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McCONEL

MULTIDRIVE

M380-4 & M420-4

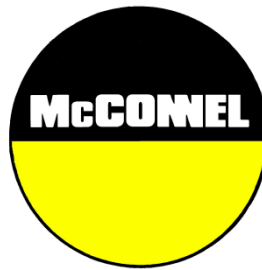
ALL TERRAIN CARRIER VEHICLE

Operator Instruction Manual



MULTIDRIVE
M380-4 & M420-4
All Terrain Carrier Vehicle

OPERATOR INSTRUCTION MANUAL



McCONNEL LIMITED

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England**

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MULTIDRIVE

OPERATOR INSTRUCTION MANUAL

INTRODUCTION

READ THIS MANUAL carefully so that you are able to operate and service your machine correctly in a safe manner. Failure to read this manual may result in personal injury or damaged equipment.

THIS MANUAL should be considered a permanent part of the machine and should stay with the machine if it is sold.

THE RIGHT AND LEFT of the machine is determined by facing in the direction of the vehicle in forward motion.

Where the term near side is used it refers to the side of the vehicle closest to the kerb (assuming vehicles are driven in the left-hand lane).

Where the term off side is used it refers to the side of the vehicle furthest from the kerb (assuming vehicles are driven in the left lane).

ALTERATIONS TO THE ENGINE beyond factory specifications without prior authorisation may result in damage and the loss of warranty protection on the machine.

BEFORE DELIVERY a pre delivery inspection was performed on this machine. After the first 100 hours of operation an after sale inspection and service should be arranged. Not doing so will seriously reduce the machine life and result in the loss of warranty protection on this machine.

This Multidrive M380-4 & M420-4 is a dedicated, specialist load carrier with high payload to unladen weight. Mechanically driven for efficiency and simplicity the vehicle has superb traction. The ergonomic cab and controls together with an automatic transmission provide a comfortable environment and ease of use for the operator. **IT IS SOLELY INTENDED** for use in agricultural or similar operations, it has been designed principally for use as a crop sprayer, fertiliser spreader and similar functions. 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 important that only correctly qualified people undertake operation, maintenance and repair of this machine.

This is the original version of the Multidrive instruction and not a translation.

Table of Contents

Warranty Policy	5
Declaration of Conformity	8
Safety	
Recognised Safety Information	9
Operators Cab	10
Brakes	10
Electrical	11
Steering	11
Maintenance	11
Tyres and pressures	14
Towing and recovery of vehicle	15
Spraying	16
Safety Decals	17
Operation	21
Vehicle Controls	22
Cab controls	22
Right Hand side console	22
Controls & switches	23
Stalk mounted controls	24
Machine Control Unit (MCU)	25
Main display	26
Warning lamps	27
Error warnings	28
Rear steer information	29
Transmission information	29
PTO information	30
Menus	31
Diagnostics	33
PTO set-up	34
Cab Interior Light	36
Transmission Gear Range Selector	36
Differential Lock	39
Handbrake	39
Seat adjustment	40
Weight Adjustment	40
Back-rest angle adjustment	40
Armrest adjustment	40
Fore and aft adjustment	40
Seat cushion adjustment	40
Steering column adjustment.	40

Mirror adjustment	40
Steering Modes	41
2 Wheel Steer 'Road Mode'	42
4 Wheel Steer	42
4 Wheel Steer Delay	42
Crab Steer	42
Offsets Steering	44
Electronic Climate System	44
Cab Ventilation	46
General Operation of Vehicle	47
Cruise control	50
Vehicle Equipment	
Power Take Off (P.T.O)	53
Single PTO Powersaver pump	53
PTO Speed Setting	53
Remote PTO Switch	54
PTO Speed Setup – Centrifugal Pump	55
PTO Safety Information	56
Ancillary Equipment	57
Hydraulic Service Valves	58
Optional Equipment	59
Hydraulic Pickup Hitch	59
Single Line hydraulic trailer brake	60
Air trailer braking	60
Engine Warning & Aftertreatment	61
Maintenance and Servicing	
Access to Engine and Radiator	67
Engine Air Cleaner	68
Screen wash reservoir	69
Electrical System	69
Isolator Switch	70
Checking Batteries	70
Distribution Board Layout	71
Fuse Box Layout	72

Foot Brake Adjustment	74
Powerbrake operation check	74
Park brake	74
Air System	76
Maintenance and Operation of Air Brake System	77
Compressor	77
Air reservoir	77
Hose coupling	77
Weekly maintenance	77
Air Suspension	78
Cab - Composite Air Filter	79
Installation	79
Maintenance	79
Changing the filter	79
Cab Air Filters	79
Lubrication and Periodic Service	80
DAILY/EVERY 10 HOURS	80
FIRST 100 HOURS OF OPERATION	82
AFTER FIRST 100 HOURS	82
EVERY 250 HOURS	83
EVERY 500 HOURS	84
EVERY 1000 / 2000 HOURS	85
Lubrication Schedule Check Sheet	86
Capacities	87
Engine	88
Transmission	88
Recommended Lubricants Fuel Coolant and Service	88
Engine	88
Fuel	88
Fuel Filters	89
Lubrication Oil	90
DEF	91
Coolant	92
Hydraulic Tank	92
Transmission Lubrication and maintenance	93
Oil Grade	93
Oil Level Check	94
Oil Change and Filter Replacement Interval	95
Transmission Oil Filter Replacement	95
Transmission calibration	96
Axles	
Axle Hubs	98
Axle Differential	99

Axle and Propshaft Lubrication	100
Set-up Procedure of Axle Stops	102
Front Axle	102
Rear Axle	102
Wheel Track Settings	103
4 Wheel Steering Calibration	104
Axle & Wheel Specification Details	107
Wide Floatation Tyres	107
Tyre Data	108
Vehicle Identification	112
Serial Numbers	112
Type Plates	112
Tractor Identification Number	112
Automatic Transmission	112
Serial Number Plate	113
Mounting Instructions	114

WARRANTY POLICY

WARRANTY REGISTRATION

All machines must be registered, by the selling dealer with McConnell 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 McConnell 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 McConnell 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 McConnell 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 McConnell 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 see page 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 McConnell 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 McConnell 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, McConnel 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: MULTIDRIVE ALL TERRAIN CARRIER VEHICLE

Model: MULTIDRIVE M380-4, M420-4

Build no.:

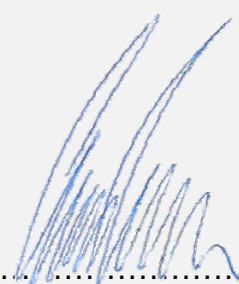
Serial no.:

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

Date: February 2019

CHRISTIAN DAVIES on behalf of McCONNEL LIMITED.

Recognised Safety Information



THIS IS THE SAFETY ALERT SYMBOL.

WHEN YOU SEE THIS SYMBOL IN THIS MANUAL BE ALERT TO THE POTENTIAL FOR PERSONAL INJURY AND / OR DAMAGE TO THE MACHINE.

MAKE SURE WHEN READING THROUGH THIS MANUAL YOU OBSERVE ALL SPECIAL NOTES and 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. When operating in adverse terrain be aware of machine limitations and the centre of gravity of load, tyre pressures etc.
4. Do not allow children or unqualified persons to operate the machine.
5. Ensure operators are trained in the use and approved to operate the machine before commencing operation.
6. Always wear your safety belt securely fastened.
7. Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.
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 or unstable ground. This is not an exhaustive list so be aware of any other hazards that might cause the machine to overturn.
10. Keep off slopes that are too steep for safe operation.
11. Do not permit others 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 17 for further details.

Operators Cab



1. Do not jumping in and out of the cab, getting into or out of the cab without care and attention may result in injury. Use steps provided, use grab handles to assist, not the steering wheel
2. Before opening or closing the doors always ensure that no one is standing in the near vicinity to prevent possible injury. Before egress visually check the ground for obstructions, use steps and grab handle provided and exit the cab backwards
3. 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.
4. Always stop the engine before working on the machine. Remove the ignition key.
5. Do not attempt to adjust the seat position whilst driving the vehicle. (Page 40)
6. 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 40)
7. Always ensure the driver's door is closed when using the vehicle.
8. In an emergency if the driver's door cannot be opened the window / door opposite can be used as an escape route, lift the release knob up (to rear at base of window) and push open, climb out with care.
9. Do not make alterations, drill holes or weld to the safety cab.
10. The A-weighted emission sound pressure level at the drivers 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.

4. Drain the compressed air tanks regularly; not doing so will affect the performance of an air braked trailer.



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. (Page 73)
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 selected for use on the road. The rest of the steering modes are intended ONLY for fieldwork at the lower speeds.



Maintenance

1. When the stop warning is displayed on the MCU, the vehicle must be stopped as soon as safety conditions permit and the fault rectified before continuing.
2. Always use the correct PPE personal protective equipment when maintaining the machine.
3. Never have the engine running when the engine bonnet/hood is open.
4. Never run the engine in a closed environment. Always ensure there is sufficient ventilation to allow fumes to disperse safely.
5. Always ensure 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.
6. Before carrying out service work stop the engine and allow it to cool. Always follow the recommended service proceedings.
7. Do not attempt to remove the radiator header tank filler whilst the engine is running or still hot.
8. Do not attempt to fill or top up a hot engine with cold coolant.
9. 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.

- 10. Avoid fluids under pressure coming into contact with the skin. Relieve system pressures first before working on high pressure pipes, fittings, etc. be aware that the machine has hydraulic accumulators for the braking circuit.
- 11. If fluid is accidentally 'injected' into the skin by contact accidentally being made with high-pressure fluid, consult a doctor immediately.



- 12. If any safety critical faults are found during the daily / weekly checks and inspections. They must be rectified before using the vehicle. 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.
- 13. 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.
- 14. Take care when filling the Diesel tank or Hydraulic oil tank that you properly identify the correct one. The diesel tank is on the left side of the chassis (when facing forward) and the hydraulic oil tank is on the right. Diesel fuel is flammable, handle fuel with care, switch off engine before refuelling, keep away from naked flames, do not smoke when filling the tank, do not leave unattended.



- 15. Fuel spillages are highly inflammable – clean up any spilt fuel. Dispose of any contaminated material in a safe place. 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.
- 16. 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.
- 17. Keep clear of rotating components such as fans, drive shafts and drive belts.



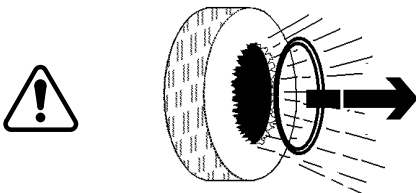
18. Under no circumstances must the chassis be welded as structural failure could well follow. Use the designated attaching points for mounting implements etc. Contact McConnell Limited for a copy of the body builder's instructions drawing for implements or attachments to be carried on the machine chassis.
19. 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.
20. When working in the vicinity of the front and rear wheels be aware of the danger of becoming trapped / crushed between the chassis and wheel, do not get into a position where this can happen.
21. Ensure that no work is done at height if it is safe and reasonably practicable to do it other than at height. For any work that has to be done at height ensure that work is properly planned, appropriately supervised and carried out in as safe a way as is reasonably practicable using appropriate equipment.
22. Be aware of the risk of contracting hot surfaces, including residual risks such as filling of oil or coolant in hot engines or transmissions.
23. Maintenance work should only be undertaken by a skilled vehicle mechanic.

Cleaning the machine

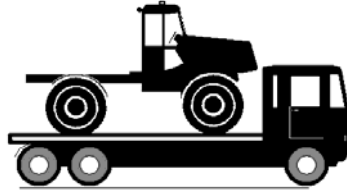
1. Keep the machine clean and free of corrosive substances.
2. Before cleaning the machine ensure that the engine is stopped, handbrake is on and ignition key is removed.
3. Clean steps, pedals and floor. Remove grease, oil, dust and mud – slippery surfaces are hazardous.

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 (see page 108).
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.

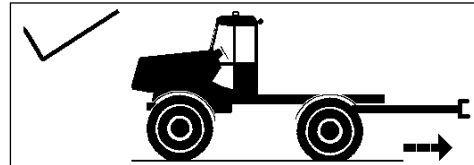
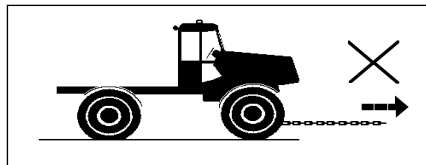


3. Contact with air under pressure can cause personal injury. Only inflate the tyre to the recommended pressure quoted in the tyre manufacturer’s handbook.
4. Failure to follow the manufacturers recommended inflation pressures may lead to distinct deterioration in performance and tyre life. Tyre condition 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 wheels 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 103.
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 axle stops on page 102.



Towing and Recovery of Vehicle

1. Trailer towing - use only the Multidrive pick-up hitch or drawbar to tow trailers. Under no circumstances whatsoever must any downward force be applied to the rear of the linkage frame mounted on the rear axle. Doing so will apply rotational forces to the rear axle and cause severe damage to the axle twin-link frame and shock absorbers. With the Multidrive pick-up hitch or drawbar, downward forces are transferred to the chassis crossmember and then to the rear axle via the suspension units in a safe manner.
2. As described in section 1 above, under no circumstances must a towing hitch or clevis be fitted onto or welded onto the linkage carrier assembly behind the axle. All downward forces must be suspended from the chassis cross member fitted immediately over the rear axle. Towing links may be fitted from the linkage carrier to a drawbar or hitch so suspended. The Multidrive drawbar and pick-up hitch is specially designed to accommodate all such movements. The fitting of a non-approved drawbar or pick-up hitch will invalidate your warranty.
3. 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 from the rear of the vehicle. The park brake is spring applied, if the brake pressure has been exhausted the brake will apply, see instruction page 75 for winding the brake off.

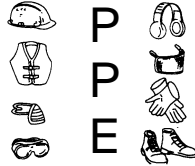


4. Ensure that all wheels are chocked prior to removal of the rigid tow bar between the vehicles.
5. The towing speed must in no case be higher than 10 km/h, the tow distance no greater than 10 km, otherwise damage will be caused because of lack of lubrication.

6. **The machine is fitted with power brakes and should not be towed when the engine is switched off. The brake system only allows 5 brake pedal movements for the braking of the vehicle with the engine stopped. Towing of the vehicle should only be with a rigid connector. It is the responsibility of the owner/operator to check weekly the operation of the emergency brake system.**



CAUTION
Spraying



P
P
E



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.

Safety Decals

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 immediately with identical items; these are available through your local McConnell dealer, using the parts codes stated.

Speed Caution Part number MD63333Z10C



Located on the right-hand side off the dashboard near the steering column. The speed of 50KPH (should not be exceeded). NOTE traffic regulations may mandate lower speeds

Rear Steering Caution



Located on the left-hand side of the dashboard adjacent to the steering adjustment handle. Ensure rear wheel area is clear before activating four-wheel steering. Four-wheel steer system must be de-activated for all road work.

Crush Zone



Located on either side of the rear axle suspension hanger X member. Keep clear of the rear wheel area at all times when engine is running

Check Transmission oil Level



Located on the outward face of the battery box lid. Instruction on how to check transmission oil level.

Isolator switch operation



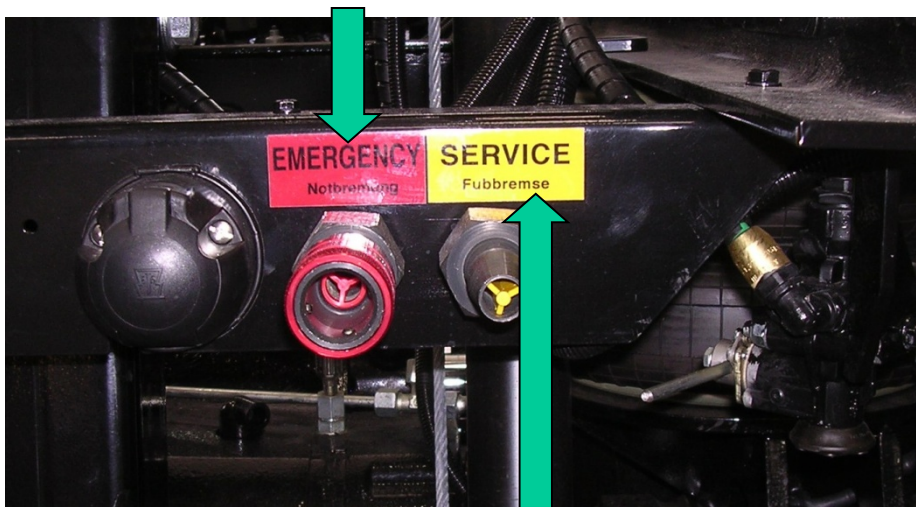
Located adjacent to the isolator switch. Instructing unless in emergency not to switch off until the light next to the isolator switch has ceased illuminating.

Trailer Air Brake Emergency Line

Part Number MD52907L20P

EMERGENCY
Notbremung

Located on the offside of the rear services carrier. The decal illustrates the position of the emergency airline.

**Trailer Air Brake Services Line**

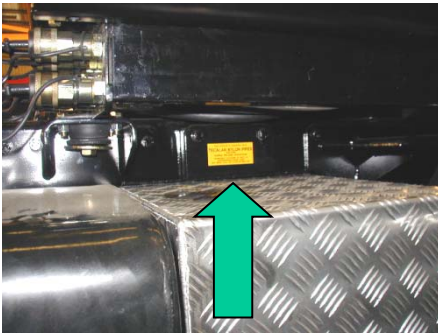
Part Number MD52906L20P.

SERVICE
Fubbremse

Located on the off side of the rear services carrier. The decal illustrates the position of the service airline.

Tecalan nylon Pipes

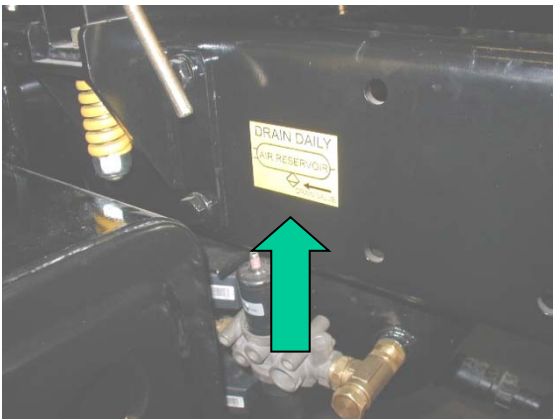
Part number MD52908L20P



Located on the off side chassis rail above the battery box. The decal alerts the operator to the danger of welding too close to the hydraulic pipes.

Air Tank Drain Daily Decal

Part number MD52908L20P



Located on the off side off chassis on the air tank behind the hydraulic tank. The decal indicates that for optimum performance of the pneumatic system air tanks should be manually drained of condensation on a daily basis.

Operation

The Cummins engine installed in this machine does not require a “break-in” procedure. 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.

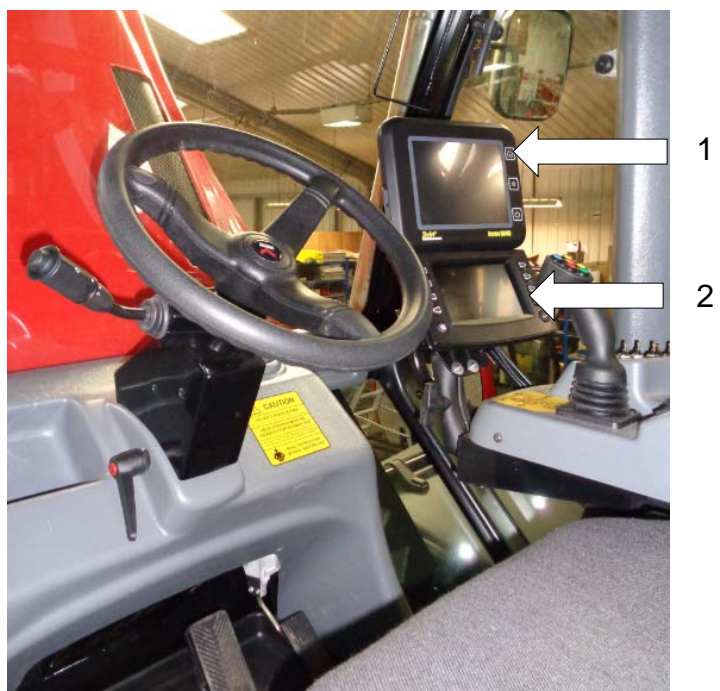
Using the MCU check the oil pressure and coolant temperatures sensors are functioning daily. Take note of any alarms or warnings indicated by the MCU and take the necessary actions.

Check and keep the coolant and oils filled to their recommended levels on a daily basis. See maintenance section later on in the manual.

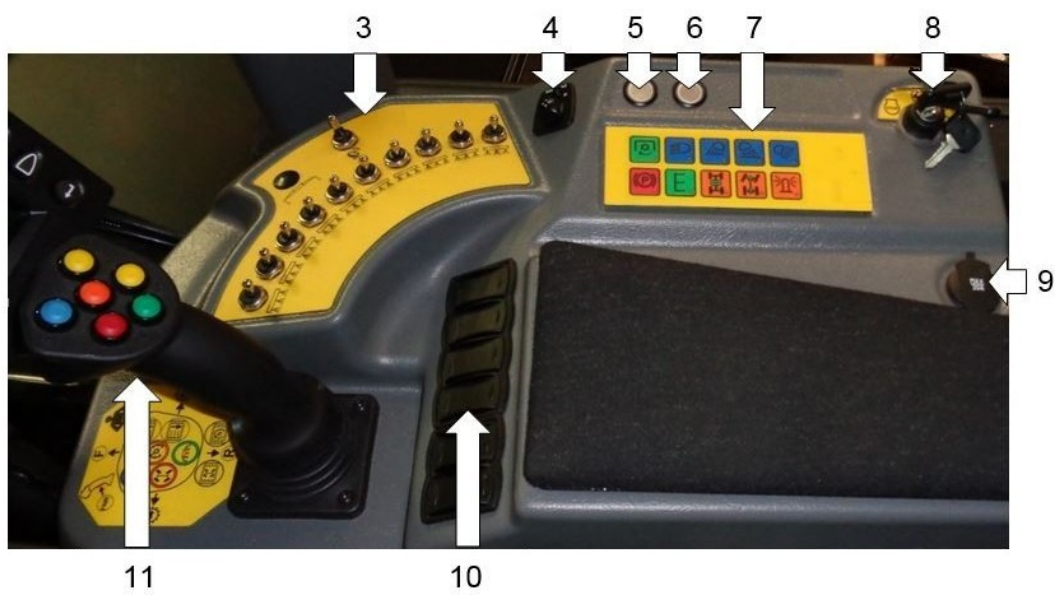
Correct care of the Multidrive will result in a longer life, better performance and more economical operation. Following the daily maintenance checks listed herein is important.

