

Take

A SIGNATURE CUT, TRUSTED FOR OVER 100 YEARS

JACOBSEN®

SAFETY, OPERATION & MAINTENANCE MANUAL

Jacobsen GP400™ Ride on Greens Mower

CAT® - C0.7 Diesel

GP400 Diesel (CAT® - C0.7)

Series: DDE / Product code:USAD004E

WARNING

WARNING: If incorrectly used this machine can cause severe injury. Those who use and maintain this machine must be trained in its proper use, warned of its dangers and must read the entire manual before attempting to set up, operate, adjust or service the machine.



RJL AGCD

10015205-A

CALIFORNIA PROPOSITION 65



WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects and other reproductive harm.

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1.1 IMPORTANT

The JACOBSEN GP400 is available as a Diesel engined self propelled reel mower. The hydraulic systems are for the traction drive, the cutting unit lift and the lower and cutting unit drives and steering.

IMPORTANT: Do the maintenance indicated in this manual to make sure that the quality of cut is kept at a high level.

This SAFETY AND OPERATORS MANUAL is part of the machine and must stay with the machine always. Suppliers of both original and used machines need to keep the documentation that comes with the machine.

You must use the machine to cut the grass only and not for any other purpose. Compliance with the conditions of operation, service and repair specified by the manufacturer, are understood to be part of the correct use.

ALL operators **MUST** read through this manual and understand the Safety Instructions, controls, lubrication and maintenance procedures.

Make sure that you obey all safety and road traffic regulations.

You must not make any changes to the machine that the manufacturer does not approve. This type of change can release the manufacturer from the liability for any damage or injury.

Discard worn parts, taking note of the environmental result, use the systems available in the country where the machine is used. When the machine is at its end of life, there are guidelines in this manual for the removal of the machine from use.

Use only Jacobsen Genuine spare parts to make sure that European conformity is controlled.

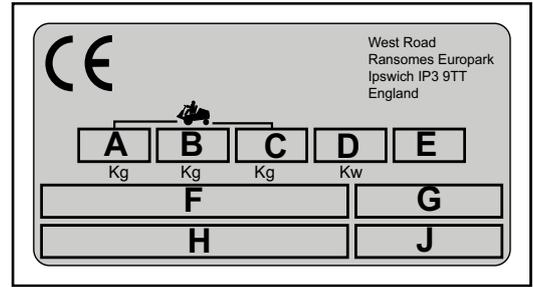
2006/42/EC

These instructions are the original instructions confirmed by Ransomes Jacobsen Limited.

1 FOREWORD

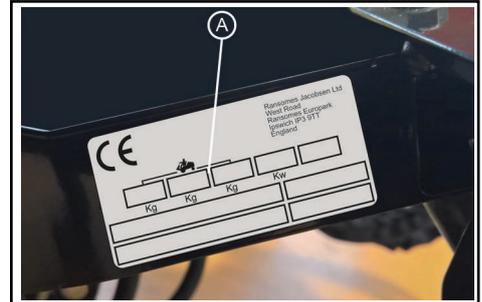
1.2 PRODUCTION IDENTIFICATION

- A. Maximum front axle load in Kg (for machines being driven on the highway)
- B. Unladen weight, (No cutting implements or fuel (mass) in Kg
- C. Maximum rear axle load in Kg (for machines being driven on the highway)
- D. Power in Kw
- E. Date code
- F. Machine type (Designation)
- G. Product code
- H. Product name
- I. Serial number



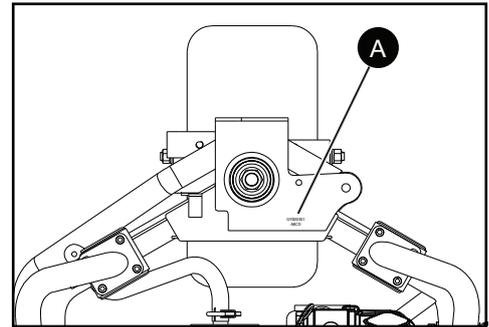
Location of Serial Number Plate

The serial number plate (A) is found on the right hand of the chassis towards the rear of the front right hand wheel.



Chassis Stamp

The Serial number and date code (B) are marked on the right hand of the chassis towards the rear of the front right hand wheel.



Engine Identification

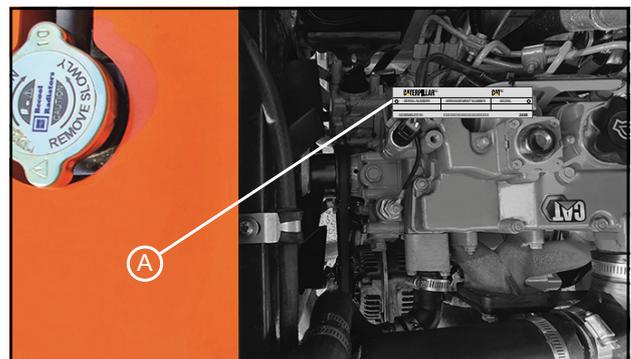
Serial Plate

CATERPILLAR®		CAT®	
○ SERIAL NUMBER	ARRANGEMENT NUMBER	MODEL	○
ASSEMBLED IN		(ALWAYS GIVE ALL NUMBERS)	2468

Location of Serial Number Plate

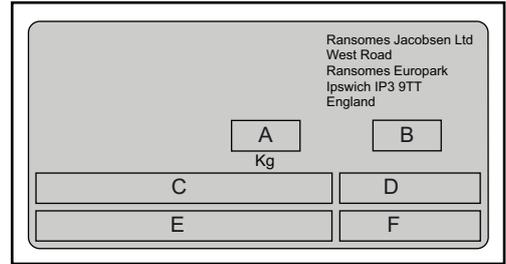
The engine serial number is found on the top of the valve cover toward the front of the mower. The label shows the engine group and serial number.

The engine serial number is also found on the engine block.



ROPS Serial Plate

- A. Weight of ROPS
- B. Date Code
- C. Standard Used
- D. Part Number
- E. Used on Product
- F. Serial Number



ROPS Serial Plate Location

The ROPS serial plate (C) is located at the base of the front of the ROPS main beam.



1 FOREWORD

1.3 GUIDELINES FOR THE DISPOSAL OF SCRAP PRODUCTS _____

1.3.1 DURING SERVICE LIFE _____

Used oil, oil filters and engine coolant are hazardous materials. Recommended procedures must be followed for their safe removal.

If a fluid leaks, contain the spill to make sure that the leak does not flow into the ground or drainage system. Follow the local laws to make sure that leaks are controlled safely.

The maintenance procedures in this manual make sure that the damage that the machine can cause in the local environment is controlled safely.

When the machine completes its full service life, the following actions must be taken.

1.3.2 END OF SERVICE LIFE _____

These guidelines must be used with applicable Health, Safety and Environmental laws. Always use the approved local waste disposal and agencies for recycled materials.

- Park the machine in a location to use all of the necessary lifting equipment.
- Use correct tools and Personal Protective Equipment (PPE) and take instruction from the technical manuals applicable to the machine.
- Remove and store correctly
 - Batteries
 - Fuel
 - Engine coolant
 - Oils
- Disassemble the structure of the machine and refer to the technical manuals where applicable. Give attention to parts that have mechanical pressure or tension applied to the part in the machine, including springs.
- Items that continue to have a service life must be separated and returned to the local store.
- items that are worn must be separated into the material groups and removed according to the agencies for recycled materials that are available. Common types are as follows:
 - Steel
 - Non ferrous metals
 - Aluminium
 - Brass
 - Copper
 - Plastic materials
 - Identified
 - Can be recycled
 - Can not be recycled
 - Not identified
 - Rubber
 - Electrical and Electronic Components
- If an item is not easily separated into different material groups, the material must be added to the “General discarded materials” area.
- Do not burn discarded materials.

Change the machinery records to show that the machine is not in service and is discarded. Supply this serial number to Ransomes Jacobsen Limited Warranty Department to close their records.

1.4 PARTS MANUAL

In compliance with the ISO14001 standard, Ransomes Jacobsen Limited does not send a paper parts manual with every product.

To refer to a parts list for this mower you have two options:

1. Website – www.jacobsen.com and select the “FIND A MANUAL” tab at the top, search our catalogue of current Jacobsen Turf Equipment for parts, and product information. Search by product name to access PDF version of the parts manual.

Complete the form included in the technical manual pack supplied with the machine if you require a paper copy of the parts manual.

1.5 KEY NUMBERS

Record the key numbers shown below:

Starter Switch: _____

Diesel tank: _____

Record the machine and engine numbers shown below:

The machine serial number is found on the registration plate and the engine serial number can be found on the rocker cover.

Machine Number: _____

Engine Number: _____

2.1 HOW TO OPERATE SAFELY

WARNING

EQUIPMENT OPERATED INCORRECTLY OR WITHOUT TRAINING CAN BE DANGEROUS.
Know the location and correct operation of controls. Operators without experience must receive instruction from another person that knows the correct operation of the equipment before you operate the mower.

Only use parts, accessories and attachments approved by Jacobsen.

2.2 SAFE OPERATION

- A. Read the Operator's Manual and other training material. If the operator or technician can not read this manual, the owner is responsible to describe this material to the operators and technicians. Manuals in additional languages may be available on the Jacobsen website.
- B. Read all of the instructions for this mower carefully. Know the controls and the correct operation of the equipment.
- C. Children or persons who do not understand these instructions must not use the mower. The local regulations can limit the age of the operator.
- D. Never use a mower near persons, including children or animals.
 - Parts could be ejected from the machine at high speed in certain circumstances. The hazard area, particularly in front of and behind the machine, must be cleared of any persons, animals or objects before starting.
 - Any use of the machine without verification of the hazard area can lead to serious or fatal accidents.
- E. Any use of the machine without verification of the hazard area can lead to serious or fatal accidents.
- F. Remember that the operator or owner is responsible for accidents or hazards that occur to other persons or their property.
- G. Never carry passengers.
- H. Never allow persons to operate or service the mower or its attachments without correct instructions.
- I. Do not operate equipment while tired, sick or whilst under the influence of alcohol or drugs.

2.3 PREPARATION

- A. When you operate the mower, wear correct clothing, slip resistant work shoes or boots, work gloves, hard hat, safety glasses and hearing protection. Long hair, loose clothing or jewelry can be caught in moving parts.
- B. Do not operate the equipment with the Interlock System disconnected or the system does not operate correctly. Do not disconnect or prevent the operation of any switch.
- C. Never operate equipment that is not in correct order or without decals, guards, shields, deflectors or other protective devices fastened. When you mow with a side discharge deck, **DO NOT** operate the cutting unit without the discharge chute installed.
- D. Inspect the mower before you operate the mower. Check the tyre pressure, engine oil level, the radiator coolant level and the air cleaner indicator. Fuel is flammable. Use caution when you add the fuel to the mower.
- E. Operate the mower in daylight or in good artificial light. Use caution when you operate the mower during bad weather. Never operate the mower with lightning in the area.
- F. Inspect the area to select the accessories and attachments that are needed to correctly and safely do the job. Only use parts, accessories and attachments approved by Jacobsen.
- G. Be careful of holes in the terrain and other hazards that are not visible.
- H. Inspect the area where the equipment is operated. Remove all objects you can find before you operate. Be careful of obstructions above the ground (low tree limbs, electrical wires) and also underground obstacles (sprinklers, pipes, tree roots). Enter a new area carefully. Look for possible hazards.

2 SAFETY

- I. Inspect the cutting system before you start the mower. Make sure the blades are free to rotate. When you rotate one blade, other blades can rotate.

2.4 OPERATION

- A. Never operate the engine without enough ventilation or in an enclosed area. The carbon monoxide in the exhaust fumes can increase to dangerous levels.
- B. Never carry passengers. Keep other persons or animals away from the mower.
- C. Disengage all drives and engage the park brake before you start the engine. Only start the engine with the operator in the seat. Never start the engine with persons near the mower.
- D. Keep your legs, arms and body inside the operator compartment while the mower is in operation. Keep your hands and feet away from the cutting units.
- E. Do not use on the slopes greater than the safe slope limit for the equipment.
- F. To guard against over turning or loss of control:
 - Operate the mower up and down on the face of slopes (vertically), but not across the face (horizontally).
 - Do not start or stop suddenly on slopes.
 - Decrease the speed when you operate on slopes or when you must turn. Use caution when you change direction. Turf condition can change the mower stability.
 - Use caution when you operate the mower near drop-offs, ditches or embankments.
 - Be careful of holes in the terrain and other hazards that are not visible.
- G. When you drive in the reverse direction, look behind you and down to make sure the path is clear. Do not operate the cutting units when you drive in the reverse direction.
- H. Use caution when you go near corners, trees or other objects that can prevent a clear view.
- I. Equipment must meet the current regulations to be driven on the public roads.
- J. Before you move across or operate on the paths or roads, turn off the PTO switch, lift the mowers and travel at decreased speed. Look for traffic.
- K. Stop the blades when the mower is on any surface that is not grass.
- L. Do not release the cut grass in the direction of persons or allow persons near the mower while in operation.
- M. Do not operate the mower with damaged guards or without safety devices in position.
- N. Do not change the engine governor setting or over-speed the engine. Never change or tamper with adjusters that are closed with a seal for the engine speed control.
- O. Before you leave the operator compartment, for any reason:
 - Disengage all the drives and lower attachments to the ground.
 - Engage the park brake.
 - Stop the engine and remove the key.
- P. When you hit an object or mower starts to cause the vibration that is not normal, inspect the mower for damage and make repairs.
- Q. Decrease the throttle setting before you stop the engine.
- R. Do not use this equipment for uses that the mower was not made for.
- S. The machine and its cutting units are designed for use on maintained turf surfaces. Use of the machine with its cutting units engaged on hard and rough surfaces could rapidly decrease design life of components and potentially cause acute damage to the units making them unsafe for operation.

2.5 ROPS AND CABIN

- A. The ROPS/Cabin is a safety device. Keep the ROPS in the vertical and locked position. Always use the seat belt when you operate the mower. Make sure the seat belt can be released quickly in an emergency.

- B. Only operate the mower with the ROPS in the folded position on flat and level surfaces when necessary. Do not operate the mower with the ROPS in the folded position on slopes, near sharp edges or near water. On a ROPS machine there is no roll over protection with the ROPS in the folded position.
- C. Check for clearance before you drive below objects. Do not contact tree branches, electrical wires or other objects with the ROPS/Cabin.
- D. Do not use the seat belt with the ROPS in the folded position.
- E. Inspect the ROPS/Cabin for damage. Keep hardware fastened.
- F. Do not weld, drill, change or bend the structure. Replace a damaged ROPS/Cabin. Do not try to correct a damaged ROPS/Cabin frame.
- G. Do not remove the ROPS/Cabin from the mower other than for maintenance access. Ensure to refit before use.
- H. Ransomes Jacobsen must approve any changes to the ROPS/Cabins.

2.6 SAFE HANDLING OF FUELS

- A. The fuel and the fuel vapors are flammable. Use caution when you add the fuel to the mower. The fuel vapors can cause an explosion.
- B. Never use the containers that are not approved to keep or transfer fuel.
- C. Never keep the mower or fuel containers near an open flame or any device that can cause the ignition of fuel or fuel vapors.
- D. Never fill the fuel containers inside a vehicle or on a truck or trailer with a plastic liner. Always put the fuel container on the ground away from your vehicle before you fill the container.
- E. Refuel the mower before you start the engine. When the engine is in operation or while the engine is hot, never remove the fuel cap or add fuel to the mower.
- F. Refuel outdoors only and do not smoke when you add fuel. Extinguish all types of ignition.
- G. The fuel nozzle must touch the rim of the fuel tank when you add fuel to the mower. Do not use a device to lock the fuel nozzle in the open position.
- H. Do not over fill the fuel tank. Leave at least 1 inch (25 mm) below the filler neck.
- I. Always tighten the fuel tank cap and container cap after you add fuel.
- J. If the fuel spills on your clothing, change your clothing immediately.

2.7 MAINTENANCE AND STORAGE

- A. Before you clean, adjust or repair this equipment, push PTO switch to the OFF position, lower the cutting unit to the ground, engage the park brake, stop the engine and remove the key.
- B. Make sure the mower is parked on a solid and level surface.
- C. Never work on a mower that is lifted only by a Jack. Always use Axle stands.
- D. Never allow persons to service the mower or its attachments without correct instructions.
- E. When the mower is parked, put into storage or left without an operator, lower the cutting device unless a positive mechanical lock is used.
 - Do not keep fuel near flames or drain the fuel inside a building.
- F. Disconnect the battery before you service the mower. Always disconnect the negative battery cable before the positive battery cable. Always connect the positive battery cable before the negative battery cable.
- G. Charge the battery in an area with good airflow. The battery can release hydrogen gas that is explosive. To prevent an explosion, keep any device that can cause sparks or flames away from the battery.
- H. Disconnect the battery charger from the power supply before you connect or disconnect the battery charger to the battery. Wear protective clothing and use insulated tools when you service the battery.
- I. Be careful and wear gloves when you check or service the cutting unit blades. Replace any damaged blades, do not try to correct a damaged blade.

2 SAFETY

- J. Keep your hands and feet away from parts that move. Do not adjust the mower with the engine in operation, unless the adjustment needs the engine in operation.
- K. Take care working on cutting units and moving parts with stored energy.
- L. To prevent injury from the hot, high pressure oil, never use your hands to check for oil leaks. Use paper or cardboard to find leaks.
- M. The hydraulic fluid pressure can have enough force to enter your skin. If hydraulic fluid has entered your skin, seek medical attention immediately.
- N. When you service the hydraulic system, make sure the hydraulic fittings, tubes and hoses are tightened to the correct torque (where applicable). Make sure the hydraulic system is in good condition before you start the engine.
- O. Keep the mower and the engine clean.
- P. Allow the engine to become cool before storage and always remove the ignition key.
- Q. Keep all nuts, bolts and screws tight to make sure the equipment is in safe condition.
- R. **DO NOT** operate the machine if you have worn or damaged parts for safety. Replace damaged or worn decals. Only use parts, accessories and attachments approved by Ransomes Jacobsen.
- S. To decrease the fire hazard, remove materials that burn from the engine, muffler, battery tray and fuel tank area.
- T. Disconnect the battery and controller connectors before you weld on this mower.

2.8 WHEN YOU PUT THE MOWER ON TO TRAILER

- A. Be careful when you load or unload the mower on a trailer. The trailer must be wider than the mower and can carry the weight of the mower.
- B. Use a full-width ramp to load or unload the mower on a trailer.
- C. Use appropriate securing methods to fasten the mower to the trailer. Both front and rear straps must be sent down and towards the sides of trailer.
- D. Make sure that all latches are correctly fastened.

2.9 IMPORTANT SAFETY NOTES



This safety alert symbol is used to alert you to possible hazards.

DANGER:

Indicates a dangerous condition that **WILL** cause death or injury unless it is prevented.

WARNING:

Indicates a dangerous condition that **CAN** cause death or injury unless it is prevented.

CAUTION:

Indicates a dangerous condition that can cause injury and property damage unless it is prevented. Also, the label can indicate work procedures that are not safe.

IMPORTANT:

Some illustrations in this manual can show shields, guards or plates removed for clarity. This equipment must not be operated without these devices correctly fastened and in position.



WARNING

The Interlock System on this mower prevents the starting of the mower unless a.) The Park Brake is Engaged. b.) The mow switch is in the OFF position, c.) The traction pedal is in the Neutral position. d) The operator is in the seat. The system stops the engine when the operator leaves the seat a.) without the Park Brake engaged and b.) the mow switch is not in the OFF position. **NEVER** operate the mower unless the Interlock System is working.



WARNING

1. Before leaving the operator's position for any reason:
 - a. Return traction pedal to the Neutral position.
 - b. Disengage all drives.
 - c. Lower all cutting units to the ground.
 - d. Engage Park Brake.
 - e. Stop the engine and remove the ignition key.
2. Keep your hands, feet, and clothing away from moving parts. Wait for all movement to stop before you clean, adjust, or service the machine.
3. Keep the area of operation clear of all persons and animals.
4. Never carry any passengers.

Never operate the equipment without guards and deflectors in position.

By following all instructions in this manual, you increase the life of your machine and keep its maximum performance. Adjustments and maintenance must always be done by an approved technician.

If a service is needed contact your authorized Jacobsen Dealer or after sales for additional information or help.

2 SAFETY

WARNING

California Proposition 65
Engine exhaust, some of its constituents, and some vehicle components contain or release chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.

WARNING

To prevent injury from the hot oil at high pressure, DO NOT use your hands to check for oil leaks.
Make sure that you use paper or cardboard.
Release of hydraulic fluid at high pressure has enough force to enter through the skin. If the fluid enters through the skin, you must seek medical attention immediately.

WARNING

When the machine is driven off-road, a seat belt must be worn only when a ROPS frame is in position.
This warning is because a seat belt must be worn with a ROPS to follow the Machinery Directive, 2006/42/EC Sections 3.2.2, Seating & 3.4.3, Rollover. (ANSI B71.4-2012 section 20.7)
Ransomes Jacobsen Limited recommends that the owner/user of the machine completes a site specific risk assessment of the machine to find any conditions that do not follow this rule.
e.g. when you drive the machine next to water.

WARNING

Explosive gases are released by batteries. The battery contains corrosive acid and supplies an electrical current that is high enough to cause injuries to the body.

WARNING

You must not use this machine to tow other vehicles.

WARNING

Ear protection must be worn when you operate machines with an operator ear noise level of more than 85dB(A) Leq

**WARNING****Vibration Exposure Limits**

Exposure limits are calculated as a combination of the vibration level (magnitude) of the tool and the Daily Exposure Time (Trigger Time). e.g. A product with 5m/s^2 vibration can be used up to 2 hours/day to reach the EAV and up to 8 hours/day to reach the ELV.

Exposure Action Value (EAV) - Daily vibration exposure $A(8) = 2.5\text{m/s}^2$

Where daily vibration exposure $A(8)$ is below 2.5m/s^2 the risk is relatively low and no action need be taken.

Exposure Limit Value (ELV) - Daily Vibration Exposure $A(8) = 5.0\text{m/s}^2$

If several tools are use the exposure values must be combined:

Total exposure is then the combined value of the activities.

**WARNING**

Never mow if there is a risk of lightning or you hear thunder. If you are in the middle of mowing, stop in a safe place, turn off the engine and go inside a building.

**CAUTION**

When you do any welding on the machine, the battery, controller and display must be disconnected before you start. You must not open the controller. If the controller is opened, this can void all of the warranties and can cause the failure of the machine

**CAUTION**

Personal Protective Equipment (PPE), for example safety glasses, safety footwear, work gloves and ear protection must be used after the owner/user completes a site specific risk assessment of the mower to prevent injury.

