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# McCONEl

## AGRIBUGGY A280

### Low Ground Pressure Vehicle

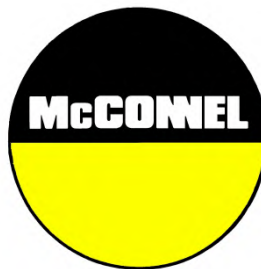
#### Operator Instruction Manual



# **AGRIBUGGY A280**

## **Low Ground Pressure Vehicle**

### **OPERATOR INSTRUCTION MANUAL**



## **McCONNEL LIMITED**

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England**

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[www.mcconnel.com](http://www.mcconnel.com)**

# **AGRIBUGGY A280**

## **OPERATOR INSTRUCTION MANUAL**

### **INTRODUCTION**

**THIS MANUAL SHOULD BE KEPT WITH THE MACHINE AT ALL TIMES AND SHOULD BE READ BY ALL OPERATORS BEFORE USING, MAINTAINING OR REPAIRING THE MACHINE.**

The Agribuggy A280 is powered by a diesel engine with automatic transmission and transfer box, providing mechanical drive to hub reduction axles. As standard it is four-wheel drive and has all wheel steer. To optimise weight distribution between all wheels it is of forward control configuration and constructed to achieve low ground pressure whilst maintaining durability.

IT IS SOLELY INTENDED for use in agricultural or similar operations, it has been designed specifically for use as a crop spraying and fertiliser spreading and therefore does not come within the scope of the Agriculture (Tractor Cabs) regulations. It should, therefore, not be used for any other purpose and should not be used for towing or be fitted with any other equipment unless approved by the manufacturer. The use of this machine in any other way is considered to be contrary to the intended use. The manufacturer accepts no liability for damage or personal injury resulting from improper use. These risks will be borne solely by the user. Improper use includes, but is not limited to the overloading of the machine and operating at excessive speeds for the prevailing conditions and or operation being performed. Operators are warned that improper use may lead to serious loss and injury. In the case of improper use the warranty may be invalidated.

Road Safety – When driving on public roads it is important to obey road safety regulations.

It is imperative that only correctly qualified people undertake operation, maintenance and repair of this machine.

After reading this manual and becoming acquainted with the Agribuggy it is recommended that you fill the sprayer with water only and have a trial run in a grass or stubble field. It is important that you get used to all aspects of operating the machine before applying chemicals.

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# WARRANTY POLICY

## WARRANTY REGISTRATION

All machines must be registered, by the selling dealer with McConnel Ltd, before delivery to the end user. On receipt of the goods it is the buyer's responsibility to check that the Verification of Warranty Registration in the Operator's Manual has been completed by the selling dealer.

### 1. LIMITED WARRANTIES

1.01. *All mounted machines supplied by McConnel Ltd are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months, unless a different period is specified.*

*All Self Propelled Machines supplied by McConnel Ltd are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months or 1500 hours. Engine warranty will be specific to the Manufacturer of that unit.*

1.02. *All spare parts supplied by McConnel Ltd and purchased by the end user are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 6 months. All parts warranty claims must be supported by a copy of the failed part invoice to the end user. We cannot consider claims for which sales invoices are not available.*

1.03. *The warranty offered by McConnel Ltd is limited to the making good by repair or replacement for the purchaser any part or parts found, upon examination at its factory, to be defective under normal use and service due to defects in material or workmanship. Returned parts must be complete and unexamined. Pack the component(s) carefully so that any transit damage is avoided. All ports on hydraulic items should be drained of oil and securely plugged to prevent seepage and foreign body ingress. Certain other components, electrical items for example, may require particular care when packing to avoid damage in transit.*

1.04. *This warranty does not extend to any product from which McConnel Ltd's serial number plate has been removed or altered.*

1.05. *The warranty policy is valid for machines registered in line with the terms and conditions detailed and on the basis that the machines do not extend a period of 24 months or greater since their original purchase date, that is the original invoice date from McConnel Limited.*

*Machines that are held in stock for more than 24 months cannot be registered for warranty.*

1.06. *This warranty does not apply to any part of the goods, which has been subjected to improper or abnormal use, negligence, alteration, modification, fitment of non-genuine parts, accident damage, or damage resulting from contact with overhead power lines, damage caused by foreign objects (e.g. stones, iron, material other than vegetation), failure due to lack of maintenance, use of incorrect oil or lubricants, contamination of the oil, or which has served its normal life. This warranty does not apply to any expendable items such as blades, belts, clutch linings, filter elements, flails, flap kits, skids, soil engaging parts, shields, guards, wear pads, pneumatic tyres or tracks.*

1.07. *Temporary repairs and consequential loss - i.e. oil, downtime and associated parts are specifically excluded from the warranty.*

1.08. *Warranty on hoses is limited to 12 months and does not include hoses which have suffered external damage. Only complete hoses may be returned under warranty, any which have been cut or repaired will be rejected.*

- 1.09. *Machines must be repaired immediately a problem arises. Continued use of the machine after a problem has occurred can result in further component failures, for which McConnell Ltd cannot be held liable, and may have safety implications.*
- 1.10. *If in exceptional circumstances a non McConnell Ltd part is used to effect a repair, warranty reimbursement will be at no more than McConnell Ltd's standard dealer cost for the genuine part.*
- 1.11. *Except as provided herein, no employee, agent, dealer or other person is authorised to give any warranties of any nature on behalf of McConnell Ltd.*
- 1.12. *For machine warranty periods in excess of 12 months the following additional exclusions shall apply:*
  - 1.12.1. *Hoses, exposed pipes and hydraulic tank breathers.*
  - 1.12.2. *Filters.*
  - 1.12.3. *Rubber mountings.*
  - 1.12.4. *External electric wiring.*
  - 1.12.5. *Bearings and seals*
  - 1.12.6. *External Cables, Linkages*
  - 1.12.7. *Loose/Corroded Connections, Light Units, LED's*
  - 1.12.8. *Comfort items such as Operator Seat, Ventilation, Audio Equipment*
- 1.13. *All service work, particularly filter changes, must be carried out in accordance with the manufacturer's service schedule. Failure to comply will invalidate the warranty. In the event of a claim, proof of the service work being carried out may be required.*
- 1.14. *Repeat or additional repairs resulting from incorrect diagnosis or poor quality previous repair work are excluded from warranty.*

***NB Warranty cover will be invalid if any non-genuine parts have been fitted or used. Use of non-genuine parts may seriously affect the machine's performance and safety. McConnell Ltd cannot be held responsible for any failures or safety implications that arise due to the use of non-genuine parts.***

## **2. REMEDIES AND PROCEDURES**

- 2.01. *The warranty is not effective unless the Selling Dealer registers the machine, via the McConnell web site and confirms the registration to the purchaser by completing the confirmation form in the operator's manual.*
- 2.02. *Any fault must be reported to an authorised McConnell Ltd dealer as soon as it occurs. Continued use of a machine, after a fault has occurred, can result in further component failure for which McConnell Ltd cannot be held liable.*
- 2.03. *Repairs should be undertaken within two days of the failure. Claims submitted for repairs undertaken more than 2 weeks after a failure has occurred, or 2 days after the parts were supplied will be rejected, unless the delay has been authorised by McConnell Ltd. Please note that failure by the customer to release the machine for repair will not be accepted as a reason for delay in repair or submitting warranty claims.*
- 2.04. *All claims must be submitted, by an authorised McConnell Ltd Service Dealer, within 30 days of the date of repair.*
- 2.05. *Following examination of the claim and parts, McConnell Ltd will pay, at their discretion, for any valid claim the invoiced cost of any parts supplied by McConnell Ltd and appropriate labour and mileage allowances if applicable.*
- 2.06. *The submission of a claim is not a guarantee of payment.*
- 2.07. *Any decision reached by McConnell Ltd. is final.*

## **3. LIMITATION OF LIABILITY**

- 3.01. *McConnell Ltd disclaims any express (except as set forth herein) and implied warranties with respect to the goods including, but not limited to, merchantability and fitness for a particular purpose.*
- 3.02. *McConnell Ltd makes no warranty as to the design, capability, capacity or suitability for use of the goods.*
- 3.03. *Except as provided herein, McConnell Ltd shall have no liability or responsibility to the purchaser or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by the goods including, but not limited to, any indirect, special, consequential, or*

*incidental damages resulting from the use or operation of the goods or any breach of this warranty. Notwithstanding the above limitations and warranties, the manufacturer's liability hereunder for damages incurred by the purchaser or others shall not exceed the price of the goods.*

*3.04. No action arising out of any claimed breach of this warranty or transactions under this warranty may be brought more than one (1) year after the cause of the action has occurred.*

#### **4. MISCELLANEOUS**

*4.01. McConnel Ltd may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.*

*4.02. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.*

*4.03. Applicable law may provide rights and benefits to the purchaser in addition to those provided herein.*

---

*McConnel Limited*



**EC DECLARATION OF CONFORMITY**



**McConnel Limited  
Station Road,  
Salford Priors, Evesham,  
Worcestershire, WR11 8SW.**

Machine Type: AGRIBUGGY LOW GROUND PRESSURE VEHICLE

Model: AGRIBUGGY A280

Build no.: .....

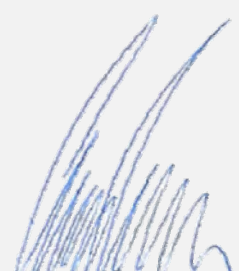
Serial no.: .....

Month/year of manufacture:.....

Complies with the required provisions of the Machinery Directive 2006/42/EC and 2009/127/EC.

The machinery directive is supported by the following harmonized standards;

- BS EN ISO 12100 (2010) Safety of machinery – General principles for design – Risk assessment and risk reduction.
- BS EN 349 (1993) + A1 (2008) Safety of machinery - Minimum distances to avoid the entrapment with human body parts.
- BS EN ISO 14120 (2015) Safety of machinery - Guards general requirements for the design and construction of fixed and movable guards.
- BS EN 4413 (2010) Hydraulic fluid power. Safety requirements for systems and their components.
- BS EN ISO 4254-1:2015. Agricultural machinery. Safety. General requirements.
- BS EN ISO 4254-6:2009. Agricultural machinery. Safety. Sprayers and liquid fertilizer distributors.
- BS EN 15695-1:2017 Agricultural tractors and self-propelled sprayers.

Signed  ..... General Manager  
*CHRISTIAN DAVIES on behalf of McCONNEL LIMITED.*

Date: February 2019

## Safety Precautions



**THIS IS THE SAFETY ALERT SYMBOL**

**WHEN YOU SEE THIS SYMBOL IN THIS MANUAL BE ALERT TO THE POTENTIAL FOR PERSONAL INJURY.**

**MAKE SURE WHEN READING THROUGH THIS MANUAL YOU OBSERVE ALL SPECIAL NOTE WARNINGS TO AVOID EITHER PERSONAL INJURY OR MACHINE DAMAGE.**



1. Read this manual thoroughly before operating the machine.
2. Always operate the machine in a proper and safe manner observing all safety and traffic regulations.
3. The machine should not be driven at speeds in excess of 30 m.p.h. (50kph)
4. Maximum laden weight should not exceed 7.5 tonnes
5. When operating in adverse terrain be aware of machine limitations and the centre of gravity of load tyre pressures etc.
5. Never allow children or unqualified persons to operate the machine.
6. Ensure operators are fully trained in the use and approved to operate the machine before commencing operation.
7. Always wear your safety belt securely fastened.
8. Wear all the appropriate PPE (personal protective equipment).
9. Avoid operating the machine near ditches and embankments; reduce speed when negotiating turns, slopes and on rough and slippery surfaces.
10. Do not operate on hazardous inclines where there is a danger of overturning.
11. Do not permit other than the driver to ride on the machine.
12. Keep your machine in sound mechanical working order. Unauthorised modifications to the machine may impair the safety and function of the machine and could invalidate warranty.
13. Replace any damaged or obscured safety decals with identical items available from your dealer see page 15 for further details.



## Operators Cab



1. Jumping in and out of the cab or getting into or out of the cab without care and attention may result in injury.
2. The cab step folds away when the machine is in operation, before using the step ensure it is positioned correctly and locked in position.
3. Always use the grab handles provided as an aid to entering the cab. Before opening or closing the doors always ensure that no one is standing in the near vicinity to prevent possible injury.
4. Never attempt to start the machine from anywhere except seated in the driving seat. Never start the engine with the main gearbox or power take-off engaged. The forward/reverse lever must be in the neutral position before the starter will operate.
5. Always stop the engine before working on the machine. Ensure the ignition key is removed.
6. Adjust the seat position to suit and driver's weight setting on the seat suspension before starting the machine. Do not attempt to adjust the seat position whilst driving the vehicle. (Page 30)
7. Do not attempt to adjust the steering column whilst the vehicle is in motion. After adjustment, ensure the steering column is firmly tightened before driving the vehicle. (Page 34)
8. Always ensure the driver's door is closed when using the vehicle.
9. Do not make alterations, drill holes or weld to the cab.
10. The A-weighted emission sound pressure level at the driver's position has been measure typically in normal operating conditions at 70 dB(A) and a maximum of 77.5 dB(A). It is important to maintain the integrity of all of the sound insulation material.



## Brakes

1. Ensure the park brake is applied prior to leaving the vehicle.
2. Ensure that the park brake is in the park position and the operator is sitting in seat before starting the engine.
3. Excessive use of the vehicles brakes when travelling down steep gradients may cause overheating and brake fade. Always select a low gear when descending a steep gradient to make use of engine braking.



## Electrical

1. Disconnect main battery leads before working on the electrical circuit, disconnect (-) terminal first.
2. Isolate controls to prevent actions by others causing dangerous movement and possible injury.
3. To avoid overloading the electrical circuits in the event of a fault, do not attempt to fit a fuse in the excess of the recommended amperage. Failure to observe this warning may result in an electrical fire. (See page 64 for fuse information).
4. Persistent fuse failure is an indication of an electrical fault, which should be rectified by a qualified auto-electrician.



## Steering

Please remember that 'Road Mode' must ALWAYS be engaged for use on the road. The rest of the steering modes are intended ONLY for fieldwork at the lower speeds.



## Maintenance

1. Maintenance work should only be undertaken by a skilled vehicle mechanic fully conversant with the Agribuggy vehicle and sprayer systems.
2. Wheel chocks must be used at all times when performing maintenance and/or service duties.
3. Before carrying out any repairs or welding on the Agribuggy, the sprayer or the spreader, remove all chemical and fertiliser residues with a pressure washer or steam cleaner together with a suitable detergent and brushing if necessary - Burning chemical fumes are extremely toxic - Ammonium Nitrate (e.g. Nitram) can be explosive. Chemical residues are extremely hazardous to anyone working on the machine. Disconnect both the positive (+) and negative (-) battery cables from the battery. Attach the welder ground cable no more than 0.61 meters [2 feet] from the part being welded. Do not connect the ground clamp of the welder to any of the sensors, wiring harness, electronic control units or the components. Direct welding of any electronic components must not be attempted. Sensors, wiring harness, and electronic control unit should be removed if nearby welding will expose these components to temperatures beyond normal operation. Additionally, all electronic control unit connectors must be disconnected.
4. When the stop warning is displayed on the Machine Control Unit (MCU), the vehicle must be stopped as soon as safety conditions permit and the fault rectified before continuing.
5. Always use the correct PPE personal protective equipment when maintaining the machine.
6. Never have the engine running when the engine hood /panels are open.
7. Never run the engine in a closed environment. Always ensure there is sufficient ventilation to allow fumes to disperse safely.
8. Ensure that nobody is near power take off (PTO) shafts or any PTO driven implement before engaging the PTO valve. Never work on a machine with the power take off or engine running.
9. Before carrying out service work stop the engine and allow it to cool. Always follow the recommended service proceedings.
10. Do not attempt to remove the radiator header tank filler whilst the engine is running or still hot.
11. Do not attempt to fill or top up a hot engine with cold coolant.
12. Engine coolant / antifreeze is a toxic substance that must not be consumed or allowed to come into contact with the skin or eyes. Thoroughly rinse the affected areas with water, for excessive skin or eye contact, seek medical attention immediately.
13. Avoid fluids under pressure coming into contact with the skin. Relieve system pressures first before working on high pressure pipes, fittings, etc. tighten all loosened connections before re applying pressure, be aware that the machine has hydraulic accumulators in the hydraulic circuit.



14. If fluid is accidentally 'injected' into the skin by contact accidentally being made with high-pressure fluid, consult a doctor immediately.

**Maintenance (continued)**

15. Hydraulic hoses can fail if physically damaged, kinked or through age and exposure. All hoses must be inspected regularly and replaced if damaged, particular attention should be paid to steering and braking hoses.
16. Hydraulic fluid connections can loosen due to damage and vibration. Connections should be regularly checked and any loose connections tightened. Pay particular attention to steering and brake hoses.
17. When checking for the source of a leak use a sheet of card, keep skin protected at all times.
18. Prolonged and repeated contact with oil may cause serious skin disorders, including dermatitis and cancer. Wash thoroughly after contact. Keep out of reach of children.
19. Diesel exhaust fluid (DEF) contains urea. Do not get the substance in your eyes. In case of contact immediately flush eyes with large amounts of water for a minimum of 15 minutes. Do not swallow in the event of ingestion contact a physician immediately.
20. If any safety critical faults are found during the daily / weekly checks and inspections. They must be rectified before using the vehicle.
21. Do not run the engine with the vehicle in a confined area – exhaust gases are poisonous which can be fatal if inhaled. Always use suitable extraction equipment.



22. Fuel spillages are highly inflammable – avoid naked flames and switch off engine when filling fuel tank.
23. Care should be taken to prevent the contamination of drains and waterways; fuel spillages should be dealt with in accordance with local regulations governing the disposal of waste.



24. Keep clear of rotating components such as fans, drive shafts and drive belts.
25. Use the designated attaching points for mounting implements etc. Contact McConnell Limited for a copy of the body builder's instructions drawing for implements or attachments to be carried on the machine chassis.
26. Caution: Battery gas can explode. Keep sparks and flames away from batteries. Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer. Always remove ground (-) battery clamp first and replace it last.
27. When working in the vicinity of the front and rear wheels be aware on the danger of becoming trapped / crushed between the chassis and wheel, do not get into a position where this can happen.

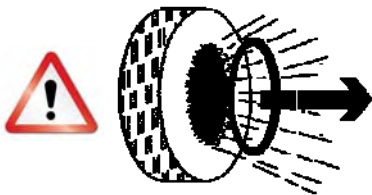
## Cleaning the Machine

1. Keep the machine clean and free of corrosive substances. Do not allow dirt / fertilisers to build up on the engine, particularly ammonium nitrate - this can create a fire hazard!
2. Before cleaning the machine ensure that the engine is stopped, handbrake is on and ignition key is removed.
3. Clean steps, pedals and floor. Remove grease, oil, dust and mud – slippery surfaces are hazardous.

**NB If any factory or field repairs have to be carried out on a contaminated machine we reserve the right to either refuse to carry out the work or to charge for any necessary cleaning.**

## Tyres and Pressures

1. Always follow correct safety procedures when fitting tyres and/or inflating them. Ensure any tyres fitted are capable of carrying the required load. Consult your tyre dealer for advice. Never over inflate a tyre.
2. Service tyres safely, check tyres for cuts, bubbles, damaged rims and missing wheel nuts, where necessary replace with specified parts.  
Do not service tyres unless you have sufficient experience and correct equipment.

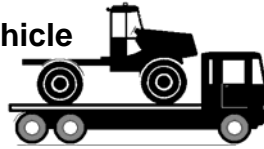


3. Contact with air under pressure can cause personal injury. Only inflate the tyre to the recommended pressure quoted in the tyre manufacturer's handbook.
4. Failure to follow the manufacturers recommended inflation pressures may lead to distinct deterioration in performance and tyre life. Tyre condition should be checked at regular intervals to prevent potentially dangerous operation of the vehicle.
5. Do not operate the vehicle overloaded or with the tyres under inflated. Tyre temperatures may rise to dangerously high levels resulting in tearing and blowouts.
6. Wheels are heavy objects – care must be exercised when removing or replacing wheels on the axle, so as not to incur injury or damage to wheel studs. Ensure that the vehicle is securely supported before removing a wheel(s).
7. It is important to tighten the wheels nuts to the correct torque loading and in the correct tightening sequence. The torque figures can be found on page 67.
8. When changing wheels, you must adjust the steering stops on the front and rear axle to prevent the tyres coming into contact with the chassis. See set-up procedure for steering stops on page 65.





