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PA5565 VERSI

Operator 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
In direct, 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 2006/42/EC

We,

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

Hereby declare that:

The Product; *Tractor Mounted Hedgecutter / Grass Mower*

Product Code; *P180*

Serial No. & Date …… Type ……

Manufactured in; *United Kingdom*

Complies with the required provisions of the Machinery Directive 2006/42/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.

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: *January 2018*

POWER ARM INSPECTION AND MAINTENANCE

A daily equipment inspection of the tractor and mower should be conducted before the equipment is used. You may use the inspection sheets to assist with these daily inspections. Any damaged or missing guards should be repaired or replaced before operating the mower. Failure to repair the damaged shield can result in objects being thrown from the mower and possibly hitting the operator or bystander.

Inspect the Mower for Safe Operating Condition

- Make sure the driveline guards and shielding are in place and in good repair.
- Inspect the flexible thrown object shielding to assure that they are in place on the front and rear of the mower head and in good repair. Repair or replace any damaged or missing thrown object shields.
- Ensure the mower cutting height is set high enough to reduce the possibility of the mower blades contacting the ground. Actual height will be dependent on the ground conditions. Increase the height when working in rough or undulating conditions.
- Inspect for broken, chipped, bent, missing, or severely worn blades. Replace damaged blades before operating the mower. Ensure the blade retaining bolts and fasteners are secure and tight.
- Ensure all head bolts and nuts are tight.
- Lubricate the driveline universal joints and telescoping members daily.
- Grease the rotor and roller bearings and inspect their condition.
- Inspect for any oil leaks or damaged hoses
- Inspect for worn or damaged decals and safety instructions. Replace unreadable, damaged or missing safety decals.
- Follow the operator's manual(s) inspection and maintenance instructions for lubricating parts, and keeping thrown object shielding, driveline guards, rotating parts shields, mower blades and decals in good repair.

Inspect the Tractor for Safe Operating Condition:

- Inspect the controls, lights, SMVs (Slow Moving Vehicle sign), seat belts, and ROPS to assure that they are in place and in good working order.
- Be sure the tires, wheels, lug bolts/nuts are in good condition.
- Make sure the tractor brakes and steering are in proper operating condition.
- Follow the operator's manual(s) inspection and maintenance procedures for keeping the tractor in good and safe condition before operating.

The inspection sheet on the following page should be kept in this book as a record. A second sheet is included for you to cut out and photocopy or the inspection sheets can be downloaded from our website at;
http://www.mcconnel.com/support/aftersales/default.aspx?nav=After Sales

POWER ARM PRE-OPERATION Inspection

Power Arm ID _____ Date: _____ Shift: _____

WARNING 

Before conducting the inspection, make sure the tractor engine is off, the key removed, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower head is resting on the ground or is securely blocked up and supported and all hydraulic pressure has been relieved.

Item	Condition at start of shift	Specific Comments if not O.K.
The Operator's Manual is in the Canister on the mower		
All Warning Decals are in place, clean and legible		
All Lights are clean and working		
The Mounting frame bolts are in place and tight		
The Arm pivot pins are tight and correctly secured		
There are no cracks in the arms		
The Hyd. Cylinder pins are tight and correctly secured		
The Hyd Cylinder hose connections are tight		
The Hyd. Pump hose connections are tight		
The Hyd. Valve hose connections are tight		
The Hyd. Valve controls function properly		
There are no damaged hoses		
The Oil level is to the green mark on the tank sight glass		
There is no evidence of Hydraulic oil leaks		
Flails are not missing, chipped, broken or excessively worn		
The Flail bolts are tight		
The Front & Rear Flaps are fitted and in good condition		
The Front hood is in place and in good condition		
The Wire Trap is in good condition		
The Skid shoes are in good condition & tight		
There are no cracks or holes in flail casing		
The Hyd. motor mounting bolts are tight		
All Flail Head Nuts and Bolts are tight		
The Rotor Bearings are in good condition and greased		
The Roller bearings are in good condition and greased		
The drive line Shaft guard is in good condition		
The drive line shaft guard is correctly secured		
Controls are securely mounted in the cab		
With engine running check arm operation		
Have a spare pack of flails, bushes, bolts and nuts		

Operators Signature: _____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER

TRACTOR PRE-OPERATION Inspection

Power Arm ID _____ Date: _____ Shift: _____

WARNING **Before conducting the inspection, make sure the tractor engine is off, the key is removed all rotation has stopped and the tractor is in park with the parking brake engaged. Any implement attached to the tractor is firmly on the ground.**

Item	Condition at start of shift	Specific Comments if not O.K.
The flashing lights function properly.		
All lights are clean and working correctly		
All cab windows are clean and wipers working correctly		
The SMV sign, where required, is clean and visible.		
The tyres are in good condition with correct pressure.		
The wheel nuts are tight.		
The tractor brakes are in good condition.		
The steering linkage is in good condition.		
There are no visible oil leaks.		
The hydraulic controls function properly.		
The ROPS or ROPS cab is in good condition.		
The seatbelt is in place and in good condition.		
The 3-point hitch is in good condition.		
The drawbar/pick up hook is secure & in good condition		
The PTO master shield is in place.		
The engine oil level is full.		
The brake fluid level is full.		
The power steering fluid level is full.		
The fuel level is adequate.		
The engine coolant fluid level is full.		
The radiator & oil cooler are free of debris.		
The air filter is in good condition		

Operators Signature: _____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER

POWER ARM PRE-OPERATION Inspection

Power Arm ID _____ Date: _____ Shift: _____

WARNING 

Before conducting the inspection, make sure the tractor engine is off, the key removed, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower head is resting on the ground or is securely blocked up and supported and all hydraulic pressure has been relieved.

Item	Condition at start of shift	Specific Comments if not O.K.
The Operator's Manual is in the Canister on the mower		
All Warning Decals are in place, clean and legible		
All Lights are clean and working		
The Mounting frame bolts are in place and tight		
The Arm pivot pins are tight and correctly secured		
There are no cracks in the arms		
The Hyd. Cylinder pins are tight and correctly secured		
The Hyd Cylinder hose connections are tight		
The Hyd. Pump hose connections are tight		
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The Hyd. Valve controls function properly		
There are no damaged hoses		
The Oil level is to the green mark on the tank sight glass		
There is no evidence of Hydraulic oil leaks		
Flails are not missing, chipped, broken or excessively worn		
The Flail bolts are tight		
The Front & Rear Flaps are fitted and in good condition		
The Front hood is in place and in good condition		
The Wire Trap is in good condition		
The Skid shoes are in good condition & tight		
There are no cracks or holes in flail casing		
The Hyd. motor mounting bolts are tight		
All Flail Head Nuts and Bolts are tight		
The Rotor Bearings are in good condition and greased		
The Roller bearings are in good condition and greased		
The drive line Shaft guard is in good condition		
The drive line shaft guard is correctly secured		
Controls are securely mounted in the cab		
With engine running check arm operation		
Have a spare pack of flails, bushes, bolts and nuts		

Operators Signature: _____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER

TRACTOR PRE-OPERATION Inspection

Power Arm ID _____ Date: _____ Shift: _____

WARNING **Before conducting the inspection, make sure the tractor engine is off, the key is removed all rotation has stopped and the tractor is in park with the parking brake engaged. Any implement attached to the tractor is firmly on the ground.**

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The SMV sign, where required, is clean and visible.		
The tyres are in good condition with correct pressure.		
The wheel nuts are tight.		
The tractor brakes are in good condition.		
The steering linkage is in good condition.		
There are no visible oil leaks.		
The hydraulic controls function properly.		
The ROPS or ROPS cab is in good condition.		
The seatbelt is in place and in good condition.		
The 3-point hitch is in good condition.		
The drawbar/pick up hook is secure & in good condition		
The PTO master shield is in place.		
The engine oil level is full.		
The brake fluid level is full.		
The power steering fluid level is full.		
The fuel level is adequate.		
The engine coolant fluid level is full.		
The radiator & oil cooler are free of debris.		
The air filter is in good condition		

Operators Signature: _____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER

For Safety and Performance…

ALWAYS READ THIS BOOK FIRST

McCONNEL LIMITED

Temeside Works
Ludlow
Shropshire
England

Telephone: 01584 873131
www.mcconnel.com

NOISE

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 equivalent daily noise exposure levels of between 85 and 90 DB, ear protection is recommended, it should be used if any window is left open.

LIST OF CONTENTS

GENERAL INFORMATION

Read this manual before fitting or operating the machine or accessory. Whenever any doubt exists contact your local dealer or the McConnel Service Department for assistance.

Only use 'Genuine McConnel Parts' on McConnel machinery and equipment.

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

⚠ DANGER

DANGER: *Alerts to a hazardous situation which will result in death or serious injury if not observed carefully.*

⚠ WARNING

WARNING: *Alerts to a hazardous situation which could result in death or serious injury if not observed carefully.*

⚠ CAUTION

CAUTION: *Alerts to a hazardous situation which could result in damage to the machine and/or equipment if not observed carefully.*

NOTICE

NOTICE: *Specific or general information considered important or useful to emphasise.*

LEFT HAND (LH) & RIGHT HAND (RH): *These terms are applicable to the machine when fitted to the tractor and viewed from the rear; these terms also apply to tractor references.*

SERIAL PLATE

All machines are equipped with a serial number plate containing important information relating to the machine including a unique serial number used for identification purposes.

Note: Images in this manual are provided for instruction and informational purposes only and may not show components in their entirety. In certain instances images may appear different to the actual machine; where this occurs the general procedure will be basically the same. E&OE.

MACHINE & DEALER INFORMATION

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

PA5565 VERSI

- Choice of Linkage or Axle Mounted
- Duel Cutting (Right Hand and Left Hand)
- Parallel Arm Geometry
- 5.5m Reach
- 1.5m Midcut
- 180° Powered Slew
- Rear Mounted
- Cast Iron Gearbox
- Hydraulic Safety Breakaway
- 192 Litre Hydraulic Reservoir
- Choice of Flailhead
- 65HP Hydraulic System
- Totally independent Hydraulics
- Independent Reversible Rotor On/Off Valve
- Head Angle Float
- Lift Float
- Revolution Proportional Control with EDS
- High Capacity Oil Cooler
- Power Monitor
- Built in Road Lighting

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 the cutting head 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 SIGNIFICANT DANGERS ASSOCIATED WITH THE USE OF THIS MACHINE:

- ▲ *Being hit by debris thrown by rotating 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.*
- ▲ *Burn risk from hot components.*

BEFORE USING THIS MACHINE YOU MUST:

- ▲ *Ensure you read all sections of the operator handbook.*
- ▲ *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 flails 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 from the tractor.*
- ▲ *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 using the stands and props provided 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.

Safe use of rotary flail hedge cutters

HSE information sheet

Agriculture Information Sheet No 21 (Revision 1)

Introduction

This information sheet outlines typical hazards when using most types of tractor-mounted rotary flail hedge cutter. It gives guidance on reducing risks to the operator and others during work with hedge cutters and will help employers, employees and the self-employed comply with their duties under health and safety law.

All users of rotary flail hedge cutters need to be aware of the particular features of their make/model of hedge cutter when considering the hazards, risks and precautions.

Hazards

The greatest risk of injury comes from contact with the machine's moving parts and in particular:

- entanglement on inadequately guarded power take-off shafts;
- contact with the cutter head parts, drive belts or pulleys;
- being struck by the cutting head or machine arm as it moves.

Other risks associated with tractor-mounted hedge cutters can include:

- being hit by material or other debris ejected by the cutters;
- being hit by component parts ejected from the machine;
- coming into contact with overhead electricity power lines (OHPLs);
- the tractor overbalancing when the machine arm is extended;
- injection of high-pressure oil from damaged hydraulic hoses or couplings;
- being struck by the machine overbalancing when un-hitched from the tractor;
- road traffic accidents due to collisions with other vehicles either directly or from debris on the road.

Control measures

It is extremely dangerous to carry out any work on a machine while it is under power. The most important safety measure is to follow the 'safe stop' procedure before dismounting, or carrying out any maintenance or adjustments, including dealing with a blockage or other problem:

- Handbrake on.
- Controls neutral.
- Stop engine.
- Remove key.

Guards and machine safety

Check that all guards and other protective devices are in place before starting work. Don't use the machine if the guards are missing or damaged. Make sure:

- the power take-off (PTO) shaft is fully enclosed in a guard along its entire length from the tractor power take-off to the power input connection on the hedge cutter;
- the tractor rear and side(s) are fitted with protective glazing, metal mesh or polycarbonate guards of a size/strength specified by the hedge cutter manufacturer to protect the operator against thrown debris or other projectiles;
- tractor mesh/polycarbonate guards are suitable for the job, undamaged and maintained in accordance with the manufacturer's instructions;
- all hedge cutter guards and safety devices are in position, correctly fitted and maintained in accordance with the manufacturer's recommendations;
- flails and their fixing heads are the right size for the task. Flails, and their fixings, should be of the type recommended by the manufacturer, securely attached, and should not be missing or damaged;
- hydraulic pipes are carefully routed to avoid damage;
- machine fittings and couplings are in good condition.

General guidance on safe working practice

- Operators should receive adequate instructions and training to enable them to use the machine safely. Take advantage of relevant training/courses provided by manufacturers/dealers. They will help ensure your safety and that of your staff, and help you get the best performance from your hedge cutter.
- Make sure the operator reads, understands and follows the instruction manual.
- Follow the manufacturer's instructions when hitching or unhitching the machine from the tractor. Do not stand in any position where you may be at risk of being crushed, eg in the area between the back of the tractor and the cutter.
- Make sure the machine is left in a stable position when it is removed from the tractor, using any stands or props provided, and securing it further if necessary.
- Do not carry out maintenance on the hedge cutter with the cutting arm/dipper arm raised, unless the arm is properly supported.
- Check the tractor is at least the minimum weight recommended by the hedge cutter manufacturer. Use ballast as necessary.
- Inspect the hedge before starting to cut and remove wire, bottles, cans and other debris. Check for any telegraph/electricity pole stays. Damaged stays should be reported to the relevant Telecoms Company/Distribution Network Operator.
- Use appropriate warning signs to alert others to the hedge-cutting operation where necessary.
- Work at a safe speed, taking account of the conditions (eg terrain, proximity to the highway, or obstacles).
- Use safe practices when work needs to be done near OHPLs. Flailhead units on some dipper arms can reach over 5.2 metres, the minimum height of OHPLs above ground level (see Further reading).
- Clear up debris after cutting if it could be a hazard to others.

Roadside hedges

Take extra care if you are hedge/verge cutting along a road. Consider what measures you will need to control the risks to other road users (eg vehicles, cyclists, pedestrians, or horse riders). For roadside work (on the public highway) there are other legal requirements. For example, there may be obligations to:

- display specific warning signs in defined locations where work is carried out;
- fit flashing beacons to tractors/machines;
- clear debris from paths and roads;
- restrict your working hours.

Consult your local authority highways department and the Department for Transport for advice (see Further reading).

Further reading

Traffic signs manual 2009. Chapter 8. Traffic safety measures and signs for road works and temporary situations. Part 2: Operations DfT ISBN 978 0 11 553052 4 http://assets.dft.gov.uk/publications/traffic-signs-manual/traffic-signs-manual-chapter-08-part-02.pdf

Working safely near overhead electricity power lines AIS8(rev3) HSE Books 2012 www.hse.gov.uk/pubns/ais8.htm

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

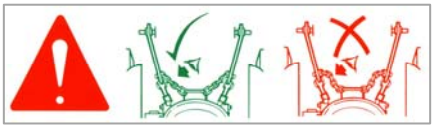
This document is available at www.hse.gov.uk/pubns/ais21.htm.

SAFETY & INFORMATION DECALS (Power Arms)

Power Arm machines are equipped with safety and information decals designed to warn of dangers, operational information and machine protection. Operators must understand the decals and heed all warnings. Keep decals in a good condition and replace immediately if they are damaged or missing.

1.

2.



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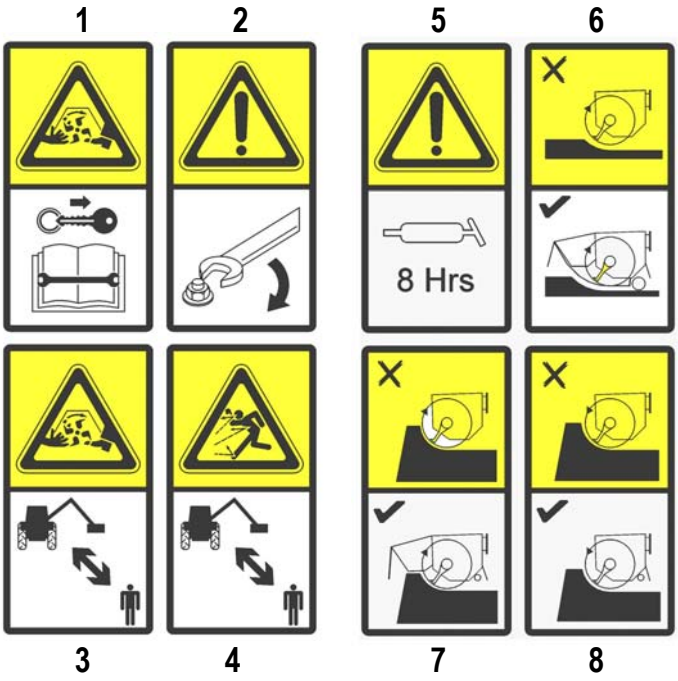
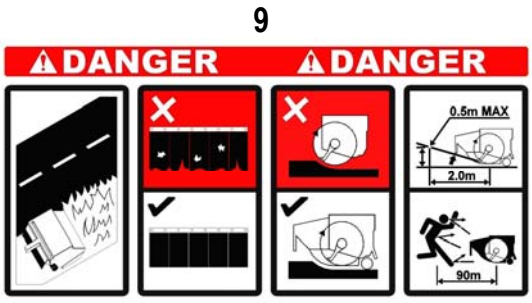
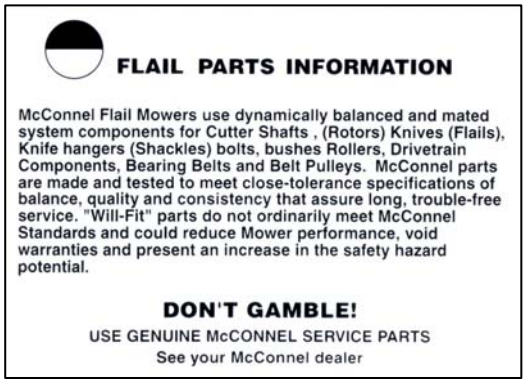
1. General Safety Warnings.
2. Driveline Hazard Warning.
3. Tighten Check Chains Warning.
4. 'In vehicle' Safety Rules Decal.
5. Serial Number Plate.
6. Read the Book First.
7. Lift Point with SWL (Kg).
8. Specific Pinch Point Warning.
9. Maximum vehicle PTO Speed & Direction Warning.
10. Oil Filter Initial and subsequent change information.
11. Lift Point for shipping only; *stow when machine installed on vehicle. (Models with stowable lift eyes only).*
12. Auto-breakaway Return Warning*; in 'Auto-Reset' arm will automatically return to the work position, when possible.*
13. Vehicle Clearance Warning; *leave 300mm+ between arm and vehicle.*
14. Lift Stop Clearance Warning; *leave 300mm+ between arm and vehicle, leave 5mm between arm and stop.*
15. Lift Tap 'Lock' Warning; *leave 300mm+ between arm and vehicle, lock lift taps for transport.*

SAFETY & INFORMATION DECALS (Flail Heads)







10

1. **Caution!** Rotating blades; keep clear of machine, stop machine (wait for rotor to stop), remove vehicle key and read the book first before performing any service or maintenance.
2. **Caution!** Keep all nuts and bolts tight.
3. **Caution!** Rotating components; keep clear of the working machine.
4. **Caution!** Thrown objects risk; keep all persons at a safe distance from the working machine.
5. **Caution!** Lubricate greasing points every 8 working hours.
6. **Caution!** Grass/Verge Mowing; front hood, front flap, rear roller and rear flap must be fitted and correctly adjusted when using the machine for grass and verge mowing. Flaps must be in good condition.
7. **Caution!** Hedging (Uphill cutting); front hood, front flap and rear flap must always be fitted and correctly adjusted. Rear roller should be placed into the raised position. Flaps must be in good condition.
8. **Caution!** Hedging (Downhill cutting); front hood may be removed; rear flap must be fitted and rear roller placed into the raised position. Flap must be in good condition.
9. **Danger!** Road side mowing. Flaps must be in good condition. Do not work if front hood, front flaps, rear roller and rear flaps not fitted. Front hood, front flaps, rear roller and rear flaps must be fitted. Adjust front hood to the correct height position for verge mowing. A extended straight line from the bottom of the rotor and bottom of the front flap should not be higher than 0.5m at a horizontal distance of 2.0m from the rotor. Keep all persons at 90m from the working machine, stop machine if persons are closer. *Refer to front hood height setting section for details.*
10. **Important!** Parts information; for safety and performance only use ‘Genuine McConnel Service Parts’.

FITTING - Tractor requirements

Minimum Tractor Weight - *including ballast weight if necessary.*
PA5565 VERSI Model – 4500kg

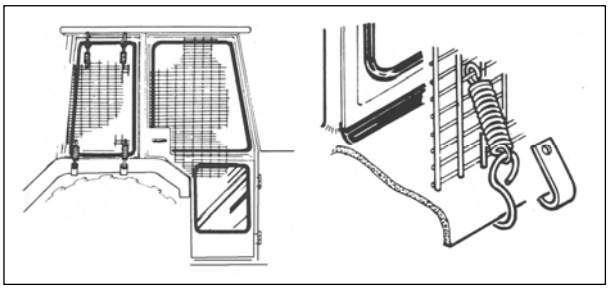
Machine Weight
1625kg with flailhead (excluding oil)

Minimum HP Requirements
PA5565 VERSI Model – 75HP

Linkage
Category 2

PTO Shaft
Tractor must be equipped with a live drive PTO to enable forward motion to be stopped while the flailhead continues to operate.

Check Chains/Stabilizers
Check chains or stabilizers must be fitted and tightened.



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 mesh to cover all vulnerable areas.
Remember 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:

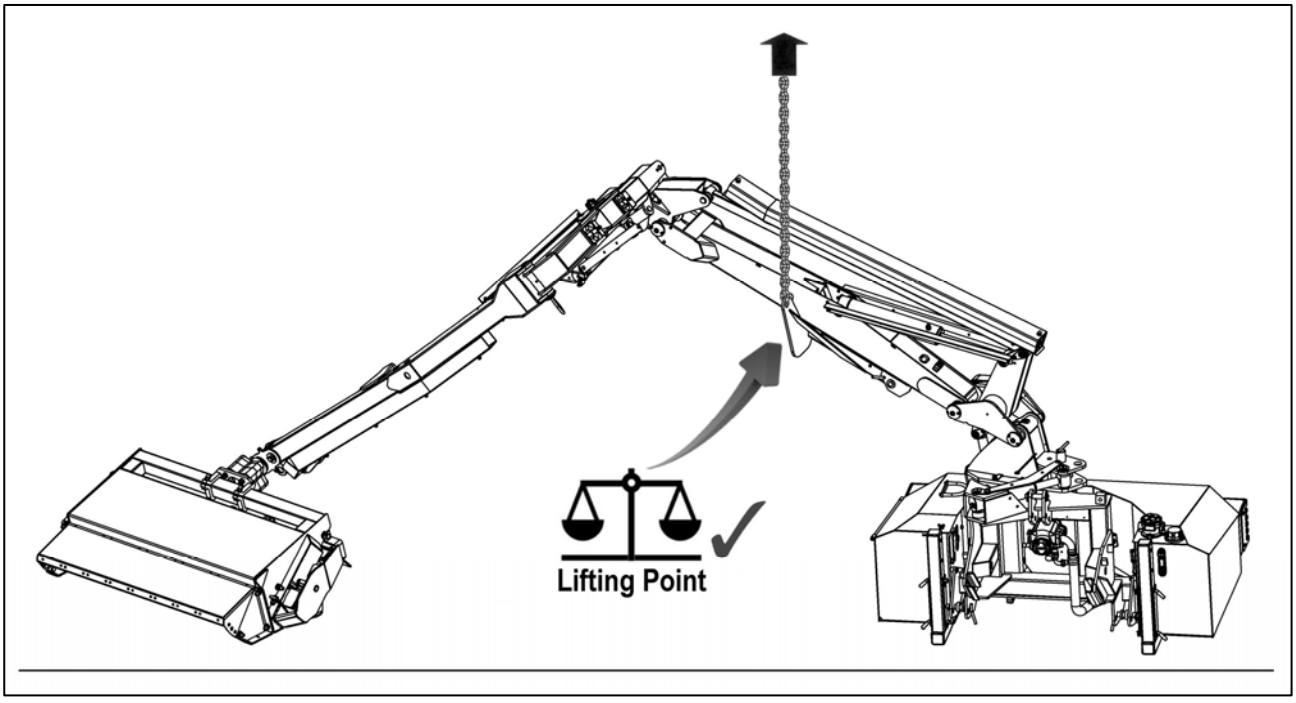
- *Increasing rear wheel track; a vehicle with a wider wheel track is more stable.*
- *Ballasting the wheel; it is preferable to use external weights but liquid can be added to around 75% of the tyre volume – water with anti-freeze or the heavier Calcium Chloride alternative can be used.*
- *Addition 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.*

The advice above is offered as a guide for stability only and is not a guide to vehicle strength. It is therefore 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.

Delivery
The machine will be delivered in a partially dismantled condition secured with transport straps and banding. Select a firm level site on which to place the machine before removing the straps, banding and other loose items.

Handling the Machine
Handling of the machine should always be performed using suitable overhead lifting equipment with a minimum safe lifting capacity over and above the maximum weight of the machine. Always ensure the machine is balanced during the lifting procedure and make sure all bystanders are kept well clear of the raised machine.

Lifting Point
To ensure even weight distribution when handling the machine it should be lifted using the sling eye in the factory fitted lifting bracket indicated in the illustration below.



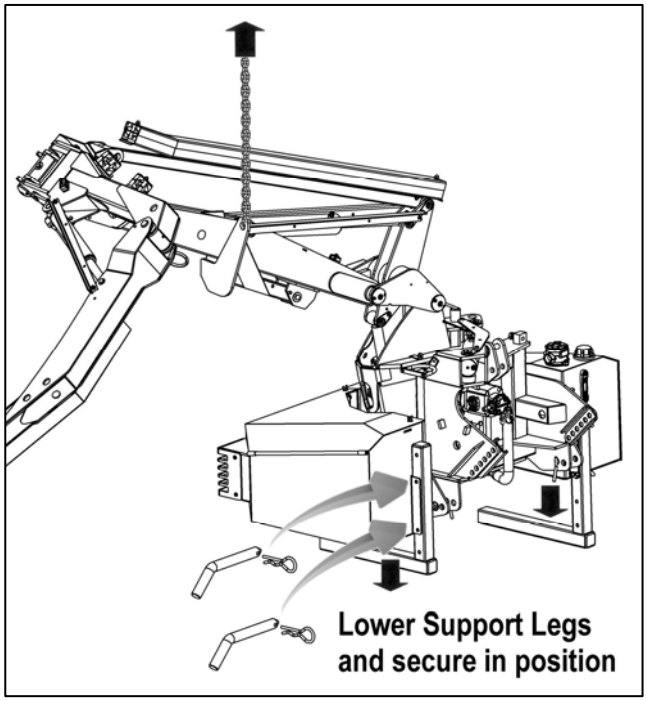
Support Legs
With the machine raised on the overhead lifting equipment lower the stand legs and pin into position selecting the holes that position the machines gearbox stub shaft approximately 3" *(75mm)* below the tractors PTO shaft - *Note the leg pin positions used.*

NOTICE

If this height setting positions the flailhead clear of the ground it may be necessary to place a suitable support beneath the head to offer extra stability to the unit.

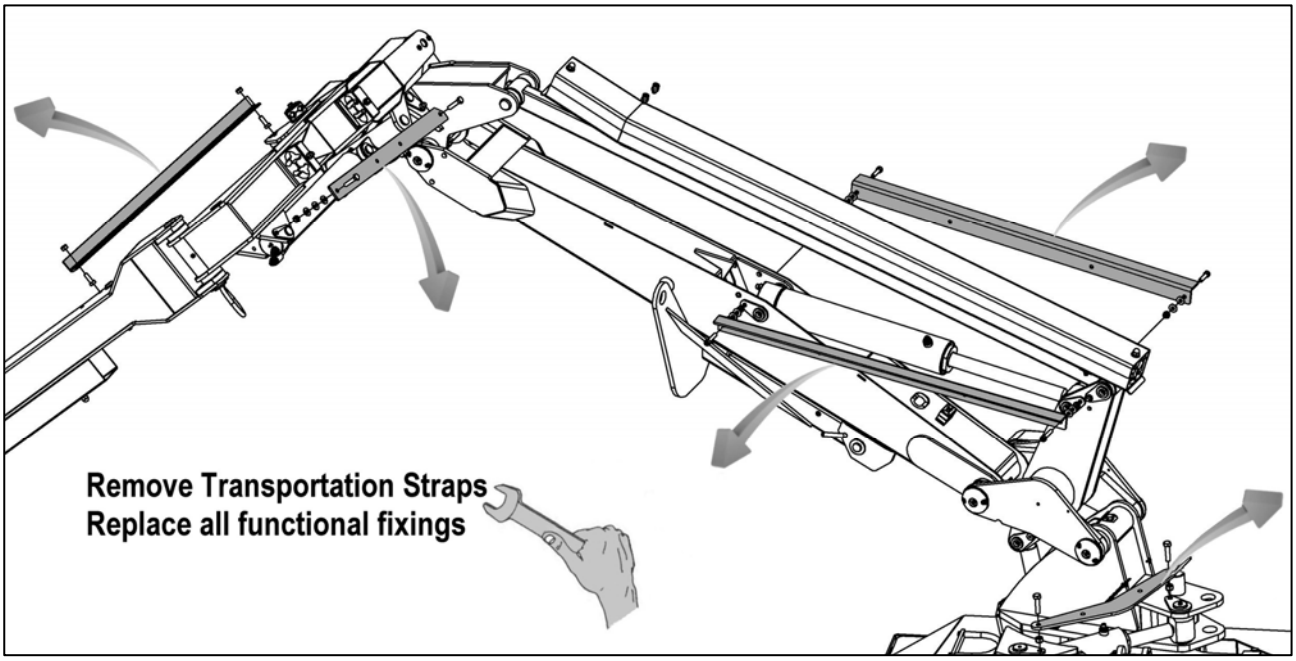
Unbolt the stabiliser from machine and remove the stabiliser nose quadrant pin.

Remove any remaining loose item attached to the machine and place them in a safe location until ready for fitting.

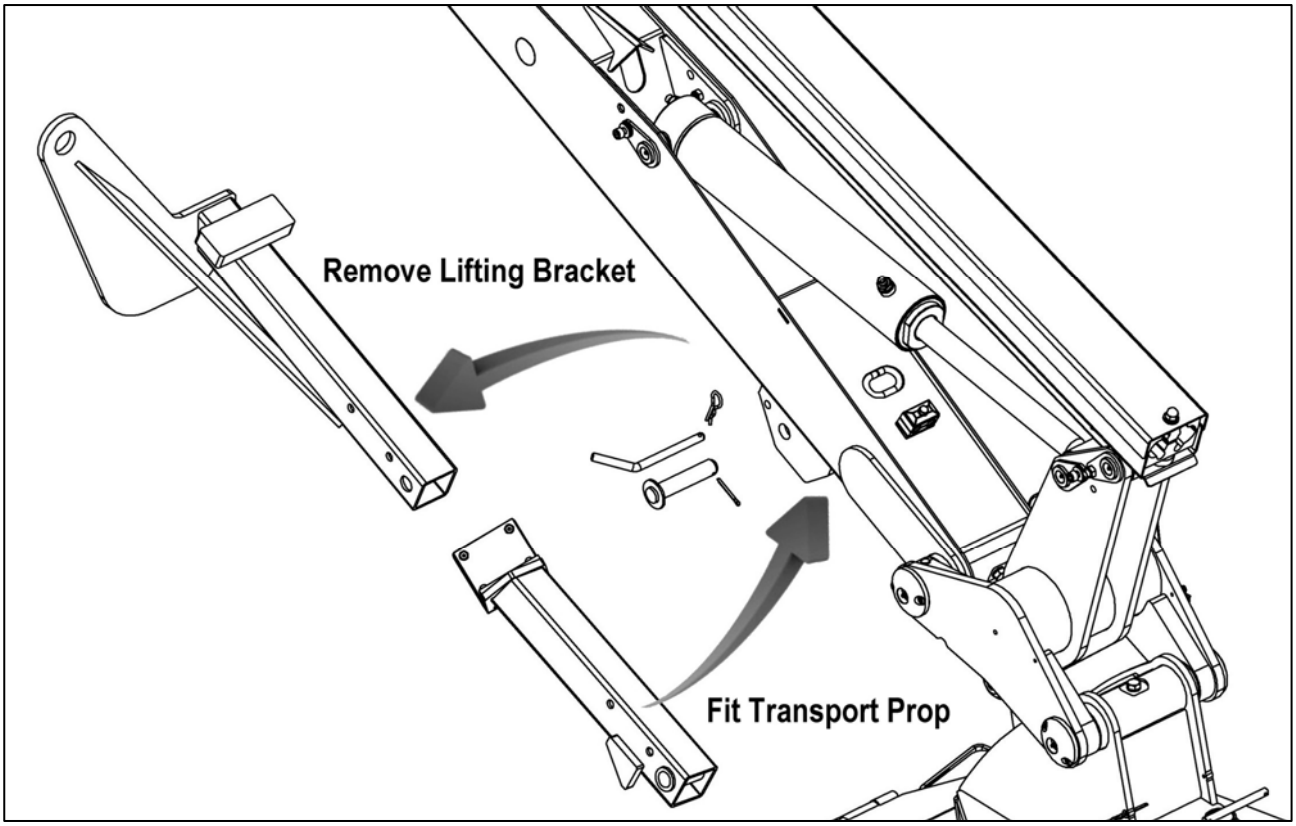


Hydraulic Oil Tank
Fill the hydraulic oil tank to the required level. Select oil from the chart of recommended oils or a suitable quality equivalent – *refer to following page for details.*
The oil tank capacity is approximately **200 litres**.

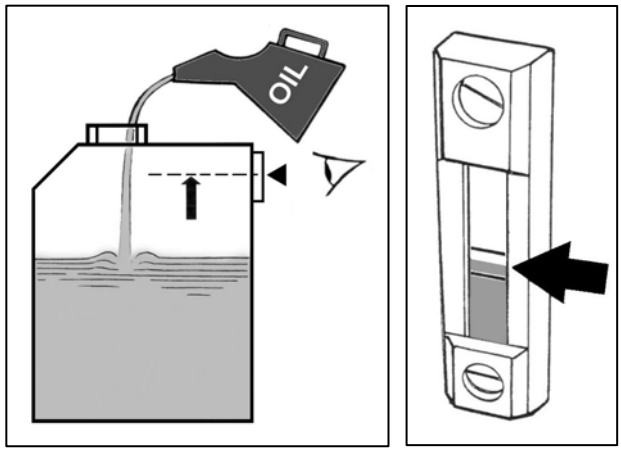
Transport Strap Removal
Remove the transportation straps shown in the illustration below; retain and replace the functional fixings located on pin tails. Packing washers and non-functional nuts and bolts can be discarded.



Transport Prop
Remove the lifting bracket and replace with the transport prop; the same fixings are used to secure it in position.



Fill the tank with oil selected from the chart below or a good quality equivalent to a point where the level is between the minimum and maximum marks on the tank gauge. When the machine is initially run the level will drop as the oil is drawn into the circuit - top back up as required to the correct level on the gauge.



Always use clean receptacles when handling and transferring oil to avoid moisture or dirt contamination that can damage components and/or reduce machine performance.

Note; refer to the maintenance section for further information on the subject of hydraulic oil and system filtration.

Reservoir Capacity

The oil tank capacity of the machine is approximately **192 Litres**.