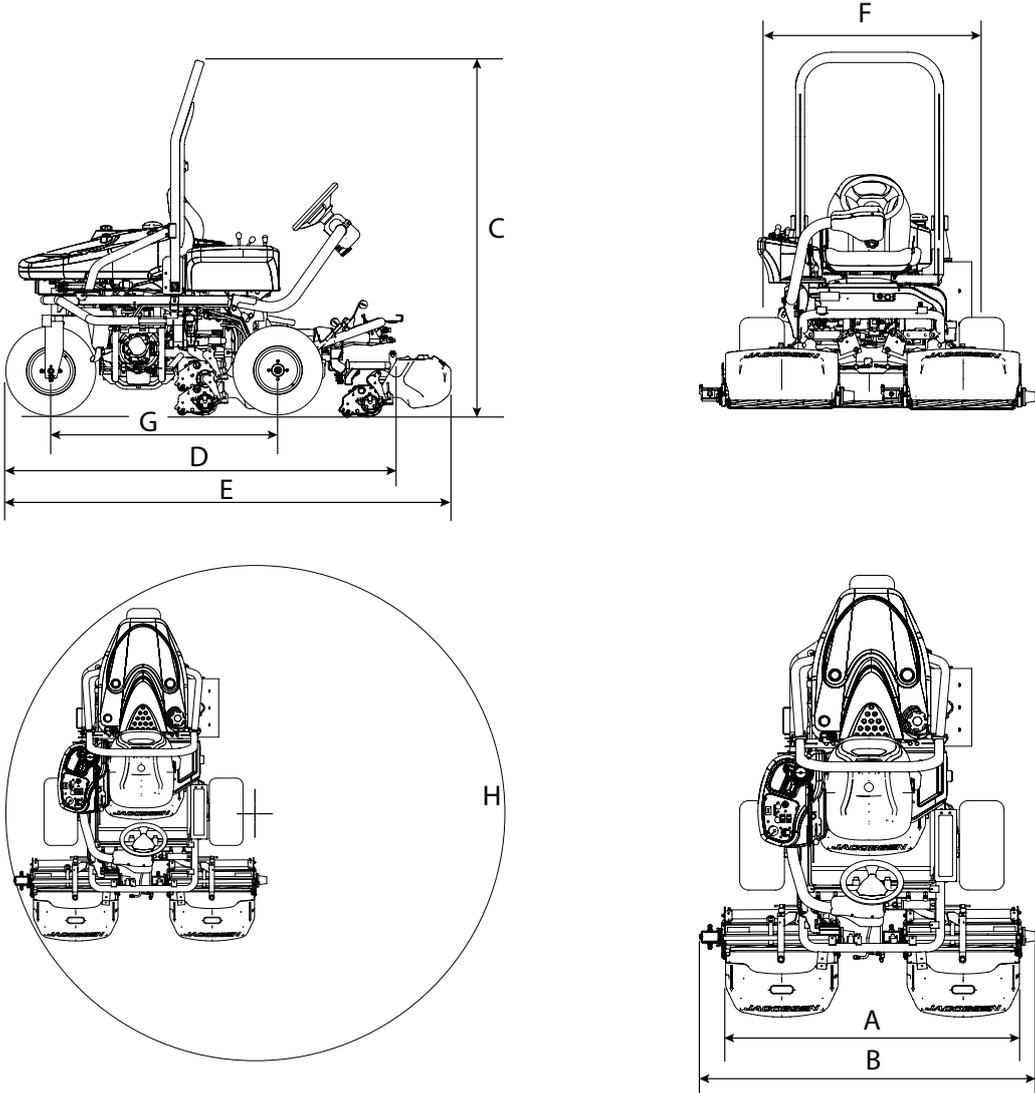
3 SPECIFICATIONS

3.1 ENGINE SPECIFICATION

CAT® - C0.7		
Cycle	4 stroke	
Number of Cylinders	3	
Bore & Stroke	67mm x 68mm (2.64 in) - 72mm (2.83 in)	
Displacement	0.762 Litres (46.5 in ³)	
Compression ratio	22.1:1	
Gross Intermittent Power	13.3kW (17.8hp) @ 3600rpm	
Maximum Speed:	3400 ± 50 RPM (No load)	3500 ± 50 RPM (No load)
Idle Speed:	1700 ± 100 RPM	1800 ± 50 RPM
Order of Firing	1-2-3	
Direction of Rotation	Counter-clockwise (viewed from flywheel side)	
Injection Pump	Bosch MD type mini pump	
Injection Pressure	13.73 MPa (140kgf/cm ²)	
Injection Timing (Before T.D.C.)	21°	20°
Compression Ratio	23.5:1	
Fuel:	No. 2-D Diesel fuel (ASTM D975)	
Lubrication (API Classification)	Above CF grade	
Oil Sump Capacity:	Maximum: 3.05 Litres / 5.36 pints - Minimum: 2.35 Litres / 4.13 pints	
Dimensions (length x width x height)	480mm (18.9 in) x 371mm (14.6 in) x 528mm (20.8 in)	
Dry Weight	71kg	
Starting System	Cell starter (with glow plug)	
Standard Starting Motor cold start limit	-20°C - (-4°F)	

3.2 DIMENSIONS & WEIGHTS

A	Width of Cut:	160 cm	63 inches
B	Overall Width Cutting:	188 cm	74 inches
	Overall Width Transport (minimum):	186 cm	73.25 inches
C	Overall Height with ROPS Frame:	196.5 cm	77.38 inches
D	Overall Length Without Grass Boxes:	219 cm	86.2 inches
E	Overall Length With Grass Boxes:	250 cm	98.4 inches
F	Wheel Track:	121.7 cm	48 inches
G	Wheel Base 2 Wheel Drive:	133.2 cm	52.44 inches
G	Wheel Base 3 Wheel Drive:	125.5 cm	49.5 inches
H	Turning Circle 2 Wheel Drive:	368 cm	144.88 inches
H	Turning Circle 3 Wheel Drive:	393.8 cm	155 inches
	Weight of Diesel Machine, No Fuel, Plus ROPS:	590kg	1390 lbs
	Weight of one Cutting Unit 11 Knife	31.6 kg	69.6 lbs
	Weight of one Brush & Groomer Kit:	7 kg	15.4 lbs
	Weight Diesel Fuel 54l (14.25 US Gallons)	46 kg	101 lb



3 SPECIFICATIONS

TYRE PRESSURE						
Product	Front Wheel			Rear Wheel		
	Tyre Size	Tyre Type	Tyre Pressure	Tyre Size	Tyre Type	Tyre Pressure
GP400	20 x 10.00 - 10	OTR Smooth	0.7 bar (10 psi)	20 x 10.00 - 10	OTR Smooth	0.7 bar (10 psi)

3.3 MACHINE SPECIFICATION

Frame construction: Welded tubular steel chassis.

Cutting unit drive: Direct Drive hydrostatic reel drive pump, bi-directional hydraulic gear motor with reel control and Backlap valves.

Transmission: Variable displacement hydrostatic pump with low speed high torque wheel motors

Speeds:

Cutting: 0 - 6 km/h (0 - 3.7 mph) Forward
0 - 3 km/h (0 - 1.9 mph) Reverse

Transport: 0 - 12 km/h (0 - 7.5 mph) Forward
0 - 3 km/h (0 - 1.9 mph) Reverse

Steering: Hydrostatic power steering 2.5 turns lock to lock, with 330mm (13 inches) dia steering wheel.

Ground pressure: 1 kg/cm² (14 psi) (Dependent on tyre pressures and accessories fitted)

Brakes: Hydrostatic braking with 152mm (6 inches) Caliper disc parking brakes on front wheels.

Battery: Yuasa YBX3063 12 Volt 440A 45Ah

3.4 VIBRATION LEVEL

The machine was tested for hand/arm vibration levels. The operator was in the normal position to drive the vehicle, with two hands on the steering mechanism. The engine was in operation and the cutting device was in rotation, while the machine was not moving.

The Machinery Safety Directive 2006/42/EC

By compliance to:

The Lawnmower Standard BS EN ISO 5395

Referenced to Hand/Arm: BS EN ISO20643:2008

Information Supplied for Physical Agents Directive 2002/44/EC

By reference to:

Hand/Arm Standards: BS EN ISO 5349-1 (2001)

BS EN ISO 5349-2 (2002)

GP400 Diesel Hand / Arm Acceleration Level	Series DDE with ROPS
	Max. LH or RH Accelerations m/s ²
	Mean Value of X, Y, Z Aeq
	1.68 ± 0.40

The machine was tested for Whole Body vibration levels. The operator was in the normal position to drive the vehicle, with two hands on the steering mechanism. The cutting device was in rotation with the machine driven in a straight line at 6 Km/hr on a level and cut lawn.

The Machinery Safety Directive 2006/42/EC

By compliance to:

Whole Body EN1032:2003

Information Supplied for Physical Agents Directive 2002/44/EC

By reference to:

Whole Body Standards BS EN ISO 2631-1 (1997)

measurements according to the requirements of BS EN ISO 5395

GP400 Diesel Whole Body Acceleration Level	Series DDE with ROPS
	Max. Seat Accelerations m/s ²
	Mean Value of X, Y, Z Aeq
	0.36 ± 1.57

3 SPECIFICATIONS

3.5 NOISE LEVEL

The Machinery Safety Directive 2006/42/EC

And

Exposure Of Workers To The Risks Arising From Physical Agents (Noise) Directive 2003/10/EC

By compliance to:

The Lawnmower Standard BS EN ISO 5395:2013

And

Sound Pressure Standard EN ISO 3746: 2010

GP400 Diesel Measured Sound Pressure 88.8 dB(A) ± 1.24 LWA

When the machine was tested for sound power (Noise in the Environment).

The Machinery Safety Directive 2006/42/EC

And

**Noise Emission In The Environment By Equipment For Use Outdoors
Directive 2000/14/EC**

By compliance to:

Sound Power Standard EN ISO 3744:1995

GP400 Diesel Measured Sound Power 103.7 dB(A) ± 1.24 LWA

3.6 SLOPES

DO NOT USE ON SLOPES GREATER THAN 16°. The 16° slope was calculated using static stability measurements according to the requirements of BS EN ISO 5395-2013

3.7 CUTTING UNIT SPECIFICATION

	7 Blade	9 Blade	11 Blade	15 Blade	Verticut
Construction	Fabricated steel construction				
Reel Length	559mm (22 in)	559mm (22 in)	559mm (22 in)	559mm (22 in)	559mm (22 in)
Number of Knives	7	9	11	15	N/A
Number of Blades	N/A	N/A	N/A	N/A	26
Reel Diameter (New)	127mm (5 in)	127mm (5 in)	127mm (5 in)	127mm (5 in)	N/A
Minimum Reel Diameter (Before Replacement)	117.5mm (4.6 in)	117.5mm (4.6 in)	117.5mm (4.6 in)	117.5mm (4.6 in)	N/A
Height of Cut True-Set™ Reel (Standard Blade)	1.6mm - 11.1mm (1/16 in - 7/16 in)				
Height of Cut Classic XP™ Reel (Standard Blade)	2.5mm - 16mm (0.1 in - 0.63 in)				
Height of Cut Classic XP™ Reel (Tournament Blade)	2mm - 16mm (0.78 in - 0.63 in)				
Bedknife to Reel adjustment TrueSet™ Reel	Micro-adjusters				
Bedknife to Reel adjustment Classic XP™ Reel	Opposed Set Screw				
Rolls (Smooth & Grooved)	50 mm (2 in) Diameter				
Height of Cut Adjustment TrueSet™ Reel & Classic XP™ Reel	Screw adjusters on front roll				
Transmission	By hydraulic motor direct to reel.				
Maximum Reel Speed at Maximum PTO Speed	2200rpm				

NOTE: These cutting units are designed to cut grass of maximum height 12mm (15/32 in) down to the available height of cut range, removing no more than 1mm (3/64 in) to 2mm (5/64 in) with each pass.

3 SPECIFICATIONS

3.8 CUTTING PERFORMANCE

Blades	Frequency of Cut @ 2200rpm reel speed		Clip rate @ 2200rpm reel speed	
	mm/kph	inches/mph	Cuts/metre @ 6.04 kph	Cuts/yard @ 3.74mph
7	1.247	0.079	41	37
8	0.963	0.061	52	48
11	0.789	0.050	64	59
15	0.584	0.037	87	80

3.9 RECOMMENDED LUBRICANTS

Engine oil:

Diesel: Should be to A.P.I. CK-4 or CAT® ECF-3 Classification CD grades. [10W-30]

TEMPERATURE	VISCOSITY
Above 4°C (39°F)	SAE30
Below 4°C (39°F)	SAE5W-30 or SAE10W-30

Grease: For rear axle: K NATE (RJL No. 4213860), or equivalent to MIL-G-23549C, MIL-G-2345C, DIN 51 825, DIN 51 818.

General: Lithium based general purpose grease.

3.10 ACCESSORIES

Orange Touch-up Paint (12 oz. spray)	554598
Rear Roller Cleaner	62820
Turf Groomer 1/4" Spacing.....	67912
Turf Groomer 1/2" Spacing.....	67914
High Cut Roller Kit.....	68634
Motor Adapter Kit	894991

Magknife Kit

22 in. Medium Section Magknife Kit.....	4266571
22 in. Tournament Magknife Kit.....	4266551
22 in. Super Tournament Magknife Kit.....	4266570

Solid Rollers

22 in. with Scraper (Light)	68530
22 in. with Scraper	68641
22 in. Solid Tube Rear Roller	1004990

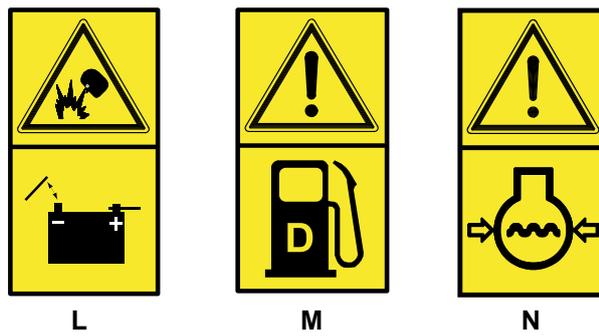
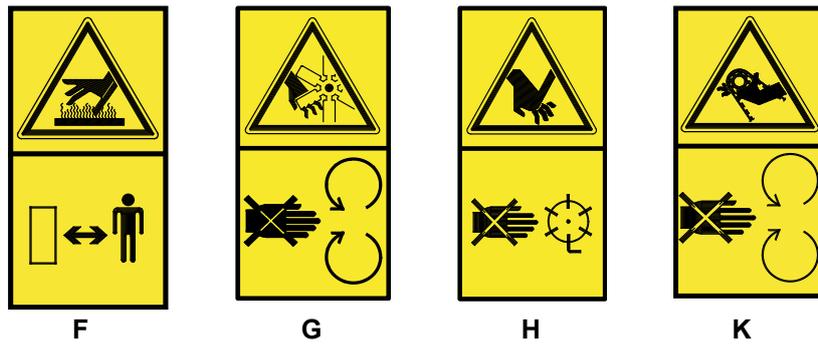
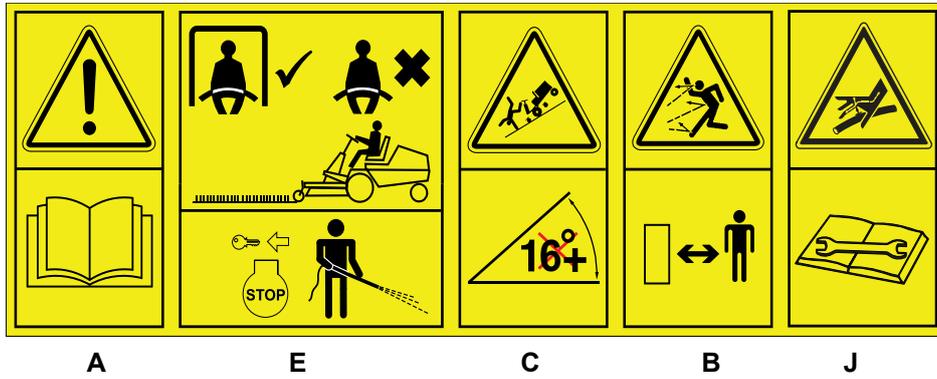
Grooved Rollers

22 in. Assembled Disc.....	68527
22 in. Machined Aluminum	68614
22 in. Machined Steel.....	68613
22 in. Segmented Roller	68673

4 DECALS

4.1 DECALS

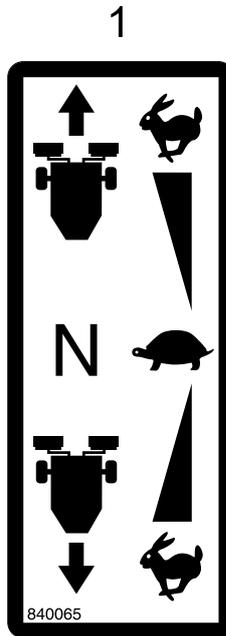
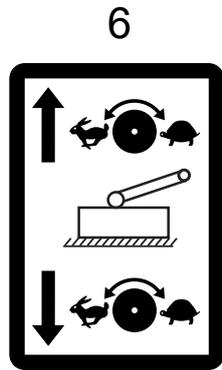
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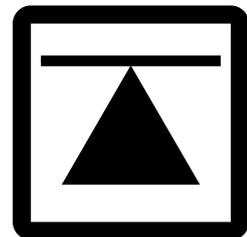
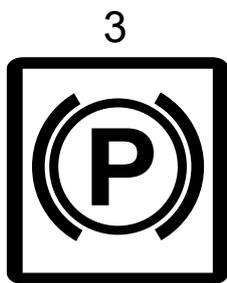
- A. Read Operator's Manual.
- B. Keep a Safe Distance from the Machine.
- C. Maximum permissible working slope. (See Accessories section for correct limit with various accessories).
- D. Seat Belt Must be Worn When ROPS is Deployed. Do Not Wear Seat Belt When ROPS is Lowered.
Read Operators Manual.
- E. Caution, Stop Engine & Remove the Starter Key Before Pressure Washing
- F. Stay Clear of Hot Surfaces.
- G. Do Not Open or Remove Safety Shields While the Engine is Running.
- H. Caution Rotating Blades.
- J. Avoid Fluid Escaping Under Pressure. Read Operators Manual for Service Procedures.
- K. Do Not Remove Safety Shields While Engine is Running.
- L. Danger of Explosion if the Battery Terminals are Short Circuited.
- M. Caution Diesel Fuel
- N. Caution Engine Coolant Under Pressure

4 DECALS

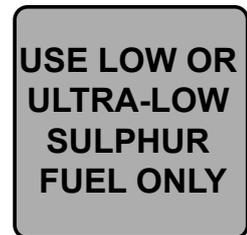
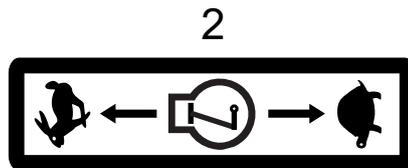
4.2 INSTRUCTION DECALS



4



5

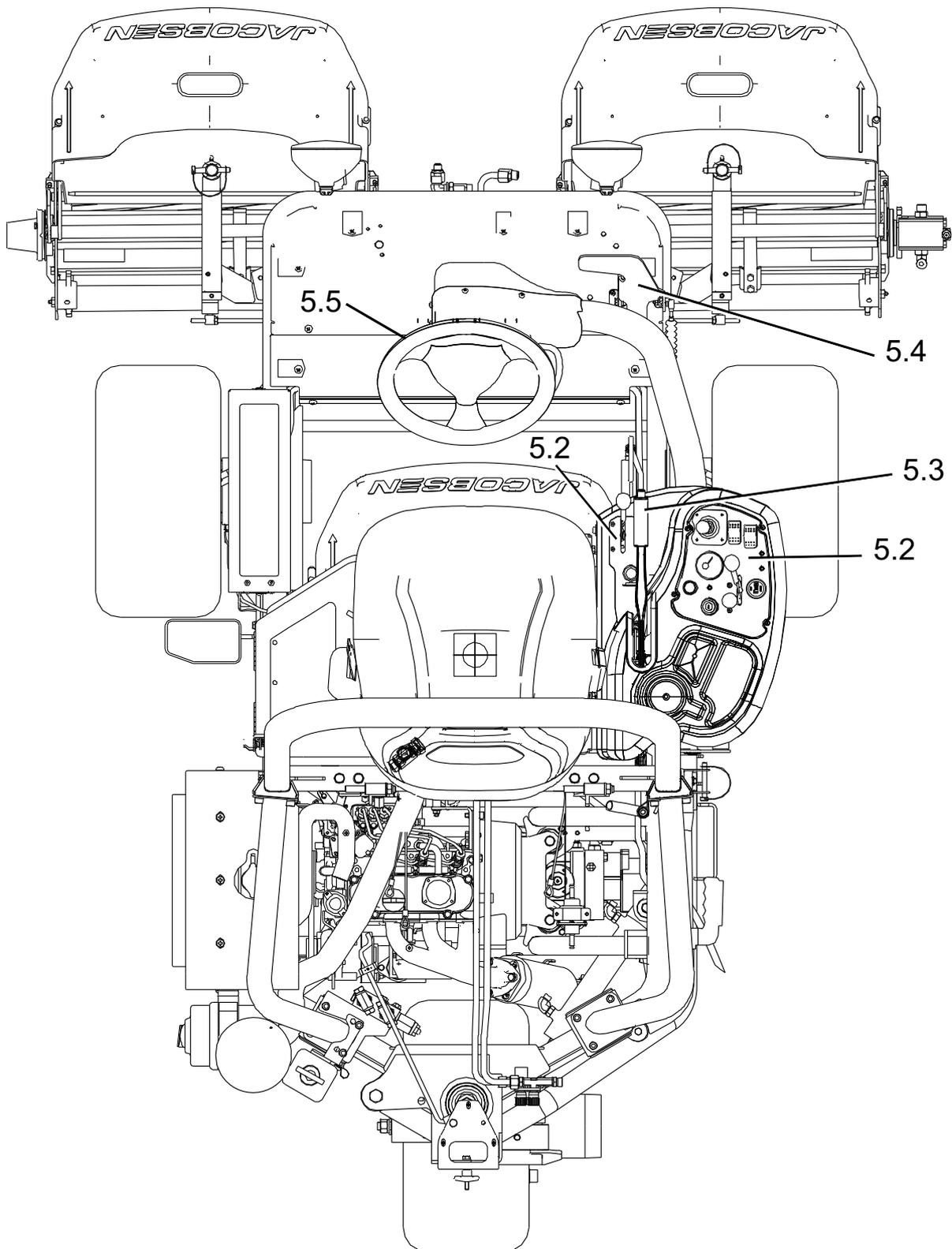


7

- 1 Speed Control (Foot Pedal)
- 2 Engine Speed Control.
- 3 Parking Brake 'P'.
- 4 Maximum Sound Power Level.
- 5 Jacking Point
- 6 Centre Unit raise / Lower Speed Adjustment
- 7 Use Low Or Ultra-low Sulphur Fuel

5 CONTROLS

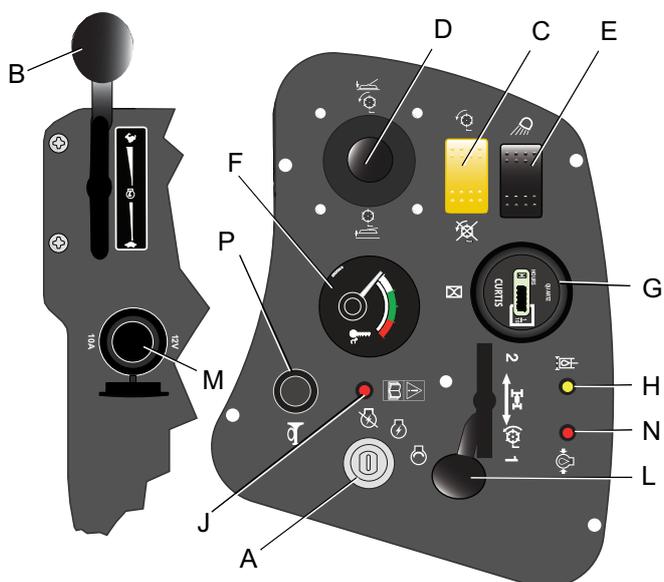
5.1 OPERATOR WORKSTATION



5.2 INSTRUMENT PANEL

DIESEL

- A: Starter Key Switch.
- B: Throttle Control Lever.
- C: Cutting Unit Switch (PTO).
- D: Joystick.
- E: Working Lights.
- F: Engine Coolant Temperature.
- G: Hour Meter.
- H: Blocked Hydraulic Filter Warning Light.
- J: Ignition Warning Light.
- L: Mow / Transport Lever.
- M: Power Outlet.
- N: Engine Oil Pressure.
- P: Horn.



5 CONTROLS

5.2.A STARTER KEY SWITCH

The key switch has three positions:

OFF - prevents all electrical functions from operating. Switch must be in the OFF position to remove the key.

ON - Illuminates the red indicator lamp. This position is also for normal operation.

START - Activates the glow plugs & automatically cranks the engine after the glow plugs have pre-heated. Release the key after engine starts (the switch automatically returns to ON).

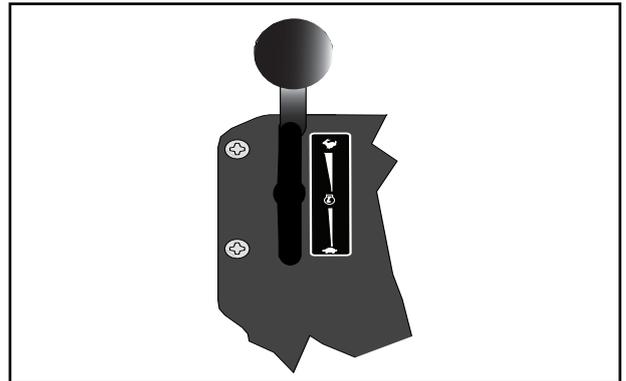
NOTICE

If the engine fails to start, or if it “dies” for any reason, the ignition switch must be returned to the “off” position before restarting is attempted. This feature prevents damage to the starter and flywheel teeth that can occur if the starter is engaged while the engine is running. Wait 30 seconds before restarting engine.

5.2.B THROTTLE CONTROL LEVER

The lever should be moved towards the front of the machine to increase the engine speed and towards the rear of the machine to decrease the engine speed.

NOTE: Engine should be used at full speed



5.2.C CUTTING UNIT SWITCH (PTO)

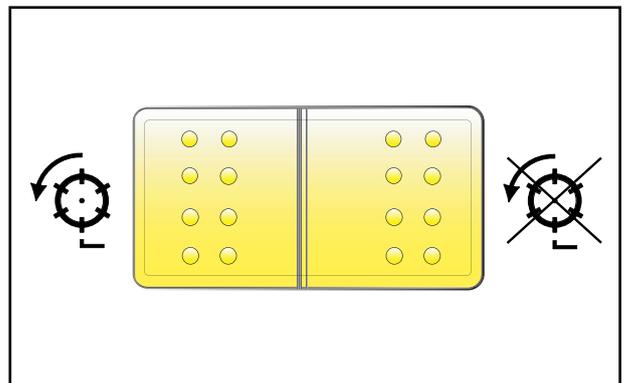
Colour Yellow.

To commence cutting ensure mow / transport lever is in mow position and the units have been lowered.

Push bottom of the rocker switch and move joystick towards the lower position.

To stop cutting unit rotation push top of rocker switch.

Cutting units stop rotating automatically when raised or the operator leaves the seat.



5.2.D JOYSTICK

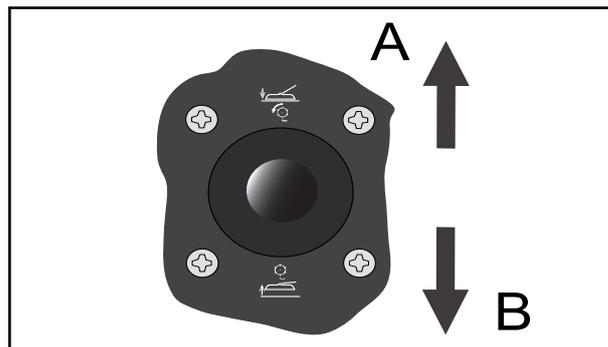
The Mow/ Lift Joystick lowers and raises the cutting heads.

To Lower the Heads:

Move the joystick forwards (A) to lower the cutting heads. If reel enable switch is on, reel rotation starts when the heads are lowered.

To Raise the Heads:

Move the joystick backwards (B) to raise the cutting heads. Reel rotation stops when the heads are raised.