**Towing and Recovery of Vehicle**



1. Before attempting to tow the vehicle the conditions should be assessed to ensure the safest possible method is used, and that no risk is taken by ensuring suitable equipment is used. Towing of the vehicle should only be with a rigid tow bar.
2. Ensure that all wheels are chocked prior to removal of the rigid tow bar between the vehicles.
3. The towing speed must in no case be higher than 10 km/h, the tow distance no greater than 10 km; otherwise damage will be caused because of lack of lubrication.



4. **The Agribuggy is fitted with power assisted brakes and should not be towed when the engine is switched off. The brake system will have no assistance without the engine running. Towing of the vehicle should only be with a rigid connector.**



**CAUTION Spraying**



1. The cab cannot fully protect against inhaling vapour, aerosol or dust, when operating in an environment where pesticides are present, wear appropriate clothing and if pesticides instructions call for it a respirator in and outside the cab.
2. To prevent ingress of hazardous substances into cab ensure: Doors and windows are closed, all seals (doors, windows) are in good condition, grommets for cables in the cab sealed properly, the air conditioning fan is ON and cab air filters are the correct type and in good condition
3. Wear personal protective equipment as called for in the pesticide instructions when leaving the cab to enter a treated area, when mixing and loading chemicals and when working on contaminated equipment such as nozzles.
4. Before entering the cab remove any clothing soiled with pesticide and ensure that footwear is free from contamination.
5. Clean Vehicle of Hazardous Pesticides. During application of hazardous pesticides, pesticides residue can build up on the inside and outside of the vehicle. Clean the vehicle in accordance with current legislation to the instructions of hazardous pesticides. Wash down entire exterior of vehicle disposing of any wash water with hazardous concentrations according to published regulations.



**DANGER Overhead Power Lines**

1. Be aware of Overhead Power Lines in the vicinity of the machinery during the unfolding procedure and whilst working. Ensure all components of the machine are kept at a safe distance from power lines at all times. Remember electrocution can occur without actually coming into contact with a power line as electricity can 'flashover' when machinery gets close to it.
2. Where doubt exists, contact the local Distribution Network Operator (DNO) who will be able to advise you on the operating voltage, safe minimum clearance distance for working, and additional precautions required.

**Overhead Power Lines (OHPLs)**

It cannot be stressed enough the dangers involved when working in the vicinity of Overhead Power Lines (OHPLs). The lowest legal minimum height for 11,000 and 33,000 volt power lines is 5.2 metres from the ground. Agribuggy machines with standard booms mounted are capable of 3.9m vertical reach and 24m horizontal reach.

Remember electrocution can occur without actually coming into contact with a power line as electricity can ‘flashover’ when machinery gets close to it.

**⚠ WARNING**

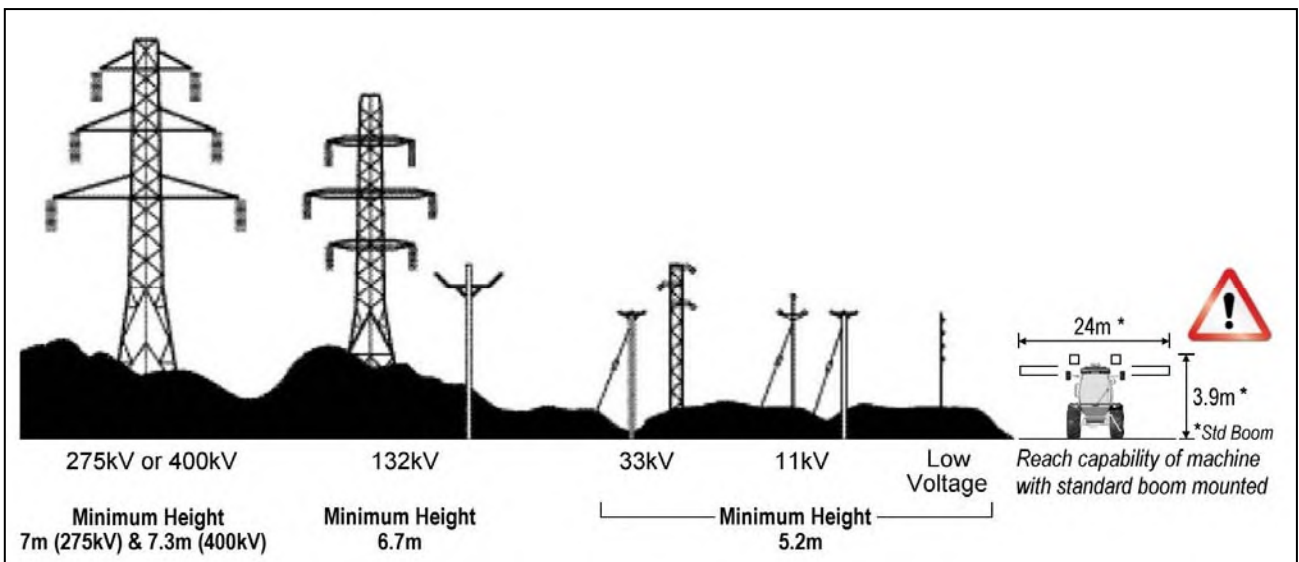
**All operators must read the following information and be aware of the risks and dangers involved when working in the vicinity of Overhead Power Lines (OHPLs).**

Wherever possible the safest option is always to avoid working in areas close to OHPLs.

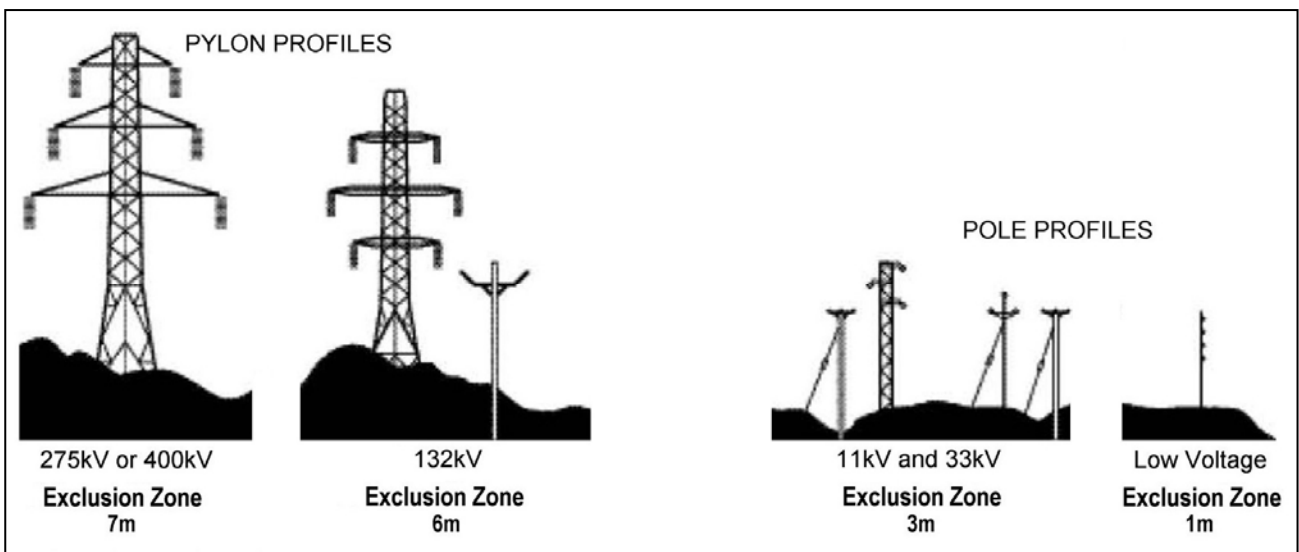
Where unavoidable, all operators must perform a risk assessment and implement a safe procedure and system of work – see *following page for details*.

All operators should perform a risk assessment before operating the machine within 10m horizontal distance of any OHPLs.

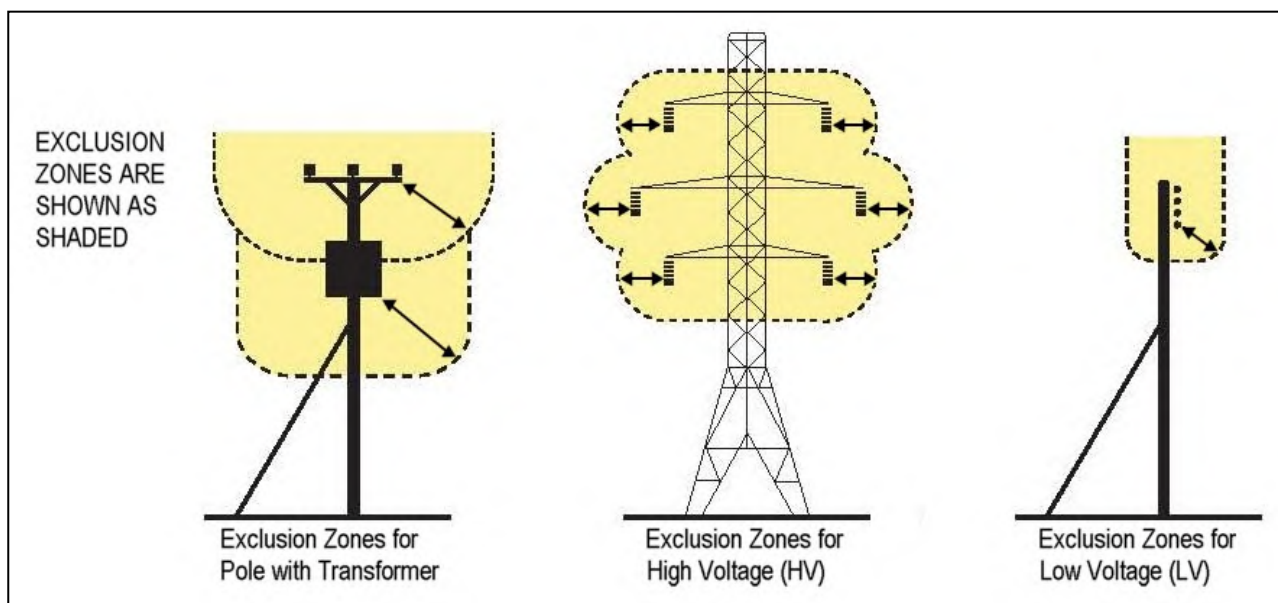
**Minimum Heights for Overhead Power Lines**



**Absolute Minimum Exclusion Zones for Specific Overhead Power Lines**



## Definitions of Exclusion Zones



### Risk Assessment

Before starting to work near OHPLs you should always assess the risks. The following points should be observed;

**Know** the risks of contacting OHPLs and the risk of flashover.

**Find out** the maximum height and maximum vertical reach of your machine.

**Find out** the location and route of all Power Lines within the work area.

**Find out** the operating voltage of all Power Lines within the work area.

**Contact** the local Distribution Network Operator (DNO) who will be able to advise you on the operating voltage, safe minimum clearance distance for working, and additional precautions required.

**Never** attempt to operate the machine in exclusion zones.

**Always** work with extreme caution and plan your work ahead to avoid high risk areas.

**If doubt exists** do not work in the area – never risk the safety of yourself or others.

### Emergency Action for Accidents Involving Electricity

- Never touch an overhead line - even if it has been brought down by machinery, or has fallen. Never assume lines are dead.
- When a machine is in contact with an overhead line, electrocution is possible if anyone touches both the machine and the ground. Stay in the machine and lower any raised parts in contact or drive the machine out of the lines if you can.
- If you need to get out to summon help or because of fire, jump out as far as you can without touching any wires or the machine - keep upright and away.
- Get the electricity company to disconnect the supply. Even if the line appears dead, do not touch it - automatic switching may reconnect the power.

Further information and leaflets on this and other agricultural safety subjects are available on the 'Health & Safety Executive' website at the following address: [www.hse.gov.uk/pubns/agindex.htm](http://www.hse.gov.uk/pubns/agindex.htm)

## Safety Decals

### **⚠ WARNING**

To alert the operator to potential hazards several safety decals are affixed to the vehicle. These warnings should be considered so that the risk of personal injury is minimised.

If the decals become worn or defaced they should be replaced with identical items available from your dealer.



Mounted on the right hand B post inside the cab.

Warnings regarding:

4 Wheel Steer.

Do not exceed 50 KPH (subject to local road legislation).

Read the Instruction manual before using the machine.

Chock wheels before performing maintenance.

Beware of overhead cables.

'Power Cut' contact telephone number **CALL 105**



Air Decal located on out facing surface of air tanks; drain daily.



Hand wash tap: located on left hand engine cover



Crush Zone; located on both chassis rails forward of rear axle



Stop engine before accessing engine compartment; located on engine covers.



Caution Chemicals: Located on chemical induction hopper



Maintenance Caution; Located on side of chemical inductor



Sprayer filter, located on both the primary and secondary filters; Flush Filters Daily.



**POWER CUT? CALL 105**

**105** is the national emergency number for Distribution Network Operators (DNO's); ringing this number automatically connects you to the local DNO who can locate an incident and disconnect the power as soon as possible.

## **Operation - Driving Controls**

### **Running in and first 100 hours of operation**

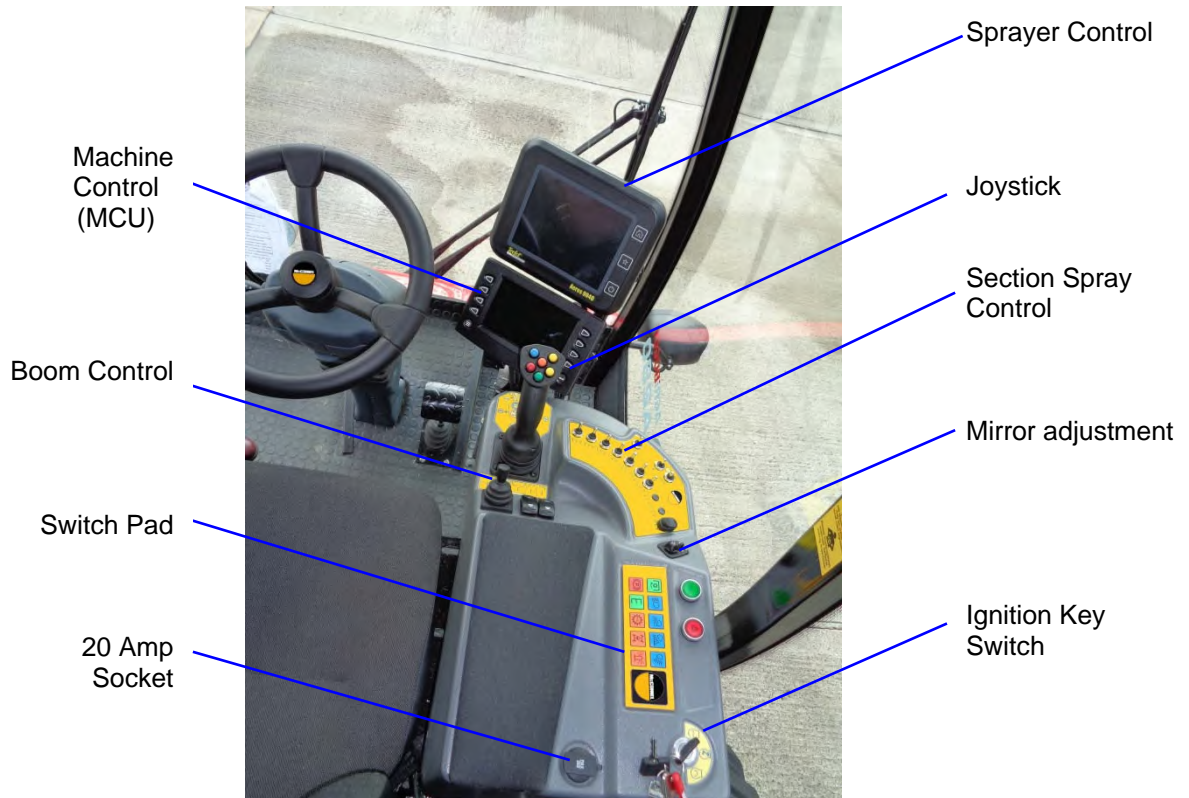
There are no strict 'running in' rules for the Cummins diesel engine. However, do not treat it harshly during the first fifty hours running. Avoid consistently high speeds, but do not let the engine labour. There should always be a positive response from the throttle. Select the right gear for the job. Be prepared to reduce your working speed if necessary. Check the Machine Control Unit (MCU) frequently and keep the coolant and oil filled to their recommended levels on a daily basis.

Be aware that the engine operates with a selective catalytic reduction (SCR) system and requires Diesel Exhaust Fluid (DEF) (see page 53 for details). The DEF is injected into exhaust system to convert the nitrogen oxide (NOx) produced by the engine into nitrogen and water. When it is cold and very dry water vapor may be seen coming from the exhaust, this is normal. Attempting to run the vehicle without DEF will result in the vehicle speed being drastically reduced.

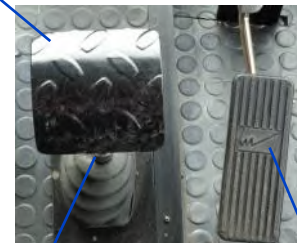
**On completing the first 100 hours running, carry out the maintenance instructions summarised in the maintenance section of this manual.**



### Cab Interior and Main Controls



Multifunction Column Switch



Foot brake

Throttle Pedal



**Stowage Locker and Document Pouch**

Stowage is provided under a padded cover to the left-hand side of the driver's seat. To the rear is a cup and flask holder behind which is a document pouch.



**Radio**

The radio is fitted in the roof panel on the right hand side of the cab. The radio is Bluetooth enabled.



**Door Switch / Interior Light / Safety Interlock**

The door switch controls the interior light and is also linked to the hydraulic boom folding controls and the automatic step control.

You should always close the cab door before operating the boom folding/height controls to avoid the boom coming into contact with the door.

You should also close the cab door before raising the step. If the automatic control that raises the step when the handbrake is switched off is engaged, it will not work with the door open.



Press to turn on      Press to turn off

**Charging Socket**

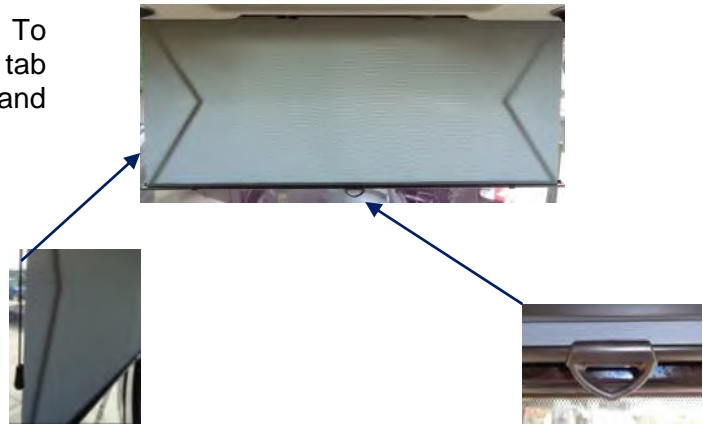
**Note;** maximum current draw of 5 AMP

5 Amp (MAX) Charging Socket



**Sun Visor**

A sun visor is provided to reduce glare. To operate the sun visor, pull the central tab downwards. To retract pull the cord to left hand side of the visor.



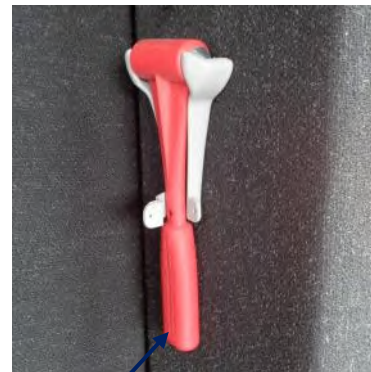
**Emergency Exit**

In the case of an emergency where the door cannot be opened an emergency hammer is provided, located as shown on the rear left-hand side of the C post adjacent to the rear bulkhead.

In emergency remove the hammer and strike the glass from which escape is safe

SMASH the window by swinging Emergency Hammer overhand, like a household hammer. One or two strikes should shatter the glass. Either of the two heads of the hammer can be used for this purpose.

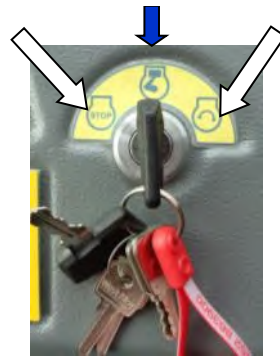
SHEILD your eyes and face from the glass, and instruct others to do the same. Still using Hammer, scrape the remaining glass from the window edges and exit the cab.