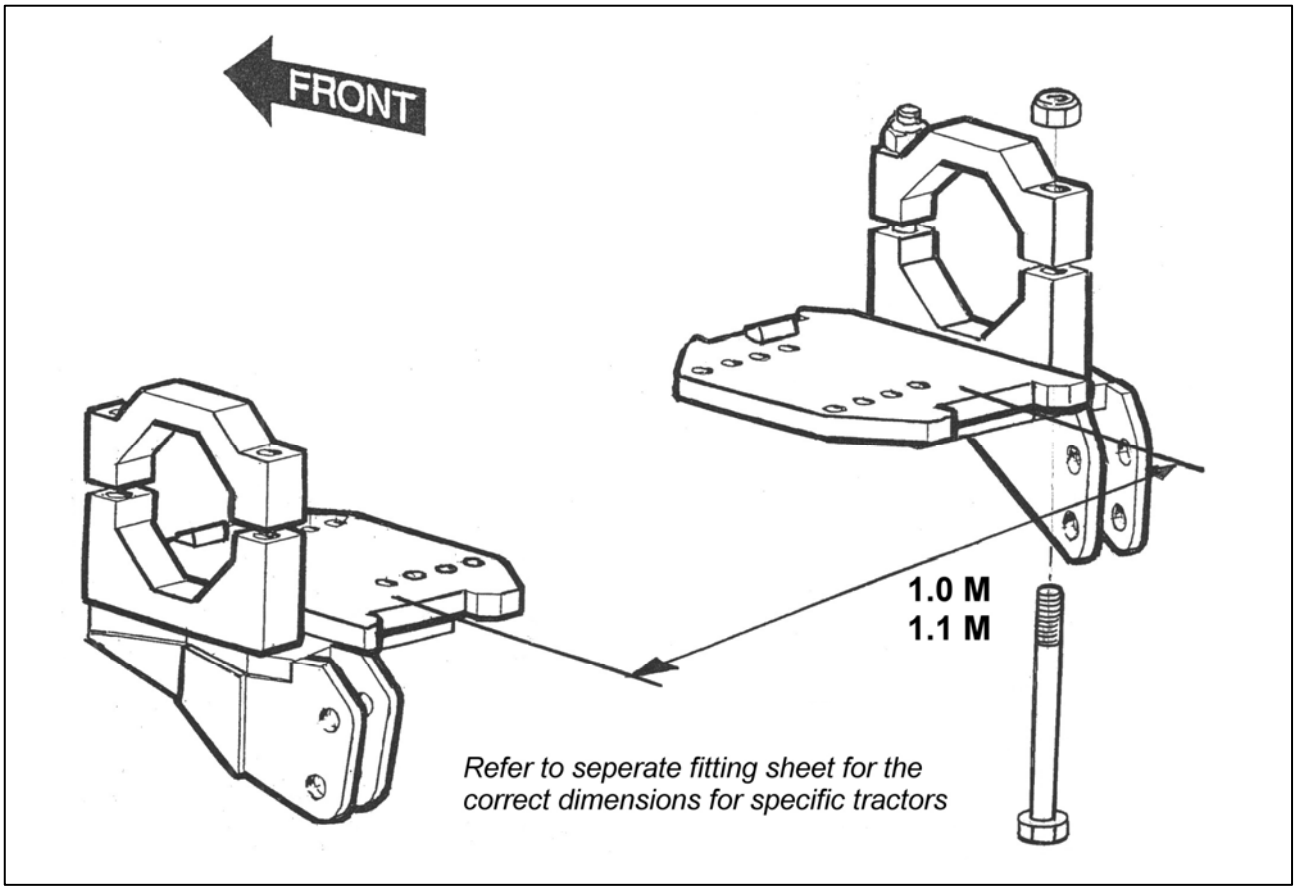
Recommended Hydraulic Oils

For initial filling of the oil reservoir, periodic oil changes and replenishment purposes the following hydraulic oils, or a good quality equivalent are recommended:

NOTICE **Only use oils that are ISO 18/16/13, NAS7, or cleaner.**

Manufacturer	Cold or Temperate Climate	Hot Climate
BP	Bartran 46 Energol HLP-HM 46	Bartran 68 Energol HLP-HM 68
CASTROL	Hyspin AWH-M 46	Hyspin AWH-M 68
COMMA	Hydraulic Oil LIC 15	Hydraulic Oil LIC 20
ELF	Hydrelf HV 46 Hydrelf XV 46	Hydrelf HV 68
ESSO	Univis N 46	Univis N 68
FUCHS (UK/Non UK markets*)	Renolin 46 Renolin HVZ 46 Renolin CL46/B15* Renolin AF46/ZAF46B*	Renolin 68 Renolin HVZ 68 Renolin CL68/B20* Renolin AF68/ZAF68B*
GREENWAY	Excelpower HY 68	Excelpower HY 68
MILLERS	Millmax 46 Millmax HV 46	Millmax 68 Millmax HV 68
MORRIS	Liquimatic 5 Liquimatic HV 46 Triad 46	Liquimatic 6 Liquimatic HV 68 Triad 68
SHELL	Tellus 46 Tellus T46	Tellus 68 Tellus T68
TEXACO	Rando HD 46 Rando HDZ 46	Rando HD 68 Rando HDZ 68
TOTAL	Equivis ZS 46	Equivis ZS 68

AXLE BRACKET/CATCH ASSEMBLY - FITTING BY DEALER



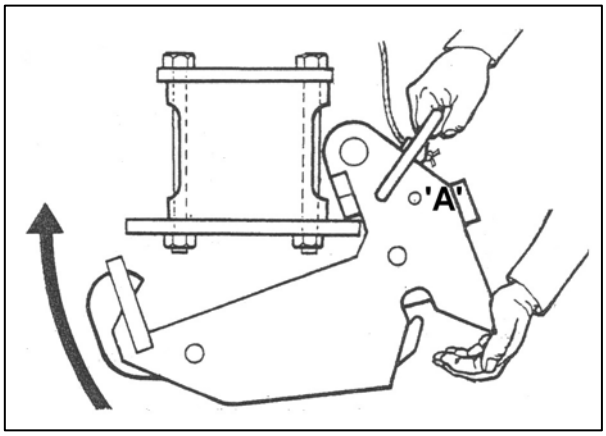
Bolt axle plates to the tractor axle at either 1.0M or 1.1M apart - this may necessitate the to removal of the tractor's check chains and/or assister ram brackets, if this is the case the axle plate will include replacement brackets for these functions.

The axle brackets supplied will be accompanied by a fitting sheet with instruction for their attachment to your tractor, follow the instructions exactly as they are specific to your particular make and model of tractor. Replace assister ram(s) if fitted.

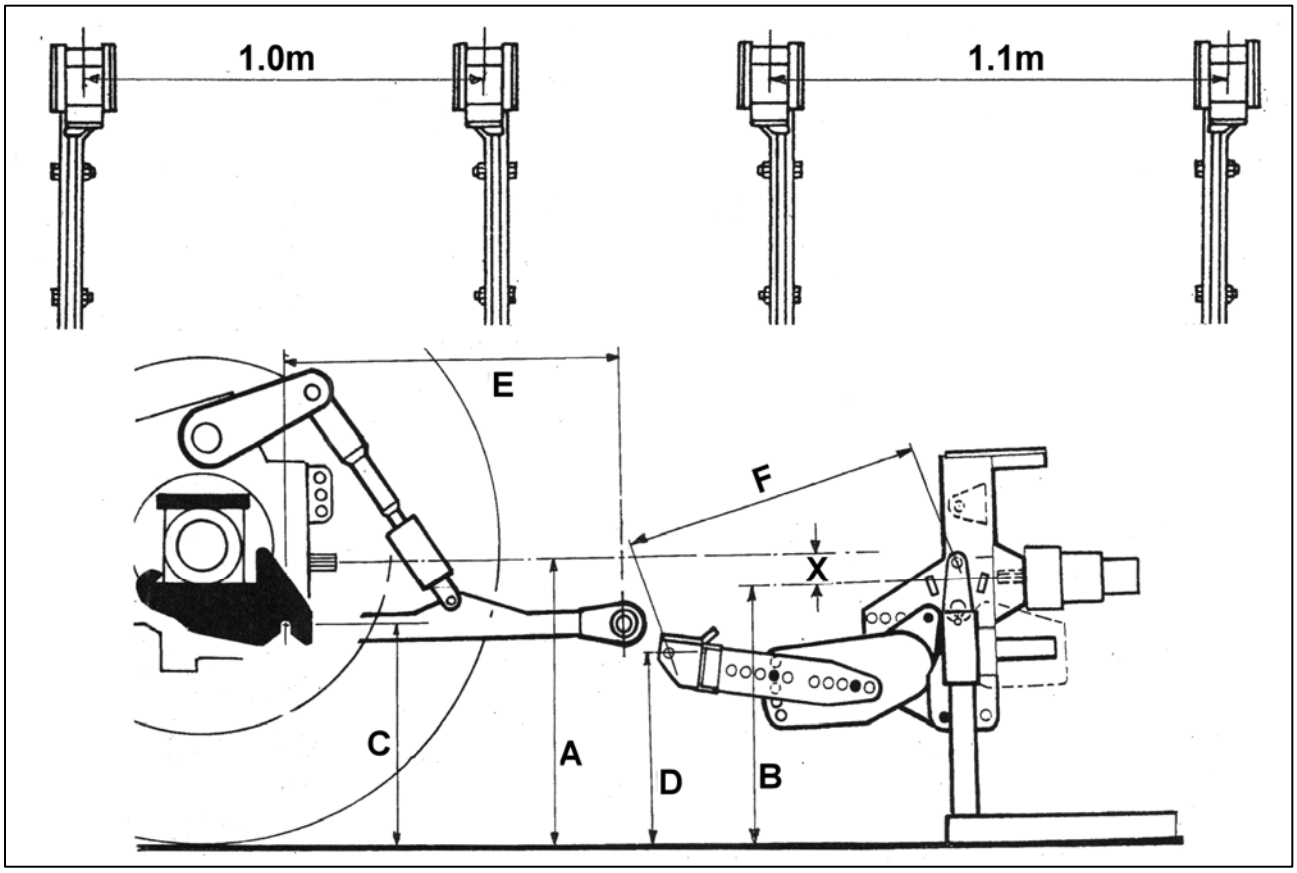
Hook the catch assemblies onto the rear of the axle plates, push firmly against the plate and vigorously pivot the catch in a forward and up direction until the spring loaded hook 'snaps' into position. Pass the release cords up into the cab.

NOTICE

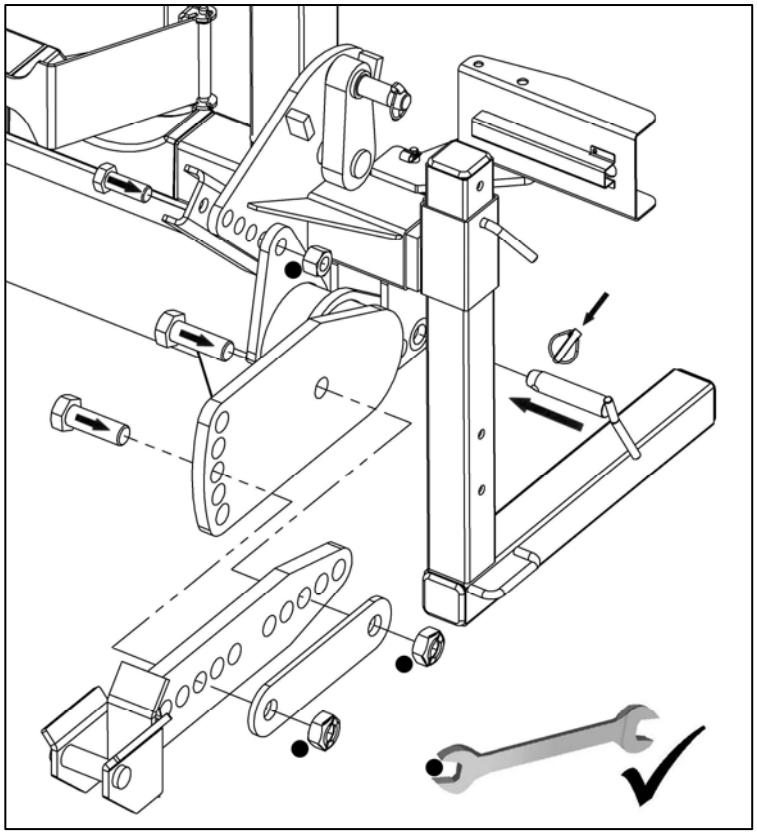
On some tractors fitted with auxiliary fuel tanks, there is insufficient space for the spring catches to be fitted, in these instances special axle brackets and catches with a 'pin on' facility are available on request.

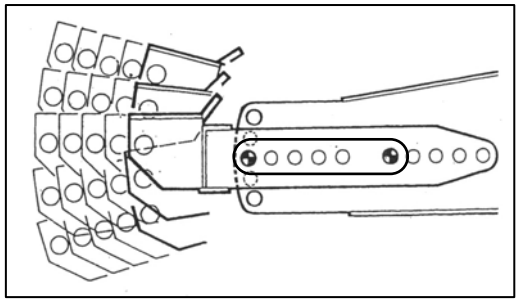


Ensure catch-locking pin 'A' is removed.



Locate axle-mounting arms onto the mainframe and secure in position using the correct nuts and bolts supplied, tighten nuts when correct hole location has been selected - *see below for details on mounting hole selection.*





With the frame in the vertical position, measure dimensions 'A' and 'B', subtract 'B' from 'A' to obtain measurement 'X'.
Measure dimension 'C'.
Select mounting holes which position the mounting bars in the end of the latch arms so that dimension 'D' equals dimension 'C' minus measurement 'X' and also when the draft link is horizontal and the rocking draft pin is in the upright position dimensions 'E' and 'F' are equal.

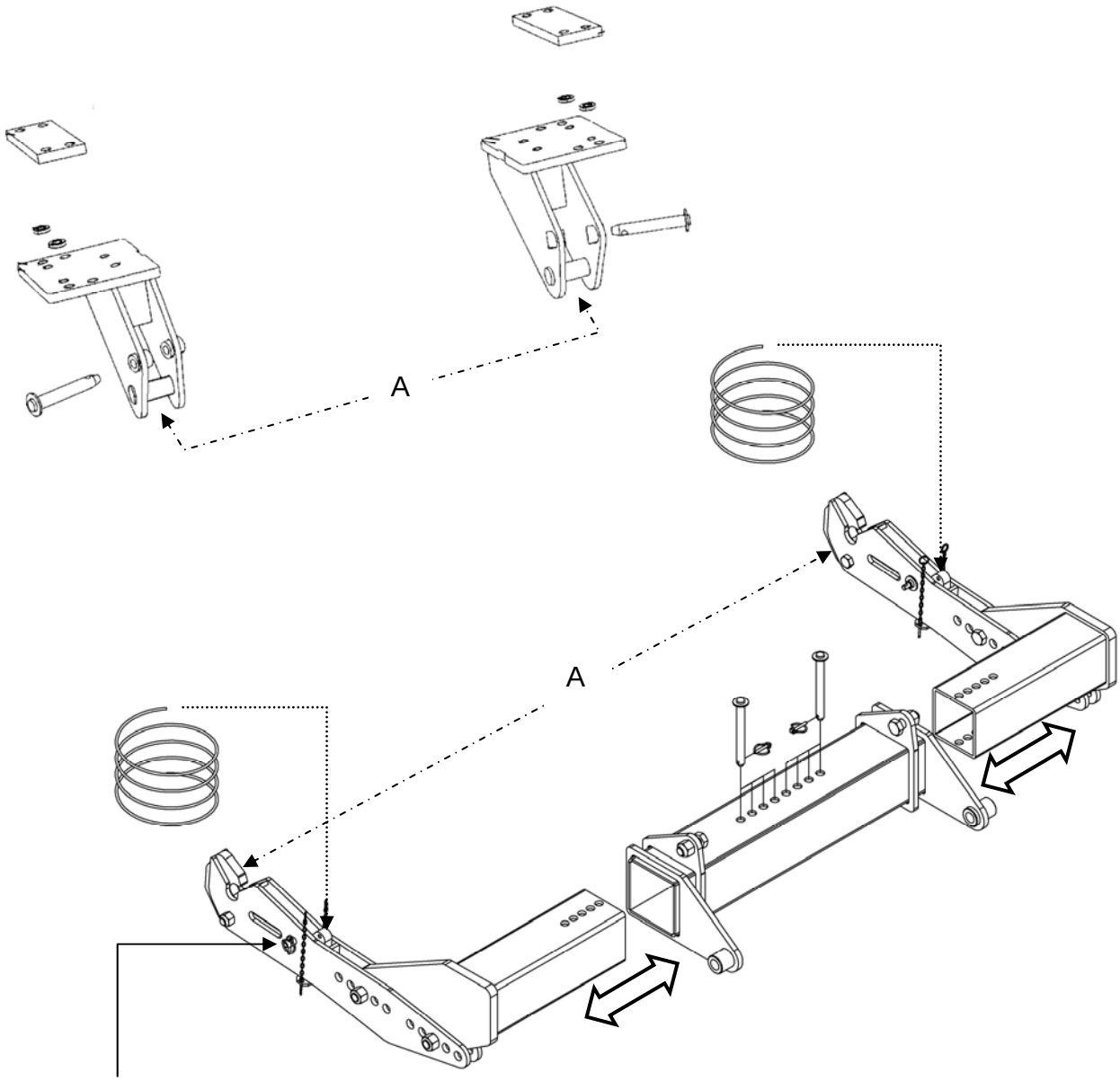
Note: Some illustrations used in this manual are for example purposes only - actual machines may differ in appearance but the general principle remains the same.

ALTERNATIVE AXLE BRACKETS – FITTING BY DEALER

Frame Adjustment

Measures the distance between the centres of the existing brackets fitted to the tractor's axle and adjust the frame *(by equal amounts each side)* to the same width by sliding the outer mounts within the frame, secure in position with the pins provided – *see diagram below.*

Attach cords to latches at the positions indicated to assist future removal of the frame – *stow cords neatly where they will not 'foul' any components or moving parts.*

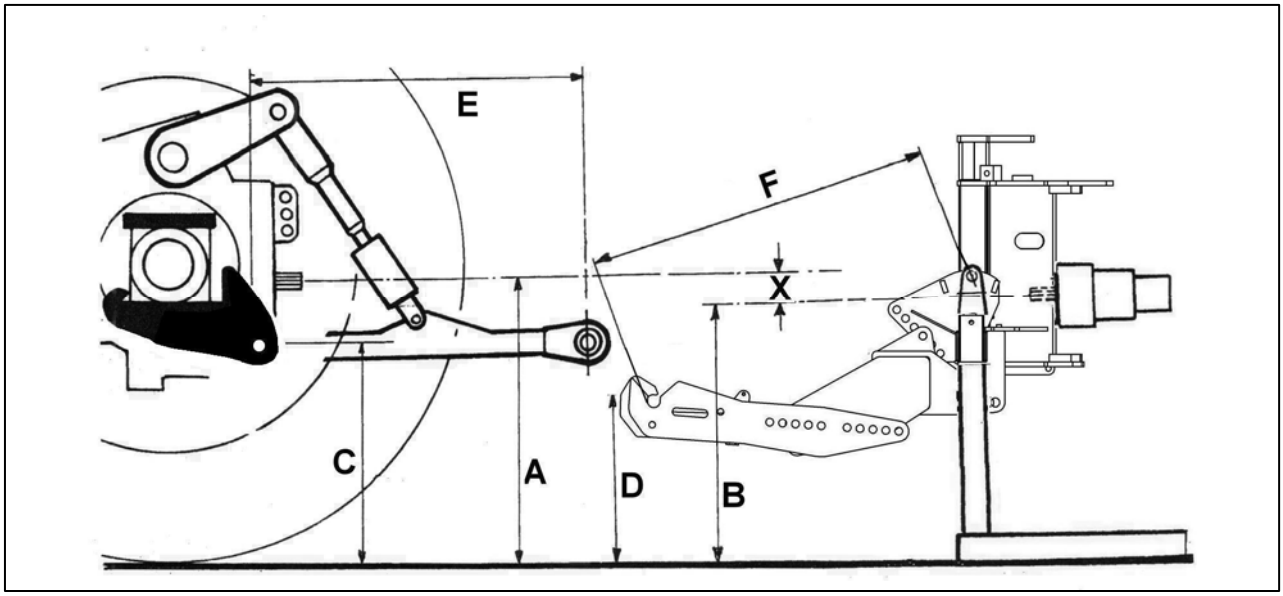


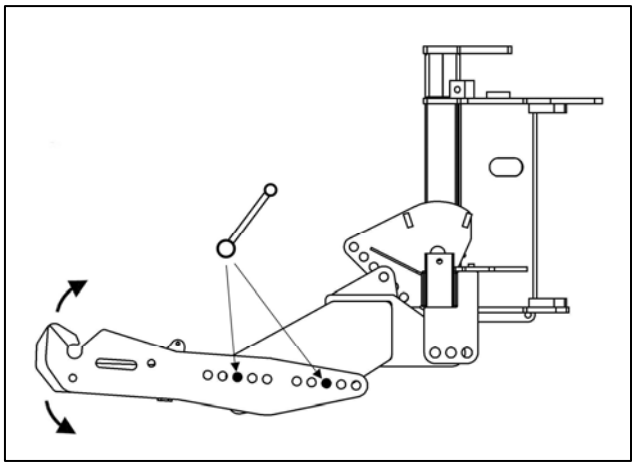
Pins illustrated in the locked position – pins should be removed only for attachment or removal of the brackets, once brackets are connected the pins must be replaced to lock the latches in place.

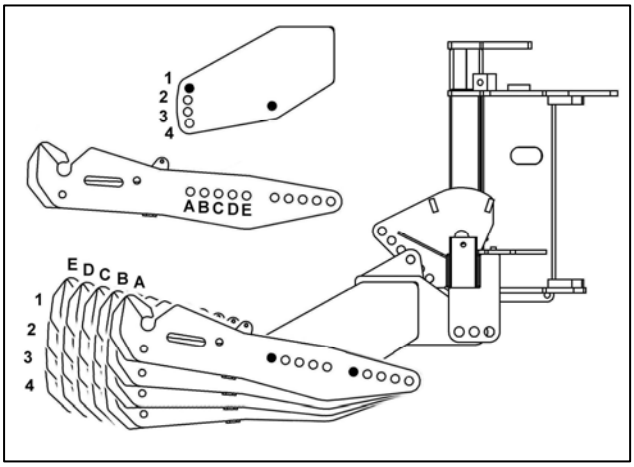
Note: locking pins are located through the arms and above the latches.

The correct mounting position is determined by the formula outlined below -
Note: in some cases certain tractors have a low PTO and/or small wheels and therefore have limited ground clearance, where this is the case, the operator must decide what is sufficient ground clearance for his needs; where there is insufficient ground clearance the latch arms can be pivoted down to a lower position. When doing this be aware that it will cause the PTO shaft to become mis-aligned - Ensure you do not exceed the angular mis-alignment allowed by the PTO shaft manufacturer and remember that this will reduce the working life of the shaft, increase noise and cause vibration.

ALTERNATIVE TYPE BRACKETS

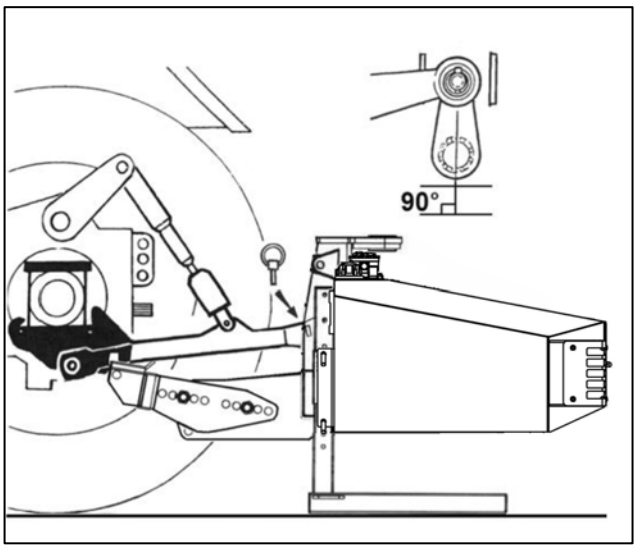






With the frame in the vertical position, measure dimensions 'A' and 'B', subtract 'B' from 'A' to obtain measurement 'X'. Measure dimension 'C'.
Select mounting holes which position the mounting bars in the end of the latch arms so that dimension 'D' equals dimension 'C' minus measurement 'X' and also when the draft link is horizontal and the rocking draft pin is in the upright position dimensions 'E' and 'F' are equal.

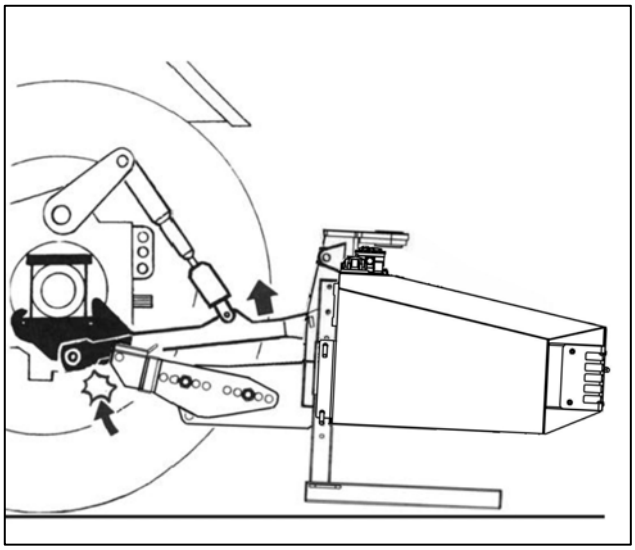
Reverse tractor squarely into position adjacent to the machine and connect the draft links to the machine - *manoeuvre tractor until both draft pin rockers are vertical.*



Raise the machine on the tractors linkage sufficient only for the latch bar to fully engage in the axle catch.

WARNING!

The quadrant lever or machine controls must only be operated from the tractor seat. Ensure no one is standing close to or within the linkage arms or bars.



NOTE

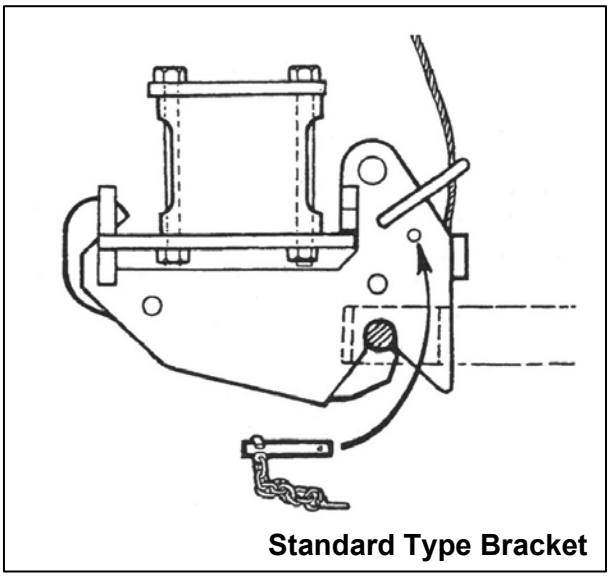
Be aware that as lift occurs the machinery may tilt slightly.

⚠ DANGER **Operating external linkage lift controls.**

If the tractor is equipped with external lift control the operator and all other persons must remain clear of the machine at all times when raising or lowering the machine on the tractor's linkage.

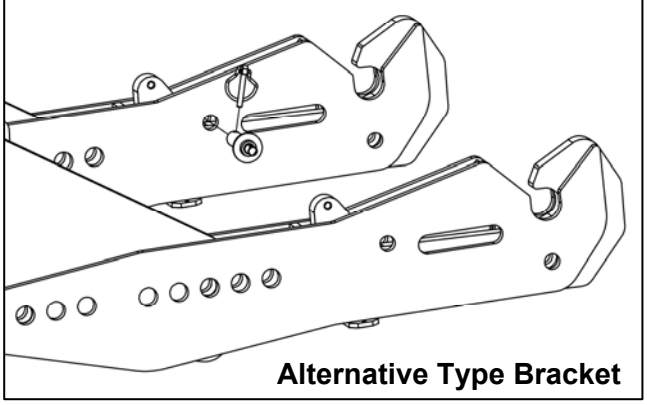
Never stand between tractor and machine.

Insert catch lock pins – *refer to diagrams below for the specific type*

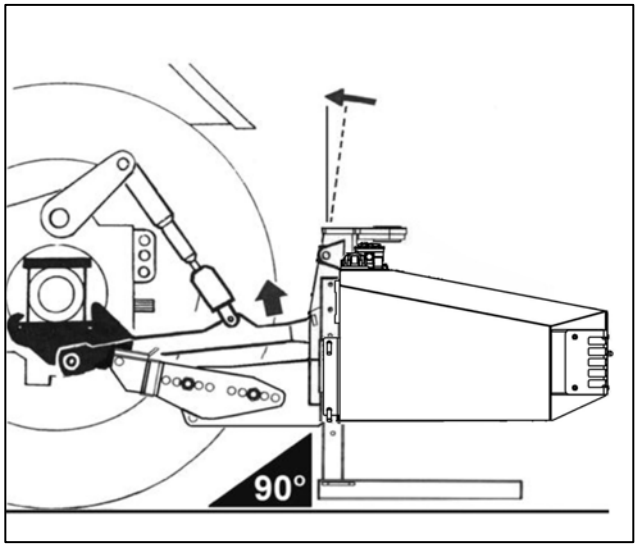


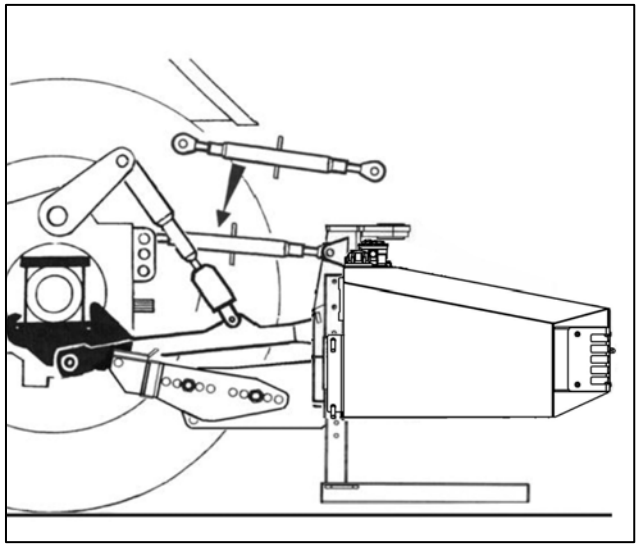
Standard Type Bracket

Locking Pins on this type of bracket pass through the arms above the latches and are secured with lynch pins.

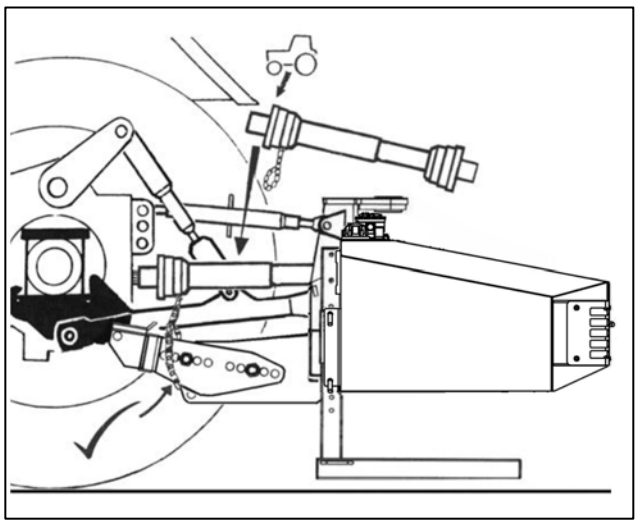


Alternative Type Bracket

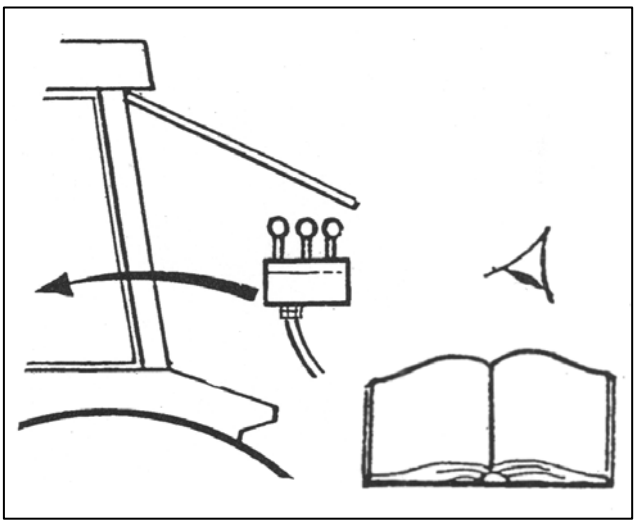




Raise machine on tractors linkage until the frame is vertical. Fit top link.



Fit PTO Shaft – *Refer to following page.*



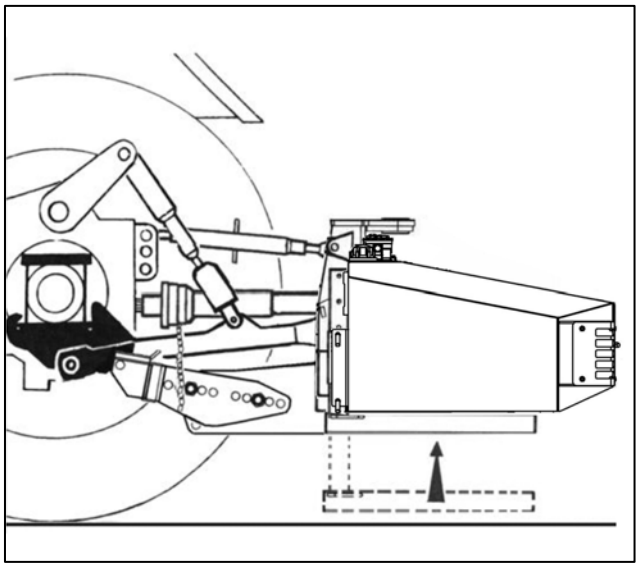
Install control unit in tractor cab.

Raise the support legs into the work position and secure with locking pins - *see diagram opposite.*

Tighten check chains and/or stabiliser bars.

Release transport locks and carefully operate the machine through its entire range of movements checking that all functions operate correctly.

Check that hoses have sufficient freedom of movement so that they are not at risk of damaged from being strained, pinched, chafed or kinked,



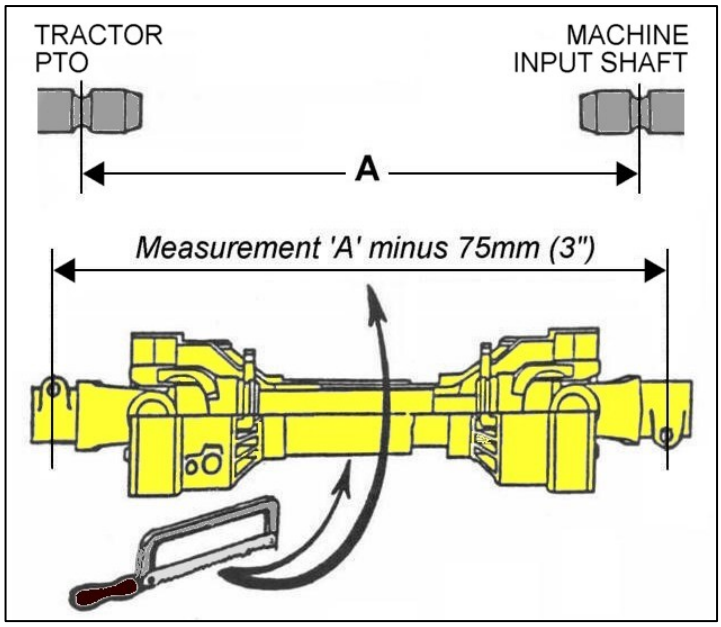
The machine can now be folded into the transport position ready to proceed to the work site - *Refer to the section on Transport Position for details on this subject.*

Ensure transport locking systems are correctly secured before transporting the machine.

PTO DRIVESHAFT INSTALLATION

The PTO driveshaft attaches between the tractor and the machine gearbox to transfer the power required to the run and operate the machine – it is important to achieve the correct shaft length to avoid risk of it 'bottoming out' when raising or lowering the machine.

The procedure for measuring and cutting the shaft is as follows:

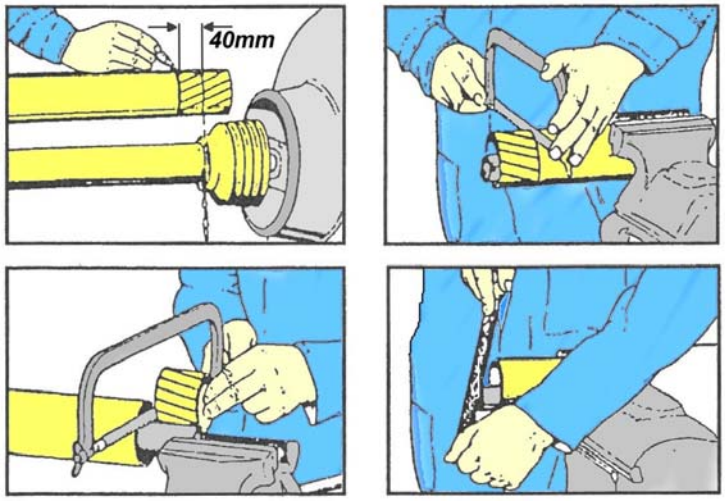


Measuring the PTO Shaft

With the machine attached to the tractor in the working position measure the horizontal distance 'A' from the tractor's PTO to the input shaft on the machines gearbox and subtract 75mm *(3") – this figure is the required shaft length.*

Place the fully closed PTO shaft on the ground and measure its overall length, if the shaft is shorter than the required length you can use it without the need to shorten - *providing it allows for a minimum 150mm (6") overlap when fitted.*

If the shaft is longer subtract the required shaft length plus an additional 75mm *(3") - the resulting figure is the excess length that will need to be removed from each half of the shaft.*



Cutting the PTO Shaft

Separate the two halves and using the measurement obtained above shorten both the plastic guarding and the inner steel profile tubes of each shaft by this same amount. De-burr the cut tubes with a file to remove rough or sharp edges and thoroughly clean to remove swarf before greasing, assembling and fitting the shaft.