5.2.E WORKING LIGHTS

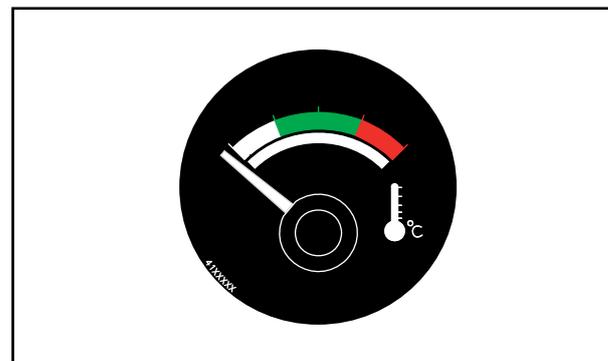
Colour Black.

The Working light Switch turns the two working lamps on and off.



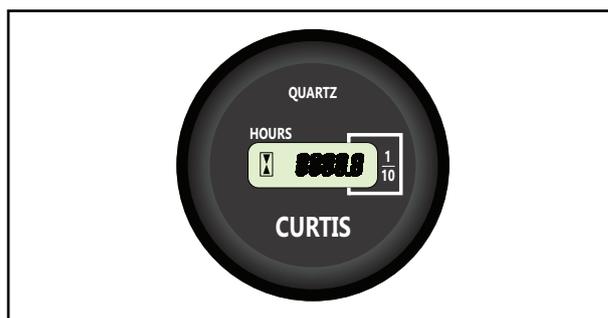
5.2.F ENGINE COOLANT TEMPERATURE

Gauge indicates engine coolant temperature.



5.2.G HOUR METER

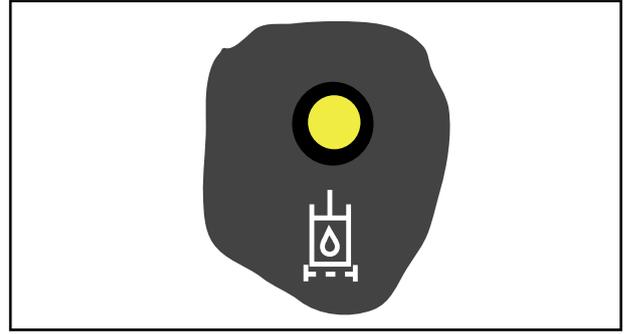
Records the number of hours the engine has run. Use the hour meter to manage a good scheduled maintenance program (refer to the Maintenance Guide 7.2).



5 CONTROLS

5.2.H BLOCKED HYDRAULIC FILTER WARNING LIGHT

Monitors Hydraulic filter condition. Coloured yellow, Illuminates prior to filter bypass valve operating, when illuminated filter requires changing. Under cold start conditions the LED may illuminate for 15 - 20 minutes until the hydraulic oil reaches normal operating temperature. This is normal, only if the LED remains illuminated after this period should the element be changed.



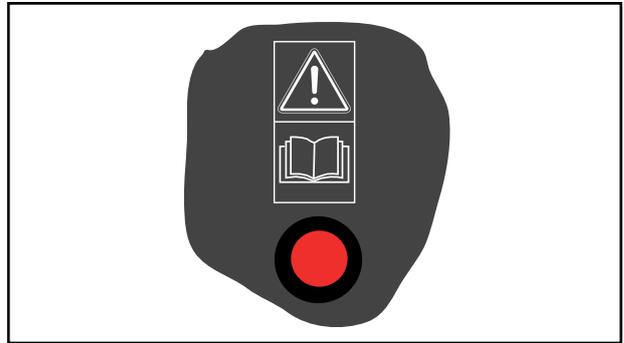
5.2.J MULTIFUNCTION WARNING LIGHT

When the ignition key is in the ON position, the red LED is on continuously. When any of the safety interlocks are not in their neutral position, the red LED flashes the applicable code.

One flash every two seconds - Seat switch is not activated.
Two flashes every two seconds - Parking brake is not applied.

Three flashes every two seconds - Reel drive engaged.
If the red LED continues to flash, the engine will not start. The red LED flashes to indicate the operation of the glow plugs on diesel engines only and the engine starts.

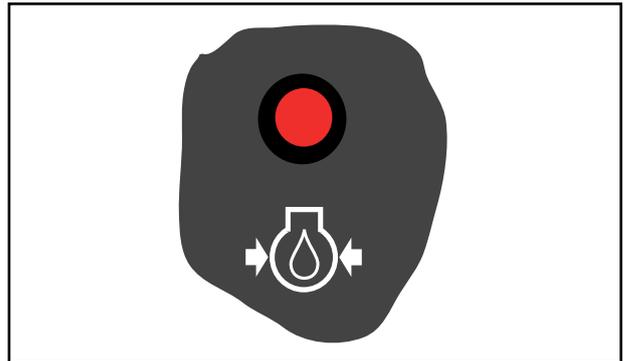
The red LED stays illuminated for two to three seconds, then goes out. If the engine is over temperature (Diesel Only), the red LED flashes and the buzzer sounds twice every four seconds.



5.2.K OIL PRESSURE WARNING LIGHT

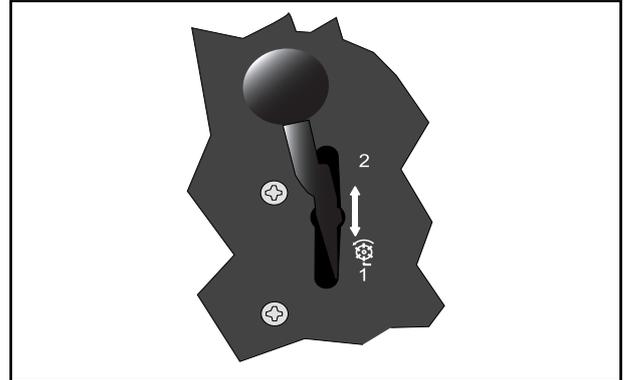
Colour red

a. On when the engine oil pressure is too low for operation.

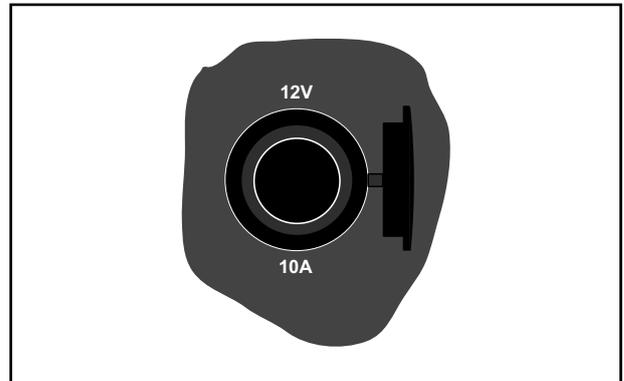


5.2.L MOW / TRANSPORT LEVER

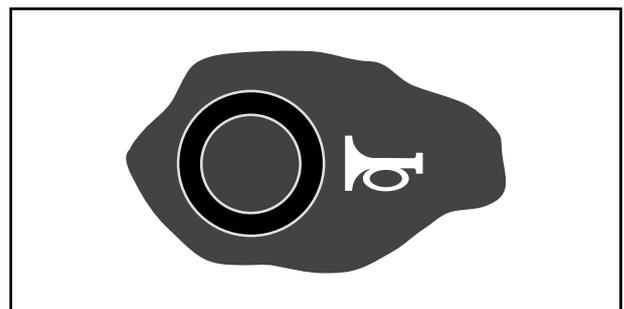
This lever limits the maximum traction speed for cutting and allows engagement of reels.

**5.2.M POWER OUTLET**

Provides a 12 volt 10 amp power supply for accessories.

**5.2.N HORN BUTTON**

Situated on rear of the control panel. Press to sound warning.

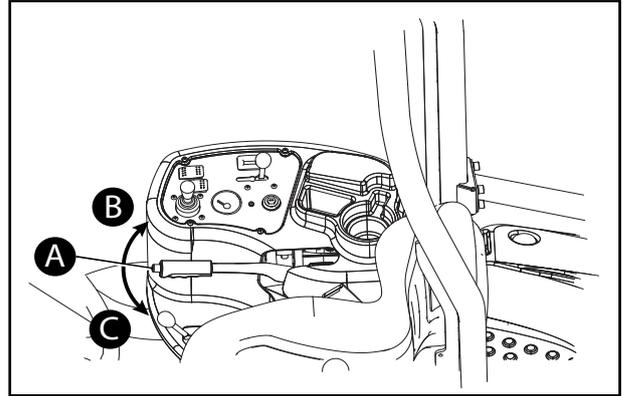


5 CONTROLS

5.3 PARKING BRAKE

The Parking Brake can be engaged by depressing button A and pulling the lever upwards to position B.

To release the parking brake depress button A and lower lever to position C.

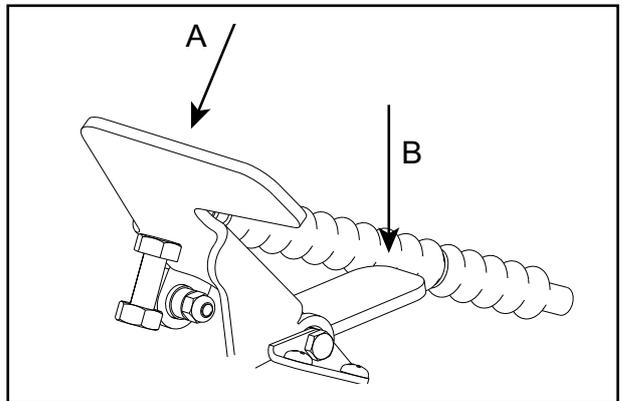


5.4 TRACTION PEDAL

The Direction/Speed Pedal controls speed and direction. Depress front of pedal (A) to go forward, depress back of pedal (B) to go backward. Increased movement of the pedal will increase speed. To slow and stop the machine, ease the pedal back to the neutral position. Proper braking is provided by hydrostatic pressure.

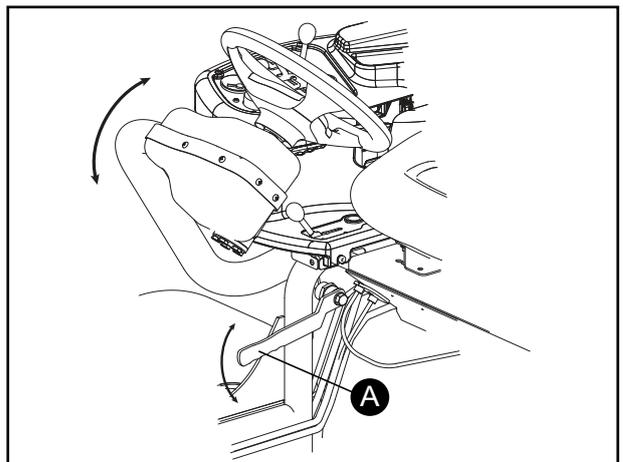
NOTE

To reduce fatigue during normal forward operation, the operator's heel should rest on the floorboard next to the pedal (not on the lower part of the pedal).



5.5 STEERING WHEEL

The steering wheel is fitted to an adjustable arm to adjust its height. Loosen the Locking Lever (A) to allow the steering wheel and control arm to be adjusted up or down. Tighten the locking lever when steering wheel is at the desired position.



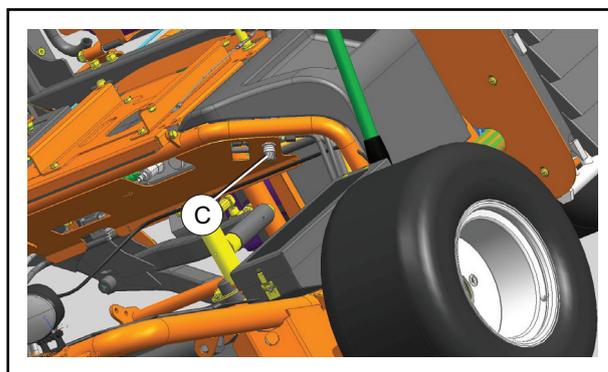
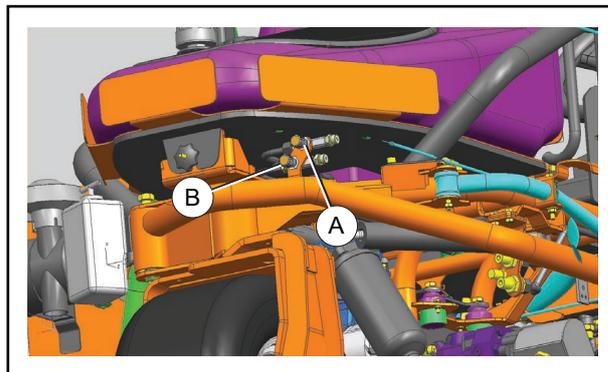
5.6 LIFT & LOWER RATE & SYNCHRONISATION CONTROL

The drop rate of the cutting units can be adjusted using these controls.

Valves 'A' & 'B' are used to control the rate of lift and lower for the centre cutting unit.

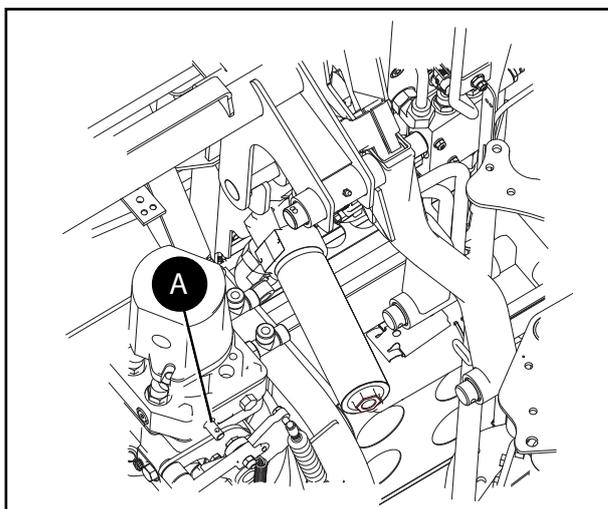
Valve 'C' is used to control the lift and lower rate for the front cutting units.

Refer to section 6.7 for more detailed instructions on setting and adjusting the soft drop.



5.7 FREE WHEEL

1. To push the machine, disengage the parking brake
2. Turn screw (A) located on the underside of the transmission pump 180° counterclockwise. Set the steering wheel so that the rear wheel is pointing straight ahead.
3. After pushing the machine, return the screw (A) on the pump to its operating position.



WARNING

The Free Wheel Facility Is For Recovery Purposes Only.
DO NOT tow the machine for more than a few metres, or allow the machine to free wheel down slopes, even when unloading down ramps.

6 OPERATION

6.1 DAILY INSPECTION

CAUTION

The daily inspection should be performed only when the engine is off and all fluids are cold. Lower implements to the ground, engage Park Brake, stop engine and remove Ignition Key.

1. Perform a visual inspection of the entire machine, look for signs of wear, loose hardware and missing or damaged components. Check for fuel and oil leaks to ensure connections are tight and hoses and tubes are in good condition.
2. Check the fuel supply, radiator coolant level, crankcase oil level, hydraulic oil level and the air cleaner is clean. All fluids must be at the full mark with the engine cold.
3. Make sure all cutting implements are adjusted to the same height of cut.
4. Check all tyres for proper inflation. (Section 3.2).

Once checks 1-4 are complete, start machine and test the operator presence control. (Section 6.2).

6.2 OPERATOR PRESENCE AND SAFETY INTERLOCK SYSTEM

1. The operator presence & safety interlock system prevents the engine from starting unless the operator is seated, Park Brake is on, the Cutter Engage (PTO) switch is off, and the Traction Pedal is in the neutral position. The system stops the engine after 3 seconds if the operator leaves the seat and the Park Brake is off. If the operator leaves the seat with the Cutter Engage (PTO) switch on and the Park Brake on only the cutters will stop.

WARNING

Never operate the equipment with the operator presence & safety interlock system disengaged or malfunctioning. Do not disconnect or bypass any switch.

2. Perform each of the following tests to ensure the operator presence & safety interlock system is functioning properly. Stop the test and have the system inspected and repaired if any of the tests fail as listed below:
 - The engine does not start in test 1;
 - The engine does start during tests 2 or 3.
 - The engine stops during test 4.
3. Refer to the chart below for each test and follow the check (✓) marks across the chart. Shut engine off between each test.

Test 1: Represents normal starting procedure. The operator is seated, parking brake is on, the operators feet are off the pedals and the mower engagement device is off. The engine should start.

Test 2: The engine must not start if the mower engage device is on.

Test 3: The engine must not start if the parking brake is not applied.

Test 4: Start the engine in the normal manner, then turn mower engage device on and lift your weight off the seat.

Test	Operator Seated		Parking Brake Switch		Mower Switch		Engine Starts	
	Yes	No	On	Off	On	Off	Yes	No
1	✓		✓			✓	✓	
2	✓		✓		✓			✓
3	✓			✓		✓		✓
4	✓	✘	✓		✓		✘	

✘ Lift your weight off the seat. The Cutting Units must stop rotating within seven (7) seconds. Unless the backlap lever is engaged.

+ If Mow / Transport speed lever is in Mow mode the Panel switch could still be engaged and the engine will not start.

6.3 OPERATING PROCEDURE

- Under no circumstances must the engine be started without the operator seated on the machine.

CAUTION

To help prevent injury, always wear safety glasses, safety footwear, a hard hat and ear protection whilst working on machinery.

- Do not operate tractor or attachments with loose, damaged or missing components. Whenever possible mow when grass is dry.
- First mow in a test area to become thoroughly familiar with the operation of the tractor and controls.

NOTICE

To prevent damage to the reel and bottom blade never operate the reels when they are not cutting grass. Excessive friction and heat can develop between the bottom blade and reel and damage the cutting edge.

- Study the area to determine the best and safest operating procedure. Consider the height of the grass, type of terrain, and condition of the surface. Each condition will require certain adjustments or precautions.
- Never direct discharge of material toward bystanders, nor allow anyone near the machine while in operation. The owner/operator is responsible for injuries inflicted to bystanders and/or damage to their property.
- Use discretion when mowing near gravel areas (roadway, parking areas, cart paths, etc.). Stones discharged from the implement may cause serious injuries to bystanders and / or damage the equipment.

6 OPERATION

7. Disengage the cutter motors and raise the implements when crossing paths or roads. Look out for traffic.

CAUTION

Remove all debris from the site before mowing. Enter a new area cautiously always operate at speeds that allow you to have complete control of the mower.

8. Stop and inspect the equipment for damage immediately after striking an obstruction or if the machine begins to vibrate abnormally. Have the equipment repaired before resuming operation.

CAUTION

Before you clean, adjust, or repair this equipment, always disengage all drives, lower implements to the ground, engage parking brake, stop engine and remove key from ignition switch to prevent injuries.

WARNING

DO NOT USE ON SLOPES GREATER THAN 16°.

9. Slow down and use extra care on hillsides. Read Section 3.6. Use caution when operating near drop off points.
10. Never use your hands to clean cutting units. Use a brush to remove grass clippings from blades. Blades are extremely sharp and can cause serious injuries
11. Always operate the machine with grass catchers attached to prevent discharge from the Centre Unit hitting the operator.

6.4 SETTING UP THE MACHINE



WARNING

Setup procedures must be performed as specified by properly trained service personnel only.

Check the hydraulic system. Make sure the connections are tight and all hoses and lines are in good condition before pressurizing the system. Hydraulic system should be allowed to warm-up and re-check connections for leaks.



WARNING

If a leak is suspected, use a piece of cardboard or wood, NOT your hand, to check for leaks.
Hydraulic fluid escaping under pressure can penetrate skin and do serious damage.
Immediate medical assistance must be sought.
Serious infection or reaction can develop if proper medical treatment is not administered immediately.

NOTICE

Any reference to the right, left, front, or rear of the unit will always be determined from the operators seated position.

6 OPERATION

6.5 MOUNTING THE CUTTING HEADS

Review the "OPERATION" section before mounting the Cutting Units.

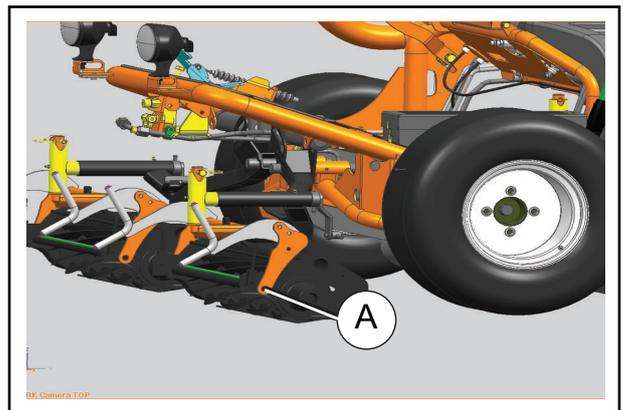
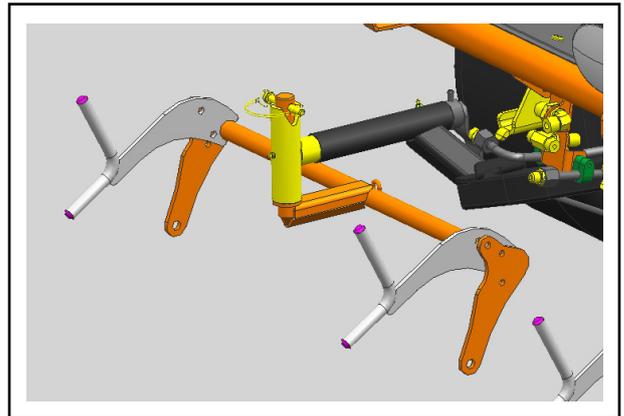
NOTICE

All Jacobsen Cutting Units are backlapped at the factory, but the Bedknife adjustment must be performed before the unit is put into use. Refer to the Bedknife Adjustment Procedure as described in section 8.8 & 8.13 in this manual.

CAUTION

Take care when handling the Cutting Units. Injury may result from contact with the sharp edges of the reel blades.

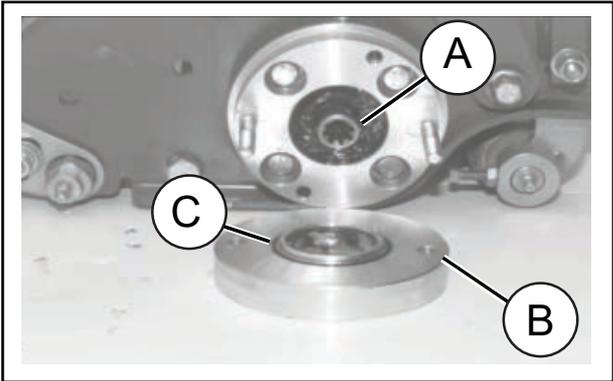
1. Cut all shipping straps holding the front pull frames in place and position the pull frames so the up stop bumpers contact the up stop brackets. Set cutting head drive motors and hoses away from the lift arms.
2. With the reel enable switch in the "OFF" position, lower all three Cutting Unit lift arms and turn off the Unit and remove ignition key.
3. Align the Cutting Unit at the front of the yoke frame. Secure cutting head to either side of the yoke frame using the shoulder bolt (A) on each side of the cutting head.
4. To remove the Cutting Unit, undo shoulder bolts, applied in step 3.



6.6 REEL MOTOR MOUNTING

1. The cutting head motor mounting adapter, coupling and hardware are shipped in the step located above the left front wheel. Install a 1.49" i.d. x 0.07" (38mm x 1.7mm) O-ring on the male side of motor adapter plate and a 1.99" i.d. x 0.07" (50mm x 1.7mm) O-ring on the reel motor mount face.

2. Remove and discard screws holding the shipping cover to cutting head (retain the shipping cover to protect the bearings whenever the motor is removed from the cutting head).



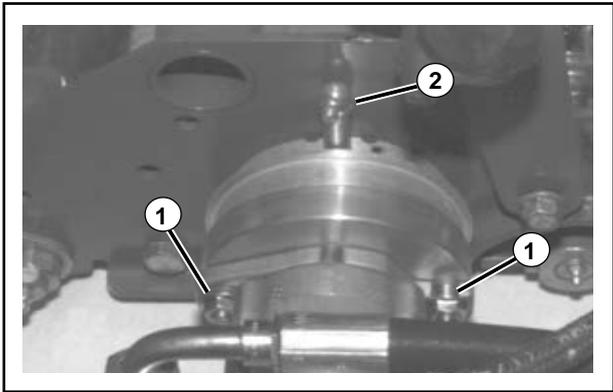
Motor Mounting

3. Install coupler (A) on cutting head shaft.

4. Install motor adapter plate (B) positioning the male face and O-ring (C) toward the cutting head.

5. Install two (2) 5/16-18 x 1 1/2" screws (with washer and lock washer) loosely into the mounting holes.

6. Align the splines on the motor shaft with the coupler (A) and slide the motor into place rotating approximately 45° away from the mounting screws. With motor face against adapter plate (B), rotate the motor mounting flange into place engaging the screws into the motor mounting flange slots. Tighten screws to 18ft/lbs (24 Nm).



Motor Mounting Screws & Lubricator

7. Add lithium based lubricant to the bearing housings at BOTH ends of the reels bearings at both ends are partially packed with lubricant at the factory, but additional lubricant is required once assembled. Use a grease gun to add lubricant until it starts to escape from the fittings. Wipe off any excess lubricant.

NOTICE

Check to **MAKE SURE** when the cutting heads are lowered to the turf, they must contact the turf evenly across the entire length of the cutting head. If the front cutting heads contact the level surface unevenly, refer to the adjustment section in the parts and maintenance manual.

6 OPERATION

6.7 CUTTING CYLINDER LIFT & LOWER RATE & SYNCHRONISATION

The valves that control the rate and sequence in which the Cutting Units rise and fall are set at the factory, however they can be reset or altered using the following steps.