Be aware that the engine operates with a selective catalytic reduction (SCR) system and requires Diesel Exhaust Fluid (DEF) (see page 91 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 vapour 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.

Cab Controls, Instruments and Warning Lights



Right hand control console



- | | |
|--|-------------------------------|
| 1 Ancillary equipment controller (Sprayer) | 6 Hazard warning light switch |
| 2 MCU (Machine control unit) | 7 Switch panel |
| 3 Sprayer section switches | 8 Ignition key switch |
| 4 Mirror adjust controls | 9 Charging socket |
| 5 Sidelight switch | 10 Ancillary switch panel |
| | 11 Joystick |

Cab Controls and Switches



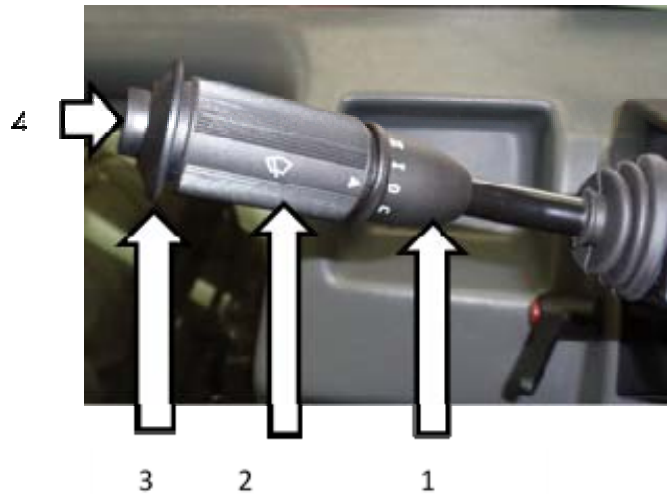
1. PTO Engage / Disengage
2. Headlights
3. Front Work Lights
4. Rear Work Lights (Cab & Sprayer)
5. Reversing/ Sprayer Lights (if fitted)
6. Parking Brake
7. Access Steps
8. Four-Wheel Drive
9. Centre Differential Lock
10. Beacon
11. Side / Parking Lights
12. Hazard Warning Lights



- | | |
|------------------------|------------------------------|
| 1 Multifunction Switch | 3 Steering Column Adjustment |
| 2 Cup Holder | 4 Brake Pedal |
| | 5 Accelerator Pedal |

Stalk mounted controls

Switches on the side instrument panel control the main side/rear lights and headlights. (See Cab Controls and Switches previous page).

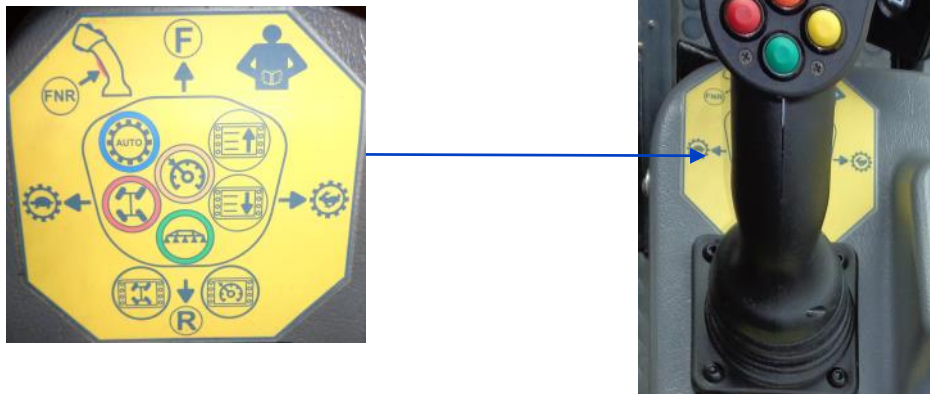


The headlight main beam/dip is controlled by the stalk (1) mounted on the steering column (see Figure 19). Move the stalk vertically up for dipped headlights and press down to select main beam. The appropriate warning on the MCU illuminates when the main beam mode is selected.

The front windscreen wiper slow/fast/intermittent wipe control is also situated in the control stalk assembly. Pressing the outer ring (2) towards the steering column activates the front windscreen washer pump.

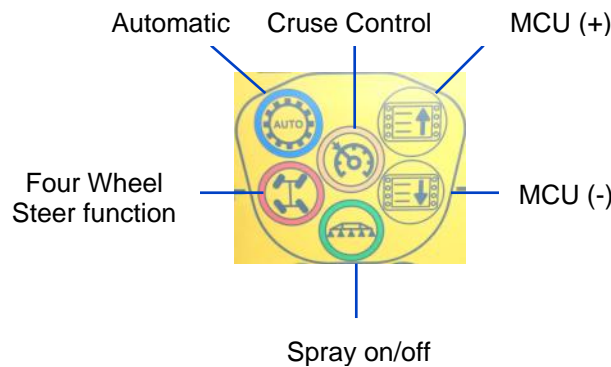
The warning horn button (3) is positioned in the end of the control assembly. Press to operate.

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)

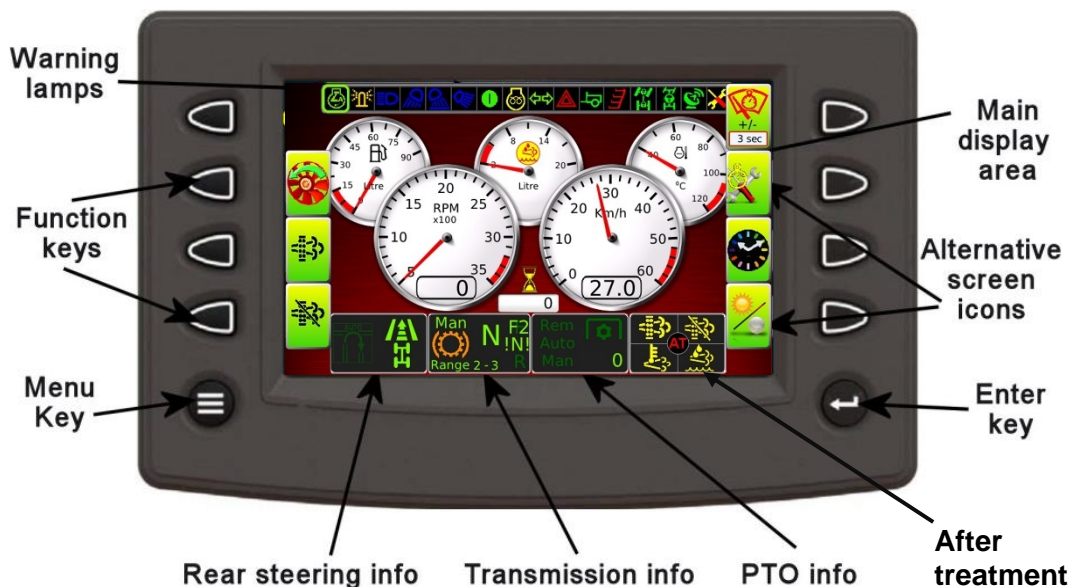
The MCU is the only display unit for the machine and not only displays a multitude of information but also controls various machine functions in conjunction with other controllers on the machine. It is an integral part of the electrical system and the machine will not function without it.

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 speed interlocks.
- 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 which screen is being displayed at the time. In operating mode the machine information and warning lamps will be on display at all times.



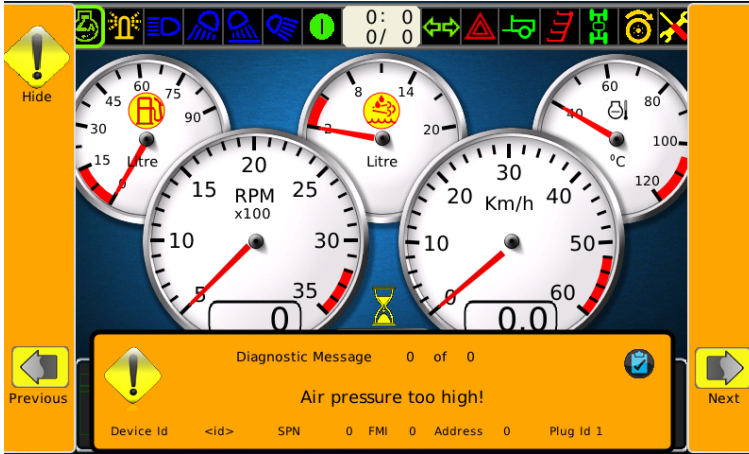
Warning lamps



- | | | | |
|---|---|---|-------------------------------------|
|  | 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/ Wait to start |  | 9/ Direction indicators |
|  | 10/ hazard warning flashers |  | 11/ Trailer direction indicators |
|  | 12/ (Optional)Power Step (down position) |  | 13/ Diff lock engaged |
|  | 13/ Front diff lock engaged |  | 13/ Rear diff lock engaged |
|  | 14/ Four wheel drive engaged |  | 15/ GPS speed sensor active |
|  | 15/ Ground speed sensor active |  | 16/ 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 McConnell please record the following codes from the bottom of the screen:







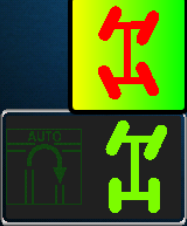


Device ID – identifies which ECU is sending the error – e.g. engine, transmission or steering controller

SPN – The error code number – may allow further to be found information

FMI – A code that may indicate the nature of the error.



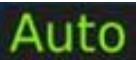





Rear steering information area

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

	Road mode, headland mode off		Delay mode
	Two wheel steer headland mode		Crab mode
	Four wheel steer headland mode		Offset LH
	Requested mode pop-up (disappears when mode has changed)		Offset RH
			Offset Auto

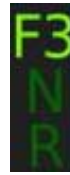
Transmission information area

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, 3rd shown)



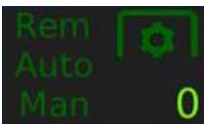
Neutral handbrack on



Neutrol required

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

The dashboard screen features several functional areas:

- Top Bar:** A row of icons for various vehicle systems and a digital display showing 0:0 / 0/0.
- Left Side:**
 - Error message Hide/Recall:** A yellow warning icon with a 'Recall' button.
 - GPS:** A blue star icon.
 - Video Camera(s):** A camera icon.
 - Transmission:** A gear icon.
- Center Gauges:**
 - Fuel Gauge:** Shows fuel level in Litre (0-90).
 - RPM Gauge:** Shows engine speed in RPM x100 (0-35).
 - Speedometer:** Shows speed in Km/h (0-60).
 - Temperature Gauge:** Shows engine temperature in °C (0-120).
- Right Side:**
 - Home:** A red house icon.
 - Engine Pressures:** A pressure gauge icon.
 - Engine Temperatures:** A temperature gauge icon.
 - PTO:** A PTO shaft icon.
- Bottom Bar:** A row of control buttons including 'AUTO', a gear icon, a red stop icon, and a PTO indicator showing 'Rem Auto Man 540'.

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

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

Pop-up menu



To access the quick access pop-up menu press the “Enter” key



From top to bottom on the right hand side functions are available to:

- 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.

Set-up menus



To enter the set-up menu system by press the “Menu” key.



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

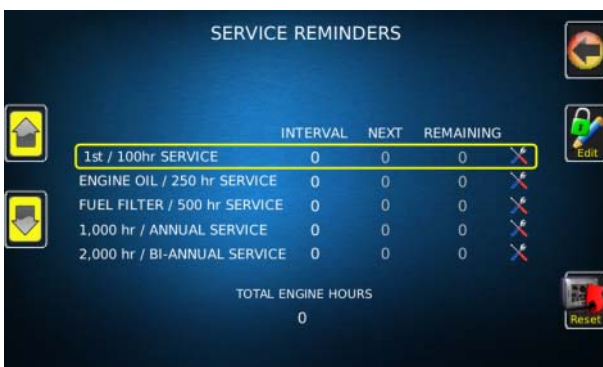
Service & diagnostics



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.

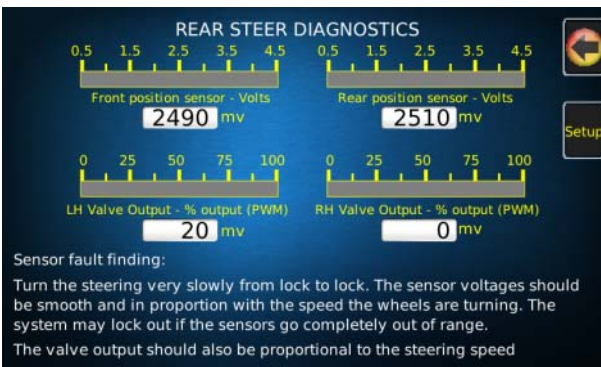
Engine diagnostics.

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



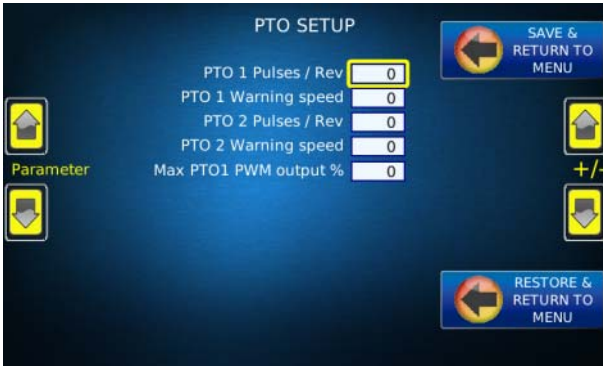
Steering diagnostics

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



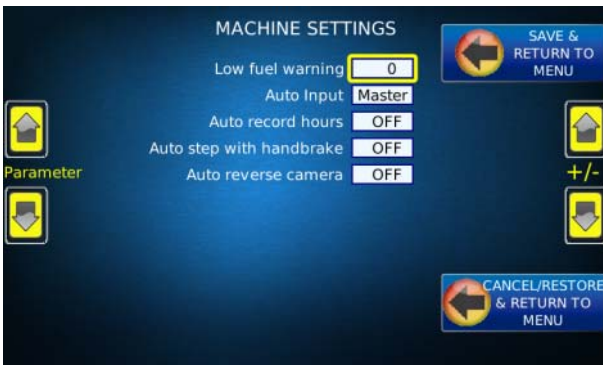
To alter parameters scroll up and down using the arrow keys on the left hand side to select the parameter to be adjusted then use the right hand keys to adjust the figures up/down. Press Save & return to save the settings.

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 / spinner 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.

Machine Settings



Low fuel warning – Default 15 litres, can be set as required, fuel tank capacity is 300 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

Power step (optional) 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)

Front side view camera – Two cameras are positioned, one each side of the bonnet front, these are to aid the driver when turning out at a road junction. The view from the cameras is displayed on the MCU.



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 smaller wheels fitted the speedometer will over-read. 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.

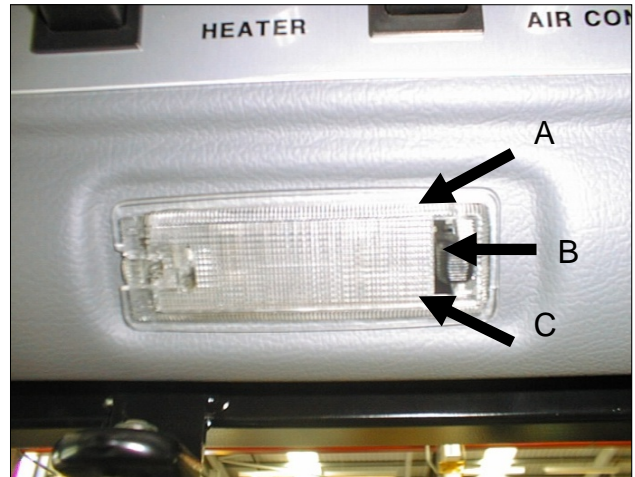
Speed limiter

For safety and legal reasons a speed limiter is fitted to the Multidrive which limits the maximum speed. 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.

Cab interior light

The lamp has a 3-position switch –

- a) On
- b) Off
- c) Illuminated only when door is opened



Transmission Gear Range Selector/ Joystick

The gear range selector / Joystick must be in the neutral position prior to starting the engine, to select forward or reverse gears; the function push button must be activated whilst engaging the desired direction of travel.

By pressing the joystick to the right (+) or the left (-) gears can be pre-selected.



Gear Selection

After shifting of a gear from the neutral position, the automatic mode is always selected.

Automatic shifting forward gears 1 to 6.

Automatic shifting reversing gears 1.

For manual operation:

- To select manual mode, a lower or higher gear, move the gear selector to the left (-) or the right (+).
- To pre-select a range of gears in manual select up to the highest gear required, the range selected will then be displayed.

Re-activate automatic mode, press the blue button (top left).

Gear Indication Display on MCU



Auto Automatic mode selected

Man Manual mode selected

Torque converter locked

Torque converter unlocked

Display of the driving direction:

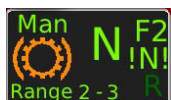
F: Forward
N: Neutral
R: Reverse

Display of the engaged gear:

Display F1, F2,F6

Waiting for Controller-Neutral:

Indication on the display: **N!** In this condition, Neutral is pending on transmission. To engage a gear, at first neutral must be shifted on the controller before the electronics allows to engage a gear again.



Pre-selected Driving Range:

Range 2 - 6

Display of Error Message:

If the transmission has a fault an error warning will be displayed on the MCU.

Transmission Important Instructions

Oil level check (see page 95):

When starting from cold, the engine must be running for about 2—3 minutes at idling speed and the oil level must show on the dipstick in the cold start mark.

The oil level check in the transmission must be carried out at engine idle speed and operating temperature of the transmission (80 to 90degree C).

At every oil change, the ZF-Fine filter must be exchanged. In addition, ZF recommends to start the autonomous calibration of the shifting elements (AEB – see page 96).

When starting the engine, the Controller must always be moved into the neutral position. With the engine running and the transmission in neutral, the parking brake must be engaged to prevent the vehicle from rolling.

Prior to moving off, release the parking brake.

Neutral position must never be selected of the forward/reverse control lever at high vehicle speeds or above walking pace.

Either a suitable gear is to be selected immediately, or the vehicle must be stopped at once.

Reversing (Standard):

Selecting the reverse mode must be performed at a standstill, or at very low driving speed. Above the programmed reversing limit, the vehicle will be shifted to neutral by the transmissions Electronic unit EST-37A, and the vehicle will continue to move in the original driving direction.

When stopping the engine and parking the vehicle - regardless of a pre-selected gear, it is of paramount importance to actuate the park brake at all times. With the vehicle parked for long periods, additional brake blocks should be placed at the wheels.

Should the vehicle require to be towed in case of breakdown, a rigid tow/draw bar should only be used. Speeds must be no higher than 10 km/h, and the towing distance no longer than 10 km. It is imperative to observe this specification otherwise the transmission will be damaged due to insufficient oil supply, resulting in an expensive transmission repair.

The approved safe solution regardless of distance would be to transport the vehicle with a low loader.

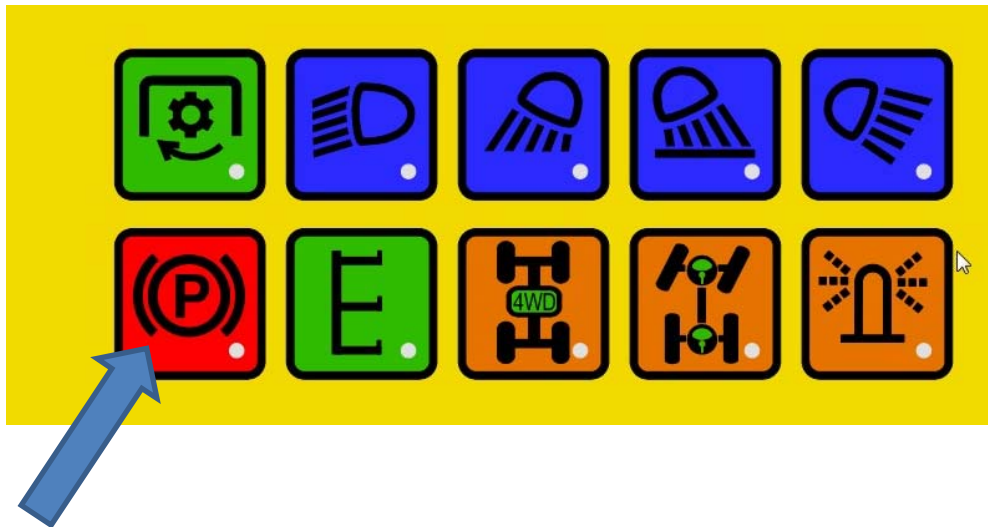
In the case of irregularities on the transmission, put the vehicle out of service and contact your local service dealer or McConnel Service.

Differential Lock

When engaged the differential lock provides increased traction by locking each pair of wheels together. The two axles can also be locked together using the 2/4WD switch (see pages 23 & 48).

To operate the differential locks depress the differential lock switch located on the right-hand console switch panel. This switch will engage the cross axle differentials in both front and rear axles, the icon on the MCU will indicate when the locks have engaged. Do not do so if one of the wheels is turning at a different speed to the other. Always disengage the differential lock switch before turning the vehicle (with the differential locks engaged the machine will resist to turn). Ensure the differential locks have disengaged when not required, check the icon on the MCU to confirm they have disengaged.