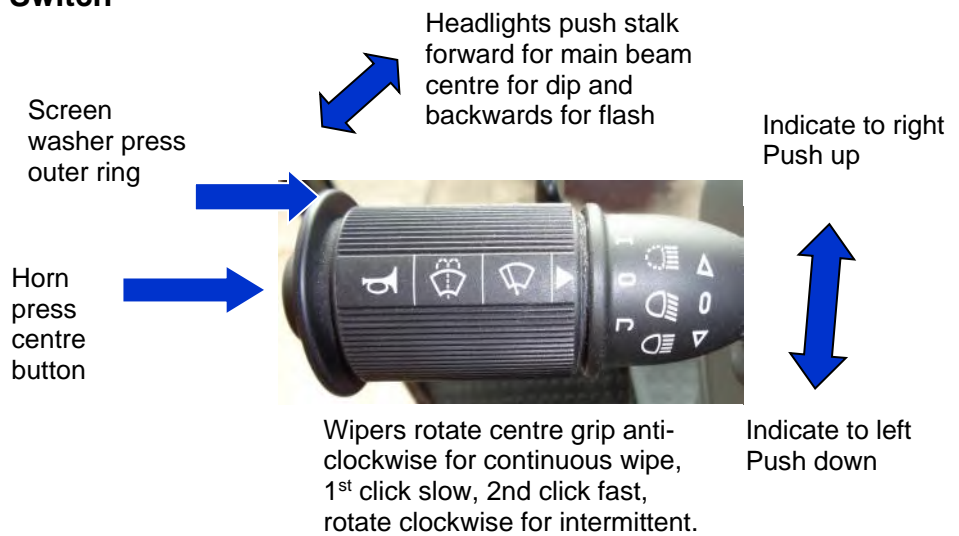
Hammer

**Key Switch**

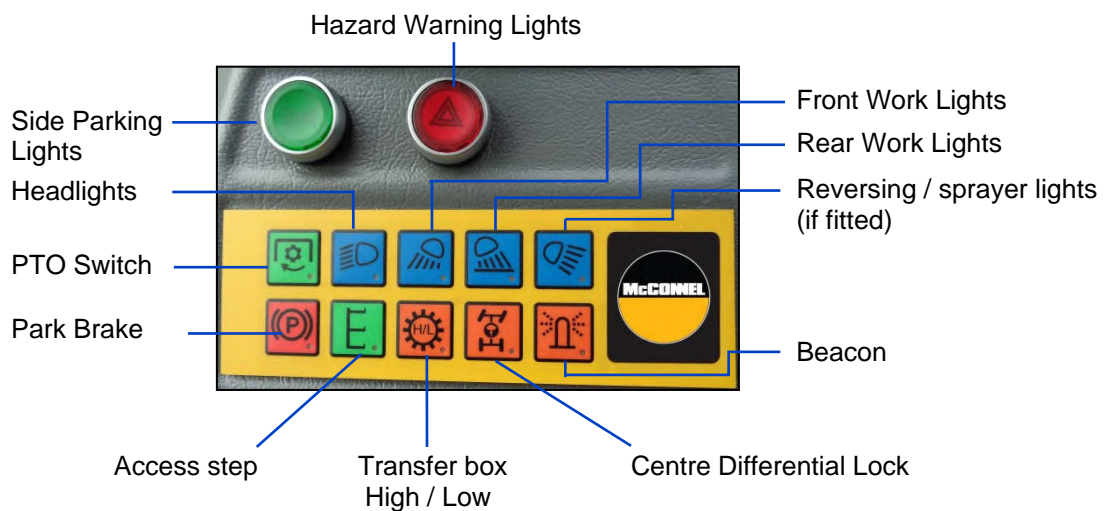
Stop Ignition on Start engine



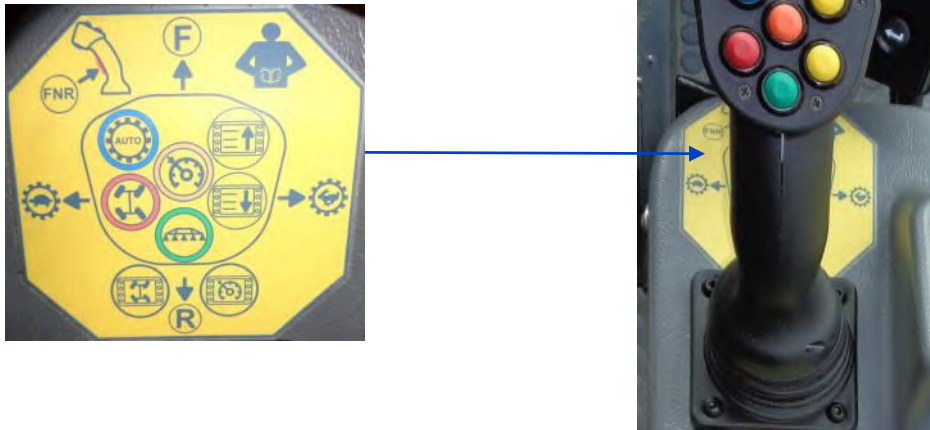
**Multifunction Column Switch**



**Push Button Panel**

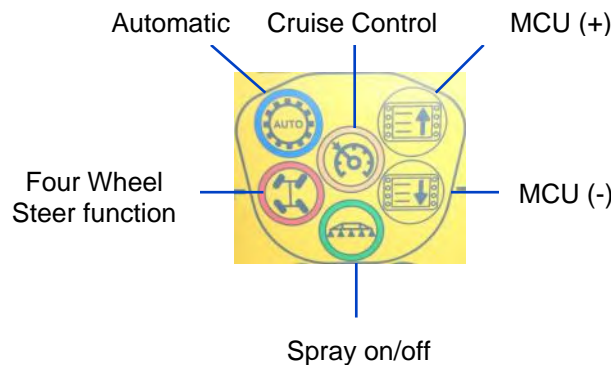


**Joystick Control**



The multifunction joystick has six function buttons on the face and two on the reverse. For transmission control the stick has movements fore and aft and side to side and a button on the stem (see transmission control section). The functions are as shown on the decal immediately in front of the joystick.

The buttons on the face have the functions as detailed below.



The two buttons on the obverse have the following functions



**Machine Control Unit (MCU)**

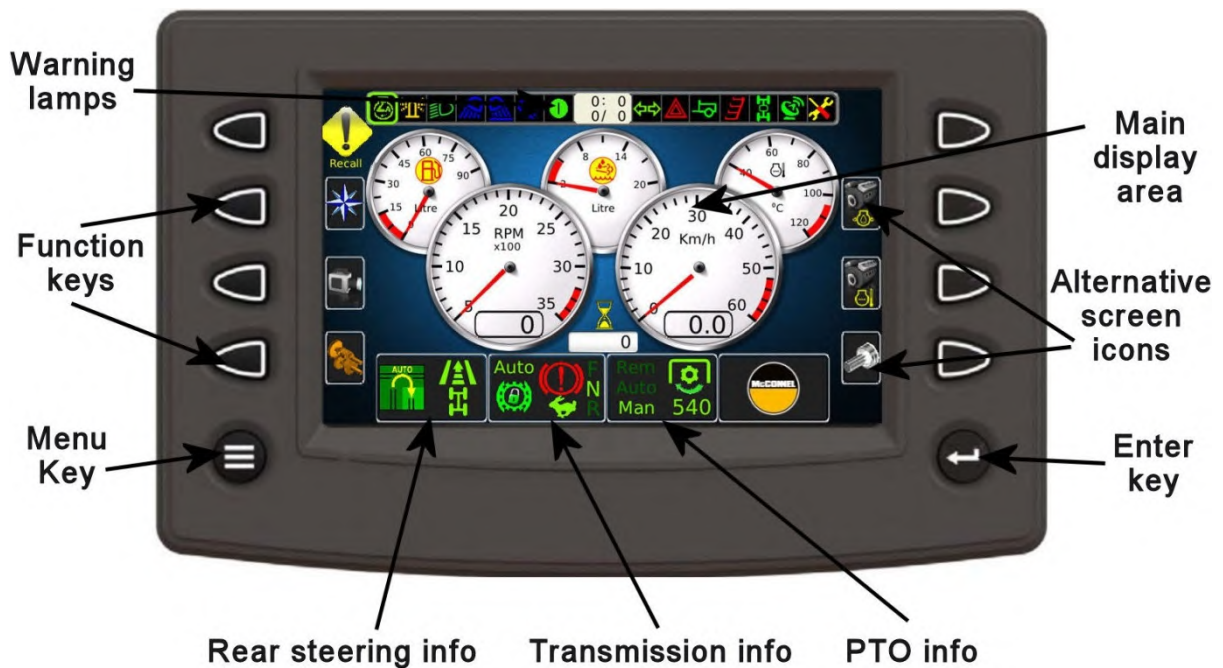
The MCU is the only display unit for the machine and not only displays a multitude of information but also controls various machine functions in conjunction with other controllers on the machine. It is an integral part of the electrical system and the machine will not function without it.

The main functions of the MCU are as follows:

- Monitoring engine functions and errors.
- Monitoring transmission functions & errors.
- Monitoring and control of the gearshift system and interlocks.
- Monitoring machine sensors, fluid levels and warning systems.
- Monitoring of functions, errors, controlling & set-up of rear steer system in conjunction with the Plus1 controller and joystick.
- Monitoring of functions and controlling & set-up of PTO system in conjunction with the Plus1 controller and the switch panel / remote PTO panel.
- Monitoring and control of the cruise control in conjunction with the engine ECM and the joystick.
- Controlling the various safety interlock systems.
- Controlling the High/low range shift and speed interlocks.
- Controlling the step.
- Controlling the handbrake & interlocks.
- Calculating forward speed from GPS & transmission output shaft speed.
- Monitoring service intervals.
- Display of up to 3 video cameras

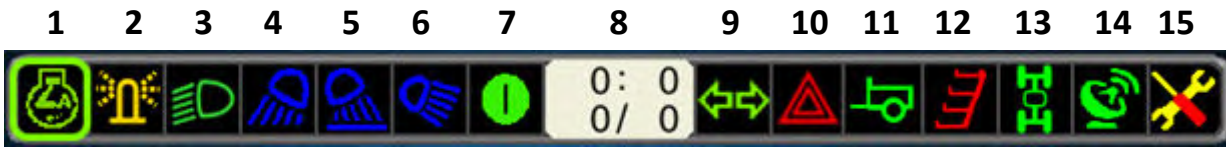
**The Main Display – Home screen**

The main home screen shows information in 3 main areas – Main Display, Warning Lamps and Machine Info. By pressing the function buttons at the side of the screen other screens can be accessed which are indicated by the icons down the side of the screen. These icons and the key functions will change according to the screen being displayed at the time. In operating mode, the machine information and warning lamps will be on display at all times.





Warning Lamps



1/ Cruise standby, engine mode.



1/ Cruise Standby, speed limit mode.



1/ Cruise active – engine speed mode.



1/ Cruise active – speed limit mode.



1/ Headland mode active.



1/ Road speed limiter active.



2/ Flashing beacon.



3/ Side lamps.



3/ Headlamps (Dipped beam).



3/ Headlamps (Main beam).



4/ Work lamps – front cab.



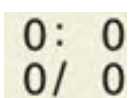
5/ Work lamps – rear cab.



6/ Reverse/sprayer lamps (If fitted).



7/ Sprayer / implement on/off.



8/ Time and date display.



9/ Direction indicators.



10/ hazard warning flashers.



11/ Trailer direction indicators.



12/ Step (down position).



13/ Diff lock engaged.



14/ GPS speed sensor active.



14/ Ground speed sensor active.



15/ Service due.

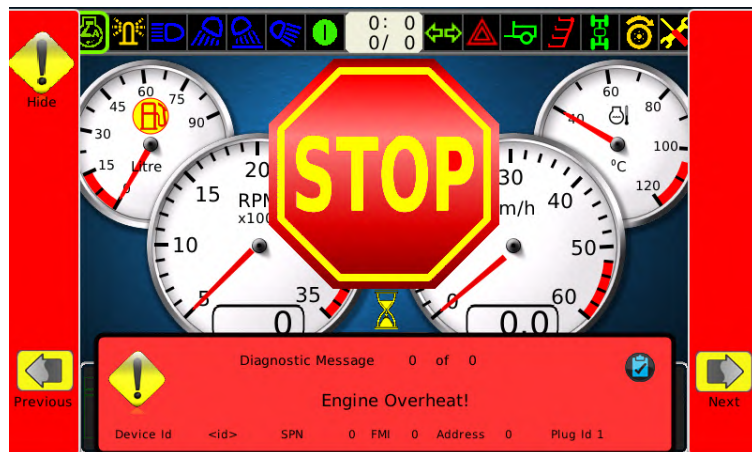


**Error Warnings**

In addition to the warning lamps there is also an error warning system to alert the operator to various other machine problems. There are two warning levels as shown below which depend on the severity of the problem. The warning screens show what the problem is in plain English and in many cases show how the problem can be checked or resolved.



The orange screen above shows a warning of medium severity which means you should stop at the first opportunity and investigate the problem.



The red screen above indicates a serious problem and is accompanied by a flashing “Stop” sign. You should stop immediately to investigate or damage to the vehicle/engine could ensue. The warning may also be a safety issue which could mean it’s dangerous to continue.

If there is more than one message, you will get “Diagnostic message 1 of xx” showing – press the “Next” key to see the next message.

If the message is medium severity (orange) you can temporarily hide the message(s) by pressing the “Hide” key. The hide key will then be replaced by a “Recall” key which allows you to recall the message(s) at any time.

If you require any further assistance regarding errors and need to call us we will also require the following codes from the bottom of the screen;

**Device ID** – tells us which ECU is sending the error – e.g. engine, transmission or steering controller.

**SPN** – The error code number – may allow us to find more information.

**FMI** – A code that may give us the nature of the error.

### Rear Steering Information Area

Please see the appropriate section in the manual for the rear steering operating instructions.



Road mode, headland mode off.



Road mode, headland mode on.



Four-wheel steer mode.



Delay mode.



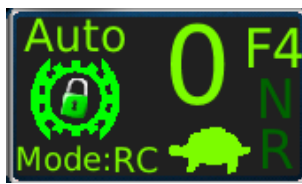
Requested mode pop-up  
(disappears when mode has changed).



Crab mode.

### Transmission Information Area

Please see the appropriate section in the manual for the transmission operating instructions.



Automatic mode selected.



Manual mode selected.



Torque converter locked.



Torque converter unlocked.



Handbrake on.



Actual current gear (Neutral shown).



Forwards, Neutral, Reverse.  
Indicator (Neutral shown).



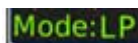
Requested gear indicator.  
(Forwards, 3<sup>rd</sup> shown).



High range selected.



Low range selected.



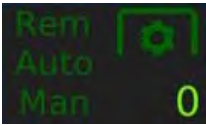
Transmission mode 'A' selected for use with standard 'Low Pressure Wheels'.



Transmission mode 'B' selected for use with 'Row Crop Wheels'.

**PTO Information Area**

Please see the appropriate section in the manual for the power take off operating instructions.



PTO switched off.



PTO switched on in manual mode. Speed shown at 540 rpm.



- Mode indicator:
- Remote Switch.
  - Automatic Speed Control.
  - Manual Speed Control.

**Alternate Screens**



Most of the screen options are self-explanatory and purely show additional information – e.g. transmission, engine, GPS and video cameras. You can return to the main display at any time by pressing the “Home” button.

For information on the PTO screen and operating the PTO please see the appropriate section in the manual.

### Pop-up Menu



You can access the quick access pop-up menu by pressing the “Enter” key.



From top to bottom on the right hand side you can:

- 1/ Change the time period for the intermittent wipe from 3 secs to 15 secs by toggling the key.
- 2/ Pull up the service interval screen which will show the time period left to the next services.
- 3/ Pull up the time & date.
- 4/ Change from day mode to night modes. The latter dulls the instruments and reduces the glare.

On the bottom left you can change the transmission from “A” mode to “B” mode. This selects the most suitable transmission mappings depending on the type of wheels fitted.

### Set-up menus



You can enter the set-up menu system by pressing the “Menu” key.



The “Technician” & “Factory” menus are both locked and can only be accessed by McConnell Technicians. Press the “Gauge Display” key to return to the home page. The other menus that can be accessed are as follows.



### Service & Diagnostics



**Can-Bus inputs** – This screen shows some information that may be useful for fault finding.

**Inputs & outputs** – This screen also shows information that may be useful for fault finding.

### Service Reminders



The service reminder screen shows the main service intervals, when each service is next due and the hours remaining to each service. When a service has been carried out you can select the service by scrolling up and down using the arrows on the left and then press reset. This will extinguish the service warning lamp on the main screen and will reset the number of hours due to the next service.

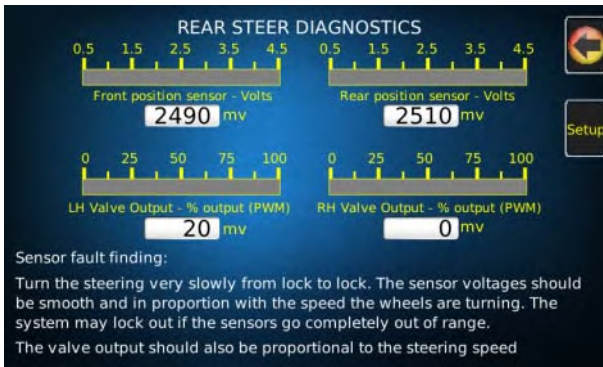
### Engine Diagnostics

The Engine diagnostics screen will show any errors that are stored in the engine ECU and how many times they have occurred. It can only be cleared by running the Cummins engine diagnostic software.

### Machine Setup Menu



## 4WS Setup and Diagnostics



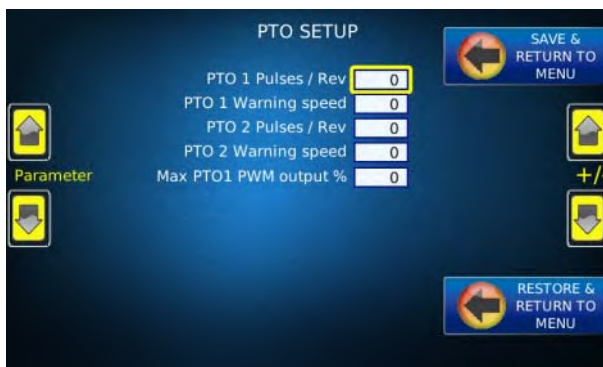
### Steering Diagnostics

The rear steer diagnostic screen is useful to assist in fault finding should a fault develop in the rear steer system – there are some basic instructions on the screen.

### Rear Steering Wheel Alignment and Setup

Please see the appropriate section in the manual regarding the setting up of the steering system.

### PTO Setup



To alter parameters scroll up and down using the arrow keys on the left hand side to select the parameter you wish to adjust then use the right hand keys to adjust the figures up/down. Press Save & return to save your settings.

The PTO settings are pre-set at the factory and do not normally require adjustment unless the machine is being used for some other purpose. Most of the parameters are self-explanatory other than the last one:

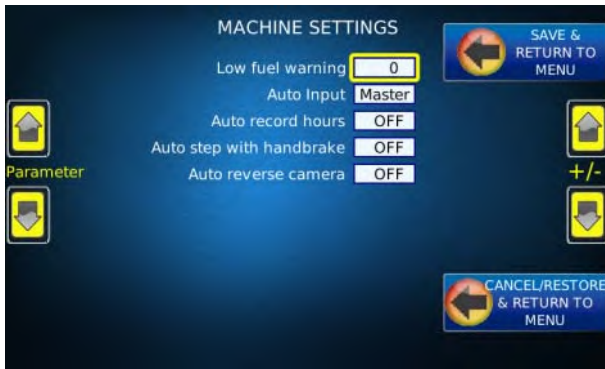
#### Maximum PTO 1 PWM Output %

This parameter is used to protect the PTO motor / spray pump from over speeding by someone inadvertently setting the PTO to run at too high a speed on the main PTO page. The PWM output % means the maximum percentage oil flow that can be sent out from the valve.

With the engine running at maximum speed it is possible to get 51 litres per min out of the PTO valve with this figure set at 100%. With it set to the default figure of 75% this is reduced to approx. 38 lpm.