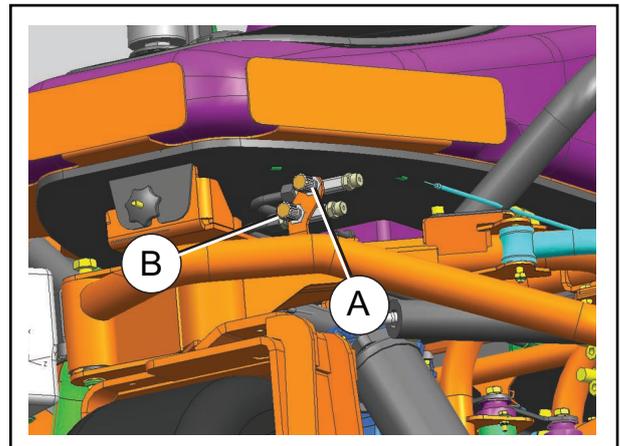
1. Start the machine and run the engine at full throttle for 15-20 minutes to ensure that the oil is at the optimum temperature.
2. To set up sequencing lift/lower of the front & rear unit. Open all three valves fully. Screw the single front unit adjuster (C) in until the rate of lift/lower is acceptable.
3. Use the two rear valves the upper valve (A) for lower and the lower valve (B) for lift to provide the sequencing of the Centre unit.
4. Cycle the cutting units to check the synchronisation. The Centre Cutting Unit should lower and lift slightly after the front Cutting Units. If the cylinders drop too quickly or are not synchronised correctly then they should be adjusted accordingly.

The upper valve (A) at the rear of the machine adjusts the rate at which the Centre Cutting Unit lowers.

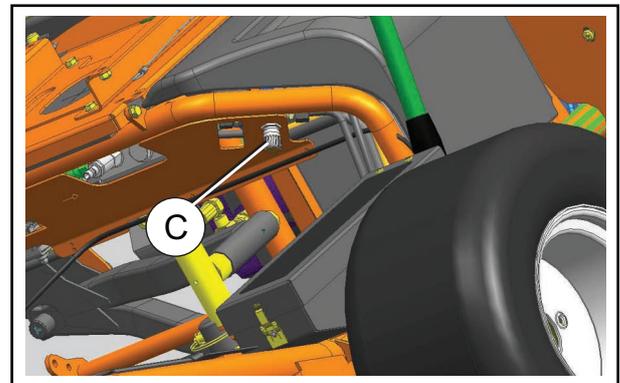
The lower valve (B) at the rear adjusts the rate at which the Centre Cutting Unit lifts.

The valve (C) under the operators seat adjusts the rate at which the front Cutting Units lower.

5. If it is not possible to get the sequencing of the rear Cutting Unit correct this may be because the front cutting units are set to lower too slowly. Try increasing the speed of drop slightly.
6. Once the Cutting Units are lifting and lowering correctly tighten each of the Grubscrews found on the valves to lock the settings.



Centre Unit Lift & Lower Valves



Front Unit Lower Valve

6.8 OPERATION OF THE MACHINE

BEFORE OPERATING FOR THE FIRST TIME

- Check and adjust tyre pressure, if necessary, see section 3.2 Specification.
- Add fuel to the fuel tank if necessary.
- Check engine oil and top-up, if necessary.
- Check radiator coolant and top-up, if necessary (50% antifreeze solution).
- Make sure you understand the information contained in the previous sections.

6.9 STARTING THE ENGINE

The following procedure is for starting cold engines.

1. Ensure the FWD/REV pedal is in the neutral position, the mow switch is off, the throttle setting is in a mid position.
2. Turn the ignition switch fully clockwise and hold until the engine starts (approximately 5-10 sec.)
3. The glow plugs are auto timed depending on the coolant temperature for operating the starter motor (This should only take a few seconds)
4. When the engine starts, release the key immediately and it will return to the RUN position.
5. If the engine does not start, return key to the OFF position and try again.

NOTES:

- If the engine fails to start after two attempts, wait 20 seconds and try again.
- The starter motor should never be run continuously for longer than 30 seconds or it may fail.
- If the red LED's on the display flash whilst starting one of the safety interlock switches has not been set correctly.

6.10 DRIVING

- Release brake - Make sure the parking brake is released before attempting to go forward or reverse.
- Forward - Gently depress the top A of the FWD/REV foot pedal to reach desired ground speed.
- Reverse - Gently depress the bottom B of the FWD/REV foot pedal to reach desired ground speed.
- To stop - Gently return the FWD/REV foot pedal to the neutral position.
- To hold the vehicle stationary on a slope it may be necessary to apply a certain amount of reverse traction.

NOTES:

- Use complete foot to operate both forward and reverse.
- Do not move pedal suddenly—always operate slowly and smoothly. Never move pedal violently from forward to reverse or vice versa.
- Always keep foot firmly on the foot pedal—a too relaxed foot control may result in a jerky motion.

6.11 MOWING PROCEDURE

NOTE: Always remove the flag and inspect the green before mowing. Remove debris or other objects that may damage the reels and/or Bedknives. Operators should practice mowing in a clear area to become familiar with raising and lowering the mowing heads. They should be aware that the centre cutting head raises and lowers slightly later than the front ones, allowing the centre cut to begin and end at the same point as the two side cuts. Practising will help the operator become proficient at starting and stopping each pass within a foot or two of the edge of the green. Then only one final pass around the green will be required to finish the operation.

Several factors may determine the direction of the mowing pattern, sand traps or other hazards near the green, trees etc that can restrict where turns are made. The terrain of the green may also be a factor, but if conditions allow, always try to mow the green in a different direction than the last time it was mowed.

1. Stop the unit just before reaching the green. Make sure the reel enable switch is in the "ON" position and the mow / transport lever is in position 1 (mow). Proceed onto the green at mowing speed and lower the mowing heads as the front grass catchers cross the leading edge of the green. At the end of the pass, raise the heads as the front grass catchers cross the trailing edge of the green.
2. Always make mowing passes across the green in a straight line. DO NOT start to make the turn for the next pass until the rear wheel is completely off the green, this will eliminate the possibility of the tires tearing the turf during the turn.
3. Each successive pass should overlap the previous one by two or three inches (51 or 76mm) (a painted

6 OPERATION

mark two or three inches (51 or 76mm) in from the outer edges of the two front grass catchers will help align each overlapping pass).

4. After all of the straight passes have been made, make one final pass around the outer edge of the green. This final pass should always be in the opposite direction from the last time the green was mowed.
5. With the engine stopped or the reel enable switch in the "OFF" position, empty the grass catchers before proceeding to the next green.

NOTICE

To avoid damage to the green, NEVER stop the forward motion of the mower on the green with the reels turning. Stopping the mower on a wet green may cause wheel indentations.

6.12 HOW TO STOP THE ENGINE

1. Disengage drive to the Cutting Units with the Cutting Unit Switch.
2. Return the FWD/REV pedal to the neutral position.
3. Set the parking brake.
4. Move the throttle control lever to the SLOW position.
5. Turn the ignition key to OFF



CAUTION

It is important to note: there will be remaining hydraulic pressure within the system that can cause the cutting cylinder to rotate when the obstruction is removed. Therefore keep your hands, feet and clothing away from Cutting Units at all times.

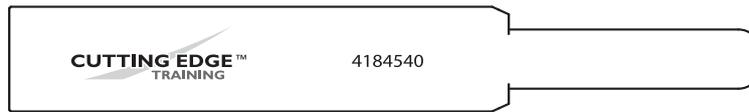
6.13 HOW TO REMOVE A BLOCKAGE FROM CUTTING UNITS

1. Disengage the power to the cutting units with the cutting unit switch.
2. Keep the cutting units lowered to the ground (Wait for the remaining cutting cylinders to stop rotation).
3. Lift the cutting units into the "Transport Position", lock in position use the transport latches fitted on your product.
4. Remove your foot from the forward/reverse pedal.
5. Set the parking brake.
6. Move the throttle control lever to the slow position.
7. Turn the ignition key to the off position and remove the key

NOTICE

Make sure correctly selected PPE is worn before you clear the obstruction.

8. Use the Jacobsen “Cutting Unit Tool” part number 4184540 See below or stout stick, put into the cutting cylinder between the blades



9. Rotate the cylinder with either the “Cutting Unit Tool” or “Stout Stick” until the obstruction has been removed.
10. Inspect all the cutting surfaces for damage, when necessary replace the damaged components.

6.14 BACKLAPPING

This mower is fitted with the ability to allow the reels to be driven in reverse for backlapping.

- Backlapping is a process which will lightly grind the reel to the bedknife whilst mounted on the mower.
- If significant amounts of metal are to be removed then the cutting unit should be reground on a specialised grinding machine.
- Before any backlapping is carried out, Ransomes Jacobsen recommends that the backlapping process should be risk assessed as a workshop process by the manager of the machine.
- Backlapping should only be carried out by trained staff.
- Ransomes Jacobsen recommend that grinding paste is only applied to the reel when it is stationary, the engine is off and the parking brake applied.
- When applying grinding paste the reel should only be rotated by appropriately sized piece of wood and not by hand.
- Place reels in the most accessible position for applying the paste.
- After applying the grinding paste the person backlapping should return to the seat, engage the relevant controls and run the reels in reverse.
- When the desired finish is achieved switch off the mower, clean off any surplus paste, reset the reel to bedknife and return the controls to the normal mow positions.

Jacobsen grinding paste:

Grinding Paste	Part Number
80 grit grinding paste, 4.5kg tin	5002488
120 grit grinding paste, 4.5kg tin	5002489
80 grit grinding paste, 9kg tin	5002490
120 grit grinding paste, 9kg tin	5002491

6 OPERATION

6.15 BACKLAPPING PROCEDURE

Before starting the backlap procedure, release the Centre Unit and swing it out. The backlap valve is located under the seat plate on the right hand side. It can be accessed from under the machine when the Centre Unit is swung out

1. Apply an even coat of backlapping compound to the entire length of each blade of the reels.
2. While pressing the centre red button (A) on the reel valve pull yellow plunger (B) away from the valve.
3. Start the engine and set the throttle to low idle. Lower heads by operating the Joystick or paddle.
4. Slowly turn the restriction valve knob (C) clockwise until the desired reel rotation speed is attained. It should be slow enough so that the reel will not throw off the backlapping compound as it spins.
5. Once all the blades on the reel are uniformly sharp, shut off the engine and push yellow plunger (B) back towards the valve. Set the reel speed valve (C) to mow speed.

NOTICE

To ensure proper reel rotation, make sure valve (C) is completely closed.

6.16 TRANSPORTING ON A TRAILER OR FLATBED

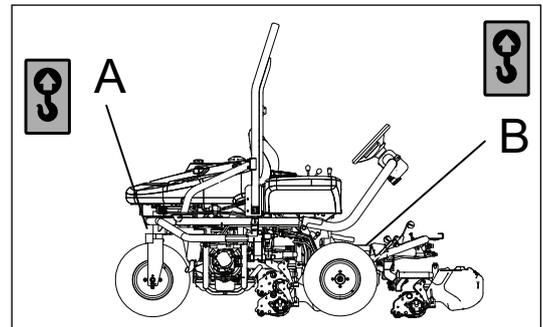
The machine has hard-point tie-down loops front (A) and rear (B). Fasten the mower to the transport vehicle.

Make sure that all tie down straps are tight. Make sure that the decks are locked in the transport position. Check the fuel and hydraulic tank caps are tight. Make sure that no part of the mower can fall during transport.

Always follow the given maximum transport load weight for the vehicle used.

DO NOT carry more than the maximum weight shown on the transport vehicle plate.

Always read the safety and operation manual of the transport vehicle before you load.



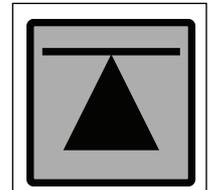
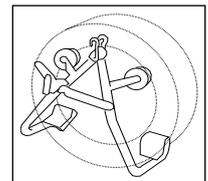
6.17 SLINGING AND JACKING THE MACHINE

Slinging

When slinging the machine use the tie down loops front and rear.

Jacking

The machine has three jacking points, one at the rear chassis engine mount and two on the front chassis wheel motor mounting.



6.18 MOWING ON SLOPES

The mower has been designed for good traction and stability under normal mowing conditions. Use caution when operating on slopes, especially when the grass is wet. Wet grass reduces traction and steering control.



WARNING

To minimize the possibility of overturning, the safest method for operating on hills and terraces is to travel up and down the face of the slope (vertically), not across the face (horizontally). Avoid unnecessary turns, travel at reduced speeds, and stay alert for hidden hazards. To ensure best stability always load the left hand storage rack first and cut with all three units powered.

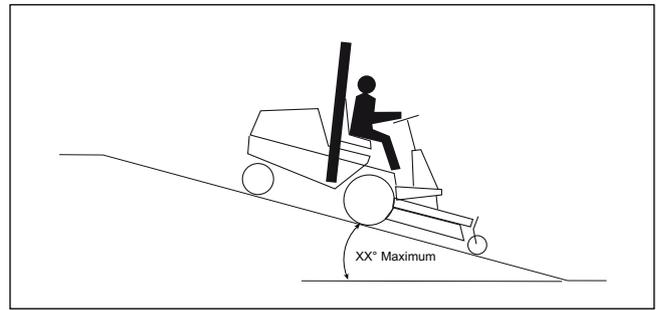
1. Always mow with the engine at full throttle, control forward speed using traction foot pedal to maintain proper cutting.
2. Use weight transfer control as required to improve weight distribution between decks and mower.
3. If the mower tends to slide or the tyres begin to mark the turf, angle mower into a less steep slope until traction is regained or tyre marking stops.
4. If mower continues to slide or mark the turf, the slope is too steep for safe operation. Do not make another attempt to climb, and back down slowly.
5. When descending a steep slope, always lower implements to the ground to reduce the risk of mower overturning.

Correct tyre pressure is essential for maximum traction. See 3.2 Specification.

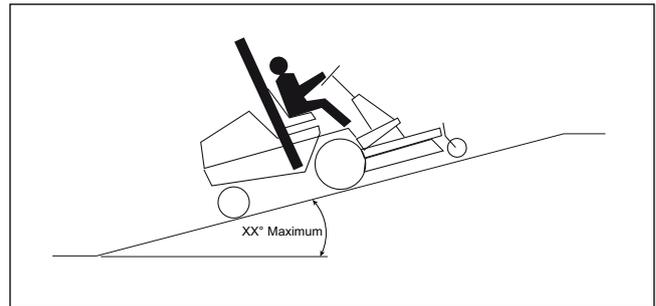


WARNING

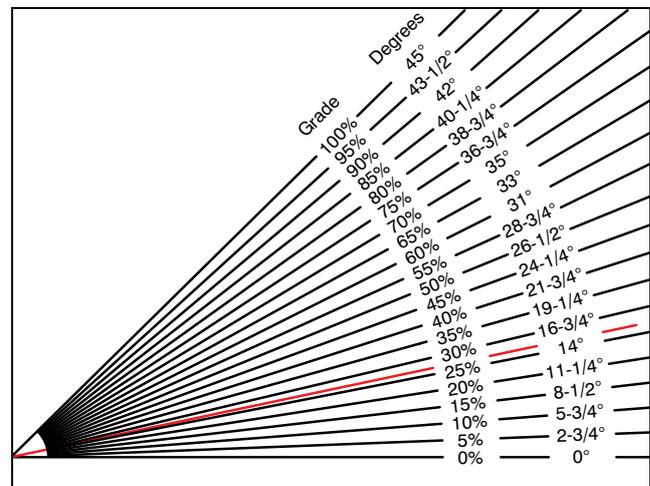
DO NOT USE ON SLOPES GREATER THAN 16°



A = Maximum Allowable Slope



A = Maximum Allowable Slope



Degrees are shown to the nearest 1/4°.

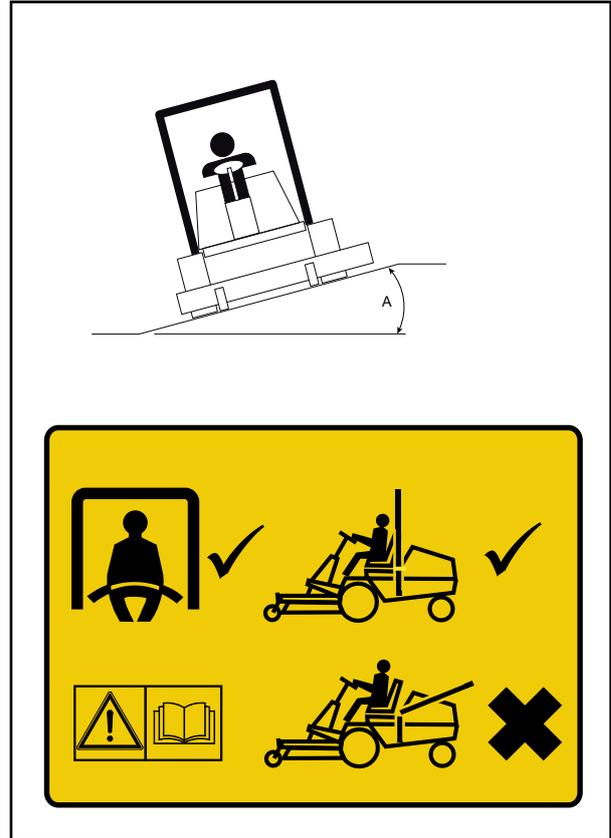
- General slope of roadway embankment - 45°
- Steepest grass area - 31°
- Slope of average roof - 19.25°
- 2nd class highway maximum grade 4.5°
- Toll road or freeway - 1.75°

6 OPERATION

WARNING

When the machine is being used, whether cutting grass or not, on slopes, the ROPS frame should be deployed and the seat belt used. This rationale is based on the fact that a seat belt must be worn with a ROPS to comply with the Machinery Directive 2006/42/EC Sections 3.2.2, Seating & 3.4.3, Rollover

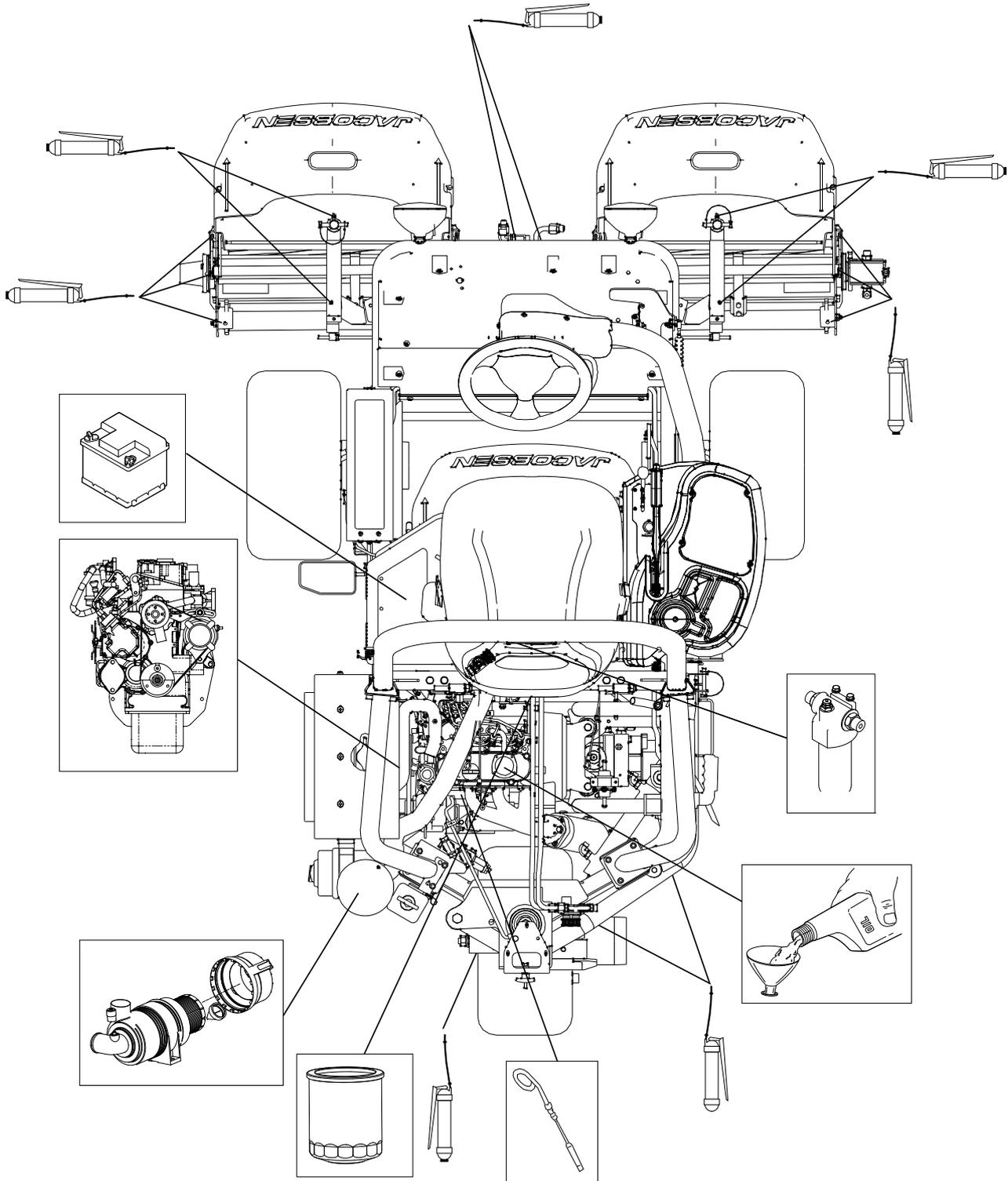
Ransomes Jacobsen Limited recommends that a local risk assessment is completed by the owner/user of the machine to determine the risks associated with working on slopes.



7 MAINTENANCE

7.1 MAINTENANCE & LUBRICATION CHART

MAINTENANCE & LUBRICATION CHART	
Interval	Item
First 50 hours	<ul style="list-style-type: none"> ● Change Engine Oil & Filter. ● Check Fan Belt Tension. ● Change Hydraulic Oil Filter.
Daily 10 hours	<ul style="list-style-type: none"> ● Check Engine Oil Level. ● Check Safety Interlock System. ● Check Engine Coolant Level ● Check Hydraulic Fluid Level ● Check Tyre Pressure. ● Check Air Filter Tell Tail Indicator*. ● Check for Hydraulic Leaks. ● Check Oil Cooler Screen. ● Check Oil Cooler Fins. ● Check Bedknife & Reel Blades. ● Walk-Around Inspection.
Weekly Every 50 hours	<ul style="list-style-type: none"> ● Check for Loose Components. ● Check Fan Belt Tension. ● Check Engine Bay For Debris. ● Check Battery Condition. ● Fuel Tank Water and Sediment - Drain.
Every 100 hours	<ul style="list-style-type: none"> ● Change Engine Oil Filter. ● Check Fuel Filter For Water Contamination.
Every 200 hours	<ul style="list-style-type: none"> ● Change Engine Oil. ● Change Inline Fuel Filter.
Every 250 hours	<ul style="list-style-type: none"> ● Change Hydraulic Oil & Filters. ● Alternator and Fan Belts - Inspect / Adjust.
Every 500 hours	<ul style="list-style-type: none"> ● Change Air Filter Element*. ● Change Oil and Filter Element. ● Check Safety Interlock System. ● Hoses and Clamps - Inspect / Replace. ● Radiator - Clean
End of season Every 1000 hours	<ul style="list-style-type: none"> ● Check Parking Brake Operation. ● Check Brake pads. ● Drain & Clean Fuel Tank ● Drain & Replace Engine Coolant
Lubricate all Grease fittings weekly A = Lift Arm Pivot, B = Cutting Unit Pivot, C = Cutting Unit Bearing Housing, D = Steering Ram Ball Joint.	
*Check more often in dirty conditions	
IMPORTANT Refer to Engine Manufacturers Manual for Additional Engine Maintenance Procedures	



Fluid Requirements

		Quantity	Type
A	Engine Oil (with filter)	3.0 litres	SAE10W 30
B	Hydraulic Oil (with filter)	23 litres	GreensCare ISO VG 46
C	Radiator Coolant	4.4 litres	50% Anti-Freeze
D	Fuel	55 litres	No 2-D (ASTM D975) Diesel

7 MAINTENANCE

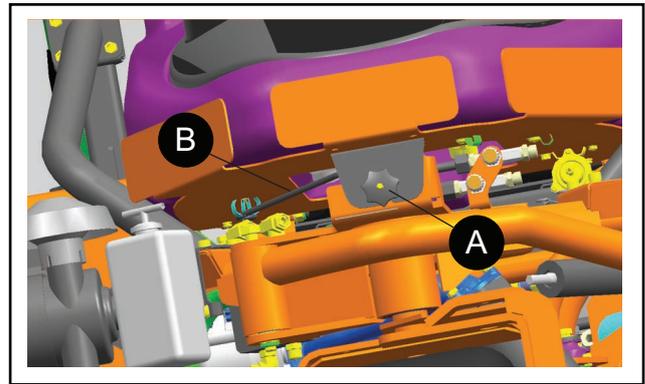
Engine Oil: Must meet A.P.I. CK-4	
TEMPERATURE	VISCOSITY
-18°C to 40°C (-0.4°F to 104°F)	SAE10W-30

7.2 ENGINE ACCESS

The Fuel & Hydraulic Tanks can be raised for better access to the engine.

- Tilt the seat forwards.
- Turn fuel tap OFF (C) (Gasoline machines only)
- Loosen the locking hand wheel (A), under the tank above the rear axle.
- Raise the tanks.

Support the tanks by pivoting the stay (B) beneath the tank and secure in the hole provided.



Lifting The Tank



WARNING

Never operate the equipment with the operator presence & safety interlock system disengaged or malfunctioning.
Do not disconnect or bypass any switch.



CAUTION

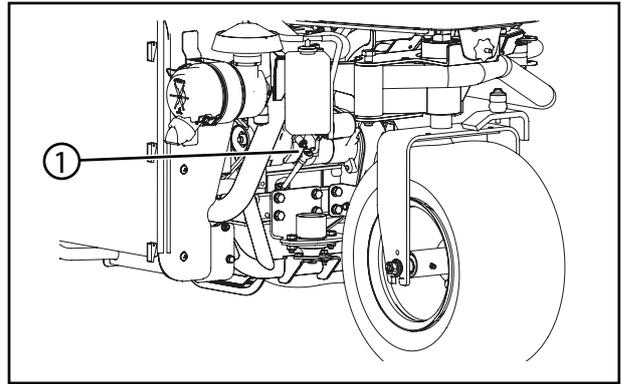
When raising the tanks have a second person available to locate the stay in the hole provided.