NOTICE

For subsequent use with different tractors the shaft should be measured again to check suitability – *there must be a minimum shaft overlap of 150mm (6").*

Maintenance

To increase the working life of the PTO shaft it should be periodically checked, cleaned and lubricated – *refer to the PTO maintenance section for further details on this subject.*

FITTING CONTROL UNITS IN CAB

Proportional Controls

Revolution Proportional Controls comprise of 2 units; the main screen/control unit and the joystick/armrest control unit. The screen is supplied with a mounting bracket and suction cup assembly that allows the unit to be mounted onto the window of the tractor cab or other suitable surface – ensure the surface used is clean and dry and that the unit is mounted in a position where it does not obstruct operator vision.

The joystick/armrest unit is designed to slide over the armrest of the tractor seat and is held in place with the fixing straps provided. Alternately, a mounting bar is supplied that can be used should a more permanent installation be required; when fitting the latter ensure that any holes drilled in the tractor cab is are clear of important component and electrical wiring and should not be located in any area where it could affect the safety structure of the cab.

The power supply cable should be connected directly to the tractors battery - *do not use cigarette lighter type connections as these prove to be sporadic and unreliable for control applications.* Control units are 12 volt DC operated; the red lead is positive (+) and the black lead is negative (-).

RUNNING UP PROCEDURE

Ensure that the rotor control valve is in ‘STOP’ position, start tractor, engage PTO and allow the hydraulic oil to circulate through the return line filter for about 5 minutes without operation of the armhead control lever.

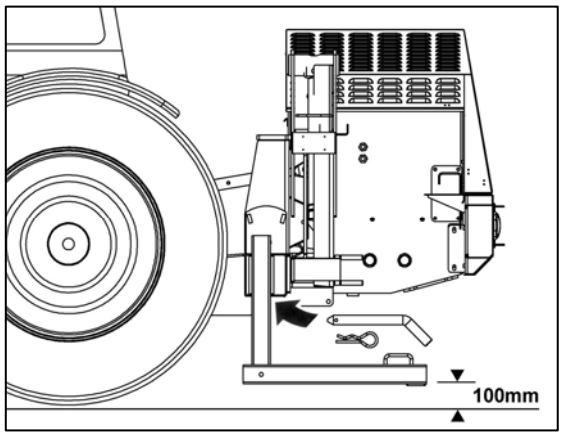
Operate the armhead levers through their complete range ensuring that all movements are functioning correctly.

Place the flail head at a safe attitude and move the rotor control to ‘START’ position. After initial fluctuation the rotor should settle to a steady speed. Increase PTO speed to approximately 360 rpm and run for a further five minutes before disengaging and stopping tractor.

Check the hose runs and observe that they are free from any pinching, chaffing, straining or kinks. Check the oil level in the tank-and top up as necessary.

REMOVAL FROM TRACTOR (Axle Mounted Machines)

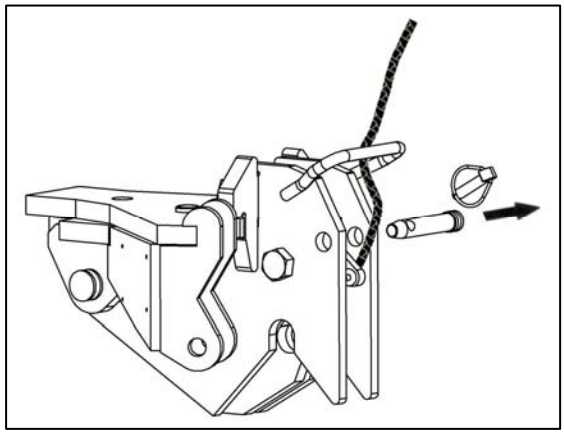
Removal of the machine must always be performed on a firm level site. Keep all bystanders at a safe distance from the machine.



⚠WARNING **Never stand between tractor and machine with the tractor running or when operating the tractor's draft links. Ensure hydraulics are set to position control.**

Fit and secure the machine's parking legs.

Position the arms at approximately half reach directly to the rear of the machine with the flail head approximately 600mm *(24")* off the ground.

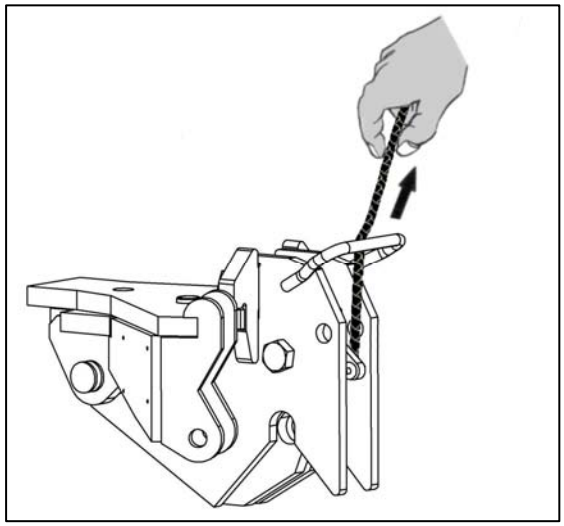


Remove axle latch security pins.

Take machine's weight on draft links sufficient to allow the top link to be disconnected, then remove the top link.

From the tractor cab; release the latch catches by pulling their cords.

Operate the draft links to lower the machine to the ground. *Check PTO is still fully engaged.*



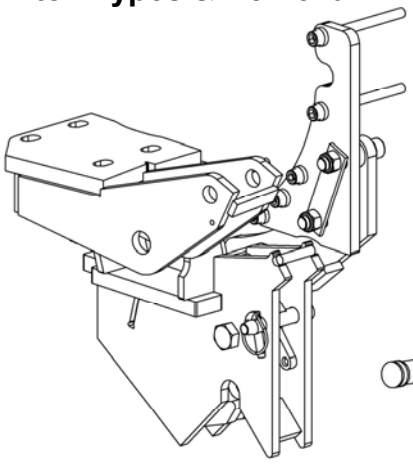
Level the machine by gently pushing the flailhead downwards against the ground using the machine's controls.

Disconnect draft links, PTO shaft and remove the control unit from the tractor cab. Store electric control units in a warm, dry and clean environment.

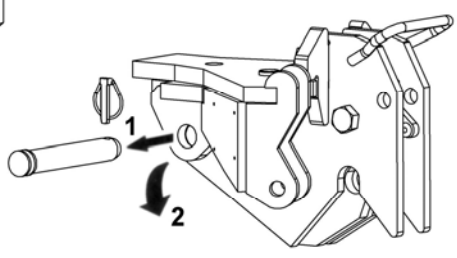
Carefully drive tractor clear of the machine.

Hitch Types & Removal

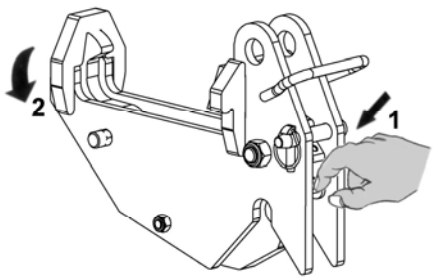
Illustrations show the 3 different types of hitches used on axle mounted machines and the removal method for 'non-fixed' versions.



Integral (fixed) Hitch



'Pin On' Hitch



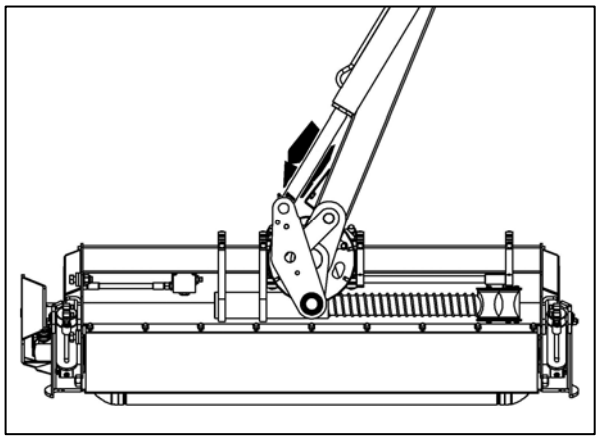
'Lift In' Hitch

STORAGE

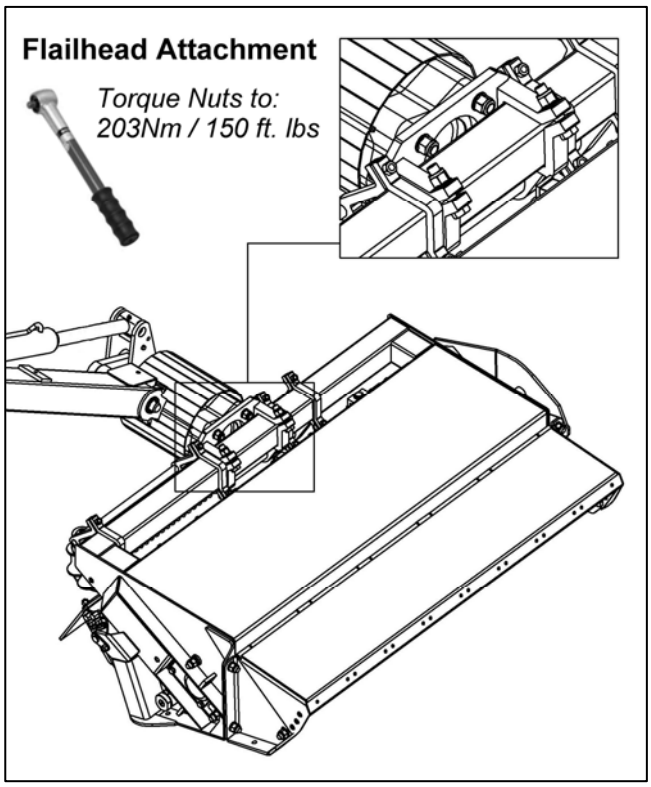
Wherever possible, storage of the machine should be a clean dry environment where it will be protected from the elements.
If the machine is to be stored for an extended period of time, lightly coat the exposed portions of the ram rods with grease. Subsequently this grease should be wiped off before the rams are next moved.

⚠WARNING **Ensure the machine is stored in a safe stable condition.**

Operate controls to manoeuvre the machine into a suitable position to enable attachment of the flailhead – *this should be with the head angle slave link in approximately the same position as shown in the illustration below.*



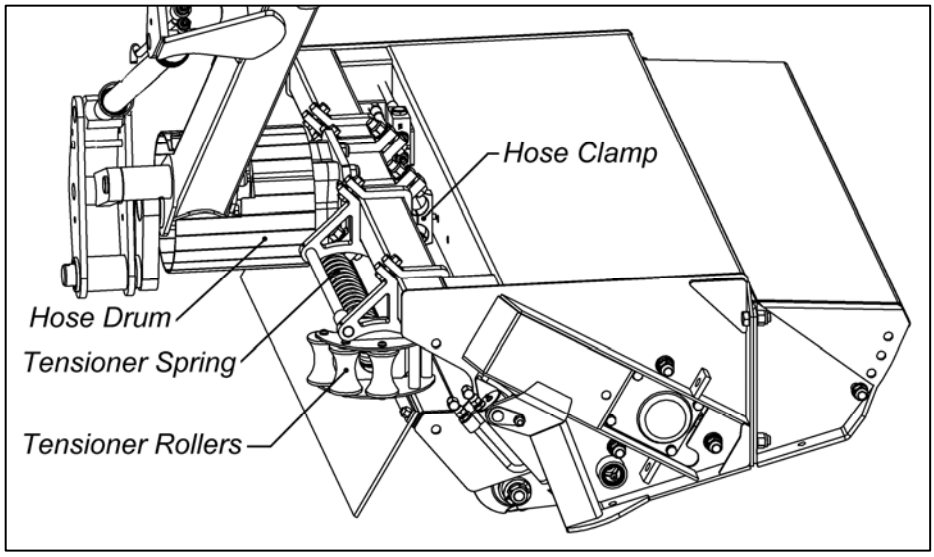
Fit the nuts and bolts supplied and tighten to a torque setting of 203Nm *(150 ft. lbs)*.

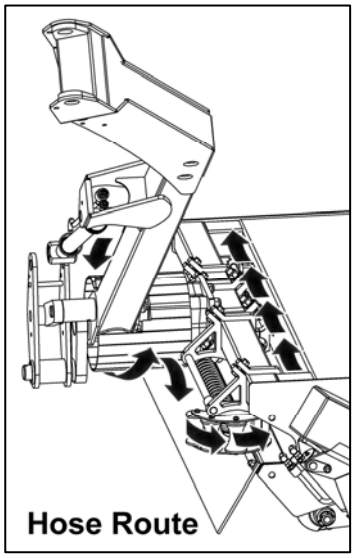


Flailhead Hose Routing and Attachment

The flailhead motor hoses must be routed over and around the hose drum before being passing round the tensioner rollers and along the rear of the flailhead, the help of a second person will be required at this point as the spring tensioner will need to be pushed towards the head pivot to afford sufficient slack in the hose run to permit the hoses to be attached to the motor. Attach the hoses to the clamps on the rear of the flailhead and tighten fully before releasing the tensioner.

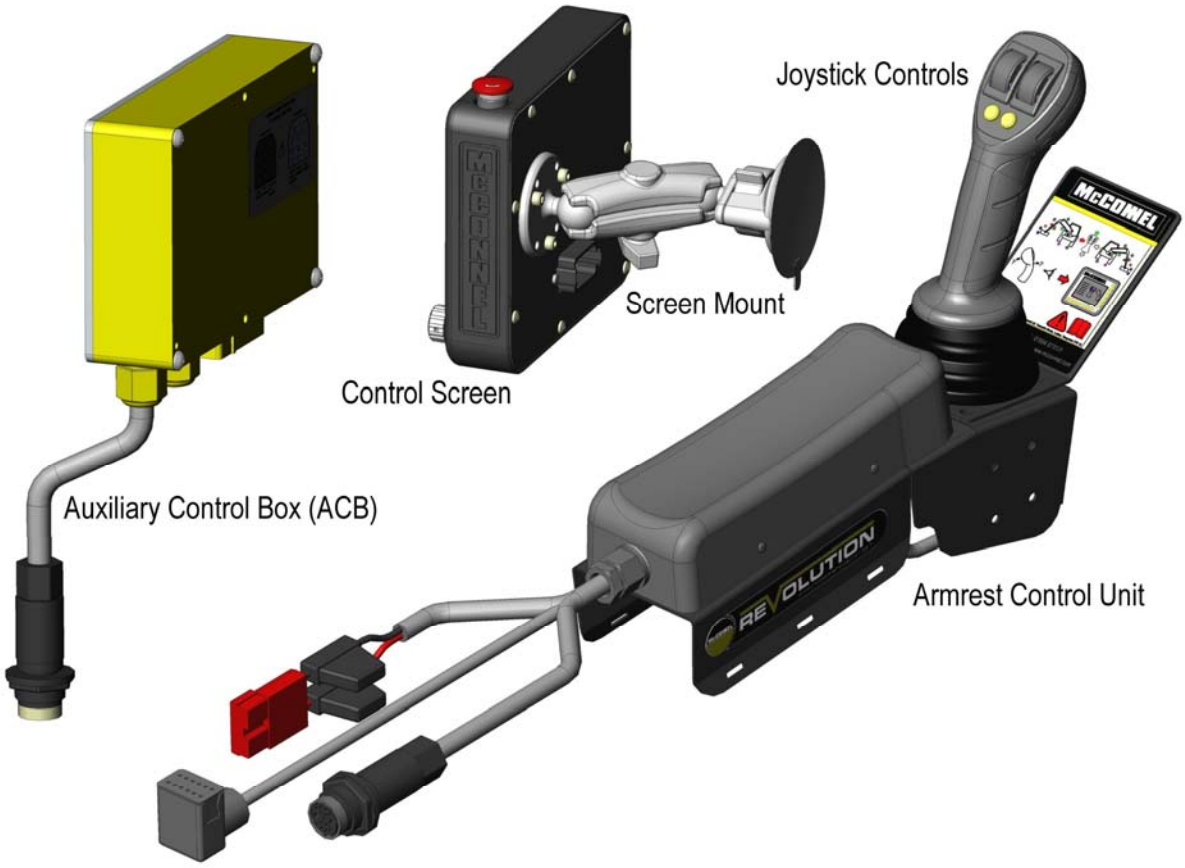
The diagrams below show locations of hose tensioning components and the routing of the flailhead hoses.

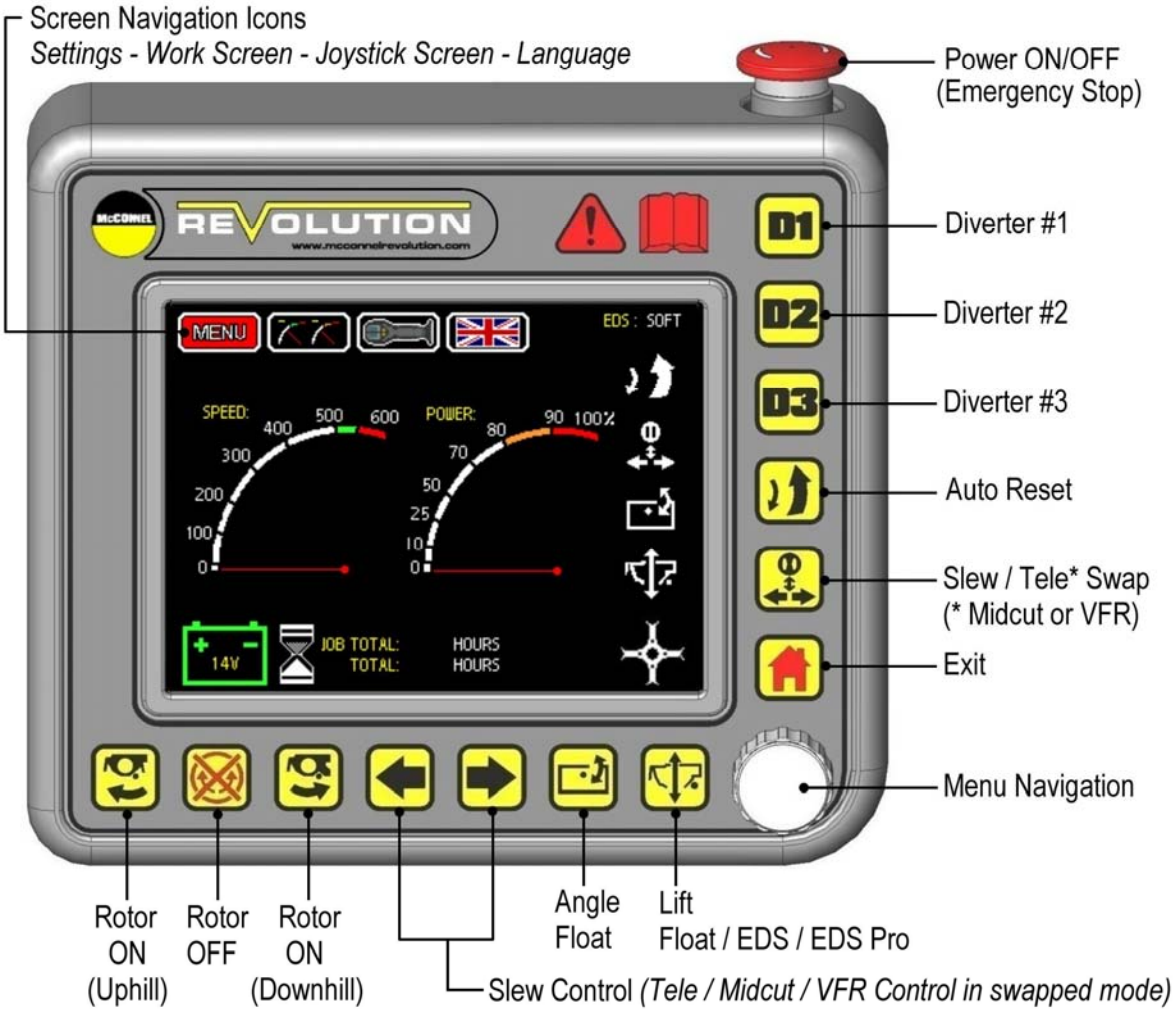




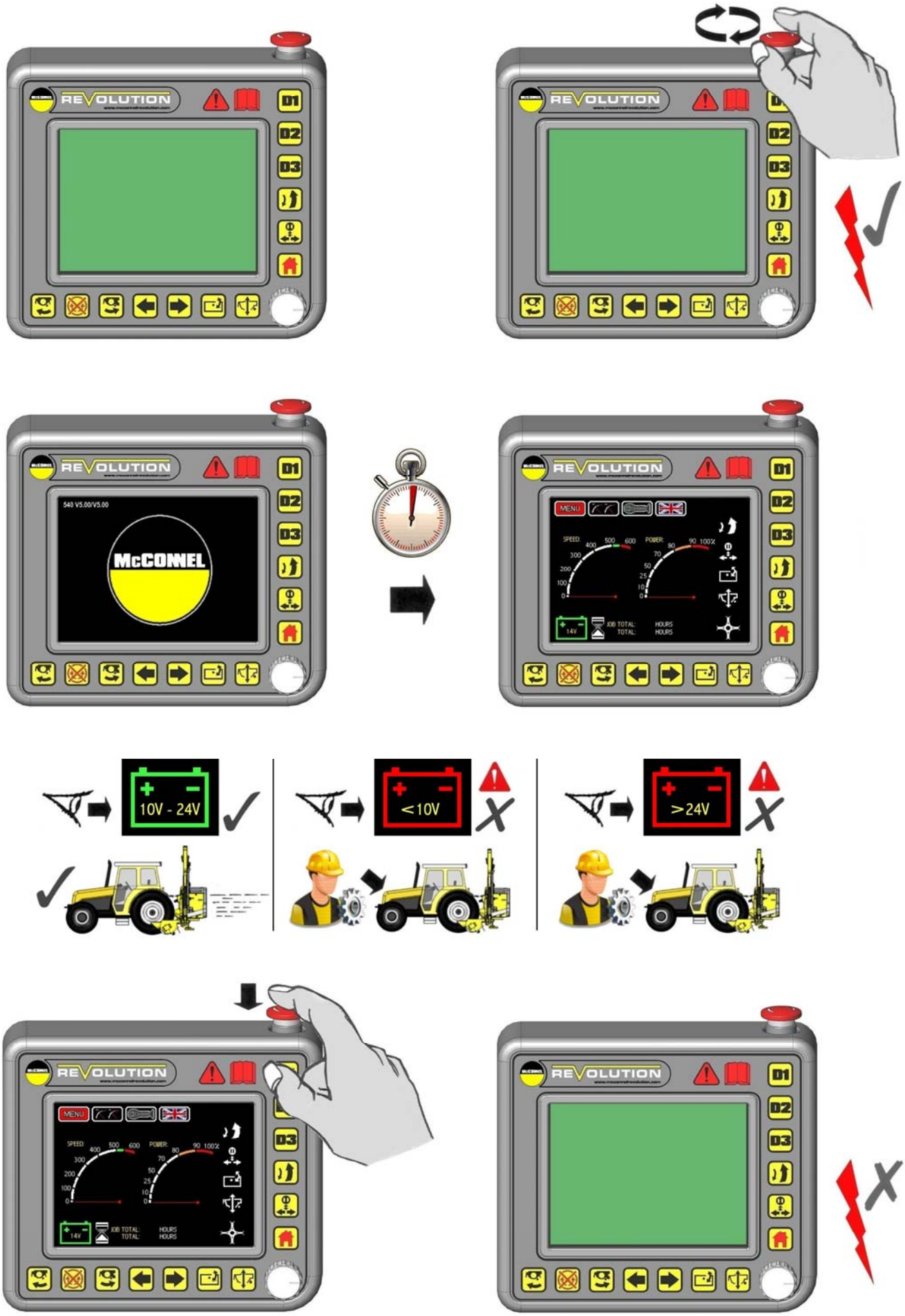
Flailhead Removal

The procedure for removal of the flailhead is basically a reversal of the above.

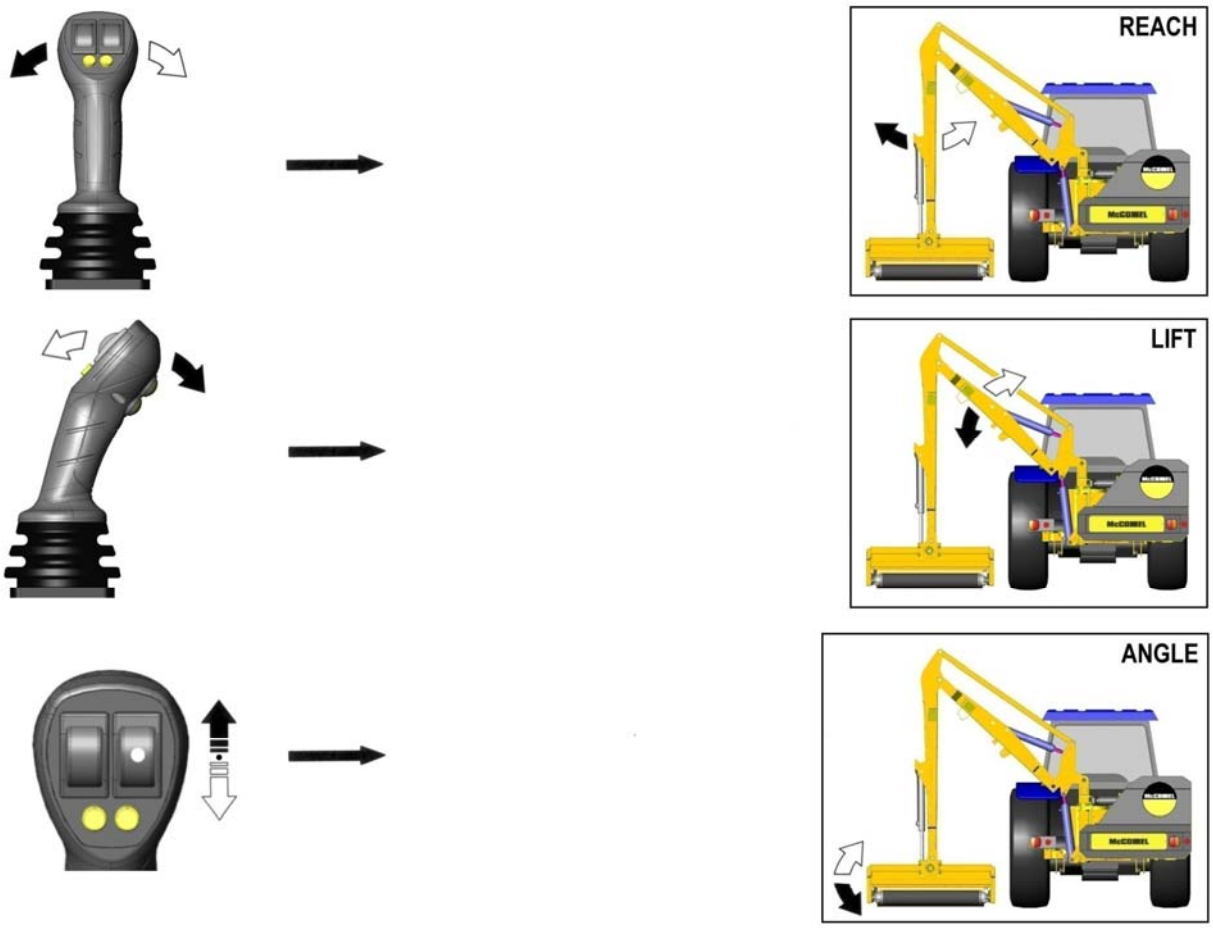

Joystick Controls
Screen Mount
Control Screen
Auxiliary Control Box (ACB)
Armrest Control Unit

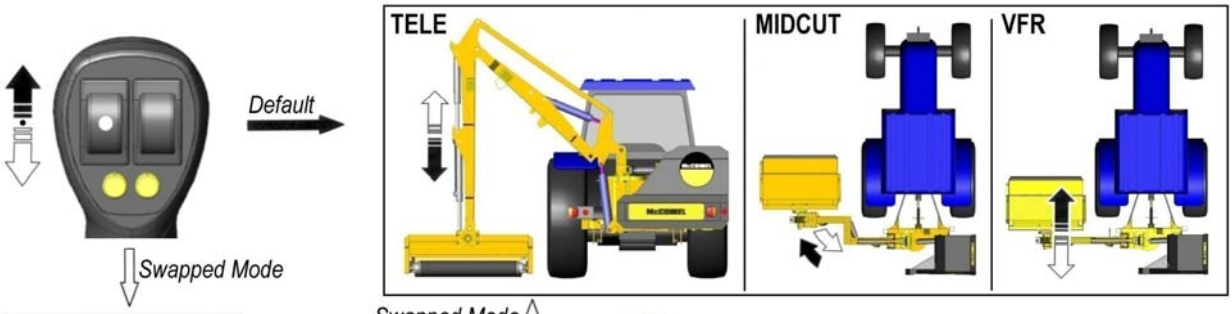

Screen Navigation Icons
Settings - Work Screen - Joystick Screen - Language
Power ON/OFF
(Emergency Stop)
Diverter #1
Diverter #2
Diverter #3
Auto Reset
Slew / Tele* Swap
(* Midcut or VFR)
Exit
Menu Navigation
Rotor ON (Uphill)
Rotor OFF
Rotor ON (Downhill)
Angle Float
Lift Float / EDS / EDS Pro
Slew Control (Tele / Midcut / VFR Control in swapped mode)