Handbrake



The park brake button is situated on the right hand console as illustrated above. To apply the brake press and hold the button down for ½ second. The Park brake is only to be operated when the vehicle is 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.

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.

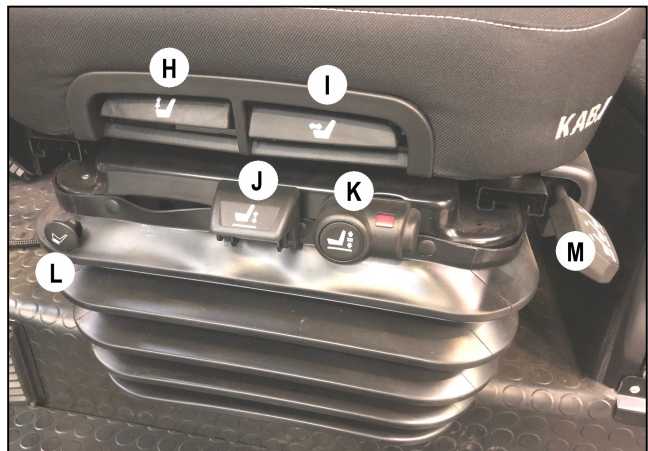


Seat Components

- A) Head restraint
- B) Armrest height
- C) Heat Control
- D) Lumbar support
- E) Backrest tilt
- F) Seat Belt

G) Base controls

- H) Seat tilt adjustment
- I) Seat base adjustment
- J) Air adjustment
- K) Weight adjustment
- L) Suspension damper
- M) Horizontal slide & lock



Heated Seat Control



Lumbar Support Adjuster



Height Indicator Window

Having adjusted the seat to suit, check that the window on the height indicator is displaying green; if red is displayed adjust weight knob so that green is being shown.

The horizontal slide has three positions. Whilst sat in the driving position, pull the lever fully upwards to adjust, mid position allows some damped fore and aft movement, fully down locks the slide and prevents any movement.

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 mirror.

Four-way button for adjusting mirror up & down or right & left.

Steering Modes

The rear wheel steer system on the Multidrive 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.



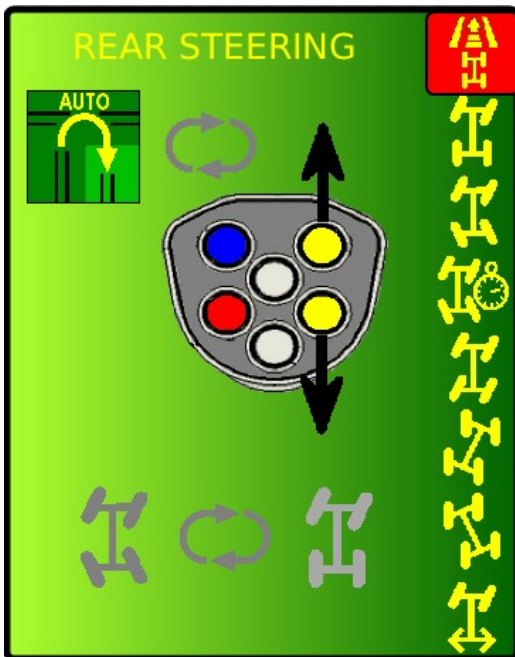
Safety precautions

1. Always ensure the rear wheel area is clear before activating the four wheel steer system.
2. Always switch to the road mode 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 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.



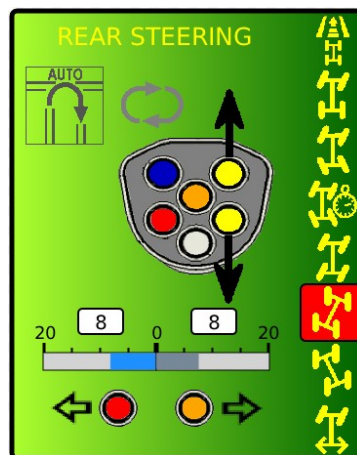
Crab steer. Crab steer may sometimes be useful when maneuvering in buildings and in tight corners in fields. The rear wheels turn in the same direction as the front ones allowing the machine to move sideways.

Offsets Steering modes

Offset steering modes are useful when spreading in soft ground conditions, the offset enables the weight of the vehicle to be spread over four sets of tracks. These modes can also be used when operating across side sloping land, the rear steer offset can be trimmed so as to maintain directional stability.



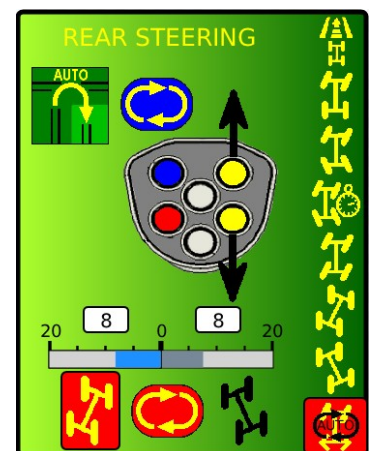
Offset RH. To operate select and then by using the red and orange buttons the degree of offset can be adjusted, the degree of offset will be indicated as shown below on the scale between 0 and 20 with the degree of offset indicated in the 'window' above the scale. When the ignition is switched off, the offset will default to 1 as a safety feature. It is therefore advisable to record the desired offset(s) so this can be quickly attained on repeat operations.



Offset LH. Operate as above.



Offset Auto. Having set the desired offsets for both RH & LH, Offset Auto can be selected. If this mode is active the steering will automatically switch between Offset and 4 wheel steer mode when the applicator is switched on/off, to enable a handland turn to be made.



Electronic Climate System

This Multidrive is equipped with a fully automatic temperature control system that maintains the user selected interior temperature using a digital keypad. The system controls both the heating and air conditioning functions of this vehicle.



WARNING UNDER NO CIRCUMSTANCES MUST THE REFRIGERANT PIPE UNIONS BE LOOSENED WHILST UNDER PRESSURE. INJURY MAY OCCUR. ALWAYS USE THE SERVICES OF A SPECIALIST.



Electronic Climate Control

To choose your ideal in cab climate during any season, select the desired internal temperature and press AUTO push button.


It is suggested that a temperature range of 20 - 23°C is selected. With this simple operation the microprocessor will maintain the desired temperature in the cab.


The ECS will control the temperature and air quantity entering the cab interior negating the need for manual intervention of the controls.





Climate Controls



ON


The AUTO system is turned on by pressing the AUTO key . In automatic mode, the system will monitor the temperature inside the vehicle and regulate both air conditioning (cooling) and heating, to maintain the pre-selected temperature. The blower speed is automatically adjusted by the controller.

Changing the Selected Temperature 



The temperature can be adjusted by pressing the (Red)  or (Blue)  keys on the left side of the panel. The temperature is selectable between 16°C and 28°C.

Adjusting the Blower Speeds 


The air conditioning blowers have three speeds and are normally controlled automatically by the temperature controller. The blowers can be adjusted manually by pressing the right hand (Up)  or  (Down) keys.

The current blower speed is shown on the control panel as indicated by a segmented display. 

Manual Control

It is also possible to select the LO mode (maximum cold) and HI mode (maximum heat) from the temperature keys (Red)  or (Blue)  .

Checking the Outside Temperature

The outside temperature can be displayed for six seconds by momentarily pressing the  key.



Switching the System OFF

Pressing the  key or,   blower (Down) key below minimum fan speed, turns the system OFF.



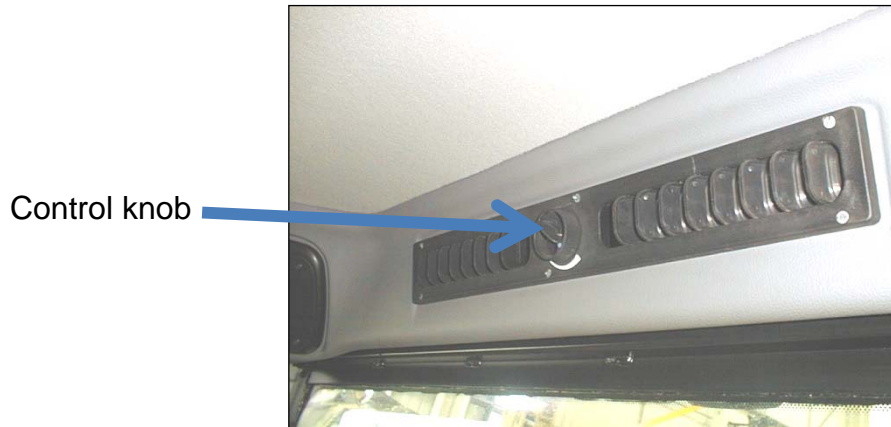
If the temperature sensors fail error codes will be displayed as follows:

- E1 External temp sensor is cut off
- E2 External temp sensor is short circuited
- E3 Internal temp sensor is cut off
- E4 Internal temp sensor is short circuited
- E5 Mixed air temp sensor is cut off
- E6 Mixed air temp sensor is short circuited
- E9 Water valve feedback signal is open or short circuited to battery
- EA Water valve feedback signal is open or short circuited to ground

If the sensors fail temperature can be manually changed by using the   buttons.

NOTE - the ratio of outside fresh air against re-circulation of air is controlled by opening or closing the roof vents above operator's seat. Close for maximum outside air, open for the maximum re-circulation.

Cab Ventilation



The cab side windows are fitted with over centre catches, which permit opening for fresh air circulation and also act as a stay to hold them open at the desired position. When two catches are fitted, open them simultaneously or breakage of glass may occur.



Do not open windows when hazardous dust and or chemicals are in the atmosphere and ensure that sufficient air is drawn into the cab through the filters to maintain a positive pressure within the cab to keep dust and vapours out.

Note: Make sure the climate control unit is switched off when the windows are open.

General Operation



Always operate the machine in a safe manner and in accordance with the recommendations in this manual.

1. Enter the cab from the left hand door ensuring that the grab rail mounted on the cab is used whilst climbing the steps.
2. Ensure that the seat, mirrors, and controls are adjusted to suit the operator’s driving position.
3. Ensure transmission control lever is in neutral position, the handbrake is applied and the steering is switched to road mode. Ensure that nobody is in the vicinity of the machine.
4. With the accelerator pedal in the idle position, insert and turn the ignition key clockwise to the ON position, momentarily the engine indication will illuminate on the MCU.



Under cold condition wait until the cold start warning has extinguished.

To start turn the ignition key clockwise to the start position.



Caution Do not engage the starter for more than 30 seconds or damage may occur, wait two minutes between attempts

When started allow the engine to idle for three to five minutes before operating under load. When starting from cold increase the speed (rpm) gradually to allow for adequate lubrication.

5. Engine operating range

The engine is designed to operate at full throttle under transient conditions down to peak torque engine speed.



Caution

Do not operate the engine at full throttle below peak torque of 1500 rpm for more than 30 seconds. Operating in this condition will shorten engine life and can cause serious engine damage. Operating in such away is considered abuse.

Do not idle the engine for excessive periods, long period, greater than 10 minutes can cause poor engine performance.

Do not operate the engine above the maximum engine speed, doing so can cause severe damage, the maximum engine speed is 2200 rpm.

6. When safe to move off, select the drive position on the gear selector, release the handbrake and move away. The transmission is fully automatic so the speed of the vehicle is entirely dependent on the amount of throttle used.

- For highway use the steering mode must be permanently in road mode. Once the vehicle is off road and in a stationary position the 4-wheel steering may be engaged.



WARNING

ALWAYS select 2-wheel steer (road mode) prior to travelling on the highway or at high speeds for maximum safety.



WARNING

During highway or high speed use the rear steer **MUST** be disabled 'Road Mode' must be selected

- Transmission neutral position must never be selected on the forward/reverse control Joystick at high vehicle speeds or above walking pace. Either a suitable gear is to be selected immediately, or the vehicle must be stopped at once.
- When reversing, selection must only be performed at a standstill, or at very low driving speed. Above the programmed reversing limit, the vehicle will be shifted to neutral by the transmissions Electronic unit, and the vehicle will continue to move in the original driving direction.

- To select Four Wheel drive press the switch the indicator icon will be displayed on the MCU as shown, when four-wheel drive is engaged. **If the ignition is switched off the front wheel drive will disengage and will need re engaging if required.**



Switch



MCU icon

- To activate the front and rear axle differential locks depress the differential lock switch, this will engage both front and rear locks. When engaged the icon on the MCU should indicate that both locks have engaged. If only the front or rear has engaged this will be indicated. Depress the switch to disconnect the differential locks. **ENSURE that the locks have disengaged.**



Switch



Both locked



MCU

Front locked



Rear locked



Do not depress differential lock switch whilst one wheel is rotating at a higher speed than the other one. Do not attempt to turn the machine with the differential locks engaged.

- NEVER** tow a loaded trailer unless fitted with efficient single line hydraulic brakes / Air brakes and the brake pipe(s) are properly connected between the tractor and trailer brake outlet / inlet. (Check for comparability of tractor / trailer braking system).
- If 4-wheel drive is required, it must only be engaged when the vehicle is below 5 KPH (3MPH). If it is engaged above this speed consequential damage may occur. Once

engaged the vehicle may operate in 4-wheel drive within normal parameters, however 4-wheel drive should not be used at high speeds or on hard surfaces where there is plenty of traction. If ignition is turned off 4-wheel drive will disengage.

- 16. Whilst driving be aware of warning lights and displays. See page 27.
- 17. Tyre pressures - due to the wide variation in the tyre sizes and types that may be fitted to the machine, we recommend you obtain the advice of the tyre manufacturer or his agent in order to identify the correct tyre and pressure to use.
- 18. Axle loadings - always ensure the wheels and tyres fitted to the machine are suitable for the load and speed you require. Wheel rims and centres must be capable of supporting the weight of the machine and any load added. Never run with the wheel track wider than necessary. Note the maximum wheel track is 80" (2025mm). Check the intended axle loading/wheel track against the data later in this manual or consult your local tyre supplier.

NOTE Any wheel track settings wider than specified or the fitting of large diameter 'rowcrop' wheels will reduce the carrying capacity of the axle. Overloading will cause severe damage to the axle and/or hubs.



WHEN USING LARGE DIAMETER WHEELS (i.e. 340/85 R46) THE MAXIMUM SPEED OF THE MACHINE MUST BE KEPT WITHIN 25 MPH (40 KPH). IT IS DANGEROUS TO EXCEED THIS SPEED AND COULD INCUR DAMAGE TO THE BRAKE DISCS.



THE MAXIMUM LOAD MUST NOT EXCEED VALUES ON THE CHART OF PAGE 107. WHEN USING LARGE DIAMETER OR EXTRA WIDE WHEELS AND LARGE ROWCROP WHEELS THE AXLE LOADING MAY NEED TO BE REDUCED (SEE NOTE).



WHEN STOPPING THE ENGINE AND PARKING THE VEHICLE - REGARDLESS OF A PRE-SELECTED GEAR, IT IS OF PARAMOUNT IMPORTANCE TO ACTUATE THE PARK BRAKE AT ALL TIMES

- 19. To turn vehicle off bring the vehicle to a stationary position. Engage the handbrake and engage neutral on the drive selector. Ensure the Road Mode is engaged.
- 20. Allow the engine to run at low idle for 3 to 5 minutes before shutting down, then turn ignition key ANTI-clockwise to STOP the engine. Remove the ignition key.

The engine is equipped with an electronic control module (ECM) to enable it to power down allow a minimum of 100 seconds between turning the ignition switch off before disconnecting the continuous (un-switched) battery power supply.



CAUTION

Failure to follow the correct shutdown procedure may result in damage to the turbocharger and shorten its life.



DO NOT RUN THE ENGINE WITHOUT THE BATTERIES CONNECTED.

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

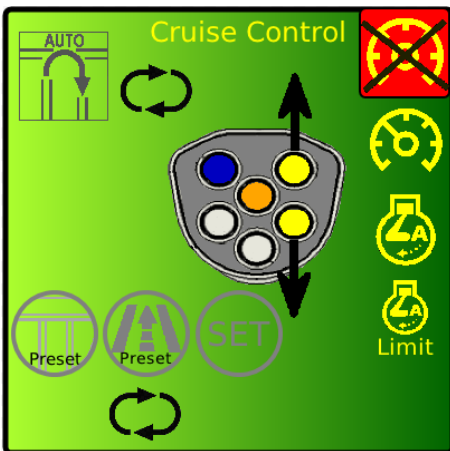
To operate the electronic throttle whilst stationary the handbrake must be applied, the transmission in neutral and the footbrake must be off. It is automatically de-activated if the footbrake is applied, the handbrake taken off or if the transmission is put into gear.

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



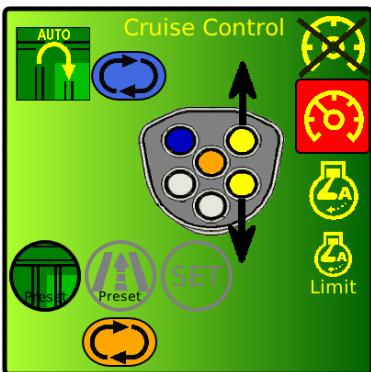
Engine mode – This mode allows you to set the engine to either a pre-set speed or you can set it to the current engine speed by pressing the “Set” button. There are preset speeds which can be saved for field and road use. When this mode is active you can increase/override the speed by depressing the 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.

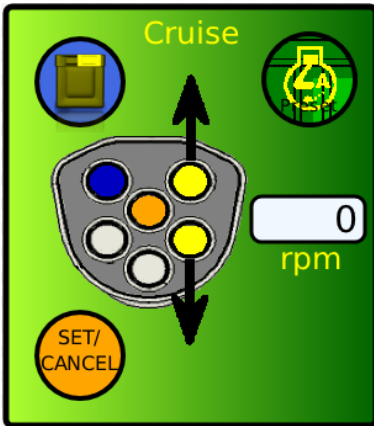
Cruise operation

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.

Hydraulic Power Take Off (P.T.O)



SAFETY WARNING - ALWAYS DISENGAGE THE PTO BEFORE DISMOUNTING FROM THE CAB. THE ENGINE MUST BE SWITCHED OFF BEFORE CONNECTING THE PTO OR MAKING ADJUSTMENTS.

PTO system

Single PTO Powersaver pump

NEVER ENGAGE PTO ABOVE 1000 ENGINE RPM.

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. The standard option is for a POWERSAVER load sensing pump which only delivers the amount of oil required, irrespective of engine rpm, (above initial setup speed).

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.



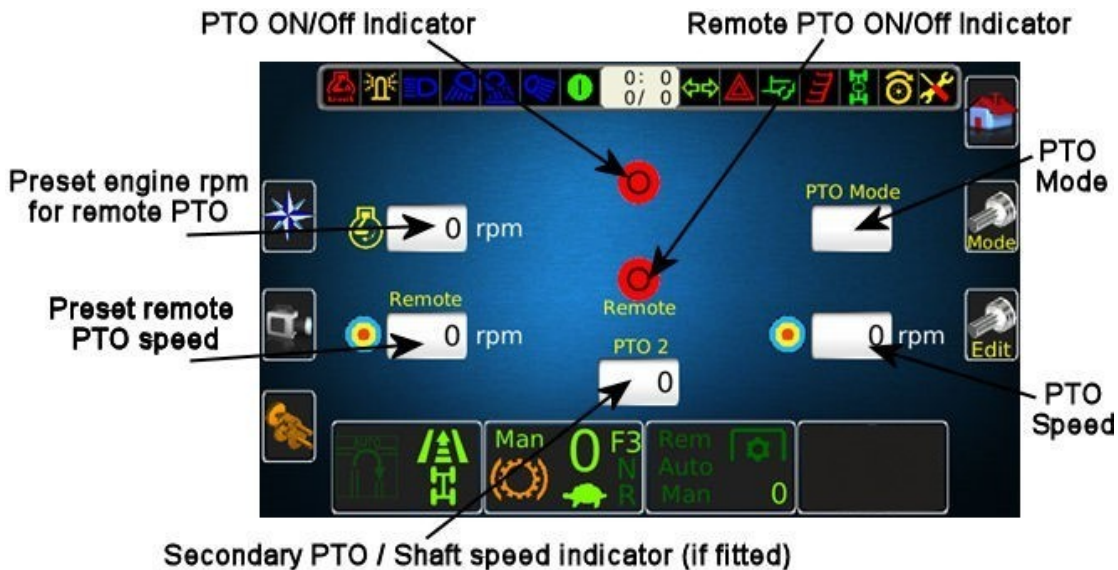
Automatic mode – In automatic mode the speed is monitored by the electronic system and adjustments are made to the hydraulic valve to maintain the preset PTO speed. This will adjust the valve and make allowances for temperature, pressures and input flow.

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 a 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.

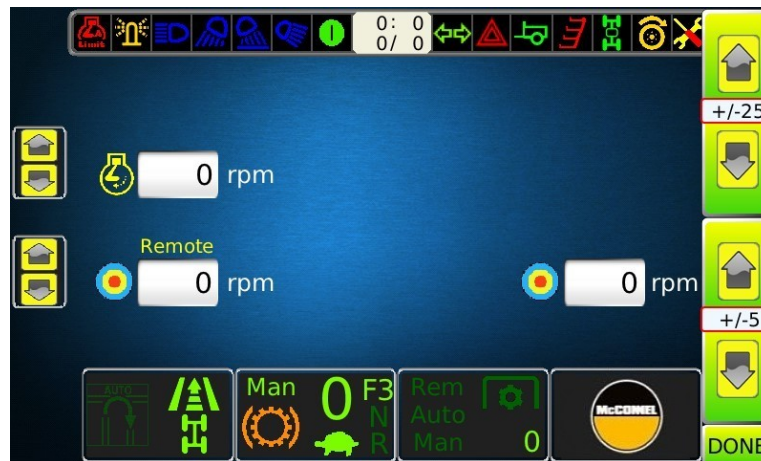
Setting the PTO speeds/outputs

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.

