

Take

A SIGNATURE CUT, TRUSTED FOR OVER 100 YEARS

JACOBSEN

SAFETY, OPERATION & MAINTENANCE MANUAL

068021-C010E - TR330, 3WD

068021-C110E - TR330, 3WD

Series DFE / DFH

CAT® - C1.1 Diesel

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 AECE

10028150-B-GB

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 TR330 with Diesel engine is a self propelled Cylinder mower with hydraulic systems to power the traction drive, the cutting unit lift and lower, the cutting unit drives and the 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 Ransomes Jacobsen Limited Genuine spare parts to make sure that European conformity is controlled.

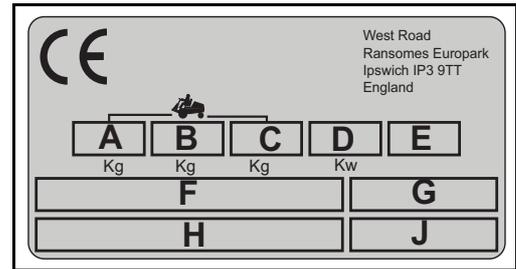
2006/42/EC

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



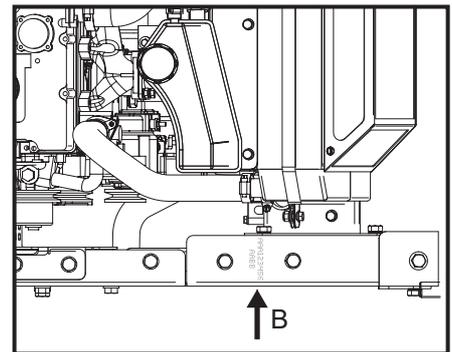
Location of Serial Number Plate

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

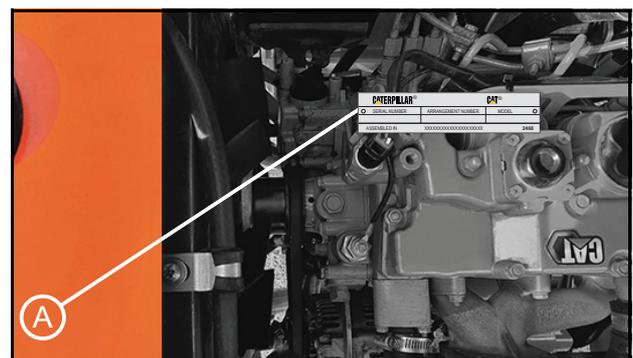
Serial Plate

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

Location of Serial Number Plate

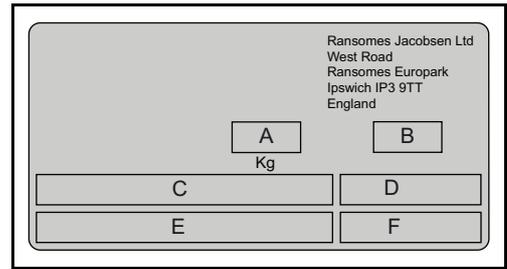
The engine serial number is found on the top of the valve cover toward the front of the mower. The label shows the engine group and serial number.

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



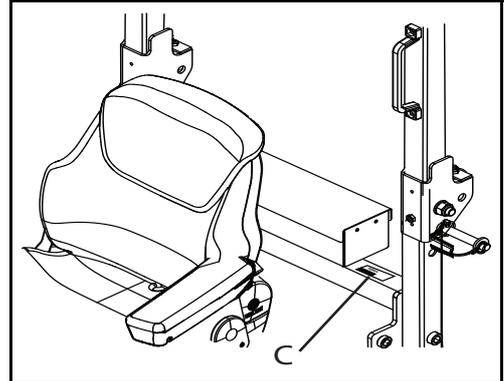
ROPS Serial Plate

- 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. Select the “MANUALS” tab at the top, select a brand, product category and product. You now have access to a 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 Ransomes Jacobsen Limited.

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 and 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.

2 SAFETY

- 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.
- 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

- a. The ROPS 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.
- d. Do not use the seat belt with the ROPS in the folded position.
- e. Inspect the ROPS for damage. Keep hardware fastened.
- f. Do not weld, drill, change or bend the structure. Replace a damaged ROPS. Do not try to correct a damaged ROPS frame.
- g. Do not remove the ROPS from the mower other than for maintenance access. Ensure to refit before use.
- h. Ransomes Jacobsen must approve any changes to the ROPS.

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.

2 SAFETY

- 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.
- 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 Ransomes 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® - C1.1	
Number of cylinders	3
Cylinder arrangement	Vertical inline
Cycle	4 stroke
Induction system	Naturally aspirated
Combustion system	Indirect injection
Bore & Stroke	77 mm (3.03 in) - 81 mm (3.19 in)
Displacement	1,131 Litres (69.0 in ³)
Compression ratio	22.1:1
Gross Intermittent Power	18.4kW (24.7hp) @ 2800rpm
Maximum Speed:	2950 ± 50 RPM (No load)
Idle Speed:	2175 ± 100 RPM
Firing Order	1-2-3
Governing at rated rpm	8% ± 2
Rotation	Clockwise (viewed from front)
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Injection Pressure	13.73 MPa (140kgf/cm ²)
Injection Timing (Before T.D.C.)	21° 20°
Compression Ratio	23:1
Fuel:	No. 2-D Diesel fuel (ASTM D975)
Lubrication (API Classification)	Above CF grade
Oil Sump Capacity:	Maximum: 4.4 Litres / 7.7 pints - Minimum: 3.4 Litres / 6 pints
Dimensions (length x width x height)	491mm (19.33 in) x 400mm (15.75 in) x 576mm (22.67 in)
Dry Weight	87, 0 kg (191.0 lb)
Starting System	Cell starter (with glow plug)
Standard Starting Motor cold start limit	-20°C - (-4°F)

Note: Specifications are subject to change without notice.

3.2 DIMENSIONS & WEIGHTS

A	Width Of Cut	178 cm	70.1 In.
B	Overall Width	246 cm	83.07 In.
C	Maximum Width Transport With Floating Head At 25 mm Height Of Cut	233 cm	87.4 In
D	Maximum Height With ROPS Frame Up	206 cm	81.1 In.
E	Total Length	246 cm	96.85 In
F	Wheel Base	136 cm	53.54 In.
G	Wheel Track Front	123 cm	48.42 In.
H	Ground Clearance: With Floating Head At 25 mm Height Of Cut	59 mm	2.32 In.
	Turning Circle	213 cm	83.86 In.
	Weight Of Machine With ROPS, No Cutting Units And Fuel Tank Empty	1035 kg.	2281.78 lb.
	Maximum Front Axle Loading	776 kg.	1710.8 lb.
	Maximum Rear Axle Loading	259 kg.	571 lb.
	Weight of one 26 inch 5 Knife Cutting Unit 673953 / 54 / 55	67kg.	147 lb.
	Weight of one 26 inch 7 Knife Cutting Unit 671604 / 05 / 06	85 kg.	187 lb.
	Weight of one 26 inch 11 Knife Cutting Unit 673956 / 57 / 58	105 kg.	231 lb.
	Weight of one 26 inch 7 Knife Cutting Unit 068093 / 94 / 95	69 kg.	152 lb.
	Weight Of 28.7 Litres (7.58 US Gallons) (6.3 Imp Gallons) Of Diesel Fuel	20.4 kg.	45.0 lb.