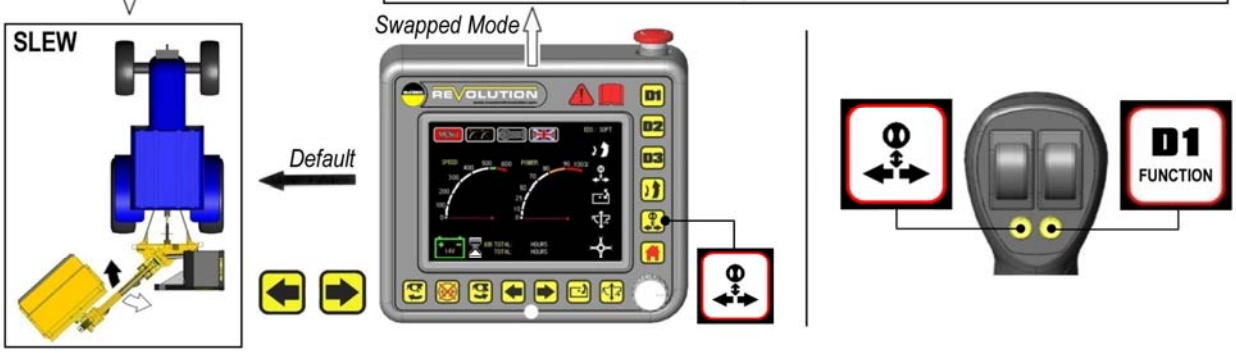
POWER ON /OFF


REVOLUTION
D1
D2
D3
540 V5.00/V5.00
McCONNEL
MENU
SPEED:
POWER:
JOB TOTAL:
TOTAL:
HOURS
10V - 24V
<10V
>24V

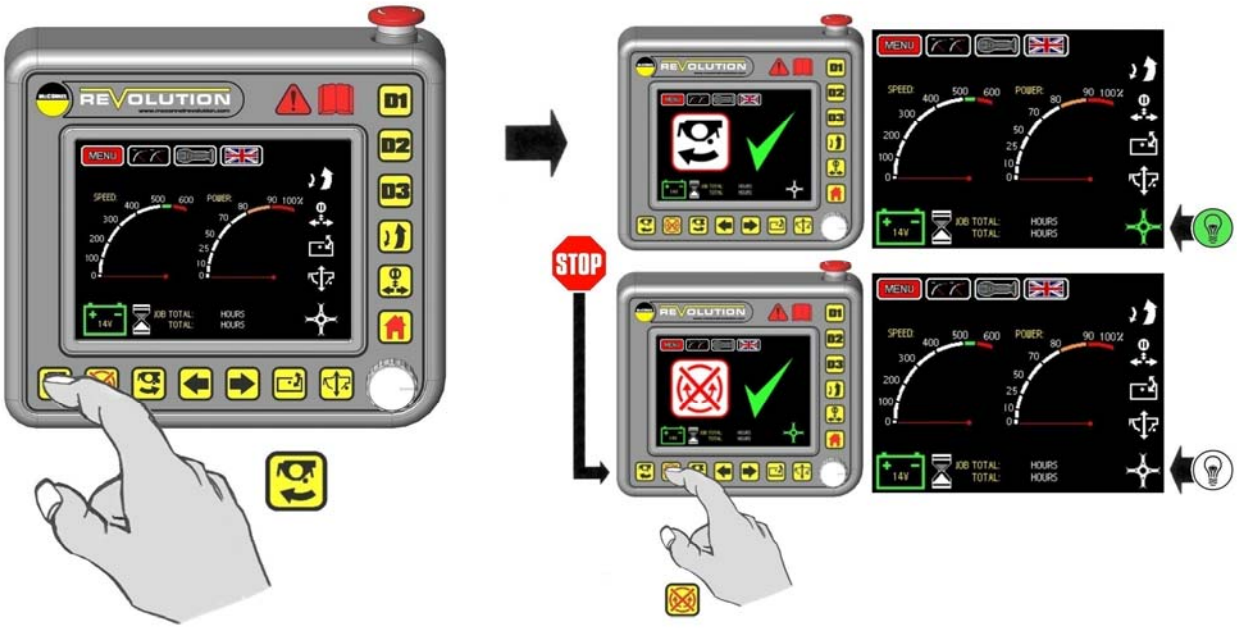
JOYSTICK LEVER OPERATIONS & DEFAULT SWITCH FUNCTIONS

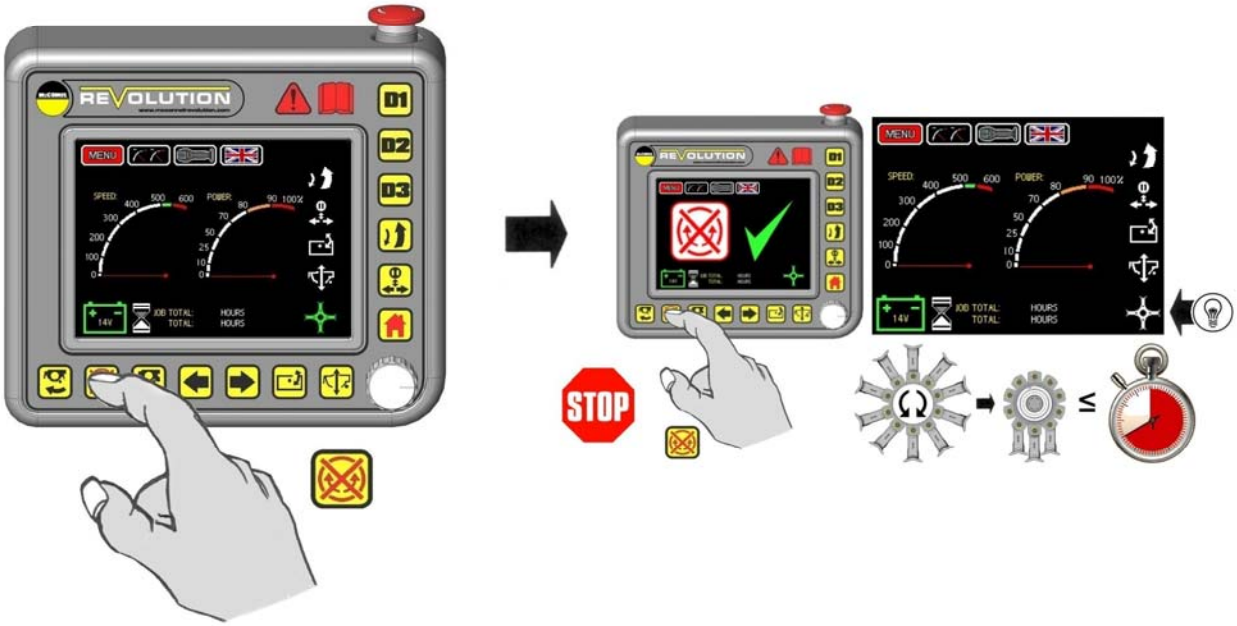


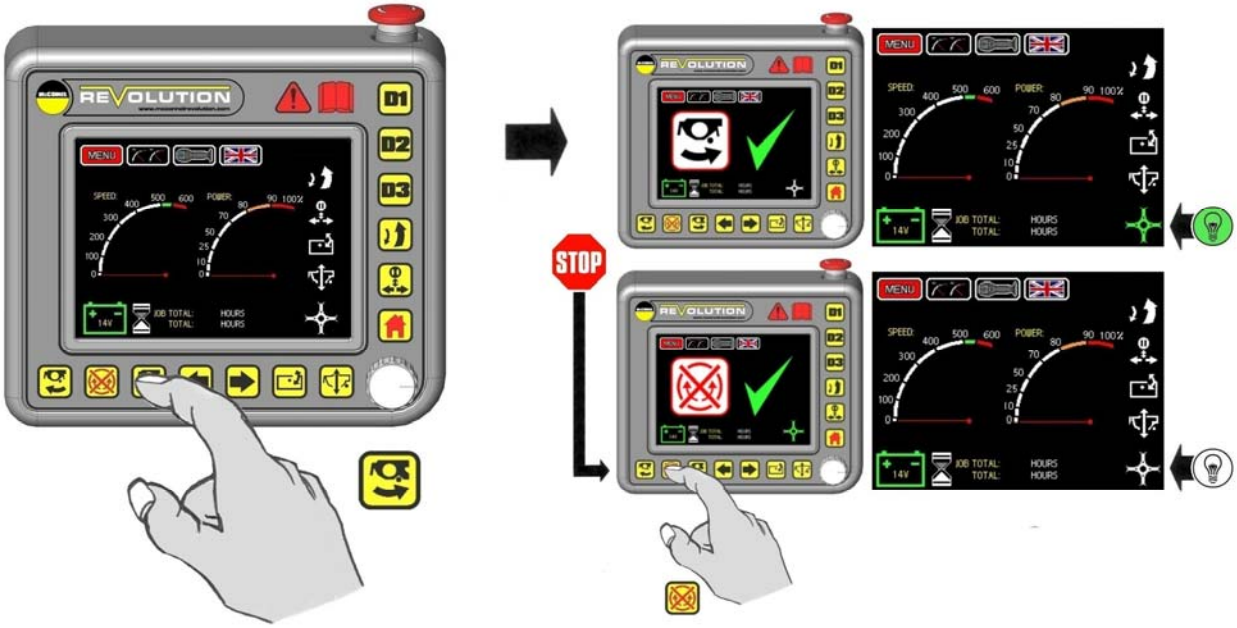




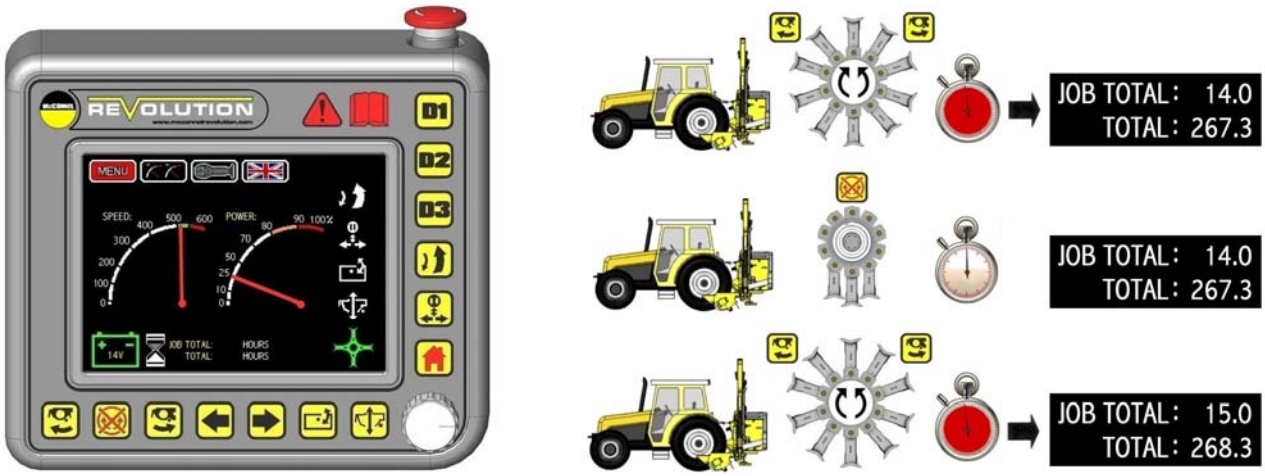
ROTOR ON & OFF

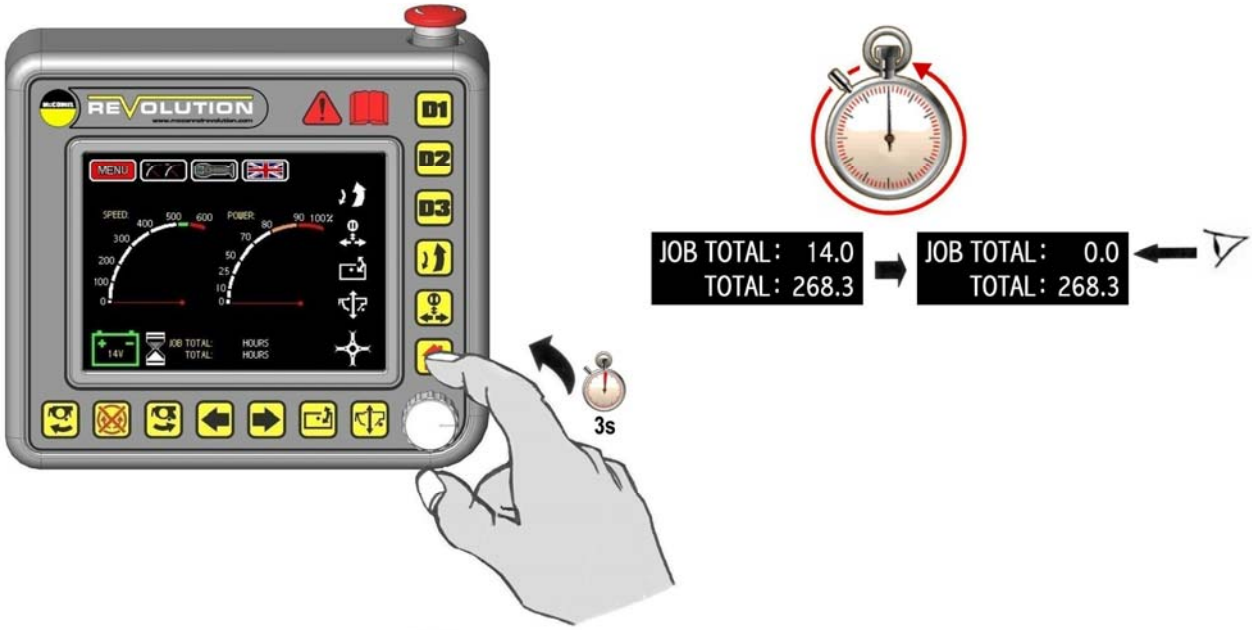

REVOLUTION
MENU
SPEED:
POWER:
JOB TOTAL:
TOTAL:
HOURS
14V
D1
D2
D3
STOP

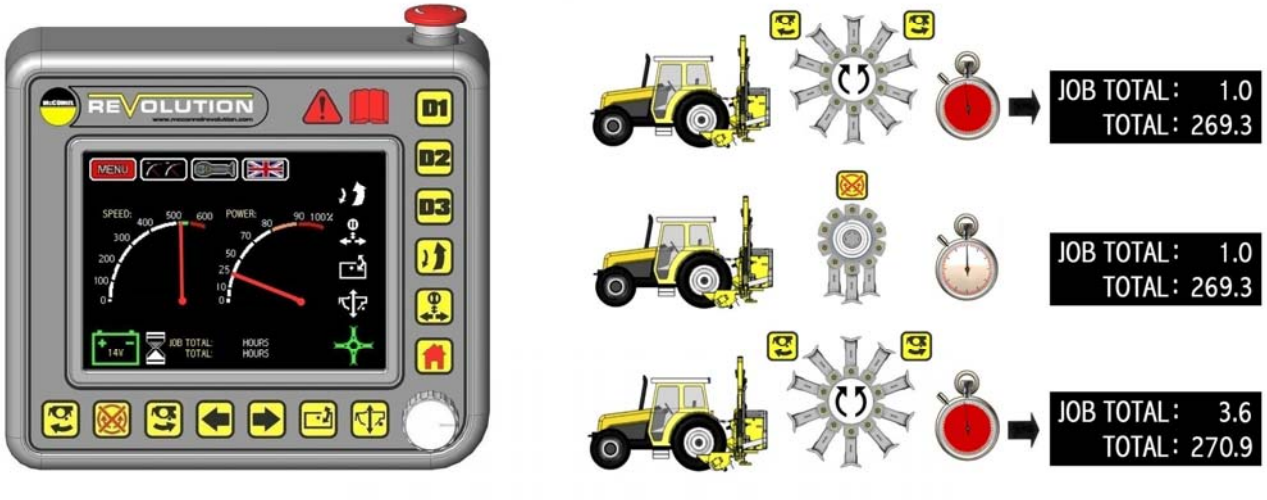

REVOLUTION
MENU
SPEED:
POWER:
JOB TOTAL:
TOTAL:
HOURS
14V
D1
D2
D3
STOP


REVOLUTION
MENU
SPEED:
POWER:
JOB TOTAL:
TOTAL:
HOURS
14V
D1
D2
D3
STOP

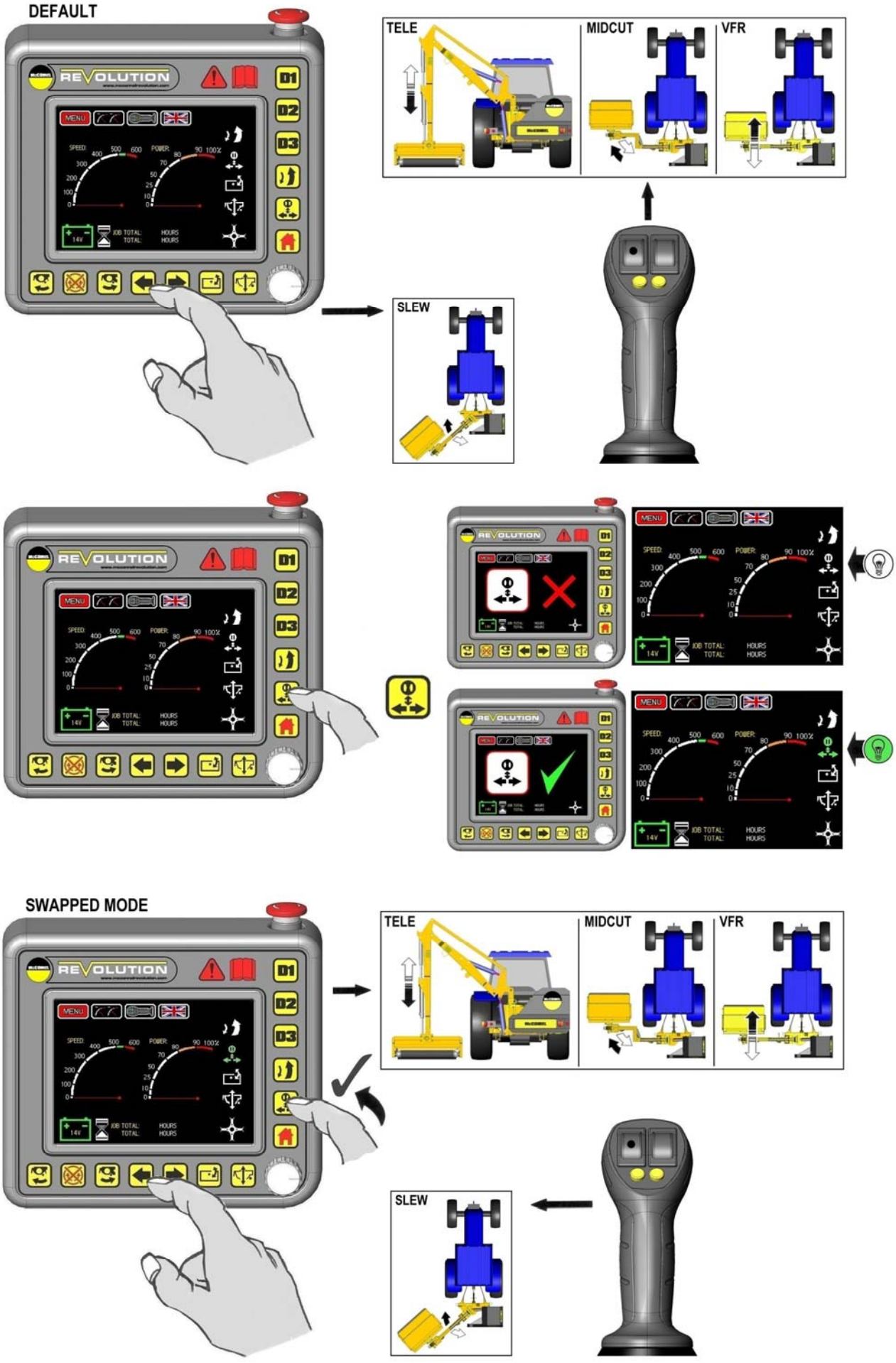
JOB TOTAL RESET



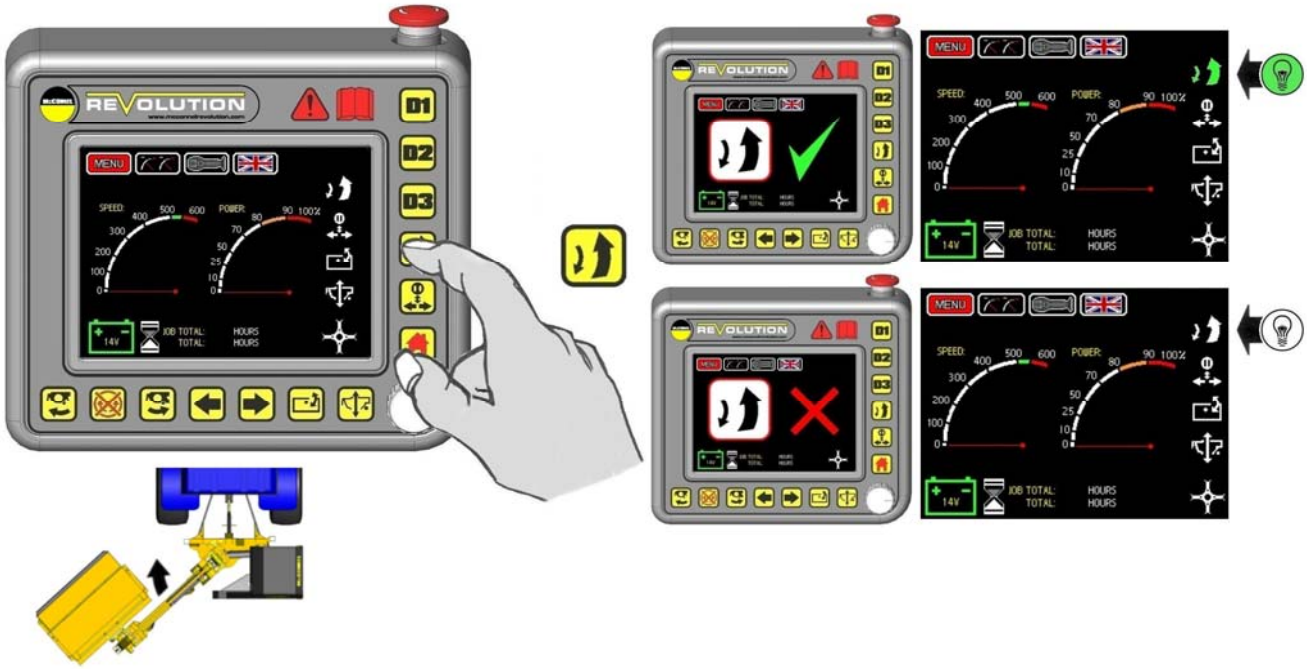




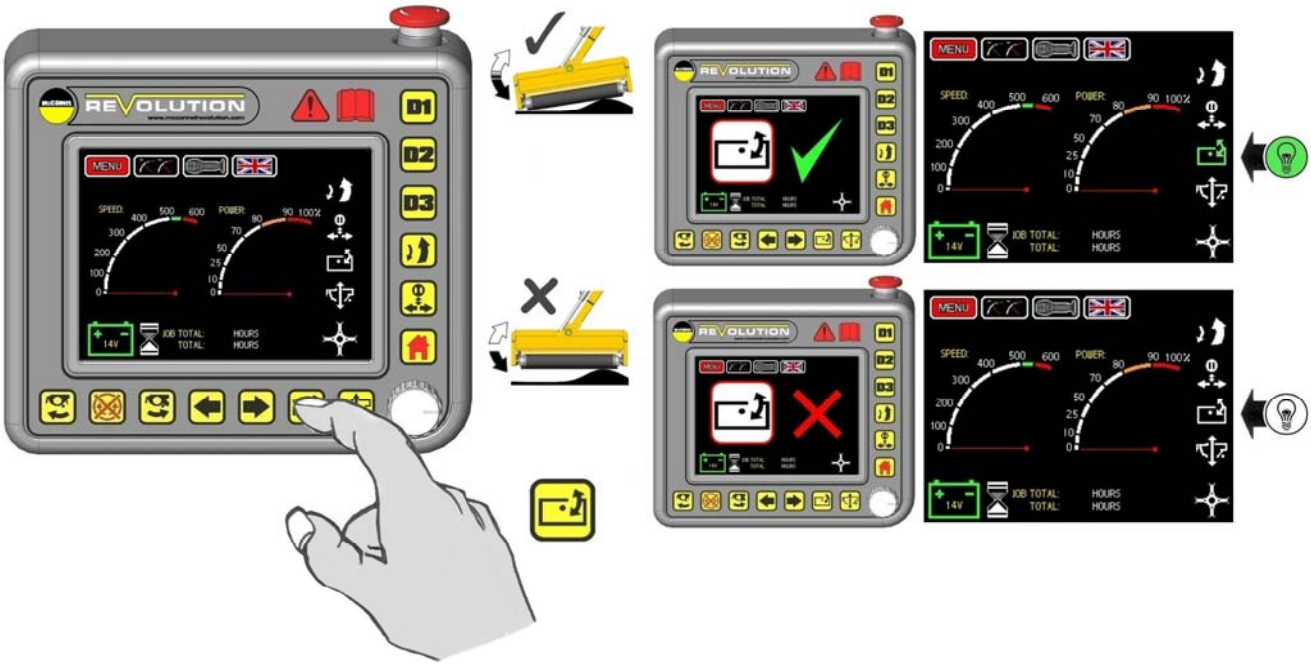
SLEW OPERATION & SLEW-TELE SWAP FUNCTION

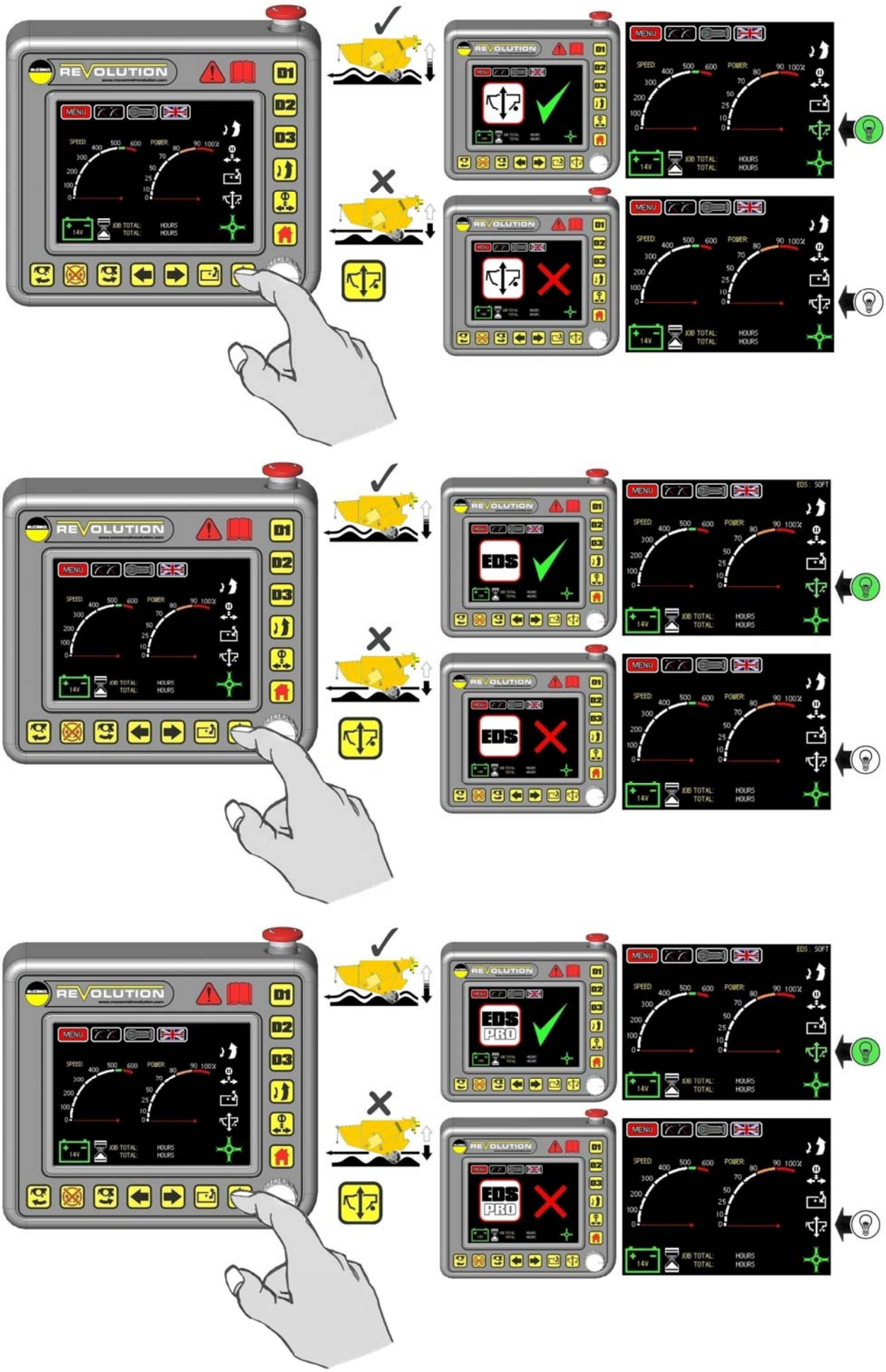


AUTO-RESET

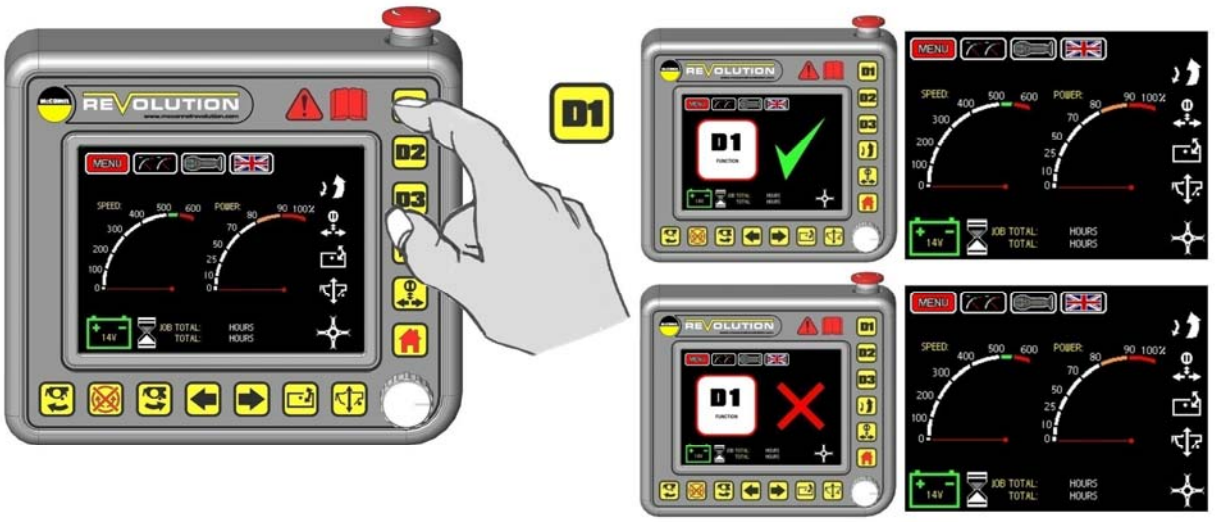


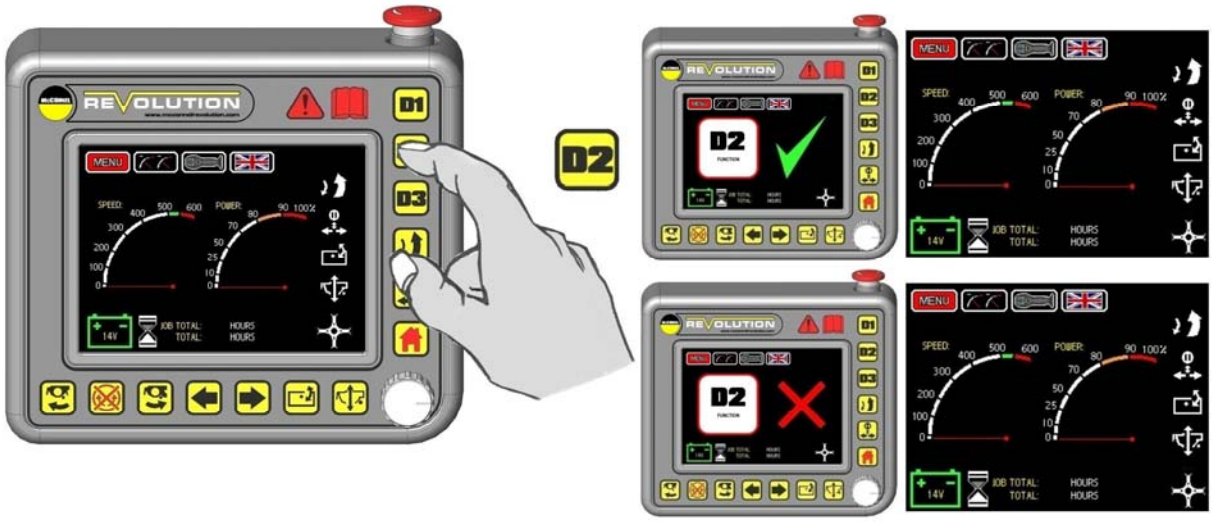
ANGLE FLOAT

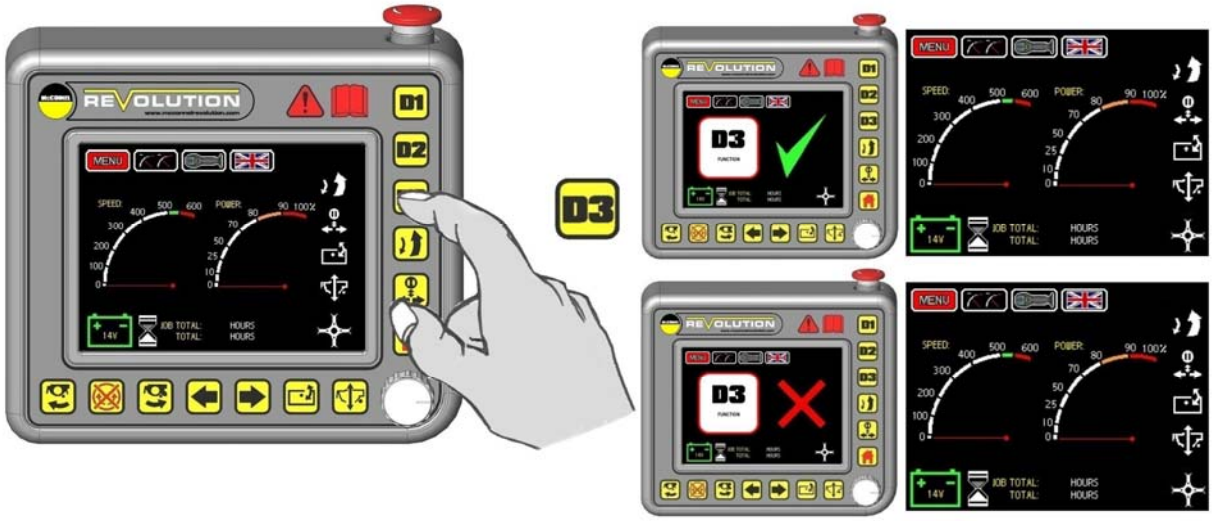


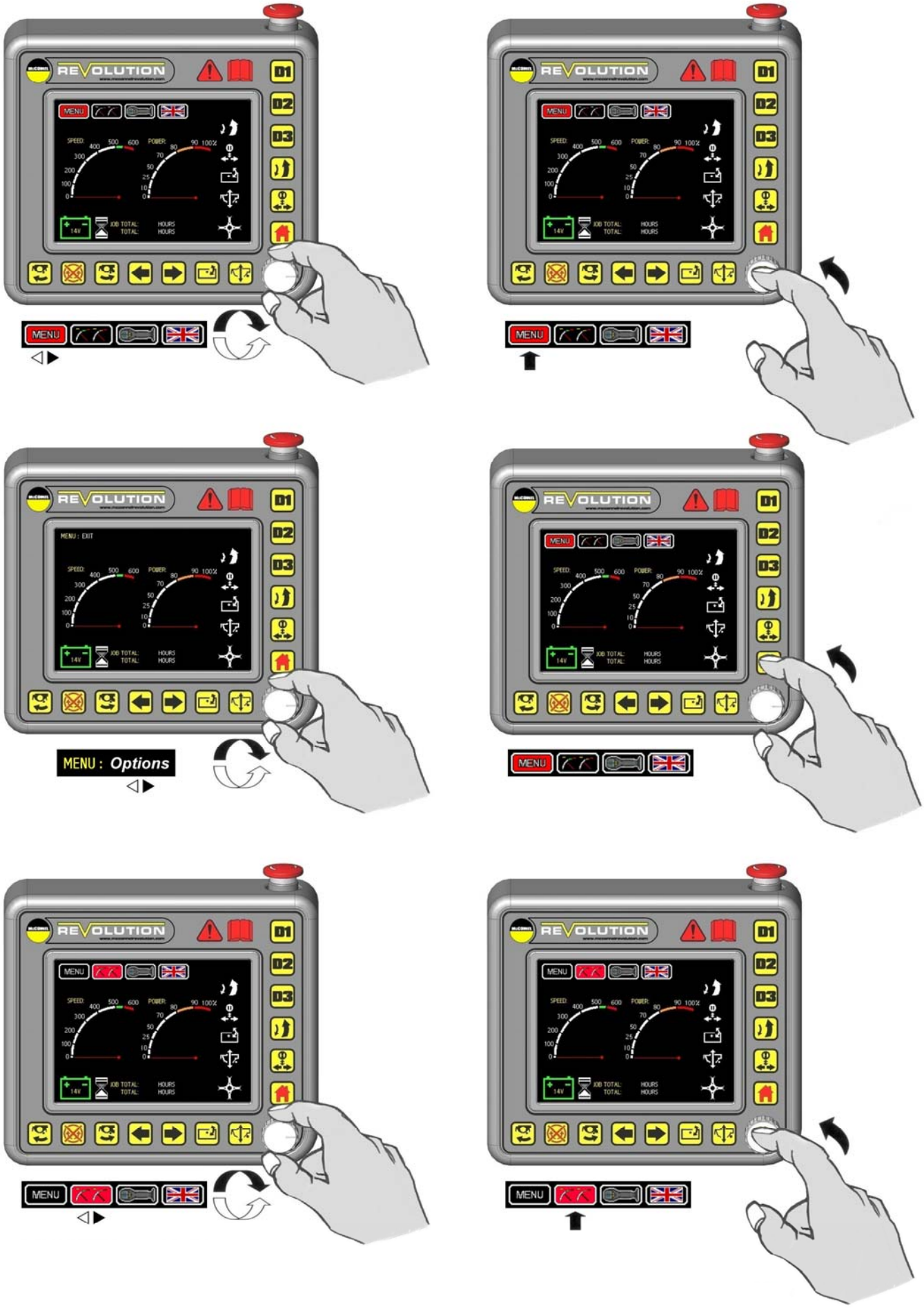

REVOLUTION
D1
D2
D3
MENU
SPEED:
POWER:
JOB TOTAL:
TOTAL:
HOURS
14V
EDS
EDS : SOFT
EDS PRO

DIVERTERS D1 / D2 / D3

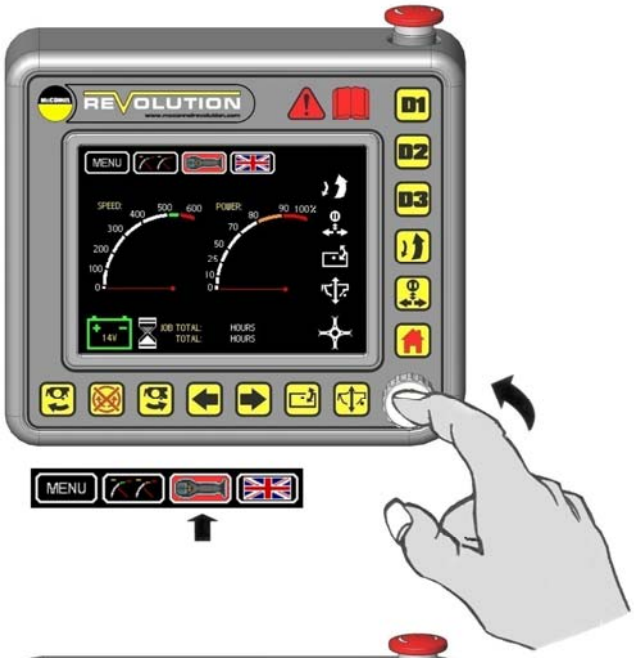







REVOLUTION
MENU
MENU : EXIT
MENU : Options


REVOLUTION
D1
D2
D3
MENU
SPEED:
POWER:
JOB TOTAL:
TOTAL:
HOURS
HOURS


REVOLUTION
D1
D2
D3
MENU
SPEED:
POWER:
JOB TOTAL:
TOTAL:
HOURS
HOURS


REVOLUTION
D1
D2
D3
MENU
THUMB : NORMAL
B1 : SLEW / TELE SWAP
B2 : DIVERTER 1
B3 : ACTIVE FLOAT
B4 : EDS FLOAT
RESET DEFAULT
TW1
TW2
B1
B2
B3
B4
JOB TOTAL:
TOTAL:
HOURS
HOURS

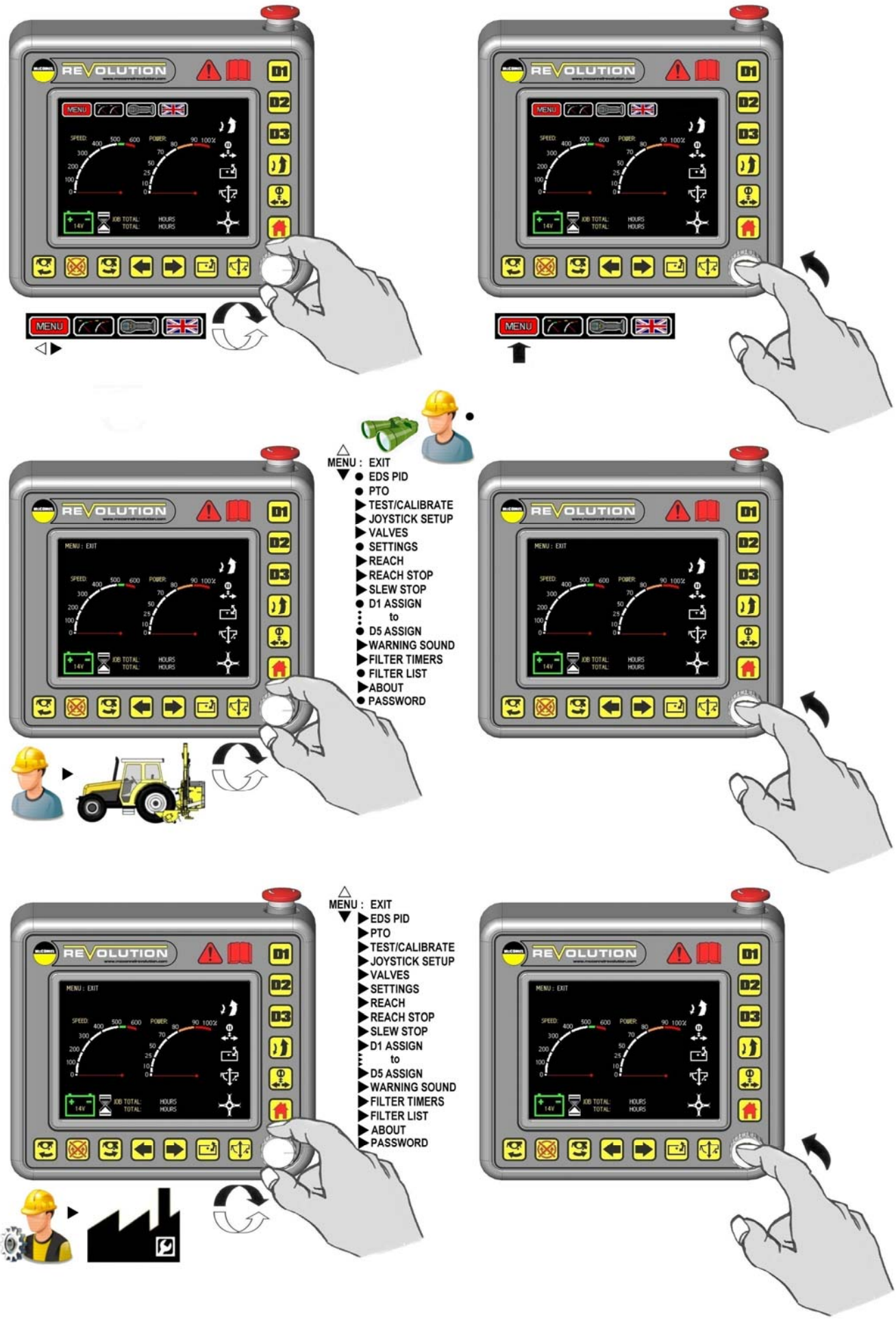

REVOLUTION
D1
D2
D3
MENU
THUMB : NORMAL
B1 : SLEW / TELE SWAP
B2 : DIVERTER 1
B3 : ACTIVE FLOAT
B4 : EDS FLOAT
RESET DEFAULT
TW1
TW2
B1
B2
B3
B4
JOB TOTAL:
TOTAL:
HOURS
HOURS