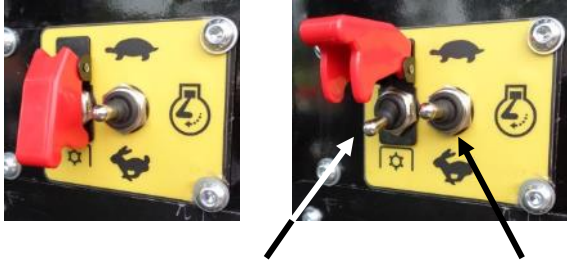


To alter the current PTO speed press the up/down keys on the right hand side of the screen. This will alter the speed in increments of 5 or 25. When you have finished press “Done” (Enter key) to return to the main PTO screen.

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**

When operating with a demount sprayer 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.

PTO speed setup - Sprayer with centrifugal pump

The following procedure should be followed for setting up a centrifugal pump without shaft speed sensing. Failure to follow this procedure correctly will lead to high flows and working pressures in the hydraulic system which in turn will cause the system to seriously overheat.

Setup:

Set the sprayer control valves with the pump suction open to tank and the pressure valve to "dead-head" (cut off) the water flow from the spray pump:

Ensure all sprayer controls and boom sections are switched off and engage the PTO as follows:

1. Set valve PWM percentage output to 30%
2. Switch the PTO by pressing the green PTO button on the switch panel
3. Adjust the percentage output until the correct sprayer pressure is reached (normally 6 to 6.5 Bar) on the sprayer pressure gauge. The percentage output should then be recorded for future reference.

NB the system should be set up when the system is at normal working temperature.

P.T.O. Safety Information**Instruction for Operators when coupling P.T.O. driven machines to Hydraulic P.T.O. drive.**

If you are coupling a particular implement to the machine for the first time (even if another operator has previously connected it) carry out the following checks: -

- A. Make sure the driveshaft is fitted correctly with any overload or overrun clutch fitted at the implement end. If two protection devices are fitted, one at each end of the shaft, then the overrun clutch shall be at the implement end.
- B. If it is possible to engage the inner and outer parts of a driveshaft in more than two positions circumferentially then make sure the universal joint yokes are correctly aligned.
- C. Check when in continuous working position the driveshaft is not at an angle of more than 20° from PTO centre line. The angles between the driveshaft and the input and output shafts should be equal.
- D. Ensure that chains or ropes used to prevent guards from turning are fixed to the tractor and implement in such a way that they will not be stretched.
- E. For stationary machinery ensure the Multidrive tractor cannot move apart during work so that the two halves of the driveshaft do not become disengaged.

Ancillary Equipment

When ancillary equipment is mounted above the chassis of the Multidrive Tractor it is ESSENTIAL that the proper mounting technique is used. An installation drawing is available from McConnel detailing how to effect same (see page 114).

In brief, the fore and aft 80mm x 80mm box sections should be used to support the weight of the equipment being mounted and attached via the clevises and pins supplied. [UNDER NO CIRCUMSTANCES MUST EQUIPMENT BE MOUNTED DIRECT TO THE CHASSIS OR ALLOWED TO COME INTO CONTACT WITH IT.] If this is allowed to occur chafing, subsequent corrosion and eventual weakening of the chassis will take place.

If two or more demountable systems are to be employed on the machine ensure that a safe means of handling the demounts is available. Most demount sprayer manufacturers will provide demount legs. However, this is less common with dry box spreaders, these in the main are mounted and dismounted employing the lifting eyes in the hopper. Ensure that suitable lifting equipment and spreader frame is used for this operation. Ensure that all hydraulic connections for the demounts are clean before connecting to ensure no foreign matter enters the hydraulic system.

Where hydraulic services, including hydraulic motors, are used on any equipment fitted, the supplier of same must ensure oil flows required are within the capacity of pipes and hoses used and that no undue back pressure is caused by short radii bends on hose fittings, pipes and adaptors. Banjo type fittings must never be used where continuous flows of oil are intended. Quick release couplers should be avoided where possible or if used, be of extremely generous size being at least one size larger than the hose end they are to be fitted to. For example, if a 1/2" hose is being used fit a 3/4" BSP (or similar size) quick coupler. Failure to adhere to what is no more than good engineering practice will cause loss of hydraulic power, overheating of the hydraulic system and possible damage to the hydraulic system and components.

When 1" tee and Oil Cooler is fitted (see example below) make sure 1" hose size is used from the (P.T.O) motor to the cooler then to the tee, it would also be advised if using auto boom leveling systems the Aux spool return should be a minimum of 1/2" BSP and also go back to the cooler.

1" Tee



Hydraulic Oil Cooler

Always use hoses of the proper diameter in accordance with the chart below.

<u>Hose Size</u>	<u>Continuous Flow</u>	<u>Intermittent Flow</u>	<u>Infrequent Flow</u>
3/8"	23	33	45
1/2"	34	53	68
3/4"	60	90	123
1"	98	150	198

All flows shown in litres per minute.

NOTE - Hoses used for return oil flows should always be one size larger than the pressure feed hoses where possible especially when the oil flow in pressure hose being used is close to the recommended capacity of that hose.

Hydraulic Service Valves

Optional hydraulic services are available and can be specified to suit the equipment fitted and number of functions required, layouts of switches will be positioned to suit specific requirements – *please refer to the equipment suppliers manual for details.*

These functions are provided via electro hydraulic spools, both double and single acting are supplied either with or without check valves to suit the application.

Auxiliary Hydraulics Switches



Auxiliary Services: these can range from 1 to 4 services depending on the particular spec.

The red 'flip type' covered switches are continuous pumping and should be 'OFF' when in transport or on the road.

N.B. On some installations an 'AUX' switch is fitted that diverts hydraulic pressure from the auxiliary spool block to ancillary equipment, e.g. sprayer mounted onto the Multidrive. This switch should always be in the off position unless the ancillary equipment is being operated. Failure to observe this instruction can cause overheating of the hydraulics and lead to equipment failure. Please refer to the ancillary equipment manufacturer's instructions.

Optional Equipment

Hydraulic Pickup Hitch

This type of hitch is operated using the double acting spool valve.

1. The hydraulic hitch is permanently plumbed into the hydraulic system.
2. To lower the hitch, actuate the switch pushing away from the operator's seat.
3. Raise the hitch to engage the trailer-towing eye, pulling the switch towards the operator when fully raised, the hitch lock will latch into place - check when connecting the trailer services to ensure positive latching, before driving off.



Figure 48, Hitch fully down

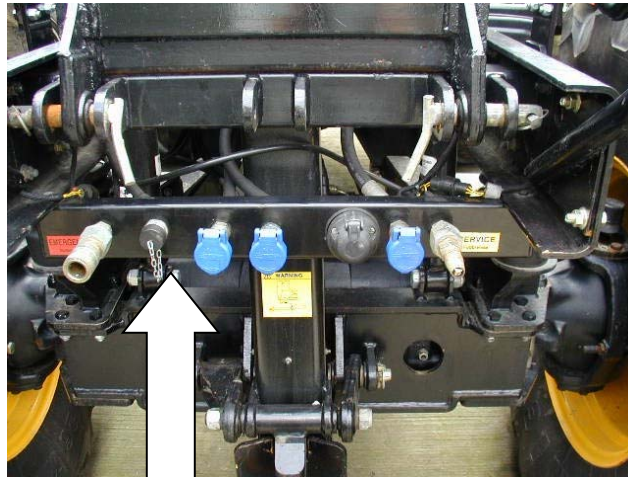


Pickup Hitch control switch

Switch position will be dependent on what other ancillary equipment is fitted onto the machine.

Single Line Hydraulic Trailer Brakes

To fit the trailer brake hydraulic hose, Remove protective cap from the trailer brake coupling, and connect pressure hose from the trailer, make sure both connections are perfectly clean of contaminating dirt. The hydraulic trailer brakes operate when pressing the tractors brake pedal. Braking effect depends on the pressure applied to the brake pedal.



Hydraulic Trailer Brake Connector



IMPORTANT

To prevent undue wear on the tractors brakes, check the trailers brake regularly for correct function.



WARNING Stopping distances increase with load and speed, when towing a laden trailer, engage a low gear when going downhill.

Trailer which are too heavy or are towed too fast can cause a loss of control.

Trailer Air Brakes

(See page 77)

Engine - Warnings and Aftertreatment SCR System Cleaning

The engine has a number indications that will if necessary be displayed on the MCU:

- Warning – check the engine
- Stop – Stop the engine
- Selective catalytic reduction (SCR) cleaning
- Diesel exhaust fluid
- SCR system cleaning inhibit
- High exhaust temperature



Warning



Stop

Exhaust cleaning
High exhaust temperature



Exhaust cleaning inhibit
DEF level low

WARNING CHECK ENGINE

The WARNING CHECK ENGINE indicates when the engine needs attention at the earliest opportunity.

Another function of the WARNING CHECK ENGINE is to display at the key ON to indicate maintenance requirements when one of the following occurs:

- Maintenance required
- Water in fuel detected
- Coolant level is low

STOP ENGINE

The STOP warning indicates, the need to stop the engine as soon as it is safe to do so. The engine **must** remain shut down until the engine is repaired.

SRC SYSTEM CLEANING

The SRC SYSTEM CLEANING indication is for the status of the aftertreatment SCR system cleaning events.



When the SCR System cleaning indication appears on the MCU the aftertreatment SCR system required to be cleaned at the next opportunity. This can be accomplished by:

1. Changing to a more challenging duty cycle, such as highway driving, for at least 20 minutes.
2. Performing a stationary SCR/ exhaust system cleaning

A flashing SCR SYSTEM CLEANING symbol indicates the status of a non-mission (stationary) SCR / exhaust system cleaning when the SCR System Cleaning Start switch has been activated.

When this indications flashing, the operator should:

1. Keep the exhaust outlet away from people and anything combustible, melt or explode.
2. Nothing should be within 0.6 meter of the exhaust outlet.
3. Nothing that can burn, melt of explode within 1.5 meter (such as petrol, straw, wood, paper, plastic, fabric, gas container or hydraulic lines). paper,
4. In an emergency, turn the engine off to stop the flow of exhaust.

A solid SCR SYSTEM CLEANING indication combined with a WARNING or CHECK ENGINE indicates that the after-treatment SCR needs to be cleaned immediately. Engine power will be reduced automatically if action is NOT taken.

When these warnings indicate, a stationary SCR/exhaust system cleaning is required.

NOTE that if this cleaning is not performed the STOP ENGINE will indicate and the engine will require specialist intervention before it can operate.

HIGH EXHAUST SYSTEM TEMPERATURE warning



WARNING



When this warning is indicated, the exhaust gas temperature could reach 800°C, hot enough to melt and ignite common materials and burn people.

This warning could show during a normal engine operation or during SCR/exhaust system cleaning. Precautions as above relating to the proximity to potentially inflammable materials as outlined above must be taken.

Check parameters in the MD configuration.

NOTE: This high exhaust temperature warning does not indicate that there is anything wrong it is just a warning to safeguard against causing damage of injury do to the exhaust outlet being too close to objects that could be damaged or burnt by it.

AFTERTREATMENT DIESEL EXHAUST FLUID

The AFTERTREATMENT DIESEL EXHAUST FLUID warning indicates solid or flashing when the diesel exhaust fluid DEF level is low and should be refilled.



The warning flashes when the DEF level has fallen below a critical level and must be refilled.

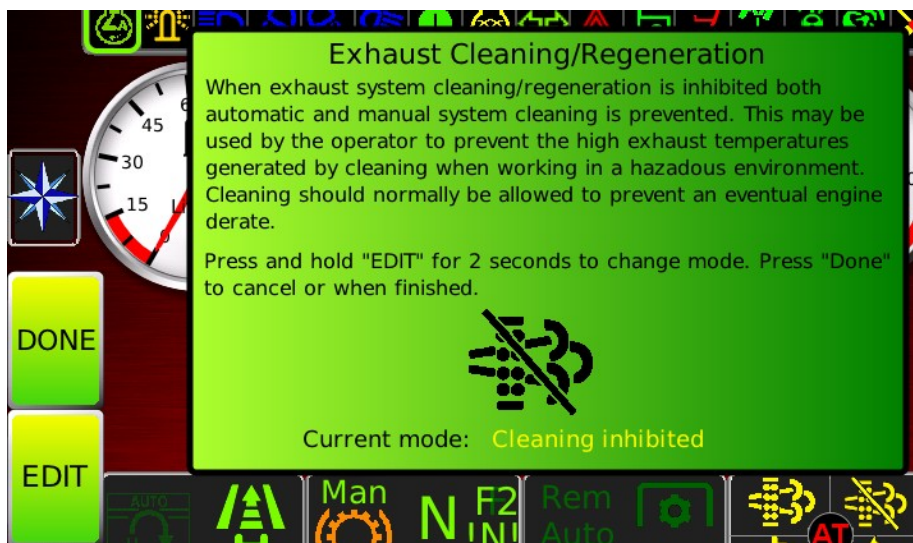
A flashing AFTERTREATMENT DIESEL EXHAUST FLUID warning combined with a WARNING or CHECK ENGINE indicates that the DEF level has fallen below the initial engine derate level. The engine power will be automatically limited and can be corrected by refilling the DEF tank. If this is not done the engine will further derate.

Allowing the DEF tank to empty may cause the system to lose prime. A loss of prime may cause other fault codes.

If within 30 minutes of the CHECK ENGINE warning the condition is not rectified the engine will enter the final derate level and may shut down and cause re starting problems

If the engine has been shut down or has idled for an extended period of time after the DEF gauge indicates empty, the STOP ENGINE lamp will also indicate along with the flashing AFTERTREATMENT DIESEL EXHAUST FLUID and CHECK ENGINE the engine will enter the final derate level and may include low idle lock, shutdown and restart limitations

SCR SYSTEM CLEANING DISABLED (INHIBIT)



The SCR SYSTEM CLEANING DISABLED (INHIBIT) indicator signals that the inhibit switch is active, therefore automatic or manual SCR/exhaust system cleaning cannot occur. Switching to enable will allow the cleaning to be performed.

NOTE it is unlawful to tamper with, modify, or remove any components of the SCR system. It is also mandatory to use DEF that meets the correct specification and the machine must not be run without DEF.

Selective Catalytic Reduction (SCR)

The SCR (Selective Catalytic Reduction) system reduces the amount of Mono -Nitrogen Oxide NO_x from the engine exhaust. This is achieved by a controlled amount of Diesel Exhaust Fluid (DEF) being sprayed into the SCR.

Selective Catalytic Reduction (SCR) System Cleaning

Deposits of DEF can build up in the SCR. To clear these and to condition the after-treatment system it is cleaned utilizing the diesel oxidation catalyst (DOC) to build heat in the system. This is done Passively, Actively or Manually.

Passive system cleaning occurs when the exhaust temperatures are high enough to meet the cleaning requirements. This happens during high engine duty cycles.

Active SCR system cleaning



WARNING

During SCR system cleaning the exhaust gas temperature could reach 800°C, hot enough to melt and ignite common materials and burn people. Take precautions relating to the proximity to potentially inflammable materials.

Active SCR system cleaning occurs when the exhaust temperatures are not high enough to meet the cleaning requirements. To raise the temperature a small amount of diesel fuel is injected into the exhaust flow. The oxidization of this additional fuel creates the necessary heat.

Active SCR system cleaning will occur more frequently if the machine is working on low load operations.

Manual SCR System Cleaning

Under operating conditions, such as low speed, low load, the engine may not have enough opportunity to regenerate the after-treatment system during normal operation. When this occurs, the engine will activate the display of the SCR System Cleaning notice on the MCU.

Manual SCR system cleaning is a form of active cleaning that is initiated by the operator when the machine is not in operation. It requires an elevated engine speed in the order of 1,000 rpm. The time taken will vary but will typically be between 20 – 60 minutes.

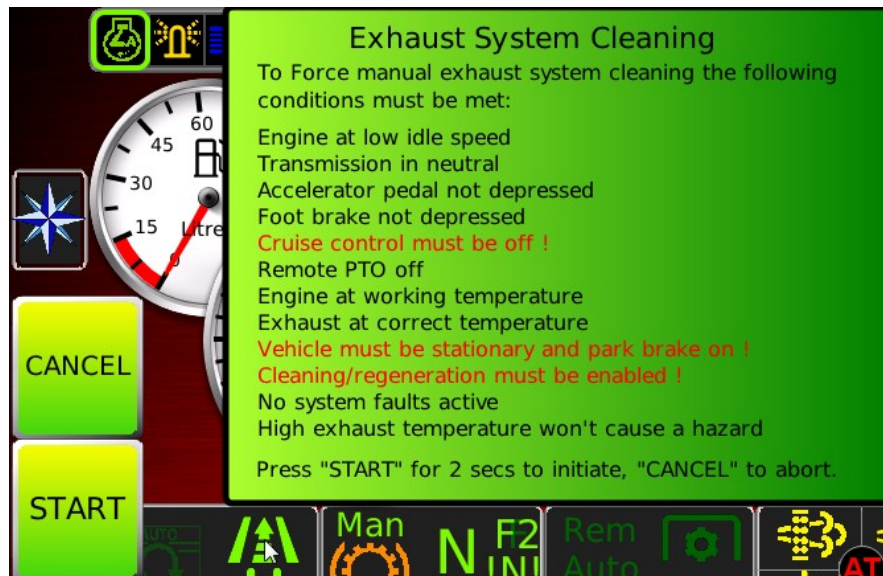
To initiate the manual cleaning

To perform a manual SCR system cleaning, follow the steps listed:

- Select an appropriate location to park the machine
- Ensure the exhaust gasses are not directed towards anything that is flammable and that no items are within 0.6 metre of the exhaust outlet and items that can burn such as petrol, straw, paper, plastic, fabric, gas cylinders, hydraulic hoses etc. are at least 1.5 metre from the exhaust outlet.

- Make sure there are no gases or vapors nearby that could burn, explode, or contribute to a fire.
- Park the vehicle securely with the transmission in park, handbrake on and wheel choke at front and rear.
- Set up a safe area with barriers as necessary. If indoors ensure an exhaust discharge pipe rated to at least 816°C is used to vent the exhaust gasses outside.
- Keep a fire extinguisher nearby.
- Check that the area around the exhaust system is clear of anything flammable.
- Brake pedal released.
- Transmission in park.
- Power takeoff off.
- Throttle pedal released.
- Initiate the manual SCR system cleaning by switching it on by pressing 'start' on the MCU for 2 seconds.
- Once the manual SCR system cleaning is initiated, the engine speed may increase, the turbocharger noise will increase, the high exhaust temperature warning may indicate and the SCR cleaning indicator blink.
- When the engine ECU detects that the cleaning process is complete, the engine will automatically return to low idle.
- Monitor the vehicle and surrounding area during the stationary SCR system cleaning. If any unsafe condition occurs, shut off the engine immediately.

To stop a manual SCR system cleaning before it is complete, depress the brake, or throttle pedal, press the SCR system cleaning 'cancel' on the MCU, or turn off the engine.



The exhaust system will remain at an elevated temperature for around five minutes after the cleaning process.

After-treatment Derates

The engine is required to meet Stage 4 Final regulations and to ensure it continues to meet the emission regulation limits, the ECM continuously monitors the after-treatment system to detect malfunctions that adversely affect emissions. When a malfunction is detected, the operator is alerted by messages / warnings sent to the MCU. If these are not heeded and the malfunction is not resolved the engine will derate.

The following is a list of some of the derate causes

- DEF level below level or malfunction
- DEF quality not too specification
- NOx sensor tampered with or malfunction
- Exhaust gas sensor tampered with or malfunction
- DEF dose unit tampered with or malfunction
- DEF valve tampered with or malfunction
- EGR valve tampered with or malfunction

Access to Engine and Cooling Pack



ENSURE THAT ENGINE IS SWITCHED OFF AND IGNITION KEY REMOVED BEFORE OPENING THE BONNET.



BEWARE OF HOT SURFACES, IN PARTICULAR THE EXHAUST AFTER TREATMENT AND PIPEWORK

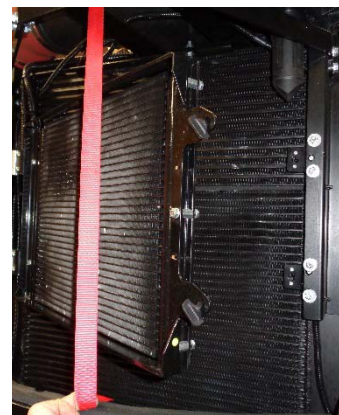
To open the bonnet / engine cover take the key from the cab and standing in front of the tractor, insert the key in the bonnet grille (as per figure) and turn clockwise to release, lift the bonnet and gas struts will fully open it. To close pull on the strap as indicated.



A



chaff guard is integrated into the front grill, brush off any debris that may have adhered to it before opening the bonnet. To check that the cooling pack is free from dust or debris, open the bonnet. An air conditioning condensing radiator is mounted immediately in front of the main cooling pack. To access the pack it can be swung away. Release the two thumb screws and pivot the condenser forward as shown.



Check to pack if it is blocked with dust between the cooling fins. It should only be cleaned by using an airline to remove the debris.

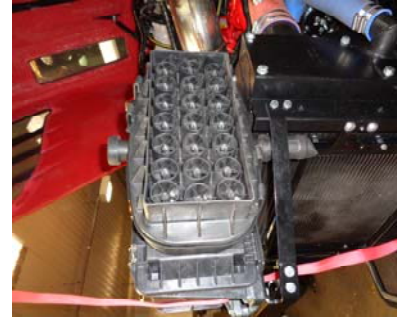


NOTE: Ensure a respirator facemask and eye protection is worn when adopting this procedure.

Engine Air Cleaner

If the air filter /pre filter intake restriction warning indicates, remove the primary and safety filter elements and replace as necessary.

To access the air cleaner, open the bonnet, the air cleaner is mounted on top of the cooling pack.