7.3 ENGINE LUBRICATION

Check Engine Oil Level

Check the engine oil level before starting or more than five minutes after stopping the engine.

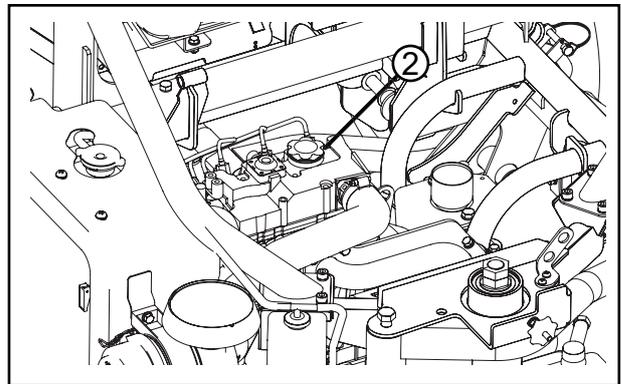
- (a) With the machine on level ground, remove the dipstick 1, wipe it clean and replace.
- (b) Take the dipstick 1 out again, and check the oil level. It should be between level marks on dipstick.



1. Dipstick

Change Engine Oil

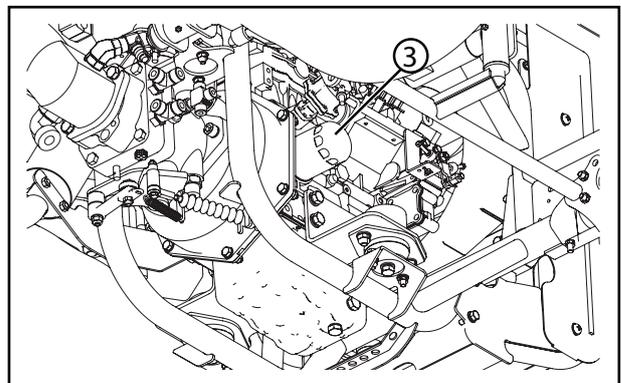
- (a) Warm up the engine first and then shut it off. Remove oil drain plug from the bottom of the crankcase and wipe it off.
- (b) Drain engine oil in to a suitable container.
- (c) Replace the drain plug and fill engine with the correct quantity & grade of oil through the filler (2).



1. Oil Filler Port

Change Engine Oil Filter

- (a) Remove single-unit cartridge (3)
- (b) Collect engine oil in a suitable container.
- (c) Clean area on crankcase.
- (d) Apply thin coat of oil to cartridge gasket before installing.
- (e) Tighten filter by hand only.
- (f) Check for oil leaks around the cartridge gasket after engine is started.



1. Oil Filter

CAUTION

Contact with engine oil can damage your skin. Use gloves when working with engine oil.
If you come in contact with engine oil, wash it off immediately.
Dispose of used engine oil in accordance with local regulations.

CAUTION

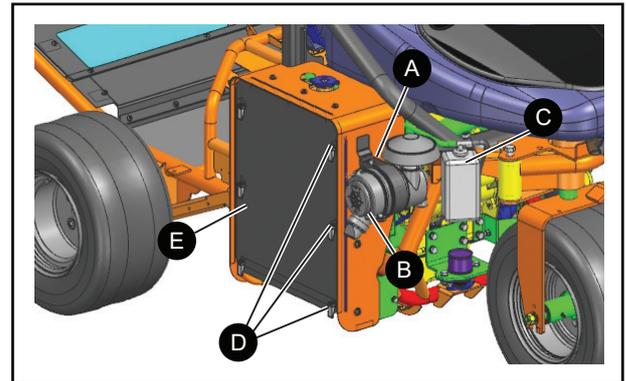
Dispose of used engine oil in accordance with local regulations.

7 MAINTENANCE

7.4 AIR FILTER

CAUTION

Check the air filter condition indicator situated on the underside of the outlet elbow at regular intervals. If the indicator shows red either clean or replace the air filter element.



A. Cover, B. Evacuator valve

Clean Air Filter Element

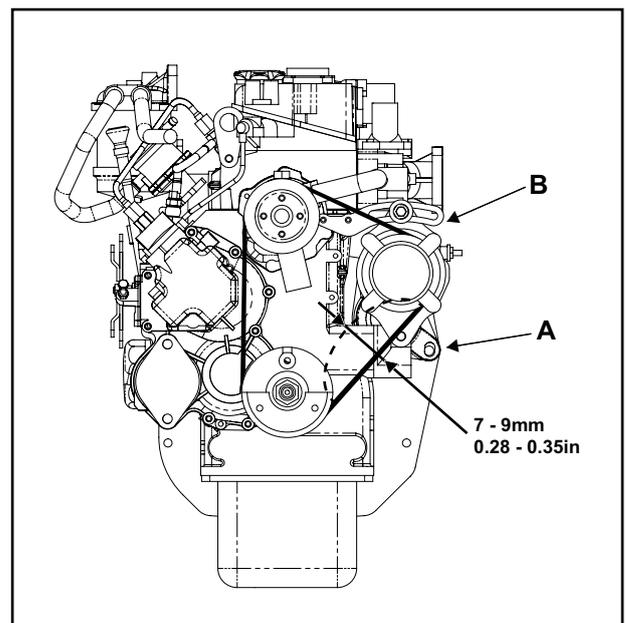
1. As the element of the air cleaner employed on this engine is a dry type, never apply oil to it.
2. Open the evacuator valve once a week under ordinary conditions-or daily when used in dusty conditions to get rid of large particles of dust and dirt.
3. Avoid touching the element except when cleaning.
4. When dry dust adheres to the element, blow compressed air from the inside turning the element. Pressure of compressed air must be under 7kgf/cm² (100psi). Wear the appropriate personal protective equipment
5. When carbon or oil adheres to the element, soak the element in detergent for 15 minutes then wash it several times in water, rinse with clean water and dry it naturally. After the element is fully dried, inspect inside of the element with a light and check if it is damaged or not. (referring to the instructions on the label attached to the element.)

7.5 ENGINE: FAN BELT

Check & Adjust Fan Belt

The fan belt is adjusted so that it has sufficient tension to avoid undue stress on alternator bearings but does not slip on the alternator pulley. Use the following procedure to check the belt tension at the mid-point of the belt between crank shaft and alternator pulleys.

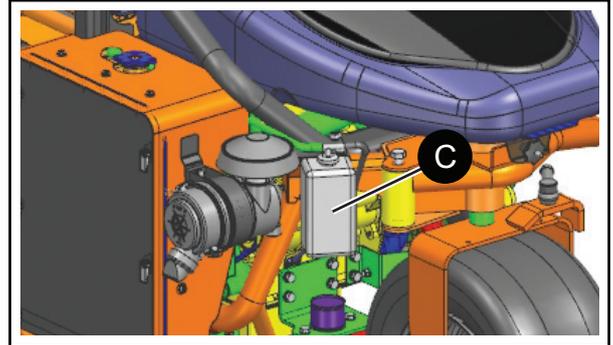
1. Loosen alternator bolt (A) and pivot bolt (B) on the underside of the alternator.
2. Move the alternator to tighten or loosen the belt so that a deflection of 7 to 9 mm is achieved at the mid-span with a load 10Kgf (98N/22lbs).
3. Re-tighten bolts.



7.6 ENGINE COOLANT

Check Engine Coolant Level

- 1 To prevent injury from the hot engine coolant or steam, never remove the radiator cap with the engine in operation. Stop the engine and wait until the radiator is cool. When radiator is cool, use caution to remove the radiator cap.
- 2 If water change is needed, remove the drain plug located at the bottom right side of the radiator.
- 3 The level of coolant in the expansion tank (C) should be between the MAX and MIN level indicators when cold.
- 4 If topping up is required, remove the plastic cap and top up using the correct anti-freeze mixture.
- 5 Replace the plastic cap when finished.



Changing Coolant

1. To drain coolant, remove hose from radiator.
2. Replace hose back on to radiator. Ensure all hose clips are tight.
3. Refill the cooling system with the correct anti-freeze mixture. Fill system through expansion tank.
4. The level of coolant in the expansion tank should be between the MAX and MIN level indicators when cold.
5. Run the engine for approximately 5 minutes or until the thermostat opens.
6. Check level of coolant in expansion tank and top up if necessary

! CAUTION

Contact with Anti-freeze can damage your skin. Use gloves when working with Anti-freeze.
If you come in contact with Anti-freeze, wash it off immediately.

7.7 AIR CLEANER

Check the service indicator (F) each day. If the red band become visible in the window, replace the filter elements.

Check the dust valve (A) each day by pressing the valve together allowing any dust particles to fall out of the air cleaner cover.

Unnecessary removal of the elements to inspect or clean increases the risk of dust and other particles to enter the engine.

When service is needed, first clean the outside of the filter housing, then remove the old primary (C).

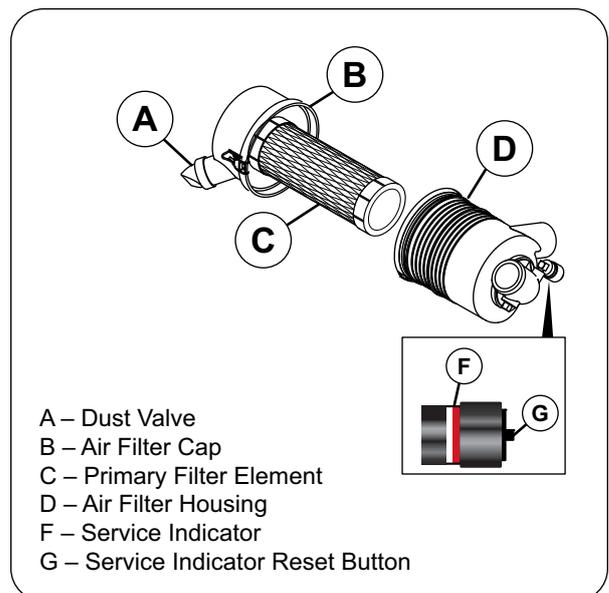
Clean the inside of the filter housing. Make sure dust and other particles do not get into the engine inlet hose.

Inspect the new elements. Do not use a damaged element and never use an incorrect element.

Make sure the element is seated correctly. Press the button to set the service indicator.

Assemble the cap (B) to the filter housing (E). Make sure the cap seals around the filter housing. The dust valve on the cap must be at the bottom of the filter. Fasten the cap with the two clips.

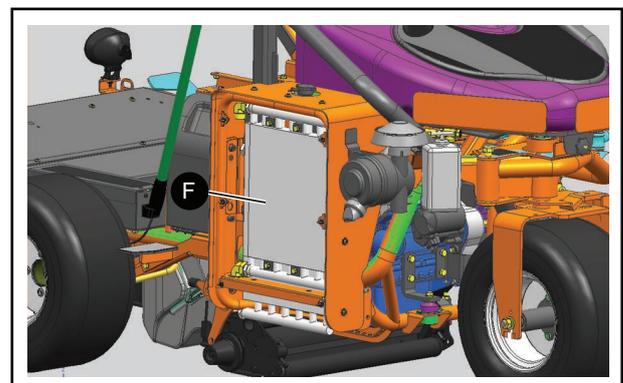
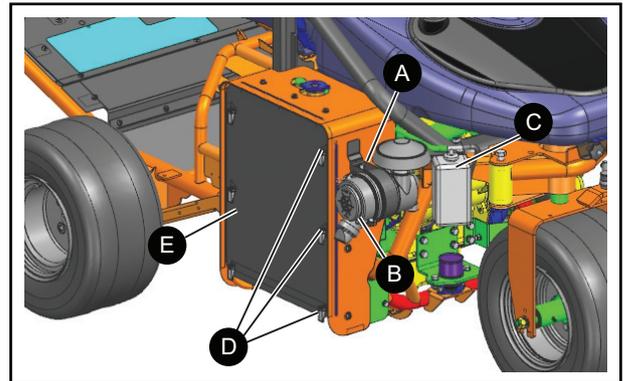
Check the air filter hoses for wear or damage. Make sure the hose clamps are tight and hold the hoses in position.



7 MAINTENANCE

7.8 OIL COOLER AND RADIATOR

1. Release the 6 Swell latches (D) holding the radiator / oil cooler mesh cover (E) to the cowling.
2. Remove screen and clean.
3. Remove any debris from inside of cowling and around oil cooler and radiator F.
4. Replace screen, secure with swell latches.



7.9 PRIME THE FUEL SYSTEM

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product.

Be prepared to collect the with suitable containers before opening any compartment or disassembling any component containing fluids.

Use the following procedure to prime the fuel system:

If air enters the fuel system, the air must be purged from the fuel system before the engine can be started. Air can enter the fuel system when the following events occur:

- The fuel tank is empty or the fuel system has been partially drained.
- The low-pressure fuel lines are disconnected.
- A leak exists in the low-pressure fuel system.
- The fuel filter is replaced.

CAUTION

Contact with diesel fuel can damage your skin. Use gloves when working with diesel fuel.
If you come in contact with diesel fuel, wash it off immediately.
Dispose of used diesel fuel in accordance with local regulations.

Secondary Fuel Filter

Fuel filter that is installed on the engine.

Element

- (1) Fuel valve
- (2) Vent screw

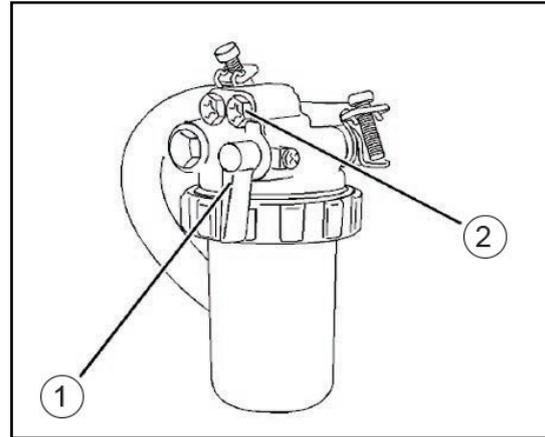
In-line Priming Pump

1. Ensure that the fuel valve for the fuel filter that has an element is in the ON position (1).
2. Loosen vent screw (2).
3. Operate in-line priming pump (3). When fuel free from air flows from the vent screw tighten the vent screw.
4. Loosen connection (4) at the fuel injection pump.

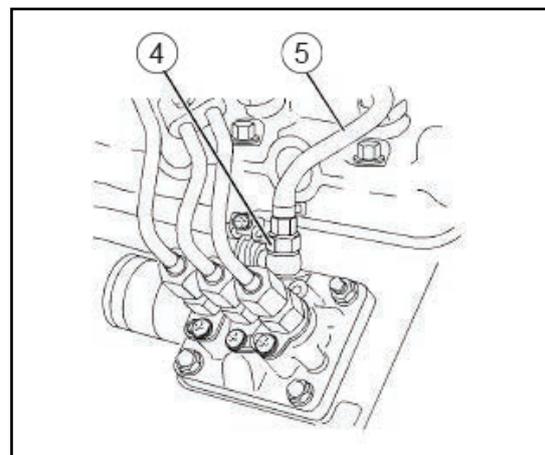
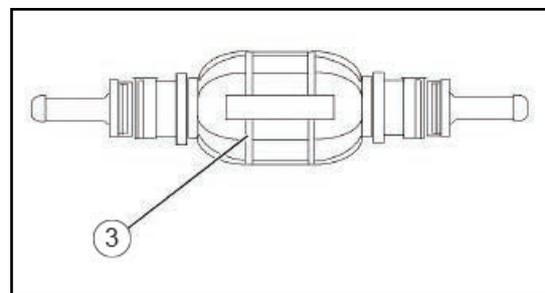
Note: Fuel return line (5) may need to be removed to prime the fuel system.

5. Operate the in-line priming pump. When fuel is free from all air flows from the connections tighten the connecting bolt.
6. The engine should now be able to start. Operate the starting motor to start the engine.

Note: Do not operate the starting motor for more than 15 seconds. If the engine does not start after 15 seconds, stop and wait for 30 seconds before trying again.



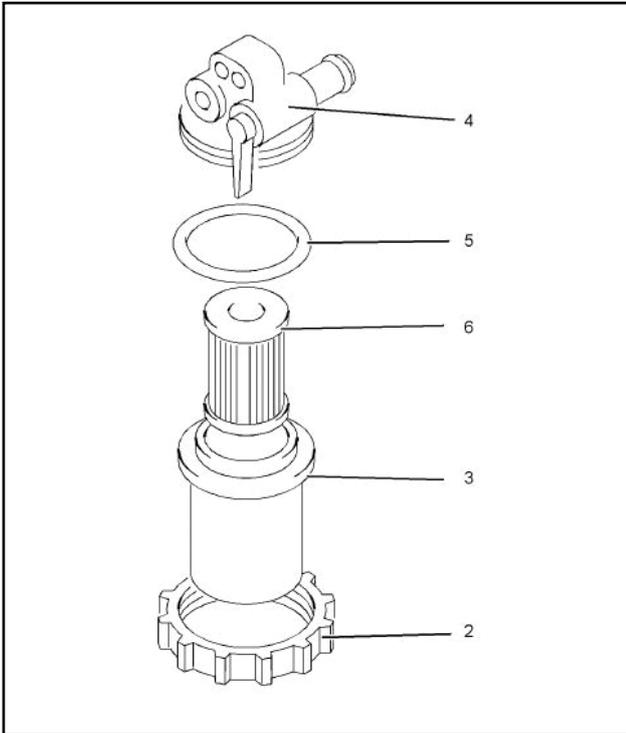
Secondary Fuel Filter



7 MAINTENANCE

Replacing Secondary Fuel Filter

1. Clean the outside of the fuel filter assembly.
2. Loosen locking ring (2).
3. Remove the casting for the filter (3) and the element. Ensure that any fluid is drained into a suitable container.



4. Assemble the following items: seal (5), filter element (6) and casing (3).

Note: Do not fill the fuel filter with fuel. This fuel will not be filtered and the fuel could be contaminated. Contaminated fuel can damage the fuel system.

5. install the assembled items to the filter base (4).
6. Install the locking ring (2) to the filter base. Rotate the locking ring in order to lock the assembly.

The fuel system will need to be primed after the new filter is installed.

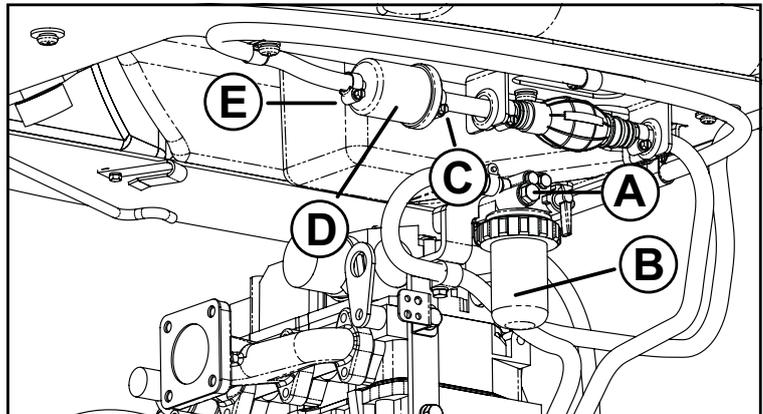
NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product.

Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids. Dispose of all fluids according to local regulations and mandates.

7.10 REPLACING FUEL FILTERS

1. Stop the engine.
2. Open the air valve (A) at the top of the filter (B) to release system pressure.
3. Remove fuel filter cartridge (B). Clean any fuel that spills.
4. Assemble new filter cartridge to the filter base. Tighten the cartridge with your hand.
5. Loosen hose clamps (C). Loosen filter clamp (E) and replace pre-filter (D).
6. Bleed air from the fuel system - Close Air Valve (A).



7.11 BATTERY

WARNING

Batteries produce explosive gases and contain corrosive acid and supply levels of electrical current high enough to cause burns.

WARNING

Batteries produce explosive gases and contain corrosive acid and supply levels of electrical current high enough to cause burns.

Battery posts, terminals and related accessories contain lead and lead compounds.
ALWAYS WASH HANDS AFTER HANDLING.

1. Keep fluid levels above battery plates.
2. Keep battery post corrosion free

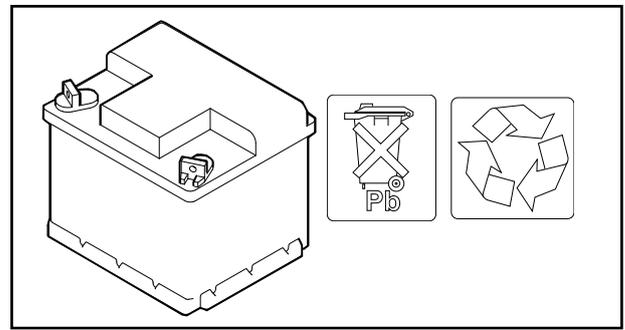
WARNING

Wear eye protection when servicing battery.

CAUTION

To help prevent injury, always wear safety glasses, safety footwear, a hard hat and ear protection whilst working on machinery.

Dispose of used batteries in accordance with local regulations.



7 MAINTENANCE

7.12 HYDRAULIC SYSTEM

Check Hydraulic Oil Level

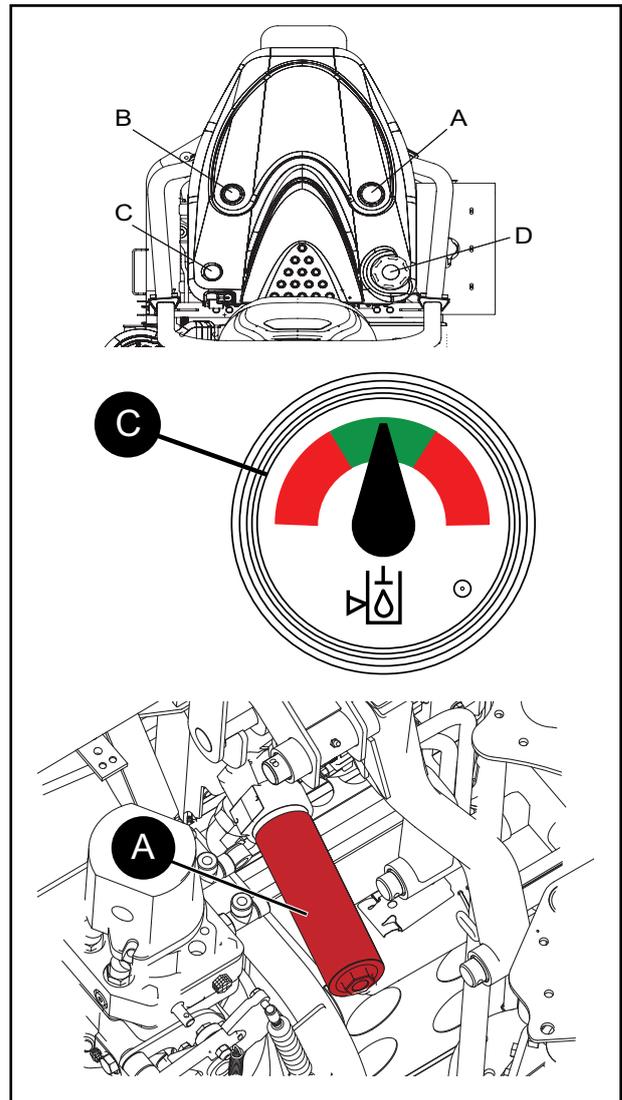
Check hydraulic oil level using sight gauge (C).

Change Hydraulic Oil

1. Clean around hose in bottom of Hydraulic tank and remove.
- 2.) Allow tank to drain into a suitable container and replace hose.
3. Refill tank with the correct quantity and grade of Hydraulic Oil through the filler cap. (D).

Change Hydraulic Oil Filter

- (a) Wipe filter canister (A) and housing to remove any dirt present.
- (b) Place a suitable drip tray under the filter.
- (c) Unscrew filter cannister and dispose of internal filter element safely.
- (d) Replace with new internal filter.
- (e) Coat the top outside lip of the filter canister with a thin film of oil, fill filter with clean hydraulic fluid and refit the filter canister.
- (f) Filter should be replaced before refilling hydraulic tank.



NOTICE

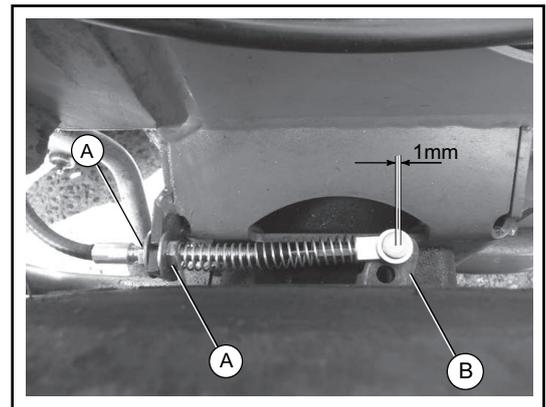
IMPORTANT - Whenever the closed loop transmission circuit has been broken into, it is essential that the circuit is flushed prior to use. Absolute cleanliness must be observed when filling the hydraulic tank. Oil must be filtered through a 25 micron filter before entering the hydraulic tank.

7.13 HANDBRAKE

Place the front axle on axle stands and remove the front wheels. Inspect the discs and pads for wear and replace if necessary. Remove all debris from around the brake assembly and ensure the calliper is free to float.

To Adjust

- a. Release locknut's A.
- b. Adjust cable until 1mm of movement is obtained at caliper lever B when the hand brake is NOT applied.
- c. Adjust both brake calipers equally.
- d. Tighten nuts A.
- e. Check hand brake operation. The hand brake lever should raise between eight and eleven clicks on the ratchet with a force of 33kgf



7.14 TYRES

Keep tyres properly inflated to prolong tire life. Check inflation pressure while the tyres are cool. Use an accurate, low pressure tyre gauge.

