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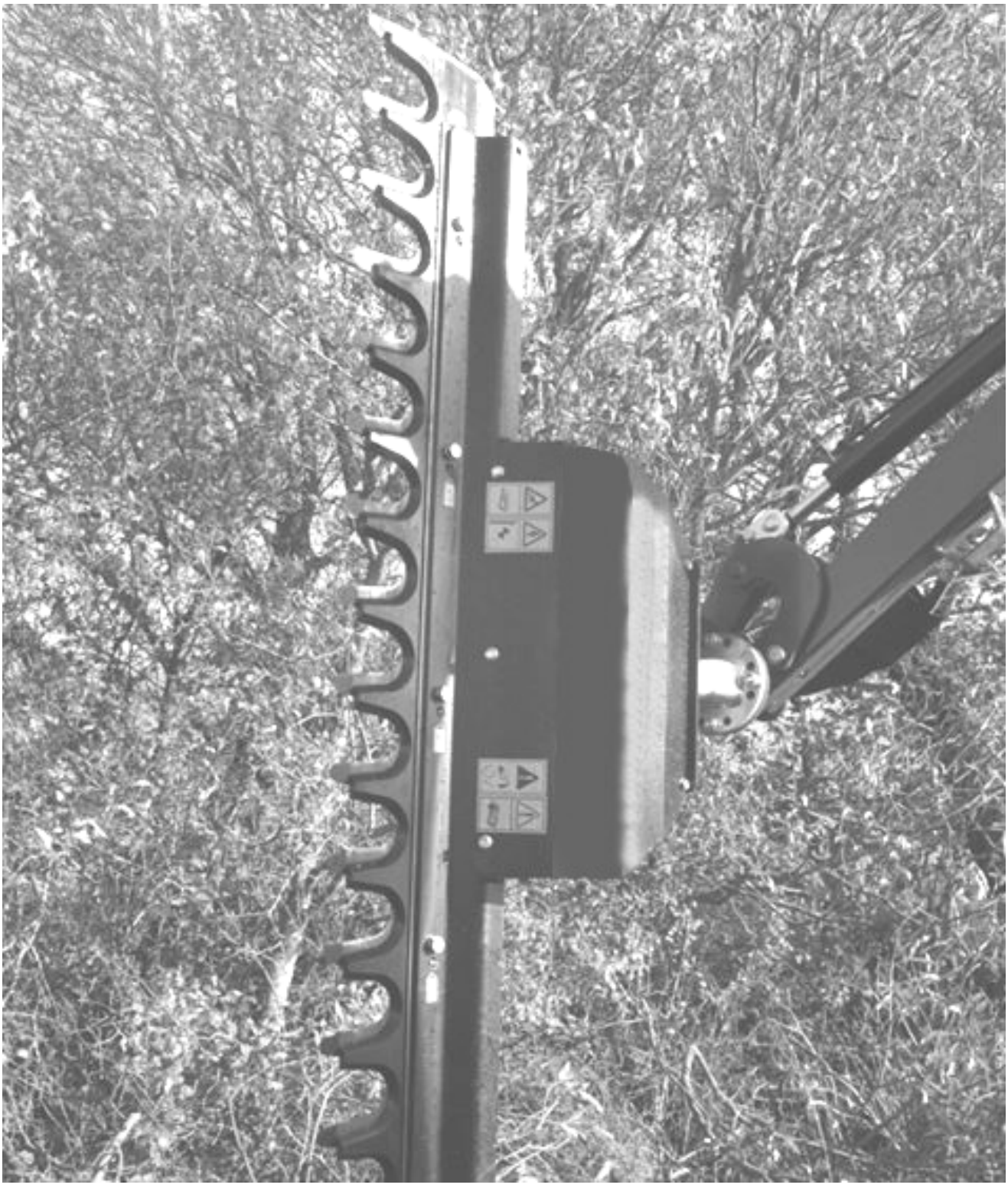
MHX 170/230/270
CUTTERBARS
(Heavy Duty)

Operator & Parts Manual



IMPORTANT

VERIFICATION OF WARRANTY REGISTRATION

DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

It is imperative that the selling dealer registers this machine with McConnel Limited before delivery to the end user – failure to do so may affect the validity of the machine warranty.

To register machines go to the McConnel Limited web site at **www.mcconnel.com**, log onto '**Dealer Inside**' and select the '**Machine Registration button**' which can be found in the Service Section of the site. Confirm to the customer that the machine has been registered in the section below.
Should you experience any problems registering a machine in this manner please contact the McConnel Service Department on 01584 875848.

Registration Verification

Dealer Name: ……

Dealer Address: ……

Customer Name: ……

Date of Warranty Registration: ……/……/..…… Dealer Signature: ……

NOTE TO CUSTOMER / OWNER

Please ensure that the above section above has been completed and signed by the selling dealer to verify that your machine has been registered with McConnel Limited.

IMPORTANT: During the initial 'bedding in' period of a new machine it is the customer's responsibility to regularly inspect all nuts, bolts and hose connections for tightness and re-tighten if required. New hydraulic connections occasionally weep small amounts of oil as the seals and joints settle in – where this occurs it can be cured by re-tightening the connection – *refer to torque settings chart below.* The tasks stated above should be performed on an hourly basis during the first day of work and at least daily thereafter as part of the machines general maintenance procedure.

CAUTION: DO NOT OVER TORQUE HYDRAULIC FITTINGS AND HOSES

TORQUE SETTINGS FOR HYDRAULIC FITTINGS

HYDRAULIC HOSE ENDS		
BSP	**Setting**	**Metric**
1/4"	18 Nm	19 mm
3/8"	31 Nm	22 mm
1/2"	49 Nm	27 mm
5/8"	60 Nm	30 mm
3/4"	80 Nm	32 mm
1"	125 Nm	41 mm
1.1/4"	190 Nm	50 mm
1.1/2"	250 Nm	55 mm
2"	420 Nm	70 mm

PORT ADAPTORS WITH BONDED SEALS		
BSP	**Setting**	**Metric**
1/4"	34 Nm	19 mm
3/8"	47 Nm	22 mm
1/2"	102 Nm	27 mm
5/8"	122 Nm	30 mm
3/4"	149 Nm	32 mm
1"	203 Nm	41 mm
1.1/4"	305 Nm	50 mm
1.1/2"	305 Nm	55 mm
2"	400 Nm	70 mm

WARRANTY POLICY

WARRANTY REGISTRATION

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

1. LIMITED WARRANTIES

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

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

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

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

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

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

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

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

1.09. Machines must be repaired immediately a problem arises. Continued use of the machine after a problem has occurred can result in further component failures, for which McConnel Ltd cannot be held liable, and may have safety implications.

1.10. If in exceptional circumstances a non McConnel Ltd part is used to effect a repair, warranty reimbursement will be at no more than McConnel 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 McConnel 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. McConnel 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 McConnel 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 McConnel 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 McConnel 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 McConnel 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 McConnel Ltd Service Dealer, within 30 days of the date of repair.

2.05. Following examination of the claim and parts, McConnel Ltd will pay, at their discretion, for any valid claim the invoiced cost of any parts supplied by McConnel 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 McConnel Ltd. is final.

3. LIMITATION OF LIABILITY

3.01. McConnel 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. McConnel 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

DECLARATION OF CONFORMITY

Conforming to EU Machinery Directive 98/37/EC, Annex II A

We,

McCONNEL LIMITED, Temeside Works, Ludlow, Shropshire SY8 1JL, UK

Hereby declare that:

The Product; Hydraulic Arm Mounted Hedge Trimmer

Product Code; PAKT

Serial No. & Date …… Type ……

Manufactured in; Denmark

Applied harmonised standards, in particular:

DIN EN ISO 12100-1
DIN EN ISO 12100-2
DIN EN 294
DIN EN 982
DIN PR EN 745

Applied national standards and technical specifications, in particular:

Accident Prevention Regulations

McCONNEL LIMITED operates an ISO 9001:2008 quality management system, certificate number: FM25970.
This system is continually assessed by the;
British Standards Institution (BSI), Beech House, Milton Keynes, MK14 6ES, UK
BSI is accredited by UK Accreditation Service, accreditation number: UKAS 003.
The EC declaration only applies if the machine stated above is used in accordance with the operating instructions.