Ensure the release- Vacuator valve (on underside of the air cleaner), can operate correctly to discharge dust. Check regularly.



Use appropriate PPE when removing and cleaning the dusty elements and housing.

The air cleaner consists of several parts, an outer casing with a two part front cover, the casing houses a main filter and safety element. The cover is in two sections, the outer of which has a series of cyclones that pre-filter the air before passing through to the main filter element.

To remove the outer front cover unclip as shown.



To remove the main cover unfasten to four clips shown



Pull tabs to remove the main filter element.



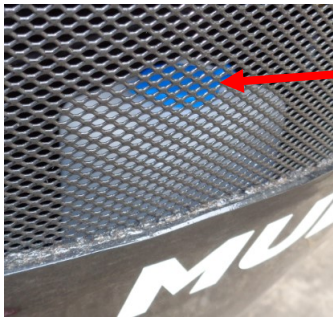
To remove the safety (inner) element pull both tabs as shown



When replacing the filter elements make sure they are seated correctly in the housing and secure the cover(s).

Windscreen Washer Bottle

The washer bottle is located under the engine hood / bonnet forward of the cooling pack
Access is obtained by lifting the engine hood / bonnet.



Windscreen washer
filler cap

Windscreen Washer Bottle

Electrical System

Electrical System	
Batteries	2 x 12volt 120 amp/hr
Battery Terminal Ground	Negative
Alternator	12v 130 amp

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

- Display unit (MCU)
- Engine ECM
- Transmission TCU
- 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 a compartment, accessed via the right hand cab, emergency escape door. 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.

Isolator / Emergency Stop Switch



The battery isolator switch with red knob, is located on the off-side of the cab skirt above the batteries. Press to isolate – turn clockwise to re-engage. Unless in emergency always wait for the red LED to the left hand side of the switch to cease to illuminate before pressing the isolator.

Checking Batteries

The batteries are located on the offside of the vehicle in front of the hydraulic tank. Remove the protective cover to allow access to both batteries.

Remove the filler caps to check the electrolyte level. Fill to level mark, using only distilled water. Clean terminals if corroded, remove corrosion, and then coat terminals with protective grease.



Warning

Wear protective goggles and clothing when checking electrolyte level.



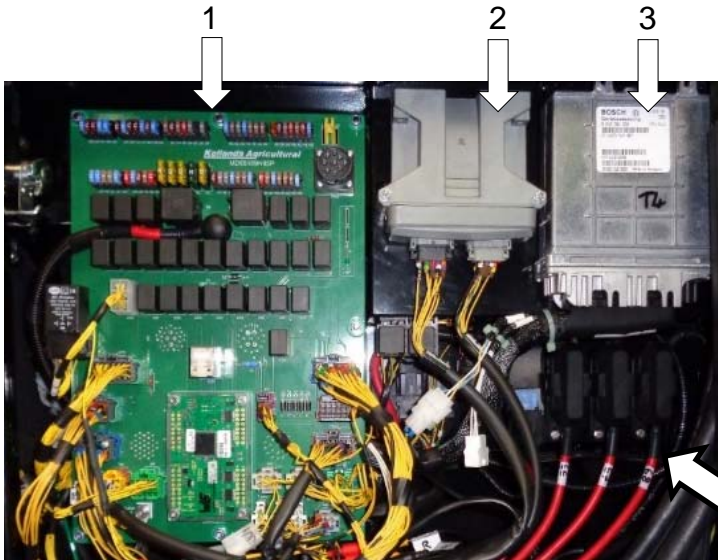
Battery gas can explode; keep naked flames away from the battery. Under no circumstances test the battery charge level by shorting the battery terminals



Battery

Distribution Board Layout

The distribution board is located behind the right hand emergency door. To gain access, from inside the cab, lift the emergency door catch, placed towards the rear right-hand corner of the cab.

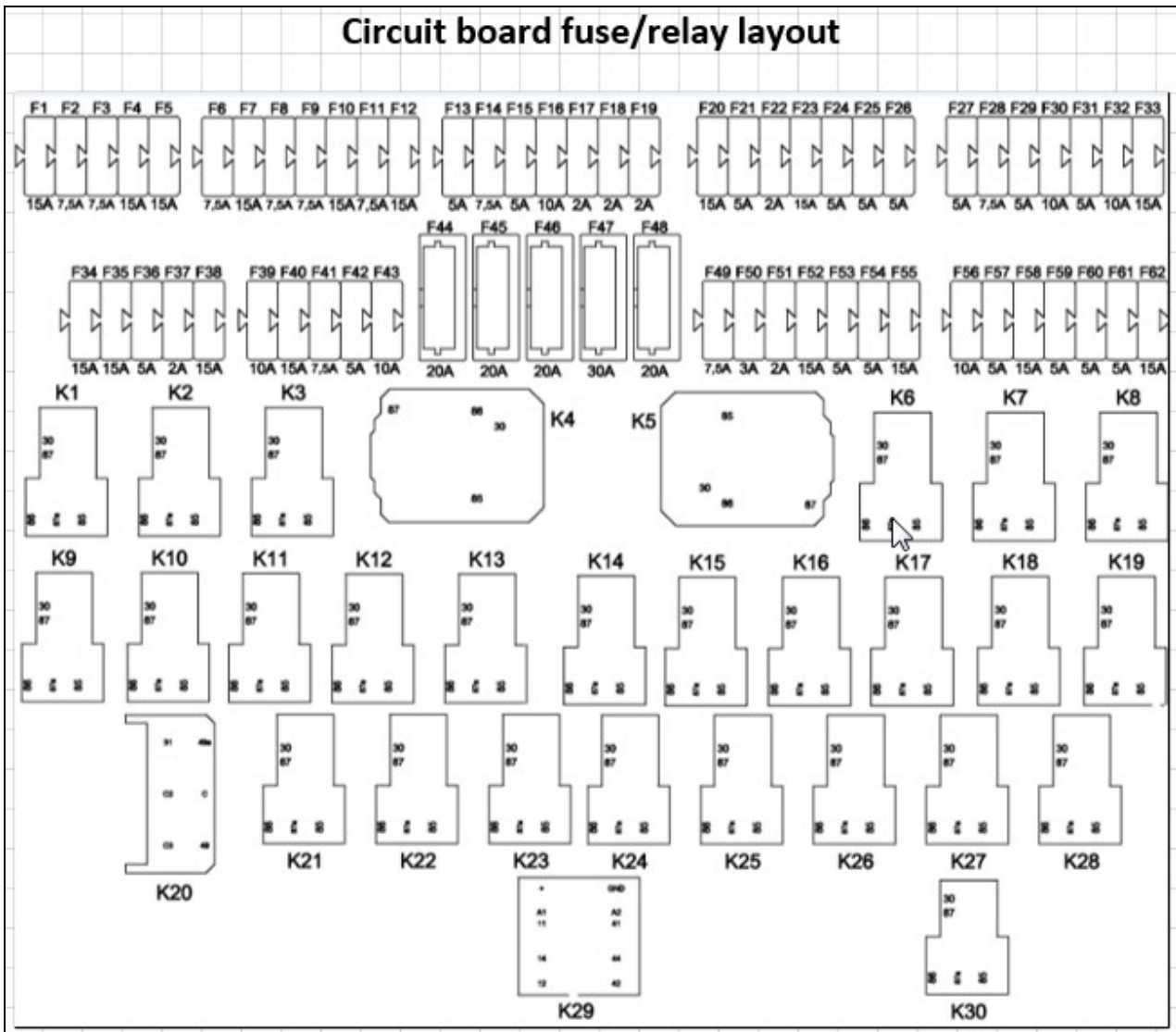


- 1 Circuit board
- 2 Plus +1 controller
- 3 Transmission TCU

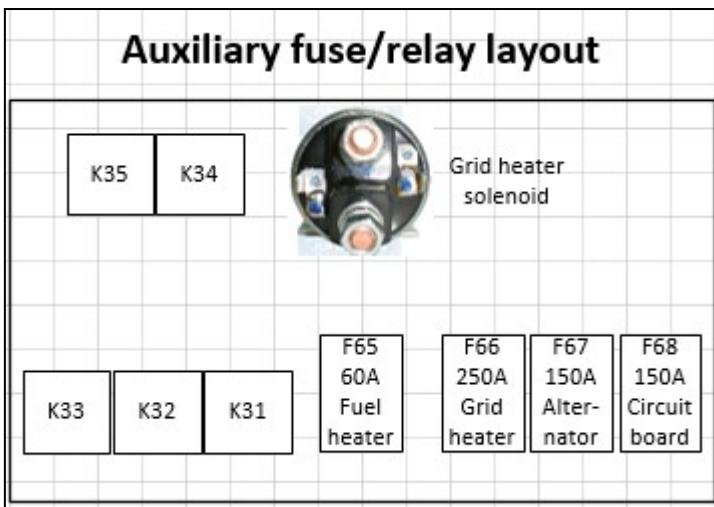


Auxiliary fuse / relays

Circuit board fuse/relay layout



Auxiliary fuse/relay layout



**** Warning ****

Always fit the correct size fuse.
 Incorrect fuses **WILL** result in irreparable damage which will require replacement of the complete circuit board assembly.

Multidrive T4 (Cummins) - Circuit board fuses 4/2/16

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

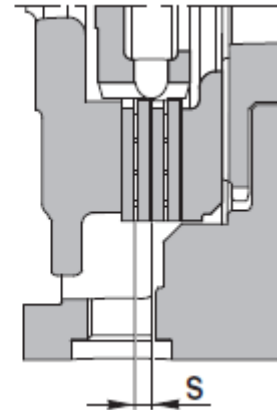
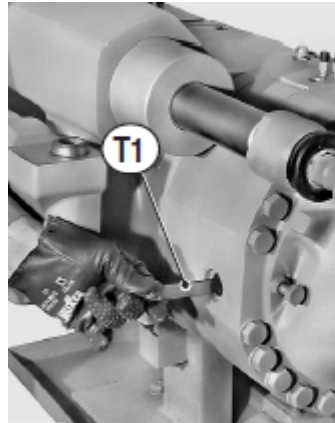
Cab - Circuit board	Fuse	Size	Handbrake solenoid	27	5
CanBus controller - circuit board	41	7.5	Four wheel drive solenoid	29	5
Diagnostic connector	25	5	Steering control module	61	5
GPS (For main display)	19	2	Steering safety lock valve	31	5
Seat heater	62		Air dryer heater	43	10
Video camera power	60	15	Engine	Fuse	Size
Cab - Control console	Fuse	Size	DEF heater	39	10
Aux power supply (Boutmarker)	48	5	DEF line heaters	40	15
Aux power supply 2 (GPS)	53	20	Engine ECU Ignition	59	5
Aux power supply console Ign live	56	5	Engine ECU battery supply	47	30
Hydraulic spool valve power	44	10	NOX ECU	58	15
Ignition switch	49	20	Start - start solenoid	32	10
Joystick power (5 volts)	37	7.5	Cooling fan speed sensor	13	5
MCU display	24	2	Lighting system	Fuse	Size
MCU Display (battery feed)	54	5	Beacon	6	7.5
Mirrors	15	5	Indicators	1	15
Panel battery power, Sidelight & Hazzard switches	51	5	Headlamp flash	55	15
Panel ignition power, joystick buttons	14	2	Headlamps	33	15
Power jack - Din 1	35	7.5	Dipped beam	52	15
Power jack - Din 2	42	15	Reverse audible warning	8	7.5
Power jack 1	16	5	Sidelights LH	2	7.5
Power jack 2	57	10	Sidelights RH	3	7.5
Sprayer power (On/off)	7	5	Stop lights	23	15
Wash, Wipe, Park, Horn.	20	15	Worklamps - reverse	10	15
Cab - Roof / air conditioning	Fuse	Size	Worklamps - sprayer	12	15
Air con - binary switch (pressuriser FC)	36	5	Worklamps front cab	4	15
Air con power (FC)	34	15	Worklamps rear cab	5	15
Air con compressor	28	7.5	Bonnet lamps	30	10
Climate control	45	20	Transmission	Fuse	Size
Radio memory, Interior light	50	3	Ignition - voltage converter	21	5
Control & warning systems	Fuse	Size	Battery feed voltage converter	46	20
Diff lock solenoid	26	5	Transmission Ignition feed	9	7.5
Rear Sensors, Brake press, Air press, Rear diff W/L	17	2	Transmission battery feed	11	7.5
Frnt sensors - Air filter restriction, Front Difflock W/L, FWD W/L, Heater relay(FC)	22	2	Hydraulic oil cooler	38	15
Relays					
Air con compressor	K17		Ignition power relay 1	K4	
Beacon	K2		Ignition power relay 2	K5	
Bonnet lamps	K6		Reverse audible		K12
DEF Line heaters	K14		Safes		K7
DEF supply module	K13		Sidelamps		K15
Difflock solenoid	K16		Sprayer master on/off		K10
Dipped beam (off board)	K32		Steering lock valve		K19
Flasher unit	K20		Steering safety relay (grounds)		K30
Four wheel drive solenoid	K18		Stoplamps		K27
Fuel heater	K33		Transmission		K22
Horn	K26		Transmission Voltage converter ign		K24
Handbrake solenoid	K28		Wipers - Intermittent		K25
Hazzard flasher - changeover relay	K21		Wipers - park (Off board)		K31
Hazzard relay	K29		Worklamps front		K9
Headlamps	K8		Worklamps rear (sprayer)		K3
Hydraulics - remote dump valve	K34		Worklamps rear cab		K1
Hydraulics - remote spool valve	K35		Worklamps reverse		K11
			Not used		K23

Foot (service) Brake Check

Park machine on level ground and secure wheels to prevent machine moving whilst carrying out any checks.

The disc brakes of both axles are self-adjusting and require no brake adjustment maintenance. However at each service interval the brake disc wear should be checked.

To check for brake wear remove the level plugs that are adjacent to the brake discs and with the brakes applied check the distance between two intermediate discs, the minimum gap ‘S’ should be 5 mm.



NOTE

Both front and rear axle should only be filled to correct levels with type API GL 4 oils with anti-squawk qualities. See page 98 for details.

FAILURE TO DO SO MAY RESULT IN BRAKE SQUAWK AND POSSIBLE BRAKE FAILURE. If the brakes start to ‘squawk’ drain oil, check brake discs for wear, replace as necessary and re fill with correct grade of oil.

Power Brake Operation Check

Start engine and ensure brake accumulators are fully charged.

With tractor parked on small incline, apply park brake and stop engine. With the footbrake applied, release park brake – vehicle should be held. Allow tractor to roll forward and apply foot brake, which should bring tractor to the stationary position.



If brakes do not operate, or brake pressure warning indicates on the MCU after one footbrake operation, please contact your service dealer. Ask your service dealer to check brake efficiency periodically.

Hand / Park Brake

Park brake should be checked regularly to ensure correct operation and adjustment and wear, refer to McConnel Service for details, or check on www.mcconnel.com technical library. For access to technical library call McConnel Service for login details.

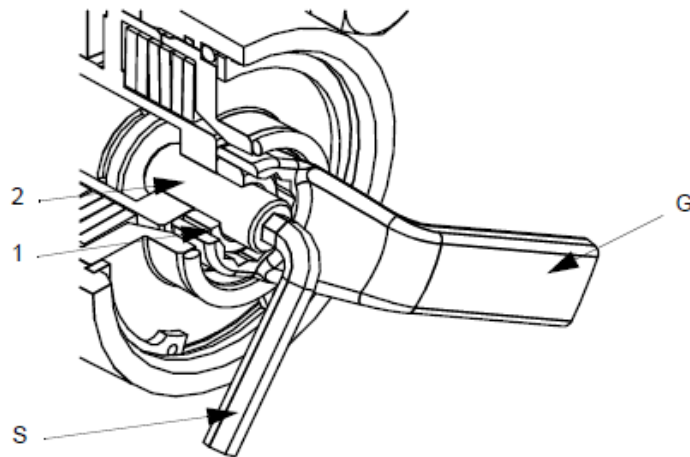
Emergency Release of Park Brake

If it is necessary to tow the vehicle and in the event of loss of hydraulic pressure in the braking system, the park brake can be released mechanically. The park brake is situated on the rear output of the Transmission.

1. Secure the vehicle from rolling away.
2. Unscrew the cap the cap – counter clockwise.
3. Release the locknut '1' and unscrew it to the end of the setting screw '2'.
4. Rotate the setting screw '2' clockwise until the brake disc is completely free. A minimum torque 70 Nm is required on the setting screw.
5. Screw the locknut '1' back up and apply a slight locking force to the setting screw '2'.
6. Screw on the screw cap to prevent dirt ingress.



In this condition the vehicle has no parking brake facility and thus must be protected from rolling away by different means. The brake **must be adjusted** before re-commissioning.



S – Allan Key

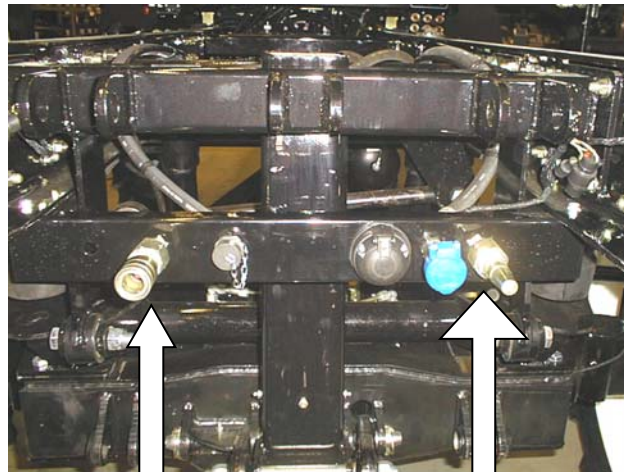
G – Ring spanner

Air Brake System for Trailers

The air brakes are a single system. Trailers with single line brakes may be connected at connection (A) and (B) as illustrated below.

Ensure that the connections on the tractor are clean and dirt free before joining the trailer air hoses.

Replace any damaged sealing washers.



A
Emergency

B
Service

Air Brake System

NOTE

Ensure that the trailer brakes are compatible with the prime mover. The Multidrive has an option of two fluid reaction valves (FRV) with ratios of 15:1 and 30:1. When coupling the trailer ensure that the trailer brakes are responding correctly.

Check compatibility between the vehicle and trailer air couplings. The valve in the vehicle's service coupling is opened by a valve-lifter in the trailer's service coupling, and the operation of this valve-lifter needs to be checked periodically.

With the trailer connected do not drive away unless the air pressure gauge is indicating below 5 bar (73 psi).

To prevent undue wear on the tractor brakes please observe the following: -

- a) Make sure that the pressure hoses on the trailer are connected.
- b) Check the air brakes on the trailer regularly to ensure they are operating correctly.

Maintenance and Operation of Air Brake System

Compressor

Check for oil and air leaks, repair if necessary.

Air reservoir

Drain condensation water from reservoir daily.



Air Reservoir

Hoses and coupling

Check all pipes and hoses for damage. When driving the vehicle without a trailer the cover on the hose coupling must be kept closed.

Weekly maintenance

With the engine shut off and the pressure in the air tank at 5.3 bar, no drop in pressure should register over a three-minute period.

If a drop in pressure is detected –

- a) Check all compressed air connections for leakage.
- b) Visually check all hoses for damage.

The air dryer desiccant cartridge requires checking and replacing as necessary.



Air Dryer

When replacing components or parts to the air system - **USE GENUINE SPARES ONLY.**



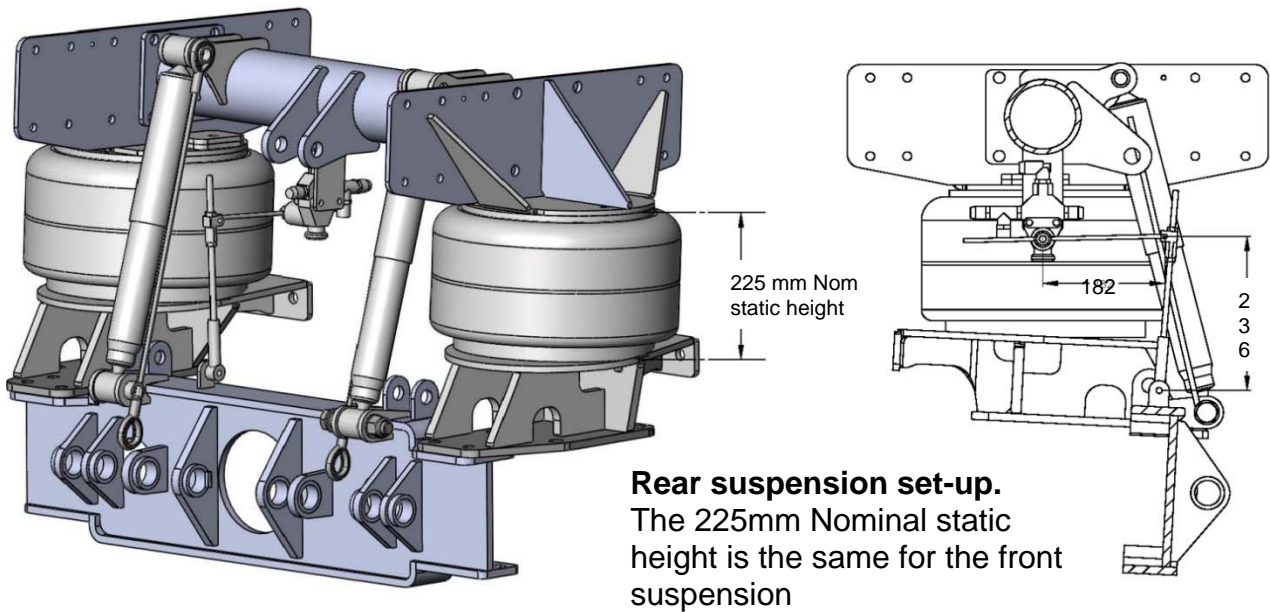
WARNING To prevent serious eye injury, always wear safe eye protection when performing vehicle maintenance or service. Remove all pressure from the air system before disconnecting any component, including the desiccant cartridge. Pressurized air can cause serious personal injury.