## Machine Settings



**Low Fuel Warning** – Default 15 litres, fuel tank capacity is 90 litres.

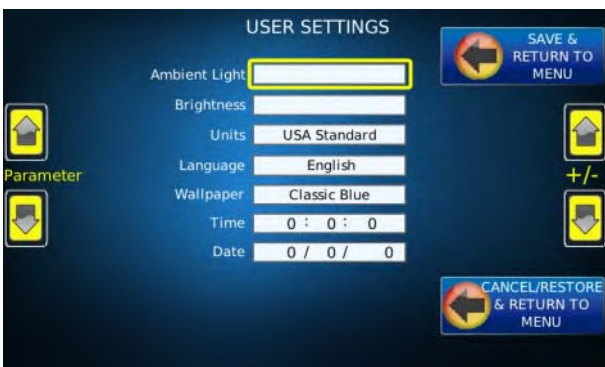
**Auto Input** – For headland control the cruise control and rear steering is normally activated by the green joystick button (sprayer on/off). It is possible to wire in an external connection so the headland control is activated by a remote switch (e.g. on a fertiliser spreader shut-off).

**Auto Record Hours** – Not currently used.

**Auto Step with Handbrake** – Default set to on – this causes the step to lift up and go down when the handbrake is switched on/off. NB it will only lift up if the cab door is shut.

**Auto Reverse Camera** – If a reversing camera is fitted it can be switched on when reverse is engaged (default).

## User Preferences



Options on this screen allow the user to change screen brightness, default display mode (day/night), language, units, screen background and time. Some of the options may not be available at this point in time but may be available in future versions.

## Speedometer



The speedometer on the main display calculates the road speed from the transmission output shaft speed and factory set figures for the gear ratios and the wheel size. The wheel size is taken as being the biggest wheel it is possible to fit. A GPS sensor is also fitted and the signal from this is used to calculate a correction factor which corrects the calculated speed to give a true ground speed.

If the GPS system fails or a signal is not available, then the speed is calculated as above and no correction is made. This means that with small (low pressure) wheels fitted the speedometer will over-read by up to 15%. An indicator on the main display shows whether a GPS signal is being received and the calculated speed is being corrected. It can take a few seconds after starting to move before the speed is updated.

There is a pulsed speed output that can be used from the display by other instruments and sprayer/spreader controllers to save fitting additional shaft/wheel sensors.

## Speed Limiter

For safety and legal reasons a speed limiter is fitted to the Agribuggy which limits the maximum speed to around 54 km/h. With low pressure wheels it is not possible to exceed this speed anyway. With row crop wheels fitted it means that maximum cruising speed can be attained at lower engine revs which is both quieter for the operator and saves a significant amount of fuel. An indicator is shown on the warning display to show when the limiter is active. It does not affect how you drive the machine it simply limits the maximum engine speed.

## Operation : Controls

### Starting Engine

1. Ensure PTO is disengaged, handbrake applied and gearshift in Neutral before starting.
2. Depress the brake and, turn the ignition switch to the center position, **wait for the Machine Control Unit (MCU) to boot up.**
3. Crank the engine by turning the key fully clockwise. Release key when engine starts. If it doesn't start within 30 seconds or starts and then stops, return the key to the off position, wait a 2 minutes and then repeat the above procedure.
4. Idle the engine 3 to 5 minutes before operating with a load. After starting a cold engine, increase the engine speed (rpm) slowly to provide adequate lubrication to the bearings and to allow the oil pressure to stabilize.
5. After starting, and before shifting from neutral to forward or reverse drive, it is necessary to apply the footbrake (do not depress the accelerator pedal).

### Stopping Engine

1. Before stopping engine ensure vehicle has completely stopped, when stationary apply handbrake (doing so will also select 'Park' in the transmission).
2. Allow engine to slow idle for at least 10 seconds before stopping particularly if you have been running at high engine revs to avoid damage to the turbo-charger bearings.
3. To stop engine, turn the key anticlockwise. Do not turn the battery isolator switch off for at least 70 seconds after the engine has stopped, this is to allow the DEF system to complete its purge cycle and ECU to shutdown, otherwise engine fault codes may indicate.

### Handbrake

Applied by pressing (and holding for ½ second) the button situated at the right hand side of the operators seat, only to be operated only when stationary. Activation of the park brake also selects the park function in the transmission. To release the brake press and hold the same button down for ½ second. The park brake should not be applied, other than in an emergency, whilst the vehicle is in motion or transmission damage may result.

The brake operates on the rear drive shaft which may result in a slight movement of the vehicle after it is applied.

### Power Steering

When turning do not hold the steering tight on full lock as this will cause the relief valve to blow off and the hydraulic system to overheat. Do not turn the steering whilst the Agribuggy is stationary particularly when on hard surfaces. This causes unnecessary, excessive pressures in the steering system especially when wide tyres are fitted.

*For information on the rear wheel steering system please see page 42.*

**Throttle**

When driving the Agribuggy with the foot throttle, anticipate tough spots and be ready to respond to avoid the engine losing speed. The machine is equipped with a cruise control (MCU for details).

A remote throttle with speed control function, is fitted just inside the cab accessible from ground level. This enables the PTO speed to be held at 540 rpm when stationary for self-filling the sprayer. Instruction on the operation of the hand throttle and speed control please refer to page 41 of this manual. To enable, hand and foot brake must be applied.

Ensure that the remote throttle is returned is shut down immediately after use. Do not leave the machine unattended when the remote throttle is being used.



Remote PTO on/off

Remote throttle

Remote hand throttle

**Automatic Transmission**

The automatic transmission features a four speed main gearbox with a torque converter and a two speed transfer box. A central differential in the transfer gearbox distributes power to both front and rear axles, providing permanent four wheel drive. Using the main gearbox in conjunction with the transfer gearing produces eight forward and two reverse speeds.

**Main Gearbox Selector Joystick**

A spring loaded catch prevents inadvertent selection out of neutral or from forward into reverse. Press and hold the catch whilst selecting desired position and at the same time apply a foot to the brake pedal. For forward gears move stick forwards and for reverse rearwards (central position is neutral). Press and hold the safety catch move the stick to the right to select a higher gear and left for a lower gear.



Joystick Gear Control



Safety Catch

**Operating Transmission**

**Park** Is selected automatically when the park brake is applied, in this position the transmission is locked to prevent the vehicle from rolling away.

**Reverse** Select **ONLY** when the vehicle is stationary and foot applied to brake pedal.

**Neutral** Use this position when the vehicle is stationary and the engine is to idle for a prolonged period (eg. at traffic lights).

**Drive (Forwards)** Select 'Drive' for all normal driving on the road; fully automatic gear changing occurs on all four forward gears according to vehicle speed and accelerator position. To select drive foot must be applied to the brake pedal.

**Manual** To Drive in manual mode press and hold the safety catch and move the stick to the right or left to select the desired gear. The transmission will then automatically select gears up to the set gear but no higher i.e. if 3<sup>rd</sup> gear is selected the transmission will be limited to 1<sup>st</sup> 2<sup>nd</sup> and 3<sup>rd</sup> gears only. To return to auto press the Auto button on the Joystick.

**It is recommended to select:**

3<sup>rd</sup> gear for field work in good operating conditions with low pressure tyres fitted.

2<sup>nd</sup> for field work in more demanding conditions and when fitted with row crop wheels. In good conditions where your forward speed is relatively low or where you only have a light load you may need to use this position to stop the gearbox changing up to third gear. Although the engine/transmission may be perfectly happy in the higher gear you may find the engine speed is too low for you to attain the required PTO speed.

**1st gear** Use at all times for steep hillside work where engine braking is required. If you are changing down from second to first it is most important that you slow down enough to ensure that first gear is correctly selected. **The gearbox has its own built-in protection system so if your forward speed is too high it will not change down automatically until the speed has reduced.**

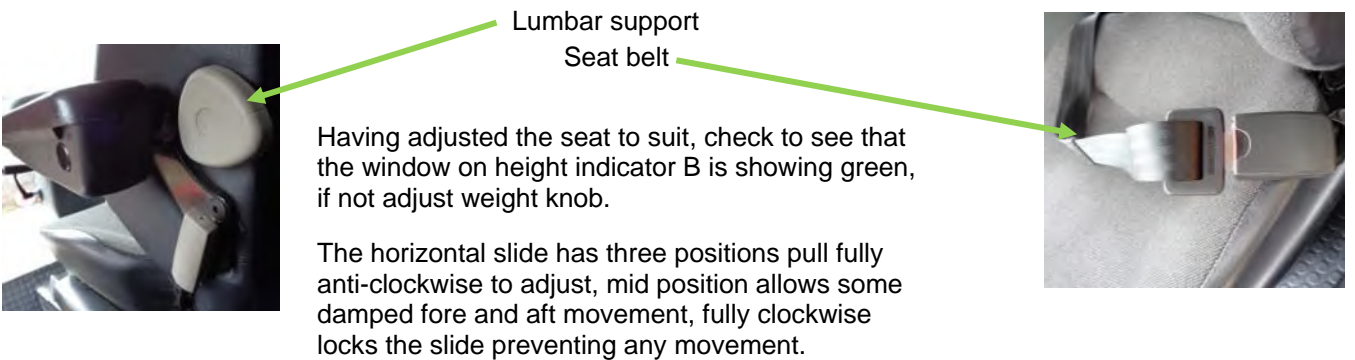
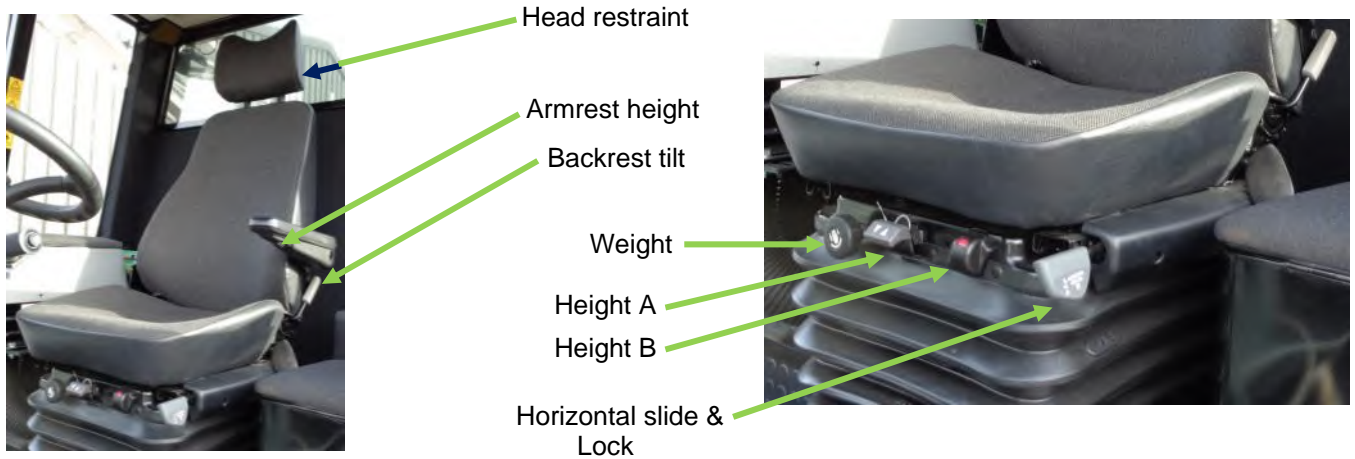
## Operating : Driving

### Driver Settings

Before starting the machine ensure that the seat, steering column and mirrors are set correctly.

### Driver's Seat

The driver's seat is fully adjustable as shown. To avoid risks from whole body vibration ensure that the seat is correctly adjusted before driving the vehicle.



### Steering Column



To adjust the steering wheel position, push the lever anti clockwise, move the column backwards or forwards, up or down to achieve the most suitable driving position. Turn the lever clockwise to lock. Do not adjust whilst driving!

### Mirror Adjustment



Position lever for mirror to be adjusted right or left hand

Four way button for adjusting the mirror up or down to right or left.



### Starting & Driving

Drivers unfamiliar with the performance characteristics of an automatic gearbox should thoroughly familiarize themselves with the following instructions before driving:

- Before starting the engine, ensure that both foot brake and handbrake are applied.
- After starting the engine, keep both brakes applied before and whilst moving the selector lever to the required drive position.
- Keep the brakes applied until you are ready to move - remember, once a drive position is selected, an 'automatic' will tend to creep forwards (or backwards).
- Never 'rev' the engine while selecting a forward or reverse gear, or while the vehicle is stationary with a drive gear selected - remember, an 'automatic' will move immediately the accelerator pedal is pressed.

### Gear Change Speeds

With Forward gears selected, the speed at which gear changes take place will vary according to the position of the accelerator: minimum acceleration will result in low speed gear changes, while larger throttle openings will cause the gearbox to delay gear changes until faster speeds have been reached.

With practice, gear changes can be made to occur at a wide range of speeds depending on accelerator pedal pressure.

On long inclines and in some working conditions, the gearbox will change back and forth between gears. Under these conditions it is advisable to change down to the next lower gear to stop it 'hunting'.

### Kick-down

To provide extra power and acceleration through tough spots, push the accelerator pedal to the full extent of its travel in a single quick movement (known as kick-down). Up to a certain speed this will cause an immediate downshift into the lowest appropriate gear. Once the pedal is relaxed normal gear changing will resume.

### Transmission Oil Temperature (Torque converter instruction)

Should the transmission overheat a warning will display on the MCU, you should **stop immediately and investigate the cause**. To avoid the transmission overheating it is important that the torque converter is always locked whilst the machine is working for prolonged periods in the field or on the road. If the engine is working hard with the torque converter unlocked the transmission will overheat very quickly.



The bottom LH icon indicates the torque converter is locked. If the torque converter won't lock it usually means you are working in too high a gear. You should change down a gear and increase the engine revs until it locks – the transmission will usually cool down very quickly.

Other common causes are low transmission oil level and/or oil cooler radiator blocked with dust and chaff.

### Transfer Gearbox

The second gearbox (known as the transfer gearbox) is used to select either the high or low gear range.

**The low range should be used for all field work regardless of which type of wheel is fitted.**

High range should be used for road work only and allows a relatively high road speed to be used at relatively low engine revs (depending on ratios fitted).

Press to change from High to Low and Low to High



Press to engage the central diff lock and again to disconnect

## Operating : Range Change Diff-lock Brakes

### Changing Range

To change range bring the vehicle to a speed below 3km/h (2 mph) or to a complete stop. Press the H/L switch on the panel and you will see the following pop up window on the screen:



It is rare that it changes range straight away and in this instance the popup window shows it is waiting to change into low range. The lower display shows it is actually in high range. At this point it is usually easiest to simply change direction momentarily, then change back again and the shift will take place. The popup window will disappear and the lower icon will change to indicate the current range.

It is important not to exceed 5 km/h whilst waiting for the change to take place as when it does eventually happen it may result in serious transmission damage.

### Differential Lock

The transfer gearbox is fitted with a lockable centre differential. With the differential locked, the drive shafts to the front and rear axles are (in effect) joined together, causing both to rotate at the same speed. This feature enhances traction when working in difficult and slippery conditions and when working on steep hillsides. With the differential unlocked for normal conditions and roadwork, the different running requirements of the two axles can be accommodated, thereby enabling the Agribuggy to operate permanently in four wheel drive for both road and field work.

### When to use the Diff Lock

As a general rule, the differential should only be locked on slippery or loose surfaces or on very steep hillsides. If excess wheel slip is evident then, it should of course be used. However, **do not** use it unnecessarily. **It must be disengaged for all road work.**

### Selecting Diff Lock

The diff lock can be engaged or disengaged either with the vehicle stationary, or when driving along. However, with the vehicle in motion it is essential to be travelling on firm ground, in a straight line and without wheel slip.

Do not engage the diff lock if one or more wheels are slipping - this could result in serious transmission damage. If wheels are slipping, ease off the accelerator before engaging the diff lock.

**Engaging diff lock** – Press the diff lock switch - the warning signal will show when the differential engages. NB This will only happen when the lock is actually engaged - rather than when it has been selected. Similarly it will only extinguish when the diff is actually disengaged.

**Dis-engaging diff lock** – Press the diff lock switch If the warning is obviously reluctant to extinguish after the diff lock has disengaged, some transmission 'windup' may be present. Reversing the vehicle for a short distance and then going forward will usually 'unwind' the transmission.

### Braking System

As a safety precaution, the hydraulic braking system operates through dual circuits. If one circuit should fail, the other will continue to function, but increased pedal travel and longer stopping distances will be experienced.

A warning will appear on the MCU will warn you of low brake fluid.

The braking system is hydraulic servo assisted, but **ONLY** when the engine is running. Without this assistance greater braking effort is necessary to safely control the vehicle, resulting in longer stopping distances. Always observe the following precautions:

1. Never allow the vehicle to freewheel with the engine turned off (the steering will also be affected).
2. Take particular care if the vehicle is being towed.
3. If the engine should stop for any reason whilst the vehicle is in motion, bring the vehicle to a halt as quickly as traffic conditions allow.



Remember! Regular servicing is vital to ensure that the brake pads are examined for wear (especially when working in wet/muddy conditions) and changed periodically to ensure long term safety and optimum performance. When new brake pads have been fitted you should allow a period of time for them to "bed in" before optimum braking is achieved.

### Hydraulic PTO System

For information on the optional high power PTO system (Airtec) or non-standard hydraulic systems please see appendices.

### Safety

THE ENGINE MUST BE SWITCHED OFF BEFORE CONNECTING THE PTO OR MAKING ADJUSTMENTS.

### Operation

The PTO is hydraulically driven, is fully independent and may therefore be engaged at any time providing the engine revs are not too high. The PTO is controlled by the main MCU monitor.

Please note to achieve a PTO speed of 540 RPM you will need to maintain a minimum engine speed of around 2,000 rpm with the standard hydraulic system. However, you will find it is not always necessary to run the PTO at this speed for most spraying operations especially when applying low application rates. Lower PTO speeds result in reduced wear and tear in the spray pump and hydraulic system, a lower engine power requirement and can help to prevent foaming in the spray tank. It is recommended that you run the pump at a lower speed if possible providing you can attain your application rate and sufficient agitation. Speeds of between 350 and 450rpm are normally adequate.

### Operating the PTO

The PTO is switched on/off by the PTO button on the switch panel (hold for ½ second). An LED on the switch indicates when it is switched on. The current speed is shown on the PTO information display along with the current status and operating mode.



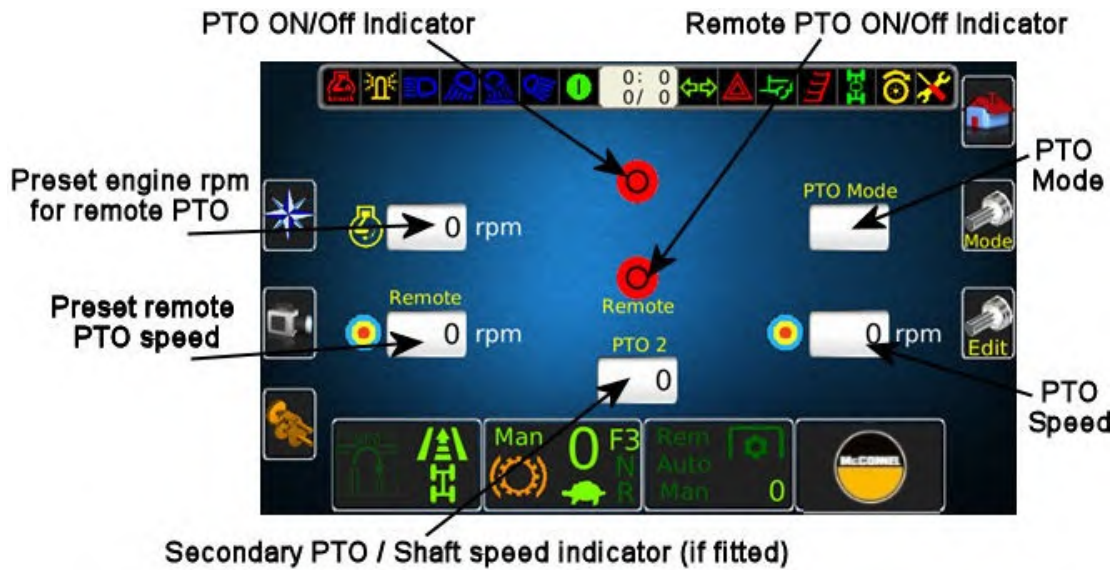
**Automatic mode** – In automatic mode the speed is monitored by the electronic system and adjustments are made to the hydraulic valve to maintain the preset PTO speed. This will adjust the valve and make allowances for temperature, pressures and input flow.