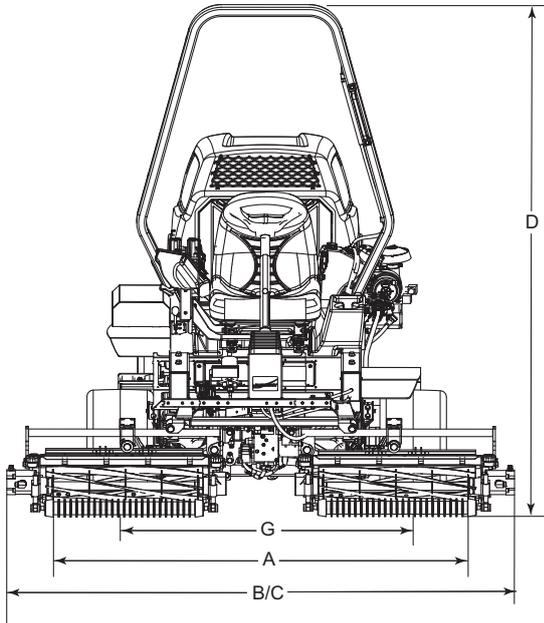
Note: Specifications are subject to change without notice

3.3 TYRE PRESSURES

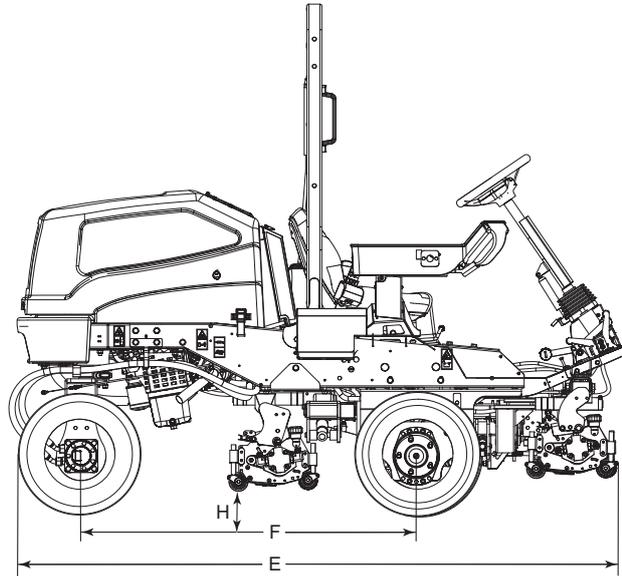
Tyre Pressure						
Product	Front Wheel			Rear Wheel		
	Tyre Size	Tyre Type	Tyre Pressure	Tyre Size	Tyre Type	Tyre Pressure
3WD, Treaded Tire Option	20 x 12.00 - 10	Grassmaster 4pr	Minimum 0.7 bar (10 psi) Maximum 1.37 bar (20 psi)	20 x 10.00 - 10	Grassmaster 4pr	Minimum 0.7 bar (10 psi) Maximum 1.37 bar (20 psi)
3WD, Smooth Tire Option	20x 12.00 - 10	Smooth 4pr	Minimum 0.7 bar (10 psi) Maximum 1.37 bar (20 psi)	20 x 10.00 - 10	Smooth 4pr	Minimum 0.7 bar (10 psi) Maximum 1.37 bar (20 psi)

3 SPECIFICATIONS

3WD Option Cutting Units Lowered
Front View.



3WD Option Cutting Units Raised
Position Right Side View.



3.4 MACHINE SPECIFICATION

Frame construction: Heavy duty steel chassis with box section frame rails.

Cutter Deck Drive: TR330, Three individual hydraulic motors.

Transmission: 3WD Transmission: Hydrostatic closed loop parallel cross system. Variable displacement piston pump. Front high torque fixed displacement piston wheel motors. Full time auto 3WD forward and reverse.

Speeds:

Cutting: 0 - 9.5 km/h (0 - 5.9 mph) Forward.

Transport: 0 - 14 km/h (0 - 8.7 mph) Forward.

0 - 6 km/h (0 - 3.7 mph) Reverse.

Steering: Hydrostatic powered steering.

Ground pressure: Dependant upon the tyre pressures and the accessories installed.

Brakes: Hydrostatic braking with wet disc parking brakes on the front wheels.

Battery: Yuasa battery P/N 4322478 - ybx306312v45ah440A (en).

Mower Lift/Lower: Hydraulic Double Acting Cylinders.

Hydraulic Tank Capacity: 28.4 Litres (6.2 Imp Gallons/7.5 U.S Gallons).

3 SPECIFICATIONS

3.5 VIBRATION

The machine was tested for hand and 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. No drive was engaged.

The Machinery Safety Directive 2006/42/EC

By compliance to:

The Lawnmower Standard BS EN ISO5395-3:2013

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)

Hand / Arm Acceleration Level	TR330
	Maximum of RH and LH Accelerations m/s ²
	0.355 ± 0.40

Whole-body vibration measurement was carried out with the machine traveling in a straight line at a speed close to 6 km/h on a flat horizontal level surface. The height of cut was set at the lowest position and the cutting means engaged.

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)

Whole Body Acceleration Level	TR330
	Maximum Weighted Acceleration m/s ²
	0.678 ± 1.57

3.6 NOISE

When the machine was tested for sound pressure (Operator Ear).

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

Measured Sound Pressure 86.8 dB(A) ± 40

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 3744:2010

Measured Sound Power 100.46 dB(A) ± 1.243

3.7 SLOPES

DO NOT USE ON SLOPES GREATER THAN 15°. The 15° slope was calculated using static stability measurements according to the requirements of BS EN ISO 5395-2013



WARNING

DO NOT USE ON SLOPES OF MORE THAN 15°.