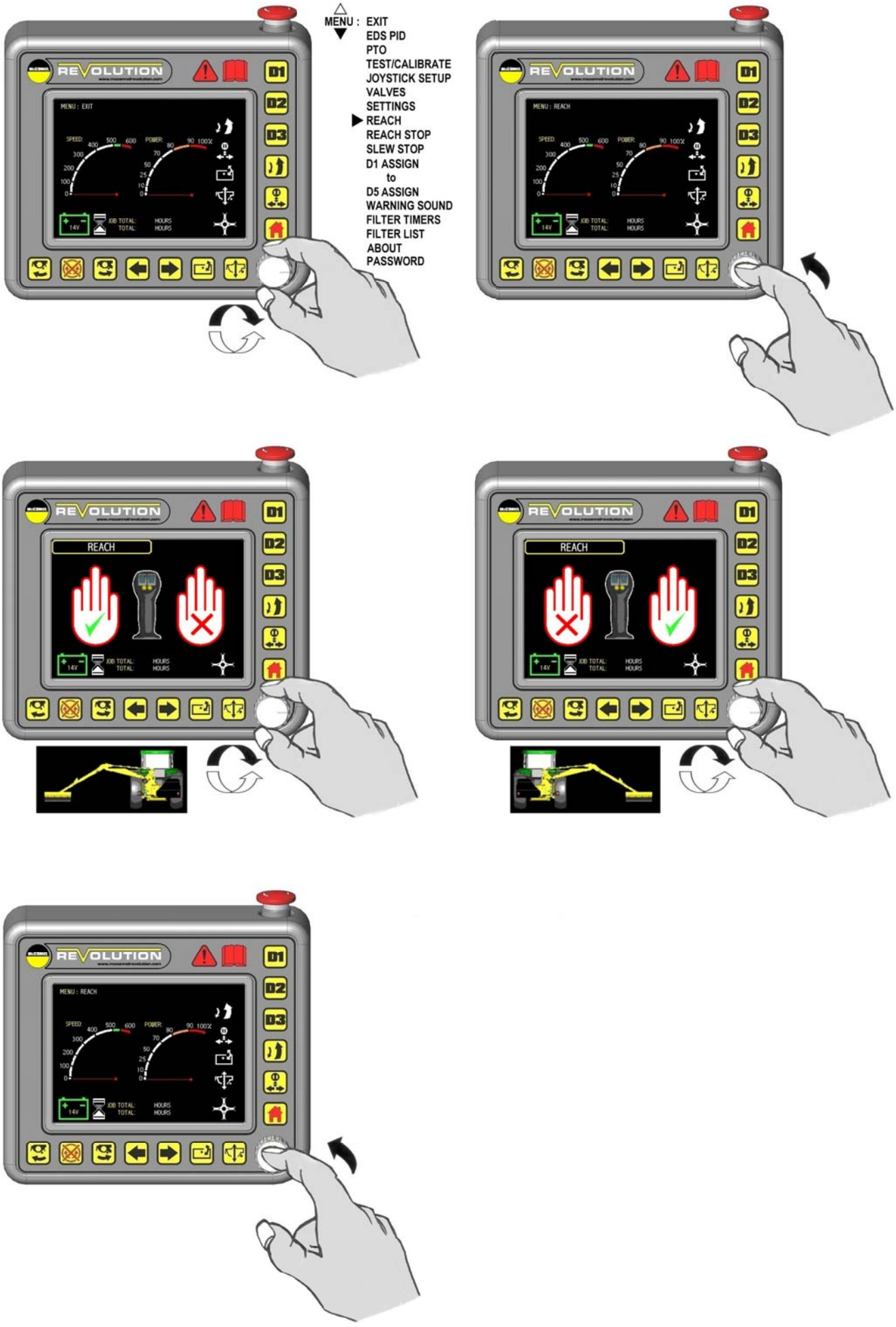

REVOLUTION
D1
D2
D3
MENU
SPEED:
POWER:
JOB TOTAL:
TOTAL:
HOURS
HOURS


REVOLUTION
D1
D2
D3
MENU
SPEED:
POWER:
JOB TOTAL:
TOTAL:
HOURS
HOURS

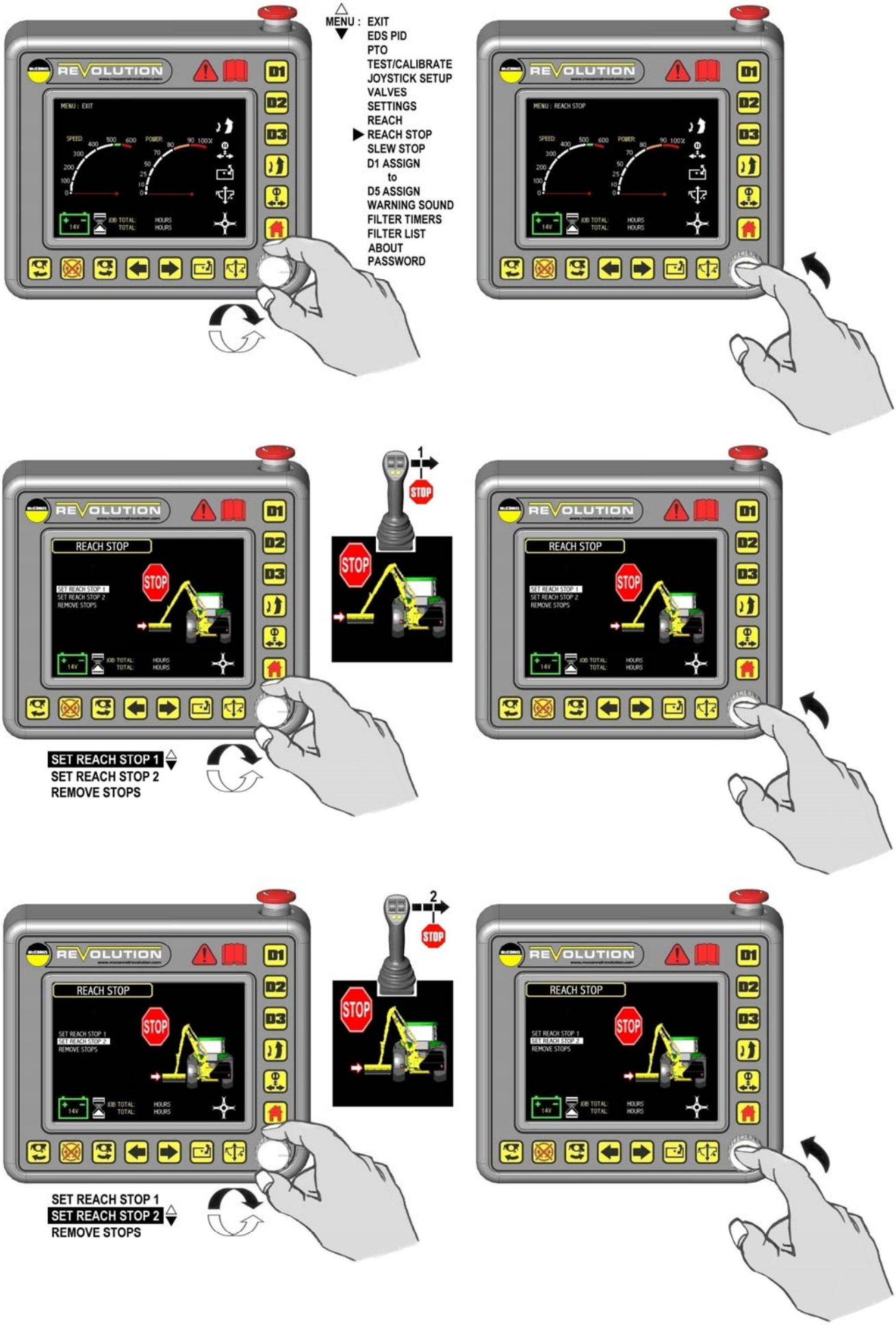
SCREEN NAVIGATION – Language Selection Screen

MENU ACCESS & SETTINGS

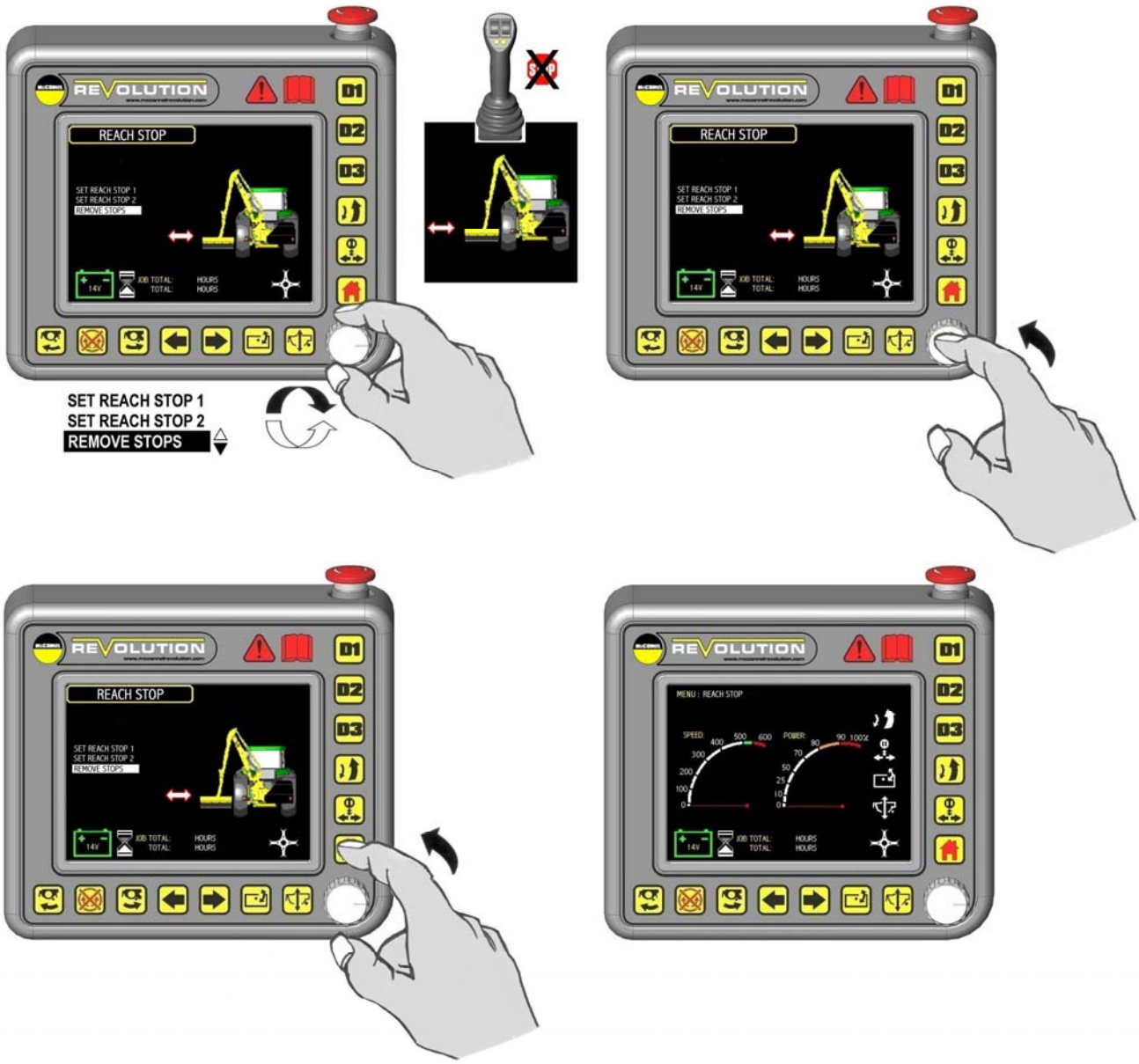



MENU : EXIT
EDS PID
PTO
TEST/CALIBRATE
JOYSTICK SETUP
VALVES
SETTINGS
REACH
REACH STOP
SLEW STOP
D1 ASSIGN
to
D5 ASSIGN
WARNING SOUND
FILTER TIMERS
FILTER LIST
ABOUT
PASSWORD
REVOLUTION
MENU : EXIT
MENU : REACH
REACH
D1
D2
D3

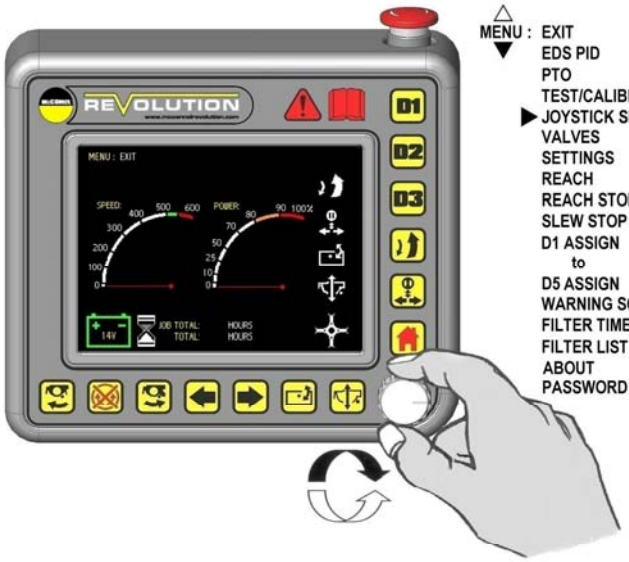
REACH STOPS – Setting Reach Stop Positions

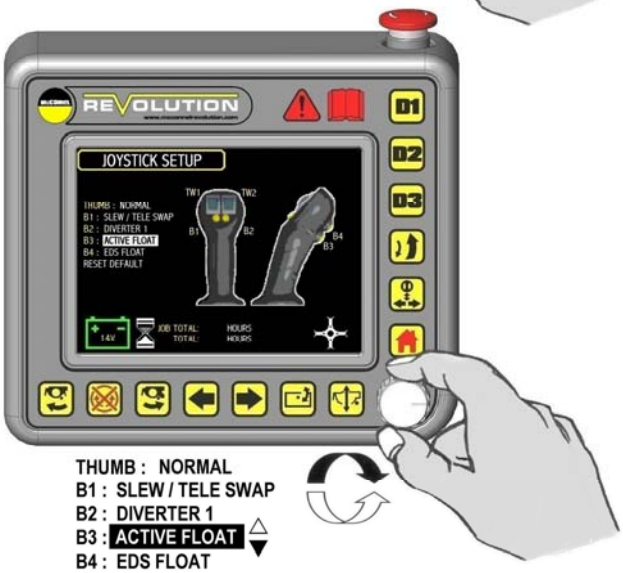


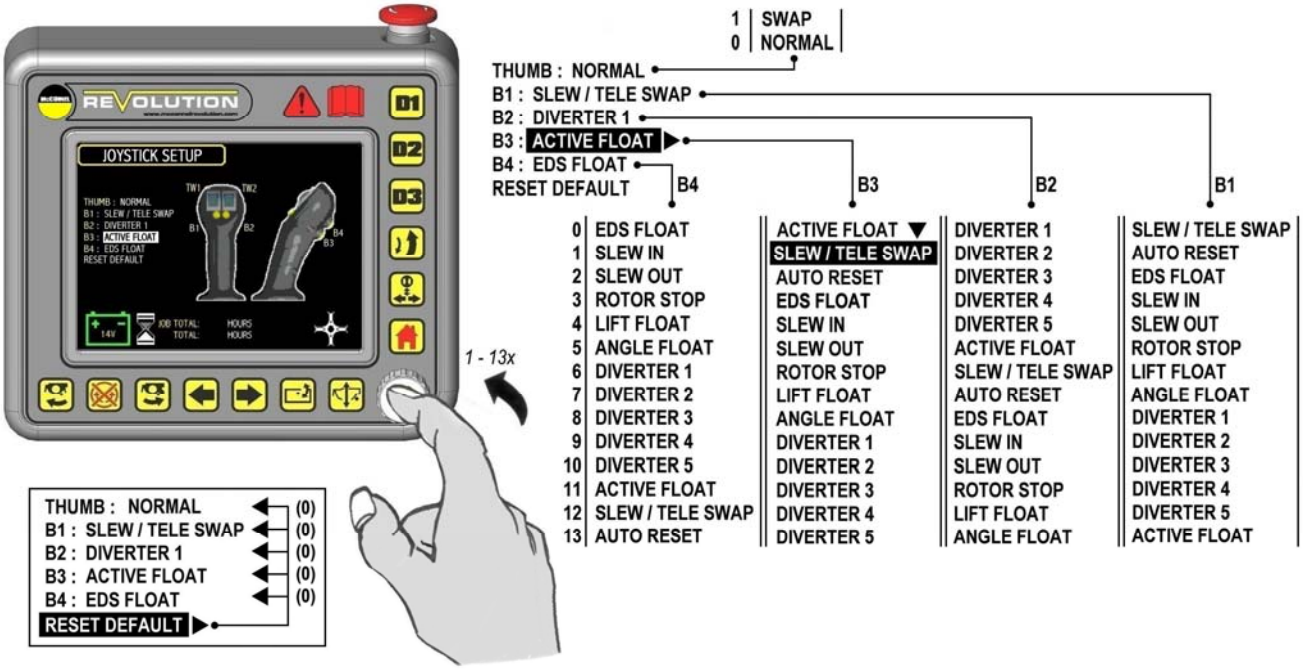
REACH STOPS – Remove Stop Positions



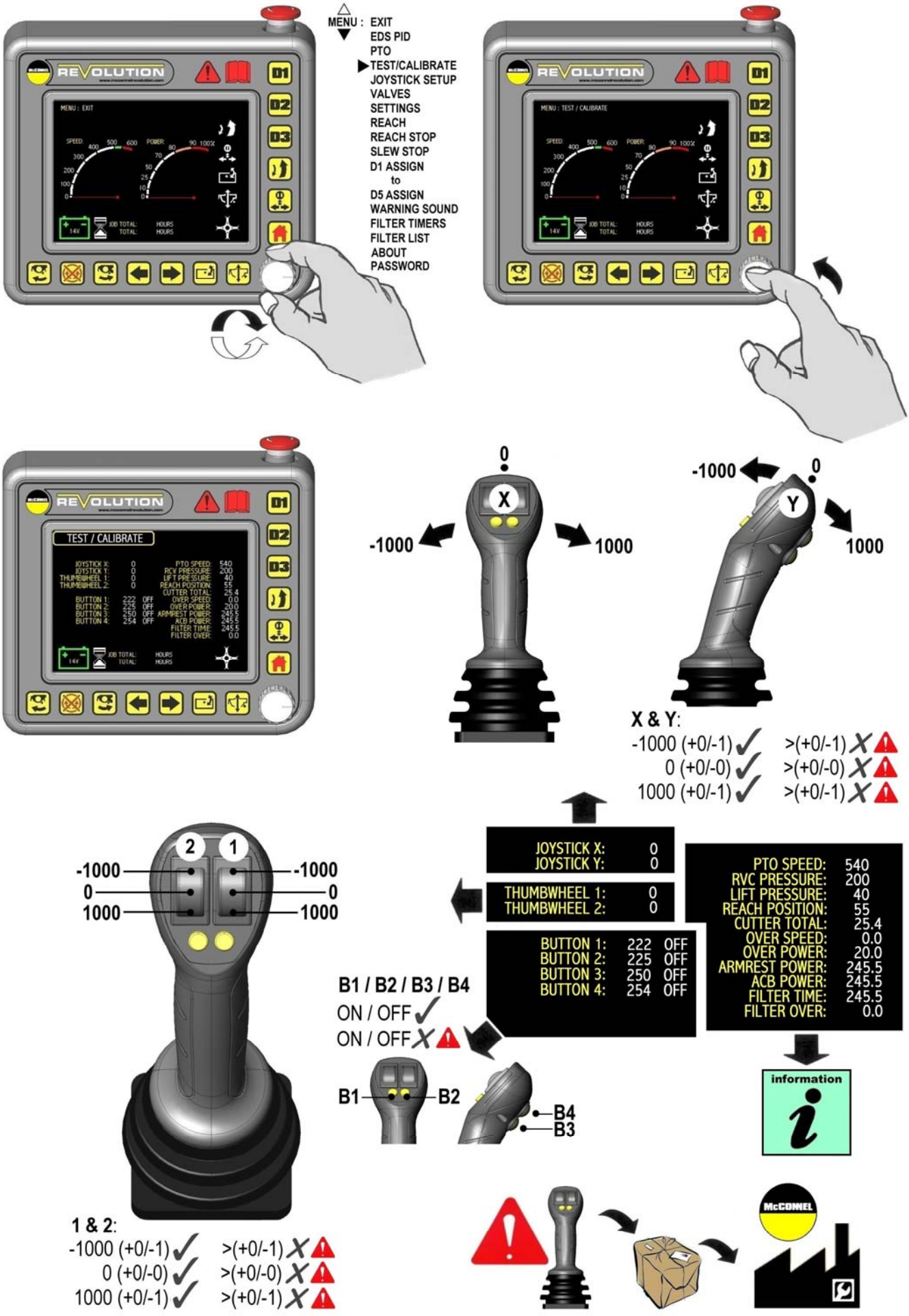
JOYSTICK SETUP – Selection & Activation of Joystick Functions



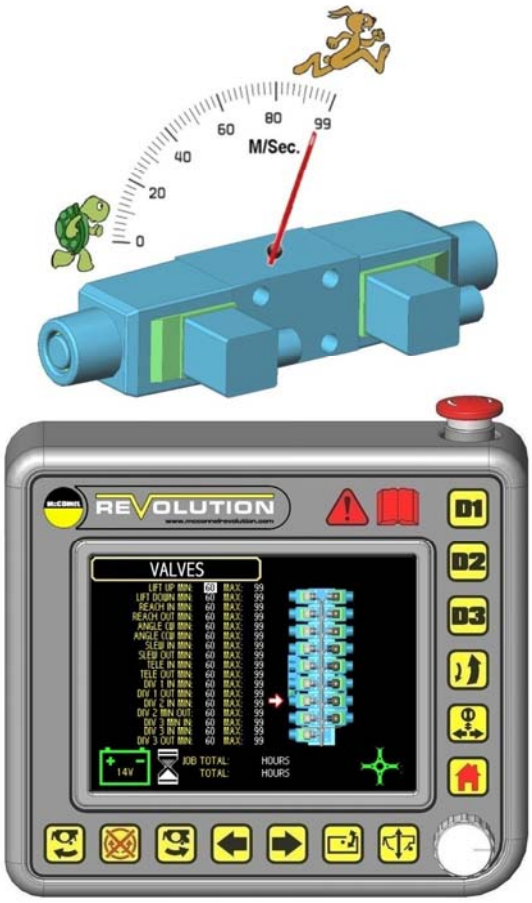




JOYSTICK TEST / CALIBRATE



VALVE RESPONSE SETTINGS



< DEFAULT SETTINGS >

LIFT UP MIN:	50	MAX:	99
LIFT DOWN MIN:	50	MAX:	99
REACH IN MIN:	60	MAX:	99
REACH OUT MIN:	60	MAX:	99
ANGLE CW MIN:	60	MAX:	99
ANGLE CCW MIN:	60	MAX:	99
SLEW IN MIN:	60	MAX:	99
SLEW OUT MIN:	60	MAX:	99
TELE IN MIN:	60	MAX:	99
TELE OUT MIN:	60	MAX:	99
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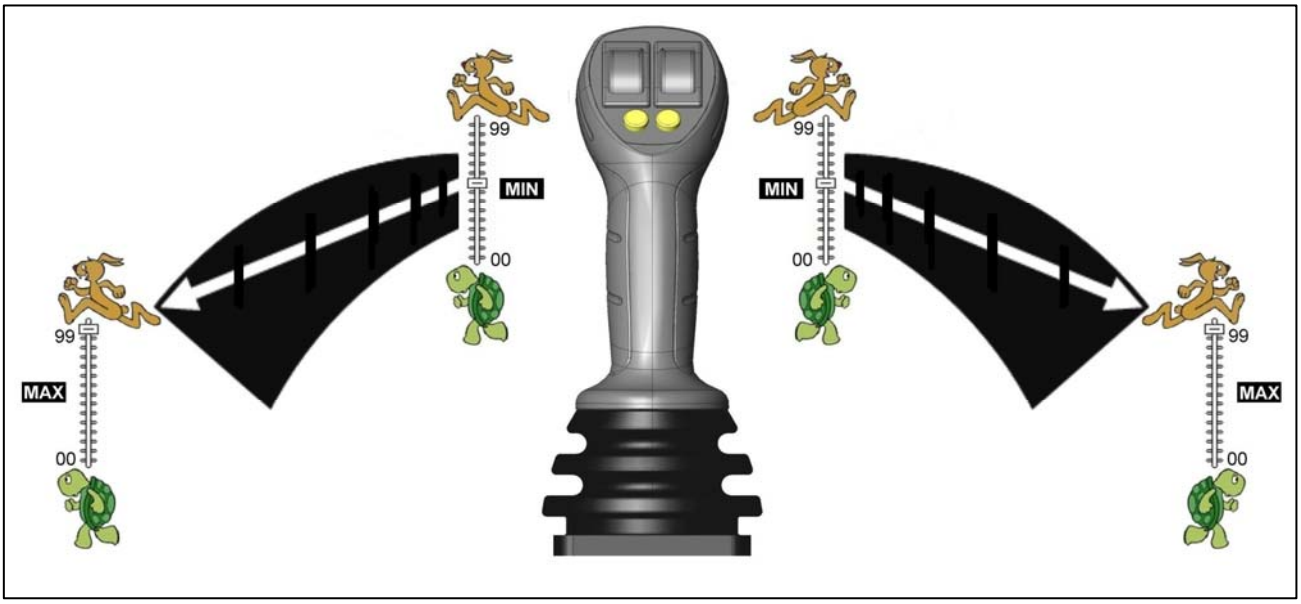
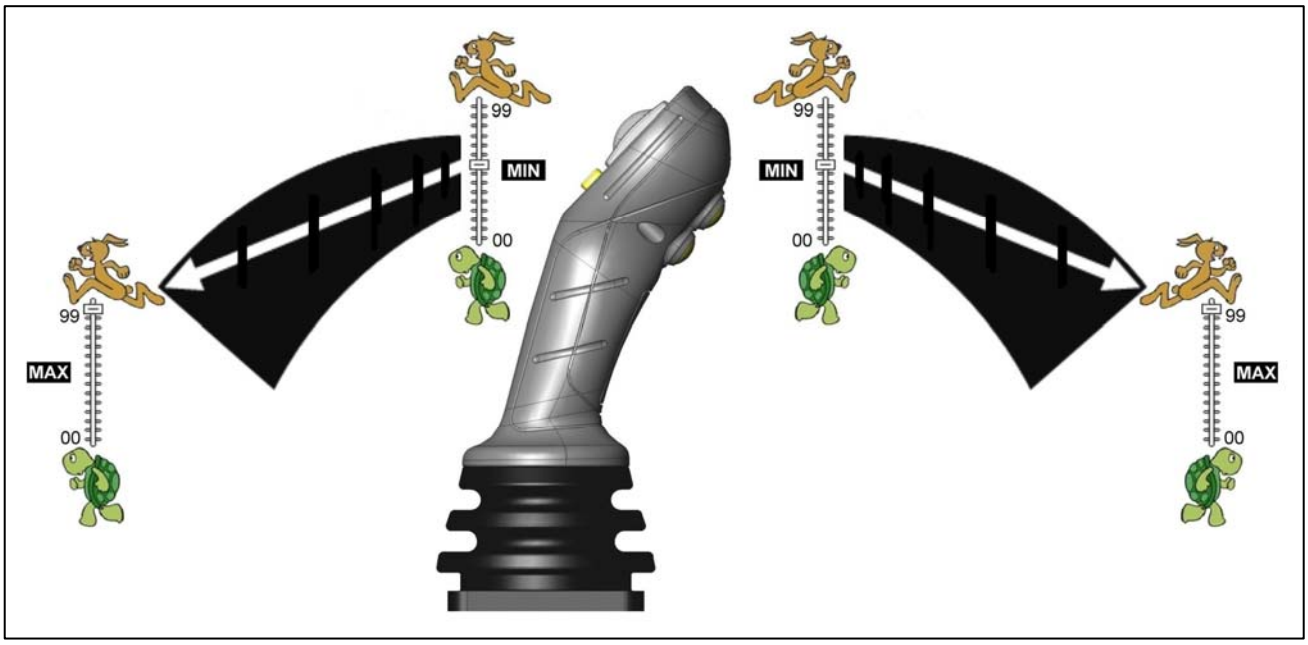
DIV 1 OUT MIN:	60	MAX:	99
DIV 2 IN MIN:	60	MAX:	99
DIV 2 OUT MIN:	60	MAX:	99
DIV 3 IN MIN:	60	MAX:	99
DIV 3 OUT MIN:	60	MAX:	99
SLEW 2 IN MIN:	60	MAX:	99
SLEW 2 OUT MIN:	60	MAX:	99

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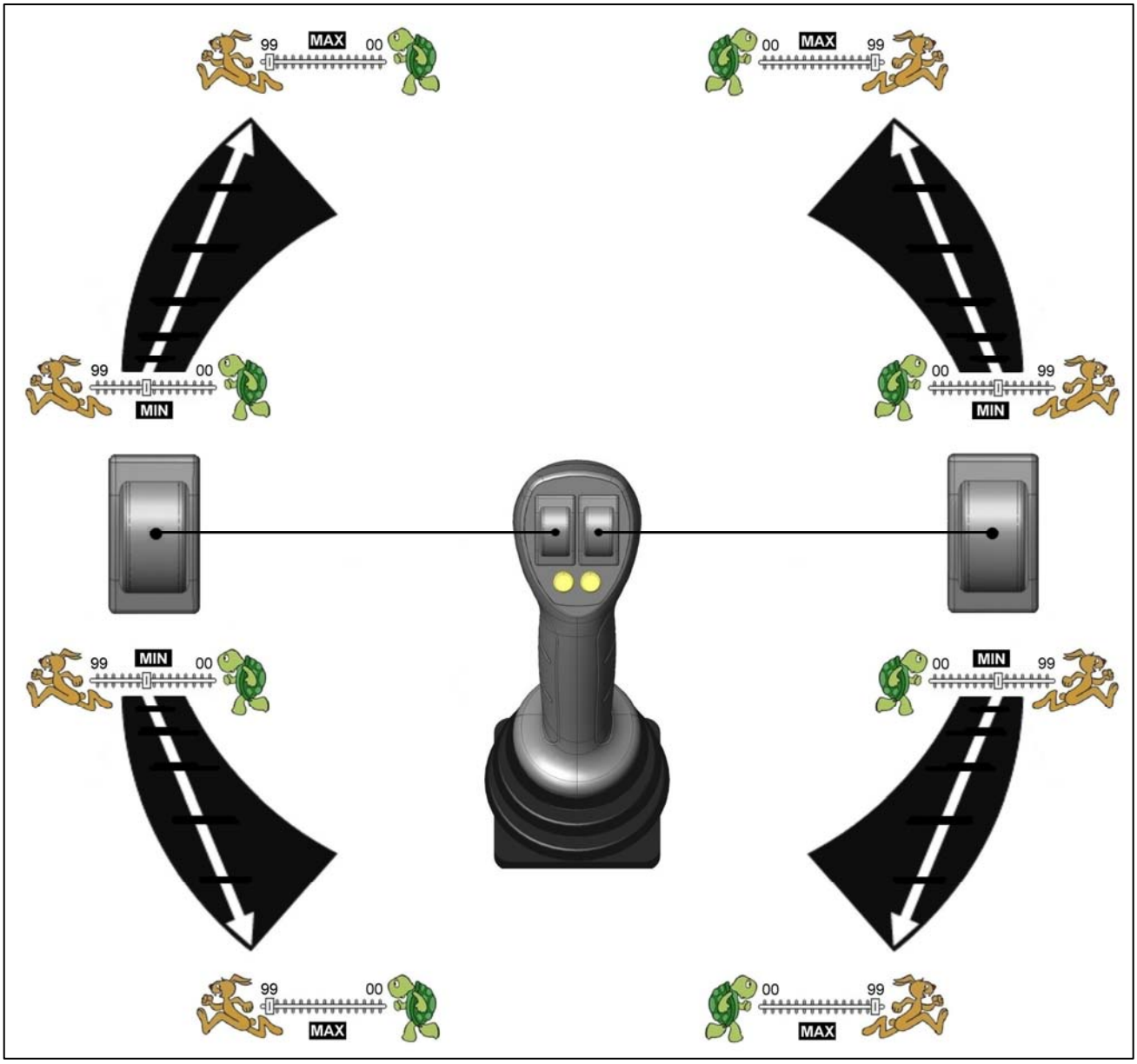
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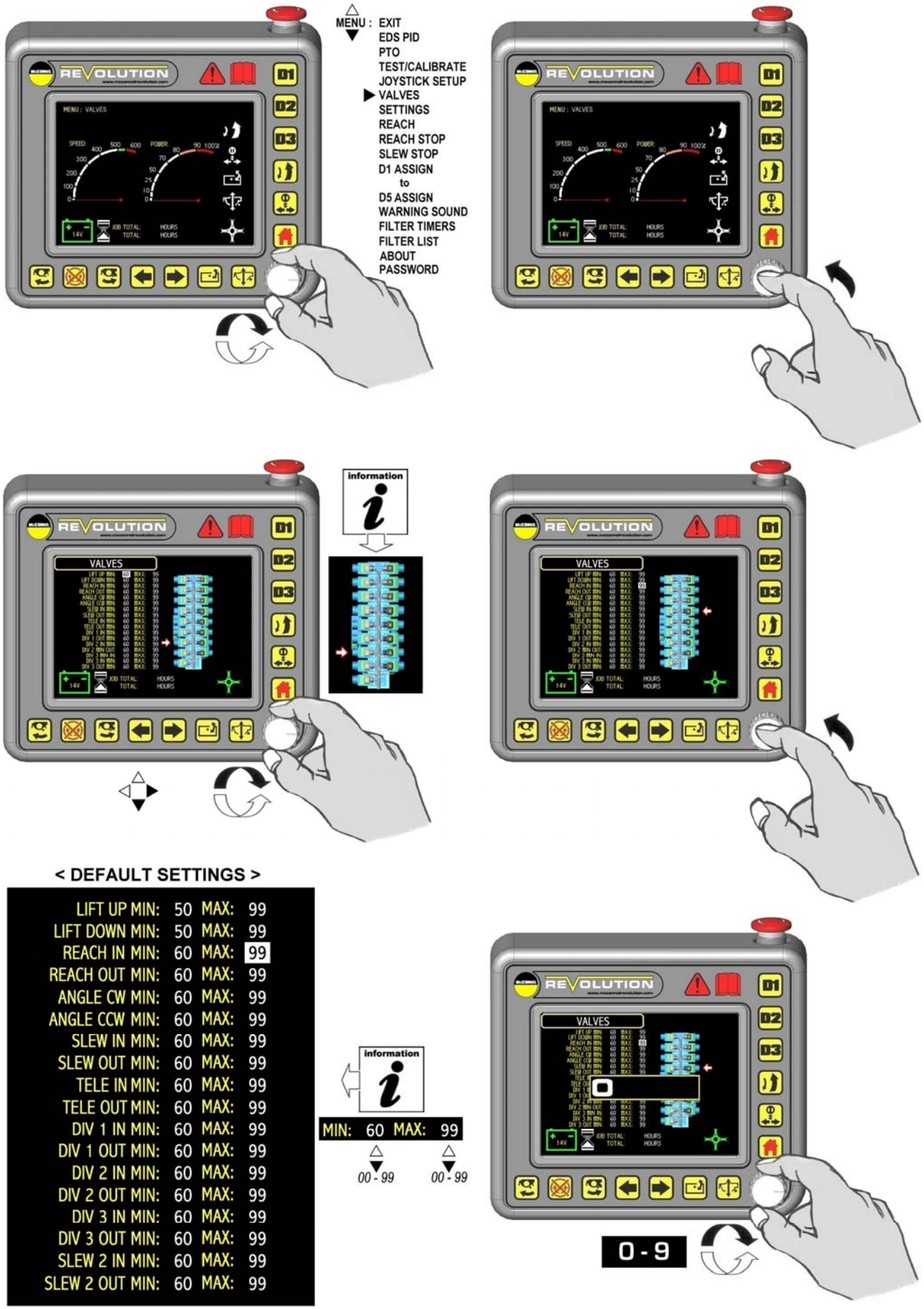
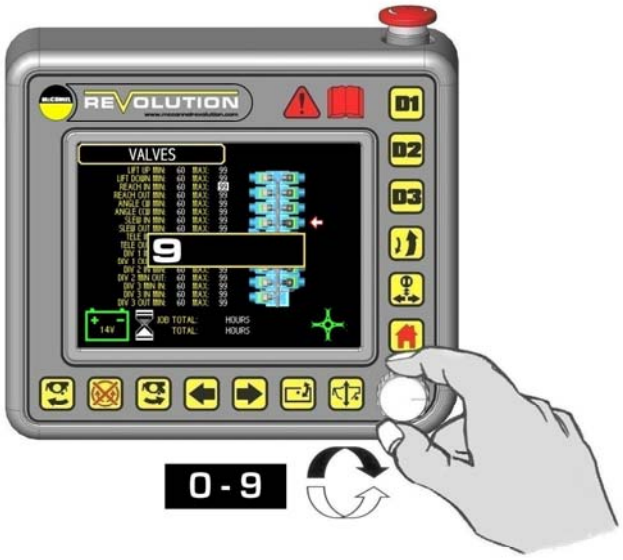
VALVE RESPONSE ADJUSTMENT