**Manual mode** – This is a very simple control where the output of the valve is set to a given percentage. This mode can be used when there is no speed signal input that can be used to help govern the speed. This is often the case with centrifugal type spray pumps.

**Remote mode** – The PTO is controlled by a remote panel near the cab door. This is used when filling the sprayer. Preset speeds for both the engine and PTO are activated when the remote switch is switched on. It will use whichever PTO mode is active at the time (auto or manual) on the MCU.

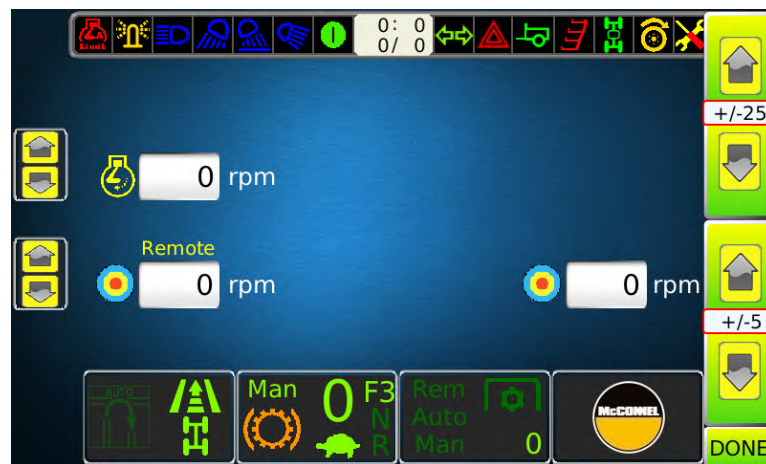
### Setting the PTO Speeds/Outputs

The PTO speeds/outputs are controlled from the PTO screen on the MCU. To get to the screen press the PTO key on the right hand side of the home screen.



To change mode press the “Mode” key. The screen will change to show the outputs expressed as percentages instead of rpm. The method of adjusting the figures is the same in both cases.

To adjust any of the PTO settings press the “Edit” key on the right hand side of the screen.

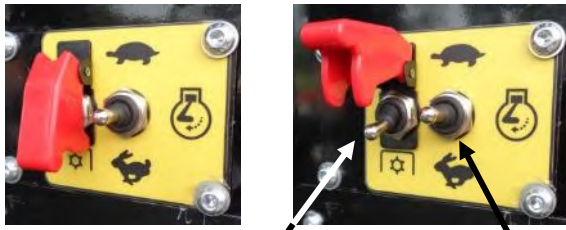


To alter the current PTO speed press the up/down keys on the right hand side of the screen. This will alter the speed in increments of 5 or 25. When you have finished press “Done” (Enter key) to return to the main PTO screen.

To change the preset remote speeds for engine and PTO press appropriate button on the left hand side of the screen to go to their respective edit screens. The speeds are altered in the same way as the main PTO speed. Again press the “Done” button to save the speeds and return to the previous screen.

## Remote PTO

A remote PTO function is available for use when stationary for operating the PTO to fill the spray tank.



Remote PTO Switch

Remote Speed Adjuster

The remote PTO has to be switched from the driver's seat with the handbrake on (this also selects the transmission park mode) and the foot brake depressed. To operate lift the red safety cover and switch the inner toggle switch up, the PTO will then run at the pre-programmed speed.

The desired remote speed is preprogramed into the MCU Monitor (see above).

The engine speed will also be increased to a preset speed and this speed can be altered by operating the outer toggle switch. Press the switch down to increase engine speed, and up to decrease. One key press will reduce the engine speed by 10 rpm. Press and hold to change the speed in 100 rpm steps.

To switch the remote PTO off press the red cover down. **SWITCH OFF IMMEDIATELY AFTER USE.**

**It is important to ensure that sprayer filters are kept clean and self-cleaning filters are working correctly at all times. Failure to do so will result in loss of PTO speed and overheating of the hydraulic system.**

## Cruise Control

The cruise control is based on an electronic throttle control system. There are different operating modes and pre-set speeds. The same system is also utilized for the remote PTO system. It can be used either statically or whilst moving providing certain criteria are met. The system will be automatically disengaged when various actions happen.

## Static Mode

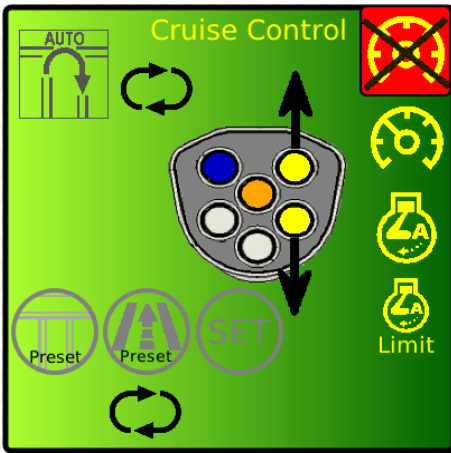
To operate the electronic throttle whilst stationary the handbrake must be applied, the transmission in neutral and the footbrake must be off. It is automatically de-activated if the footbrake is applied, the handbrake taken off or if the transmission is put into gear.

## Travelling Mode

To operate the cruise control whilst moving the handbrake must be off, the transmission in gear and the footbrake off. Taking the transmission out of gear, applying the footbrake or handbrake or if the road speed limiter comes on will all de-activate the cruise control.

### Activating the Cruise Control

The cruise control system is controlled by buttons on the joystick. Options are selected from a menu on the main display. To bring up or switch off the cruise menu on the display press the right hand (black) button on the underside of the joystick. If the cruise is currently inactive the orange button will also bring up or switch off the menu.



If no buttons are pressed the pop-up menu will disappear after 5 seconds. The centre joystick icon indicates which buttons are available. They will only work if the appropriate cruise mode has been selected.

### Mode Selection

To select a mode use the yellow buttons to scroll up and down to select from one of the following modes:



**Standby mode** – the system is active but not in operation.



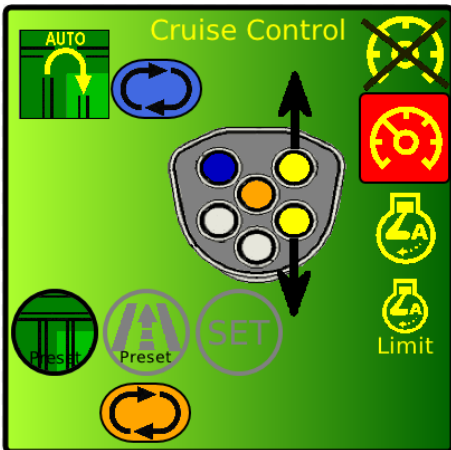
**Engine mode** – This mode allows you to set the engine to either a pre-set speed or you can set it to the current engine speed by pressing the “Set” button. There are preset speeds which can be saved for field and road use. When this mode is active you can increase/override the speed by depressing the foot throttle. In this mode headland control is also available which will switch the system between Standby and Engine mode when the sprayer is switched on and off.



**Limit mode** – This mode sets the maximum speed the engine will run at when your foot is all the way down on the throttle. This can be used for example to set a speed whilst travelling up and down the field. You can then ease back on the throttle for turning at the ends and then put your foot hard down when you start work again. Headland control is not available when in this mode.

**Preset Speeds**

There are 3 preset speeds that can be used in either Engine mode or Limit mode for use in either field or on the road. These are selected by toggling the orange button when the main cruise control screen is in view and one of the active modes has been selected.



In the example above the field preset speed has been chosen. Headland control has also been switched on by pressing the blue button.

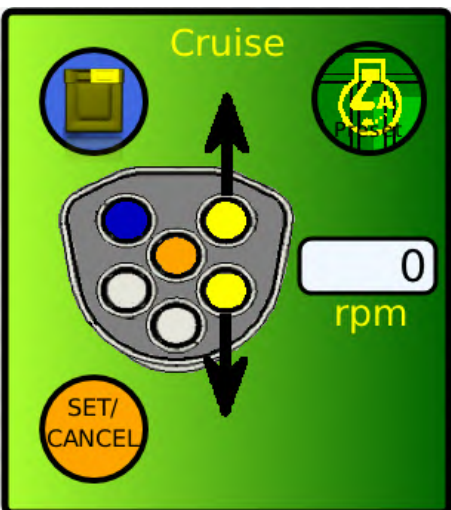
**Cruise Operation**

Once the settings above have been chosen either wait for the screen above to disappear or press the black cruise menu button to close it.

The orange button then cycles the cruise on or off or, if headland control is switched on, the cruise will switch on and off with the green (sprayer control) button on the joystick.

**Speed Control**

To change or set the speed, press a yellow button (with the cruise menu off). You will then get a screen like or similar to the one below (there is a different screen depending on which preset speed mode you are using).



If the cruise is inactive when the screen is pulled up simply press the orange button to set and engage the cruise at the current engine speed / throttle position. The actual speed will then show in the rpm box, you can take your foot off the throttle and the engine speed will be maintained.

If the cruise is active when the screen is pulled up, you can either fine tune the speed using the yellow buttons or cancel using the orange button. You can change the speed in increments of 10rpm with each button press or you can hold the button down to change in increments of 100rpm.

If you update the speed it will stay in memory whilst the ignition is switched on. If you want to save the current speed for future use, then simply press the blue button.

### Rear Wheel Steering System

The rear wheel steer system on the Agribuggy is controlled electronically. Signals from sensors mounted on both axles are continually monitored by the electronic control box and a varying signal is sent from the control to an electro-hydraulic proportional valve which, in turn, directs oil to the steering ram on the rear axle to ensure the rear wheels are always kept in the correct position. The rear wheel position is also continually monitored when in two wheel steer and crab modes, again, to ensure that the wheels do not "creep" and to keep them in the correct position.



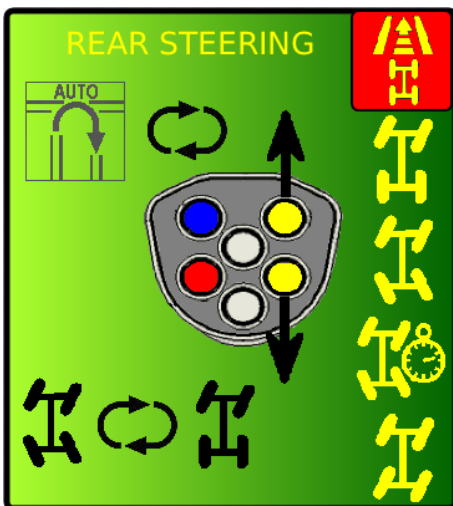
#### Safety Precautions

1. Always ensure the rear wheel area is clear before activating the four wheel steer system.
2. Always switch to the roadwork position for speeds above 12 m.p.h. (20 kph).
3. Do not switch modes when travelling at speed.
4. Danger of trapping, on no account allow any person to be placed between the wheels and chassis while the engine is running, always remove the ignition key and isolate the battery before accessing the area.



### Rear Steering Activation

The rear steering system is controlled by buttons on the joystick. Options are selected from a menu on the main display. To bring up or switch off the Steering menu on the display press the left hand (black) button on the underside of the joystick. If the steering is currently in road mode the red button will also bring up or switch off the menu.



If no buttons are pressed the pop-up menu will disappear after 5 seconds. The centre joystick icon indicates which buttons are available. They will only work if the appropriate steering mode has been selected.



## Mode Selection

To select a mode use the yellow buttons to scroll up and down to select from one of the following modes:



### Road Mode

In the Road mode position the electronics are deactivated for safety and the rear axle will be locked hydraulically. Before switching to this position, allow the rear wheels to straighten up in Two Wheel Steer. After a few miles on the road the wheels may tend to "creep". If this happens slow down to less than 5 mph, switch back to Two wheel Steer (which will quickly straighten the rear wheels) and then switch back to Road mode again. The steering system should not be operated at speeds above 12 mph. If this speed is exceeded the system will automatically straighten the rear wheels and will shut down into road mode.



### Two Wheel Steer/Auto

In Two Wheel Steer mode the rear axle position is monitored continually and fine adjustments will be made by the system to ensure the wheels keep straight. You may switch to this position at any time in the field and the rear wheels will straighten up automatically once the front wheels pass through the "Mode activation window" (see next section below). When this mode is selected you can also use the 4ws toggle (red) button to change between 2 and 4 wheel steer modes. If headland mode is active, it will automatically switch between 2 and 4 wheel steer mode when the sprayer is switched on/off.



### Four Wheel Steer

In Four Wheel Steer mode the rear wheels will always follow the front ones and will give you the tightest turning circle. You may switch to and from this position at any time in the field and the rear wheels will re-align automatically when the front wheels pass through the "Mode activation window" (see next section below).



### Delay Mode

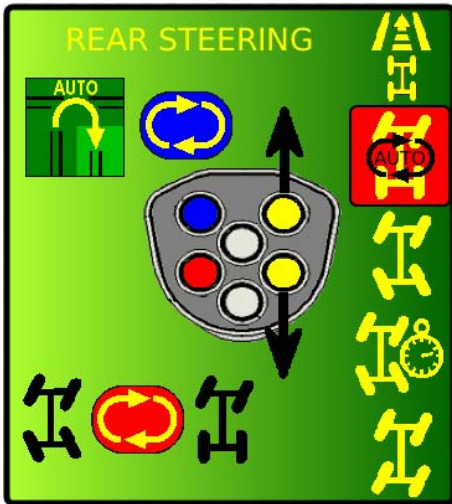
In delay mode the rear wheels will only start to move when the front wheels have passed an angle of approximately 8 degrees. This is useful when spraying as it allows a degree of deviation from the straight ahead position with the front wheels without the rear wheels moving. This is better than four wheel steer as you travel down the field as it keeps the boom more stable. For headland turns the rear steering comes in once you have started the turn and the slight delay also makes for more accurate wheel tracking as you turn.



### Crab Steer

Crab steer may sometimes be useful when maneuvering in buildings and in tight corners in fields. The rear wheels turn in the same direction as the front ones allowing the machine to move sideways.

**Headland Mode**



The blue button on the joystick will turn headland mode on/off. Headland mode is only available when the main mode selector is in the 2WS/Auto position. The headland mode icon will illuminate when this mode is selected. In headland mode the steering will change from 2WS to 4WS when the sprayer is switched on/off with the green button.

**Steering Toggle**

When the steering is set to 2WS/Auto you can use the Red joystick button to toggle between 2WS and 4WS modes. If headland mode is switched on the red button will reverse the current setting and switching the sprayer on/off will correct the setting to 4WS with the sprayer off and 2WS with the sprayer on.

**Mode Activation Window**

The steering will only change modes when the front wheels are within a central window. This is approximately 7 degrees either side of the straight ahead position. This is to avoid large unexpected and uncontrollable movements of the rear wheels. An indicator on the display will show when the system is waiting to change modes.



Indicator to show the requested mode – this will show whilst it is waiting for the front wheels to move to within the activation window. This will disappear once the window has been reached.

This indicator shows the current steering mode. It will change, in this case, to 4WS when the activation window has been reached and the mode has changed.

### Rear Steering Setup

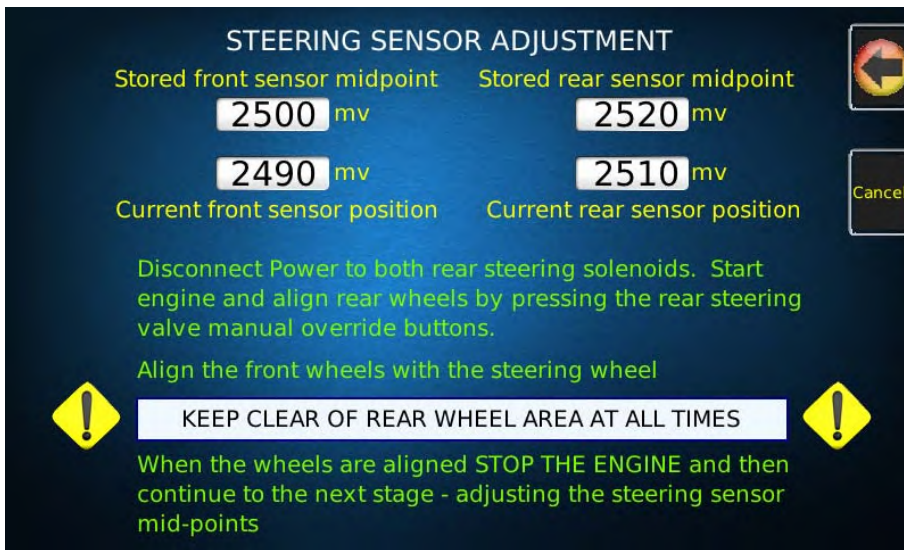
If any adjustments to the steering are made or system components replaced it may be necessary to reset the steering center points so the system knows where the straight ahead positions are on both axles. Inaccurate setup will lead to the vehicle crabbing whilst travelling in some or all of the different modes.



**\*\*\*\* Safety First \*\*\*\* – do not under any circumstance position yourself or allow anyone else to be positioned between the wheels and the chassis or carry out any adjustments whilst the engine is running! \*\*\*\***

The setup procedure is as follows:

On the MCU go to the 4WS diagnostics screen and press the “Setup key”. The engine should be stopped to access the screen. When on the setup screen press the “Align rear wheels” key. That will take you to this screen. **You must be on this screen before you can operate the steering control valve manually.**

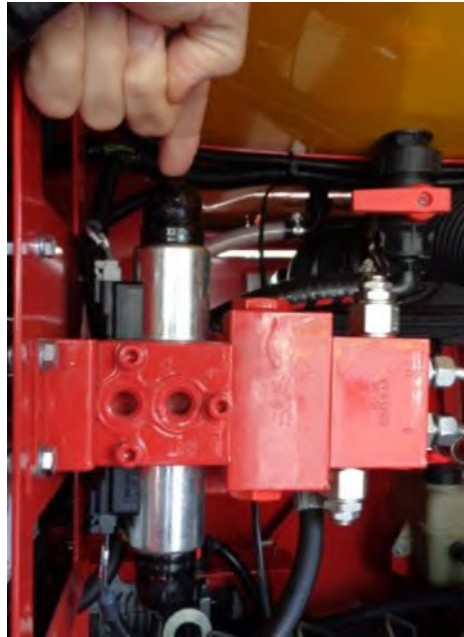
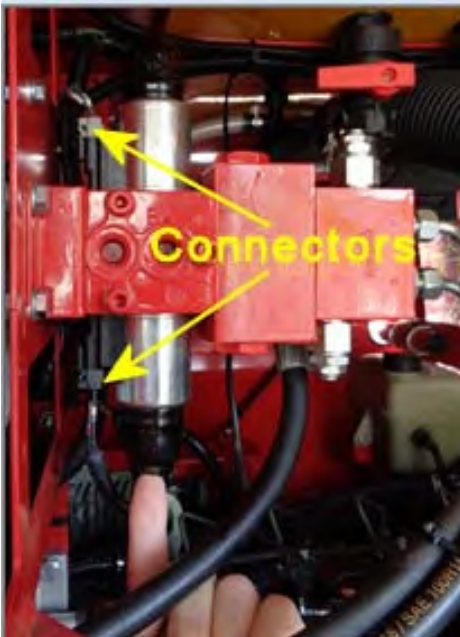


Read the instructions, ensure the handbrake is applied, then start the engine and align the rear wheels as per the procedure below:

### Rear Wheel Alignment / Emergency Operation

To align the rear wheels when setting the rear steering up proceed as follows *(the same procedure can be used should the system fail completely to operate the machine in “get you home” mode)*:

Unplug the two connectors from the two solenoids on the hydraulic control valve. The valve is situated under the engine cover towards the rear bulkhead. Press the solenoid manual operation button(s) on the ends as shown to centralise the rear wheels. Use either a straight edge or a line to align both front and rear wheels accurately. Once the wheels are set perfectly straight you can then stop the engine.



Switch the ignition back on and go the steering setup page.

**Storing Midpoints**

The sensors may need adjusting to ensure that the electrical position is within the correct range. You can see on the setup page what the stored sensor midpoints are set at in the steering controller and what the current actual readings are. In the example below you can see the stored points are 2500 & 2520 for front and rear respectively and the current points are 2490 and 2510. In this case the sensors do not require any adjustment and you can continue by pressing and holding the “Store Front Midpoints” and “Store Rear Midpoints” in turn for 3 seconds. This will update the steering controller and the display will change to reflect the new settings.