Signed ……..... *Responsible Person*
CHRISTIAN DAVIES on behalf of McCONNEL LIMITED

Status: General Manager *Date:* May 2011

For Safety and Performance…

ALWAYS READ THE BOOK FIRST

McCONNEL LIMITED

Temeside Works
Ludlow
Shropshire
England

Telephone: +44 (0)1584 873131
www.mcconnel.com

- NOISE STATEMENT -

The equivalent daily personal noise exposure from this machine measured at the operators' ear is within the range 78 – 85 dB, these figures apply to a normal distribution of use where the noise fluctuates between zero and maximum. The figures assume that the machine is fitted to a tractor with a 'quiet' cab with the windows closed in a generally open environment. We recommend that the windows are kept closed. With the cab rear window open the equivalent daily personal noise exposure will increase to a figure within the range 82 – 88 dB. At an equivalent daily noise exposure level of 85 – 90 dB ear protection is recommended and must always be used if any window is left open.

Operating, servicing and maintaining this equipment can expose you to chemicals including gasoline, diesel fuel, lubricants, petroleum products, engine exhaust, carbon monoxide, and phthalates, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov. This website, operated by California's Office of Environmental Health Hazard Assessment, provides information about these chemicals and how individuals may be exposed to them.

CONTENTS

GENERAL INFORMATION

Always read this manual before fitting or operating the machine – whenever doubt exists contact your dealer or the McConnel Service Department for advice and assistance.

Use only McConnel Genuine Service Parts on McConnel Equipment and Machines

DEFINITIONS – *The following definitions apply throughout this manual:*

WARNING
An operating procedure, technique etc. which can result in personal injury or loss of life if not observed carefully.

CAUTION
An operating procedure, technique etc. which can result in damage to either machine or equipment if not observed carefully.

NOTE
An operating procedure, technique etc. which is considered essential to emphasis.

LEFT AND RIGHT HAND
This term is applicable to the machine when attached to the tractor and is viewed from the rear – this also applies to tractor references.

MACHINE & DEALER INFORMATION

Record the Serial Number of your machine on this page and always quote this number when ordering parts. Whenever information concerning the machine is requested remember also to state the make and model of tractor to which the machine is fitted.	
Machine Serial Number:	**Installation Date:**
Machine Model details:	
Dealer Name:	
Dealer Address:	
Dealer Telephone No:	
Dealer Email Address:	

MACHINE DESCRIPTION & PURPOSE OF USE

The McConnel MHX170, MHX230 & MHX270 are a range of 'Power Arm' mounted hydraulic cutterbars with working widths of 1.7m, 2.3m and 2.7m respectively.
The heavy duty machines are designed for cutting hedges and branches with a maximum diameter of 100mm *(4"),* in normal conditions, without fraying the branches. For best results branches over 70mm *(2 ¾")* should be cut individually.

These machines should only be used to perform the tasks for which they are designed; use of the machines for any other function is dangerous to persons and will risk causing damage to the components.

Handling
Handling of this machine, as with all machinery, should only be performed using suitable lifting equipment operated by persons fully trained in its safe use.

Hoisting
Before hoisting the machines ensure that the hoisting equipment is suitable for lifting the weight of the machine and that the working area has been inspected to detect the presence of possible dangers such as electric power lines, gas or fluid lines etc. Ensure that there is sufficient space and headroom for safe manoeuvring and all bystanders are kept at a safe distance at all times. Ensure that the unit is correctly balanced before attempting to raise the machine.

DANGER: Failure to follow the above instructions may result in injury to persons or damage to the machinery.

TECHNICAL SPECIFICATIONS

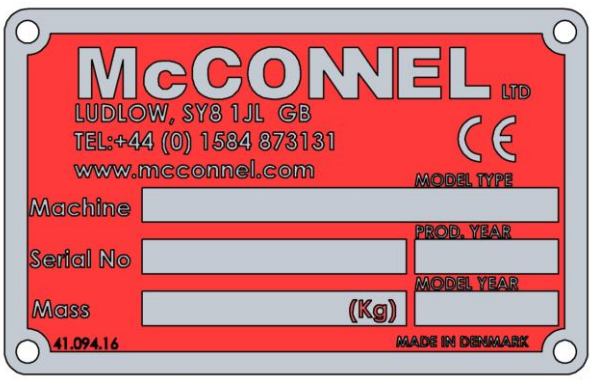
Specifications	MHX170	MHX230	MHX270
Working Width	*1.7m*	*2.3m*	*2.7m*
Cutting Thickness (Min. / Max.)	*5mm / 100mm*	*5mm / 100mm*	*5mm / 100mm*
Work Application	*Vertically +/- 45°*	*Vertically +/- 45°*	*Vertically +/- 45°*
Stroke Frequency (double strokes)	*60 p/min*	*60 p/min*	*60 p/min*
Oil Requirement *(integrated flow divider)*	*45-50 l/min*	*45-50 l/min*	*45-50 l/min*
Weight	*190 kg*	*220 kg*	-

IDENTIFICATION

Serial Plate
Each machine is fitted with an identification plate which includes the following information:

1. Machine (Part Number)
2. Machine Serial No.
3. Machine Weight

When ordering spares or replacement parts from your local dealer it is important to quote both Part Number and Serial Number as stated on the identification plate so the machine and model can be quickly and correctly identified.



This machine has the potential to be extremely dangerous - in the wrong hands it can kill or maim; It is therefore imperative that both owner and operator of the machine reads and understands the following section to ensure they are fully aware of the dangers that do, or may exist, and their responsibilities surrounding the use and operation of the machine.
The operator of this machine is responsible not only for their own safety but equally for the safety of others who may come into the close proximity of the machine, as the owner you are responsible for both.
When the machine is not in use it should be lowered to rest on the ground. In the event of any fault being detected with the machine's operation it must be stopped immediately and not used again until the fault has been corrected by a qualified technician.

POTENTIAL DANGERS ASSOCIATED WITH THE USE OF THIS MACHINE:

▲ *Being hit by debris thrown by moving components.*

▲ *Being hit by machine parts ejected through damage during use.*

▲ *Being caught on a rotating power take-off (PTO) shaft.*

▲ *Being caught in other moving parts i.e.: belts, pulleys and cutting heads.*

▲ *Electrocution from Overhead Power Lines (by contact with or 'flashover' from).*

▲ *Being hit by cutting heads or machine arms as they move.*

▲ *Becoming trapped between tractor and machine when hitching or unhitching.*

▲ *Tractor overbalancing when machine arm is extended.*

▲ *Injection of high-pressure oil from hydraulic hoses or couplings.*

▲ *Machine overbalancing when freestanding (out of use).*

▲ *Road traffic accidents due to collision or debris on the road.*

BEFORE USING THIS MACHINE YOU MUST:

- ▲ *Ensure you read all sections of the operator handbook for this machine and any other machines associated to its use.*
- ▲ *Ensure the operator is, or has been, properly trained to use the machine.*
- ▲ *Ensure the operator has been issued with and reads the operator handbook.*
- ▲ *Ensure the operator understands and follows the instructions in operator handbook.*
- ▲ *Ensure the tractor front, rear and sides are fitted with metal mesh or polycarbonate guards of suitable size and strength to protect the operator against thrown debris or parts.*
- ▲ *Ensure tractor guards are fitted correctly, are undamaged and kept properly maintained.*
- ▲ *Ensure that all machine guards are in position, are undamaged, and are kept maintained in accordance with the manufacturer's recommendations.*
- ▲ *Ensure knives and their fixings are of a type recommended by the manufacturer, are securely attached and that none are missing or damaged.*
- ▲ *Ensure hydraulic pipes are carefully and correctly routed to avoid damage by chaffing, stretching or pinching and that they are held in place with the correct fittings.*
- ▲ *Always follow the manufacturer's instructions for attachment and removal of the machine.*
- ▲ *Check that the machine fittings and couplings are in good condition.*
- ▲ *Ensure the tractor meets the minimum weight recommendations of the machine's manufacturer and that ballast is used as necessary.*
- ▲ *Always inspect the work area thoroughly before starting to note obstacles and remove wire, bottles, cans and other debris.*
- ▲ *Use clear suitably sized warning signs to alert others to the nature of the machine working within that area. Signs should be placed at both ends of the work site. (It is recommended that signs used are of a size and type specified by the Department of Transport and positioned in accordance with their, and the Local Highways Authority, guidelines).*
- ▲ *Ensure the operator is protected from noise. Ear defenders should be worn and tractor cab doors and windows must be kept closed. Machine controls should be routed through proprietary openings in the cab to enable all windows to be shut fully.*
- ▲ *Always work at a safe speed taking account of the conditions i.e.: terrain, highway proximity and obstacles around and above the machine. Extra special attention should be applied to Overhead Power Lines. Some of our machines are capable of reach in excess of 8 metres (26 feet) this means they have the potential to well exceed, by possibly 3 metres (9' 9"), the lowest legal minimum height of 5.2 metres from the ground for 11,000 and 33,000 volt power lines. It cannot be stressed enough the dangers that surround this capability, it is therefore vital that the operator is fully aware of the maximum height and reach of the machine, and that they are fully conversant with all aspects regarding the safe minimum distances that apply when working with machines in close proximity to Power Lines. (Further information on this subject can be obtained from the Health & Safety Executive or your Local Power Company).*

- *Always disengage the machine, kill the tractor engine, remove and pocket the key before dismounting for any reason.*
- *Always clear up all debris left at the work area, it may cause hazard to others.*
- *Always ensure when you remove your machine from the tractor that it is left in a safe and stable position and secured if necessary.*

WHEN NOT TO USE THIS MACHINE:

- *Never attempt to use this machine if you have not been trained to do so.*
- *Never use a machine until you have read and understood the operator handbook, are familiar with it, and practiced the controls.*
- *Never use a machine that is poorly maintained.*
- *Never use a machine if guards are missing or damaged.*
- *Never use a machine on which the hydraulic system shows signs of wear or damage.*
- *Never fit, or use, a machine on a tractor that does not meet the manufacturer's minimum specification level.*
- *Never use a machine fitted to a tractor that does not have suitable front, rear and side(s) cab guarding made of metal mesh or polycarbonate.*
- *Never use the machine if the tractor cab guarding is damaged, deteriorating or badly fitted.*
- *Never turn a machine cutting head to an angle that causes debris to be ejected towards the cab.*
- *Never start or continue to work a machine if people are nearby or approaching - Stop and wait until they are at a safe distance before continuing. WARNING: Some cutting heads may continue to 'freewheel' for up to 40 seconds after being stopped.*
- *Never attempt to use a machine on materials in excess of its capability.*
- *Never use a machine to perform a task it has not been designed to do.*
- *Never operate the tractor or machine controls from any position other than from the driving seat, especially whilst hitching or unhitching the machine.*
- *Never carry out maintenance of a machine or a tractor whilst the engine is running – the engine should be switched off, the key removed and pocketed.*
- *Never leave a machine unattended in a raised position – it should be lowered to the ground in a safe position on a level firm site.*
- *Never leave a tractor with the key in or the engine running.*
- *Never carry out maintenance on any part or component of a machine that is raised unless that part or component has been properly substantially braced or supported.*
- *Never attempt to detect a hydraulic leak with your hand – use a piece of cardboard.*
- *Never allow children near to, or play on, a tractor or machine under any circumstances.*

ADDITIONAL SAFETY ADVICE

Training
Operators need to be competent and fully capable of operating this machine in a safe and efficient way prior to attempting to use it in any public place. We advise therefore that the prospective operator make use of relevant training courses available such as those run by the Agricultural Training Board, Agricultural Colleges, Dealers and McConnel.

Working in Public Places
When working in public places such as roadsides, consideration should be paid to others in the vicinity. Stop the machine immediately when pedestrians, cyclists and horse riders etc. pass. Restart only when they are at a distance that causes no risk to their safety.

Warning Signs
It is advisable that any working area be covered by suitable warning signs and statutory in public places. Signs should be highly visible and well placed in order to give clear advanced warning of the hazard. Contact the Department of Transport or your Local Highways Authority to obtain detailed information on this subject. The latter should be contacted prior to working on the public highway advising them of the time and location of the intended work asking what is required by way of signs and procedure. – '*Non-authorised placement of road signs may create offences under the Highways Act'.*

Suggested Warning Signs Required

'Road works ahead' *warning sign with a supplementary* ***'Hedge cutting'*** *plate.* ***'For 1 mile'*** *or appropriate shorter distance may be added to the plate.*

'Road narrows' *warning signs with supplementary* ***'Single file traffic'*** *plate.*

White on blue ***'Keep right'*** *(*) arrow sign on rear of machine.*
**** Note – this applies to UK Market machines where traffic passes to the right of a machine working in the same direction as the traffic flow. The direction, use and colour of the arrow sign will depend on the country of use and the Local Highway Authorities regulations in the locality.***

Use of Warning Signs

- ▲ *On two-way roads one set of signs is needed facing traffic in each direction.*
- ▲ *Work should be within 1 mile of the signs.*
- ▲ *Work only when visibility is good and at times of low risk e.g.: NOT during 'rush-hour'.*
- ▲ *Vehicles should have an amber-flashing beacon.*
- ▲ *Ideally, vehicles should be conspicuously coloured.*
- ▲ *Debris should be removed from the road and path as soon as practicable, and at regular intervals, wearing high visibility clothing and before removing the hazard warning signs.*
- ▲ *Collect all road signs promptly when the job is completed.*

Although the information stated here covers a wide range of safety subjects it is impossible to predict every eventuality that can occur under differing circumstances whilst operating this machine. No advice given here can replace 'good common sense' and 'total awareness' at all times, but will go a long way towards the safe use of your McConnel machine.

Safety Decals – Identification

WARNING!
Avoid fluid escaping under pressure. Consult technical manual for services procedures.

WARNING!
Shut off engine and remove key before performing maintenance or repair work.

WARNING!
Flying objects - keep safe distance from the machine when it is working.

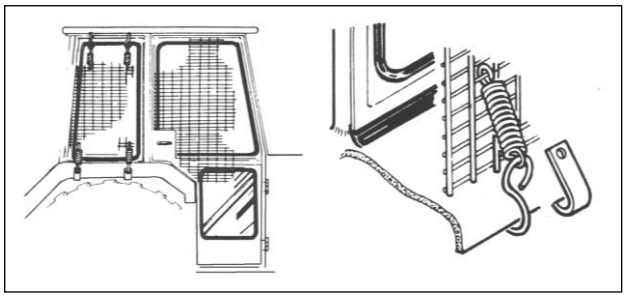
WARNING!
Check all nuts are tight every 8 hours.

WARNING!
Stay clear of cutter blade when machine is running.

WARNING!
Carefully read operator's manual before handling this machine. Observe instructions and safety rules when operating.

WARNING!
Stay clear of swinging area of implements.

VEHICLE / TRACTOR PREPARATION



We recommend vehicles are fitted with cabs using 'safety glass' windows and protective guarding when used with our machines.
Fit Operator Guard (Part No. 7313324) using the hooks provided. Shape the mesh to cover all vulnerable areas. The driver must be looking through mesh and/or polycarbonate glazing when viewing the flail head in any working position - unless the vehicle/ cab manufacturer can demonstrate that the penetration resistance is equivalent to, or higher than, that provided by mesh/polycarbonate glazing. If the tractor has a roll bar only, a frame must be made to carry both mesh and polycarbonate glazing. The operator should also use personal protective equipment to reduce the risk of serious injury such as; eye protection (mesh visor to EN1731 or safety glasses to EN166), hearing protection to EN352, safety helmet to EN297, gloves, filter mask and high visibility clothing.