Air Suspension

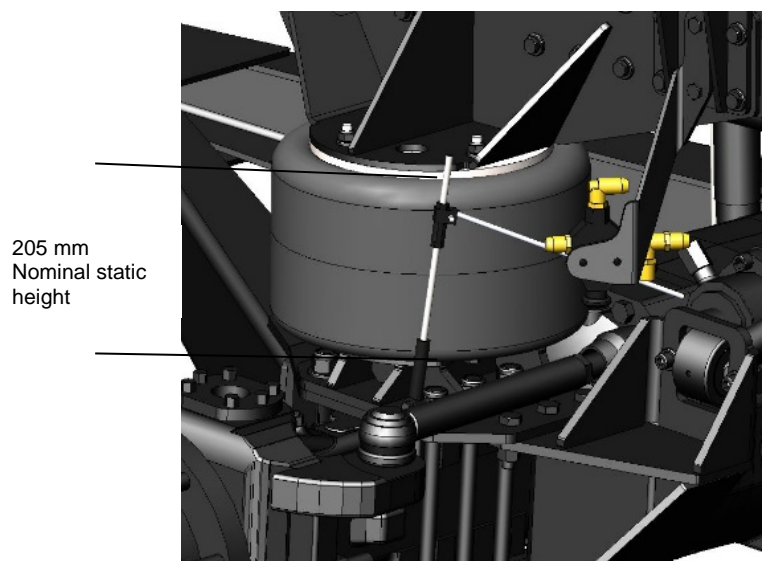
The suspension consists of an air bag at each side of each axle. Air is supplied to the air bag from the pneumatic system via a chassis mounted levelling valves, the valves control the height of the suspension.

Depending on the specification there may be one or two levelling valves on each suspension.

The operation of the levelling valve is controlled by the linkage which is adjustable. The height should be set as shown.



Front suspension set-up
The Nominal static height for the front suspension is 205 mm



Cab Air Filter

As a standard option dust filters are fitted. The filters are housed in the cab roof above the doors. Regular servicing of these cab filters should be carried out, particularly when working in dusty conditions. Remove grills and two filters to clean. Clean them with compressed air directed from the clean side (this applies to the standard dust filter only). . Replace cab air filters as necessary

Note: as an option **carbon** filters are available for when spraying hazardous chemicals, as recommended to comply with the Health and Safety Executive. The carbon filters meet the recommendations for standard pesticides as detailed in the HSE publication PM74 Sept. 1990



WARNING 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.

Installation (applies to both filter types)

1. Wear a dust mask and gloves when removing the old filter and cleaning the housing.
2. Carefully remove the old filter.
3. Clean any dust and dirt from the filter housing.
4. Inspect the filter gasket ensure that it is undamaged.
5. Insert the filter carefully and ensure that it seats correctly.
6. Refit the grills and secure.

Changing the filter

1. 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. The carbon filters should be replaced after 250 – 300 hours of use.
2. The filters are not cleanable DO NOT attempt to blow them out with compressed air. DO NOT attempt to wash them. Both methods will destroy the integrity of the filter.
3. When not in use, store the filters in a sealed plastic bag in a dry place.
4. Consult your waste authority for advice on the safe disposal of used filters.

Hydraulic Hoses

Inspect hoses and fittings for damage or leaks. Check the cover for signs of abrasion, blisters, nicks, cracks, cuts, hardness or colour changes.



Avoid fluids under pressure coming into contact with the skin. Relieve system pressures first before working on high pressure pipes, fittings, etc. be aware that the machine has hydraulic accumulators for the braking circuit.

Service and Warranty

Refer to Warranty Policy at the front of this manual.

The Multidrive carries a 24 month / 2000 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 hundred 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 understand that many customers will repair straight-forward faults themselves without reporting them, however McConnell 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, the right is reserved to either refuse to carry out the work or to charge for cleaning.

Maintenance, Technical Information, Lubrication and Periodic Service

DAILY / EVERY 10 HOURS

Component	Description
Engine Crankcase	Check oil level.
Engine Crankcase Breather Tube	Check
Primary Fuel Filter	Check filter/ water bowl drain as required.
Radiator & Cooling Fan	Check coolant level Check to ensure the grill is free from debris and that no debris and bypassed the grill and is blocking the cooling pack Check the cooling fan
Air Intake System	Check air cleaner restriction
Air Cleaner Valve	Check air intake piping Clean out dust as necessary
After treatment Exhaust Piping	Check

After treatment Exhaust Piping	Check
Diesel Exhaust Fluid (DEF) Level	Check
Transmission	Check oil level
Brakes	Check operation
Air System	Drain moisture from air tanks
Hydraulic Tank	Check oil level at sight glass
Lights, wipers etc.	Check all are functioning correctly
Front and Rear Axle	Lubricate steering joints (only when operating in wet and muddy conditions)
Washer Wiper Bottle	Check and fill with Screen Wash.

WASH MACHINE OFF REGULARLY WHEN USING CORROSIVE SUBSTANCES - E.G. SPRAYS AND FERTILISER. SPRAY CHASSIS AND LINKAGE WITH LIGHT OIL OR SPECIALIST PROTECTION FLUIDS.

EVERY 50 HOURS

Battery connections	Check tightness
Instruments, indicator lights and acoustic alarms	Check function
Axle oil levels	Check levels are correct

FIRST 100 HOURS OF OPERATION

1. Check all oil levels regularly.
2. Tighten wheel and rim nuts regularly **ESPECIALLY** after changing wheels and during first 20 hours of operation.
3. Do not over rev the engine when lightly loaded.
4. Do not allow the engine to idle at low speed for long periods.
5. Do not allow the engine to labour under heavy loads. Change down a gear if necessary.
6. Ensure tyre pressures are correct for the task in hand and/or the load being carried. Consult your tyre dealer for advice.

AFTER FIRST 100 HOURS

Component	Description
Front Axle Differential	Drain and refill with fresh oil
Front Axle Hubs	Drain and refill with fresh oil
Rear Axle Differential	Drain and refill with fresh oil
Rear Axle Hubs	Drain and refill with fresh oil
Transmission	Drain and refill with fresh oil
Transmission fine filter	Replace filter element - use only genuine ZF filter
Batteries	Check electrolyte level
Air System	Drain moisture from tank(s)
Air Cleaner	Remove primary element and clean
Hydraulic System	Renew hydraulic filter element. Check system pressures. Check to ensure that none of the hydraulic hoses are chaffing, pay particular attention to steering and brake hoses.

IT IS ESSENTIAL to ensure the hydraulic filter in the top of the hydraulic tank is changed. This will ensure that any that any contamination in the hydraulic system is removed.

Unscrew filter head cap to change element.
 Replace 'O' ring on cap if damaged.



Hydraulic Tank Filter Housing

EVERY 250 HOURS

Component	Description
Air intake Piping	Check
Charge Air Pipework	Check
Charge Air Cooler	Check
Radiator	Check coolant level
Radiator Hoses	Check
Transmission	Check oil level (see page 93)
Front Axle	Check levels in differential and hubs
Rear Axle	Check levels in differential and hubs
Drive Shafts	Lubricate with high pressure grease, check bolts for tightness
Steering Joints	Lubricate with multi-purpose grease
Batteries	Check electrolyte level
Air Cleaner	Remove primary element and clean Check 'vacuator' unloaded valve
Fuel Tank	Drain residue check in-line filter change as necessary
Air System	Drain tank of moisture

EVERY 500 HOURS
(Additional to 100 and 250 hours of service)

<u>Component</u>	<u>Description</u>
Engine Lubricating Oil	Change
Engine Oil Filter	Change
Fuel Filters	Replace filter elements
Front Axle Differential	Drain and refill with fresh oil
Front Axle Hubs	Drain and refill with fresh oil
Rear Axle Differential	Drain and refill with fresh oil
Service brakes	Check brake disc for wear
Rear Axle Hubs	Drain and refill with fresh oil
Handbrake	Clean and check operation adjust if required.
Air Intake Hoses	Check connections for leaks
Fan Drive Belt	Inspect for cracks and fraying
Cooling Pack	Clean all cooler element fins
Coolant	Check antifreeze
Header Tank	Check Pressure Cap
Engine Electrics	Check Earth Connections
Batteries	Check

EVERY 1000 HOURS OR ANNUALLY (whichever is 1st)

(Carry out all 250 hours and 500 hours services)

<u>Component</u>	<u>Description</u>
Engine	Check drive belt
Engine	Check belt tensioner
Aftertreatment	Inspect DEF tank filter
Transmission	Drain and refill with fresh oil
Transmission Filter	Replace with only genuine ZF filter element.
Hydraulic System	Renew hydraulic filter element. Drain and refill with fresh oil, check system pressures.
Air Cleaner	Replace air intake filters.
Brake System	Bleed system if required, Check brake discs wear.
Handbrake	Check operation, adjustment & pad wear.
Cab	Replace cab filters (paper elements) Check and tighten all bolts and linkage
Drawbar/Hitch and chassis	frame. Tighten all axle bolts. Tighten 'A' frame and panhard rod bolts.
Pentronic Steering	To be serviced by Dealer Technician.
Air Conditioning	Service as Eberspacher instructions including change of filter drier.

EVERY 2000 HOURS OR EVERY 24 MONTHS (whichever 1st)

(Carry out all 250 hours and 500, 1,000 hours services)

<u>Component</u>	<u>Description</u>
Engine	Clean
Engine Thermostat	Test
Crankcase Vent Filter	Change
Cooling System	Flush
Engine Vibration Damper	Check
Air Compressor Lines	Check
Air dryer desiccant cartridge	Replace

EVERY 4500 HOURS OR 3 YEARS (whichever 1st)

(in addition to other routine service items)

<u>Component</u>	<u>Description</u>
Aftertreatment DEF Charge Unit	Change filter

EVERY 5000 HOURS OR 4 YEARS (whichever 1st)

(in addition to other routine service items)

<u>Component</u>	<u>Description</u>
Overhead Set	Adjust

Multidrive M380/420 Lubrication/Service Schedule (illustrates requirements up to 2000 hours and additions for the 4500 and 5000 hour services)

Service Periods	Daily or 10 hourly	1 st 100 hours	250 hours / 3 monthly	500 Hours / 6 monthly	1000 hours / yearly	1500 hours / yearly	2000 hours	4500 hours / 3 yearly	5000 hours / 4 yearly
Engine Diesel Exhaust Fluid (DEF) Check level	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engine Oil Check level	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engine Oil Change				✓	✓	✓	✓	✓	✓
Engine Oil filter Replace				✓	✓	✓	✓	✓	✓
Oil filter seal ring Replace as necessary				✓	✓	✓	✓	✓	✓
Fuel water trap Drain	✓	✓	✓	✓	✓	✓	✓	✓	✓
Secondary fuel filter Replace				✓	✓	✓	✓	✓	✓
Engine air filter Check restriction	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engine air filter Clean dust valve	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engine air filter Replace					✓		✓		✓
Air intake pipework Check			✓	✓	✓	✓	✓	✓	✓
Charge Air pipework Check			✓	✓	✓	✓	✓	✓	✓
Charge Air Cooler Check			✓	✓	✓	✓	✓	✓	✓
Radiator Hoses	✓	✓	✓	✓	✓	✓	✓	✓	✓
Radiator Check			✓	✓	✓	✓	✓	✓	✓
Header tank pressure cap				✓	✓	✓	✓	✓	✓
Crankcase breather Check	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engine vibration damper Check							✓		✓
Engine fan belt Check tension			✓	✓	✓	✓	✓	✓	✓
Engine Coolant Check level	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engine coolant Check antifreeze					✓		✓		✓
Engine coolant Flush and refill							✓	✓	✓
Engine aftertreatment exhaust piping Check	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engine aftertreatment Check DEF Tank Filter					✓		✓		✓
DEF dosing unit filter Change								✓	
Engine Thermostat check							✓		

Service Periods	Daily or 10 hourly	1 st 100 hours	250 hours 3 monthly	500 Hours / 6 monthly	1000 hours / yearly	1500 hours / yearly	2000 hours	4500 hours / 3 yearly	5000 hours / 4 yearly
Engine crankcase vent filter Change							✓		
Engine overhead set Adjust									✓
Air compressor Hoses Check							✓		✓
Air System replace desiccant cartridge							✓		
Transmission oil Check level	✓	✓	✓	✓	✓	✓	✓	✓	✓
Transmission oil Drain and replace		✓			✓		✓		✓
Transmission filter Replace		✓			✓		✓		✓
Re calibrate Transmission		✓			✓		✓		✓
Axle differentials oil Check level		✓	✓	✓	✓	✓	✓	✓	✓
Axle differentials oil Drain & refill		✓		✓	✓	✓	✓	✓	✓
Axle final drives (hubs) oil Check level		✓	✓	✓	✓	✓	✓	✓	✓
Axle final drives (hubs) Drain and refill		✓		✓	✓	✓	✓	✓	✓
Hydraulic oil Check level	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hydraulic oil Drain & replace					✓		✓		✓
Hydraulic oil filter Replace		✓			✓		✓		✓
Hydraulic Hoses Check		✓	✓	✓	✓	✓	✓	✓	✓
Cab dust filters Check & clean		✓	✓	✓		✓		✓	
Cab dust filters replace					✓		✓		✓
Carbon filters replace				✓	✓	✓	✓	✓	✓
Lubricate prop-shafts *under extreme conditions	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lubricate axle kingpins * under extreme conditions	✓	✓	✓	✓	✓	✓	✓	✓	✓
Air Conditioner, Service & replace filter drier					✓		✓		✓
Batteries Check				✓	✓	✓	✓	✓	✓
Battery cables and earth straps and all electrical looms Check for security and damage				✓	✓	✓	✓	✓	✓

Capacities

Capacities are approximate and all quoted in litres

<u>Model</u>	<u>M380/420</u>
Engine Crankcase	16.7
Cooling System	38
Automatic transmission	26
223 Front Axle Differential	12.5
Epicyclical hubs 223 axle	1.75
213 Rear Axle Differential	15
Epicyclical hubs 213 axle	1.75
Air Reservoir Tank	20
Fuel Tank	300
DEF Tank	57
Hydraulic Tank	160
Air Conditioning Gas R134	1000 gram

Recommended Fuel and Lubricants and Service details

Engine

Full engine technical, service and maintenance details are available at <https://quickserve.cummins.com>

Diesel Fuel

Diesel fuel meeting the following standard is required:

ASTM 2D – Centane minimum of 42. Lubricity BOCLE 3100 or greater ASTM specification D6078

ULSD/Bio blends to a maximum of B20 (20% biodiesel) are acceptable.

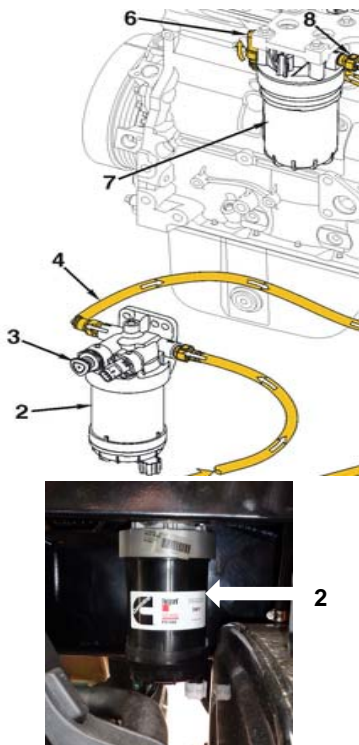


CAUTION

Ultra-low sulphur content diesel fuel is required for the correct operation of the after-treatment system. If ultra-low sulphur fuel is not used the aftertreatment system could be damaged.

DO NOT use diesel fuel with a sulphur content greater than 10 ppm.

Fuel Filters



- 2 – Water separator / fuel suction filter (mounted on LH chassis rail level with the front of fuel tank as shown)
- 3 – Priming pump
- 7 – Pressure side fuel filter (on LH side of engine block)

Daily

Drain the water / fuel separator. To drain turn the tap on the base of the filter counter clockwise 3 ½ turns until it drops down 25 mm and drainage occurs. Drain until clear diesel is visible. Re tighten tap hand tight – do not over tighten.

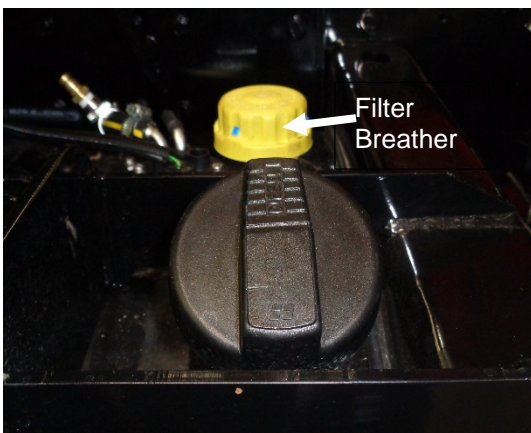
500 Hour intervals

Replace both the suction and pressure filters.

To remove (disconnect the wire harness from the suction filter), unscrew using the 1” drive hexagon on the base of the filters.

Fit replacement filter having first lubricated the ‘O’ ring with clean lubricating oil, tighten until contact is made with the gasket and then turn another ¾ turn or torque to Nm 38 – do not over tighten.

Fuel Tank



The fuel tank is mounted on the left-hand side of the chassis adjacent to the cab entry steps.

The tank has a filter breather fitted. This filter requires periodic replacement. No time period is specified as the interval will be highly dependent upon the conditions to which it is exposed.

Lubricating Oils

Specification as below are required:

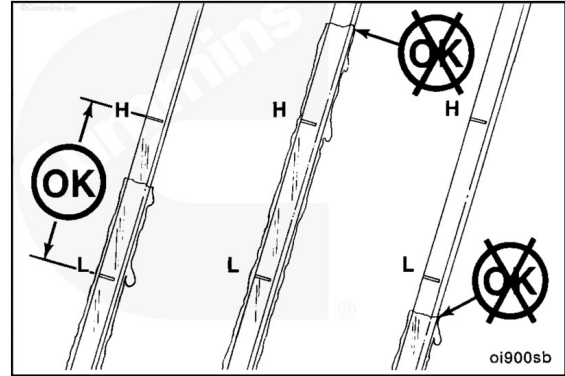
- **CES 20081** It is essential that oil meets CES (Cummins Engineering Standard)
- **API CJ-4/SL**

Oil Viscosity 15W-40 For operating temperatures above – 15°C



CAUTION! Never run the engine with the oil level below or above the level shown on the dipstick.

Check the level with the machine on level ground. Stop the engine and wait 15 minutes for the oil to settle in the sump before checking.



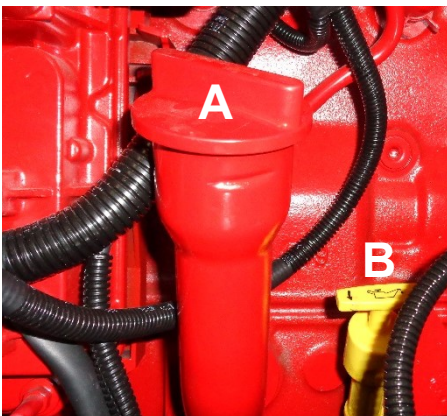
Oil Change and Oil Filter Replacement

Both the engine oil and oil filter are to be changed at 500 hour intervals. With the engine warm (water temperature approx. 60°C) stop the engine and remove the sump drain plug and drain oil into suitable container.



The engine oil filter is located towards the front of the right hand side of the engine. Clean the area around the filter head, use a filter wrench to unscrew the filter. Clean the gasket area of the filter head. Fill to new filter with the correct 15W-40 oil and coat the filter and filter head gasket areas with a thin film of 15W-40 oil. Screw the filter into the filter head until contact is made with the filter head surface and then tighten a further 3/4 - 1 turn.

Clean the sump plug and plug location, if necessary replace the sealing washer. Replace the plug and tighten (M18 plug to 60 Nm - M22 plug to 80Nm). Re fill with the specified grade of oil to the correct level. Start and idle the engine and check for leaks at filter and sump plug. Stop the engine and wait five minutes for the oil to drain down. Check the oil level and if necessary add oil to the High 'H' level on the dipstick.



The dipstick is located on the left hand side of the engine as shown. There are two available oil fill points, one adjacent to the dipstick, the other on top of the rocker cover.

- A) Oil filler caps**
- B) Dipstick**



Diesel Exhaust Fluid (DEF)

Only DEF conforming to standard ISO 22241-1 / DIN 70070 should be used. Any other fluid could seriously damage the after-treatment system.

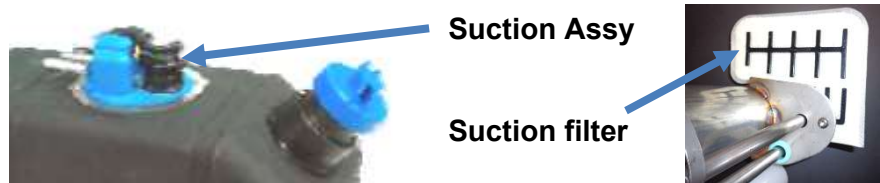


WARNING!

Do not get DEF in your eyes or ingest it.

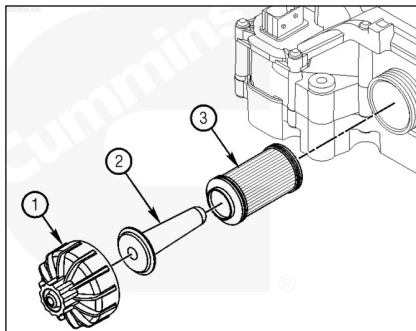


The DEF tank is located on the right hand side of the chassis, between the battery box and hydraulic tank



DEF Tank suction filter is mounted on the base of the suction assy. To access remove the cover, release the clamp and withdraw suction assy. The filter is on the base, retained by a screw.