STEERING SENSOR ADJUSTMENT

Stored front sensor midpoint <span style="font-size: 1.2em; font-weight: bold;">2500</span> mv	Stored rear sensor midpoint <span style="font-size: 1.2em; font-weight: bold;">2520</span> mv
<span style="border: 1px solid white; padding: 2px;">2490</span> mv Current front sensor position	<span style="border: 1px solid white; padding: 2px;">2510</span> mv Current rear sensor position

Store Front mid points

Store Rear mid points

Align front & rear wheels then STOP ENGINE and adjust sensors to give a reading as near as possible to 2500mv (within the range of 2400 & 2600). Press the appropriate "Store" button for 3 Secs to store the sensor midpoints. See manual for full wheel alignment procedure.

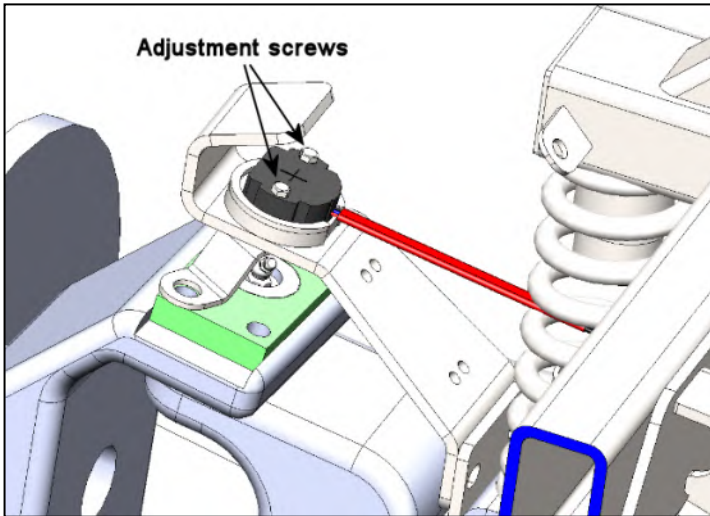
DO NOT adjust the rear steering parameters with the engine running. Refer to the operators manual for full instructions.

Align rear wheels

←

### Sensor Adjustment

Should the current midpoints be out of the range of 2400 and 2600mv it is necessary to adjust the sensor position to bring it within range. It is easier with an assistant to do this so one person can watch the display whilst the other adjusts the sensor.



Remove the protective cap and slacken off the two screws on top of the steering potentiometer. Rotate it a small amount, the center point reading will change on the display. Adjust to get it as near as possible to 2500mv and then retighten the screws and replace the protective cap.

Repeat with the second steering sensor if necessary.

Once you have finished you can set the center points as above.



## Operating : Hydraulics

### Spool Valves

Electro-hydraulic spool valves are fitted to operate the boom's, these are controlled using the 4-way "Joystick" for lift/lower and tilt, and the two toggle switches for inner and outer folding, all located on the main console. The decals behind each switch indicate its function for boom folding. There are normally 4 services fitted which can be any combination of single and double acting spools. A double acting spool can be safely used to operate a single acting service if required.

The hydraulic system/spool valve(s) fitted are only designed for intermittent operation of hydraulic cylinders and **should not be used to power motors or other hydraulic circuits**. Maximum pressure at the spools is approx. 2300 psi (160bar) Please consult the manufacturer if you require higher pressures or if wish to use them for any other purpose.

Please ensure that all couplings are clean before connecting hoses and that any couplings that are not in use are protected with plugs / caps. Ingress of dirt into the hydraulic system can lead to premature wear and possible failure of major components.

**⚠ WARNING** Door must be closed before operating boom controls



### 7-Section spray controls





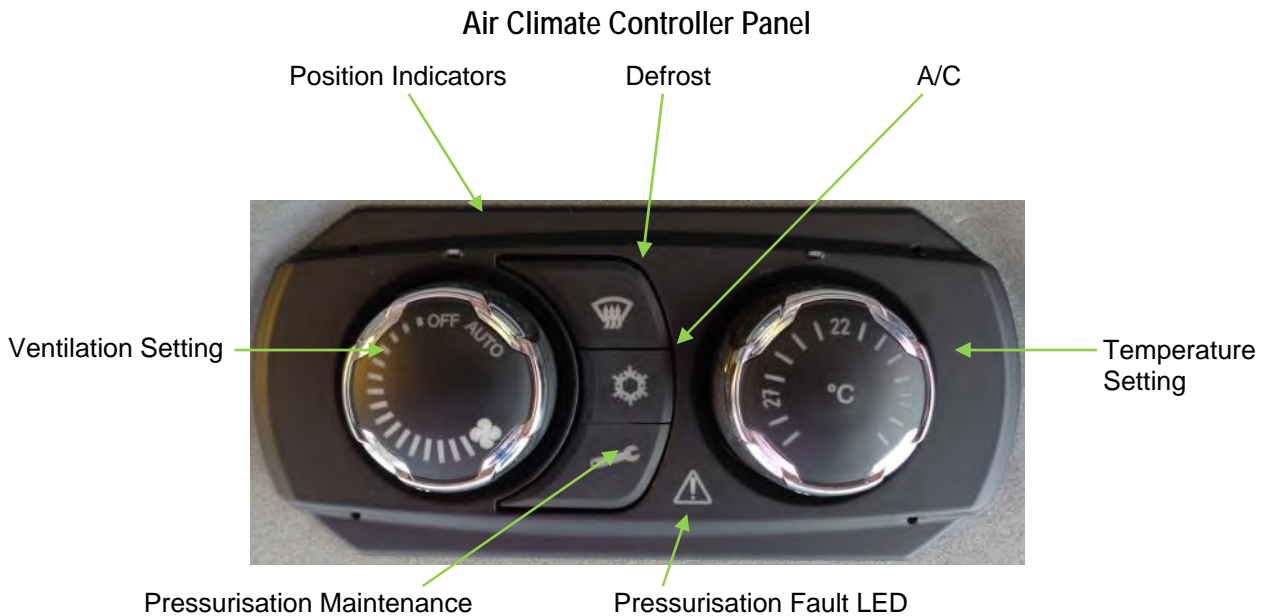
**Air Conditioning / Ventilation**

A climate control unit is installed in the cab roof. The unit will control the temperature of the air which may be drawn into the cab through a carbon filter or the re-circulated air within the cab.



**When applying chemicals it is important that some air be drawn into the cab at all times to ensure that it is kept positively pressurised to keep dust and vapors out.**

**Operating - Cab Ventilation**



**Operation:**

**Automatic Mode** – Turn left hand control to Auto, the A/C light is on, select the desired target temperature with the right hand control. The ventilation will be automatically adapted to suit requirements.

**Defrost /Demist** – Press the defrost button, the defrost LED will light up, the A/C and heater plus max blower ventilation will be activated.

**Manual Mode** – Select the blower speed by turning the ventilation control.

**Heating Mode** – Turn the temperature setting to maximum and select the desired blower speed on the ventilation control.

**A/C Mode** – Turn the temperature setting to the minimum, press the A/C button, the A/C LED lights up. Select the desired blower speed on the ventilation control.



Directional Air Vents



**Service & Warranty**

The Agribuggy carries a 12 month / 1,000 hour warranty (whichever occurs first) on defective parts and workmanship. It does not cover faults caused by incorrect use and servicing or faults caused by fertiliser or chemical corrosion.

All servicing should be carried out as per this instruction manual particularly during the warranty period. The first service is normally carried out by the customer after the first fifty hours running. If any faults are apparent on delivery, at this first service or during the warranty period McConnell Limited would appreciate notification as soon as possible, even if the fault is rectified by the customer. McConnell Limited understand that many customers will repair straight-forward faults themselves without reporting them, however McConnell's policy is one of continual improvement and with co-operation and any suggestions and ideas, product enhancements can be made to the mutual advantage of customer and supplier.

If any problems occur with the machine please contact McConnell Limited, without delay, with whom you can discuss the best way to deal with the problem to avoid unnecessary delays. If a repair is carried out by the customer or by an outside engineer to save time, and it is wished to claim costs under warranty, McConnell Limited must be notified first or the claim will not be accepted under any circumstances. Unauthorised repairs may affect or even invalidate any remaining warranty. Any parts replaced must be returned to us for assessment.

If McConnell Service Engineers are called out at any time, to work on the machine or if the machine has to be returned to their works for repair, it must be thoroughly cleaned to remove all chemical and fertiliser residues to enable the work to be carried out safely and effectively. If the machine is not clean, we reserve the right to either refuse to carry out the work or to charge for cleaning.

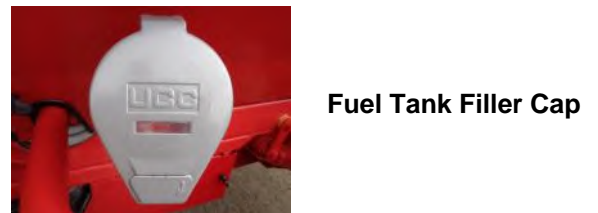
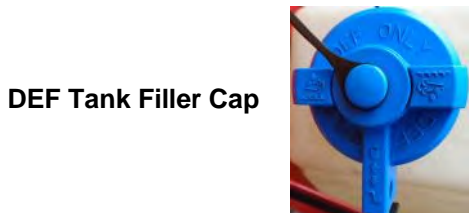
**Wheel Chocks**

To avoid the risk of accidental movement, wheel chocks must be tightly placed to the front and rear of a suitable wheel prior to performing close inspections, maintenance or servicing. When not in use the chocks are stowed on the side of the vehicle in the location shown below. Wheel chocks should be carried on the vehicle at all times to ensure they are readily available for any emergency situations.



## Maintenance & Technical Information

### Daily Maintenance Points – Engine



Viewed from the right hand side engine cover

The DEF tank is mid mounted on the right hand side of the chassis, the level of DEF in the tank is displayed on the MCU, when filling the level is monitored by a sensor in the tank the signal is routed via the engine ECU and there is a delay before the information is available to display on the MCU.

The Diesel tank is mounted at the rear of the chassis the filler is adjacent to the engine cover on the right hand side of the chassis.



**Maintenance & Technical Information**

The life of the Agribuggy will depend on the care it receives throughout its life. It is the operator's responsibility to ensure that the machine is correctly operated and that the maintenance operations outlined in this manual are carried out regularly after the specified hours of operation are reached. If you are unsure of how to carry out any of the maintenance operations, please do not hesitate to enlist the help of McConnel Limited.

Please remember that the Agribuggy is unlike a tractor in many ways and the standard of maintenance needs to be much higher. It is designed primarily as a light weight machine and so consequently the components used in its construction have to be lightweight and are often of automotive origin. These parts will generally last just as long as heavy duty components providing they are inspected, serviced and maintained regularly. The Agribuggy is fitted with suspension and a rubber mounted engine so consequently not only are the drive line components more open to the elements but there are more moving parts which are also more subject to wear and tear. Engine hoses, cables and wiring looms are also more susceptible to wear and tear and also need regular inspection. Finally, the machine is much more susceptible to general corrosion, seizure of components and electrical problems than a tractor due to the mounting position of the sprayer and fertiliser spreaders - right on top of it!

When carrying out your weekly service it is well worth spending a little time looking over (and under!) the machine and checking the condition of hoses, wear on drive shafts and for any signs of chafing or things coming loose. Also take the opportunity to go round with the oil can and lubricate anything that moves - particularly when working with fertilisers. An hour a week can save expensive down-time later on.

All nuts and bolts should be checked for tightness after the first day's operation, **especially axle u-bolts, wheel nuts, steering joints and track rod ends and propeller shaft bolts**. Check engine and hoses for fluid leaks regularly during the first few days of operation.

Please refer to the condensed maintenance guide for service intervals.

**Engine Oil**

**Checking Oil**

Check oil level daily ensuring that the Agribuggy is standing on level ground.

Check the oil when the engine is hot. Allow the engine to stand for 15 minutes after shutting down to allow the oil to drain back into the sump.

Withdraw dipstick and wipe clean. Fully reinsert dipstick and withdraw to check level.

The level should NEVER be allowed to fall below the bottom level mark on the dipstick.

**Do not fill above 'Max' mark on dipstick**

**NB** If it is necessary to check the oil whilst the engine is cold, DO NOT start the engine. Follow the procedure as above and re-check the oil level once the engine has reached working temperature.

*As a general guide if the level is nearer to the upper mark than the lower one then add no oil.*

*If it is nearer the bottom mark than the top one add half a litre.*

*If it is on the bottom mark or below it add one litre of oil.*



Dipstick  
Access through left-hand engine cover

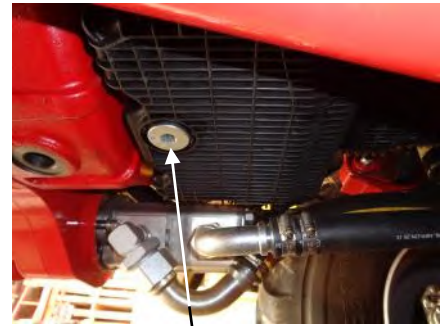
Lubricating Oil Filler Cap  
Towards the front right-hand side of rocker cover.



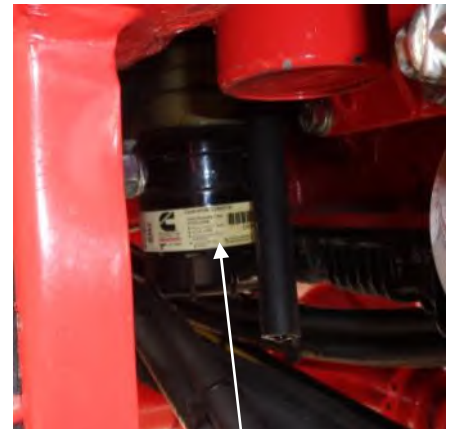
## Maintenance - Changing Engine Oil

### Changing Oil And Filter

1. Warm engine until the water temperature reaches 60°C.
  2. Make sure machine is stood on level ground, stop engine and turn battery isolator off.
  3. Remove oil filler cap from rocker cover, place suitable draining tray (capacity at least 5 Litre) under engine and remove drain plug from oil pan.
  4. Clean the area around the oil filter head. Using a suitable wrench or ½" drive (bottom of the filter), unscrew the oil filter canister.
  5. Position a suitable draining tray underneath the filter and remove the filter from the engine casting by hand. Discard the old filter canister.
  6. Thoroughly clean the gasket face of the filter head.
  7. Apply a thin film of clean oil to the filter gasket surface. Fill the new filter with clean oil of the correct type.
  8. Screw on new filter until the gasket abuts the filter head and tighten a further 1/2 turn or tighten to a torque of 38 Nm. **DO NOT OVERTIGHTEN.**
  9. Clean and check the sump drain plug use a new O-ring if damaged, install sump drain plug (Note: it is plastic torque to 24 Nm). Fill engine via filler neck in rocker cover. Total oil capacity (including filter) is 6.6 litres.
- NB** A funnel will be required for filling oil through the rocker cover filler neck.
10. Replace oil filler cap, run engine and check for any leaks from the oil filter.
  11. Stop engine, allow oil to settle, check and top up as necessary. **DO NOT OVERFILL**



Sump Oil Drain Plug



Oil Filter



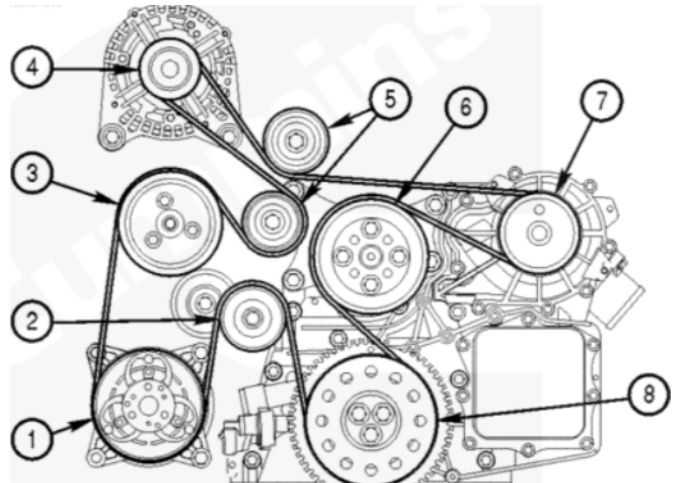
## Maintenance : Drive Belts

### Drive Belt

The engine cooling fan and other ancillaries are driven by a multi-V 'serpentine' belt. The belt is tensioned by an automatic tensioner.

The schematic shows the routing of the belt and items driven.

1. A/C compressor
2. Tension pulley
3. Hydraulic Pump (Brakes)
4. Alternator
5. Idler pulley
6. Fan drive
7. Water pump
8. Crankshaft pulley



Inspect the belt daily; belt should be changed if transvers and longitudinal crack intersect or if it is frayed or has material missing.



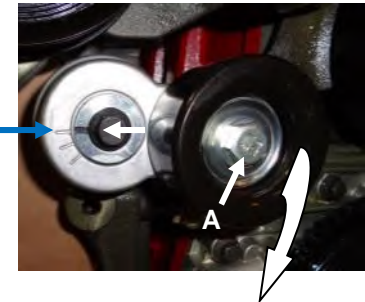
Before checking the belt ensure that the batteries isolator is turned off to prevent the engine from being started.

### Replacing the Drive Belt

1. Slacken the belt tensioner with a 15 mm ring spanner on the tensioning pulley center bolt (A on belt tensioner picture) and remove the belt and release tensioner gently.
2. Inspect the idler and drive pulleys for wear or cracks and build of dirt, clean or replace as necessary.
3. Pivot the tensioner to release to enable the new belt
4. Release the tensioner to apply tension to the drive belt.
5. Check the alignment of the belt with the tensioner and other pulleys.

### Belt Tensioner

After the belt has been removed the tension marks should align as shown.



Turn Clockwise to release tension from the belt

### Cooling Fan

The cooling fan has a viscous coupling which does not require any maintenance.

## Maintenance - Cooling System

### Cooling System



Do not remove the pressure cap from a hot engine. Wait until the coolant temperature is below 50°C before removing the cap.

Heated coolant and steam can cause personal injury. The coolant level is visible through the transparent walls of the degas tank. The coolant should be level with the 'Max' mark when the engine is cold. DO NOT OVERFILL. Only turn the cap to the first stop, so that pressure in the system is released. Then wait a few seconds before removing the cap completely.

Never use cold water to top-up the cooling system of a hot engine, particularly if the coolant level is very low. This could cause serious damage to the engine.

The system should only be topped up with a water/anti-freeze mix as specified, refer to Fuels, Lubricants and Coolants chart. Ensure that the pressure cap is re-tightened correctly before running engine.

After 2,000 hours or two years the cooling system must be flushed out and coolant replaced. When the coolant is replaced or if a high quantity of coolant has to be used for topping up then care must be taken to ensure the system is free from air. The engine should then be run (with the cab heater turned on) until it reaches normal working temperature and then switched off and allowed to cool and the water level re-checked.

A fine mesh screen is fitted in front of the cab air intake grill and should be kept clean at all times. It can be cleaned by brushing lightly or blowing out with an airline

Ensure the cab lower side panels together with their respective sealing rubbers are correctly fitted at all times - they ensure only clean air can be pulled through the inlet grill to the radiator.

Ensure that the radiator cores are also kept clean - inspect it regularly but take care if using a pressure washer to clean it - it is very easy to flatten the fins which will reduce air flow through it. To access remove lower cab side panel and access through flap beneath.

*For late season spraying it is recommended that the optional crop deflector be fitted to the front of the Agribuggy to not only reduce crop damage but also to avoid blocking of the radiator grill/screen with pollen etc.*

Coolant Filler Pressure Cap



Radiator drain tap viewed from RH side of chassis



Cab lower side panel



Access panel

Air intake mesh screen



Crop deflector

## Maintenance - Fuel System

### Fuel System

It is particularly important to keep the fuel system well maintained - If even only slight traces of contamination or water are allowed to get past the filtration system and into the injection pump, the engine performance will be seriously affected and serious damage will be caused to the pump.

### Fuel Tank

The fuel tank holds approx. 20 gals (91 litres). Use clean diesel fuel only. Always fill the tank at the end of the day's work to avoid condensation. Drain the diesel tank periodically. (At least every 300 hrs) Take care to ensure the cap is correctly closed after filling and when washing off do not direct a pressure washer directly at or under the filler/breather.