The slope was calculated according to the requirements of BS EN ISO 5395:2013

3 SPECIFICATIONS

3.8 CUTTING UNIT SPECIFICATION

	67353/ 54 / 55	671604 / 05 / 06	673956 / 57 / 58
Construction	Heavy duty welded pressed steel		
Reel Length	660 mm (26 in)		
Number of Knives	5	7	11
Reel Diameter (New)	165 mm (6.5 in)		
Minimum Reel Diameter (Before Replacement)	149 mm (5.875 in)		
Cylinder to Bottom Blade Adjustment	Self locking notched hand micro adjusters. Each notch giving 0.04mm (0.0015in) of movement.		
Height of Cut	12 - 47 mm (0.47 - 1.85 in)		
Rear Roll	Full width 75 mm (3in) diameter plain roll running on taper roller bearings with shaft seals and lubricators.		
Front Roll	Full width 75 mm (3in) diameter steel grooved roll running on taper roller bearings with shaft seals and lubricators. or Full width 75mm (3in) diameter plain steel roll running on taper roller bearings with shaft seals and lubricators.		
Height of Cut Adjustment Front	Threaded roll carriage & locknuts.		
Height of Cut Adjustment Rear	Coarse adjustment: Three position housing mounting. Fine adjustment: Threaded roll carriage & locknuts		
Transmission	By hydraulic motor through cardan shaft to cutting cylinder.		
Maximum Reel Speed at Maximum Engine rpm	1240rpm		

	068093/ 94 / 97
Construction	Heavy duty welded pressed steel
Reel Length	660 mm (26 in)
Number of Knives	7
Reel Diameter (New)	178 mm (7 in)
Minimum Reel Diameter (Before Replacement)	159 mm (6.25 in)
Height of Cut	9.5 -69.8 mm (0.37 in - 2.75 in) (3/8" - 2 3/4")
Rear Roll	Full width 63.5 mm (2.5 in) diameter plain Steel roll running on taper roller bearings with shaft seals and lubricators.
Front Roll	Full width 75 mm (3in) diameter steel or nylon grooved roll running on taper roller bearings with shaft seals and lubricators. or Full width 75mm (3in) diameter plain steel roll running on taper roller bearings with shaft seals and lubricators.
Height of Cut Adjustment	Threaded roll carriage & locknuts.
Transmission	By hydraulic motor through coupling to cutting cylinder.
Maximum Reel Speed at Maximum Engine rpm	1240rpm

Note: Specifications are subject to change without notice.

3.9 CUTTING PERFORMANCE

UK Cutting Units.

39 cuts per metre at 9.5 km/hr with 5 knife cylinders.
55 cuts per metre at 9.5 km/hr with 7 knife cylinders.
86 cuts per metre at 9.5 km/hr with 11 knife cylinders.

1.58 hectares/hr.at 9.5 km/hr. (3.9 acres/hr at 6 mph)

10% allowance is included for normal overlaps and turning at the end of each cut.

U.S Cutting Units.

39 cuts per metre at 9.5 km/hr with 5 knife cylinders.
55 cuts per metre at 9.5 km/hr with 7 knife cylinders.
86 cuts per metre at 9.5 km/hr with 11 knife cylinders.

1.78 hectares/hr.at 9.5 km/hr. (4.4 acres/hr at 6 mph)

10% allowance is included for normal overlaps and turning at the end of each cut.

3.10 RECOMMENDED LUBRICANTS

Grease:

Shell Darina R2 lithium grease or equivalent.

12.1 ACCESSORIES

Mower Options (USA Units).

068093 - LH Front 0.66 m (26") x 7-Blade Reel.

068094 - RH Front 0.66 m (26") x 7-Blade Reel.

068097 - Centre 0.66 m (26") x 7-Blade Reel.

067731 - (Set of 3) 66 cm (26") Grooved Steel Front Rollers.

069147 - (Set of 3) 66 cm (26") Grooved Front Roller Scrapers.

067909 - 66 cm (26") Rear Roller Scraper (3) Required.

674415 - US 66 CM 26" Attachment Kit (Required Accessory for US 26" Units).

Mower Options (UK Units).

63953 5 Knife Floating Head Unit Less Front Rollers, Left.

673954 5 Knife Floating Head Units Less Front Rollers, Right.

673955 5 Knife Floating Head Units Less Front Rollers, Centre.

671604 7 Knife Floating Head Unit Less Front Rollers, Left.

671605 7 Knife Floating Head Units Less Front Rollers, Right.

671606 7 Knife Floating Head Units Less Front Rollers, Centre.

673956 11 Knife Floating Head Unit Less Front Rollers, Left.

673957 11 Knife Floating Head Units Less Front Rollers, Right.

673958 11 Knife Floating Head Units Less Front Rollers, Centre.

JMAB422 0.66 m (26") Grooved Front Roller & Scraper (For Floating Head Units) (3 Required).

JMAB423 0.66 m (26") Smooth Front Roller & Scraper (For Floating Head Units) (3 Required).

Accessories.

672858 - Weight Transfer Kit.

4395006 - Back Lap Kit.

4392007 - Mow Mode.

4400013 - LED Work Light Kit.

068127 - Adjustable Canopy / Sunshade Kit.

669644 - Ball Guard.

4399787 - Inclinator.

LMAC629 - Foot Rest.

4184540 - Bat (for clearing blockages).

4185600 - Reel to bedknife setting paper.

4 DECALS

4.1 SAFETY LABELS



A



B



C



D



E



F



G



H



J



K



L

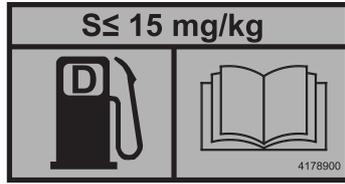
- A. 009034920 Caution, Stay Away From Hot Surfaces.
- B. 009034880 Caution, Fan Blade, Do Not Open Or Remove The Safety Shields While The Engine Is In Operation.
- C. 009034900 Caution, Drive Belt, Do Not Remove The Safety Shields While The Engine Is In Operation.
- D. 009114340 Caution, Diesel Fuel.
- E. 009114100 Caution, Battery.
- F. 009114160 Slope Angle.
- G. 009034960 Caution, Rotating Blades.
- H. 009114380 Caution, Fasten Seat Belt.
- J 4153197 Caution, Stop The Engine And Remove The Starter Key Before You Pressure Wash The machine.
- K. 4164860 Caution, Hydraulic Oil.
- L. 4181865 Decal, Warning.