The DEF dosing unit



- 1) Filter cap
- 2) Filter equaliser element
- 3) Filter element
(replace at 4500 hour intervals)



The DEF dosing unit is mounted behind the battery box. Inspect the area around the seal and vent of the dosing unit for signs of leakage. DEF leaks leave a white deposit. If leaks are found clean and inspect the cap for cracks, holes or damage to the thread, also inspect the dosing unit thread for damage. If damage found the parts must be replaced.

To remove the filter unscrew the DEF filter cap, remove the filter equalising element. A service tool is included with the replacement filter to aid in the removal of the filter element. When inserting the tool a 'click' sound indicates proper engagement with the filter.

NOTE: if the filter element and equaliser element are removed, they must be discarded and replaced, regardless of condition and replaced by new units.

To replace slide the filter equalising element into the filter cartridge and insert the assembly into the dosing unit. Install and tighten the cap, torque to **20Nm**.

Coolant

Only coolant meeting Cummins Engineering Standard, CES 14603 ES Compleat should be used. Antifreeze is required regardless of the climate; it broadens the operating temperature by lowering the freezing point and by raising the boiling point. The corrosion inhibitors also protect the cooling system.



The coolant header tank is located in the engine compartment on top of the engine.



WARNING!

Do not attempt to remove the radiator header tank filler whilst the engine is running or still hot.



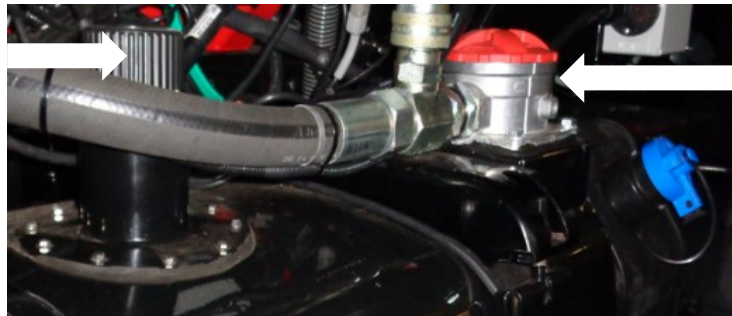
Do not attempt to fill or top up a hot engine with cold coolant.



Hydraulic Tank

ISO VG46 Mineral Hydraulic oil. Hydraulic oil cleanliness is essential for the life of the hydraulic components and an ISO 4406 cleanliness level of 19/17/14 should be maintained.

Hydraulic tank filler cap



Hydraulic oil filter housing



Hydraulic oil level & temperature gauge is mounted on the tank side.



Level



Temperature

Transmission Maintenance

Oil Grade:

The permitted oil grade for the power-shift transmission is oils in the ZF list of recommended lubricants T E- ML03.

This list of lubricants will be updated periodically and a copy can be requested from the McConnel Service Department.

Factory fill of oil in the transmission is: - TOTAL RUBIA 10W



Oil Level Check:

IMPORTANT It is imperative that the correct procedure is followed:

- **Transmission in neutral**
- **Oil at working temperature 80-90°C**
- **Engine at low idle**
- **Handbrake on**
- **Read following instruction thoroughly**

The transmission oil check should be carried out with regard to the safety directions and rules for accident prevention, the respective national regulations have to be absolutely respected.

For example: the vehicle has to be secured against rolling with blocks to the wheels.

The oil level check must be carried out as follows:

1. Oil level check (weekly).
2. The vehicle must be parked on level ground.
3. Transmission to be in the neutral position "N"
4. In a cold start situation, the engine must be running for about 2-3 minutes at low engine idle speed. and the mark on the oil dipstick must be above the cold start mark "COLD MIN" (see figure 4.2 B2)
5. At transmission operating temperature of about 80-90 degree Celsius.
6. At an engine low idling speed
7. Loosen oil dipstick by counter clock rotation, remove and clean it.
8. Insert oil dipstick slowly into the oil level tube until contact is obtained, and pull it out again.
9. On the oil dipstick, the oil level must be in the area marked " HOT " (see figure 4.2 B2)
10. Insert the oil dipstick again, and tighten by clockwise rotation

If the oil level has dropped in the operating temperature condition below the HOT zone, it is absolutely necessary to replenish with oil according to the recommend list of lubricants TE-ML-03.

An oil level above the "HOT" mark will lead too a high oil operating temperature within the transmission.

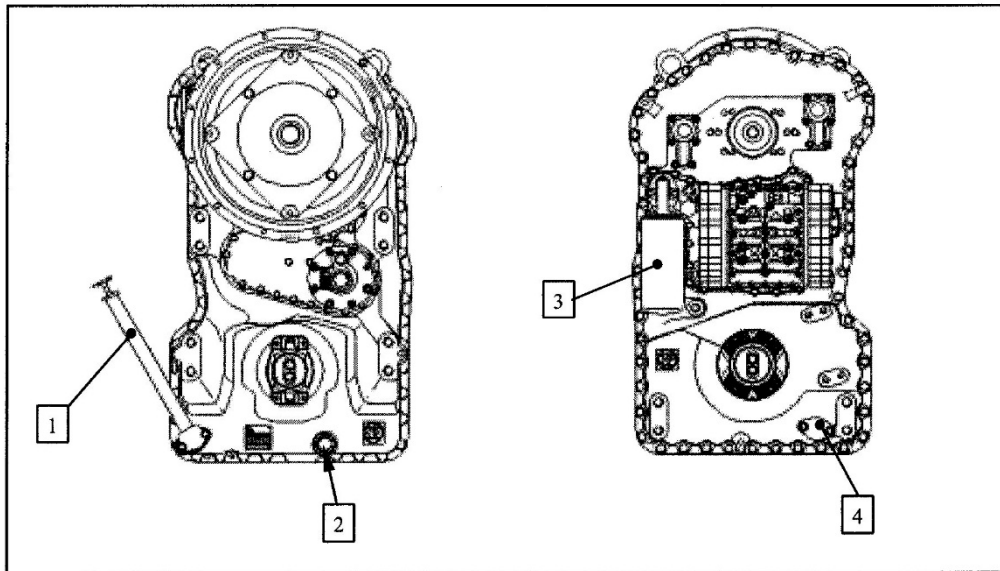


Figure-No.: 4.2 B1

Legend:

- 1 = Oil filler tube with oil dipstick.
- 2 = Oil drain plug M38 x 1,5
- 3 = Removable canister filter (ZF-fine filter)

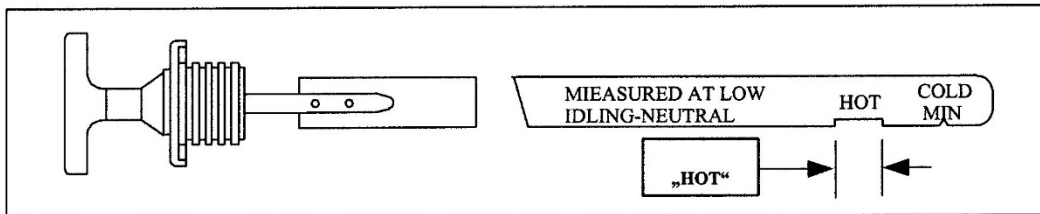


Figure-No.: 4.2 B2

Figure 67, ZF gearbox

Oil Change and Filter Replacement Interval:

The oil must be changed after the first 100 operating hours of work.

Every further oil change should be after 1000 operating hours of work, or at least once a year!

At every oil change, the transmission pressure filter must be replaced, using only the genuine ZF-Fine filter.

Use of non-genuine filters will compromise the operation of the transmission, and any warranty work will be rejected if due to fitting non-genuine parts.

Oil Change and Oil Filling Capacity:

It is imperative to pay attention to the absolute cleanliness of oil and filter

The oil change must be carried out as follows:

1. Transmission must be at operating temperature and vehicle parked on level ground, open the oil drain plug and drain the used oil into a container capable of holding the transmission oil capacity.
2. Clean the drain plug with the magnetic insert of any debris and the sealing surface on the housing, re-install plug along with a new O-ring again.
3. Fill with new oil (about 19 litres) according to the recommended list of ZF lubricants TE-ML-03 (see page 93 for factory oil fill type)
Alternatively check with dealer for recommended list of lubricants.
4. The indicated quantity is to be used as a guide only.
5. Start the engine and run at idling speed with the transmission in Neutral position "N".
6. Check oil level and top up to the "COLD – MIN" mark if required.
7. Ensure the tractor wheels are chocked and secure then warm up the transmission.
8. Shift the controller through all gear positions.
9. Check the oil level again and top up once more if necessary.
10. The oil level on the dipstick must be in the "HOT" zone see figure 4.2B2.
11. Insert the oil dipstick again then tighten it by clockwise rotation.

At the initial oil fill of the transmission, consideration has to be given that the oil cooler and pressure filter as well as pipes must get filled with oil.

ZF strongly recommends that the AEB starter procedure (calibration of the shifting elements) is carried out at every oil and/or filter change.

Transmission Oil Filter Replacement:

When replacing the transmission oil ZF filter ensure that filter area is completely cleaned prior to the filter removal, also ensure dirt or oil sludge contaminants cannot penetrate the oil circuit.

Also ensure the parking brake disc is covered to avoid contamination from possible oil spillage.

Excessive force must be avoided when removing the old filter from its housing.

The mounting of the filter must be carried out as follows:

- 1. Lubricate the face of the sealing ring on the new filter with a small amount of clean oil prior to fitting to the transmission.**
- 2. Screw the filter into the filter housing until contact with the sealing surface is obtained, then tighten by hand about 1/3 to 1/2 turn.**
- 3. Treat the filter with care at all times, damaged filters must never be installed.**

The filter differential pressure valve (bypass valve) is equipped with a filter contamination switch, which will inform the driver about a blockage within the ZF filter.

In this instance, an error indication is shown on the dashboard digital display. It is recommended that the machine is stopped and the servicing dealer is contacted.

Transmission calibration AEB Starter procedure

After every oil and or oil filter change the transmission should be recalibrated. This is a simple process initiated via the MCU. To access select the service and diagnostics screen and select transmission calibration. The calibration automatically adjusts the filling parameters for the clutches.

Before commencing the AEB procedure it is of vital importance the transmission oil level is correct (especially after refilling with new oil).

The following procedure should be adopted to reset the clutch parameters within the transmission.

1. Park the tractor on level ground and block the wheels to hold secure. Ensure that there is a clear space of at least 5 metres in front of the tractor.
2. The transmission sump oil is required to be at a working temperature of approximately 75 degrees prior to activating the AEB starter, otherwise the programme will abort.
3. Sitting in the driver's seat, start the engine and engage forward gear.
4. Apply the footbrake to hold the vehicle from moving forward and release the park brake.
5. Move the transmission gear to F6, and then open the throttle to attain 1600 engine RPM.
6. Monitor both sump and torque convertor temperatures (shown on bottom of MCU display) adjust engine speed as necessary to ensure that the torque convertor temperature does not exceed 100 degrees.
7. With the transmission up to temperature, the engine throttle can now be brought to low idle position and the transmission controller placed into neutral and handbrake applied.
8. With the engine at low idle (approx. 825 RPM) and transmission temperature as mentioned above, press the MCU AEB start key for two seconds.
9. The MCU display will now show the operation of clutch parameters being checked.
10. Once all the transmission system is checked and reset a "Finished" message will be displayed on the MCU.

11. Switch off the engine to complete the cycle. The operation is now complete.
12. Remove the block from the wheels and take the tractor for a test, run through all gears to check that all gear changes are effected smoothly.

TRANSMISSION CALIBRATION (AEB STARTER)

To run the calibration the vehicle handbrake must be on, the transmission in neutral, the engine running at approx 825 RPM and the transmission sump temperature must be over 72°. When ready press the "Start" key for 2 Secs and wait for the "Finished" message. Engine must be turned off to complete the cycle, to abort or reset after a failure

AEB cycle number:

AEB cycle status:

AEB Error messages:

Sump temp:	Torque converter temp:	RPM:	Gear:
<input style="width: 60px;" type="text" value="75"/>	<input style="width: 60px;" type="text" value="78"/>	<input style="width: 60px;" type="text" value="817"/>	<input style="width: 60px;" type="text" value="0"/>

TRANSMISSION WARM-UP (AEB STARTER)

The Warm-up should be carried out in a clear, open space. See operators manual for full details and then proceed as follows:

Apply foot brake with LEFT foot
 Switch handbrake off
 Select forwards gear with joystick then press F6 to force transmission into top gear
 Increase engine speed to approx 1600 rpm whilst keeping machine stationary with brake
 Monitor transmission temperature and adjust engine speed to ensure torque converter temperature doesn't exceed 100° and untill the sump temperature reaches 75°
 Press "N" to select Neutral and return to previous page

Sump temp:	Torque converter temp:	RPM:	Gear:
<input style="width: 60px; background-color: #90ee90;" type="text" value="75"/>	<input style="width: 60px; background-color: #90ee90;" type="text" value="97"/>	<input style="width: 60px;" type="text" value="1421"/>	<input style="width: 60px;" type="text" value="6"/>

Axles

SAE80W85 with additives for 'oil-bath' brakes, 'Anti – Squawk'.

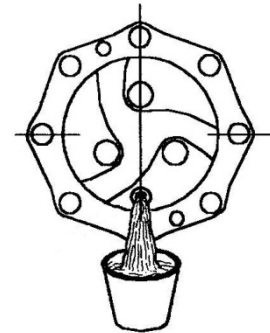
- API GL-4
- Renault Agriculture 180596-88.3
- Massey Ferguson CMS M 1141/1135
- New Holland NH 420A
- Ford M2C 86B/86C
- FIAT, JCB, KOMATSU, MANITOU

Factory fill is: **Total Dynatrans FR80w/85**

Axle Hubs

Drain oil from axle hubs by rotating plug to the six o'clock position.

Remove plug using a 12mm hexagonal drive Allen key.



Draining Oil from Axle Hubs

To fill with recommended new oil, rotate axle hub until level plug is at the three o'clock position.

Ensure seal on drain/fill plug is in good order when replacing. Do not over tighten.

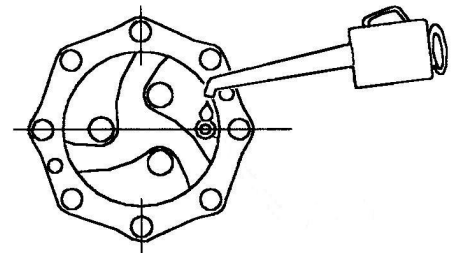


Figure 69, Refilling Axle Hubs

Axle Level Plug

Level plugs can be accessed through rear frame.

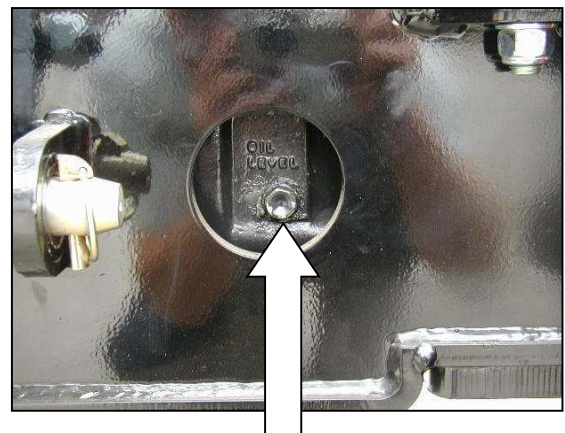
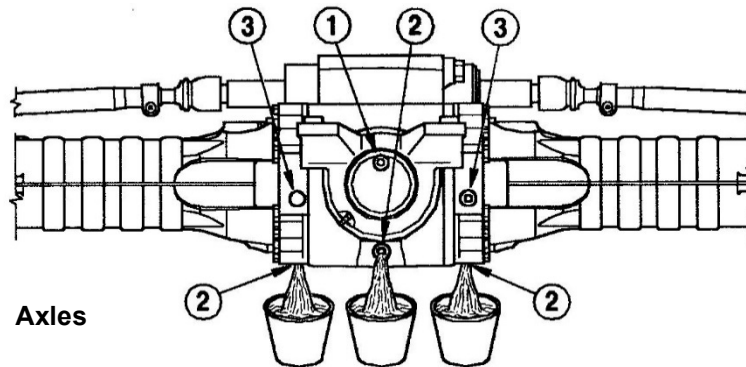


Figure 70, Axle level plug

Axle Differentials

Front and Rear Axles



1. Oil filling plug

2. Oil draining plug

3. Check level plug

Drain oil from differential housing as per diagram. Oil level and filler plug are at different positions in axle case. For axle oil capacities see page 88.

IT IS OF EXTREME IMPORTANCE TO NOTE THE AXLE HAS SEPARATE LEVEL PLUGS AND ARE SET LOWER IN THE DIFFERENTIAL HOUSING THAN THE FILLER PLUGS.



IMPORTANT
DO NOT OVER FILL ABOVE LEVEL PLUGS, AS OVERHEATING WILL OCCUR.

NOTE

The identification plate can be found on the differential housing, the opposite side to the drive shaft. The model type together with the serial number is required when ordering replacement parts.

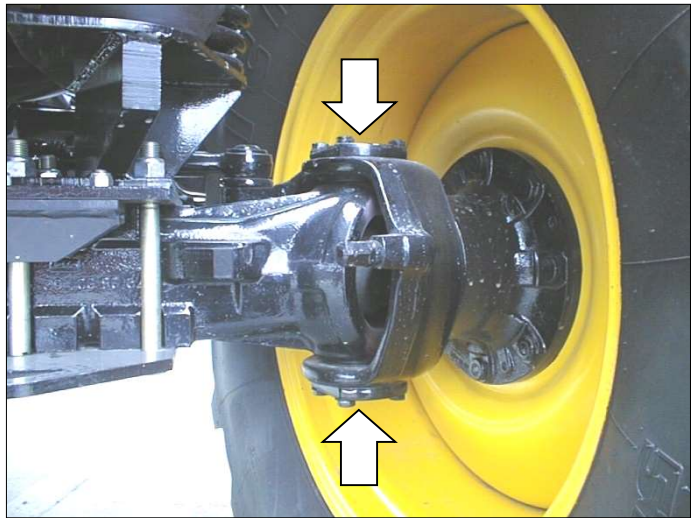


Serial number of axle.

Axle and Prop shaft Lubrication

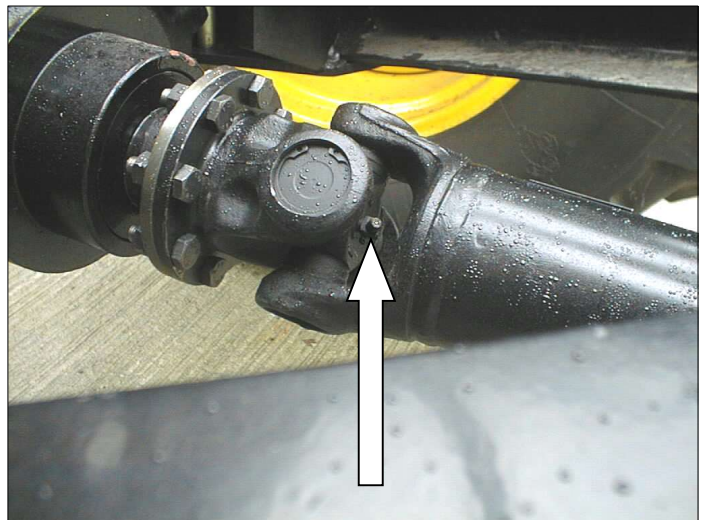
Use only multi-purpose grease EP2 for steering joints.

Grease points

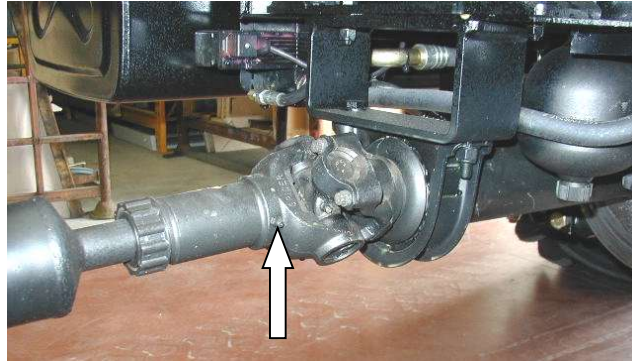


Steering Joints

Lubricate prop shaft universal joints with high-pressure grease.



Universal prop shaft

Rear Axle Prop shaft

Prop shaft greasing points

Two grease points are located either end of the prop shaft, in the cross joint; the exception to this is on the 3.8 metre and 4.2m wheelbase, where a grease nipple is provided to lubricate the slide joint on the rear prop shaft.

Set-up Procedure of Axle Stops

It is of great importance that the steering stops are set correctly. When changing from large diameter wheels to small and vice-versa.

Front Axle

Select 2-wheel steer mode; turn the wheels to full right hand steering angle without the tyres fouling the chassis, or brackets etc. (steering stops may require adjustment to allow this to happen). Turn wheels to full left hand steering angle again wheels must not foul the chassis, or brackets etc. Reset other pair of steering stops.

Once happy with the steering angle achieved, tighten the locknuts on all four steering stops fitted to the steering cases.

Rear Axle

Select 4-wheel steer mode, turn wheels to full right hand lock, rear wheels should not touch the chassis or implement on the rear load platform. As the rear wheels follow the front steering, if there is insufficient clearance between the rear wheels and chassis, it will be necessary to re set the front stops to suit.

If the tyre clearance is satisfactory set the adjustable stops with as 2mm gap between the fixed stop on the axle housing.

Turn the wheels to full left hand lock and do the same procedure. If rear axle stops are set correctly the relief valve will not blow off. If the rear axle contacts the stops before reaching the angle prescribed by the front steering the relief valve will blow off and could over heat AND DAMAGE the hydraulics.



WARNING! When working in the vicinity of the front and rear wheels be aware of the danger of becoming trapped / crushed between the chassis and wheel, do not get into a position where this can happen.