### Draining Fuel Filter

The fuel filter unit should be drained weekly to allow any accumulated water to drain from the filter. To do so shut of the engine, turn the drain valve counter clockwise approximately 3½ turns, until the valve drops down, drain into a container until clear fuel is visible. To close the valve, lift the valve and turn clockwise until it is hand-tight.

**Filter** Unscrew cap to access the element.

**Note:** *Environmental care should be taken at every stage of this process, catch any fuel released in a suitable container and dispose of in accordance with local environmental regulations.*

### Bleeding the Fuel System

The injection pump on this engine is self-priming, however, should you change the filter or run out of fuel, the system may need bleeding as far as the fuel filter. A hand pump is fitted to the filter head for this purpose - see illustration.

Operate the lift pump repeatedly until air-free fuel flows from the filter outlet.

Start the engine as normal but avoid turning the engine over continually for above 30 secs to avoid damage to the starter motor - it may take several attempts.

When it starts it may run erratically for a few minutes this is normal. On no account should any of the injector pipes / fittings be slackened in the bleeding process.

Fuel Filter



Drain Valve



Priming Pump



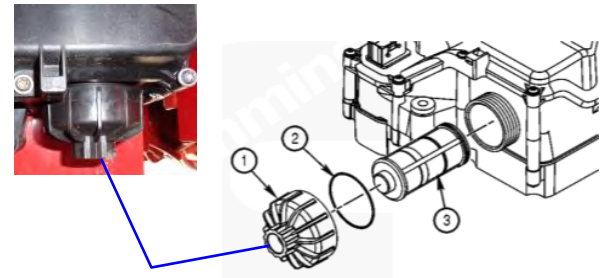
**Diesel Exhaust Fluid (DEF)**

The DEF tank is located mid mounted on the right-hand side of the chassis frame.

The DEF tank has a filter attached to the suction assembly. To access, remove the cover, release the clamp and withdraw the suction assembly. The filter is on the base, retained by a screw.

The DEF dosing unit has a 10-micron filter. Before removing the old filter ensure that the unit has completed its purge cycle, disconnect the battery. Wipe dosing unit with a clean damp cloth to remove any dirt that could contaminate the unit. To change the filter, remove the cap and O ring and extract the old filter. Replace the filter and O ring with genuine new parts. Check the threads on the cap and unit, clean the cap fit the filter and new 'O' ring and tighten the cap Torque 20 Nm. Re-connect the batteries, start the vehicle and check for leaks.

Diesel Exhaust Fluid level must be checked daily.

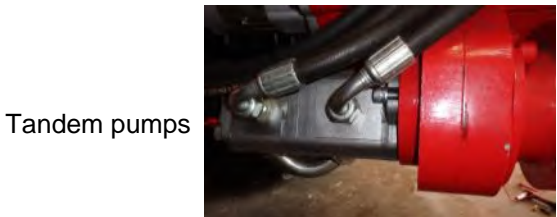


Brake power assistance pump

**Hydraulic System**

There are three hydraulic pumps. The brake power assistance is fed from a pump driven from the engine drive belt. The steering and electro-hydraulic spools are powered by one of the tandem pumps on the PTO (between the engine and transmission). The other tandem pump powers the PTO.

The standard hydraulic PTO develops a maximum of 6hp. Please consult the manufacturer if you wish to drive anything other than a conventional diaphragm sprayer pump.



Tandem pumps

**Do not alter the relief valve settings** on either the spool valve or flow divider without consulting the manufacturer, they are pre-set at:

- PTO Flow Control 2,000 PSI,
- Spool Valve Relief Valve 2,500 PSI,
- Brakes 1,000 PSI,
- Front Steering 1,800 PSI and Rear Steering 2,000 PSI.

**Hydraulic Oil**

Ensure the hydraulic system is kept clean. Be careful when refilling the tank. Do not direct high pressure hose at filler/breather cap. Oil level should be kept to top of level/temperature gauge. Use good quality, clean hydraulic oil for topping up only (I.S.O VG 46). Do not use universal oils. The oil should always look clear and clean - *If there are any signs at all of cloudiness or "milkiness" the oil should be changed.*

**Hydraulic Tank**

The hydraulic tank is located at the front of the chassis beneath the cab. To access to the hydraulic oil filler cap remove the grill on the nose in front of the cab. The level gauge and tank drain plug are on the left-hand side of the vehicle.



Drain plug

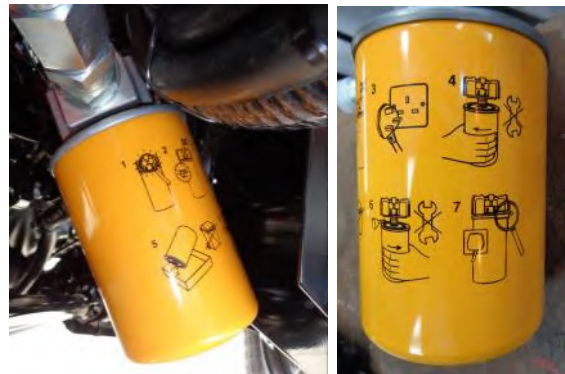
**Oil Filter**

**Return Line Filter**

The return line filter is mounted on the off-side of the chassis at the approximate mid-point behind a cover plate.

Change the return line filter when required or at least every 500 hours or 12 months whichever is sooner. If excessive oil contamination is evident the oil should also be changed and the suction filter (inside tank) should be removed and washed out. If this filter is removed, ensure that no contamination gets inside the suction pipe or into the inside of the filter. - Return line pressure should not exceed 20 p.s.i.

Return line filter



Pressure filter



**Pressure Filter**

The pressure filter is mounted towards the rear of the engine compartment and is accessed through the left-hand engine cover. *Filter element should be changed every 1,000 hours.*

**Pneumatic System**

The pneumatic system consists of a compressor with intake filter, a filter dryer with regulating valve and air tanks. It provides pneumatic power for the air seat, spray pack, cab step, park brake release, hi-low range selection and diff-lock. Air pressure is regulated to 8 Bar.

The air intake filter is mounted in the engine compartment,

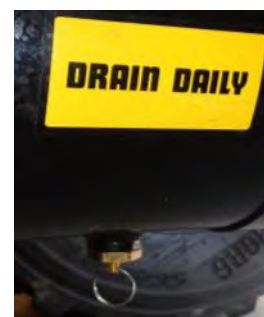
The Filter dryer is between the compressor and purge and air tank. The purge tank and air tank should be drained daily by means of the 'key ring' valves one on each tank. Note there is a further valve on the outlet from the dryer, before disconnecting and air hoses ensure all the air is discharged.



Intake Filter



Filter Dryer



Air tank with drain valve



## Maintenance - Air Cleaning

### Air Cleaning System

A cyclone type air cleaner is fitted to the Agribuggy with a dry element. Under normal operating conditions it should be replaced every 500 hrs. In dusty conditions it should be replaced more regularly change if the air cleaner restriction warning indicates.

When the air filter element does need servicing, replace it with a new one. Do not attempt to clean it. The condition of the air intake hoses should be checked regularly for signs of wear or damage and should be replaced if necessary.

Retaining clips



Dump valve

### Dump Valve

The dump valve is situated on the end of the filter housing (see right). Squeeze the valve open to release any accumulated particles every 50 hrs.

To change the filters, release the four retaining clips and remove the lid. Extract the primary filter. The secondary filter can then if necessary be extracted; if changing the secondary filter, fit the replacement as soon as the old one is removed to prevent dust getting into the clean side of the air intake



Primary air filter



Secondary (Safety) filter element

Ensure that the filter housing is clean internally before fitting replacement filters.

### Screen Wash

The screen wash reservoir is situated in the noise in front of the cab, to access turn the fasteners to release the grill.


Screen Washer Bottle Filler Cap



## Maintenance - Cab Filtration

### Cab Filtration and Pressurisation Unit

The Agribuggy cab is fitted with an integrated pressurisation system and category 4 filtration. The air inlet filter will filter out dust and small particles and the carbon element of the filter will filter out chemical particles and vapours. Positive pressure inside the cab will prevent particles or vapour entering. The carbon in the filter will only remain effective for up to a maximum of 6 months, whether the machine is being used or not, as the carbon degenerates when in contact with the air. If the machine is being used continuously it is recommended that the filter be changed every 200 hrs.

*If positive pressure is not maintained in the cab the warning LED on the climate control panel will indicate* 

When the filter warning spanner symbol lights the filter should be changed.

Keep the inlet grill free of dirt dust chaff etc.

### Filter Replacement



**Caution:** Exposure to chemicals can cause injury - wear protective equipment (PPE).

**Caution:** Working at height - ensure safe access.


To access the filter, release the two retaining bolts securing the roof lid. The lid is hinge mounted at the rear and hinges up aided by gas struts. Release the two clamps that securing the lid onto the filter housing and removed the lid. Slide the filter cassette out, using the two pull straps one at either side. Place it in a plastic bag and dispose of properly. When fitting the replacement filter ensure that the rubber seal around the filter is located correctly so as to avoid contaminated air being pulled into the cab past the filter. After replacing the filter, with the ignition on and the spanner symbol illuminated, press the button and hold for 3 seconds to turn the LED off.

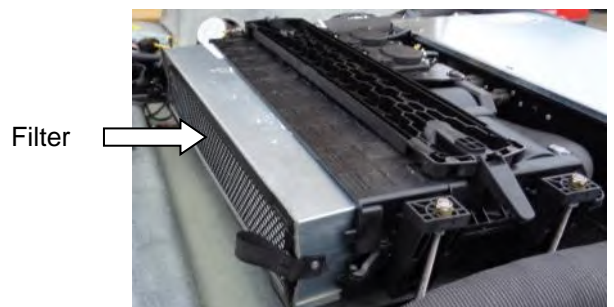
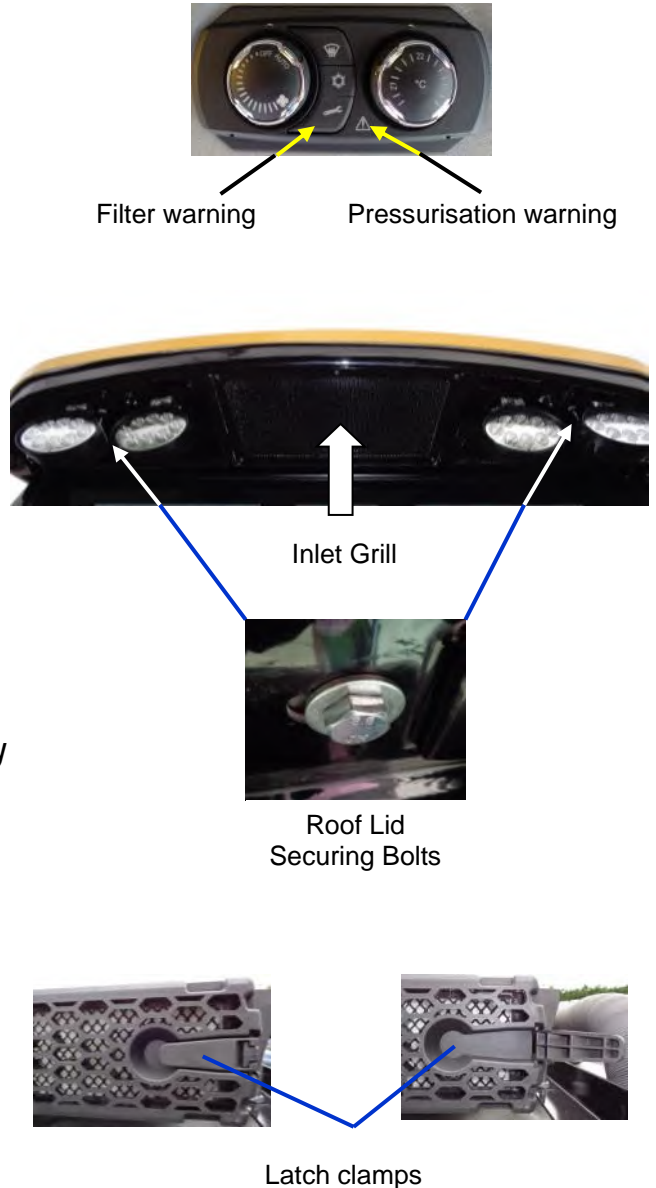
### Air Conditioning

With the exception of the recirculation air filter there are no user serviceable parts in the air conditioning system, the only regular maintenance being the servicing of the compressor drive belt - as described earlier in this manual. The clean of the intake grill and replacement of the filter.

It is recommended that the system is serviced annually by a qualified refrigeration engineer.

The refrigerant gas currently being used is R134A at which time the receiver dryer and oil should be changed.

If the  symbol blinks 2 times a second an electrical fault is indicated.



## Maintenance - Gearbox, Electrical

### Automatic Transmission Oil

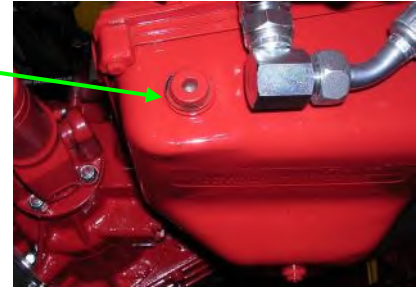
The transmission fluid level should be checked at least every 50 hours. It should be checked when the fluid is cold and with the engine **idling in neutral**.

Ensure the transmission fluid is kept to the level of the plug hole - **Do not overfill**.

Use ATF Dexron IID for topping up - top up through the level hole.

The oil should be changed every 500 hours. The oil, oil filter and oil filter screen in the bottom of the gearbox should be changed either by McConnell Limited, your dealer, or by a suitably qualified engineer

Transmission fluid fill and level check point



Transmission filter mounted on rear engine bulkhead

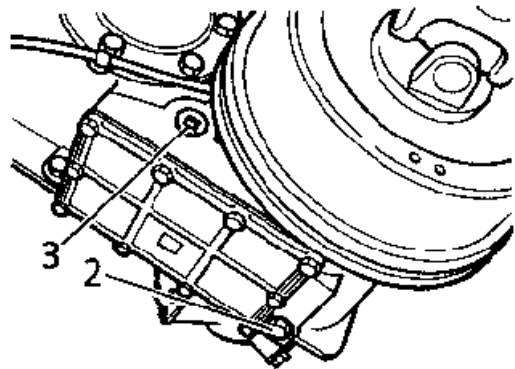


### Transfer Gearbox Oil

The transfer gearbox oil level should be checked every 300 hours.

The level can be checked by removing the level plug (3). It should be topped up through the same hole until it begins to run out.

The oil should be drained (2) and changed every 500 hours. Use one of the following oils; MIL-L-2105 90W EP MIL-L-2105B, C & D 80W EP



## Electrical System

### Battery

The battery fitted is 'maintenance free' and topping up is not normally required throughout the normal life of the battery. However, the level should still be checked when periodic services are carried out. Ensure terminals are kept clean and protected with petroleum jelly. Battery is mounted adjacent to the engine rear bulkhead.

An isolator switch is fitted to the nearside engine cover for use in emergencies or when any welding or repairs are being carried out to the machine. Press to isolate the battery. Pull and ¼ turn clockwise to connect to battery.



Battery



Isolator Switch

There are several ECUs (Electronic control unit) on the machine as follows:

- Display unit (MCU)
- Engine ECM
- Transmission ECU (Compushift)
- Steering/PTO controller (Plus1)
- Circuit board
- Switch Panel

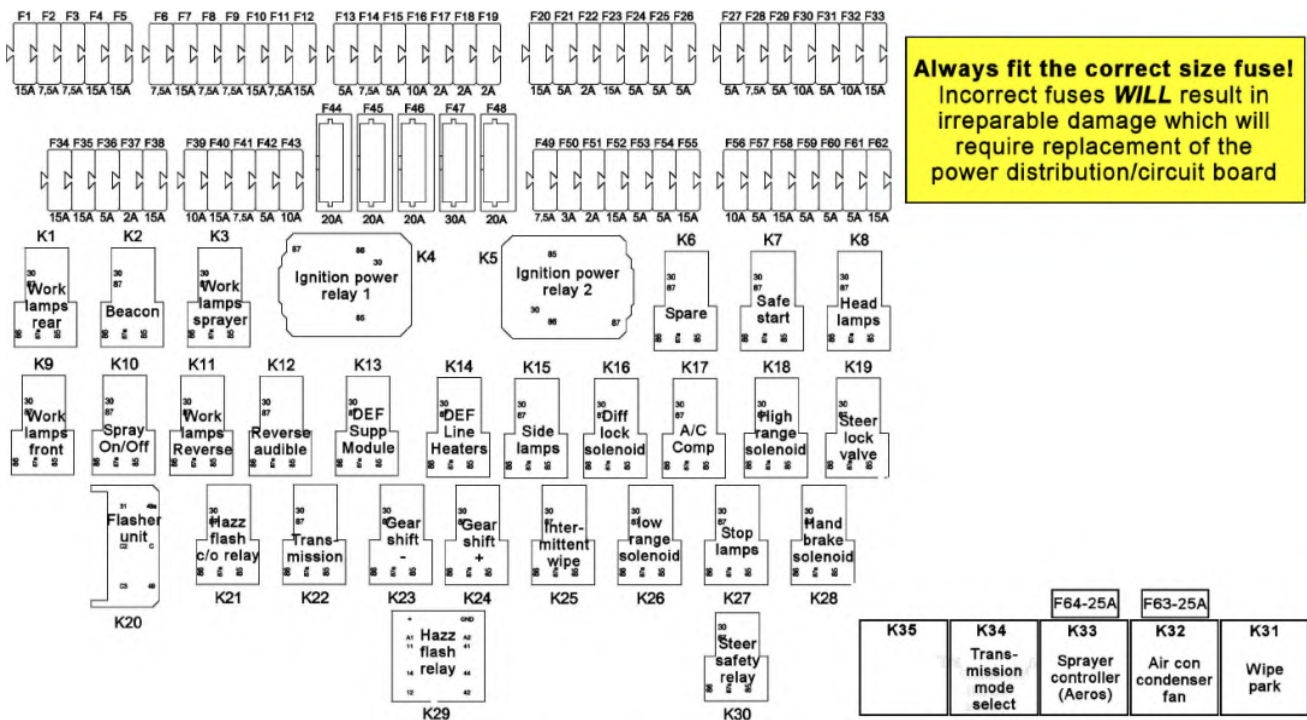
The ECUs are all connected via a J1939 Can Bus system. This system allows the ECUs to “talk” to each other via a network system which consists of just 2 wires.

The heart of the electrical system is the power distribution circuit board which is mounted in the rear right hand corner of the cab. All the machine wiring harnesses plug into this board and all the relays and fuses are mounted on it. Most of the relays and are operated via the can bus with the majority of the instructions being sent either by the MCU or the switch panel.

N.B. It is most important to protect all wiring connections from the corrosive effects of fertilisers and chemicals. All connections should be frequently checked, cleaned and coated with dielectric grease, or other suitable anti-corrosive lubricant.

**Electrical system description**

**Fuses & Relays**



The main fuse panel can be accessed by removing the cover from the panel. Should any fuses require replacement please ensure they are replaced with the correct size or serious damage to the wiring system and particularly the electronic circuit board WILL occur.