Vehicle Ballast: It is imperative when attaching 'third-party' equipment to a vehicle that the maximum possible stability of the machine and vehicle combination is achieved – this can be accomplished by the utilisation of 'ballast' in order to counter-balance the additional equipment added.

Front weights may be required for rear mounted machines to place 15% of total outfit weight on the front axle for stable transport on the road and to reduce 'crabbing' due to the drag of the cutting unit when working on the ground.

Rear weights may be required to maintain a reasonable amount of rear axle load on the opposite wheel from the arms when in work; for normal off-ground work i.e. hedge cutting this should be 20% of rear axle weight or more for adequate control, and for ground work i.e. verge mowing with experienced operators, this can be reduced to 10%.
All factors must be addressed in order to match the type and nature of the equipment added to the circumstances under which it will be used – in the instance of Power Arm hedgecutters it must be remembered that the machines centre of gravity during work will be constantly moving and will differ from that during transport mode, therefore balance becomes critical.

Factors that effect stability:

- *Centre of gravity of the tractor/machine combination.*
- *Geometric conditions, e.g. position of the cutting head and ballast.*
- *Weight, track width and wheelbase of the tractor.*
- *Acceleration, braking, turning and the relative position of the cutting head during these operations.*
- *Ground conditions, e.g. slope, grip, load capability of the soil/surface.*
- *Rigidity of implement mounting.*

Suggestions to increase stability:

- *Increasing rear wheel track; a vehicle with a wider wheel track is more stable.*
- *Ballasting the wheel; it is preferable to use external weights but liquid can be added to around 75% of the tyre volume – water with anti-freeze or the heavier Calcium Chloride alternative can be used.*
- *Addition of weights – care should be taken in selecting the location of the weights to ensure they are added to a position that offers the greatest advantage.*
- *Front axle locking (check with tractor manufacturer).*

NOTE: The advice above is offered as a guide for stability only and is not a guide to vehicle strength. It is recommended that you consult your vehicle manufacturer or local dealer to obtain specific advice on this subject, additionally advice should be sought from a tyre specialist with regard to tyre pressures and ratings suitable for the type and nature of the machine you intend to fit.

PROCEDURE FOR USE

WARNING: This machine should only be used for the cutting of hedges or growth materials up to a maximum diameter of 100mm.

For safety purposes the machine is supplied with a blade protection guard that attaches over the knives of the cutterbar and is held in place with spring clips; the guard should be fitted to cutterbar at all times other than during work and must always be fitted during installation and transport.

INSTALLATION

Before beginning installation ensure that the specifications of the 'vehicle' machine match those of the cutterbar and that the connecting pipes are suitable to sustain the maximum working pressure. The working environment and all connections and fittings should be kept clean in order to protect the hydraulic system from contamination by grit or dirt.
The attachment procedure should be performed on a clean firm level site where there is suitable space to manoeuvre tractor and machine adjacent to the cutterbar.

WARNING!
Ensure all persons are kept clear of machine and tractor when positioning the machine for attachment.

Attaching
Place the hydraulic arm of the 'vehicle' machine into a position that will allow attachment of the cutterbar; fit and secure the cutterbar in place using the mounting kit supplied.
Ensure hydraulic hoses are routed where they are not at risk of being trapped, stretched or otherwise damaged during normal arm movements when operating the machine.
Hoses can be routed into the body of the cutterbar from either side by first removing one or other of the side access covers; select the side that offers the best unobstructed route.

Hydraulic Connections
Connect the pressure and return hoses to the cutterbar valve, ensure the hoses are plumbed correctly; the valve is stamped with 'P' for the pressure connection and 'T' for the return to tank.

Blade Protection Guard
The blade protector must be removed prior to start up with the motor switched off and the oil not under pressure, and replaced only once the machine has stopped completely – *the protector should be in position at all times during transportation of the machine as a means of safeguarding people and machine.*

CAUTION!
Do not attempt to run the machine with the blade protection guard fitted. Remove protection guard before starting the cutterbar.

WARNING!
Removal of the protection guard must only be performed when the motor is switched off and the oil free from pressure.

START UP AND OPERATION

Start up and operation of the cutterbar must only be carried out by an operator who has been fully trained in the use of such machinery and is fully aware of the dangers and hazards surround the use of this type of machine.
Ensure all persons remain at a safe distance before starting the machine and at all times whilst it is running.

WARNING! Remove the cutterbar guard before attempting to run the machine.

WARNING! Never approach the cutterbar whilst it is running or working.

Initial Running Up
Select a safe site on which to run up the machine. Remove the protection guard and ensure all persons and onlookers remain at a safe distance during the following procedure.
Start the cutterbar at a low flow rate (low RPM / low oil flow) and allow it to run without load for about 15 minutes to heat the oil.
Operate the machine through its full range of work positions to check it functions correctly and that hoses are not being strained or pinched in any of the possible working positions.

NOTE: For all cold starts the cutterbar should be run at a low flow rate flow and allowed run without load to heat the oil before starting work.

Switch off the machine and replace the guard before transporting.

IMPORTANT: On new machines the tightness of all nuts and bolts, connectors, pipes and clamps should be checked on an hourly basis during the first day of work, and where necessary retightened. On subsequent days work the same procedure should be carried out at regular intervals and always prior to starting work each day.

Starting the Cutterbar for Work
Remove protection guard and ensure the area around the machine is clear of persons and any danger risks.
Place the machine into the position for work at a 90° angle to the material; *but not actually in contact with it.* Start the machine and slowly increase oil flow until the cutterbars correct working speed is reached *(60 double strokes p/min)* before then moving the machine into contact with the work material. Slowly begin forward movement adjusting cutterbar height and angle as and when required.

Stopping the Cutterbar
When stopping the cutterbar it should be removed from the material being cut and the engine RPM gradually reduced to a fast idle before stopping. Avoid rapid oil flow increases or decreases to the cutterbar as this can have a harmful effect on its hydraulic system.
When not in use or during work breaks the cutterbar should be placed on the ground and the protection guard fitted.

Forward Working Speed
The forward speed will primarily depend on the thickness and density of the material being cut and the work site location and terrain, but as a general rule it should be at a speed that will allow clean efficient cutting and produce a neat finish. **Never work at forward speeds that fail to permit the operator sufficient time to avoid obstacles or dangers.**

CAUTION! If the cutterbar becomes jammed on materials, switch off the cutterbar and machine and carefully remove the object before restarting. Do not attempt to restart the blade with material in it.

WORKING

The work area should be thoroughly inspected prior to starting in order to detect and note possible dangers or hazards such as wire, steel poles or other foreign objects. All removable objects that could cause problems or danger should be cleared from the work area beforehand and any immovable objects or hazards clearly marked in order to avoid them.
The cutterbar must only be used for cutting materials for which it is designed – hedges and wood plant materials up to maximum of 100mm diameter – failure to observe this may cause injury to persons and/or damage to the machine.
In addition to the information stated in this manual, operators must read the operation manuals for the tractor and machine that the cutterbar is being operated on.

WARNING! Keep all persons and animals at a safe distance from the machine whilst working – if passers-by approach, work should be halted until they are clear of the danger area.

TRANSPORTATION OF THE MACHINE

For transportation the machine and cutterbar should be positioned within the width of the carrying vehicle with the blade protection guard fitted and machine controls positioned or protected against accidental or inadvertent operation during transport. Warning lights and/or signs should be displayed as and where required or if local highway authority rules dictate.

MACHINE REMOVAL

Turn off the motor and ensure that the hydraulic oil is not under pressure before removing the pipes connected to the cutterbar. Cap all hydraulic connection points and hoses to protect the hydraulic system from risk of dirt and moisture contamination.
Block and suitably support the cutterbar before removing it from the ‘vehicle’ machine. Removal is basically a reversal of the attachment procedure.