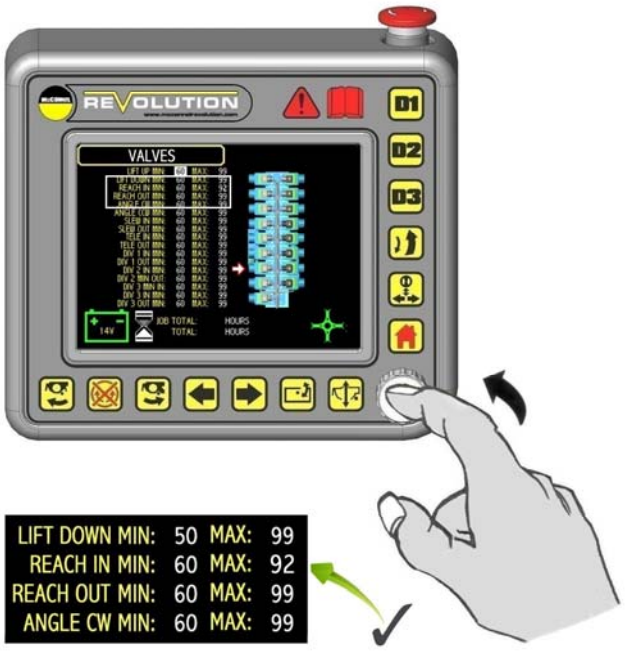



REVOLUTION
VALVES
9
0 - 9


REVOLUTION
VALVES
9

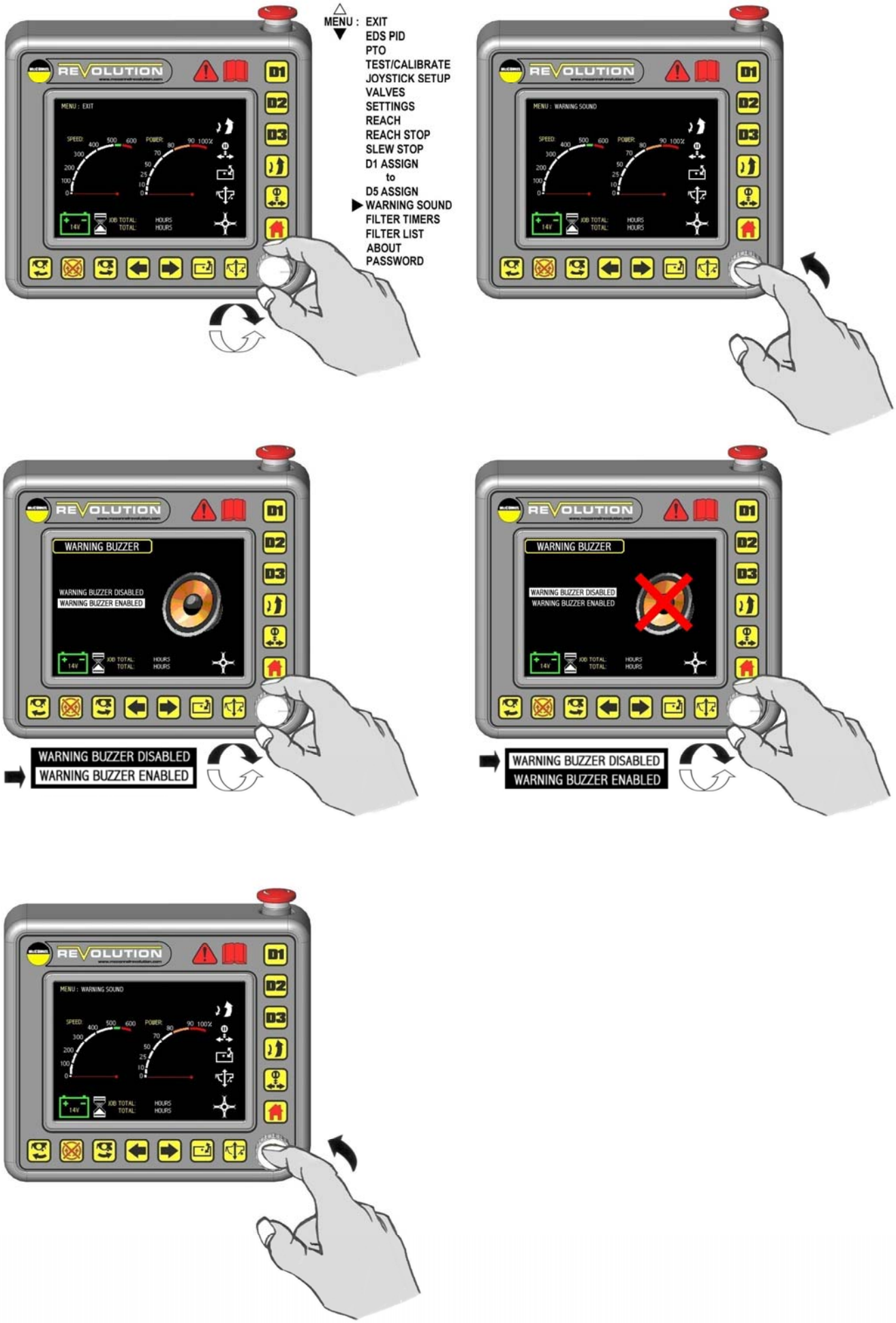

REVOLUTION
VALVES
92
0 - 9


REVOLUTION
VALVES
92

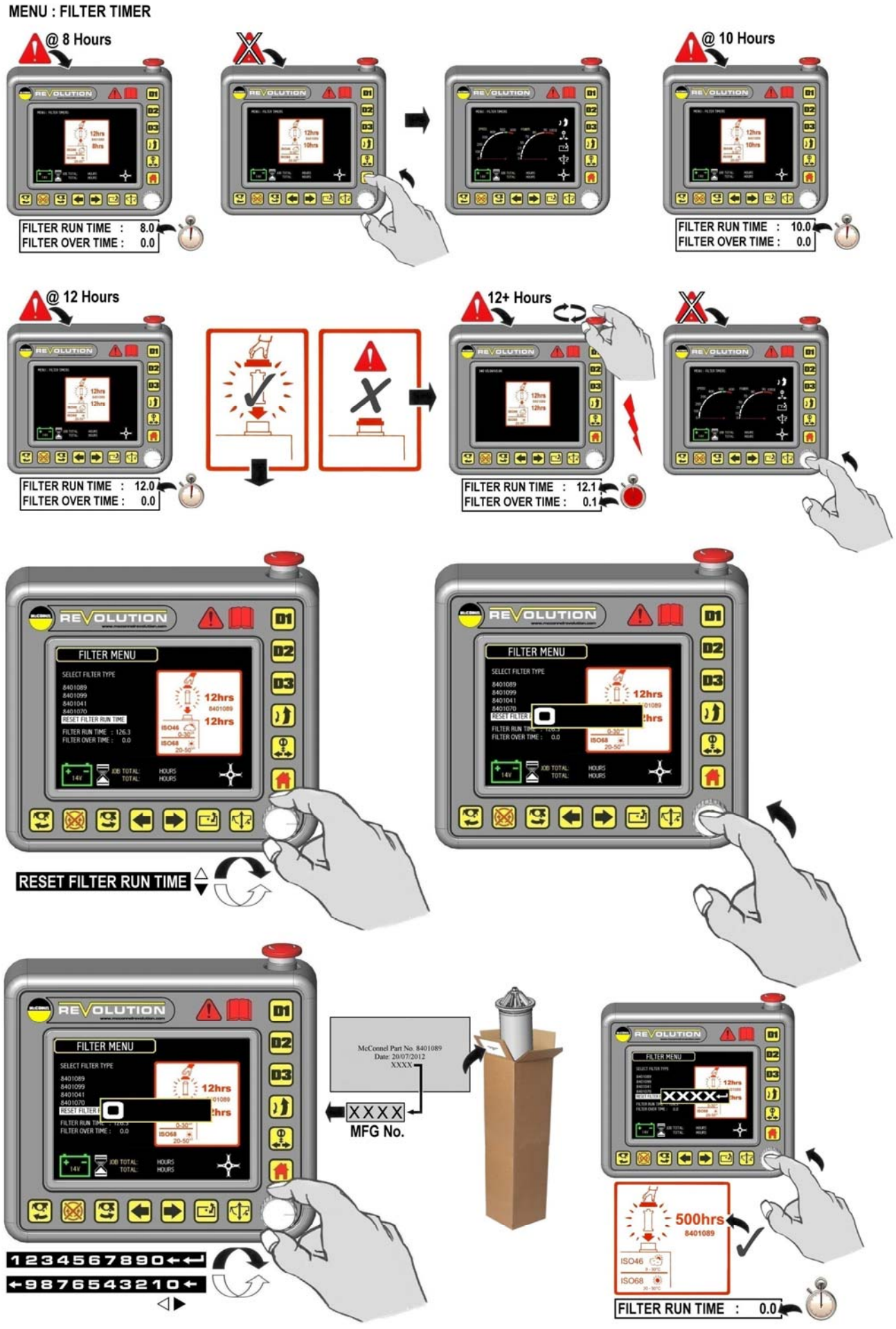

REVOLUTION
VALVES
LIFT DOWN MIN: 50 MAX: 99
REACH IN MIN: 60 MAX: 92
REACH OUT MIN: 60 MAX: 99
ANGLE CW MIN: 60 MAX: 99


REVOLUTION
MENU : VALVES

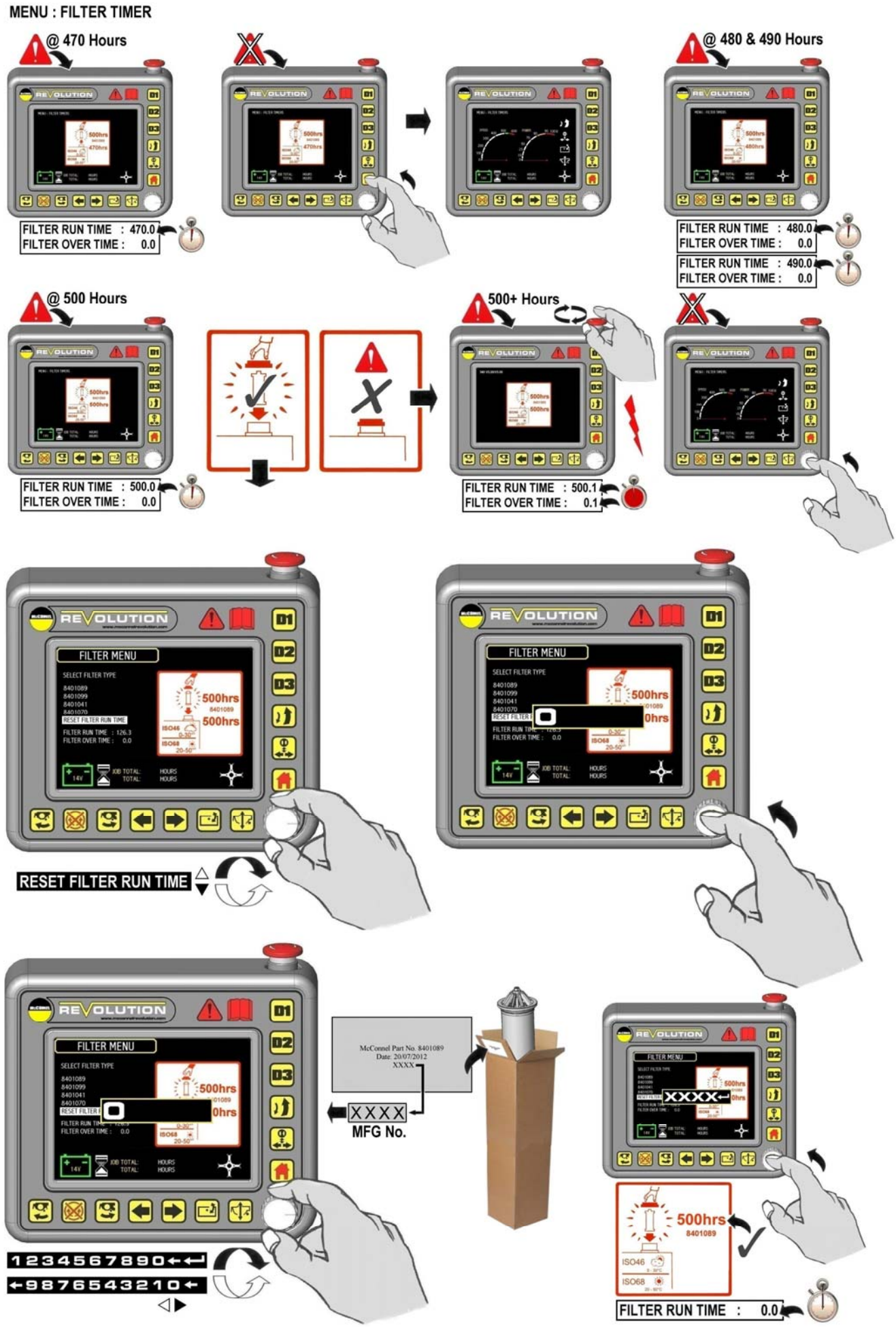
WARNING SOUND ON/OFF



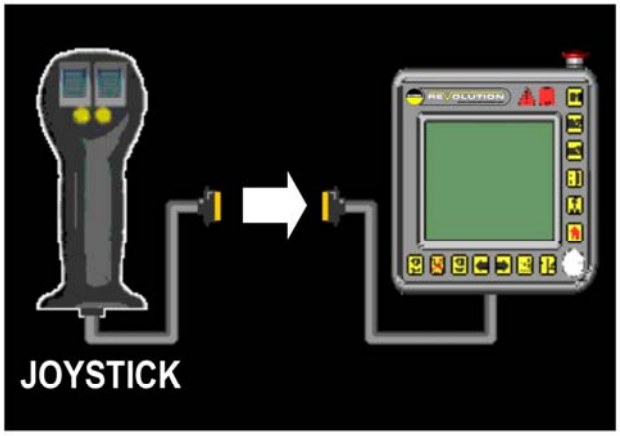
FILTER TIMER WARNINGS & RESET – Initial Filter (12 Hours)

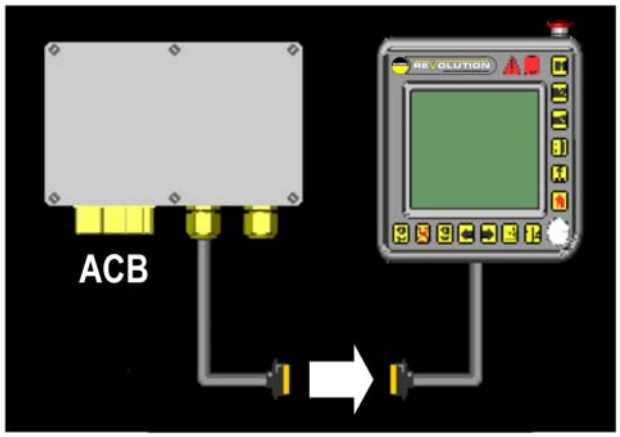


FILTER TIMER WARNINGS & RESET – Replacement Filters (500 Hours)



DISCONNECTED COMPONENT WARNINGS





WORK SCREEN - SPEED & POWER WARNINGS

⚠WARNING **Ensure that all users of this machine have read and fully understood this Operation Manual. Users must be fully conversant with all machine functions and features to enable them to operate the machine in a safe and efficient manner.**

It is advisable on initial use that operators practice using the machine in a clear open space without the rotor running until they are fully familiar with all controls and operation of the machine.

⚠CAUTION

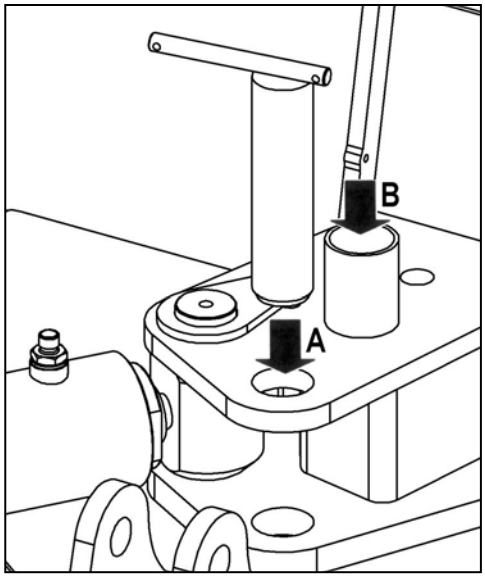
Care must be adopted when working with the flail head 'close in' as in some circumstances it can come into contact with the tractor and/or tractor wheel.

TRANSPORT LOCKS (SLEW & LIFT LOCKS)

Slew Lock

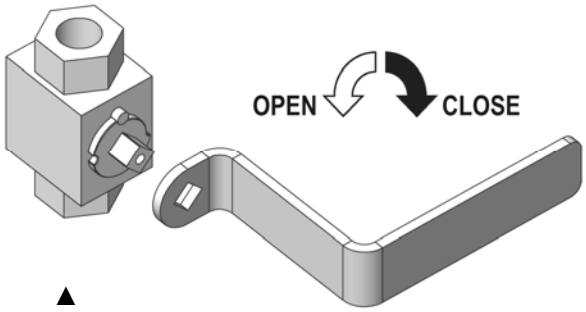
The machine is fitted with a slew lock comprising of a slew locking pin that locates through the pillar into the top of the mainframe.
The slew function must be 'locked' at all times during transportation and storage of the machine and only unlocked for work – *see illustration opposite.*

Place pin in position 'A' for transport and storage.
Place the pin in position 'B' for work only.



Lift Ram Locks

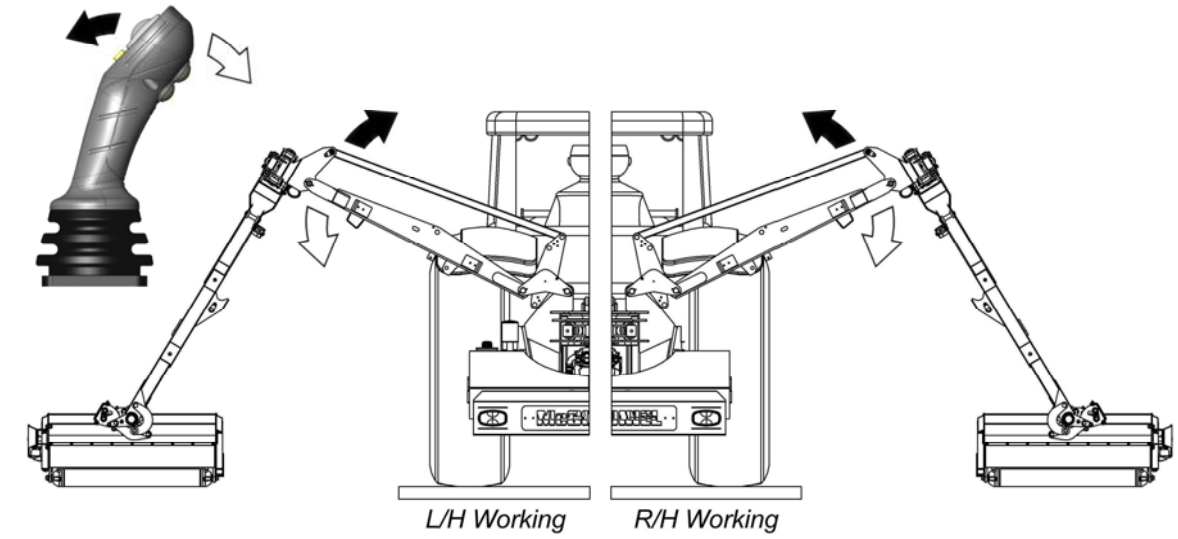
The machine is fitted with two lift ram lock taps – these must always be closed during transport and storage of the machine to prevent movement of the arms during transportation or when the machine is parked up.

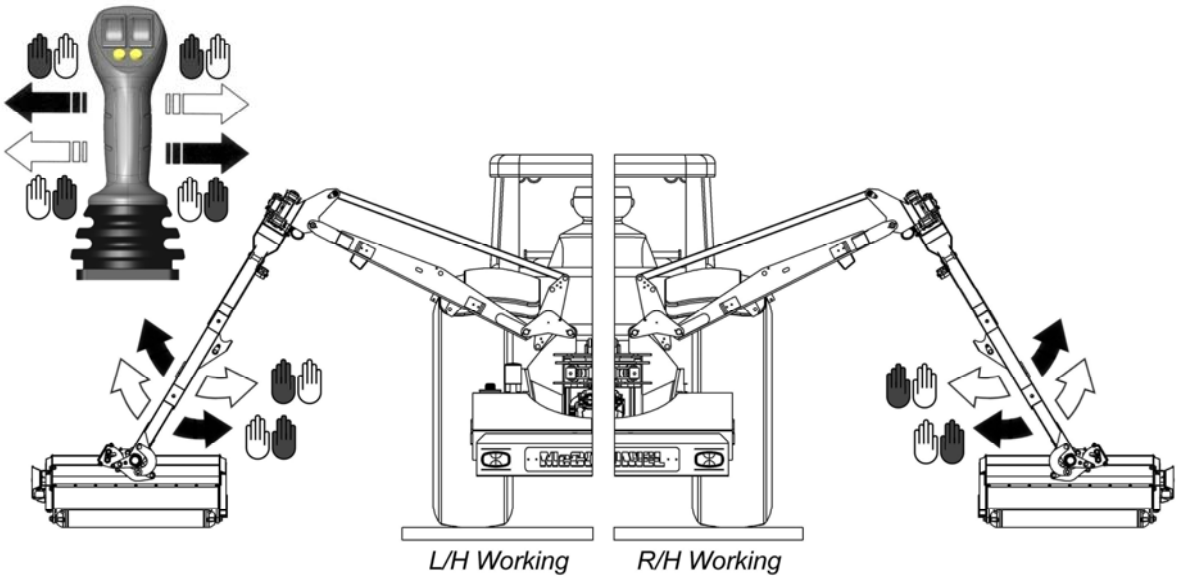


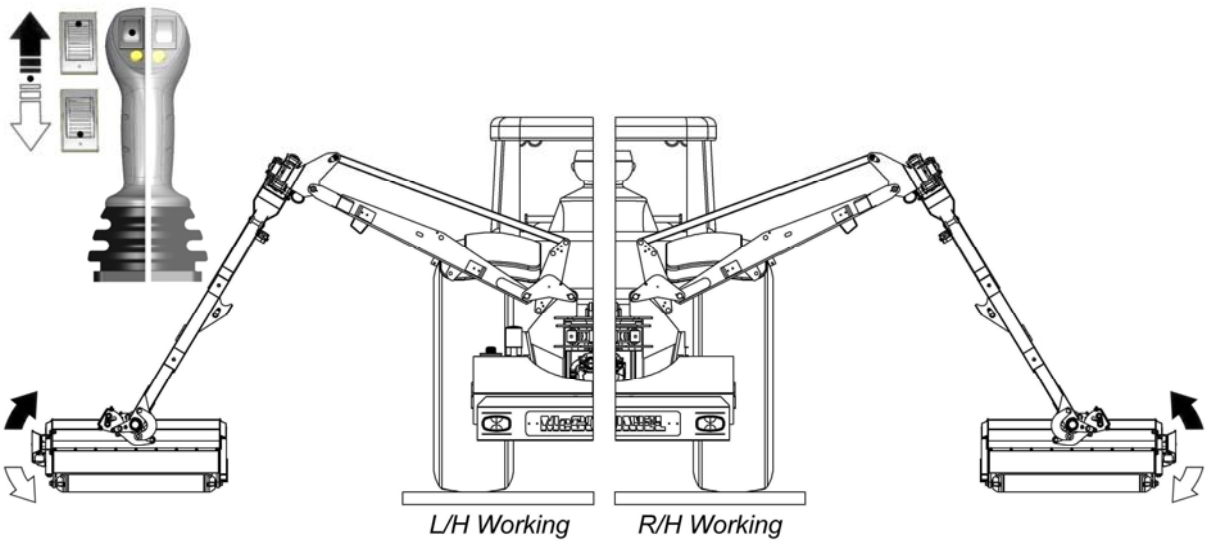
▲
LIFT RAM LOCK TAP
Open – ***only for working***
Closed – *always for transport & storage*

⚠CAUTION

Slew and Lift Locks must be in the closed / locked position at all times during machine transportation and storage – open / unlock only for work.

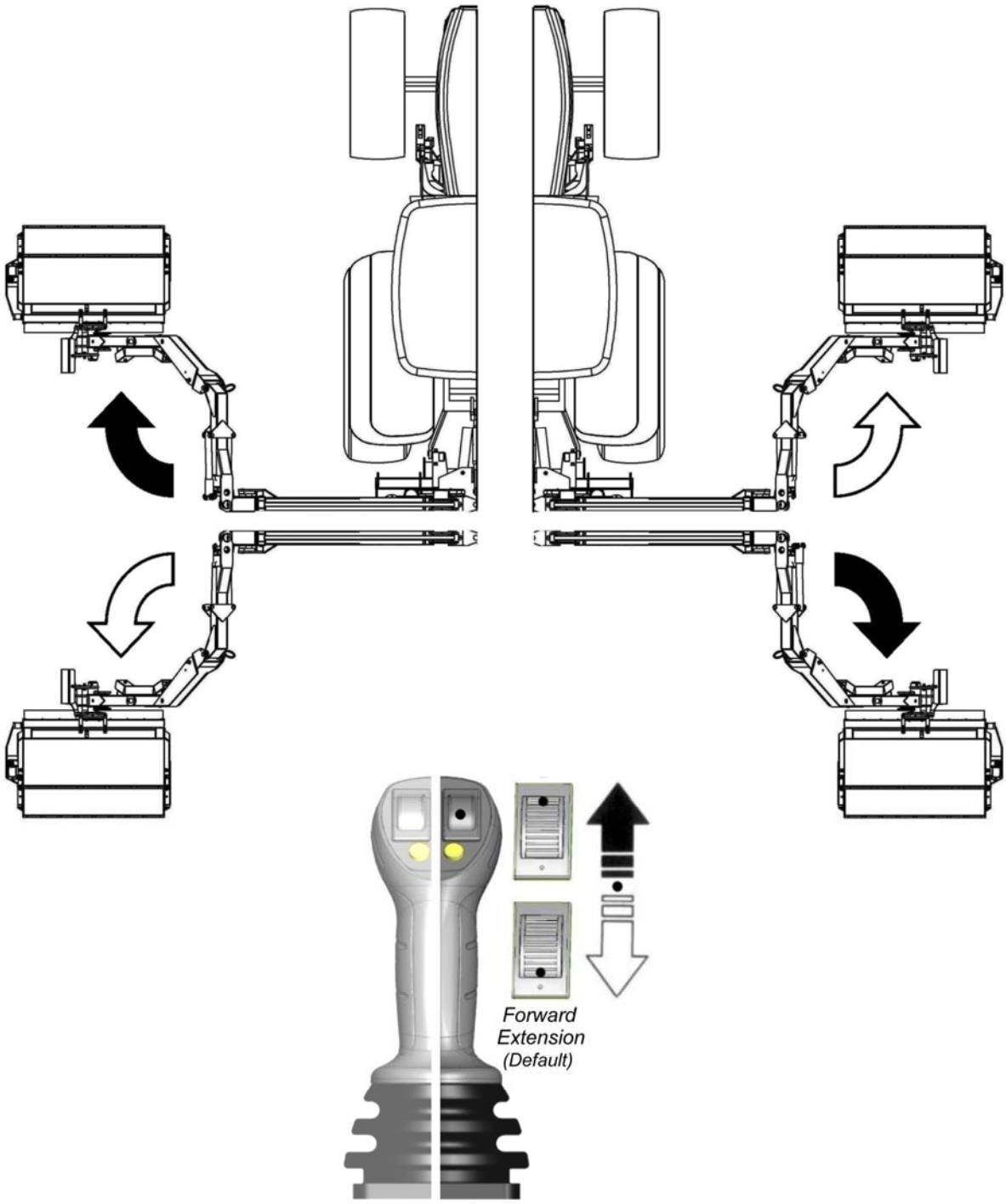




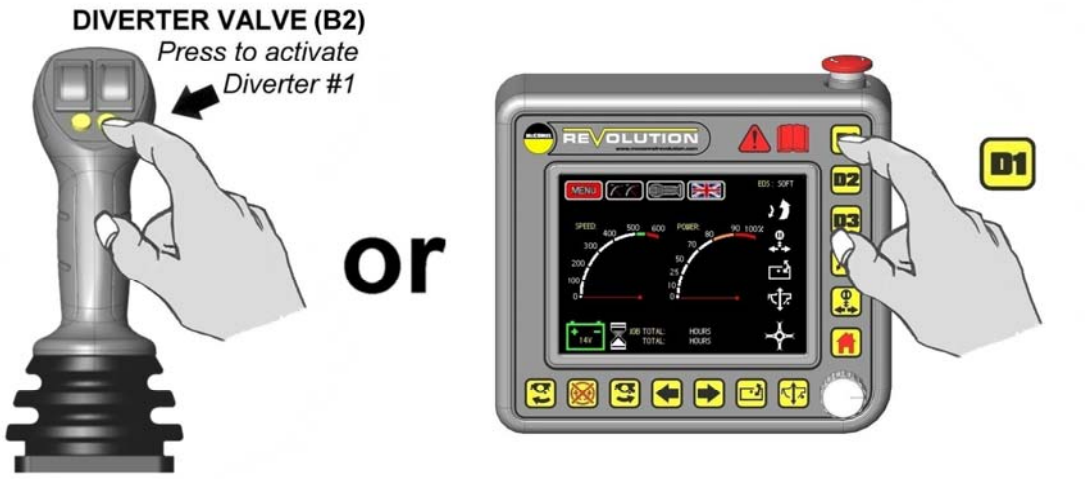


NOTE: Illustration shows the left hand thumbwheel as the default angle control, this can be swapped within the settings to the right hand thumbwheel if desired.

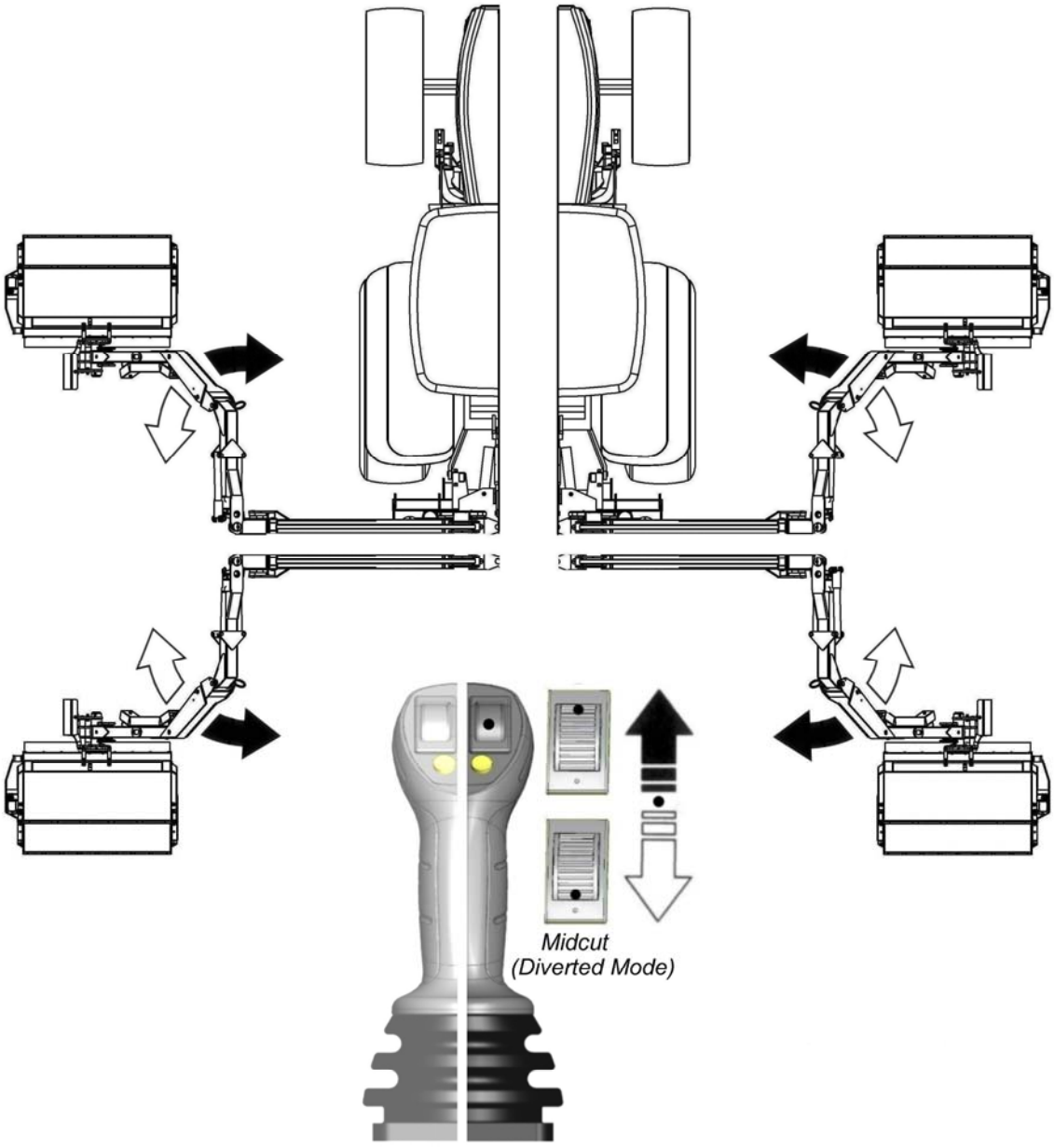
FORWARD EXTENSION OPERATION – JOYSTICK CONTROL (T2 Default)



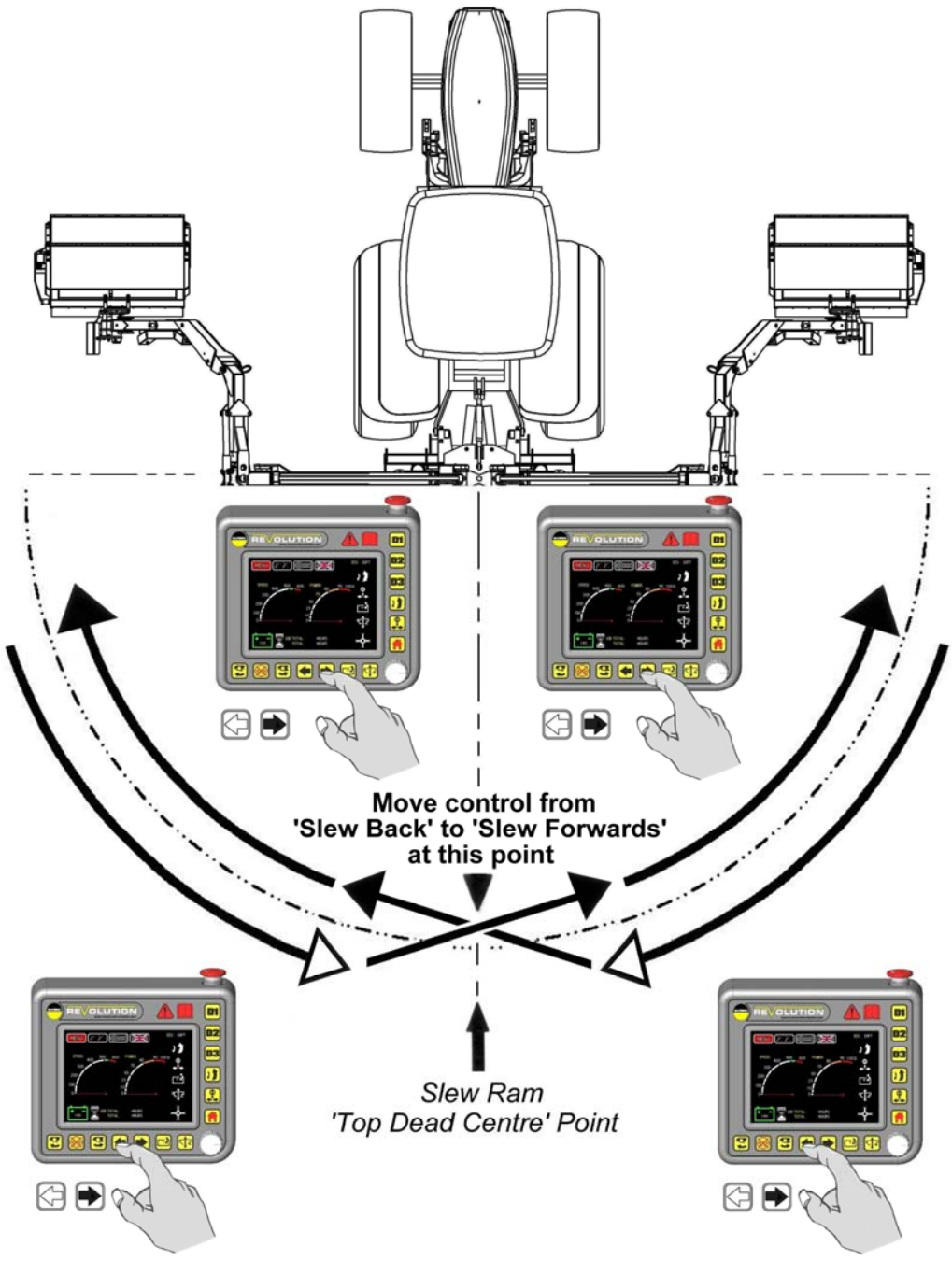
In the default mode Forward Extension is operated with the right hand thumbwheel.