Keep tires inflated to the air pressure specified. See Specifications 3.2

CAUTION

Caution must be used when inflating a low pressure tyre to the recommended pressure. Check pressure with a low pressure tyre gauge before connecting an air hose to a partly inflated tyre.

Due to the low air volume requirements of a small tyre, over inflation may be reached in a matter of a few seconds, which could cause the tyre to explode.

7 MAINTENANCE

7.15 MACHINE MAINTENANCE GENERAL

Other Regular Service

- Verify proper operation of safety interlock switches (Seat switch, etc.)
- Ensure nuts and bolts remain tight.
- visually inspect for hydraulic leaks.
- Keep engine bay clear of debris.
- Keep tyre pressure at correct level. See Section 3.2
- Follow the engine manufacturer's maintenance recommendations.
- If a label becomes worn or removed, see the LABELS section of this manual or the tractor Parts Manual for replacement information.

NOTICE

When washing machine with pressure spray washers or steam cleaners, avoid washing bearing areas because cleaning solutions might penetrate bearing seals and cause premature bearing failure.

Storage

- Store petrol or diesel fuel in an approved container in a cool dry place.
- Keep the machine and fuel containers in a locked storage place to prevent tampering and to keep children from playing with them.
- Do not store fuel or petrol / diesel fuel powered equipment in any closed area where heating appliances, pilot lights or any sort of open flame is present.
- Before storing, allow the engine to cool, and drain fuel completely from fuel tanks and containers.
- When the vehicle is not being used for an extended period, the tyre pressures must be increased. Inflate to the maximum rating on the tyre wall to make sure that flat spots do not occur. Decreased the tyre pressure before the vehicle is put into operation.
- Maximum safety and best mowing results can only be expected if the mower is maintained and operated properly.

7.16 LUBRICATION OF CUTTING UNIT

Cleaning

The cutting heads should be washed after use each days and dried as well as possible to prevent rust.

Lubrication

The lubrication fittings at each end of both the front and rear rollers, as well as the reel bearings at each end should be lubricated periodically (approximately once each week). Use only enough lubricant to keep the bearings from drying out. Too much lubricant may drop from mower onto turf, causing damage to the grass.

8.1 TRACTION CONTROL PEDAL

ADJUSTING MOW SPEED

To determine mow speed, run a time check on how fast the unit travels in a distance of 50' (15.24 M). Prepare a level surface with enough room to start and end beyond the 50' marks.

Place a stake in the ground where you want to begin timing the unit. Measure and place another stake at a distance of 50' (15.24 M). Lower the cutting heads and press the direction pedal forward so the unit is traveling at full throttle (the cutting heads should be in the neutral position when timing the unit).

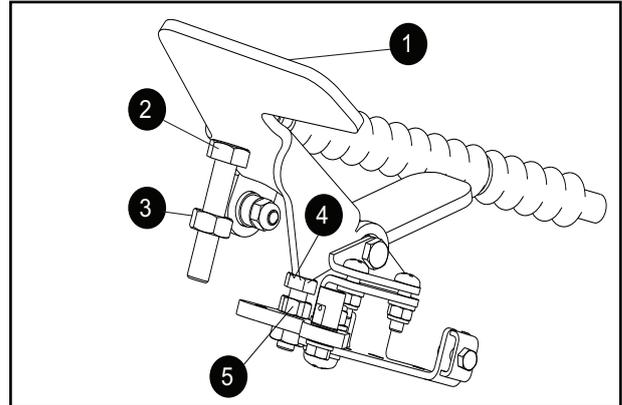
Begin timing the unit when the centre of the front tire aligns with the first stake. Stop timing when the centre of the front tire aligns with the stake placed at 50' (15.24 M). Estimated time for 3.8 mph (6.1 Km/hr) will be approximately 8.8 to 9.2 seconds. If there is a significant difference in the times listed above, you can adjust the mow speed as follows.

To Adjust Transport Speed Stop.

- a. Loosen locknuts (3).
- b. Adjust bolt (2).
- c. Tighten locknuts (3).

To Adjust Mow Speed Stop.

- a. Loosen locknuts (5).
- b. Adjust screw (4).
- c. Tighten locknuts (5).



1. Direction/Speed Pedal
2. Transport Stop
3. Locknuts
4. Mow Stop
5. Locknuts

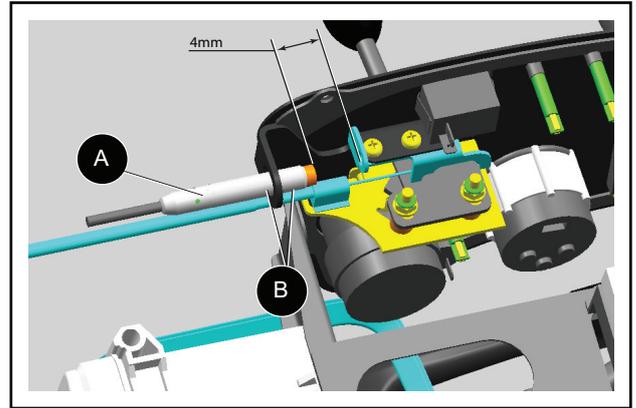
8 ADJUSTMENTS

8.2 ADJUSTING SPEED CONTROL SWITCH

The speed control sensor is positioned under the control panel. The mechanism is activated when the speed control lever is cycled from the transport and mow positions.

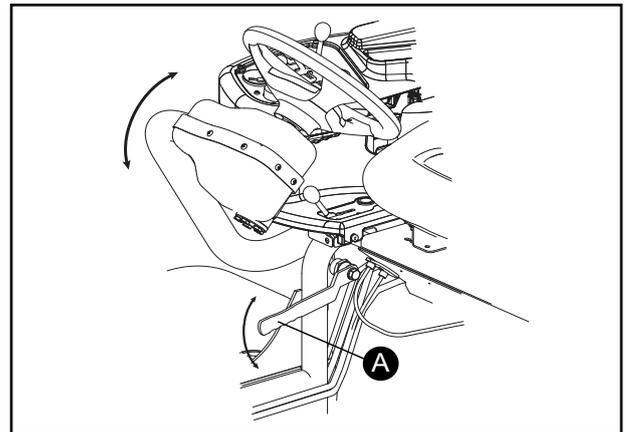
To set the sensor (A), position the control lever in the “mow” position, loosen nuts (B), and adjust sensor until a gap of 4mm is achieved. Tighten nuts. Cycle control lever to the “transport” position, to ensure bolt head is clear of switch.

To ensure correct set-up, the cylinders MUST only rotate when the switch is activated. i.e the Mow position.



8.3 STEERING ARM ADJUSTMENT

Support the control arm to avoid a sudden drop while adjusting its height. Loosen the Locking Lever (A) to allow the steering wheel and control arm to be adjusted up or down. Tighten the locking lever when steering wheel is at the desired position.



WARNING

DO NOT attempt to adjust the control arm position while the machine is moving. The operator may lose control, causing possible injury to themselves or bystanders.

8.4 REAR SWING OUT ARM

NOTICE

The rear swing out arm is to allow you easy access to the rear cutting head. The cutting heads must be in the raised position. **DO NOT** swing the arm out with the cutting heads in the lowered position.



- 1.The grass catcher **MUST BE** removed before you swing the arm out.
- 2.Release the latch (1).
- 3.Pull the handle (2) and swing the rear arm and cutting head out.
- 4.After you are properly seated in the operator's seat, restart the unit and lower the cutting heads.
- 5.Shut off the unit and remove the rear cutting head for service.
- 6.After you have completed your servicing, secure the cutting head to the rear arm.
- 7.After you are properly seated in the operator's seat, restart the unit and raise the cutting heads.
- 8.Shut off the unit and swing the rear arm back under the unit and secure the arm with the draw latch.
- 9.Install the grass catcher.

WARNING

To avoid the possibility of serious injury, **ALWAYS** be properly seated in the operator's seat while the engine is running.

NEVER attempt to drive the machine while the rear arm is not secured by the draw latch. Driving the machine with the rear arm out, will result in damage to the machine and/or cause serious injury or death of the operator and/or bystanders.

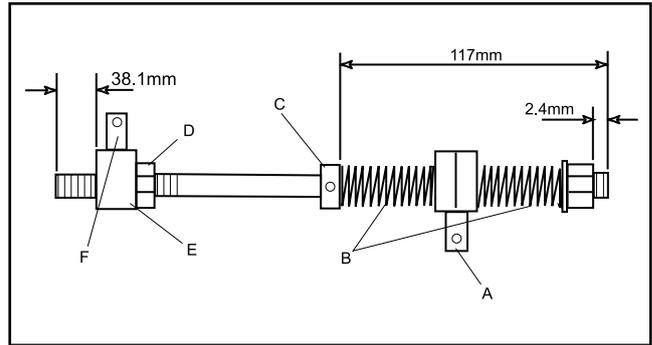
8 ADJUSTMENTS

8.5 LEVELLING LINKAGE FOR THE FRONT CUTTING HEADS

NOTICE

The dimensions in the figure are factory preset and the leveling linkage should not need adjusting. After some time the linkage may require some adjusting. If it is required, only make adjustments on the adjusting connector (E).

1. With the unit on a level surface (recommend concrete surface), place cardboard underneath all three of the cutting heads.
2. An additional person is needed to stand 3 meters in front of the unit to check on how level the front heads are when lowering. Lower the cutting heads and ensure the entire width of the front heads are parallel with the level surface as the heads touch the cardboard.
3. If they do not touch evenly, make an adjustment using the adjusting connector. Repeat procedure as needed until the two front heads touch evenly on the level surface.



WARNING

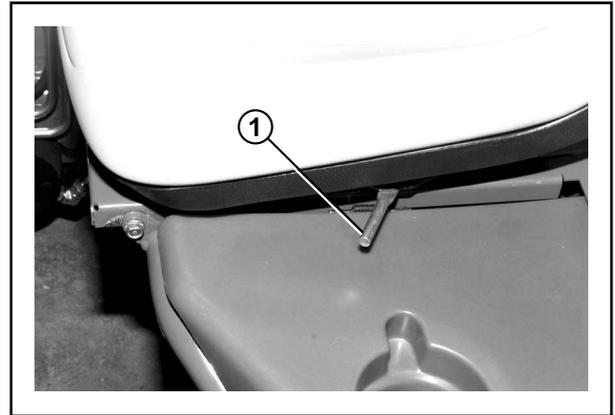
This procedure must be performed as specified and only by properly trained service personnel.

During this entire procedure the reel enable switch must be in the off position. Turning on the reel enable switch will result in damage to the unit and/or serious personal injury or death to you the operator or bystanders.

8.6 SEAT ADJUSTMENT

Milsco XB200

Pull out on the adjustment lever located under the left side of the seat. Slide the seat to the desired position and release the lever.



Grammer MSG 65

Safety

Driver's seats that have been adjusted incorrectly have a smaller moving area. In order to prevent any personal injury, the seat must be adjusted for the driver's weight.

To prevent injury, no objects should be placed within the moving area of the driver's seat.

To eliminate any risk of accident, the settings must be checked to ensure they are correctly engaged before the vehicle is driven.

Adjustments must not be made While driving.

Only touch the handle for setting the fore/aft adjustment at the indented grip provided for that purpose (do not put your whole hand around it). Risk of crushing.

After removal of the backrest upholstery, the backrest frame must be supported, for example held in place, before the backrest adjuster is operated. If you fail to do so, there is a danger that the backrest frame may jerk forward and cause injury.

Any changes to the series standard of the seat (for example fitting parts which are not original Grammer AG parts) may impair the safety standard to which it has been tested. Functions may be impaired, threatening your safety. For this reason, any changes in design of the seat must be approved by Grammer AG.

Do not hold onto the covers for lifting the driver's seats. If you do so anyway, there is an increased risk injury due to loosening or breaking covers.

Before you remove the driver's seat, disconnect all plug-in connections between the seat and the vehicle supply network. When you replace the plug-in connectors, make sure they are tight (dust, water).

Seatbelts are fitted or can be retrofitted to the driver's seat. Seatbelts may only be fitted on approval of the vehicle manufacture, as they increase the load in the seat mounting area. Seatbelts must be fitted in accordance with specific national regulations and guidelines, and must be approved by Grammer AG.

Seatbelts must be fastened before driving.

The seatbelts must be replaced after an accident.

Where seatbelts are fitted to the driver's seat, the seat and seatbelt mounting must be checked additionally by specialist personnel after an accident has occurred.

Fasteners must be checked regularly for tight seat. If the seat wobbles, there may be loose bolts or other faults.

8 ADJUSTMENTS

If you notice that the seat does not function correctly (for example a defective suspension of the driver's seat; improper curvature of the lumbar support or damaged bellows), contact a specialist workshop immediately to arrange for repairs to be carried out. If you fail to do so, your health may be affected and the risk of an accident increased.

Before the vehicle is used, switches that might be in the seat (for shutting down mechanical equipment when the driver leaves his/her seat) must be checked for proper function. If malfunctions are detected, the vehicle must not be driven.

Loads must not be placed on seats with a built in switch, except for the driver's weight during normal use, as the vehicle may otherwise start to move by itself. If you take off the weight from the seat while driving, this will cause the vehicle to stop.

Do not indent the bellows while there is load on the driver's seat.

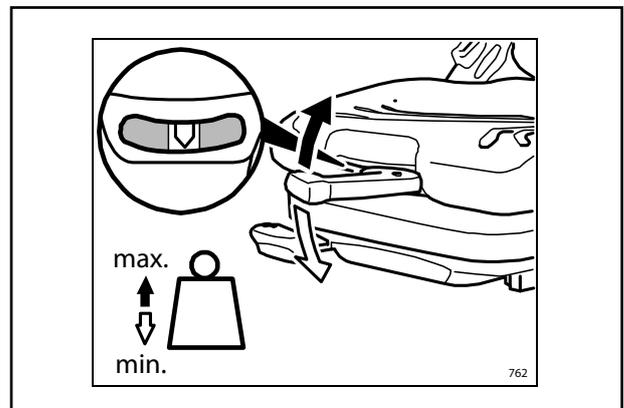
Make sure that the interior of the driver's seat remains free of foreign objects or liquids.

Seat functions and operation

Weight adjustment

The seat is adjusted for the driver's weight with the driver sitting on the seat. Fold out the weight adjustment lever completely, hold it at the front and move it upwards or downwards (10 movements from minimum to maximum). Before every new movement, bring the lever back to the starting position (audible locking sound). The driver's weight has been set correctly, when the arrow is in the middle of the viewing window.

- To prevent damage to the health and material, the setting for the driver's weight must be checked and adjusted as necessary before the vehicle is driven.
- When the minimum/maximum has been reached, you can notice an empty movement in the handle.
- When you have set the weight, fold the lever completely into the locking.



Fore/aft adjustment

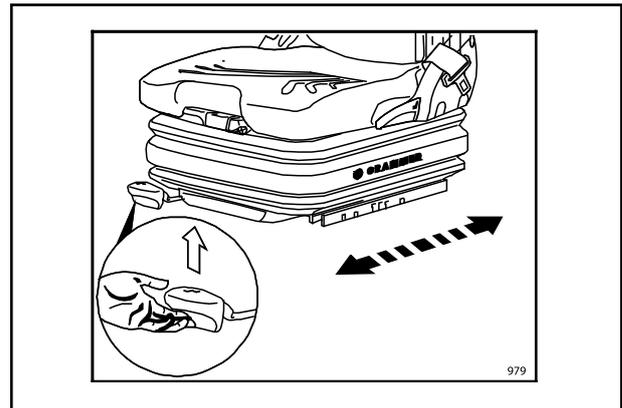
The fore/aft adjustment is released by lifting the locking lever.

WARNING

Risk of accident.
Do not operate the locking lever while driving.

WARNING

Risk of crushing.
only touch the lever at the indented grip,
do not reach back under the lever.



- After the adjustment, the locking lever must latch into the desired position with an audible click. It should not be possible to move the driver's seat into another position when it is locked.
- Do not lift the locking lever with your leg or calf.

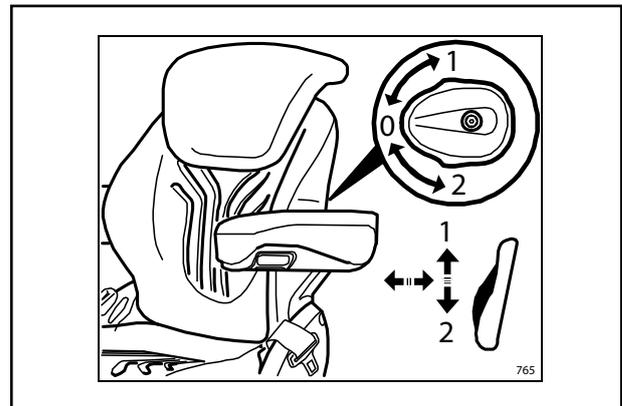
Lumbar support

The lumbar support increases both the seating comfort and the performance of the driver. By turning the adjustment knob upwards, the curvature in the upper part of the backrest cushion can be adjusted. By turning the knob downwards, the curvature in the lower part of the backrest cushion can be adjusted.

0 = No curvature

1 = Max. curvature at the top

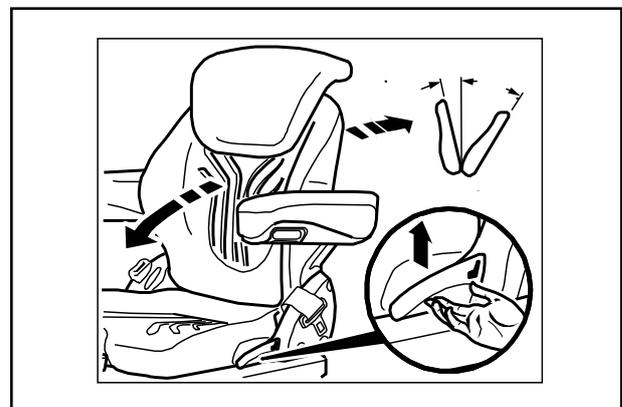
2 = Max. curvature at the bottom.



Backrest adjustment

Pull up the locking lever to release the backrest catch. When releasing the backrest catch, do not apply load to the backrest by pressing against it. By exerting pressure on or off the front or rear part of the seat pan it can be moved to the desired position. Release the locking lever to lock the backrest.

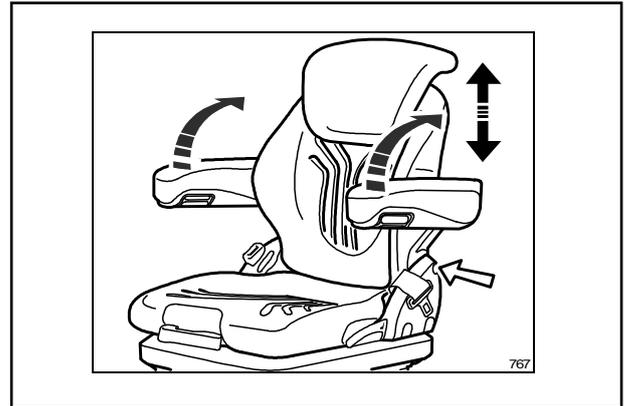
- It should not be possible to move the backrest into another position after it has been locked.



8 ADJUSTMENTS

Armrests

The armrests can be folded back if required and the height individually adjusted. To adjust the armrests for height, separate the round cap (see arrow) from the cover, loosen the hexagon nut (size 13 mm) behind it and adjust the armrests to the desired position (5-steps) and tighten the nut again (25Nm). Replace the cap onto the nut.

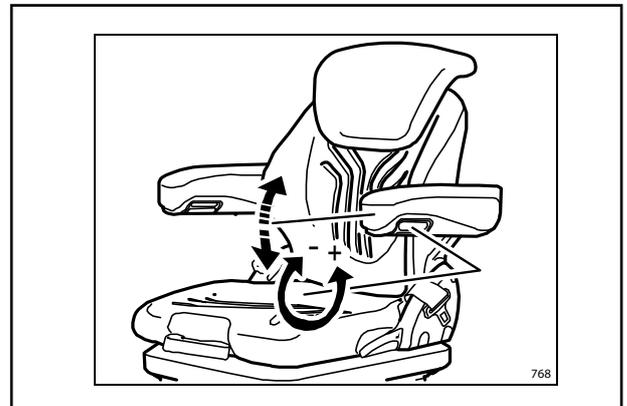


WARNING

If the belt roller is fitted, do not install the armrest in the lowest position as otherwise the belt roller might not function correctly. Carry out a functional test of the belt roller.

Armrest adjustment

The inclination of the armrests can be modified by turning the adjustment knob. When turning the knob to the outside (+) the front part of the armrest will be lifted, when turning the knob to inside (-) it will be lowered.

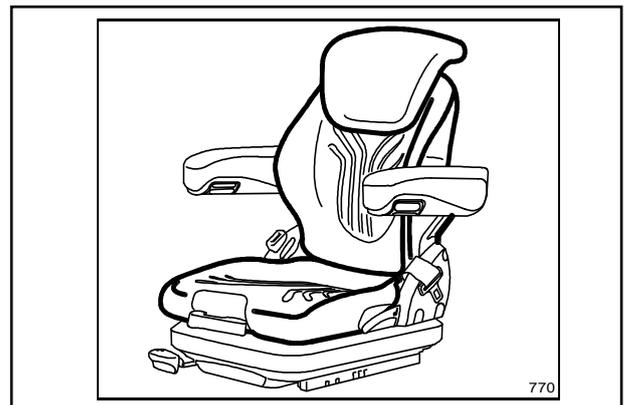


Maintenance

Dirt can impair the function of the seat, So make sure you keep your seat clean. Upholstery does not need to be removed from the seat frame for cleaning.

CAUTION

Take care with the backrest - it may jerk forward and cause injury. When cleaning the backrest cushion, the backrest must be held in place when operating the backrest lever.



ATTENTION: Do not clean the seat with a pressure washer.

When cleaning the upholstery, make sure the upholstery is not soaked.

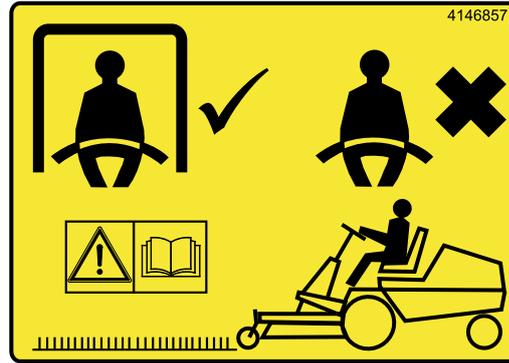
Use standard commercially available upholstery or plastics cleaning agent. Test first for compatibility on a small, concealed area.

DANGER

When the machine is being used off road, whether cutting grass or not, the seat belt should only be worn when a ROPS frame is in place and deployed.

This rationale is based on the fact that a seat belt must be worn with a ROPS to comply with the Machinery Directive 98/37/EC Sections 3.2.2, Seating & 3.4.3, Rollover.

Ransomes Jacobsen Limited recommends that a local risk assessment is completed by the owner / user of the machine to determine any exceptions to this seat belt wearing rule e.g. use of the machine next to water or on the highway.



8 ADJUSTMENTS

8.7 BEDKNIFE-TO-REEL TRUESET™ REEL

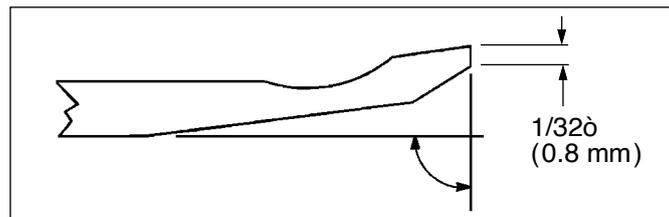
(Pre-adjustment Check)

1. Check the reel bearings for end play or radial play. There should be no end play or radial play. See 8.10.

CAUTION

To prevent personal injury and damage to the cutting edges, wear gloves and handle the reel and bedknife with extreme care.

2. Inspect the reel blades and bedknife to insure good sharp edges without bends or nicks.
 - a. The leading edge of the reel blades must be sharp, free of burrs and show no signs of rounding off.
 - b. The bedknife and bedknife backing must be securely tightened. The bedknife must be straight and sharp.
 - c. A flat surface of at least 1/32 in. (0.8 mm) minimum must be maintained on the front face of the bedknife. Use a standard flat file to dress the bedknife.
3. If wear or damage is beyond the point where the reel or bedknife can be corrected by the lapping process, they must be reground.
4. Proper reel-to-bedknife adjustment is critical. A gap of 0.001 to 0.003" (0.025 to 0.076 mm) must be maintained across the entire length of the reel and bedknife.
5. The reel must be parallel to the bedknife. An improperly adjusted reel will lose its sharp edges prematurely and may result in serious damage to the reel and bedknife.
6. Grass conditions will also affect the adjustment.
 - a. Dry, sparse conditions will require a wider gap to prevent heat buildup and damage to the reel and bedknife.
 - b. High quality grass with a good moisture content requires a closer gap (near zero).