4 DECALS

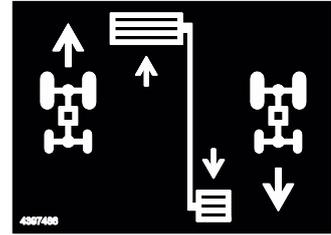
4.2 SAFETY LABELS



A



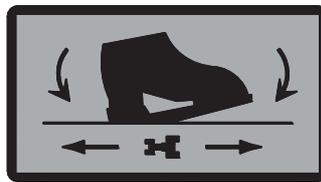
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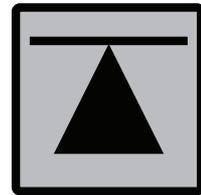
C



D



E



F



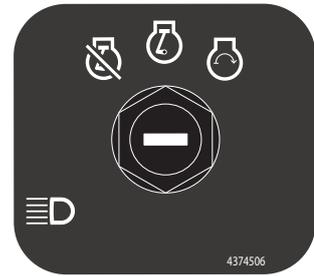
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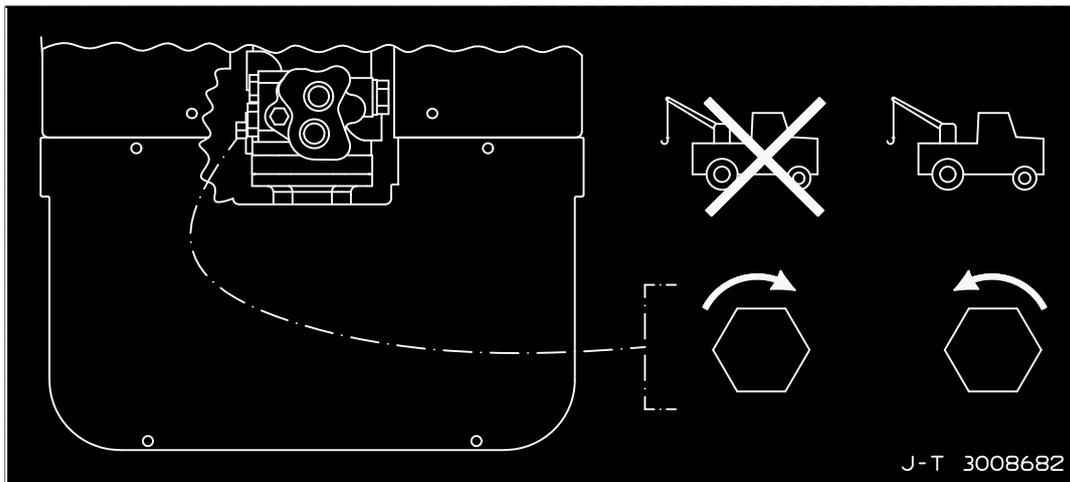
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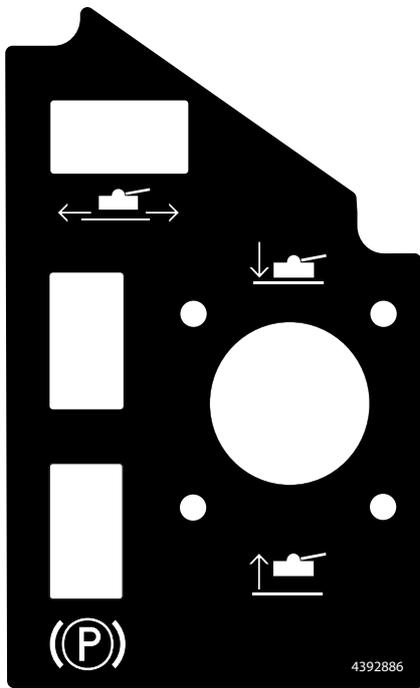
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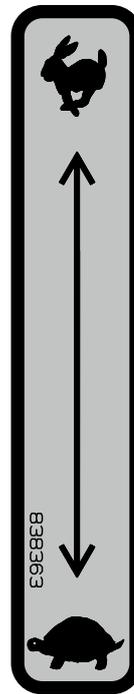
K



L



M



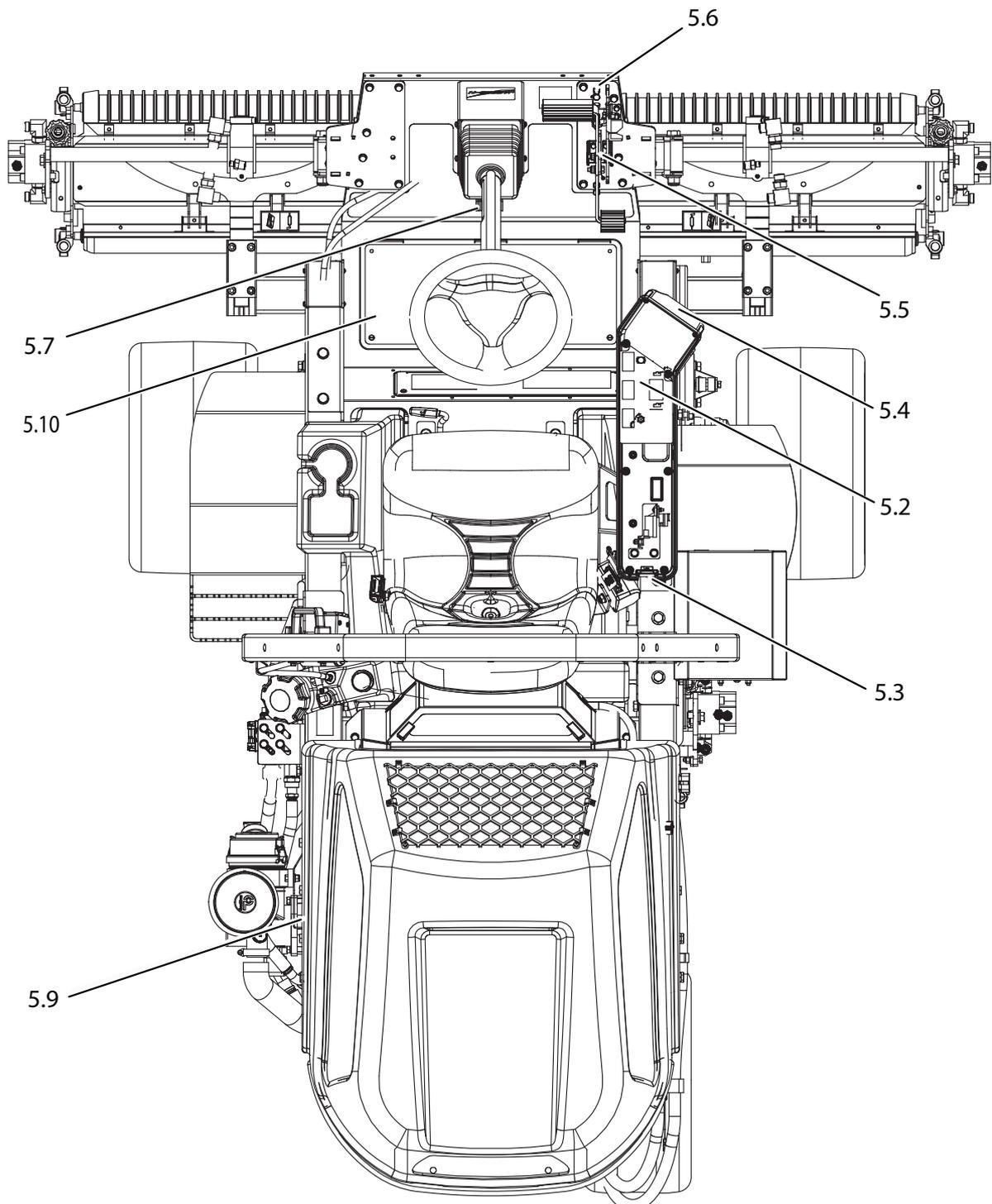
N

Description

A.	009034770	Guaranteed Sound Power Level.
B.	4178900	Diesel Fuel.
C.	4397486	Traction.
D.	673581	Tyre Pressure.
E.	4164861	Forward / Reverse Traction Pedal.
F.	4397046	Jacking Point.
G.	4164580	Lubrication Point.
H.	4286422	Hydraulic Fluid.
J.	4111408	Biofluid.
K.	4374506	Keyswitch and Light.
L.	3008682	Tow Valve.
M.	4392886	Control Panel.
N.	838363.	Throttle Lever.