Wheel Track Settings

The maximum recommended wheel centre width 80" (2050mm) on **MAXIMUM** 750mm width wheels at which the full stated axle load can be carried. It is recommended you **DO NOT EXCEED** these widths.

Note: axle loads **MUST** be reduced when large diameter rowcrop wheels are fitted. Wheels fitted to the Multidrive Tractor are of either fixed or adjustable wheel centre construction.

Note: If you change wheel track setting you **MUST** re-set steering stops to prevent wheels fouling on chassis.

Wheel Changing

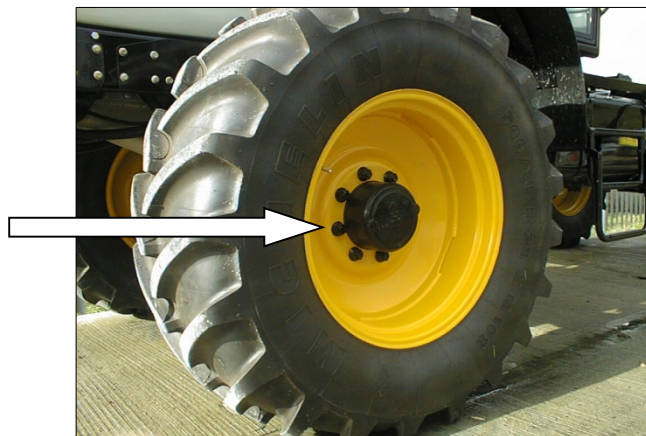
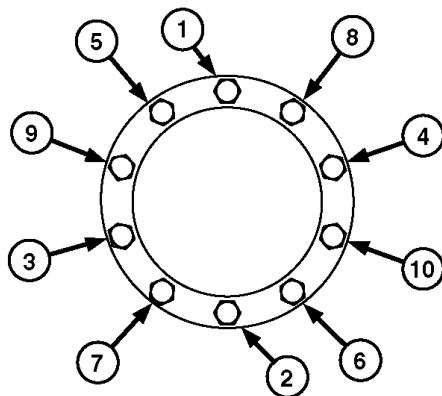
When changing wheels tighten wheel nuts to prescribed torque settings.

- Front axle** 22mm studs **650Nm** (479 lbs ft)
- Rear axle** 22mm studs **650Nm** (479 lbs ft)



IMPORTANT

After the first four and eight hours of operation, re-check all wheel nuts to the above torque settings. Tighten in the sequence indicated.



Wheel Nuts

Multidrive Plus+1 Steering Controller Calibration Process 4 Wheel Steer

Rear steering setup

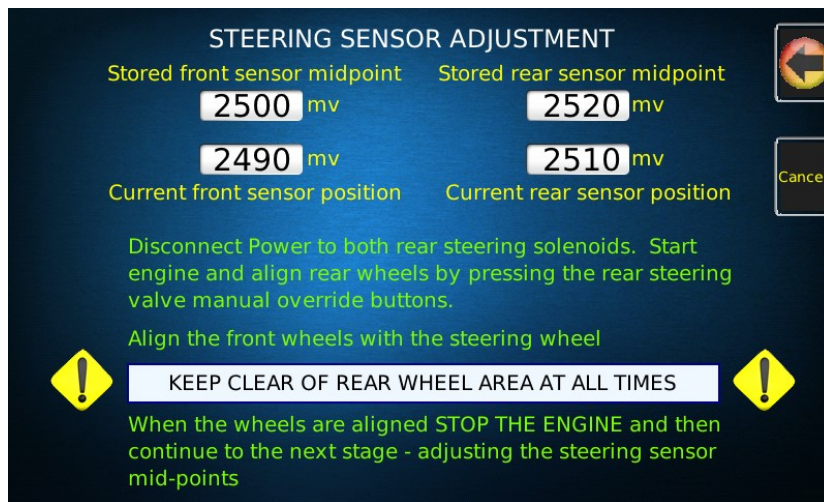
If any adjustments to the steering are made or system components replaced it may be necessary to reset the steering center points so the system knows where the straight ahead positions are on both axles. Inaccurate setup will lead to the vehicle crabbing whilst travelling in some or all of the different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



WARNING! ** 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.

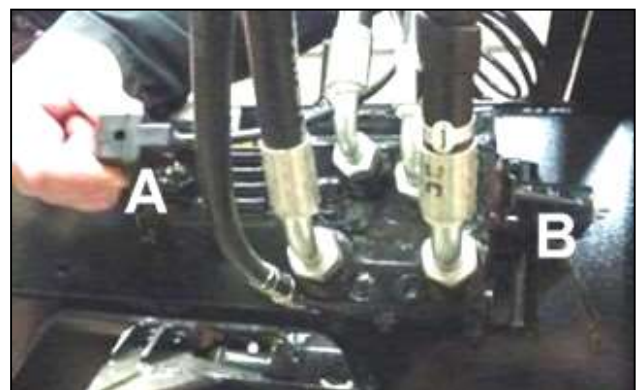


Read the instructions, ensure the handbrake is applied, then start the engine and align the rear wheels as per the procedure below:

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 ‘A’ connector from the PVG head on the hydraulic control valve (*refer to photo opposite*); the valve is located on the front face of rear axle ‘H’ frame cross-member. Place a spanner on ‘B’ to centralise the rear wheels.



By removing ‘A’ you can override the valve by moving ‘B’; this will move the rear wheels left and right as required.

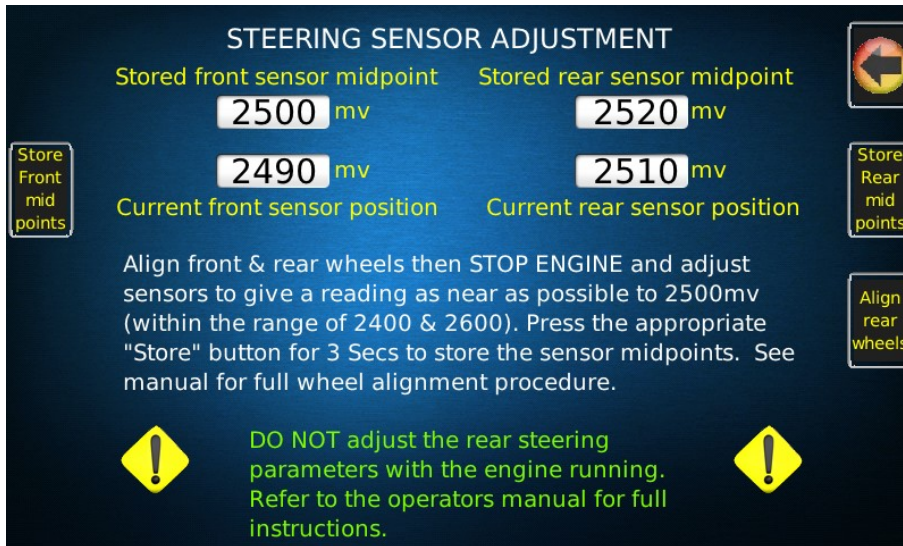
Use either a straight edge or a line to align both front and rear wheels accurately. Once the wheels are set perfectly straight you can then stop the engine.

WARNING! Do not do this in the ‘Crush Zone’. Only required if wheels are mis-aligned.

Switch the ignition back on and go to 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.



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.



Adjustment Screws

Axle & Wheel Specification Details

280.8mm diameter hub mounting spigot
10 x 22mm studs at 335 mm PCD-M22 flat nuts
WIDTH OVER AXLE HUB FLANGES 80.7" (2050mm)

Wide Flotation Tyres

In order to avoid tyre contacting the chassis and/or suspension brackets the MINIMUM width between widest point on tyres is **50" (1270mm)**. Always adjust axle lock stops to prevent tyre scuffing on chassis or suspension members. (See set up procedure on page 102).

Maximum Axle Loads (TONNES) subject to suitable tyre equipment.

FRONT AXLE		7.00
REAR AXLE		11.00
GVW		16.00

IMPORTANT NOTICE - THE USE OF VERY LARGE WIDTH OR DIAMETER WHEELS WILL REDUCE AXLE CARRYING CAPACITY

Consult McConnel if in doubt.

See overleaf for the carrying capacities. Various sizes of tyres are quoted for fitment to the various Multidrive models. **RESPECT MUST BE PAID BY USERS TO THE CARRYING AND SPEED CAPACITY OF THE VARIOUS TYRE OPTIONS AVAILABLE.**

FOR ADVICE ON TYRE DATA NOT SHOWN, CONSULT McCONNEL SERVICE DEPARTMENT OR YOUR LOCAL TYRE DISTRIBUTOR.

Tyre Data

The following information is provided as a guide only; tyre manufactures amend specifications from time to time. It is essential that when changing tyres notice of the manufactures current data on pressures, speeds and loads is complied with.

Michelin IF 600/70 R30 AXIOBIB									
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm		Rolling Circumference in mm		Capacity In Litres 75% max			
600	1585	695		4683		450			
Speed in Km/h	PRESSURE (bars) AND LOADS PER TYPE (kg)								
Bar	0.8	1.0	1.2	1.4	1.6				
p.s.i.	12	15	17	20	23				
65	2800	3224	3650	4010	4375				

Michelin 600/65 R34 151D TL MULTIBIB									
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm	Rolling Circumference in mm		Capacity In Litres 75% max				
594	1654	732	4897		463				
Speed In Km/h	PRESSURE (bars) AND LOADS PER TYPE (kg)								
Bar	0.6	0.8	1.0	1.2	1.4	1.6	1.7	1.8	1.9
p.s.i.	9	12	14	17	20	23	25	26	28
10	2800	3160	3515	3875	4195	4510	4670	4830	4990
30	2240	2605	2975	3340	3655	3970			
40	2140	2485	2835	3180	3480	3780			
50	2050	2385	2715	3050	3335	3620			

Michelin MACHXBIB 600/65 R 28 154 D TL								
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm	Rolling circumference in mm	Capacity in Litres 75% max				
615	1502	666	4449	424				
Speed in Km/h								
PRESSURE (bar & psi) – Load per tyre in kg								
Bar	1.0	1.2	1.4	1.6	1.8	1.9	2.0	2.4
p.s.i	14	17	20	23	26	28	29	35
10	3315	3660	4005	4335	4565	4670	4775	5205
30	2655	2975	3300	3620	3790	3880	3965	4310
40	2580	2870	3160	3450	3615	3695	3780	4105
50	2465	2780	3040	3305	3465	3545	3620	3940

Michelin MEGAXBIB 620/75 R 26 166A8 /166 B TL								
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm	Rolling circumference in mm	Capacity in Litres 75% max				
588	1602	712	4748	516				
Speed in Km/h								
PRESSURE (bar & psi) – Load per tyre in kg								
Bar	1.0	1.4	1.6	1.9	2.2	2.4	2.6	3.0
p.s.i	15	20	23	28	32	35	38	44
10	3910	4570	4900	5315	5730	6010	6285	6840
30	3060	3620	3900	4230	4565	4780	5005	5450
40	2860	3380	3640	3950	4260	4470	4680	5090
50	2860	3380	3640	3950	4260	4470	4680	5090

Michelin MACHXBIB 710/55 R30 153D TL								
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm	Rolling circumference in mm	Capacity In Litres 75% max				
684	1516	673	4491	506				
Speed in Km/h								
PRESSURE (bar & psi) – Load per tyre in (kg)								
Bar	0.8	1.0	1.2	1.4	1.6	1.8	1.9	
p.s.i	12	15	17	20	23	26	28	
10	3370	3775	4185	4590	5000	5320	5480	
30	2655	3040	3430	3815	4200			
40	2530	2900	3265	3635	4000			
50	2425	2775	3130	3480	3830			

Michelin IF620/75 R30 164D TL AXIOBIB							
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm	Rolling circumference in mm	Capacity In Litres 75% max			
659	1670	728	4927	570			
Speed in Km/h	PRESSURE (bar & psi) – Load per tyre in (kg)						
Bar	0.8	1.0	1.2	1.4	1.6		
p.s.i	12	15	17	20	23		
50	3150	3575	4000	4500	5000		

Michelin IF650/75 R30 166D TL AXIOBIB							
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm	Rolling circumference in mm	Capacity In Litres 75% max			
679	1721	745	5071	637			
Speed in Km/h	PRESSURE (bar & psi) – Load per tyre in (kg)						
Bar	0.8	1.0	1.2	1.4	1.6		
p.s.i	12	15	17	20	23		
50	3450	3910	4375	4840	5300		

Kleber Super 3 Narrow 300/95 R 46 (12.4 R 46) ****TL 158A2 / 144B							
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm	Rolling Circumference in mm	Capacity In Litres 75% max			
320	1741	803	5308				
Speed in Km/h	PRESSURE (bars) AND LOADS PER TYPE (kg)						
Bar	2.4	2.6	3.0	3.2	3.6	3.8	4.4
p.s.i	35	38	43	46	51	54	63
10	2840	2980	3270	3410	3690	3830	4250
30	2630	2760	3010	3140	3400		
40	2400	2520	2750	2870	3100		
50	2170	2270	2480	2590	2800		

Michelin AGRIBIB 340/85 R 46 150A8/150 B TL					
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm	Rolling Circumference in mm	Capacity In Litres 75% max	
338	1747	810	5227	225	

Speed in Km/h	PRESSURE (bar & psi) – Load per tyre in (kg)								
Bar	1.6	1.8	2.0	2.2	2.4	2.7	3.2	3.4	3.6
p.s.i	23	26	29	32	35	39	46	49	52
10 Cyc	2780	3020	3265	3510	3750	3975	4340	4540	4730
25	2490	2600	2715	2830	2940	3150	3500	3610	3720
30	2400	2510	2620	2730	2840	3040	3370	3475	3580
50	2240	2340	2445	2550	2650	2840	3150	3250	3350

Michelin AGRIBIB 380/90 R 46 157A8/157 B TL									
Nominal Section in mm	Overall Diameter in mm	Loaded Radius in mm	Rolling Circumference in mm	Capacity In Litres 75% max					
400	1833	850	5486	285					
Speed in Km/h	PRESSURE (bars) AND LOADS PER TYPE (kg)								
Bar	1.6	1.8	2.0	2.2	2.4	2.8	3.2	3.4	3.6
p.s.i	23	26	29	32	35	41	46	49	52
10 Cyc	3450	3740	3695	3830	3970	4970	5330	5570	5810
25	3110	3235	3360	3485	3610	3955	4300	4440	4580
30	3000	3120	3240	3360	3480	3815	4150	4280	4410
50	2800	2910	3025	3140	3250	3560	3875	4000	4125

Michelin SPRAYBIB 380/90 R46 173D TL									
Nominal Section in mm	Overall Diameter mm	Loaded Radius mm	Rolling Circumference mm	Capacity Litres 75% max					
383	1842	848	5530	308					
Speed in km/h	PRESSURE (bars) AND LOADS PER TYPE (kg)								
Bar	2.2	2.4	2.6	2.8	3.0	3.2	3.4		
p.s.i.	32	35	38	41	44	46	49		
65 km/h	4375	4625	4810	5000	5225	5450	5625		

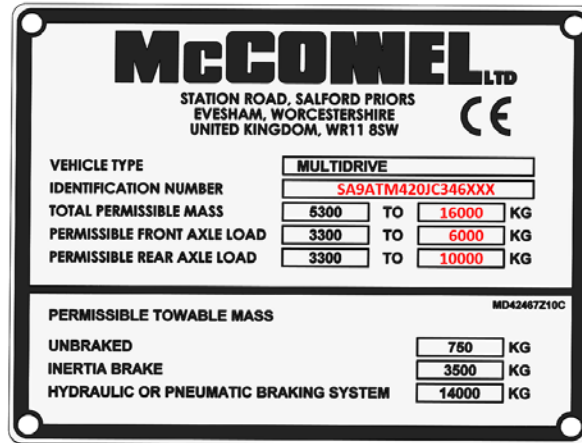
Serial Numbers

Type Plates

The letters and numbers on the plates must be quoted when making warranty claims or ordering spare parts.

Tractor Identification Number

The plate bearing the identification number is located on the right hand side of the main chassis frame.



Multidrive Serial No. Plate



Multidrive Engine Identification Plate

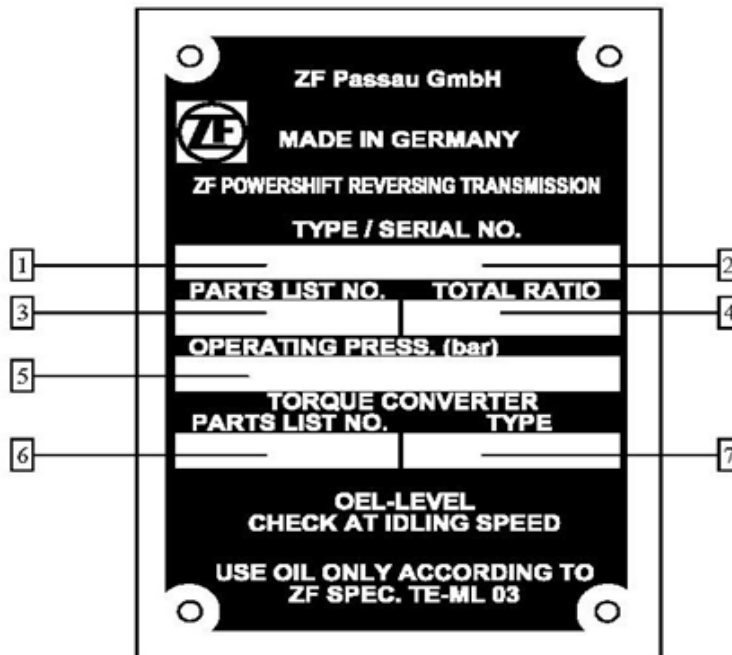
Automatic Transmission

The transmission identification plate located on the front of the gear casing, close to the front drive outlet, provides information as shown on 1 next page.



Gearbox Identification Plate

Serial Number Plate



NOTES REGARDING THE SPARE PARTS ORDERS:

When ordering genuine ZF-Spare Parts, please indicate:

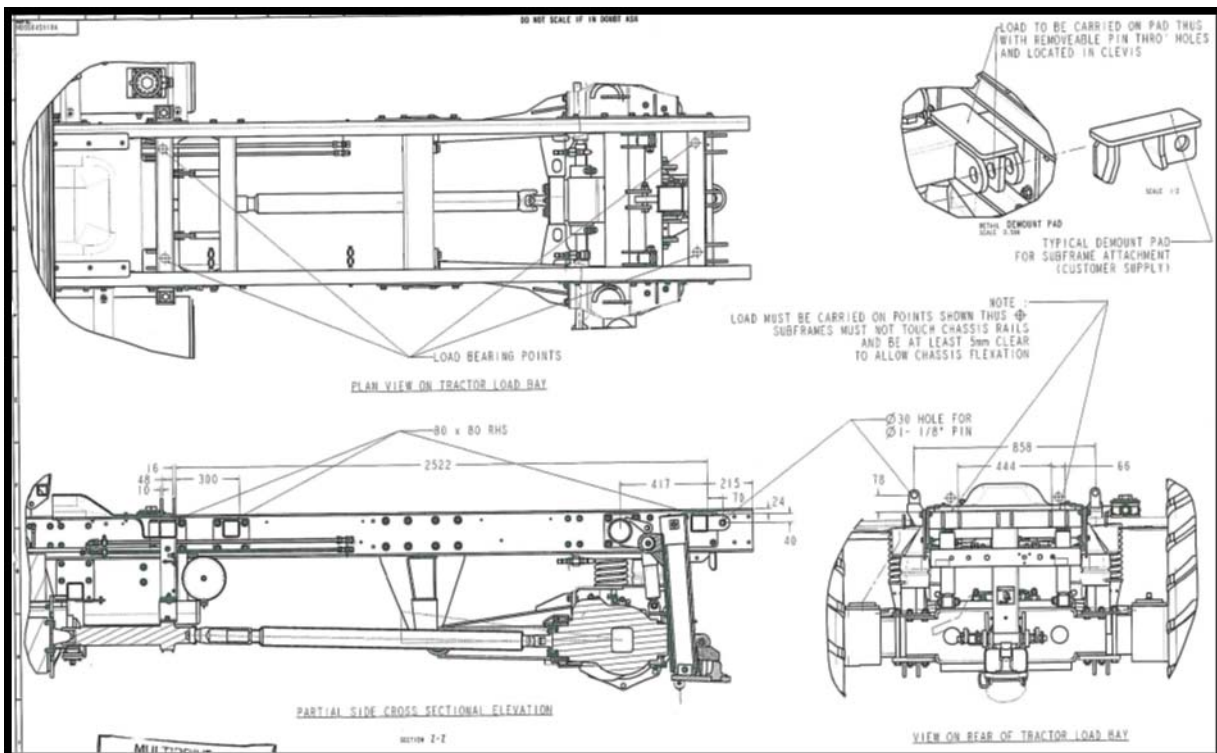
- 1. = Gearbox type
- 2. = Serial-No.
- 3. = ZF-Parts List-No.
- 4. = Mark and type of vehicle
- 5. = Denomination of the spare part
- 6. = Spare parts-No.
- 7. = Way of transport

} See Model identification Plate!

When all of the above required indications are considered, errors in the delivery of spare parts Orders can be avoided!

Mounting Instructions

The Multidrive chassis has been designed with specific load bearing and mounting points. The load is taken by two cross-members, at the front and rear of the chassis (see drawing below). The front mounting has two clevises to restrain the mounted equipment from side to side movement. Upwards movement is restrained by clevis and spring arrangements, these are designed to allow the chassis and sub-frame of the mounted equipment to flex independently and avoid introducing stress into either by the other. At the rear the mounted equipment is restrained in all directions by two pins which are retained by lynch pins. To suit some larger equipment additional mounts are provided at a mid-point on the chassis.



The above drawing shows the mountings on a 4.2meter wheelbase machine, the distance between the mounting points varies according to the wheelbase. Details are available from McConnel Limited.



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