STORAGE

Transport the unattached cutterbar using suitable means and store on a level, safe, clean and dry environment where it will not cause hazard or danger to persons or animals.
Thoroughly clean and lubricate the machine prior to storage and ensure blade protectors are securely fitted.
Never use high-pressure washers to clean the machine and great care should be adopted if steam cleaners are used. Rinse off all cleaning agents to prevent discoloration or damage to the paint finish.

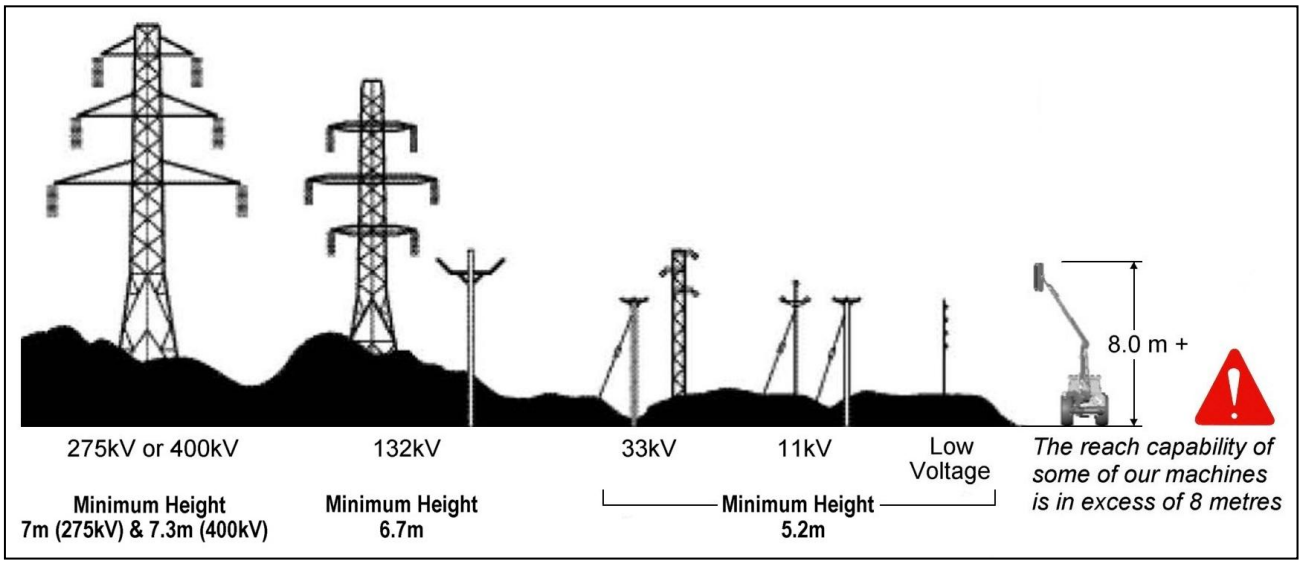
OVERHEAD POWER LINES (OHPLs)

It cannot be stressed enough the dangers involved when working in the vicinity of Overhead Power Lines (OHPLs). Some of our machines are capable of reach in excess of 8 metres *(26');* they have the potential to well exceed, by possibly 3 metres *(9' 9"),* the lowest legal minimum height of 5.2 metres from the ground for 11,000 and 33,000 volt power lines.
Remember electrocution can occur without actually coming into contact with a power line as electricity can 'flashover' when machinery gets close to it.

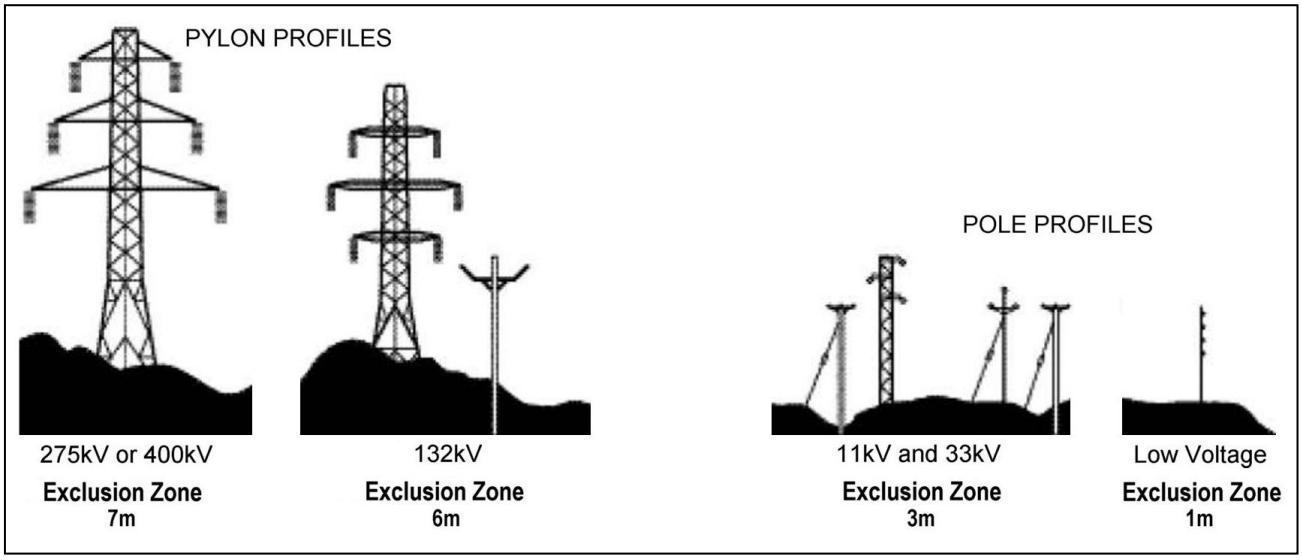
WARNING: All operators must read the following information and be aware of the risks and dangers involved when working in the vicinity of Overhead Power Lines (OHPLs).

Wherever possible the safest option is always to avoid working in areas close to OHPLs.
Where unavoidable, all operators must perform a risk assessment and implement a safe procedure and system of work – *see following page for details.*
All operators should perform a risk assessment before operating the machine within 10m horizontal distance of any OHPLs.

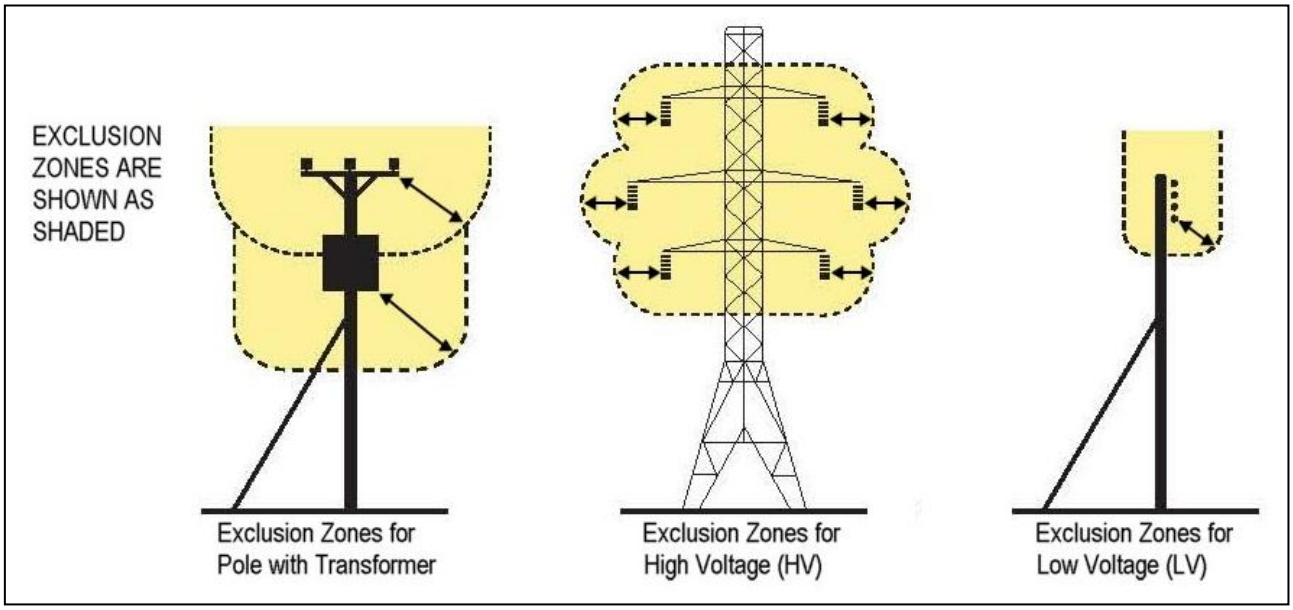
Minimum Heights for Overhead Power Lines