**Fuses & Relays**

**\*\*\* WARNING - FITTING AN INCORRECT SIZE FUSE WILL DAMAGE THE CIRCUIT BOARD BEYOND REPAIR! \*\*\***

<b>Cab - Circuit board</b>	<b>Fuse</b>	<b>Size</b>	Handbrake solenoid	27	5
CanBus controller - circuit board	41	7.5	High range solenoid	29	5
Diagnostic connector	25	5	Steering control module	61	5
GPS (For main display)	19	2	Steering safety lock valve	31	5
Seat compressor (if fitted)	52	15	<b>Engine</b>	<b>Fuse</b>	<b>Size</b>
Seat heater	62	15	Air con compressor	28	7.5
Video camera power	60	5	DEF heater	39	10
<b>Cab - Control console</b>	<b>Fuse</b>	<b>Size</b>	DEF line heaters	40	15
Aux power supply (Boutmarker)	48	20	Engine ECU Ignition	59	5
Aux power supply 2 (GPS)	53	5	Engine ECU battery supply	47	30
Aux power supply console Ign live	56	10	NOX ECU	58	15
Hydraulic spool valve power	44	20	Start - start solenoid	32	10
Ignition switch	49	7.5	<b>Lighting system</b>	<b>Fuse</b>	<b>Size</b>
Joystick power (5 volts)	37	2	Beacon	6	7.5
MCU display	24	5	Indicators	1	15
MCU Display (battery feed)	54	5	Headlamp flash	55	15
Mirrors	15	5	Headlamps	33	15
Panel battery power, Sidelight & Hazard switches	51	2	Reverse audible warning	8	7.5
Panel ignition power, joystick buttons	14	7.5	Sidelights LH	2	7.5
Power jack - Din 1	35	15	Sidelights RH	3	7.5
Power jack - Din 2	42	5	Stop lights	23	15
Power jack 1	16	10	Worklamps - reverse	10	15
Power jack 2	57	5	Worklamps - sprayer	12	15
Sprayer power (On/off)	7	15	Worklamps front cab	4	15
Sprayer controller (Aeros)	64	25	Worklamps rear cab	5	15
Wash, Wipe, Park, Horn, Low range	20	15	<b>Transmission</b>	<b>Fuse</b>	<b>Size</b>
<b>Cab - Roof / air conditioning</b>	<b>Fuse</b>	<b>Size</b>	Gear shift actuator	21	5
Air con - cab pressuriser fan	36	5	Transmission Ignition feed	9	7.5
Air con cab fan	34	15	Transmission	13	5
Air con condenser fan	63	25	Transmission oil cooler	38	15
Climate control	45	20	<b>Spares</b>	<b>Fuse</b>	<b>Size</b>
Radio memory, Interior light	50	3	NO FUSE FITTED	18	
<b>Control &amp; warning systems</b>	<b>Fuse</b>	<b>Size</b>	Spare / Not used	11	7.5
Diff lock solenoid	26	5	Spare / Not used	30	10
Sensor supply, Brake fluid level, Air pressure	17	2	Spare battery live feed	46	20
Sensor switch feed - Remote PTO, Hyd filter, Hyd temp, Air filter restriction, Difflock W/L, Hi/Lo W/L	22	2	Spare Ignition live	43	10

**Relays**

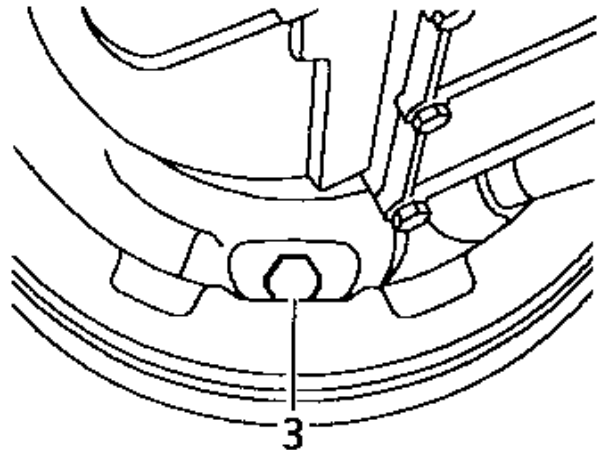
Air con compressor	K17	Reverse audible	K12
Air con condenser fan	K32	Safestart	K7
Beacon	K2	Sidelamps	K15
DEF Line heaters	K14	Spare	K6
DEF supply module	K13	Sprayer master on/off	K10
Difflock solenoid	K16	Sprayer controller (Aeros)	K33
Flasher unit	K20	Steering lock valve	K19
Gearshift -	K23	Steering safety relay (grounds)	K30
Gearshift +	K24	Stoplamps	K27
Handbrake solenoid	K28	Transmission	K22
Hazard flasher - changeover relay	K21	Transmission mode select	K34
Hazard relay	K29	Wipers - Intermittent	K25
Headlamps	K8	Wipers - park	K31
Ignition power relay 1	K4	Worklamps front	K9
Ignition power relay 2	K5	Worklamps rear (sprayer)	K3
Range solenoid - high	K18	Worklamps rear cab	K1
Range solenoid - low	K26	Worklamps reverse	K11



## Maintenance - Brakes

### Handbrake Adjustment

1. Chock the wheels and ensure the brake lever is off.
2. Raise one of the rear wheels clear of the ground and support the axle with an axle stand.
3. Tighten the adjusting bolt (3 right) until brake drum will not rotate by hand.
4. Slacken the adjuster by turning it 1.5 turns anti-clockwise and ensure the drum rotates freely.



If the actuating cable becomes slack, the free play can be taken up by adjusting the cable fitting on the actuating cylinder end of the cable.



### Shoe Replacement

If the adjuster reaches the end of its travel, the brake shoes will need replacing. To do so the rear prop shaft will need to be removed and the drum will then slide off after slackening off the adjuster.

The drum should be removed every 1,000 hours to clean the brake. If you are working in very wet and muddy conditions or if you are spreading a lot of fertiliser then it may require cleaning every 500 hours.

### Foot Brakes

The brake fluid reservoir is situated behind the cab on the right hand side of the front engine bulkhead. Top up with 'Universal' brake fluid to between the 'max' and 'min' marks on the reservoir.

The linkage from the brake pedal to the master cylinder should be lubricated regularly.

The brakes are all self-adjusting discs and only need to be checked for wear periodically. Have the pads replaced before they get right down to "bare metal".

When working in muddy conditions check pads weekly.

If you use your Agribuggy to spread a lot of fertiliser, inspect the metal brake pipes regularly for signs of corrosion and replace if necessary.



Brake fluid reservoir

## Maintenance - Steering

### Brake Servo

The Agribuggy braking system has hydraulic servo assistance powered by oil taken from the main hydraulic system on the machine.

This should not be confused with the brake fluid reservoir which operates the actual brake calipers (see previous page).

Regularly check brake hoses for security and damage.

### Steering

The steering on the Agribuggy is hydrostatic with the oil supply for the steering unit being taken from the main hydraulic system on the machine.

Regularly check steering hoses for security and damage.

Security of mechanical elements of the steering should also be regularly checked.

### Lubrication

There are grease nipples on the steering kingpins which require greasing every 100 hours (see illustration).

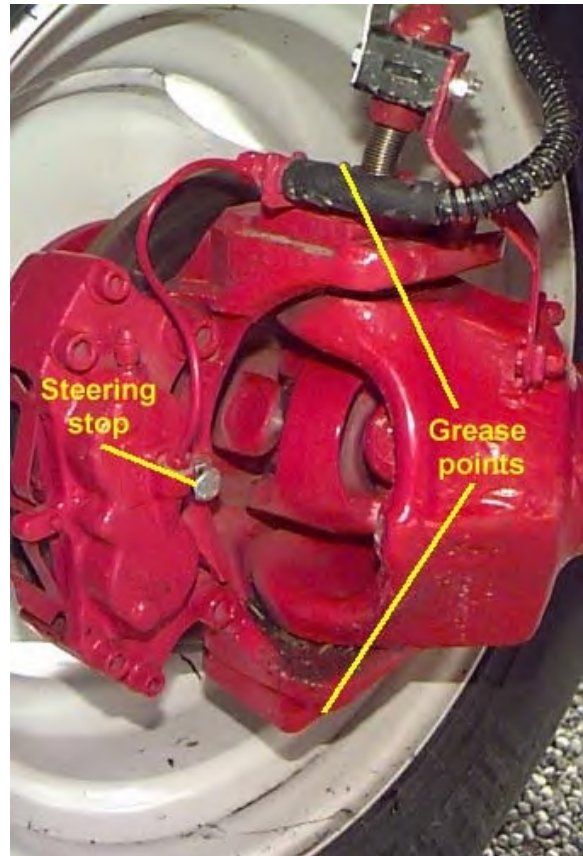
**Please note on four wheel steer machines the front and rear steering systems are not connected in any way, either mechanically or hydraulically. See appendix 1 for further information on the four-wheel steering system.**

### Steering Stop Adjustment

When fitting row crop wheels for late season work you may find it necessary to adjust the steering stops to stop the wheels fouling the cab. This will almost certainly be the case if you are working on track widths of less than 68".

To adjust the stops, firstly turn the steering until the wheels are just clearing the cab on LH lock and then simply slacken off the lock-nut and screw out the stop until it touches the swivel housing. Repeat for RH lock.

**When screwing the stops in, it is important that they are not screwed in further than the original factory settings.** This will cause the swivels to over-rotate causing damage to the seals and may also result in damage to the axle drive shafts.



## Maintenance – Axles

### Axle Drive Shafts

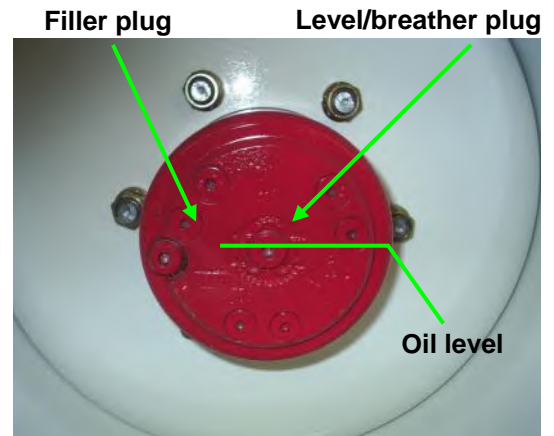
The axle drive shafts are fitted with sealed universal joints and therefore require no maintenance. However, **it is essential that swivel housing area is kept clean.** When working in adverse conditions any mud or crop debris that accumulates around the drive shaft must be washed out daily. If it is left to accumulate it will wear the hub and axle oil seals which will eventually cause oil leaks and premature wear to the wheel and drive shaft bearings.

### Wheel Hubs

The wheel hub/epicyclic units on the Agribuggy axles are filled with oil. The level should be checked every 300hrs. The hub should be rotated until the oil level/filler plug is in the position as shown on the right.

#### Use EP85/90 oil for topping up.

The oil should be changed every 500 hrs. To drain the oil, rotate the hub until the level/filler hole is at its lowest position.



### Wheel Bearings

The wheel bearings should be checked regularly for signs of play. Should any play become evident they can be adjusted by McConnell, your local dealer or by a suitably trained engineer.

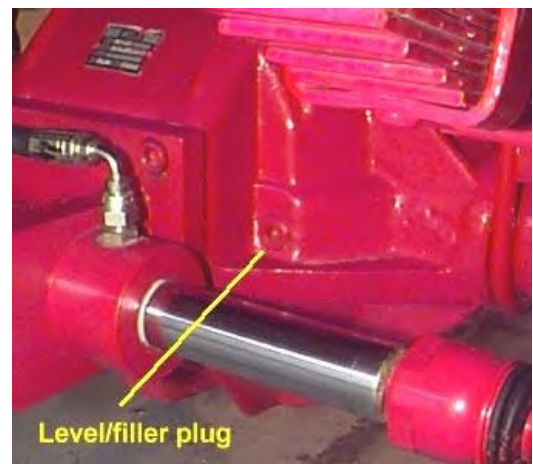
### Axle Oil Levels

Use **EP85/90** gear oil for topping up the axle oil levels. The filler/level plugs are shown on the diagrams on the right.

**The axle oil should be changed every 500hrs.**

### Axle Breathers

Should any axle oil leaks develop, the axle breather should be removed first and checked to make sure it is not blocked. Some breathers have a small ball fitted inside which is prone to seizure, particularly when spreading fertiliser.



Rear axle (4ws version shown)

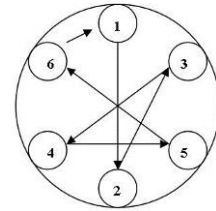


Front axle

## Maintenance - Grease, Tyres, Cleaning

### Wheel

Check wheel nut torque (360Nm) tighten in the sequence shown opposite.



### Wheel Alignment

The front axle should have a toe-in of 1-2mm and the rear steer axle (4ws machines only) should toe-out 1-2mm.

### Greasing

Grease nipples are located as follows and all nipples should be greased every 50 hrs.

Prop shafts - 2 on each universal joint and 1 on the center sliding section.

Axle kingpins - 4 on front axle (4 also on four wheel steer rear axle).

### Tyres

The low pressure tyres are normally pre-set at 11 psi (0.7 bar). The pressure may be reduced in adverse conditions to as low as 8 psi (0.6 bar) depending on the load being carried. However, the main thing to watch is that the tyre side walls do not crease when loaded. If the machine is being used for long periods on the road the pressure should be increased to 14 psi (1 bar). Row crop tyres should be inflated to 35 psi (2.4 bar).

### Cleaning

Mud and crop debris should be cleaned away from the steering swivel and brake calipers on a daily basis to avoid damage to axle oil seals and bearings.

Do not allow crop debris to build up on the engine, exhaust or in any of the cooling system radiators - this should be checked on a daily basis when working in tall or dusty crops.

Great care should be taken in cleaning the machine, particularly after spreading fertiliser. Some types of fertiliser are very corrosive and if not cleaned daily, problems will soon be encountered.

The wiring system is most vulnerable and connections should be checked regularly. The radiator is also susceptible to corrosion and every effort should be made to keep fertiliser out of the radiator core.

**After washing off, leave engine running for a while so that the engine compartment dries out.**

Some types of fertiliser spreaders are prone to throwing fertiliser forwards or making a lot of dust. If this is the case with your spreader it is advisable to fit a sheet or screen in front of the spreader to stop it getting into the engine compartment.

Coating the chassis with a mixture of oil and diesel, or a proprietary anti-corrosive coating agent, after cleaning, pays dividends if you spread large amounts of fertiliser.

It also pays to go round the machine with the grease gun and an oil can on a daily basis when the machine is being used intensively for spreading fertiliser in damp conditions.

***Please remember the warranty does not cover problems caused by corrosion and mud/debris build up!***

**Maintenance Schedule**

Service Operation		Daily 10 Hours	First 100 Hours	Every 50 Hours	250 Hours 6 mths	500 Hours 1 yr	1000 Hours 2 yrs	2000 Hours	3000 Hours
1	Check engine oil level and top up if necessary	✓	✓	✓	✓	✓	✓	✓	✓
2	Check air intake pipework	✓	✓	✓	✓	✓	✓	✓	✓
3	Check coolant level and top up if necessary	✓	✓	✓	✓	✓	✓	✓	✓
4	Drain water from fuel water separator	✓	✓	✓	✓	✓	✓	✓	✓
5	Check fan drive belt and cooling fan	✓	✓	✓	✓	✓	✓	✓	✓
6	Check crankcase breather tube	✓	✓	✓	✓	✓	✓	✓	✓
7	Check cooling radiators/steering swivels for cleanliness	✓	✓	✓	✓	✓	✓	✓	✓
8	Check DEF level	✓	✓	✓	✓	✓	✓	✓	✓
9	Check wheel nuts for tightness		✓	✓	✓	✓	✓	✓	✓
10	Grease prop shafts & check for wear		✓	✓	✓	✓	✓	✓	✓
11	Grease kingpins & check for wear		✓	✓	✓	✓	✓	✓	✓
12	Lubricate electrical connections		✓	✓	✓	✓	✓	✓	✓
13	Check brake fluid level		✓	✓	✓	✓	✓	✓	✓
14	Check power steering fluid level		✓	✓	✓	✓	✓	✓	✓
15	Check automatic transmission fluid level		✓	✓	✓	✓	✓	✓	✓
16	Check/clean radiator screen		✓	✓	✓	✓	✓	✓	✓
17	Check condition of drive belts, pulleys, pump, alternator and Refrigerant compressor		✓		✓	✓	✓	✓	✓
18	Check for oil, fuel & coolant leaks		✓		✓	✓	✓	✓	✓
19	Check expansion tank pressure cap		✓		✓	✓	✓	✓	✓
20	Check battery water level		✓		✓	✓	✓	✓	✓
21	Tighten leaf spring U bolts		✓		✓	✓	✓	✓	✓
22	Check engine, prop-shafts, steering joints are tight		✓		✓	✓	✓	✓	✓
23	Oil brake pedal linkage				✓	✓	✓	✓	✓
24	Clean & adjust transmission brake				✓	✓	✓	✓	✓
25	Clean & lubricate battery terminals				✓	✓	✓	✓	✓
26	Check transfer gearbox oil level				✓	✓	✓	✓	✓
27	Check condition & security of wiring looms				✓	✓	✓	✓	✓
28	Renew fuel filter elements				✓	✓	✓	✓	✓
29	Visually check for exhaust system leaks				✓	✓	✓	✓	✓



**Maintenance Schedule**

Service Operation		Daily 10 Hours	First 100 Hours	Every 50 Hours	250 Hours 6 mths	500 Hours 1 yr	1000 Hours 2 yrs	2000 Hours	3000 Hours
30	Check all air, oil and water hoses for leakage, damage or deterioration				✓	✓	✓	✓	✓
31	Remove wheels, check brakes for wear and replace pads if necessary				✓	✓	✓	✓	✓
32	Check axle/wheel hub oil levels				✓	✓	✓	✓	✓
33	Drain fuel tank				✓	✓	✓	✓	✓
34	Replace cab carbon filter				✓	✓	✓	✓	✓
35	Check wheel alignment on steering axles				✓	✓	✓	✓	✓
36	Check & adjust wheel bearings if necessary				✓	✓	✓	✓	✓
37	Change engine oil and filter ( <b>Must</b> use oil as specified)					✓	✓	✓	✓
38	Change air filter elements					✓	✓	✓	✓
39	Change all axle and transfer gearbox oils					✓	✓	✓	✓
40	Change auto transmission oil					✓	✓	✓	✓
41	Service A/C inc. replace receiver dryer					✓	✓	✓	✓
42	Replace hydraulic oil and filters, clean suction element						✓	✓	✓
43	Change auto transmission oil and filter						✓	✓	✓
44	Replace main drive belts and check the belt tensioner						✓	✓	✓
45	Flush out cooling system & renew coolant						✓	✓	✓
46	Drain brake fluid, replace & re-bleed						✓	✓	✓
47	Replace compressed air inlet filter						✓	✓	✓
48	Replace DEF dosing unit filter						✓	✓	✓
49	Replace DEF tank suction filter							✓	
50	Check crankshaft pulley							✓	
51	Engine overhead set adjust							✓	
52	Replace Centraflex Element (P/No. AB66796L10P)							✓	
53	Replace PTO drive belt (exchange unit)								✓

**Fuels, Lubricants, Coolant Etc.**

*Capacities are approximate and all quoted in litres*

Component	Grade	Volume
Engine Crankcase	SAE 15W-40 to the following classifications are recommended ACEA E7 & E9 API CI-4, & API1 CJ-4 (Use E9 for best DPF performance/engine wear protection)	5 Litres Sump only 6 Litres including filter
Cooling System	ASTM D3306 or ASTM D6210 Fleetguard Compleat.	12 Litres
Automatic transmission	ATF Dexron IID	Service re-fill 4-5 Litre
Transfer box	MIL-L-2105 90W EP MIL-L-2105B, C & D 80W EP	4 Litre
Front Axle Differential	EP 85/90	
Rear Axle Differential	EP 85/90	
Epicyclical Hubs Front axle	EP 85/90	
Epicyclical hubs Rear axle	EP 85/90	
Air Reservoir Tank		Purge tank 5 Litre Main reservoir 20 litre
Fuel Tank	ASTM 2-D, Ultra-low sulphur diesel with a maximum sulphur content of 50 parts per million with a minimum centane number of 40. Fuel lubricity BOCLE number of 3100 or greater.	91 Litre
DEF Tank	Diesel Exhaust Fluid to ISO 22241-1      DIN 70070	25 Litre
Hydraulic Tank	ISO VG 46	
Brake Reservoir	Universal brake fluid	
Air Conditioning	Gas R134	1300 gram 250 cc oil

<b>Electrical System</b>	
Batteries	105 Amp/Hr
Battery Terminal Ground	Negative
Alternator	120 Amp 14 Volt

**Parts**

All replacement parts are available from McConnel Limited. Some parts may also be available from other local sources. Only genuine replacement parts should be used during the warranty period and we strongly recommend that you do the same after the warranty has expired. If you require any parts information, please do not hesitate to contact us.

When ordering parts please quote the Agribuggy model/build no. which can be found on a plate on the front right hand corner of the chassis.

If you are in any doubt about operating or maintaining the machine or fitting any of your own equipment, please do not hesitate to contact us.

This instruction book covers all the most important points on operation and servicing of the Agribuggy but, by no means, does it cover everything in full detail. It is updated periodically and we would therefore welcome any suggestions of further information that you would like to see included. We hope to produce a more detailed workshop manual and parts book in the not too distant future.

***The manufacturer cannot be held responsible for any accident, injury, or any other occurrence resulting from the incorrect use of the machine or equipment fitted to it.***





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