Activate Diverter Valve #1 - Midcut Arm is then operated using the right hand thumbwheel.

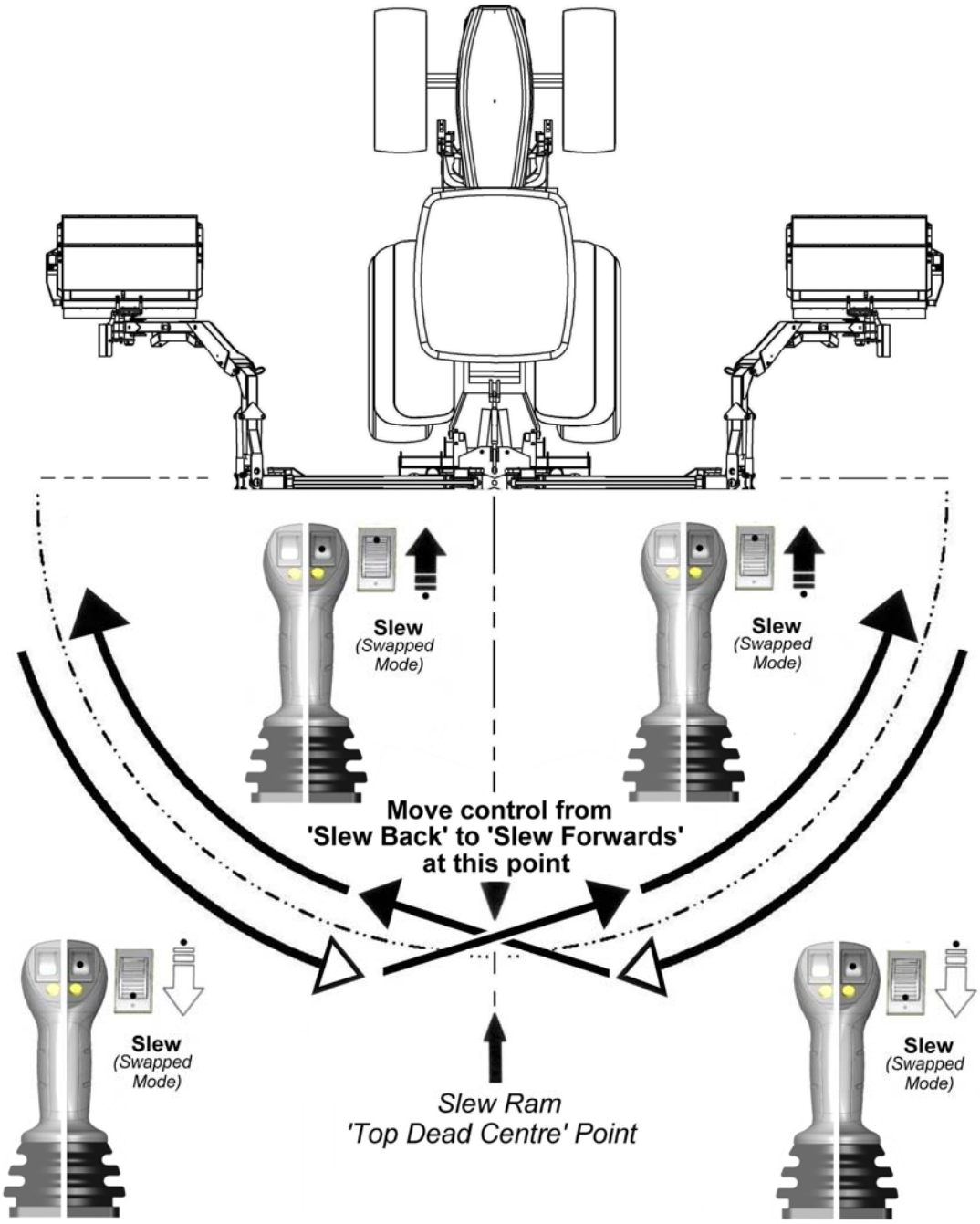


SLEW OPERATION – SCREEN CONTROL (Default)



In the default mode Slew is operated with the left and right arrow buttons on the control unit.

Select 'Slew/Tele Swap' - Slew is then operated using the right hand thumbwheel.



BREAKAWAY

The machine is fitted with a hydraulic breakaway device which protects the structure of the machine should an unforeseen obstacle be encountered.

The breakaway function does not relieve the operator of his responsibility to drive carefully, be alert and avoid obvious hazards before contact occurs.

Breakaway may occur momentarily during normal work should an extra thick or dense patch of vegetation be encountered; in these instances tractor forward motion may be maintained with care.
Where breakaway has occurred as a result of contacting a post or tree etc. the tractor must be halted and the controls of the machine utilised to manoeuvre the head away from the obstacle. **Never continue forward motion to drag the head around the obstacle in breakback position.**

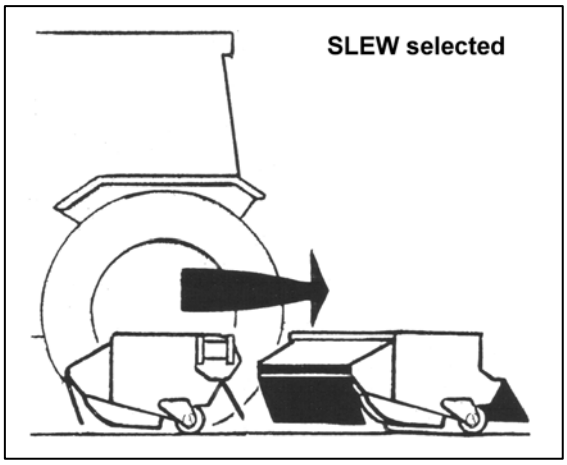
NOTICE

The force required to activate the breakaway system will vary dependent upon the gradient of work - it will require less force when working uphill and vice versa.

On Midcut machines the geometry of the breakaway causes the head to initially move outwards in addition to rearwards, therefore; be aware that the breakaway action will be impeded if the outer end of the head is working against a steep bank. In these circumstances extra care must be adopted during operation to avoid this occurrence.
Breakaway occurs at the slew column pivot. When an obstacle is encountered continued forward motion causes the pressure in the slew ram base to rise until the relief valve setting is exceeded.

With 'Slew' selected
When the slew relief valve setting is exceeded oil is displaced from the slew ram allowing the arm to pivot backwards horizontally and the obstacle to be cleared.

Re-setting the head into the work position is carried out manually by selecting 'Slew Out' on the control assembly



POWERED SLEW

The slew feature allows a 180° arc of powered arm movement to facilitate operation of the machine on either side of the tractor. This feature is also required in order to place the machine into its transport position and additionally it can be used to sweep the arm ‘to and fro’ whilst cutting in awkward areas and corners thus avoiding the need to constantly reposition the tractor.

If breakaway occurs the slew motion must be reversed to allow the slew breakaway relief valve to re seat and the ram to become operable again.

⚠CAUTION

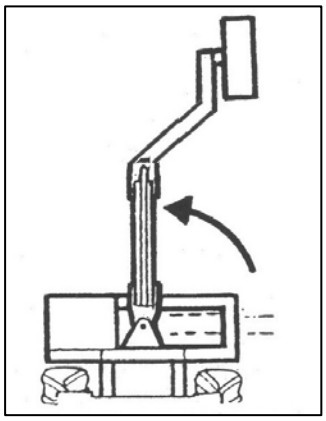
Extra care must be taken when working in 'Slew’ mode with the reach fully in it is possible for the flail head to hit the tractor or machine frame.

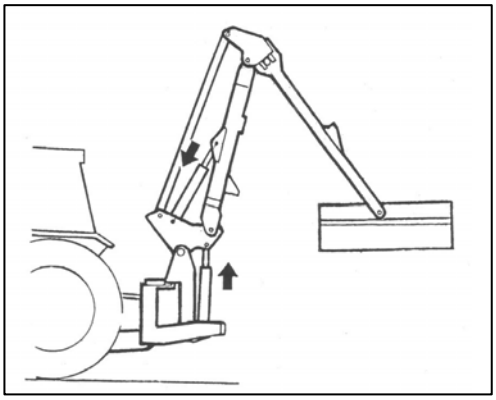
MOVING INTO THE TRANSPORT POSITION

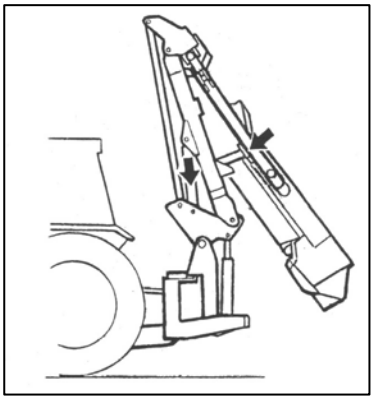
For transportation of the machine the dipper arm can only be folded into the left hand side of the main arm.

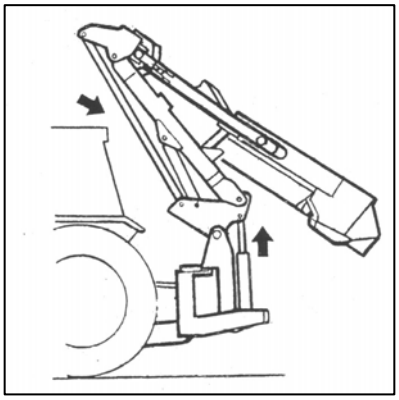
The procedure for moving into the transport position is as follows;

- Select ‘Rotor Off‘- **wait until the rotor has stopped turning completely.**
- Ensure that the ‘Lift’ and ‘Angle Float’ are switched off.
- With the flailhead raised off the ground; power breakaway into folded position before powering arms into position at the rear of the machine. *Note; if the start position is with the arms to the right hand side of the tractor, the forward extension arm will first need to be traversed to the left.*
- Operate ‘Lift’ and ‘Reach’ to manoeuvre the arms of the machine into the folded position.









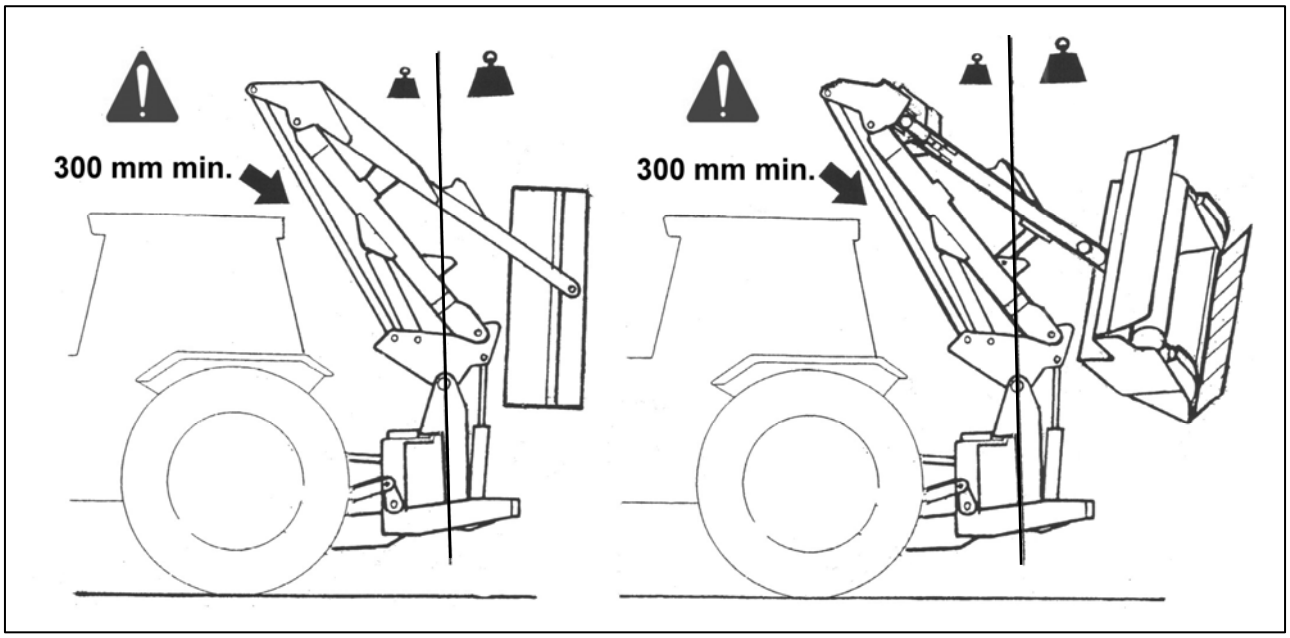
- Operate ‘Reach In’ to position the dipper arm on the transport prop.
- Operate ‘lift up’ to raise the arms bringing them forward and towards the tractor – ensure the distance between the tension link and the tractor cab is a minimum of 300mm *(12”).*
- Operate ‘angle’ to position the flailhead so that the unit is as compact as possible.
- Close lift ram taps and fit transport pin to lock the slew column.

Machine shown folded into its transport position ►

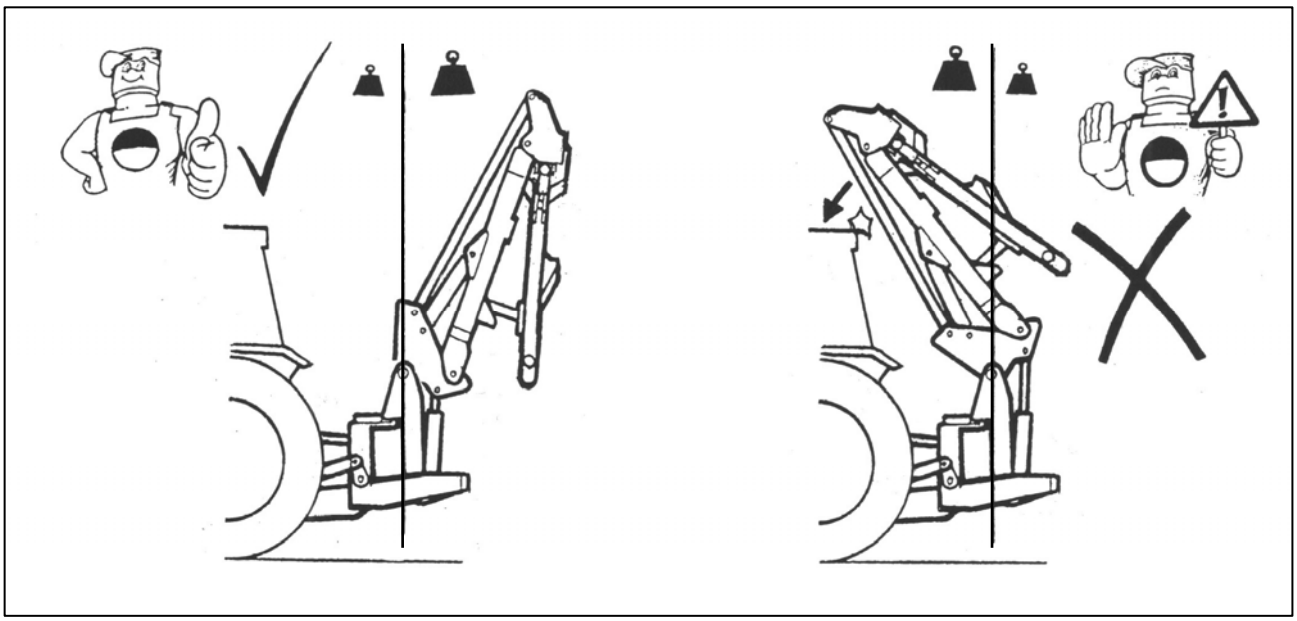
TRANSPORT POSITION

The machine is transported in line to the rear of the tractor – there must be a minimum clearance of 300mm *(12")* between the tension link and the rear cross member of the tractor cab.

Transport Position with Flailhead Fitted



Transport Position with Flailhead Removed



With the flailhead removed the arms are fully folded but with the lift ram fully retracted. If the lift ram is extended the weight of the arms will result in the balance of the machine going 'over centre' causing the tension link to crash into the rear cross member of the tractor's cab.

⚠WARNING

During transport the 'SLEW' mode must ALWAYS be selected on the controls.

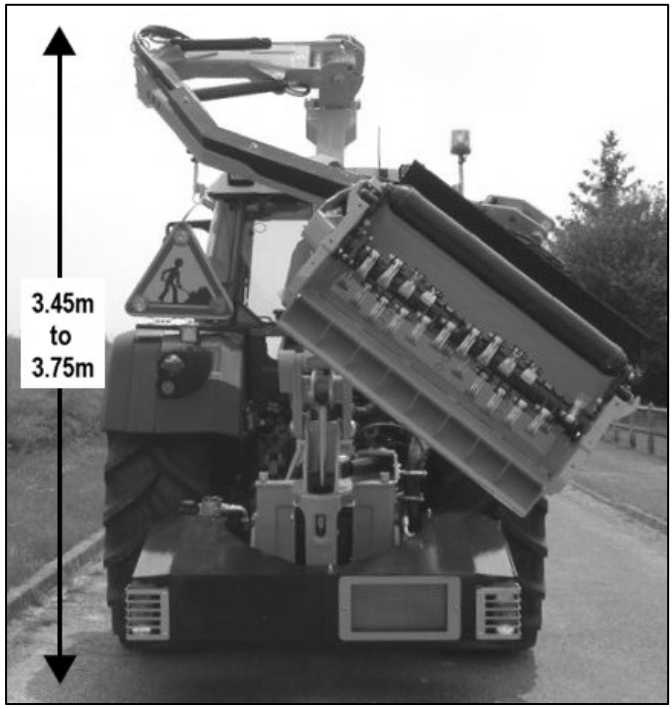
TRANSPORTING

When in transport the PTO must be disengaged and power to the control box switched off. The acceptable speed of transport will vary greatly depending upon ground conditions; always avoid driving at a speed which causes exaggerated bouncing as this will put unnecessary strain on the tractors top hitch position and increase the likelihood of the tension link contacting the cab rear cross member.
In any conditions, transport speed must not exceed maximum 40 km/h *(25 mph approx.)*

⚠WARNING **Lock slew and close lift rams for transportation of the machine.**

TRANSPORT HEIGHT

There is no fixed dimension for transport height as it will vary depending on the height that the machine is carried and the degree of arm fold that the rear of the tractor cab will allow.
For the majority of installations the transport height will generally fall between a minimum of 3.45m and a maximum of 3.75m when the machine is correctly folded.



⚠CAUTION

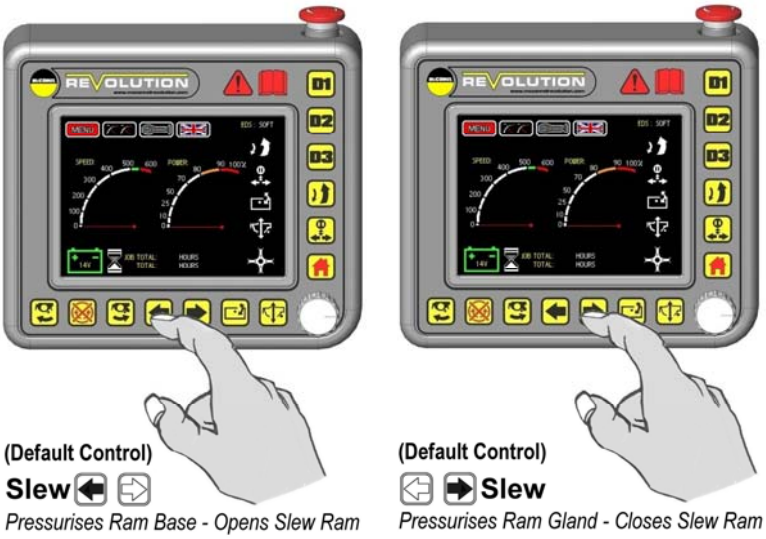
Operators should make themselves aware of the height of the machine when in work and in also in transport - great care must be adopted at all times to avoid the dangers of overhead obstacles.

It is recommended that operation of the machine be practiced in a safe, spacious area clear of dangers until the operator is familiar with all the control functions and movements of the machine before attempting to use it in a working environment. Never attempt to operate this machine in a public area if you have not been trained in its safe operation.

Initial Slewing from Transport Position

Power the machine from its folded position on the transport prop by operation of firstly the reach ram and secondly the fold ram so that the machines arms are positioned ready for slewing into the work position.

Slewing of the arms *(default mode)* is performed by operation of the two slew buttons on the screen unit; the left hand button powers the base of the slew ram and the right hand button powers the gland of the slew ram. Alternately, slew may be operated via the joystick in 'swapped mode' - *refer to controls section for further details.*



NOTICE *It must be noted at this point that the slew ram operates the slewing function on both sides of the tractor as well as transferring the arms to the desired work side - in the case of the latter the arms will travel through the slew ram 'top dead centre' point when they are at the rear, therefore when the arms are positioned directly behind the tractor to begin with the initial direction of slew when operating the buttons will be dependent upon the 'centre of mass' of the machine at the current time - this can vary on the slightest of slopes – for that reason extreme care must be adopted as initial operation of the buttons can move the arms either to the left or to the right – the direction will not become apparent until movement begins.*

Operate the slew function to take the arms to right angles to the tractor – if initial movement is to the intended work side continue to slew forward using the L/H button, if movement is not in the required direction operate the R/H button to bring the arms back to, and through, the rear position retaining momentum of the movement until the arms have passed over the slew ram 'top dead centre point' at this exact instance slew operation must then be transferred to the L/H button in order to continue operating forward slew to bring the arms to the work position on the desired side. *Although an awkward manoeuvre to begin with, after practice the operator will soon master the procedure.*

Operating the Forward Extension Arm

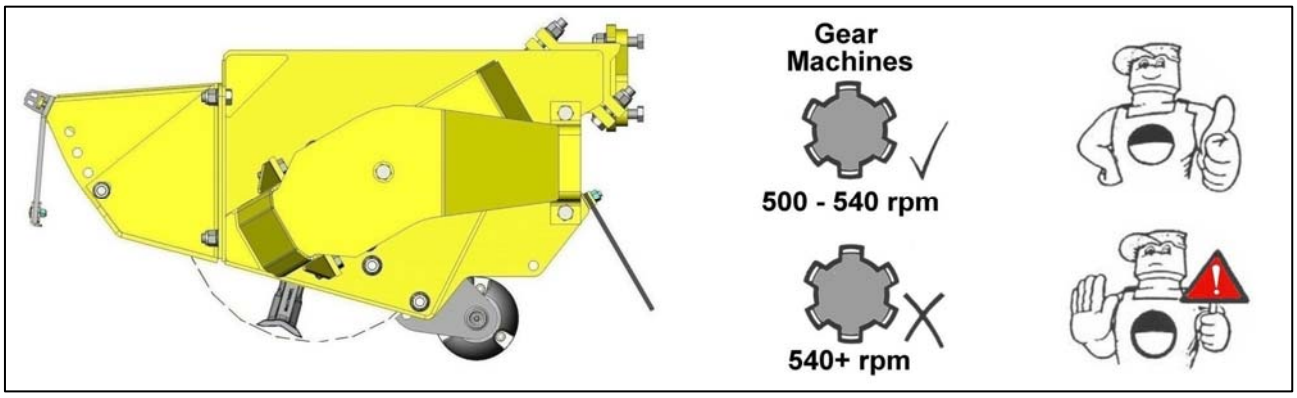
When initially moving the arms to work on the right hand side of the tractor the forward extension arm will need to be powered round by 180° to the correct working position – this can only be achieved by traversing the arm through the horizontal plane, the arm should be powered through this plane to its furthest point which will be 90° forward of the main arm.

Engaging Drive

Ensure that the rotor control is in the stop position before engaging the PTO shaft. Allow the oil to circulate for a minute or so before operating the arms. Position the flail head in a safe position, increase the engine speed to a high idle before starting the rotor – after initial surging the rotor will run at an even speed.

PTO Operating Speed

The correct PTO speeds for operation of this machine is; **500 - 540 rpm (Max)**



⚠CAUTION **Damage to the machine may occur if the maximum PTO speed is exceeded.**

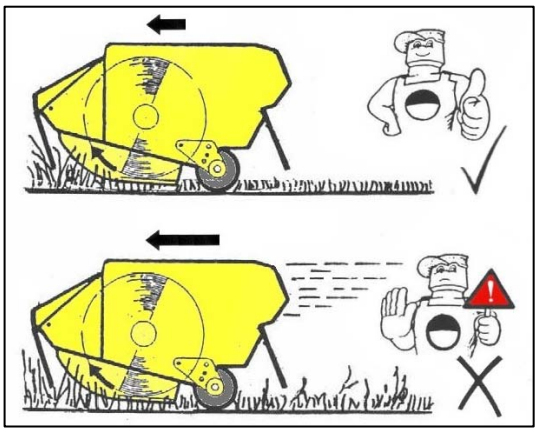
Engaging Drive

- Ensure the rotor control lever/switch is in the 'stop' position before engaging the PTO.
- Allow the oil to circulate for a minute or so before operating the armhead controls.
- Move the flail head into a safe working position just clear of the material to be cut.
- *Increase engine speed to a high idle and start the rotor* – after initial 'surging' the rotor will run at an even speed.
- Carefully lower the flail head into the work area and begin work.

Tractor Forward Speed

The material being cut will determine the tractor forward speed. Forward speed can be as fast as that which allows the flail head sufficient time to cut the vegetation both efficiently and neatly.

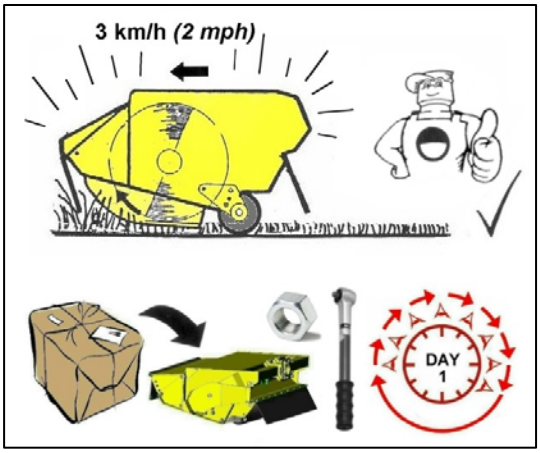
If forward speed is too fast this be indicated by over frequent operation of the breakaway system, a fall off in tractor revs and a poor untidy finish to the work leaving ragged uncut tufts and poorly mulched cuttings.



'Running In' a New Machine

For the first day's work with a new machine it is recommended that tractor forward speed is restricted to 3 km/hr *(2 mph)* maximum. This will allow machine components 'bed in' and allow the operator to become familiar with the controls and their response under working conditions whilst operating at a relatively slow speed. If possible, select a first days work that affords mainly light to average cutting with occasional heavy duty work – *during this period check the tightness of nuts and bolts every hour, retightening as and when required.*

First day use - check tightness of nuts & bolts hourly ►



EMERGENCY STOPPING

In all emergency situations machine operation and functions must be stopped immediately; **Stop PTO operation** using the tractor controls then immediately kill electrical power to the machine using the **Off (Emergency Stop)** switch on the machine's control unit.

WARNING **Auto-Reset Machines**

When the Auto-Reset feature is active the machines arm set is capable of unintentional movement even when the PTO is switched off and stationary. Always ensure that electrical power to the machine is switched off using the **Off (Emergency Stop)** switch on the machine's control unit in emergency situations and/or when the machine is not being operated.

WARNING **Cable Operated Machines**

In certain conditions, and/or if the Auto-Reset feature is active, the arm sets on cable operated machines possess the potential to move unintentionally, even when the PTO is switched off and stationary, if the levers were to be accidentally operated. Care must be adopted to avoid any movement of the levers when the machine is not being operated. Ensure arm sets are lowered fully to the ground when the machine is parked up or not in use.

OVERHEAD POWER LINES (OHPLs)

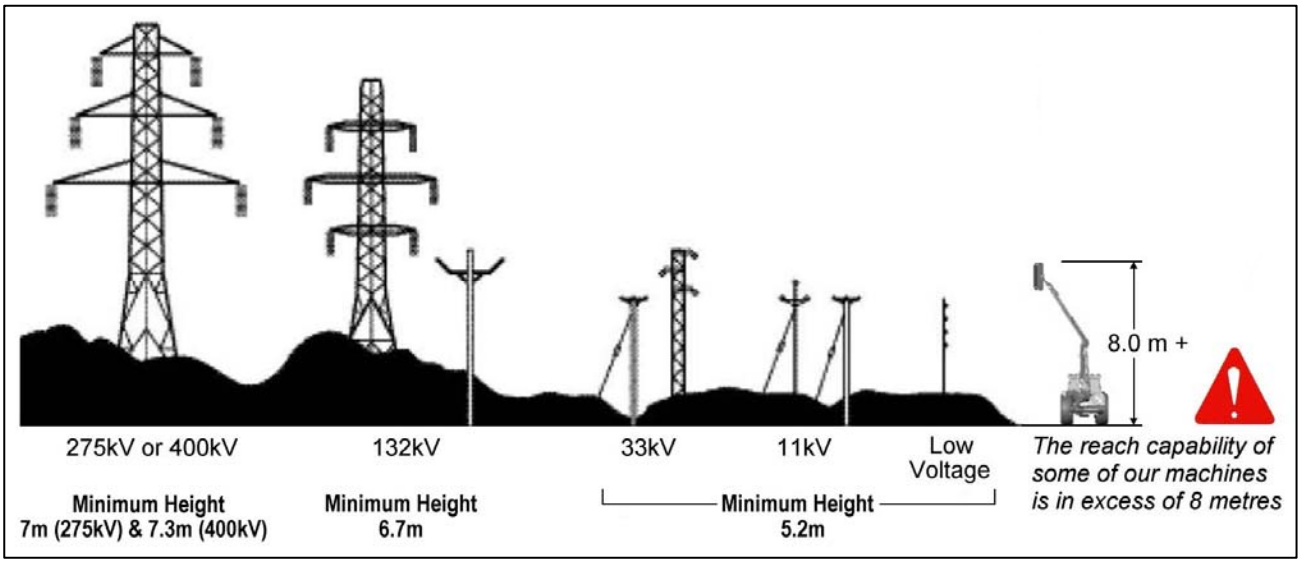
It cannot be stressed enough the dangers involved when working in the vicinity of Overhead Power Lines (OHPLs). Some of our machines are capable of reach in excess of 8 metres *(26');* they have the potential to well exceed, by possibly 3 metres *(9' 9"),* the lowest legal minimum height of 5.2 metres 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

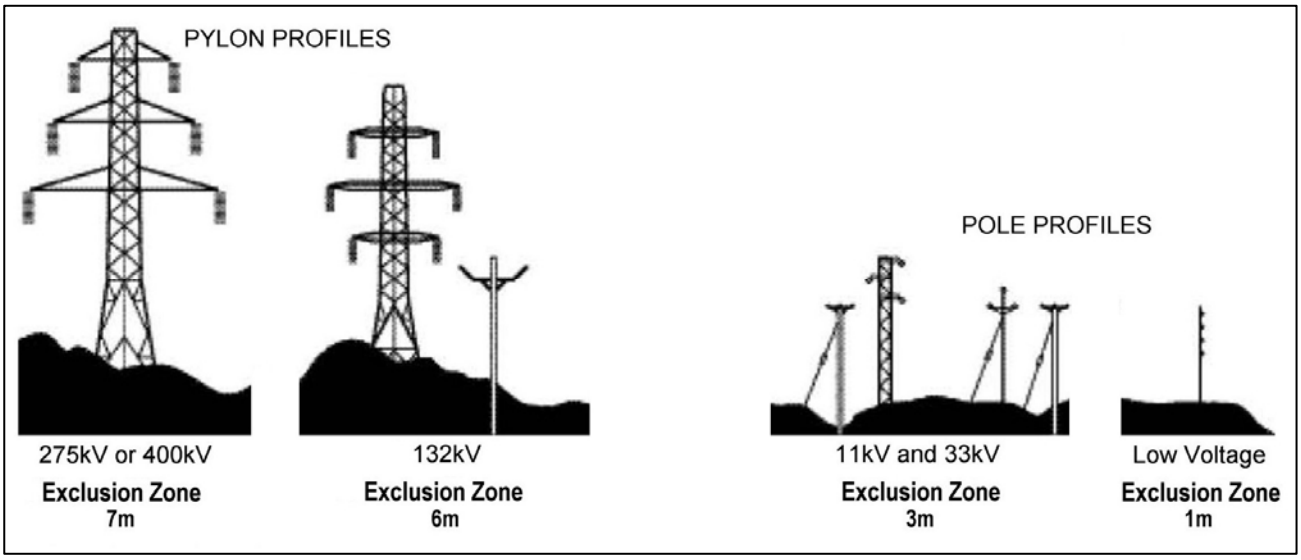
All operators must read the following information and be aware of the risks and dangers involved when working in the vicinity of Overhead Power Lines (OHPLs).

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.

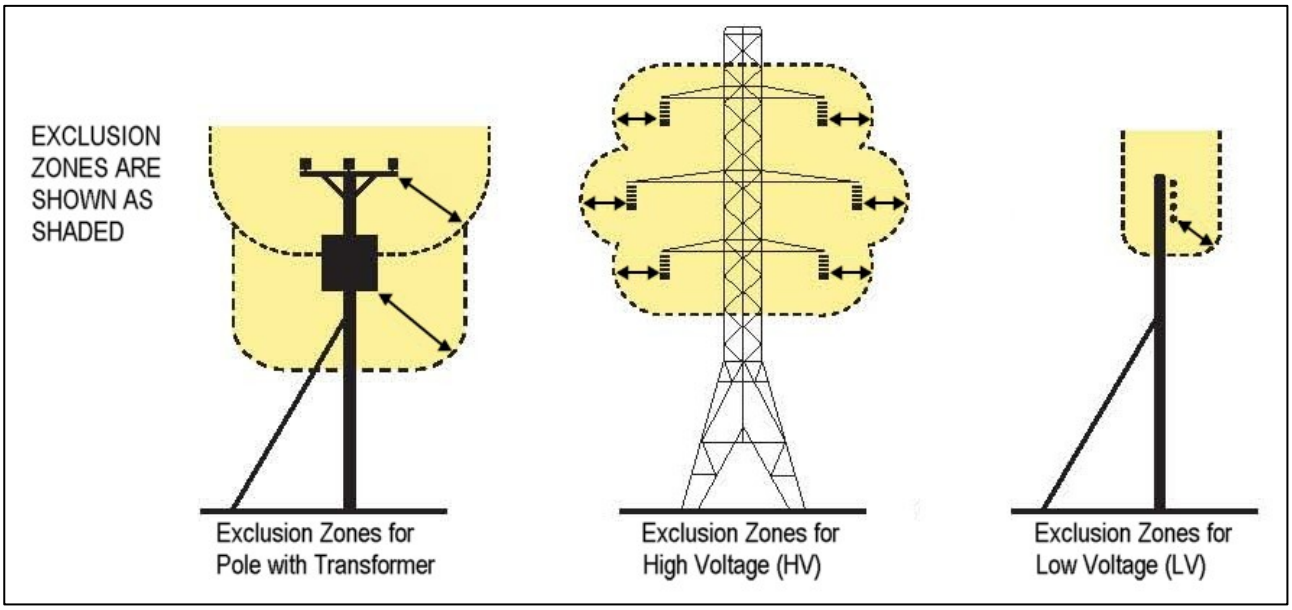
Minimum Heights for Overhead Power Lines



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.