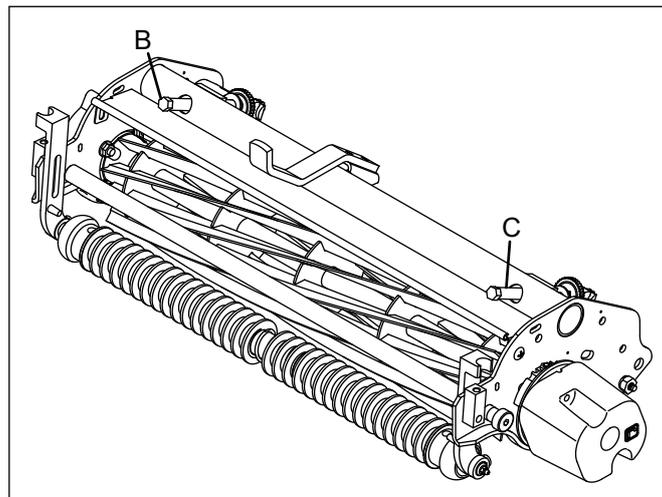


8.8 BEDKNIFE ADJUSTMENT TRUESET™ REEL

1. Read Section 8.7 before making the adjustment.
2. Start adjustment at the leading end of the reel, followed by the trailing end. *The leading end of the reel blades is that end which passes over the bedknife first during normal reel rotation.*
3. Use adjusters (**B and C**) in Figure 9A, to adjust gap. Rotate adjusters (Clockwise) to close gap. Each click of the adjuster moves the bedknife 0.001" (0.025 mm) closer to the reel.
 - a. Slide a feeler gauge or shim stock 0.001" - 0.003" (0.025 - 0.075 mm) between the reel blade and the bedknife. Do not turn the reel.
 - b. Adjust the trailing end of the reel to the same gap in a similar manner then recheck the adjustment at the leading end.
 - c. When the reel is properly adjusted to the bedknife, the reel will spin freely and you should be able to cut a piece of newspaper, along the full length of the reel, when the paper is held at 90° to the bedknife.

NOTICE

Avoid excessive tightening or serious damage may result to bedknife and reel blades.
Reels must turn freely.



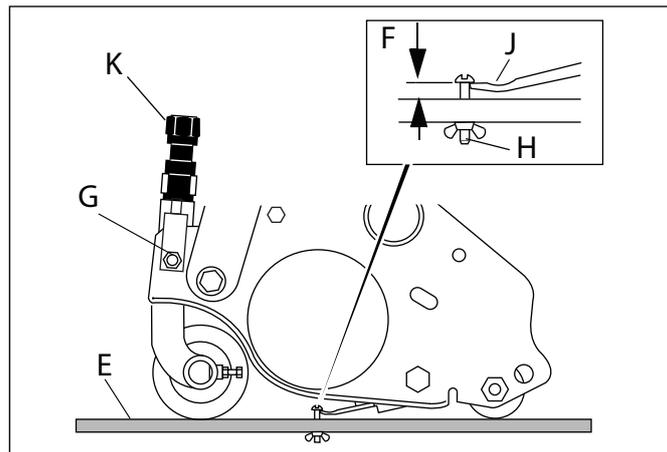
8 ADJUSTMENTS

8.9 CUTTING HEIGHT TRUESET™ REEL

NOTICE

Always make the reel to bedknife adjustment before adjusting height of cut. (Sections 8.7 and 8.8).

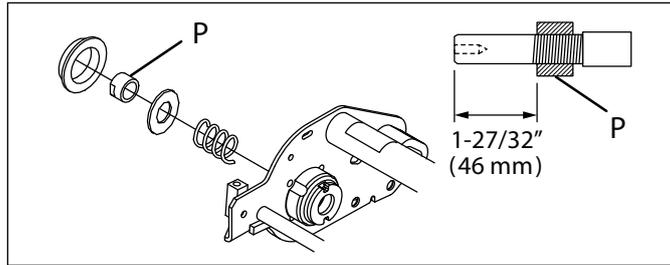
1. Set desired cutting height on the gauge (**E**).
 - a. Measure distance between the underside of screw head and gauge block surface (**F**).
 - b. Adjust screw (**H**) to obtain desired height then tighten the wing nut.
2. Loosen the nuts on the front roller brackets (**G**) just enough to allow the adjuster knob (**K**) to raise or lower the front roller.
3. Place gauge (**E**) across bottom of front and rear rollers near one end of roller.
4. Slide the head of gauge screw (**H**) over the bedknife (**L**) and adjust the knob (**K**) to close the gap between the screw head and bedknife. Then tighten locknut (**G**).
5. Repeat Steps 4 and 5 on opposite end. Complete adjustment to one end before adjusting opposite end.
6. Tighten nuts (**G**) and recheck each end.



8.10 REEL BEARING TRUESET™ REEL

Any radial play or excessive end play indicates bad bearings, a weak tension spring or a backed off nut.

1. Check bearing housing mounting hardware. Tighten or replace components as required. Carefully clean threads with degreaser.
2. Apply a medium strength grade of Loctite to nut (P), then thread nut onto the reel shaft until the nut is 1-27/32" (46 mm) from the end of the reel shaft.
3. Fill reel bearing housings with NLGI - Grade O grease after adjusting spring.

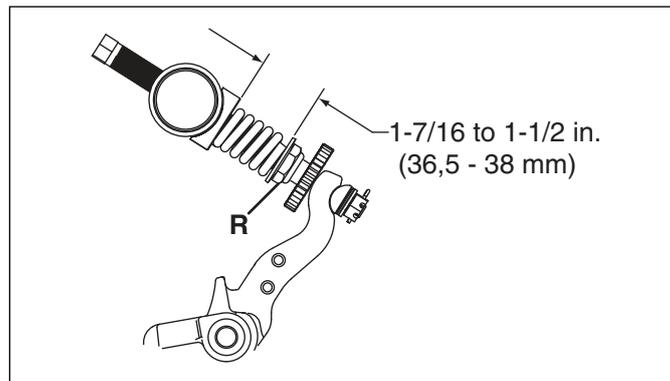


8.10.1 BEDKNIFE ADJUSTER SPRING TRUESET™ REEL

For proper operation, bedknife adjuster spring should be compressed to a dimension of 1-7/16 - 1-1/2 in. (36.5-38 mm).

To adjust spring compression, loosen or tighten nut (R) to obtain a distance of 1-7/16 - 1-1/2 in. (36.5-38 mm).

After adjusting spring, check reel to bedknife adjustment.



8 ADJUSTMENTS

8.11 KNIFE ADJUSTER TENSION TRUESET™ REEL _____

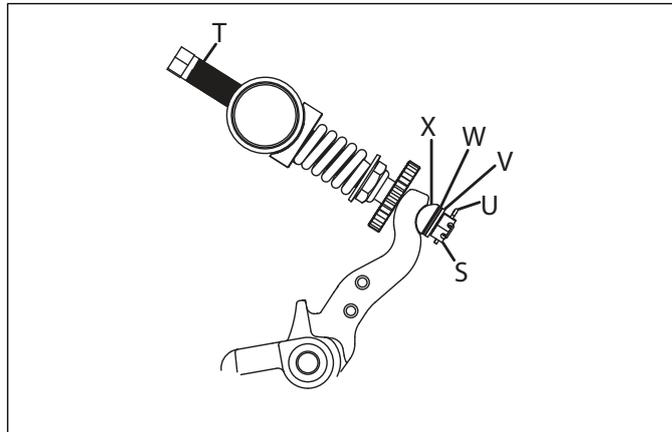
NOTICE

Over tightening slotted nut (S) will make bedknife adjuster rod (T) difficult to adjust.

Remove cotter pin (U) and fully loosen, then tighten slotted nut (S) to remove clearance (no end play) between components. Continue to tighten nut until next slot in nut aligns with hole in bedknife adjuster rod (T). Install new cotter pin.

Check torque required to rotate adjuster rod (T). Maximum torque should be 24 in. lb. (2 ft. lb.) (2.7 Nm).

After adjusting nut, check reel to bedknife adjustment.



8.12 GRINDING BEDKNIFE TRUESET™ REEL _____

Bedknife can be lowered out of the reel for grinding without completely removing the bedknife assembly.

1. Remove cotter pin (U), slotted nut (S), bellville washer (V), shim washer (W) if required, and half trunnion (X). See Figure 9A.
2. Press down on adjuster end of rod (T) to rotate other end of the adjuster out of the bedknife finger.
3. Rotate bedknife backing to access the reel and bedknife for grinding.
4. After grinding, assemble bedknife using reverse order of removal. Check adjustment of bedknife adjuster tension and reel to bedknife adjustment.

8.13 BEDKNIFE ADJUSTMENT CLASSIC XP™ REELS

Any adjustment to the clearance between the reel blades and the bedknife should be done at the leading end of the reel first (the end at which each individual blade first crosses the bedknife). Then at the opposite end of the reel.

1. Loosen the lower adjustment screws at each end by turning them approximately 1/4 turn counterclockwise.
2. While rotating the reel backwards, turn the upper adjustment screws (leading end first) until there is approximately .001, (.025mm) clearance. After adjusting both ends, recheck the leading end.

NOTICE

Too much clearance between the bedknife and the blades will result in poor cutting quality.

Too little clearance will cause excessive wear to the cutting edges and may cause damage to the bedknife, reel blades or other components.

3. Using a wrench rotate the reel forward. The reel must turn freely and you should just be able to hear the reel blades making slight contact with the bedknife.
4. After the bedknife is properly adjusted, tighten the lower adjustment screw at each end.
5. Test the cutting head by holding two strips of newsprint perpendicular to the bedknife. Rotate the reel with a wrench. The reel must turn freely and each blade on the reel should cut one of the two strips of paper.

WARNING

To avoid the possibility of serious injury, NEVER attempt any cutting head adjustments while the engine is running.

WARNING

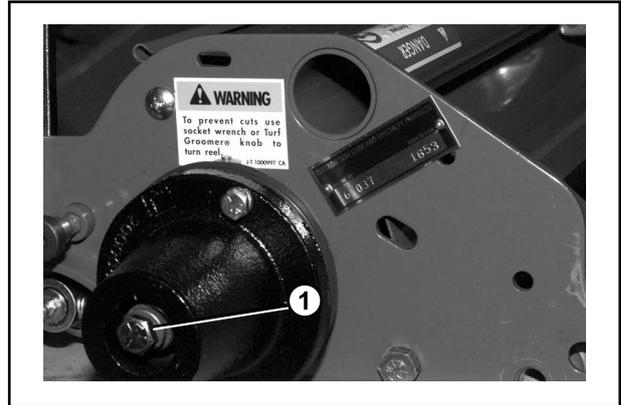
NEVER rotate the cutting reel by pushing it with your hands or fingers.
Fingers can become caught between the reel and the frame resulting in serious injury.
Use a ratchet with a 9/16" socket on the end of the reel shaft to rotate it during adjustments and testing.

8 ADJUSTMENTS

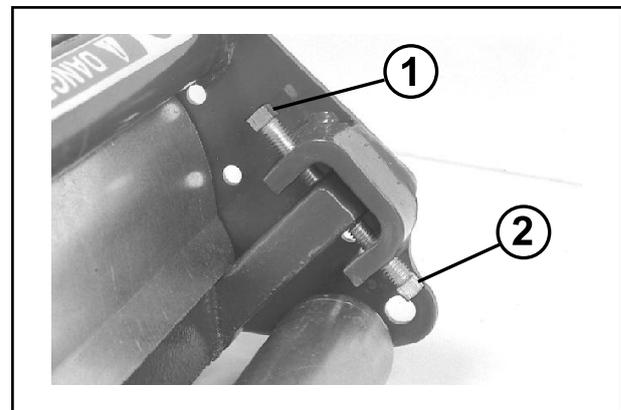
8.14 HEIGHT OF CUT CLASSIC XP™ REELS

Any adjustment to the clearance between the reel blades and the bedknife should be done at the leading end of the reel first (the end at which each individual blade first crosses the bedknife). Then at the opposite end of the reel.

1. Loosen the lower adjustment screws at each end by turning them approximately 1/4 turn counterclockwise.
2. While rotating the reel backwards, turn the upper adjustment screws (leading end first) until there is approximately .001, (.025mm) clearance. After adjusting both ends, recheck the leading end.



1. Rotate Cutting Reel with this Screw Head



1. Upper Adjustment Screw
2. Lower Adjustment Screw

NOTICE

Too much clearance between the bedknife and the blades will result in poor cutting quality.

Too little clearance will cause excessive wear to the cutting edges and may cause damage to the bedknife, reel blades or other components.

3. Using a wrench rotate the reel forward. The reel must turn freely and you should just be able to hear the reel blades making slight contact with the bedknife.
4. After the bedknife is properly adjusted, tighten the lower adjustment screw at each end.
5. Test the cutting head by holding two strips of newspaper perpendicular to the bedknife. Rotate the reel with a wrench. The reel must turn freely and each blade on the reel should cut one of the two strips of paper.

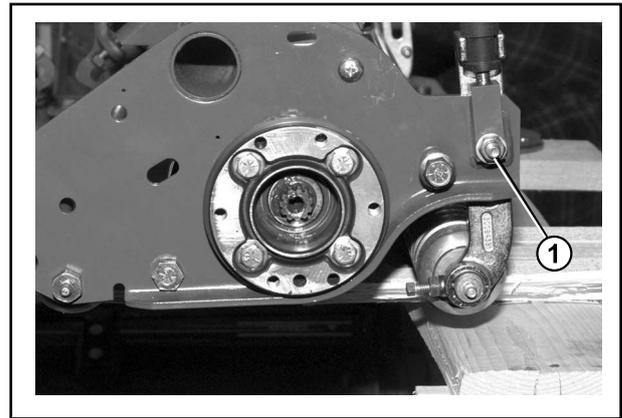
8.15 HEIGHT OF CUT CLASSIC XP™ REELS

Work Bench Setting.

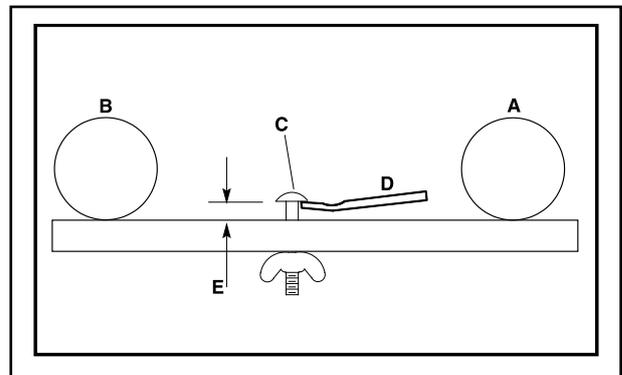
NOTICE

All three cutting heads **MUST** be accurately set at the same height of cut to ensure an even cut.

1. Set the height of cut on the gauge block (Part No. 892010) by turning the wing nut until the distance between the bottom of the screw head and the top of the gauge block equals the desired height of cut.
2. Loosen the locking nut on one of the front roller adjusting brackets just enough to allow adjustment.
3. Hold the gauge block (Part No. 892010) across the bottom of both the front and rear rollers near the roller adjustment bracket and adjust the front roller until the cutting edge of the bedknife comes up to touch the bottom of the gauge screw head.
4. Tighten the locking nut and repeat the procedure at the other end. After adjustment has been made at both ends, go back and recheck both ends.
5. Make sure all three cutting heads are set without changing the height of the gauge screw.



1. Loosen Locking Nut



Height of Cut Adjustment

A = Rear Roll

B = Front Roll

C = Gauge Screw Head

D = Bedknife

E = Height of Cut

WARNING

To avoid the possibility of serious injury, NEVER attempt any cutting head adjustments while the engine is running.

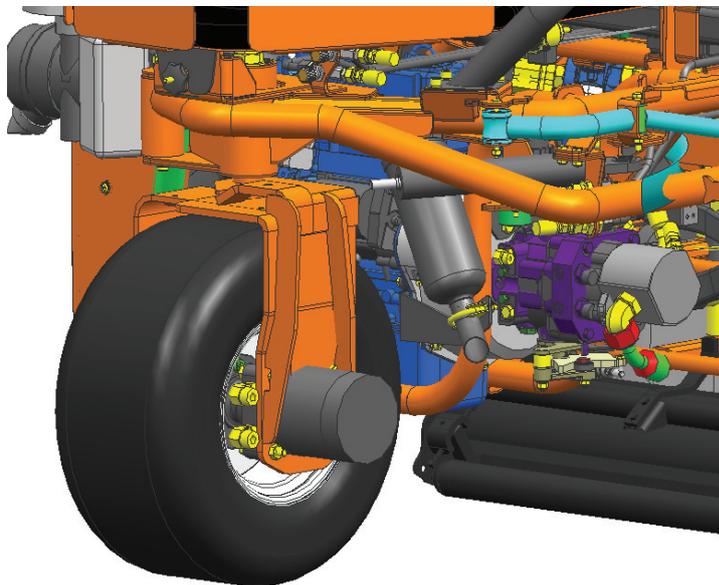
WARNING

NEVER rotate the cutting reel by pushing it with your hands or fingers. Fingers can become caught between the reel and the frame resulting in serious injury. Use a ratchet with a 9/16" socket on the end of the reel shaft to rotate it during adjustments and testing.

9 ACCESSORIES

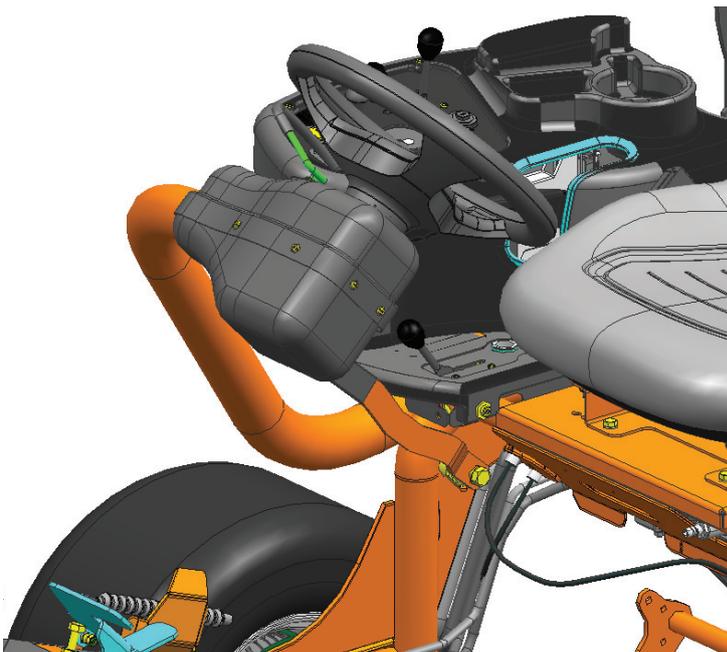
9.1 THREE WHEEL DRIVE KIT

Kit number: LMAC418



9.2 PADDLE KIT

kit number: LMAC412



9.3 DEW WHIP KIT

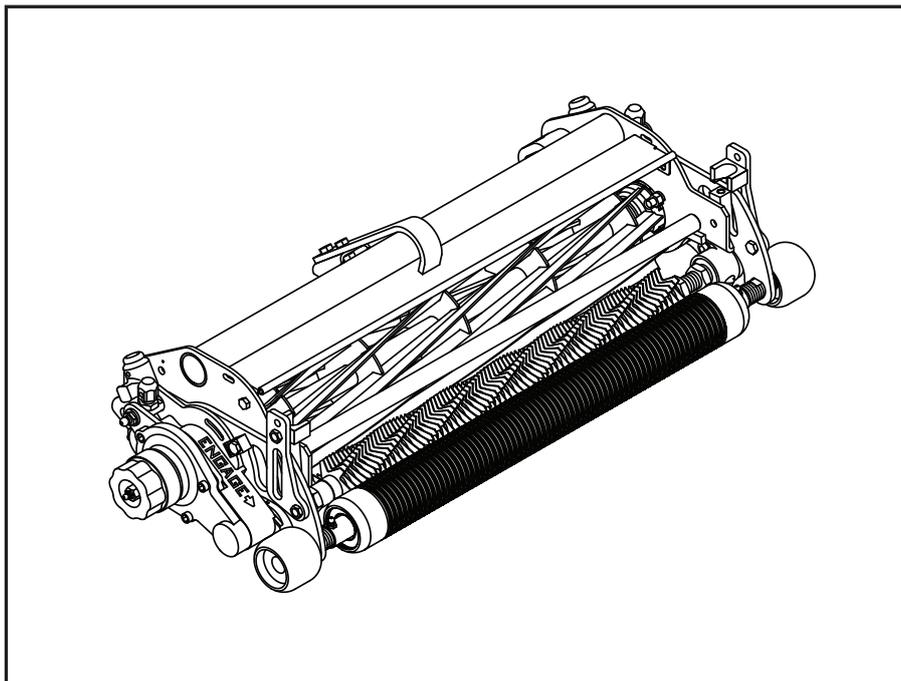
Kit number: LMAC415



9.4 GROOMER KIT

Kit number: 067912 (6.3mm spacing) 1/4 Inch

Kit number: 06 7914 (12.7mm spacing) 1/2 Inch



10 PROBLEM SOLVING

10.1 PROBLEM SOLVING GENERAL

Symptoms	Possible Causes	Action
Engine will not start	Glow plug has not timed out	Reset ignition switch and allow glow plug to time out before cranking engine.
	Battery low on charge or defective.	Inspect condition of battery and battery connections.
	Fuel tank empty or fuel contaminated.	Fill tank with fresh fuel. Change filter. Bleed air from lines.
	Blown fuse.	Replace Fuse.
	Defective starter relay.	Test and replace relay if necessary.
	Brake switch is not on.	Ensure brake switch is on.
	Mow switch set to cut.	Set mow switch to off.
	Transport pedal not in neutral.	Remove foot from pedal, cheek pedal returns to the neutral position.
Engine hard to start or runs poorly.	Fuel tank empty or fuel contaminated.	Fill tank with fresh fuel. Change filter. Bleed air from lines.
	Air Cleaner blocked or dirty.	Check air cleaner, replace as necessary.
	Injectors, fuel pump.	Consult engine manual.
	Other Engine Problem.	Consult engine troubleshooting guide.
Engine Stops	Fuel tank empty.	Fill with fresh fuel and bleed lines.
	Interlocks not set before leaving operators seat.	Ensure Parking Brake is on & Mow switch is in the off position.
Engine Overheating	Coolant level low.	Inspect and add 50/50 antifreeze solution if required
	Radiator air intake restricted.	Clean wire mesh guard at radiator.
	Waterpump/alternator belt or fan belt loose or broken.	Inspect waterpump/alternator belt and fan belt. Tighten if necessary.
Battery not holding charge. Battery light on	Loose or corroded battery terminals.	Inspect terminals, clean and tighten as required.
	Low electrolyte level in battery.	Refill battery with distilled water.
	Alternator belt loose or broken.	Inspect waterpump/alternator belt. Tighten if necessary.
	Alternator defective.	See engine manual.
Decks cut unevenly Poor quality of cut.	Cutting blades are worn.	Replace blades.
	Engine speed too low.	Check engine speed, run engine at full throttle.
	Cutter motors worn.	Check case drain leakage & flow check cutting circuit.
	Ground speed too high.	Set work speed stop.

11 QUALITY OF CUT

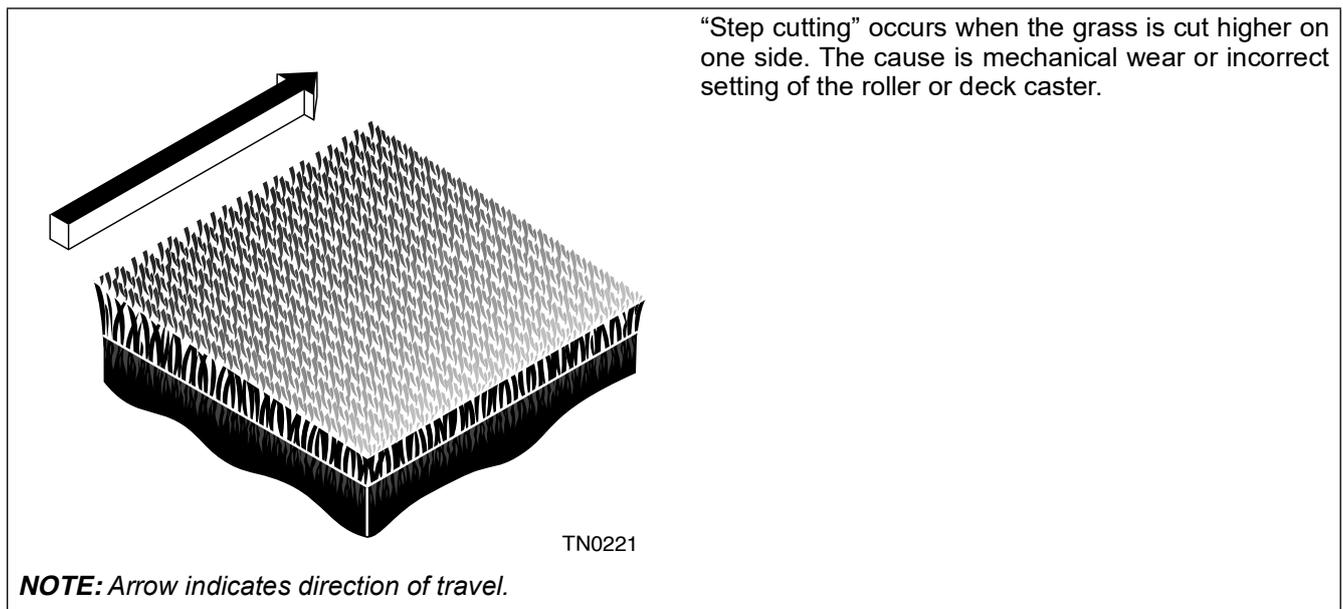
11.1 QUALITY OF CUT PROBLEM SOLVING

If required perform a “test-cut” to assess the performance of the mower before you begin the repairs. When the work is completed, repeat the “test-cut” to check the mower performance.

The following items must be checked and set correctly to make sure of an effective assessment.