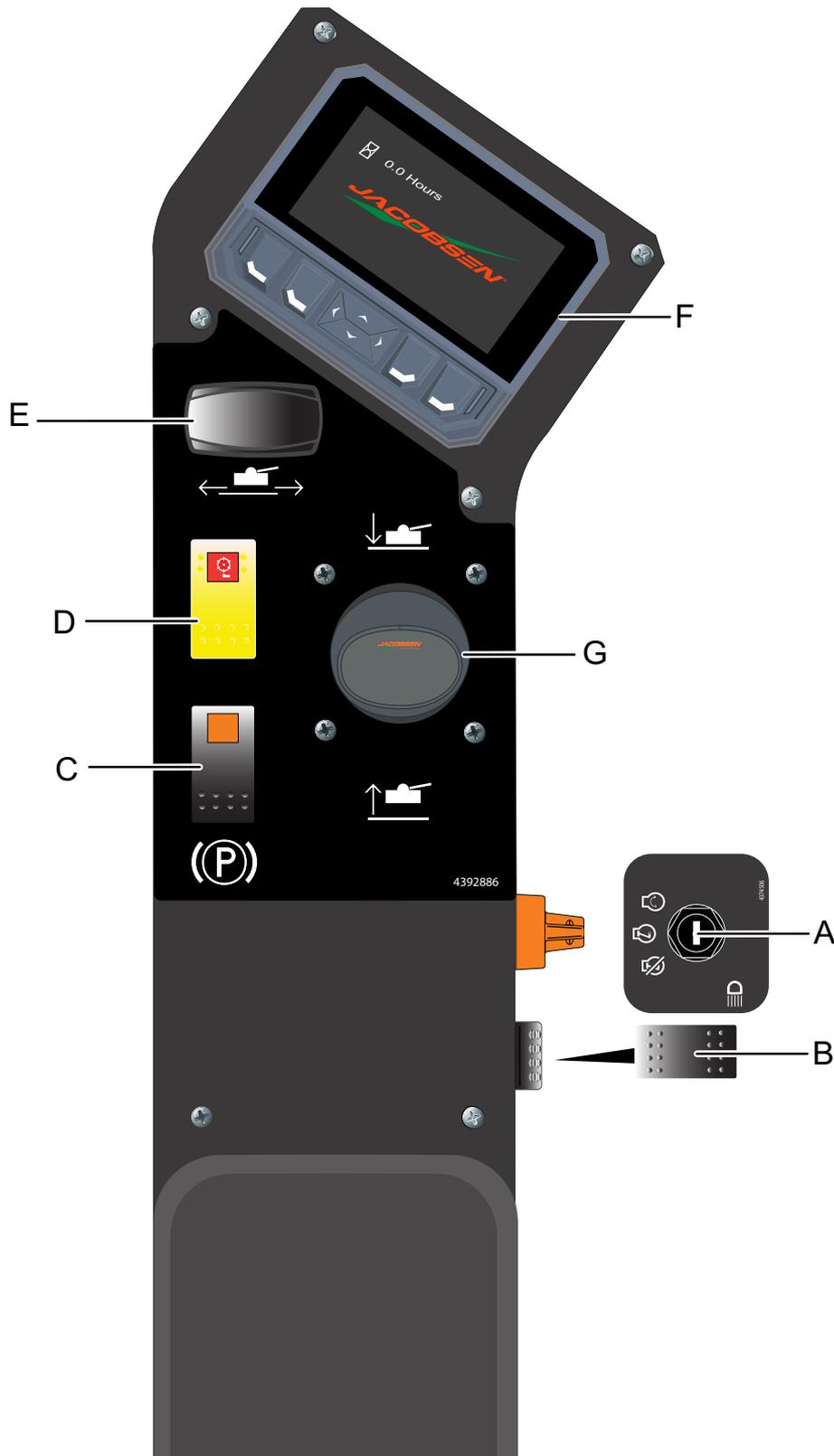
5 CONTROLS

5.1 OPERATION WORKSTATION



- 5.3 - Control Panel
- 5.4 - Throttle Control
- 5.5 - Armrest Adjuster
- 5.6 - Traction Pedal
- 5.7 - Mow Speed Lever
- 5.8 - Steering Tilt Lever
- 5.9 - Tow Valve
- 5.10 - Brake Valve (Under Floorboard)

5.2 CONTROL PANEL



- | | | | |
|----|-------------------------|----|---------------------|
| A. | Key Switch | E. | Side Shift Switch |
| B. | Light Switch (Optional) | F. | Visual Display |
| C. | Parking Brake Switch | G. | Lift/Lower Joystick |
| D. | Mow Switch | | |

5 CONTROLS

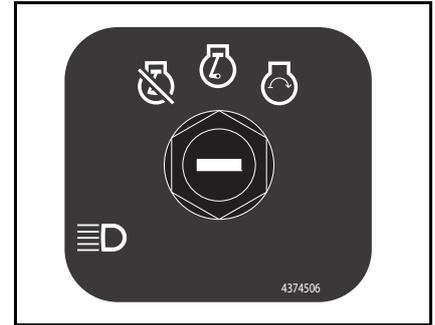
5.3 CONTROL PANEL

5.3.A KEY SWITCH

Turn the starter key to the “Start Position” to crank the engine. Let go of the key when the engine is running and the key will return to the “Run Position”.

Note: The glow plugs operate automatically. The engine will not run from cold until the glow plugs reach their operating temperature.

Turn the starter key to the “Off Position” to turn the engine off.

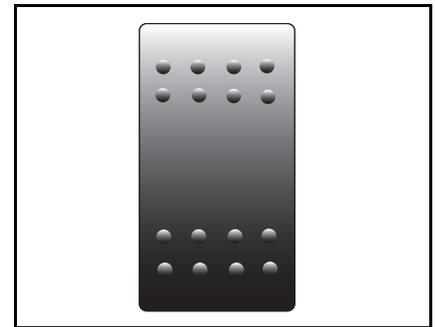


5.3.B LIGHT SWITCH (OPTIONAL)

Turns the work lights “On” and “Off”.