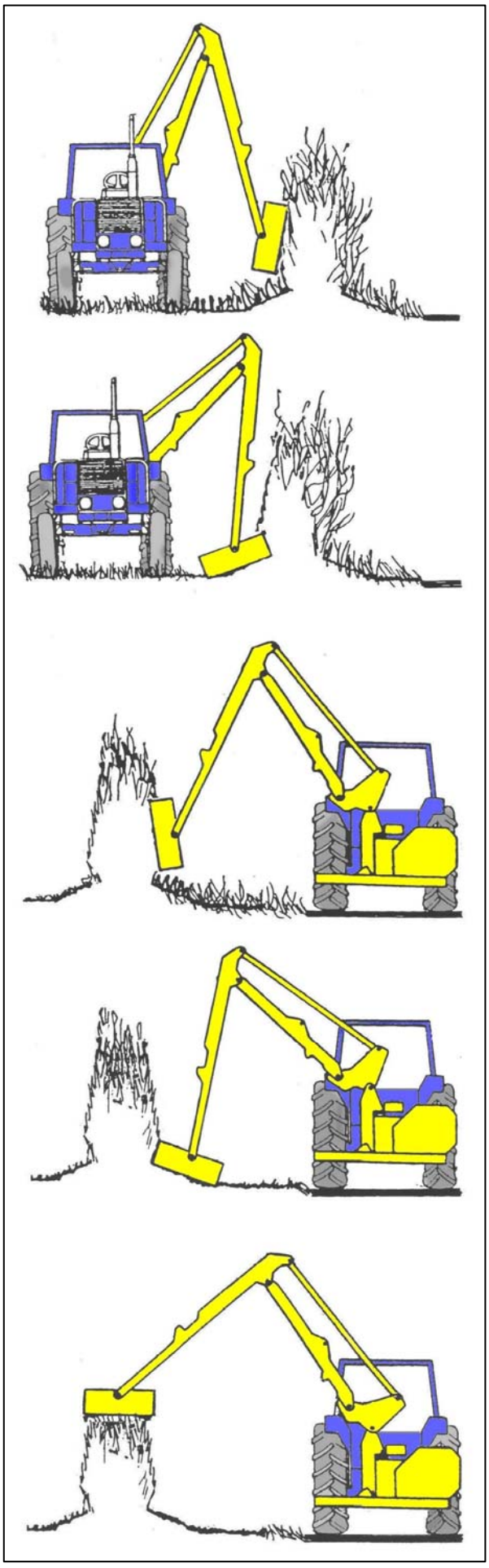
Emergency Action for Accidents Involving Electricity

- 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

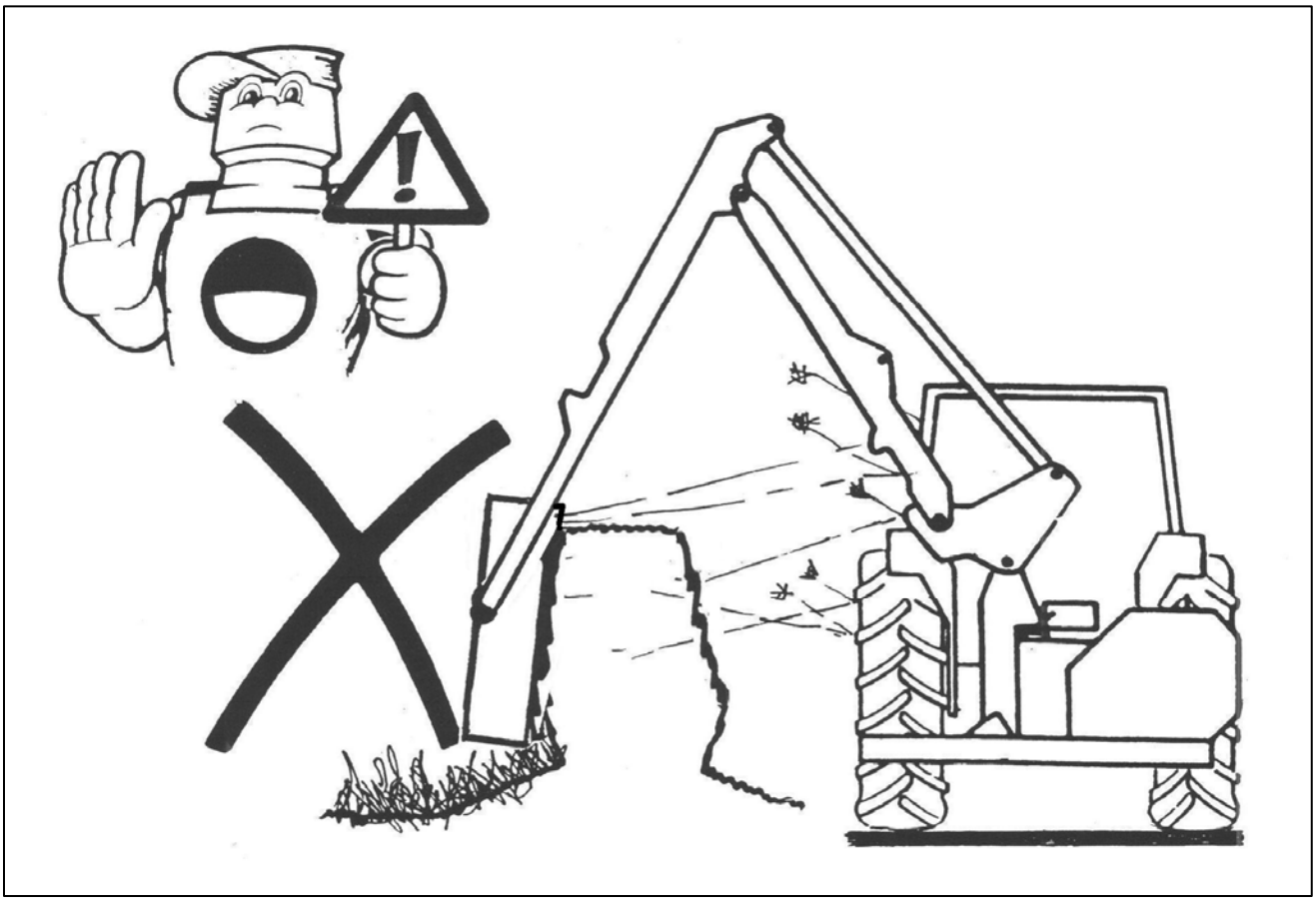
HEDGECUTTING PROCEDURE

Cut the side and bottom of the field side first. This leaves the maximum thickness of hedge on the road side to prevent the possibility of any debris being thrown through the hedge into the path of oncoming vehicles.



Cut the side and bottom of the road side.

Top cut the hedge to the height required.

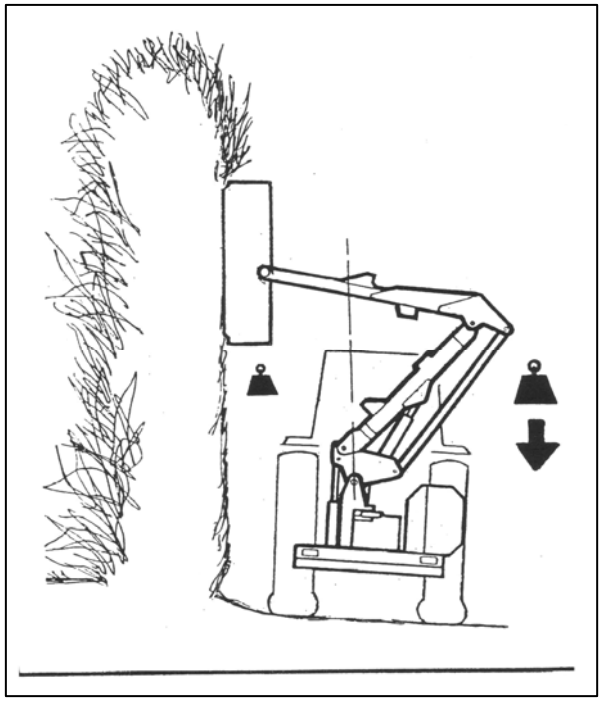


WARNING!
NEVER CUT ON THE BLIND SIDE OF THE HEDGE.
It is impossible to see potential hazards or dangers and the position of the flail head would possibly allow debris to be propelled through the hedge towards the tractor and the operator.

WORKING ON ADVERSE SLOPES

When working high with the reach fully in it is possible for the main arm balance to go over centre and take the weight off the lift ram. A restrictor in the gland connection of the lift ram prevents sudden unpredictable movements should this occur.

WARNING
Never remove the restrictor from the lift ram gland connection.

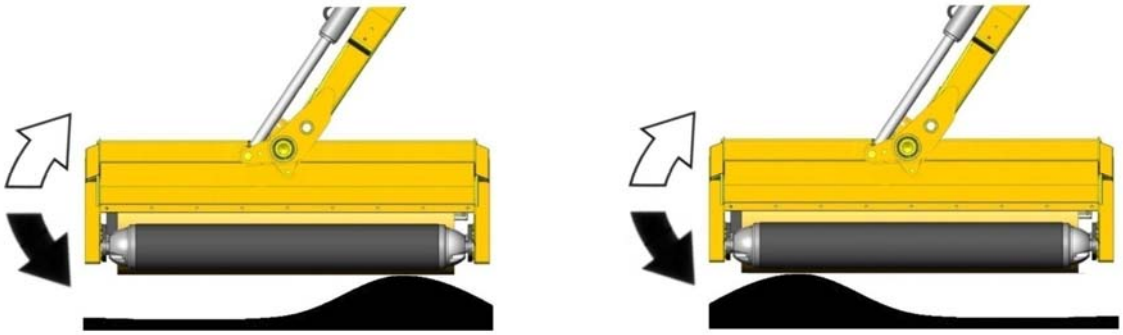


EASY DRIVE SYSTEM (EDS)

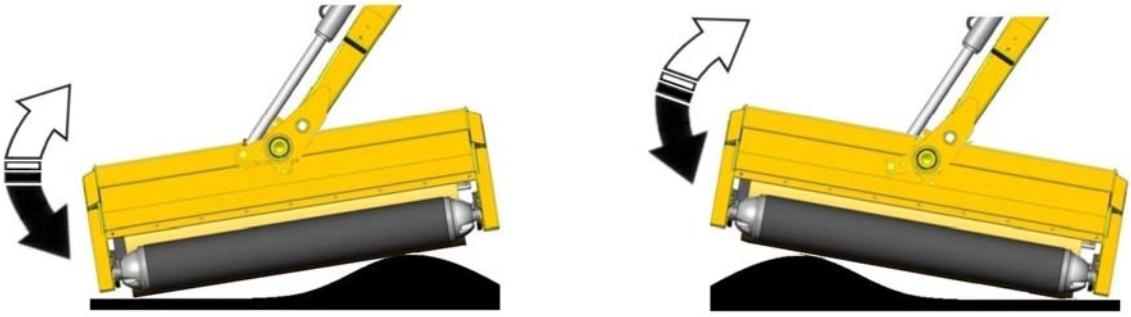
The Easy Drive System (EDS) is an optional extra on proportional machines with digital controls – where fitted it provides 'hands free' cruise control operation with automatic head and lift float at greater working speed that increase both safety and efficiency.
The system comprises of sensors that measure rotational movement of the rocker pin and pressure variations in the lift ram circuit these are processed and forwarded to the hydraulic system which then regulates the optimum lift ram pressure to allow the arm and head to 'float' over changing ground contours. With readings taken and processed every 30 milliseconds the lift ram pressure is constantly and rapidly re-evaluated and adjusted.
Any movement of the joystick in the lift plane will automatically de-activate EDS, on release of the joystick the system will immediately be reverted back to EDS mode - *This is particularly useful feature for manoeuvring the machine around obstructions.*
The EDS system has 3 user settings available for differing operating conditions – these are soft, medium and hard. For machines where EDS is installed refer to the specific control section for details of operation.

ANGLE FLOAT KIT (Standard Feature)

Machines are fitted with Angle Float as standard – when activated the feature connects the base and gland circuits of the angle ram to allow free movement of oil in both directions thus allowing the head to automatically angle itself to match the contours of the ground.
Refer to specific controls section for details of operation.
NOTE: On proportionally controlled machines any operation of the angle float thumbwheel will override and de-activate the automatic angle float function, on release of the thumbwheel it will revert back to automatic angle float.



Angle Float Off – ***Requires operator input to adjust flail head angle***



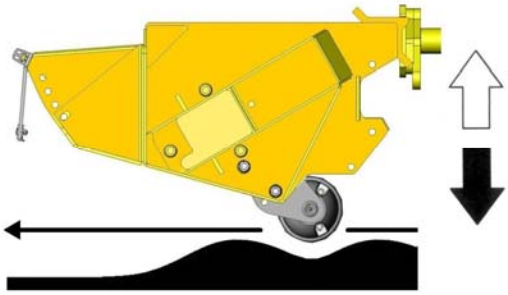
Angle Float On – ***Flail head automatically angles itself to match the ground contours.***

LIFT FLOAT (Optional Extra for Ground Work)

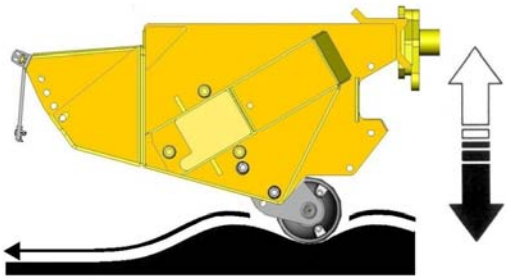
Work without lift float requires far more concentration and input from the operator to quickly react and re-adjust to the ground contours often resulting in patches of higher cut material where the head is cutting too high and ‘scalping’ of the ground where it is cutting too low – *in the case of the latter this can lead to increased flail wear, damage or even loss of flails.*

The Lift float feature is an optional extra for use during mowing work. When the function is activated the pressurised accumulator(s) work in conjunction with the valve and lift ram to take a proportion of the flailheads weight off the flail roller allowing the head to automatically follow the natural contours of the ground; this produces a cleaner more uniform cut without the need for constant operator re-adjustment. On EDS models the function has 3 user settings for differing working conditions – these are soft, medium and hard. *Refer to the relevant control section for details of selecting the required setting.*

Operation of the lift float function is as follows: with lift float switched off, position the flailhead approximately 1m clear of the ground before switching the float function on to charge the accumulator(s) – *the arms may drop at this point depending on the current level of retained pressure.* Lower the flailhead into the work position, release the lift control and proceed to work. *NOTE: with the exception of EDS models, occasional operation of the lift function will be required when working on downhill or uphill slopes and when reaching in or out in order to replenish the oil level within the accumulator(s) to retain optimum float capability*.



Without Lift Float
- Will require constant operator input.



With Lift Float
- Automatically follows ground contours.

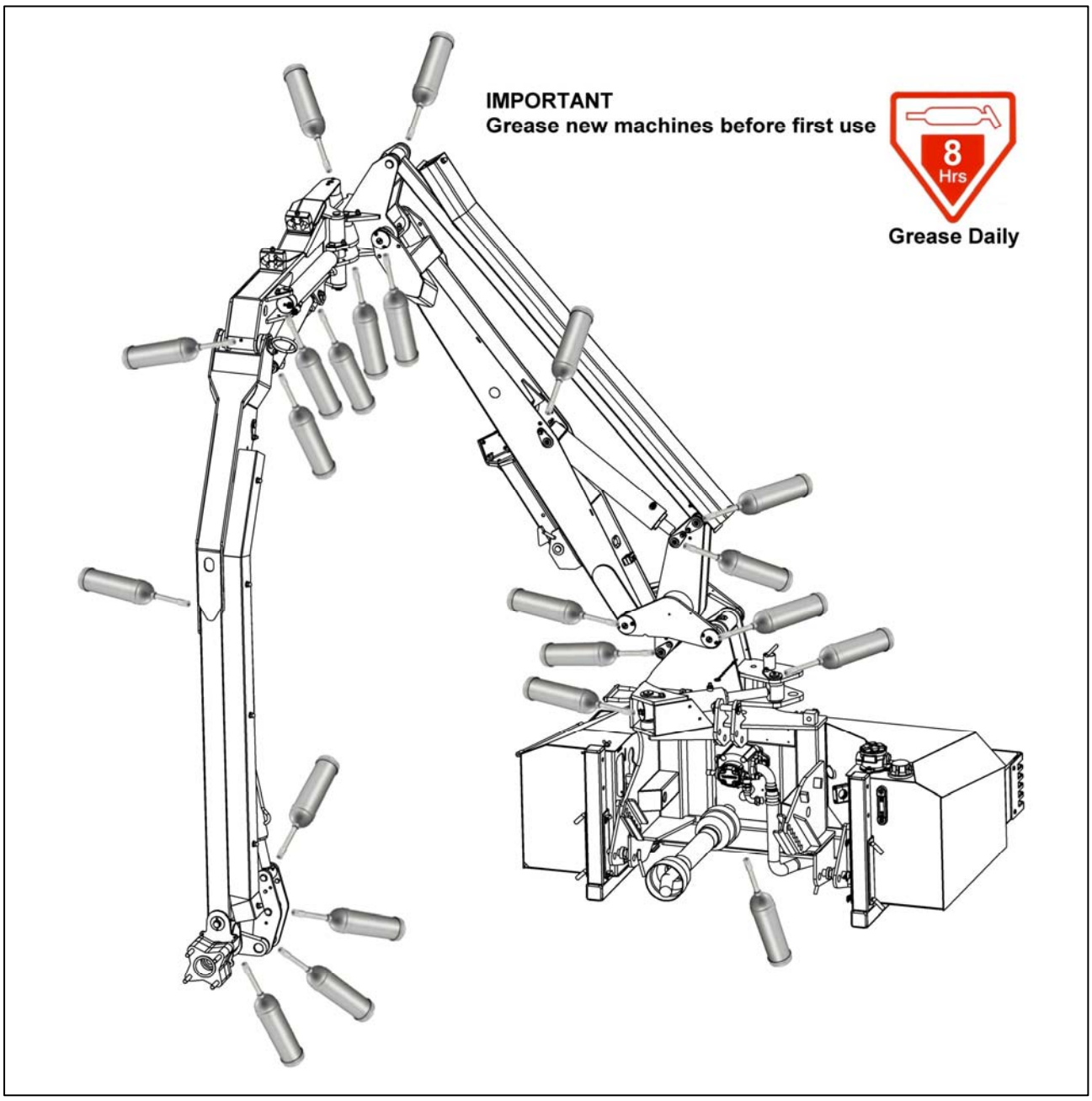
Lift float operation when supplied as a factory fitted option is controlled from the controls unit that accompanied the machine *(refer to controls section for details)*, but the feature is also available for a range of models as an after market kit, in which case operation will either be via an auxiliary switch on cable controlled machines, or by utilisation of the auxiliary three-position type switch on the control unit of electric controlled machines - *this will allow for selection of ‘lift float alone’ or ‘lift and angle float in unison’ if both features are fitted.* Operation of the lift float control for these models will then be as specified in the main controls section.

Lift Float Power Connections

Power to the unit is via connection 15 and common connection 16.
Non-EDS proportional machines use connections LF and C.

General Lubrication

The illustration below indicates the general locations of lubrication points - all points should be greased on a daily basis and prior storage of the machine.
New machines must be greased prior to first use.



Gearbox Lubrication

Check gearbox oil level on new machines prior to first use, top up if required before using the machine. Change oil after an initial 50 hours of use and thereafter at annual or 500 hour intervals, whichever occurs earliest.

Gearbox Capacity:

1.0 Litre SAE75W90 Fully Synthetic which meets the following minimum requirements;

Viscosity at 40°C, cSt, 100.0 min.
Viscosity at 100°C, cSt, 17.2 min.

Replacing Gearbox Oil

Drainage of the gearbox for changes of oil is via the drain plug located on the lower edge of the gearbox beneath and to the right of the stub shaft.

Every Day

- Grease machine fully prior to work (and prior to storage).
  NOTE: New machines must be greased before initial use.
- Check for broken or damaged flails.
- Check tightness of flail nuts and bolts.
- Visually check for oil leaks and damaged hoses.
- Check all guards and safety shields are correctly fitted and undamaged.
- Ensure all lights are working and clean.
- Check oil level.
- Clean the cooler matrix, in dusty conditions more frequent cleaning is required.

After initial 50 Hours

- Change gearbox oil.

After initial 100 Hours or 12 Months (whichever occurs first)

- Change return line filter element. *Failure to do so will invalidate the warranty.*
  Note; factory fitted filter elements are identified differently to replacement elements.

Every 25 Hours

- Grease PTO Shaft universal joints and tubes.

Every Week

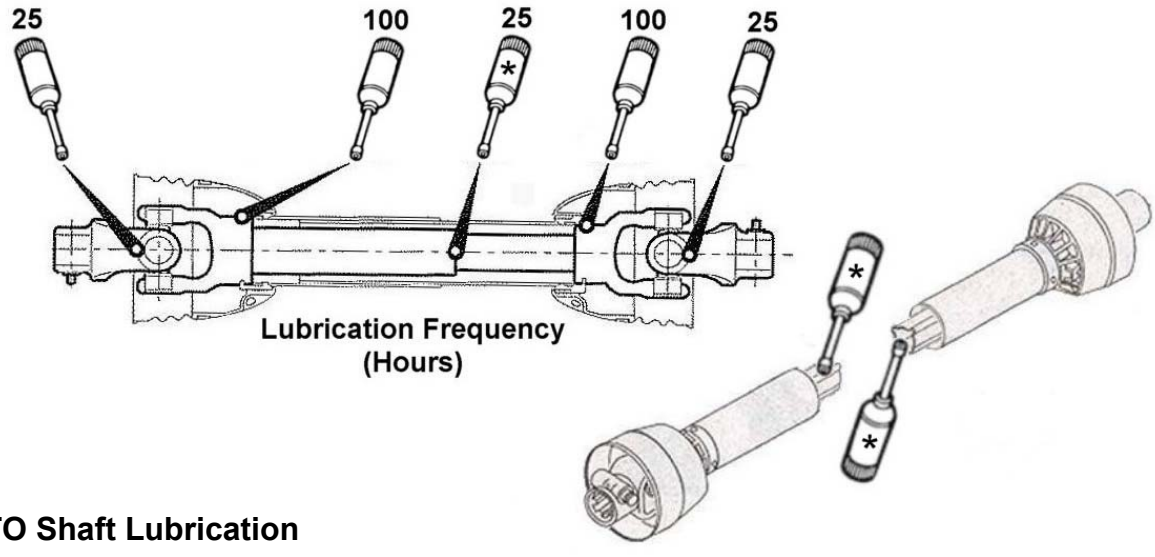
- Check tightness of all nuts and bolts.
- Check gearbox oil level.
- Check for wear on telescopic arm pads – *where applicable.*

Every 100 Hours

- Grease PTO shaft shield lubrication points.

Every 500 Hours

- Change return line filter element *(Every 500 hours or yearly whichever occurs first).*
- Change tank breather.
- Change gearbox oil.
- Check condition of hydraulic oil and change if required; *when changing oil new return line filter and suction strainer elements should be fitted and return line filter changed again after 100 hours of work.*



PTO Shaft Lubrication

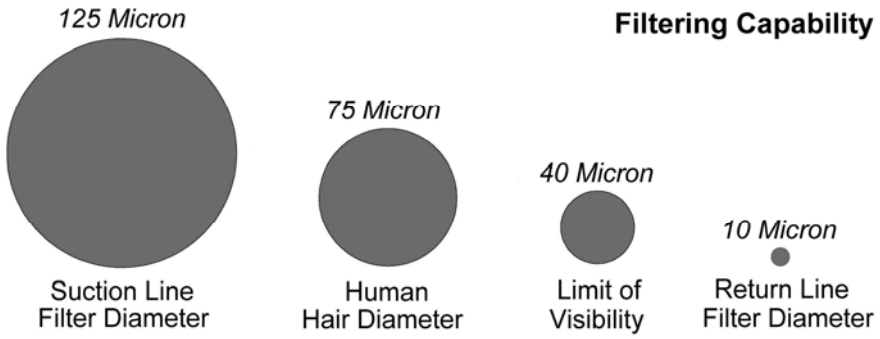
Oil Supply
Check the oil level in the reservoir daily.

Oil Condition & Replacement
No fixed time period can be quoted for oil changes as operating conditions can vary widely but a visually inspection of the oil will often indicate its current overall state. Signs of a reduction in its condition will be apparent by changes in colour and appearance when compared to new oil. Oil in poor condition can be dark, smell rancid or burnt, or in some cases be yellow, unclear or milky in appearance indicating the presence of air or emulsified water. Moisture resulting from condensation can become entrapped in the oil causing emulsification that can block the return line filter, consequentially the filter system will be by-passed and the oil and any possible contaminants present will continue to circulate without filtration risking damage to hydraulic components. All are indications or conditions that will require replacement of the oil.

Hydraulic oil is a vital component of the machine; contaminated oil is the root cause of 70% of all hydraulic system failures. Contamination can be reduced by the following:

- Cleaning around the reservoir cap before removal, and keeping the tank area clean.
- Use of clean containers when replenishing the system.
- Regular servicing of the filtration system.

Filtration System
Machines are protected by both replaceable 125 micron suction strainers and low pressure 10 micron full flow return line filters – the diagram below is a 'scaled up' view illustrating the filtering capability built into the hydraulic system of the machine:



Suction strainers – *Stops large contamination in the oil entering the pump*
The replaceable 125 micron suction strainers *(Part No. 8401097)* are fitted within the hydraulic tank and are 'screw' fitted with easy access for removal and replacement.

Return Line Filter– *Stops small contamination in the oil entering the hydraulic tank*
The return line filter element should be changed at 500-hour intervals or annually, *whichever occurs first.* It is important to note hours worked as if the filter becomes blocked an internal by-pass within the canister will operate and no symptoms of filter malfunction will occur to jog your memory.
Early builds use a 25 micron absolute filter element *(Part No. 8401089)* **S/N ► M1750008**
Later builds use a 10 micron absolute filter elements *(Part No. 23371.02)* **S/N M1750009 ►**

Tank Breather – *Stops contamination from the air mixing with the oil*
To reduce the risk of pump cavitation the 10 micron absolute tank breather *(Part No. 8401137)* should be changed at 500-hour intervals or annually, *whichever occurs first*.
For machines operating in dry dusty environments it is recommended that replacement be increased to 250-hour intervals or every 6 months, *whichever occurs first*.

⚠WARNING

The breather pressurises the fluid trapped in the tank up to 0.3Bar; this is to reduce pump cavitation and reduces the air flow through the breather - extending the filter life.
To avoid danger; unscrew the breather two revolutions and then wait until pressure in tank is equal to the atmosphere - the breather can then be removed safely.
It is advisable to remove any pressure in the tank before working on the hydraulics as this will reduce the amount of oil split.

⚠WARNING **Hot Oil & Hot Components**

Never attempt to perform service or maintenance work on the machine's hydraulic system whilst the components and/or their contained oils are hot; machines must be allowed to cool down to a safe temperature state before performing any repairs, service or maintenance tasks.

The condition of all hoses should be carefully checked during routine service of the machine. Hoses that have been chaffed or damaged on their outer casing should be securely wrapped with waterproof adhesive tape to stop the metal braid from rusting. Hoses that have suffered damage to the metal braid should be changed at the earliest opportunity.

Hose Replacement
Before changing any hoses take the time to study the existing installation as the routing has been carefully calculated to prevent hose damage during operation - always replace hoses in exactly the same location and manner. This is especially important for the flail hoses where they must be crossed, upper to lower, at the dipper and head pivots.

- Always replace one hose at a time to avoid the risk of wrong connections.
- When the hose is screwed to an additional fitting or union, use a second spanner on the union to avoid breaking both seals.
- Do not use jointing compound on the threads.
- Avoid twisting the hose. Adjust the hose line to ensure freedom from rubbing or trapping before tightening hose end connections.

All Hydraulic Hoses (BSP) now fitted to McConnel Power Arm Hedge/Grass Cutters have ‘soft seal’ connections on both flail and ram circuit hoses.

Recommended torque settings for nut security are as follows:

SIZE		TORQUE SETTING			O Ring Ref.
1/4” BSP	=	24 Nm	*or*	18 lb.ft.	10 000 01
3/8” BSP	=	33 Nm	*or*	24 lb.ft.	10 000 02
1/2” BSP	=	44 Nm	*or*	35 lb.ft.	10 000 03
5/8“ BSP	=	58 Nm	*or*	43 lb.ft.	10 000 04
3/4“ BSP	=	84 Nm	*or*	62 lb.ft.	10 000 05
1” BSP	=	115 Nm	*or*	85 lb.ft.	10 000 06

For hose unions (BSP) fitted in conjunction with bonded seals the recommended torque settings are as follows:

SIZE		TORQUE SETTING		
1/4” BSP	=	34 Nm	*or*	25 lb.ft.
3/8” BSP	=	75 Nm	*or*	55 lb.ft.
1/2” BSP	=	102 Nm	*or*	75 lb.ft.
5/8“ BSP	=	122 Nm	*or*	90 lb.ft.
3/4“ BSP	=	183 Nm	*or*	135 lb.ft.
1” BSP	=	203 Nm	*or*	150 lb.ft.

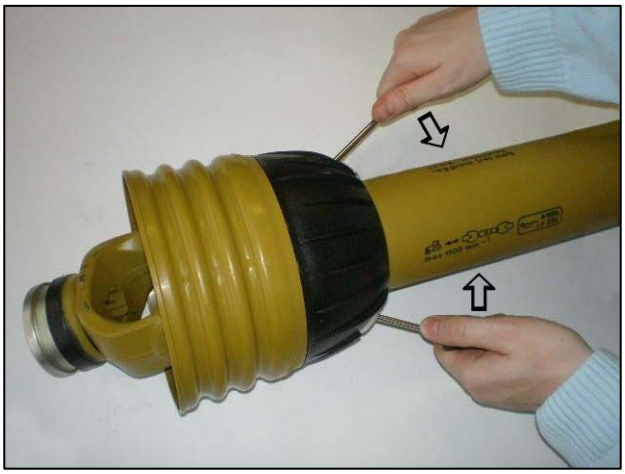
Safety Note
Soft seal hose connections are capable of holding pressure when the nut is only ‘finger tight’. It is therefore recommended during dismantling that the hose be manually flexed to relieve any residual pressure with the retaining nut slackened prior to complete disassembly.

PTO Shaft Lubrication

The PTO shaft should be lubricated on a regular basis using lithium based grease – each end of the shaft has 2 greasing points; one for lubrication of the universal joint and one for lubricating the rotating fixing ring of the shaft shield – access to the lubrication points is gained by releasing the shaft shield from its fixing ring and sliding it back along the body of the driveshaft – *the procedure and lubrication frequency is illustrated below.*

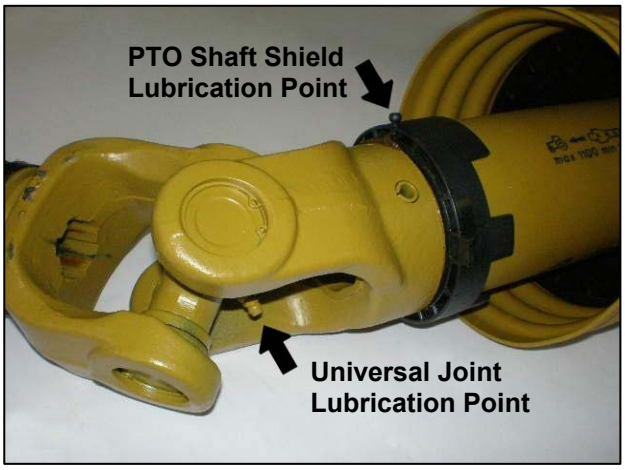
Shaft shield fixing clasps

Insert screwdrivers into the clasps

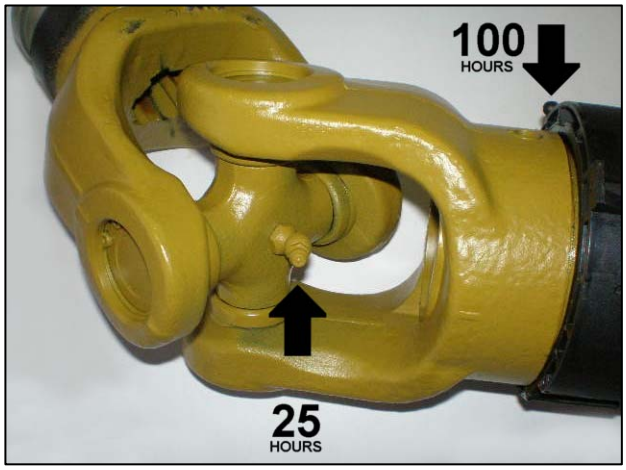


Prise clasps open to release the shield

Slide shield back to reveal universal joint



Location of lubrication points



Recommended lubricating frequency

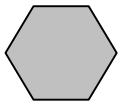
Slide the shaft shield back into place after lubrication ensuring the clasps relocate correctly in the fixing ring – always fit torque chains to the shields to stop them from rotating with the shaft during operation.

TORQUE SETTINGS FOR FASTENERS

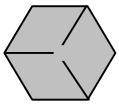
The chart below lists the correct tightening torque for fasteners. This chart should be referred to when tightening or replacing bolts in order to determine the grade of bolt and the correct torque unless specific torque values are assigned in the text of the manual.

Recommended torque is quoted in Foot-Pounds and Newton-Metres within this manual. The equation for conversion is 1 Nm. = 0.7376 ft.lbs.

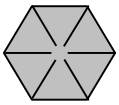
TORQUE VALUES FOR IMPERIAL BOLTS



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

TROUBLESHOOTING CHART

The chart below lists possible causes and solutions to problems that may be encountered.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Gearbox overheating	Oil level incorrect	Check oil level
	Oil grade incorrect	Check oil grade
	Implement overloaded	Reduce forward speed
	Wrong PTO speed	Ensure tractor PTO speed matches implement
Excessive belt wear	Belt and pulley condition	Replace if necessary
	Pulley alignment	Check alignment
	Incorrect belt tension	Tension belts to spec
	Overloading of implement	Reduce forward speed or increase cut height
PTO wear / UJ failure	Working angle too great	Reduce mis-alignment of drive stub shafts
	Shaft length incorrect; bottoming out	Resize PTO shaft as recommended
	Lack of maintenance	Grease PTO shaft as recommended
Cut Quality	Flails worn or damaged	Replace worn/damaged flails
	Rotor speed / direction	Check rotor direction/tractor PTO speed
	Cutting conditions	Work in suitable cutting conditions
Rotor bearing failure	Rotor out of balance	Refer to rotor vibration below
	Wire / string in bearing	Remove wire / string
	Lack of maintenance	Grease bearings to schedule
	Moisture in bearing(s)	Grease bearing(s) to expel moisture
Rotor vibration	Flails broken or missing	Replace flails
	Bearings worn or damaged	Replace bearings
	Rotor unbalanced / bent	Re-balance / replace rotor
	Debris build up	Remove debris
	Incorrect speed	Check rotor RPM
Oil tank overheating	Oil level incorrect	Fill tank to correct level
	Oil grade incorrect	Drain and refill tank with correct grade oil
	PTO speed too fast	Match the tractor's PTO speed to machine
	Ambient temperature too high	Reduce work rate / install oil cooler
	Machine overloaded	Reduce forward speed or increase cut height
Frequent Break-back	Machine overloaded	Reduce forward speed or increase cut height
	Working on excessive incline	Disable auto-reset
	Machine weight sat on rear roller	Raise head or operate with head float
	Machine not set vertical	Adjust top link
	Internal valve leakage	Contact local dealer or McConnel Service
Hydraulics not responding	Oil level low	Fill oil to correct level
	Oil pump suction filter blocked	Replace filter element
	Oil leak in pressure line	Check machine for hydraulic leaks
	Drive line broken	Check pump is rotating
Irregular arm movement	Spool contacting with housing	Check spool moves freely
	Broken spring in spool valve	Check spring in spool valve
	Ram seal failure	Replace ram seals
Electric valve unresponsive	Faulty wiring	Check wiring and switches
	Dirt in valve	Check for ingress of dirt
	Sticking valve	Replace the valve
	Insufficient voltage	Ensure power is sourced direct from battery

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