner* an extension or recommencement of the *Warranty Period*; and

(b) a defective wiring harness will not entitle an *Owner* to a replacement *Product* and a defective *Product* will not entitle an *Owner* to a replacement wiring harness where the other is in ordinary working order.

5. The *Warranty* shall cover only the repair, replacement or adjustment of the *Product* or *Parts* thereof. No other type of claim or compensation of whatsoever nature (including labour costs or incidental, indirect, special or consequential damages such as, without limitation, loss of use, inconvenience, rental vehicle charges, towing charges or accommodation), notwithstanding that the same may have resulted from, or have arisen in consequence of, a defect in materials or workmanship in the *Product*, will be recognised under the *Warranty*. The rights and remedies available to the *Owner* are available under any relevant *Legislation* or otherwise at law and any claim for compensation must be pursued outside the ambit of this *Warranty*.

6. This *Warranty* is in addition to other rights and remedies conferred upon consumers under any applicable Commonwealth, State or Territory *Legislation*, and otherwise all other warranties and representations as to the characteristics, performance, fitness or suitability for purpose and merchantability are hereby expressly excluded.

7. The meaning of words printed in italics is set out under the heading 'Definitions' on the following page of the guide.

Definitions

Legislation means the Competition and Consumer Act 2010, and any other statutory enactment of the Commonwealth of Australia, or of any Australian State or Territory, and includes law, by-law, rule, regulation, or ordinance made pursuant to any such legislation;

Modification means any addition, deletion or alteration made to or from the Product not approved Safari;

Owner means the original Purchaser of the Product for the time being during the Warranty Period;

Part means any part, component or assembly of the Product, including but not limited to any housing, harness and plugs in respect of the Product;

Product means the Safari Armax Engine Control Unit and any Part thereof;

Repairer means such person engaged by Safari who has performed, or who is expected to perform any repair, replacement or adjustment on the Product as required by this Warranty;

Safari is defined in **paragraph 1**;

Safari Instruction is defined in **paragraph (2)(a)**;

Warranty means this warranty;

Warranty Period means the period expiring 3 years following the date on which the Product was purchased by the original Owner; and

Warranty Service means any repair, replacement or adjustment which is to be, or which has been, performed by the Repairer under the Warranty.