Push the top of the switch to turn the lights ON.

Push the bottom of the switch to turn the lights OFF.



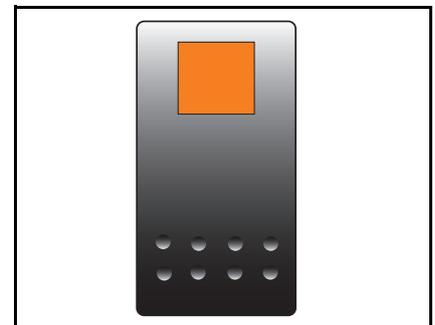
5.3.C PARKING BRAKE SWITCH

Move the orange button to the rear (Towards the Operator) and press the switch to engage the parking brake.

When the engine is stopped, the parking brake engages.

To release the parking brake, press the opposite end of the switch.

DO NOT apply the brake while the machine is being driven.



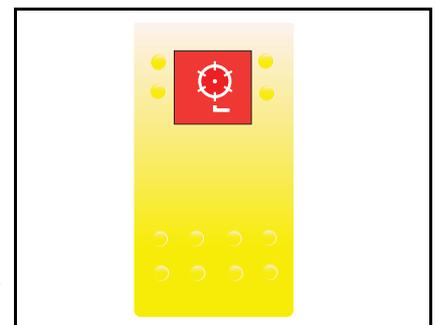
5.3.D MOW SWITCH

The mow switch engages the cutter rotation.

To cut grass, push the front of the “Mow Switch” (Red Lens End) and move the joystick forward to lower the cutting means. When engaged the Red lens will illuminate.

To stop drive to the cutting means, push the bottom of the rocker switch (Opposite end to the Red Lens).

Note: When the cutting means is raised above 400mm from the ground or when the operator leaves the seat, blade rotation is stopped.



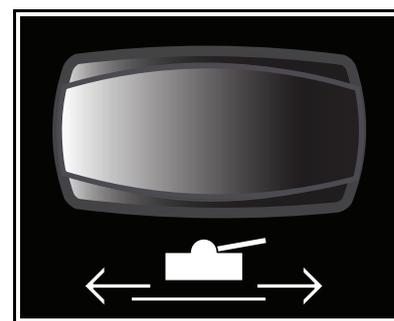
5.3.E SIDE SHIFT SWITCH

The side shift switch shifts the all cutting units to either the left or right.

Push the lever to the left to shift the front cutting units to the left.

Push the lever to the right to shift the front cutting units to the right.

Note: The cutting units MUST be raised into the “Cross Cut” position before using this function.



5.3.F LIFT LOWER JOYSTICK

The lift/lower joystick controls the cutting units lift and lower. The lift/lower joystick operates in One-Touch or manual mode. Push the lift/lower joystick to lower the cutting units or pull the lift/lower joystick to lift the cutting units.

The One-Touch or manual mode is set on the display.

Manual Mode – When One-Touch is disabled, the cutting units will lift or lower only while the lift / lower joystick is either pulled or pushed.

One-Touch Mode – With One-Touch mode enabled and the Mow Switch on, push and release the lift / lower joystick to lower the cutting units to the ground and start the cutting unit reels.



5.3.G VISUAL DISPLAY UNIT

The visual display is activated when the key switch is turned to the ‘Run’ position

5.4 STARTUP SCREEN

When the key switch is turned to the ‘Run’ position, this screen is shown.

The hour meter will show total hours of engine operation.



5 CONTROLS

5.4.1 ENGINE START

After the initial start-up screen, the warning screen is displayed for three seconds. If there is no input required, the main screen will become visible.

If a fault condition has occurred during the previous start, a pop up screen will become visible over the top of the warning screen. The operator must confirm the fault before they can move to the first screen.



5.4.2 THE ENGINE WILL NOT START

This screen shows the position of the interlock switches.

The engine temperature gauge is on the right side of the display. The colour changes from green to red as the temperature increases.



ICONS

- | | | | |
|---|--|----|--|
| 1 | | 10 | |
| 2 | | 11 | |
| 3 | | 12 | |
| 4 | | 13 | |
| 5 | | 14 | |
| 6 | | 15 | |
| 7 | | 16 | |
| 8 | | 17 | |
| 9 | | | |

1.	Parking Brake Engaged
2.	TST Active
3.	TST Not Active
4.	Cutter Indicator (Flashes if not in off position on start up)
5.	Foot Pedal Warning (Flashes if not in neutral position on start up)
6.	Seat Warning (Flashes if not occupied or disconnected on start up)
7.	Cutting Unit Position Indicator
8.	Engine Temperature Indicator (Below bar graph)
9.	Glow Plug
10.	Time
11.	Engine Able To Start
12.	Engine Unable To Start
13.	Back
14.	Home
15.	Red Select
16.	Green Select
17.	Menu Option Indicator

5.4.3 ENGINE START

When the key switch is turned to the start' position and the interlocks are set, this screen is shown.

To start the engine, the parking brake must be applied, the mow switch must be in the off position and the foot pedal must be in the neutral position. When the glow plug timer ends, the engine will start.

The two LED lamps will flash green if the all of the above conditions have been met.



5.4.4 THE ENGINE WILL NOT START

When the ignition key is turned to the start position and the interlocks are not set, this screen is shown.

- The parking brake is not applied.
- Mow switch is not in the OFF position.
- The foot pedal is not in the neutral position.

The engine will not start until all the items in the list are correct.

The two LED lamps will flash red until the above conditions have been corrected.



5.4.5 MAIN MENU

When the first screen is shown on the display, press the left or right arrow keys to access the main menu.



5 CONTROLS

5.4.6 MAIN NAVIGATION

When the first screen is shown on the display, press the left or right arrow keys to access the main menu.

Use the up and down arrow keys to move the selection arrow up and down the list.

Press the select button ✓ to select the menu option indicated by the green arrow.

Press the back button ↶ to return to the previous screen.

Press the home button 🏠 to return to the previous screen.

The main menu has backlap, language, clock, vehicle settings (requires pin) and service.



5.4.7 LANGUAGE

Turn the key switch to the “Run” position.

Press the left or right arrow key to display the main menu.

Use the up or down arrow keys until the green arrow is next to Language. Press the select button ✓ to select Language.

The green arrow is moved with the up or down arrow keys until the green arrow is next to the preferred language.

The ✓ button accepts the option that has the green arrow beside it.

Press the select button ✓ to set.

Press the button ↶ to return to previous menu.



5.4.8 CLOCK

Turn the key switch to the “Run” position.

Press the left  or right  arrow key to display the main menu.

Use the up  or down  arrow keys until the green arrow is next to clock. Press the select button  to select clock.