Absolute Minimum Exclusion Zones for Specific Overhead Power Lines



Definitions of Exclusion Zones



Risk Assessment

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

- **Know** the risks of contacting OHPLs and the risk of flashover.
- **Find out** the maximum height and maximum vertical reach of your machine.
- **Find out** the location and route of all Power Lines within the work area.
- **Find out** the operating voltage of all Power Lines within the work area.
- **Contact** the local Distribution Network Operator (DNO) who will be able to advise you on the operating voltage, safe minimum clearance distance for working, and additional precautions required.
- **Never** attempt to operate the machine in exclusion zones.
- **Always** work with extreme caution and plan your work ahead to avoid high risk areas.
- **If doubt exists** do not work in the area – never risk the safety of yourself or others.

Emergency Action for Accidents Involving Electricity

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

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

WARNING!
Before any work is carried out on the machine it must be switched off and the hydraulic system freed of pressure. Remove the ignition key, and secure the carrier vehicle against unintended operation or movement.

DANGER!
Always wear suitable protection such as gloves, safety glasses, safety boots etc. when carrying out maintenance or repair work on this machine.

General Maintenance

- Check nuts, bolts and fixings after every 2 operating hours and retighten if necessary.

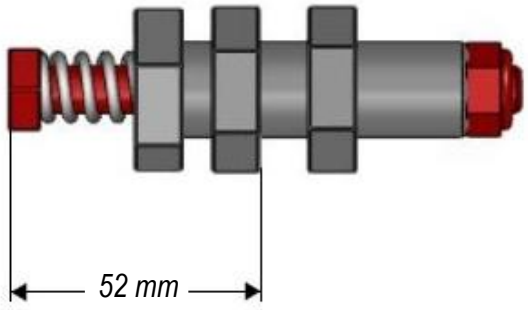
- Lubricate grease points every 8 operating hours under normal conditions. In a demanding environment frequency of lubrication should be increased.

- Check valve block on a regular basis for signs of oil leakage; should leakage be detected replace valve block seals immediately.

- Check condition of the hydraulic hoses on a regularly basis - replace immediately if damaged or excessively worn. Ensure replacement hoses conform to the manufacturer's specifications.

- Remove ram and valve protection cover and clean out any cutting debris on a regular basis.

- Regularly check/adjust spring stop bolt tension; *correct setting is shown below.*



- Check the cutter components on a regular basis and replace any damaged or missing parts immediately; *defective or worn components produce an unclean cut and increase power requirement dramatically – always replace damaged or worn components with genuine parts that are designed specifically for the machine.*

- Check all safety decals are visible and readable, replace unreadable safety decals immediately.

Bolts and Bushings
All main swivel points are fitted with replaceable bushings; change on signs of wear and tear.

CAUTION!
Never use grease with Molybdenum Disulfide on nylon bushings or wear washers.

Hydraulic Connections and Hoses
Avoid twisting the fittings when replacing a hose. Always use two single-head wrenches to loosen and tighten hoses. Hoses will be impaired if they are twisted during installation and pressure pulses in twisted hoses can stress the steel mesh in the hose.

The warranty on the hoses covers only the replacement of hoses due to defective materials or manufacturing defects. The warranty does not cover the following:

1. *Hoses that are damaged due to rubbing.*
2. *Wear and tear.*
3. *Hoses that have been cut or crushed during operation.*
4. *Damage to threads due to excessive tightening.*

Size (BSP)	Tightening Torque	
¼"	24 Nm	18 lbs/ft
⅜"	33 Nm	24 lbs/ft
½"	44 Nm	35 lbs/ft
¾"	84 Nm	62 lbs/ft
1"	115 Nm	85 lbs/ft

TROUBLESHOOTING

Problem	Possible Cause	Remedy
Cutting blade does not move	- Too much oil flow - Hoses incorrectly connected - Pump is off	- Check oil flow - Swap hoses over - Activate the pump
Cutting blade locks after a stroke	- Hoses incorrectly connected - Low pump pressure	- Swap hoses over - Contact specialist workshop
Frayed cutting finish	- Worn cutterbar blade - Blade bolts loose - Forward speed too fast	- Sharpen blade (consult specialist workshop) - Replace blade - Tighten bolts and grease well - Reduce forward speed
Cutting blade running too fast	- Oil flow too high	- Check oil flow rate - Fit flow divider
Overheating	- Incorrect cutterbar speed - Low oil level in tank - Wrong type of oil - Debris build up on cutterbar	- Check speed - Check oil level - Drain tank and add correct oil - Stop machine and remove debris

For best performance …

USE ONLY GENUINE McCONNEL SERVICE PARTS

To be assured of the latest design improvements purchase your
'Genuine Replacements' from the 'Original Equipment Manufacturer'