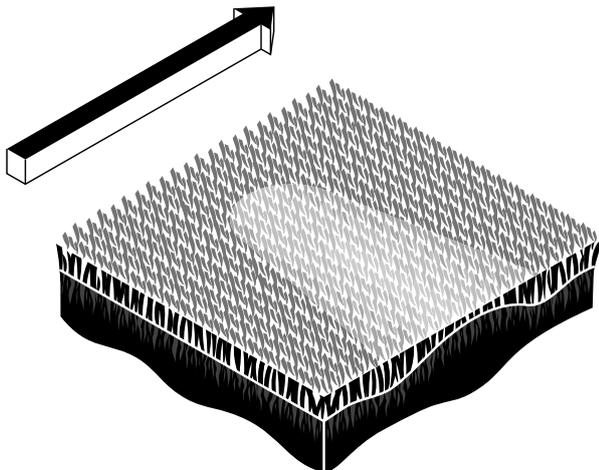
1. Blade Sharpness
2. Blade Speed
3. Mowing (Ground) Speed
4. Height-of-Cut (HOC)
5. Rake Angle
6. Caster/Roller and Roller Bearing Condition
7. Tyre pressures
8. General wear and tear of the machine

11.2 STEP CUTTING



Possible Cause	Correction
The HOC (height-of-cut) settings are different on the side of one cutting implement.	Check HOC adjustment of cutting implement
Worn roller bearings or deck caster wheels.	Check and replace the roller bearings, deck caster wheels.
Changes in turf density	Change the direction of cut.
The machine ride height is uneven side to side.	Check and adjust the tyre pressure. (See section 3.2)
General wear and tear of the machine.	Check machine for any damaged or worn parts.

11.3 SCALPING



“Scalping” is a condition in which some areas are cut shorter than the set height of cut. This results in very short grass or brown areas. The cause is a low height-of-cut (HOC) setting, rough surface.

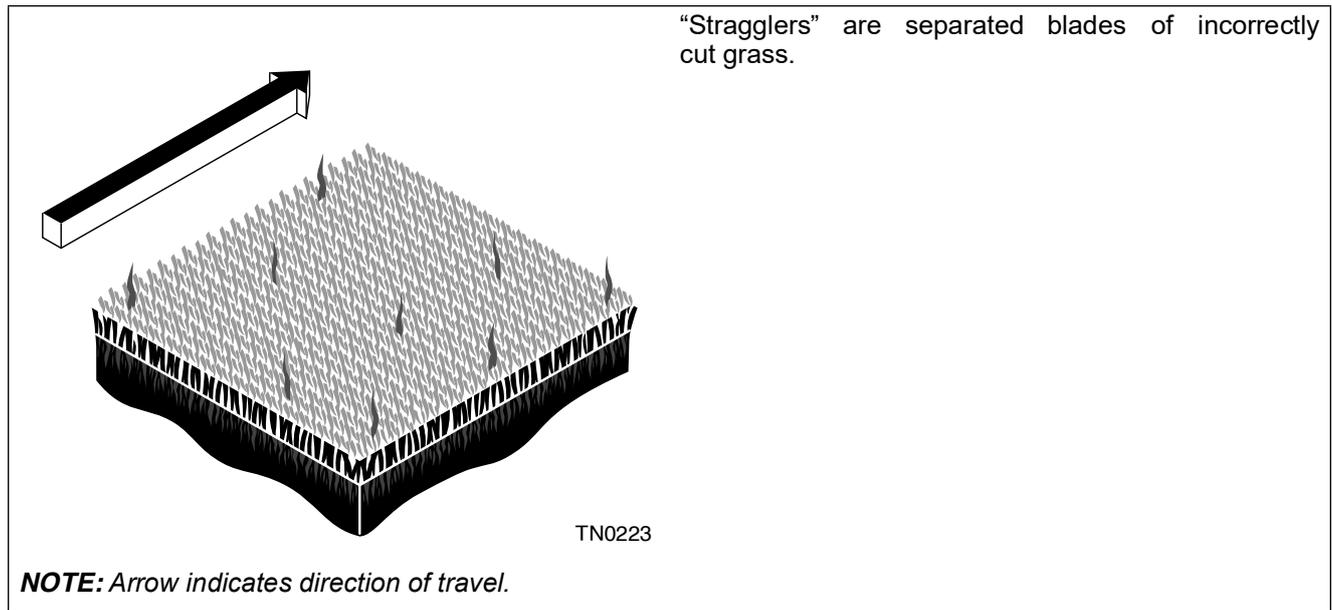
TN0222

NOTE: Arrow indicates direction of travel.

Possible Cause	Correction
The HOC (height-of-cut) settings are low for the conditions.	Check and adjust the HOC settings. (See section 8.14)
The mower cannot follow the ground in this direction.	Change the direction of cut.
The height of grass is being reduced too much in one pass.	Mow more often or raise the height of cut.
Damaged anti-scalp skid/roller	Replace or repair
Rotary Deck caster stance too wide	Move deck caster towards the centre of the deck

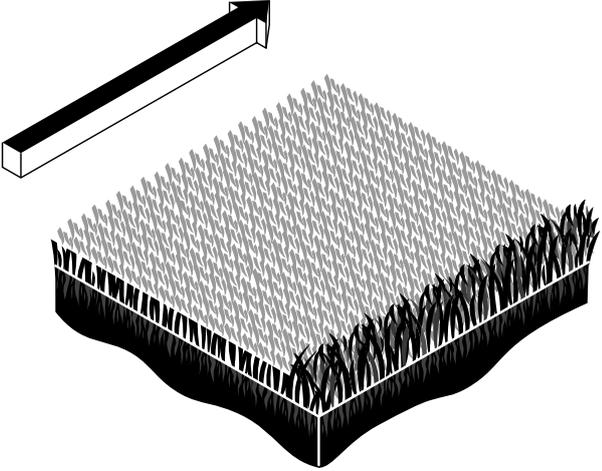
11 QUALITY OF CUT

11.4 STRAGGLERS



Possible Cause	Correction
The cutting blades are blunt.	Replace or sharpen blades.
Cutting Speed too fast for grass conditions.	Decrease the cutting speed.
Too much grass is being removed in one pass.	Mow more often or raise the height of cut.
Grass lain flat in direction of cut.	Change the direction of cut on each cut.

11.5 STREAKS



A streak is a strip of longer grass in the cutting area. The cause is a damaged blade.

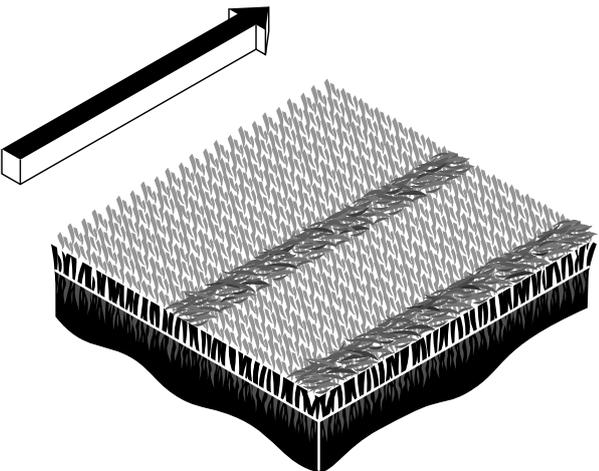
TN0224

NOTE: Arrow indicates direction of travel.

Possible Cause	Correction
Damaged or worn blades.	Replace the blades.
Blades fitted incorrectly.	Install blades correctly.
Low lift blades do not lift the grass sufficiently to be cut.	Try high lift blades.
Front castor wheels flattened grass before it is cut.	On rotary deck, move the castor wheels to the outer edges of the deck and remove anti scalp rollers.
Wet grass is flattened before the cut.	Mow when ground conditions have improved.

11 QUALITY OF CUT

11.6 WINDROWING



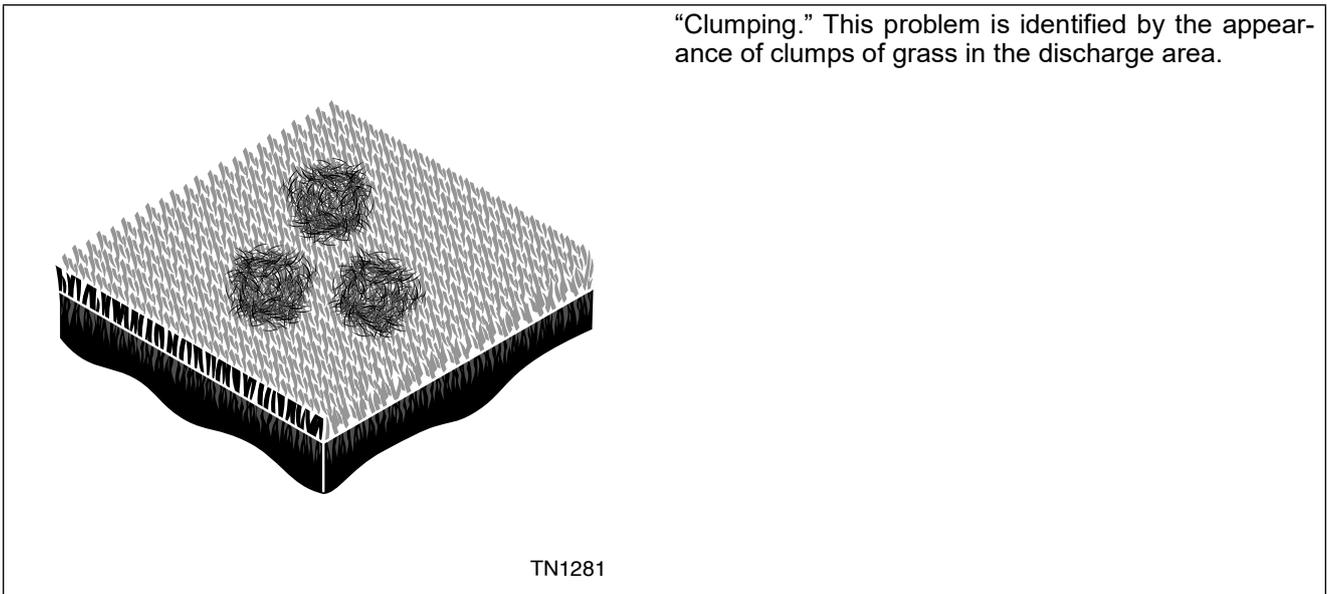
“Windrowing” is an increase of cut grass arranged in rows in the discharge area of the rotary cutting implement, this appears as cut grass in the direction of travel.

TN0225

NOTE: Arrow indicates direction of travel.

Possible Cause	Remedy
The Height of grass is being reduced by too much in one pass.	Mow more often or raise the height of cut. Try high lift blades.
Incorrect blade choice.	Use original Ransomes blades: Low Lift, High Lift or Eliminator blades.
Damaged baffles.	Check for damage, repair/replace.
Mowing while grass is very wet.	Mow when grass conditions improve.

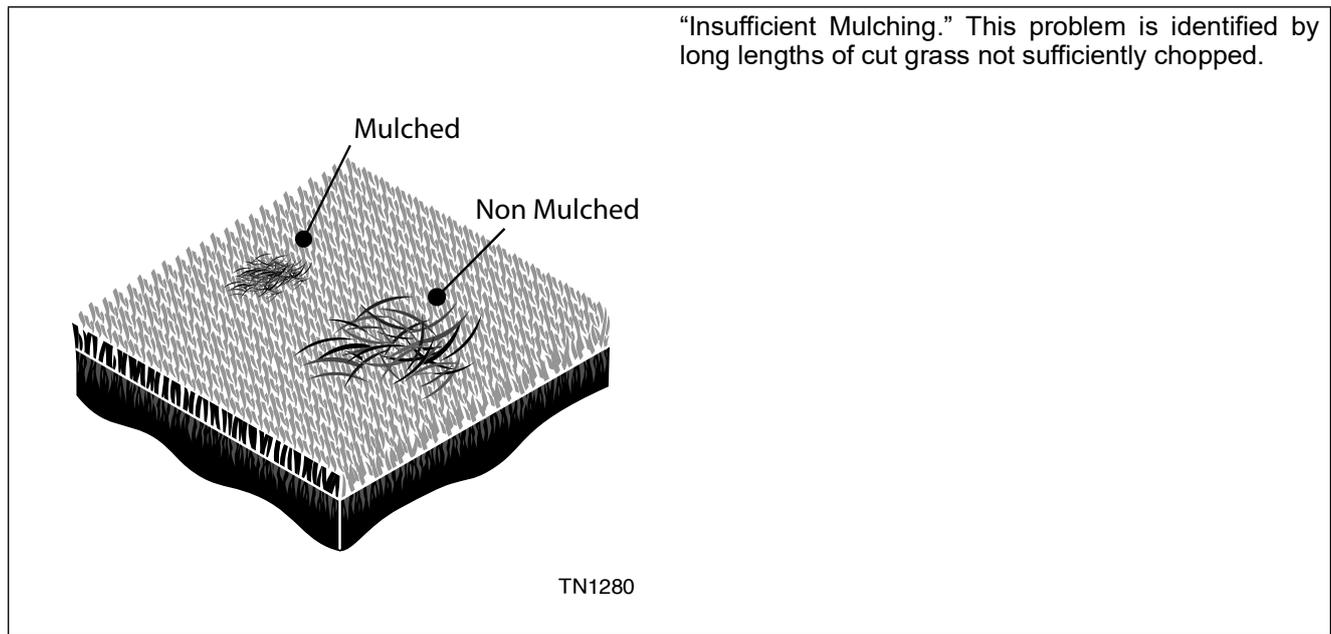
11.7 CLUMPING



Possible Cause	Correction
Front edge of deck bulldozing grass between front castor wheels and anti-scalp rollers.	Move the castor wheels to the outer edges of the deck and remove anti scalp rollers.
Extreme volume of grass is not discharged quickly enough from the deck.	Consider using a cut and clear kit (152cm rotary deck only).
Damaged baffles.	Check for damage, repair/replace.
Mowing while grass is very wet.	Mow when grass conditions improve.
Grass discharge build up on machine dropping off.	Remove grass from machine regularly.

11 QUALITY OF CUT

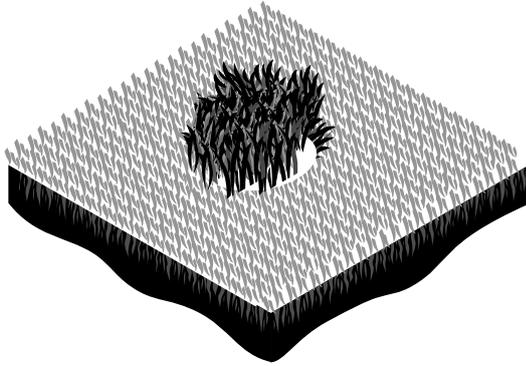
11.8 INSUFFICIENT MULCHING



Possible Cause	Correction
Incorrect blades fitted.	Ensure standard low lift blades are fitted Try Shredder blades.
Cut and clear kit fitted.	Fit standard baffles and blades.
Long lengths of grass are not sufficiently chopped.	Consider dropping the rear height of cut pins 1 hole to flatten the deck.
Cutting at more than the recommended speed.	Decrease the cutting speed.
Too much grass is being removed in one pass.	Mow more often or raise the height of cut.
Level of mulching insufficient.	Install mulching kit.

11.9 TORN CROWNS

“Torn Crowns” This problem is identified when clumps of grass (Crowns) are torn up rather than cut.

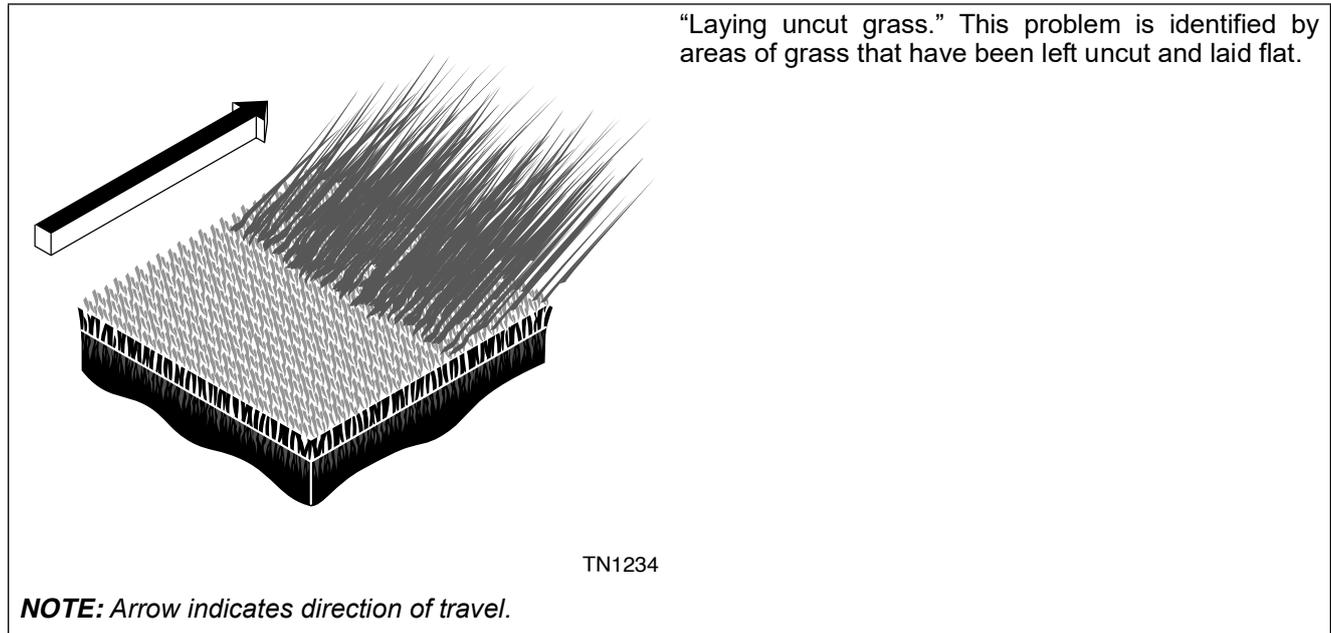


TN1234

Possible Cause	Correction
Too much material.	Cut more frequently, increase HOC.
Worn blade edge.	Sharpen or Replace damaged blades.
Cutting too fast for conditions.	Decrease the cutting speed.

11 QUALITY OF CUT

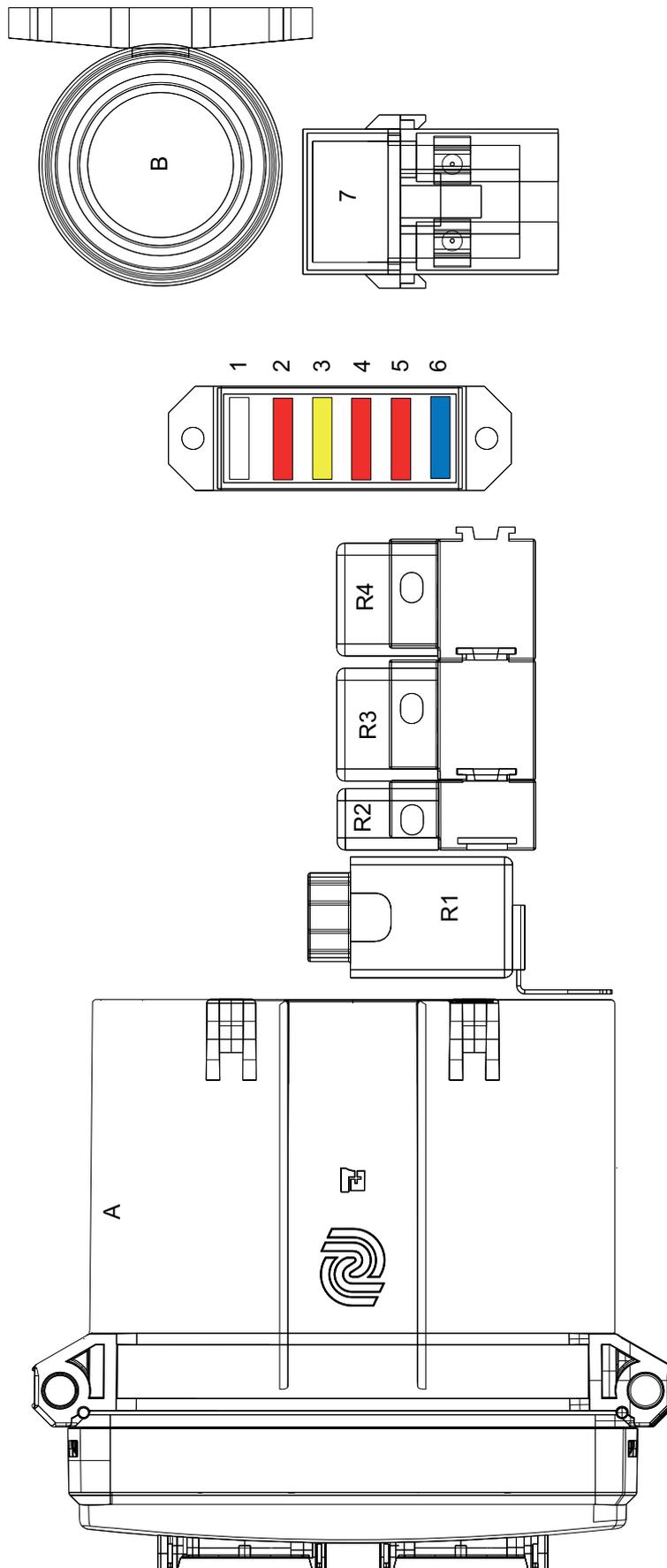
11.10 LAYING UNCUT GRASS



Possible Cause	Correction
Mowing (ground) speed is too fast.	Cut more frequently, increase HOC.
HOC set close to the actual grass height.	Reduce HOC.
Too much material to clear rear of unit, brought round the unit pushing over the grass.	Reduce mowing (ground) speed.
Excessive cut grass wrapped on the front of the cutting blades resulting in blunt blades beating the grass down.	Cut when grass conditions improve. Remove excessive grass build up. Sharpen or replace damaged blades.
Grass always cut in same direction.	Cut grass in opposite direction.

12 SCHEMATICS

12.1 ELECTRICAL FUSES & RELAYS



12.2 FUSE AND RELAY IDENTIFICATION

Fuse Number	Colour	Amps	Function
1			Accessory
2	Red	10	Air Seat
3	Yellow	20	Plus 1 Controller
4	Red	10	PTO Switch
5	Red	10	Accessory Socket
6	Blue	15	Working Lights
7	Orange	40	Glow Plugs (Diesel)

Relay Number	Function
R1	Engine Stop Relay (Diesel)
R2	Starter (Gasoline Only)
R3	Glow Heater (Diesel Only)
R4	Starter (gasoline & Diesel)

Item	Description
A	Plus 1 Controller
B	Audible Alarm

13 TORQUES

13.1 TORQUES

FINE PITCH METRIC THREADS						COARSE PITCH METRIC THREADS						
Dia (mm)	Grade 4.6	Grade 4.8	Grade 8.8	Grade 10.9	Grade 12.9	Dia (mm)	Grade 4.6	Grade 4.8	Grade 8.8	Grade 10.9	Grade 12.9	
	(Nm)	(Nm)	(Nm)	(Nm)	(Nm)		(Nm)	(Nm)	(Nm)	(Nm)	(Nm)	
6	0	0	0	0	0	6	5	6	12	17	21	
8	12	16	32	45	54	8	11	15	30	42	51	
10	24	31	63	88	106	10	22	30	59	84	100	
12	42	57	113	159	191	12	39	52	104	146	175	
14	67	90	179	252	302	14	62	82	165	232	278	
16	103	137	274	385	462	16	96	129	257	362	434	
20	209	279	557	783	940	20	188	251	502	706	847	
22	281	375	750	1055	1266	22	256	341	683	960	1152	
24	354	472	944	1327	1593	24	325	434	868	1220	1464	
27	514	686	1371	1928	2314	27	476	635	1269	1785	2142	
30	715	954	1908	2683	3219	30	646	862	1723	2424	2908	
33	964	1286	2572	3616	4340	33	822	1097	2193	3084	3701	
36	1196	1594	3189	4484	5381	36	1129	1506	3012	4235	5082	

UNF THREADS						UNC THREADS					
Dia (in)	Grade A	Grade S	Grade T	Grade V	Grade X	Dia (in)	Grade A	Grade S	Grade T	Grade V	Grade X
	(lbf. ft)		(lbf. ft)								
1/4	3.8	10.4	11.3	14.3	17.3	1/4	3.4	9.2	9.9	12.6	15.2
5/16	7.7	20.8	22.5	28.5	34.5	5/16	7	18.9	20.4	25.8	31.3
3/8	13.9	37.7	40.7	51.6	62.5	3/8	12.3	33.5	36.1	45.8	55.5
7/16	21.9	59.5	64.2	81.4	98.6	7/16	19.7	53.5	57.8	73.2	88.7
1/2	33.7	91.5	98.7	125	152	1/2	30.1	81.6	88	112	135
9/16	48.2	131	141	179	217	9/16	43.3	117	127	161	195
5/8	67.4	183	197	250	303	5/8	59.8	162	175	222	269
3/4	118	319	344	437	529	3/4	106	288	310	394	477
7/8	188	509	550	697	845	7/8	171	464	500	635	769
1	279	757	817	1036	1255	1	256	695	749	950	1152
1 1/8	405	1099	1186	1504	1823	1 1/8	363	984	1062	1347	1632
1 1/4	563	1529	1650	2093	2535	1 1/4	511	1387	1497	1899	2300
1 3/8	759	2061	2224	2821	3418	1 3/8	670	1820	1963	2490	3017

14.1 GUARANTEE

WARRANTY

Warranty is subject to specific terms and conditions, e.g. wearing parts, unapproved modifications, etc. are not included. For a full set of warranty conditions, contact your local dealer or distributor.

NOTICE

The use of components not provided by the manufacturer under this warranty or maintenance or repair that is improperly or incorrectly performed may void this warranty.

SERVICE

A network of authorised Sales and Service dealers has been established and these details are available from your supplier.

When service attention, or spares, are required for the machine, within or after the warranty period your supplier or any authorised dealer should be contacted. Always quote the registered serial number of the machine. If any damage is apparent when delivery is made, report the details at once to the supplier of the machine.

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