The  is moved with the up  or down  arrow keys to select, date, time or date format.

The  button accepts the option that has the  beside it.

Use the up  or down  arrow keys to increase or decrease the value.

Use the left  or right  arrow keys to move between fields.

Press the select button,  to set.

Press the button  to return to previous menu.



5.4.9 DISPLAY SETTINGS

Turn the key switch to the “Run” position.

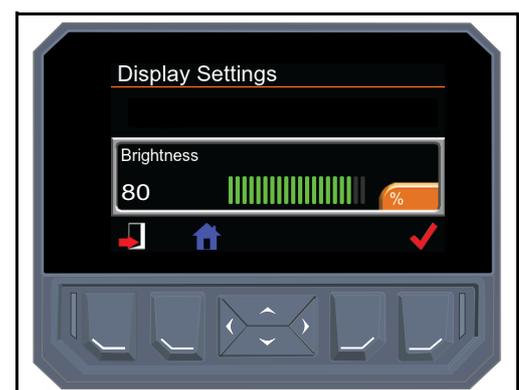
Press the left  or right  arrow key to display the main menu.

Use the up  or down  arrow keys until the green arrow is next to display settings. Press the select button  to select display settings.

Use the up  or down  arrow keys to toggle the brightness.

Press the select button,  to set.

Press the button,  to return to previous menu.



5 CONTROLS

5.4.10 VEHICLE SETTINGS

Turn the key switch to the “Run” position.

Use the up  or down  arrow keys until the green arrow is next to vehicle status. Press the select button  to select vehicle status.



The vehicle settings menu has the measurement units and pin options available.



5.4.11 MEASUREMENT SETTINGS MENU

Turn the key switch to the “Run” position.

Use the up  or down  arrow keys until the green arrow  is next to measurement units.

Press the select button  to select vehicle status.

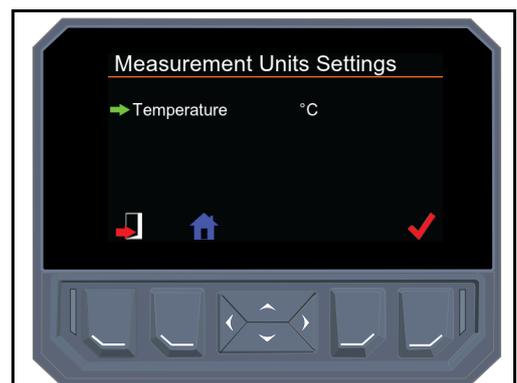
Press the button  to return to previous menu.



Use the arrow keys to change the unit of measure, only the temperature setting can be changed to either Celsius or Fahrenheit.

Press the select button  to accept the new values.

Press the button  to return to previous menu.



5.4.12 ENTER PIN

Turn the key switch to the “Run” position, navigate to the vehicle settings menu.

Use the up  and down  arrow keys until the green arrow is next to pin.



Use the arrow keys to highlight the correct number. Press the select button  to enter the number and to advance to the next position. Repeat until all four numbers of the pin have been entered.

Highlight the “C” and press the select button  to clear the previous number.

The initial pin number is 1001.



If the correct pin number has been entered the pin menu will be displayed.

Press the button  to return to vehicle settings menu.

NOTE: Managers are advised to change the pin number to stop the machine parameters being changed.



5 CONTROLS

5.4.13 ONE TOUCH

Turn the key switch to the run position, navigate to the pin menu.

Use the up  or down  arrow keys until the green arrow  is next to one touch. Press the select button  to select one touch.

Use the up  and down  arrow keys until the green arrow  is next to Enable or Disable. Press the select button  to accept.



Disable - The cutting units lift or lower only while the lift/lower joystick is pulled or pushed.

Enable - The lift/lower joystick is pressed and released to lift or lower the cutting units.

Press the back button  to return to previous menu.



5.4.14 CHANGE PIN

Turn the key switch to the "Run" position, navigate to the pin menu.

Use the up  and down  arrow keys until the green arrow  is next to the Change Pin.



Use the arrow keys to highlight the new correct number.

Press the select button  to enter the number and to advance to the next position. Repeat until all four numbers of the pin have been entered.

Press the select button  to accept.

Press the button  to return to Pin Menu.



5.4.15 SET DEFAULT PARAMETERS

Turn the key switch to the “Run” position, navigate to the pin menu.

Use the up  and down  arrow keys until the green arrow  is next to set default parameters. Press the select button  to select set default parameters.

Press and hold the select button  for five seconds to reset the mower to default parameters.

Press the back button  to return to previous menu



5 CONTROLS

5.4.16 RESET SERVICE HOURS

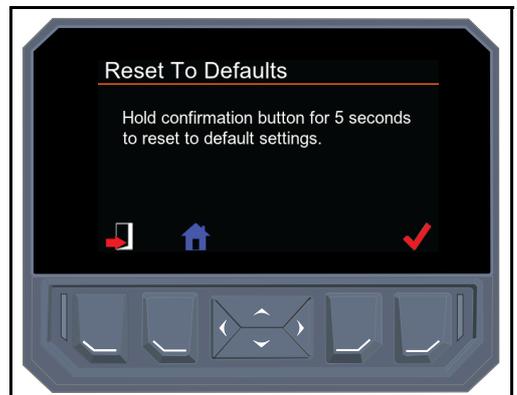
Turn the key switch to the “Run” position, navigate to the pin menu.

Use the up  or down  arrow keys until the green arrow  is next to reset service hours. Press the select button  to select reset service hours.



Press and hold the select button  for five seconds to reset current service hours.

Press the back button  to return to previous menu.



5.4.17 SERVICE MENU

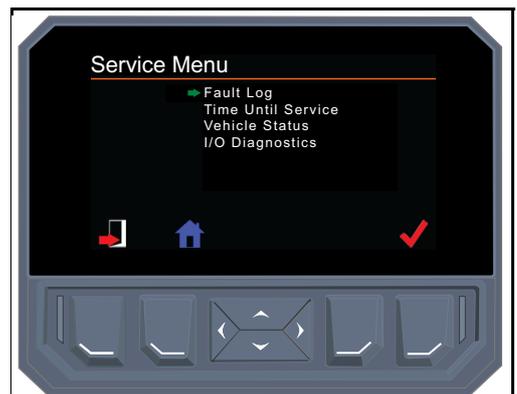
Turn the key switch to the “Run” position.

Press the left  or right  arrow key to display the main menu.

Use the up  or down  arrow keys until the green arrow  is next to Language. Press the select button  to select service.

The service menu has the fault log, time until service, vehicle status and I/O diagnostics (input/output diagnostics).

Press the back button  to return to the previous screen.



5.4.18 FAULT LOG

Turn the key switch to the “Run” position, navigate to the service menu.

Use the up  or down  arrow keys until the green arrow is next to fault log. Press the select button  to select fault log.