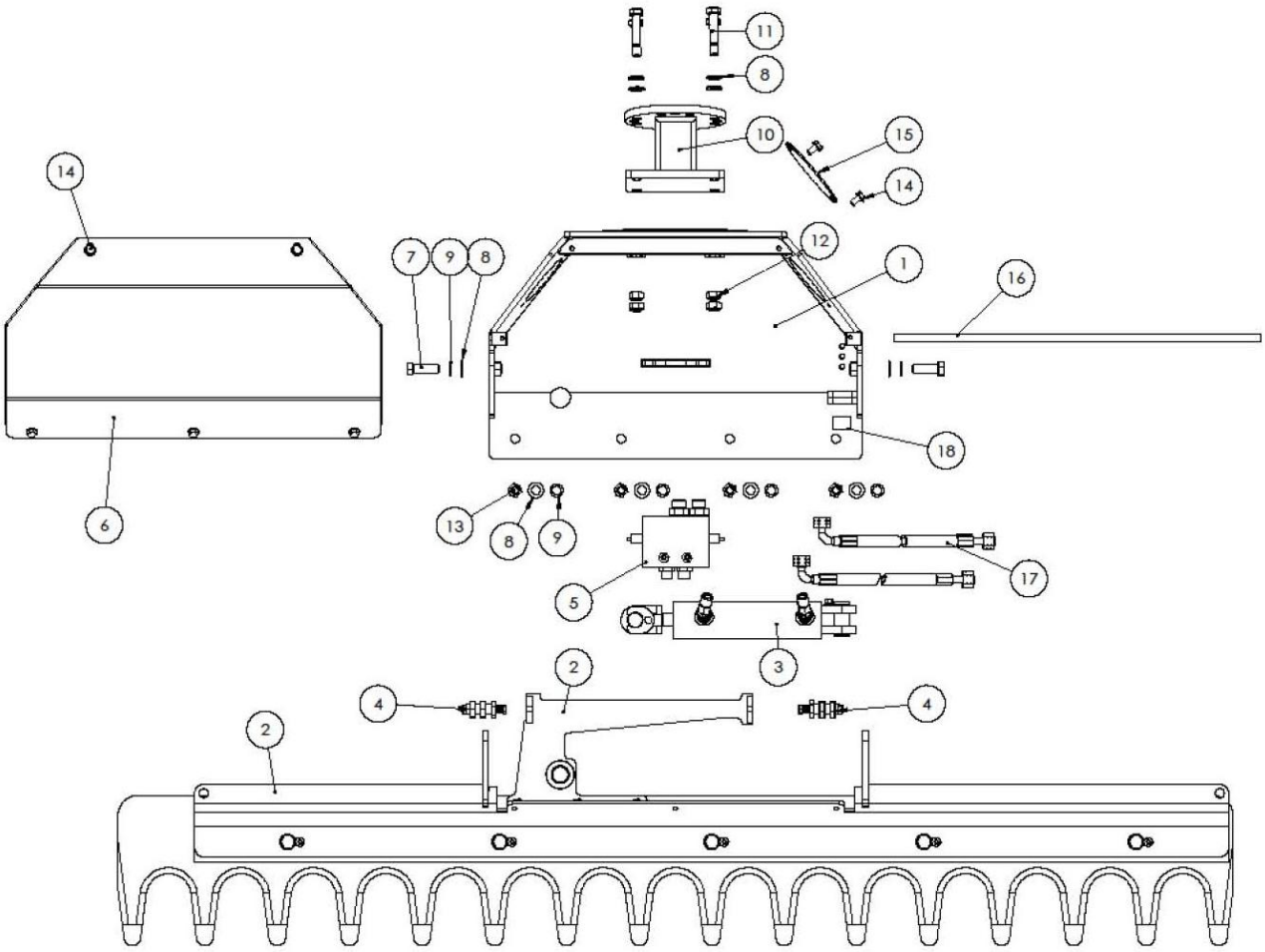
McCONNEL LIMITED

Through your local Dealer or Stockist

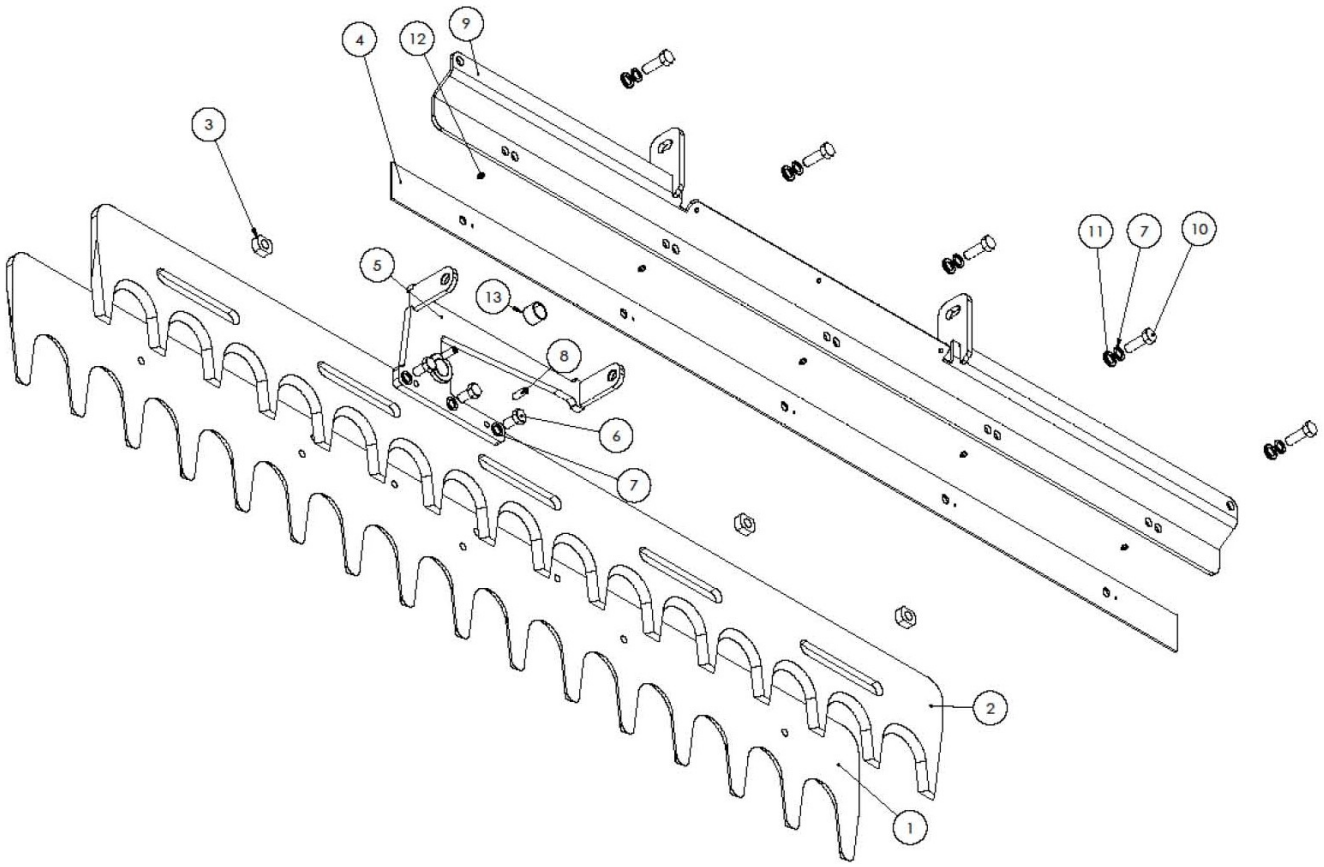
Always quote:

- ***Machine Type***
- ***Serial Number***
- ***Part Number***

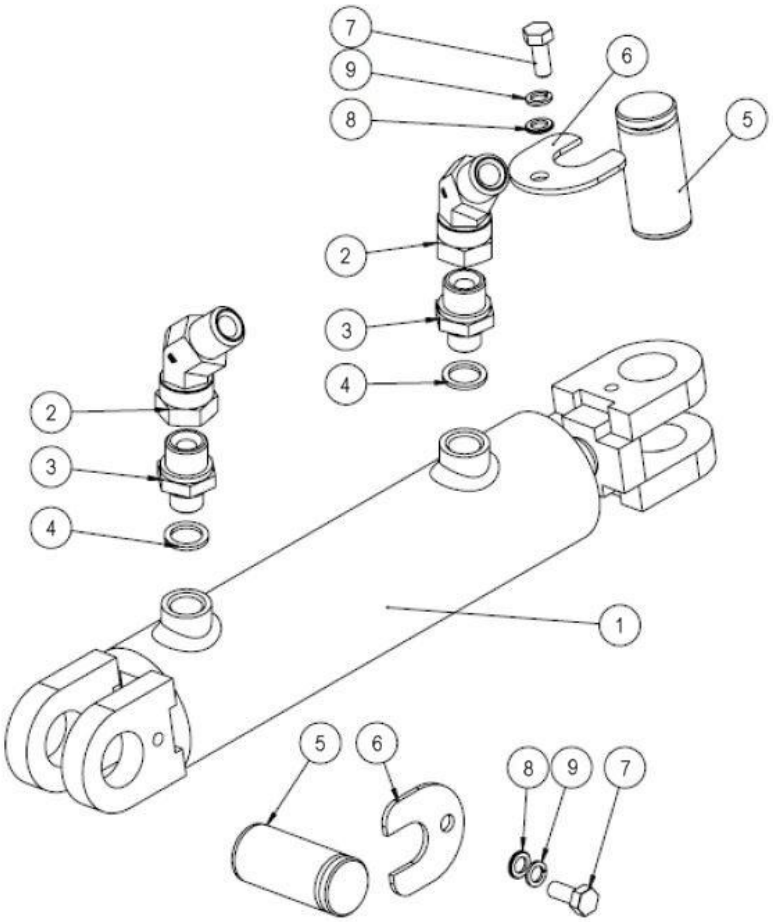
Design improvements may alter some of the parts listed in this manual –
the latest part will always be supplied when it is interchangeable with an earlier one.



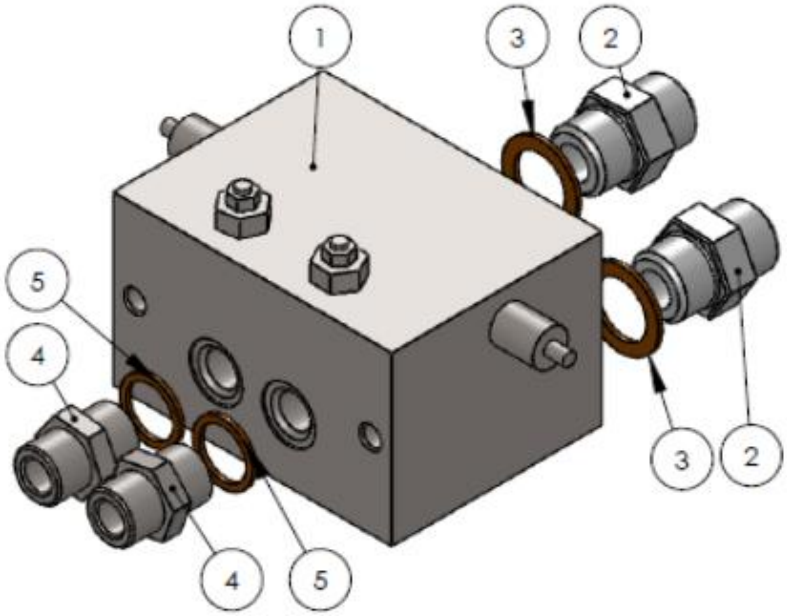
REF.	QTY.	PART No.	DESCRIPTION
		6506951	**CUTTERBAR ASSEMBLY - MHX 230**
1	1	6506052	CYLINDER BOX
2	1	6506060	CUTTER KNIFE ASSEMBLY
3	1	6506053	RAM ASSEMBLY
4	2	6506054	SPRING (COMPLETE)
5	1	6506055	VALVE ASSEMBLY
6	1	6506056	GUARD
7	2	9213107	BOLT
8	10	0100106	WASHER
9	6	9100207	SPRING WASHER
10	1	6506057	ADAPTOR
11	4	9213127	BOLT
12	4	9163007	LOCK NUT
13	4	9313067	BOLT
14	7	6506058	BOLT (SPECIAL)
15	1	6506059	COVER
16	1	6506063	ROD
17	1	6506064	HOSE SET
18	1	6506065	RAM BUSH



REF.	QTY.	PART No.	DESCRIPTION
		6506060	**CUTTER KNIFE ASSEMBLY**
1	1	6506061	LOWER CUTTER KNIFE
2	1	6506062	UPPER CUTTER KNIFE
3	5	6506078	WEAR BLOCK
4	1	6506079	SLIDE BAR
5	1	6506080	HEEL ARM
6	3	9313067	BOLT
7	8	9100207	SPRING WASHER
8	2	6506081	TENSION PIN
9	1	6506082	SUPPORT RAIL
10	5	9213107	BOLT
11	5	0100106	WASHER
12	5	6506083	GREASE NIPPLE
13	1	6506084	BUSH



REF.	QTY.	PART No.	DESCRIPTION
		6506053	**HYDRAULIC RAM ASSEMBLY**
1	1	6506066	RAM
2	2	6506068	ANGLE ADAPTOR
3	2	6506069	ADAPTOR
4	2	6506070	BONDED SEAL
5	2	6506071	RAM PIN
6	2	6506072	PIN BRACKET
7	2	9313044	BOLT
8	2	9100104	WASHER
9	2	9100204	SPRING WASHER
		6506067	**SEAL KIT**



REF.	QTY.	PART No.		DESCRIPTION
		6506055		**VALVE ASSEMBLY**
1	1	6506073		TWO-WAY VALVE
2	2	6506074		ADAPTOR
3	2	8650106		BONDED SEAL
4	2	6506075		ADAPTOR
5	2	8650104		BONDED SEAL
6	2	6506076	*	PRESSURE SWITCH (SIDE MOUNT)
7	2	6506077	*	RELIEF VALVE (TOP MOUNT)

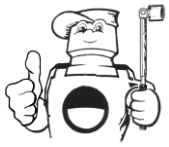
* *Not shown*

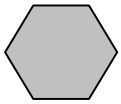
TORQUE SETTINGS FOR FASTENERS

The Chart below lists the correct tightening torque for fasteners. The Chart should be referred to when tightening or replacing bolts in order to determine the grade of bolt and the correct torque unless specific torque values are assigned in the text of the manual.

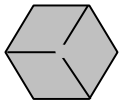
Recommended torque is quoted in Foot-Pounds and Newton-Metres within this manual.
The equation for conversion is 1 Nm. = 1.356 ft. lbs.

TORQUE VALUES FOR IMPERIAL BOLTS

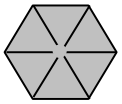




Head Marking
No Marks
Grade Two



Head Marking
Three Lines
Grade Five

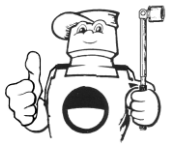


Head Marking
Six Lines
Grade Eight

Bolt Dia.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.
1/4"	*5.5*	*7.5*	*9*	*12.2*	*12.5*	*17.0*
5/16"	*11*	*15.0*	*18*	*25.0*	*26*	*35.2*
3/8"	*20*	*27.0*	*33*	*45.0*	*46*	*63.0*
7/16"	*32*	*43.0*	*52*	*70.0*	*75*	*100.0*
1/2"	*50*	*68.0*	*80*	*110.0*	*115*	*155.0*
9/16"	*70*	*95.0*	*115*	*155.0*	*160*	*220.0*
5/8"	*100*	*135.0*	*160*	*220.0*	*225*	*305.0*
3/4"	*175*	*240.0*	*280*	*380.0*	*400*	*540.0*
7/8"	*175*	*240.0*	*450*	*610.0*	*650*	*880.0*
1"	*270*	*360.0*	*675*	*915.0*	*975*	*1325.0*
1-1/8"	*375*	*510.0*	*850*	*115.0*	*1350*	*1830.0*
1-1/4"	*530*	*720.0*	*1200*	*1626.0*	*1950*	*2650.0*
1-3/8"	*700*	*950.0*	*1550*	*2100.0*	*2550*	*3460.0*
1-1/2"	*930*	*1250.0*	*2100*	*2850.0*	3350	4550.0

NOTE:
The values in the chart apply to fasteners as received from the supplier, dry or when lubricated with normal engine oil. They DO NOT apply if special graphited, molydisulphide greases, or other extreme pressure lubricants are used. This applies to both UNF and UNC coarse threads.

TORQUE VALUES FOR METRIC BOLTS.



Head Marking
4.8

Head Marking
8.8

Head Marking
10.9

Head Marking
12.9

Bolt Dia.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.
6mm	*4.5*	*6.1*	*8.5*	*11.5*	*12*	*16.3*	*14.5*	*20.0*
8mm	*11*	*14.9*	*20*	*27.1*	*30*	*40.1*	*35*	*47.5*
10mm	*21*	*28.5*	*40*	*54.2*	*60*	*81.4*	*70*	*95.0*
12mm	*37*	*50.2*	*70*	*95.0*	*105*	*140.0*	*120*	*160.0*
14mm	*60*	*81.4*	*110*	*150.0*	*165*	*225.0*	*190*	*260.0*
16mm	*92*	*125.0*	*175*	*240.0*	*255*	*350.0*	*300*	*400.0*
18mm	*125*	*170.0*	*250*	*340.0*	*350*	*475.0*	*410*	*550.0*
20mm	*180*	*245.0*	*350*	*475.0*	*500*	*675.0*	*580*	*790.0*
22mm	*250*	*340.0*	*475*	*645.0*	*675*	*915.0*	*800*	*1090.0*
24mm	*310*	*420.0*	*600*	*810.0*	*850*	*1150.0*	*1000*	*1350.0*
27mm	*450*	*610.0*	*875*	*1180.0*	*1250*	*1700.0*	*1500*	*2000.0*
30mm	*625*	*850.0*	*1200*	*1626.0*	*1700*	*2300.0*	*2000*	*2700.0*

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