The last 50 faults that the controller finds are recorded. When 50 faults are recorded, the fault that next occurs will write over the oldest fault.

The engine, records the engine shut downs because of overheating or loss of oil pressure.

The service, records missed service.

Press the button  to select, press the up  and down  arrow keys to move the green arrow the faults will move with the last error to the top of the screen.

Select the fault log to be accessed  to accept then  to show the details.

These details show the date and time of the fault.

Press the button  to return to previous menu.



5 CONTROLS

5.4.19 TIME UNTIL SERVICE

Turn the key switch to the “Run” position, navigate to the service menu.

Use the up  or down  arrow keys until the green arrow  is next to fault log. Press the select button  to select time until service.

Press the button  to return to previous menu.



5.4.20 VEHICLE STATUS

Turn the key switch to the “Run” position., navigate to the service menu.

Use the up  or down  arrow keys until the green arrow  is next to Vehicle Status. Press the select button  to select vehicle status.



The first screen of the vehicle status shows the battery voltage and the engine coolant temperature.

Press the button  to return to previous menu.



The second screen of the vehicle status shows the software revision of the MCU controller and display.

Press the button  to return to previous menu.



5 CONTROLS

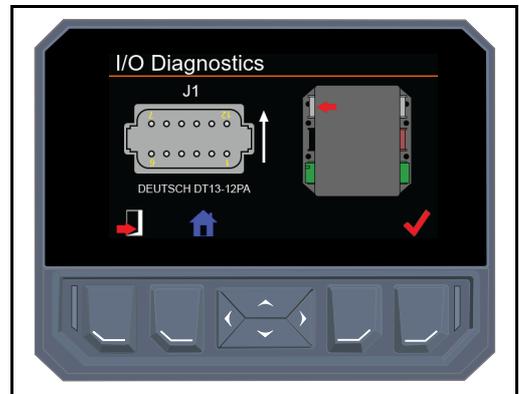
5.4.21 INPUT/OUTPUT DIAGNOSTICS (I/O DIAGNOSTICS)

Turn the key switch to the “Run” position, navigate to the service menu.

Use the up  or down  arrow keys until the green arrow is next to I/O Diagnostics. Press the select button  to select I/O Diagnostics.



Use the up  or down  arrow keys until the red arrow is next to the connector. Press the select button  to select the required connector.



5.4.22 CONNECTOR J1

Turn the key switch to the “Run” position, navigate to the service menu.

Information shown for illustration purposes only.

Press the button  to return to I/O Diagnostic Menu.



5.4.23 CONNECTOR J2

Turn the key switch to the “Run” position, navigate to the service menu.

Information shown for illustration purposes only.

Press the button  to return to I/O Diagnostic Menu.



5.4.24 CONNECTOR J3

Turn the key switch to the “Run” position, navigate to the service menu.

Information shown for illustration purposes only.

Press the button  to return to I/O Diagnostic Menu.



5.4.25 CONNECTOR J4

Turn the key switch to the “Run” position, navigate to the service menu.

Information shown for illustration purposes only.

Press the button  to return to I/O Diagnostic Menu.



5 CONTROLS

5.4.26 CONNECTOR J5

Turn the key switch to the “Run” position, navigate to the Service Menu.

Information shown for illustration purposes only.

Press the button  to return to I/O Diagnostic Menu.



5.4.27 CONNECTOR J6

Turn the key switch to the “Run” position, navigate to the Service Menu.

Information shown for illustration purposes only.

Press the button  to return to I/O Diagnostic Menu.



5.4.28 BACKLAP

See section 7.15



5.4.29 WARNINGS

NOTICE

The number in the top right of the screen indicates the total number of current faults recorded. If more than one fault, it will cycle all current faults.

5.4.30 WARNING - OIL PRESSURE FAULT

When this screen is shown, the engine oil pressure has decreased below the normal level. If this happens during operation, Stop the engine and check the oil level. Top up if necessary. If the problem persists consult your service dealer.

Press the select button  to confirm the fault.



5.4.31 WARNING CLEAR RADIATOR SCREENS

When this screen is shown, the engine temperature has risen above normal levels.

Park the machine in a safe area disengage the cutting units, set engine to idle to allow engine temperature to decrease prior to switching off the engine.

Turn engine off, clean the radiator and screens of all grass and debris.

Press the select button  to confirm the fault.



5 CONTROLS

5.4.32 WARNING - CAN TIMEOUT

This screen is shown if there is a communications fault between the display and the controller.

Stop the machine as soon as possible and contact your service dealer. Check the armrest and controller harness connections.

Press the button below the ✓ to confirm the fault.



5.4.33 WARNING - BATTERY FAULT

When this screen is shown, the battery is below 12V for 30 seconds.

Press the button below the ✓ to confirm the fault.



5.4.34 WARNING - CONTROLLER I/O FAULT

When this screen is shown, there is a Controller I/O fault.

Press the button below the ✓ to confirm the fault.

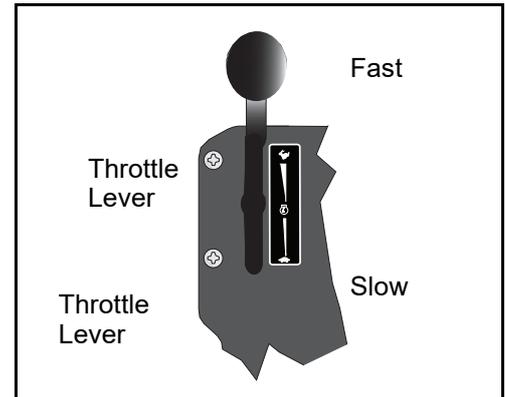


5.5 THROTTLE LEVER

The throttle lever controls the engine speed. Always operate the mower at full throttle during normal operation.

Push the throttle lever toward the front of the mower to increase engine speed.

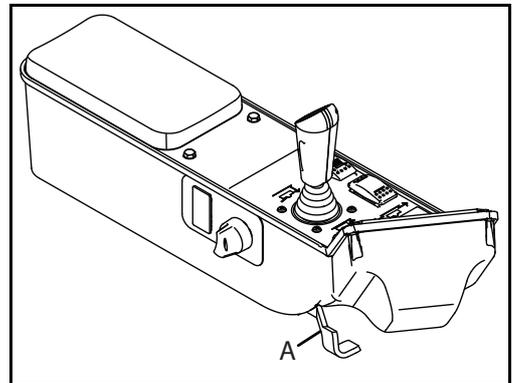
Pull the throttle lever toward the rear of the mower to decrease engine speed.



5.6 ARMREST ADJUSTER

The armrest adjuster is found on the right side under the armrest.

Lift up on the adjuster lever and slide the armrest in the forward or rearward direction. Release the adjuster lever to set the adjustment.



CAUTION

To prevent injury or property damage, do not adjust the armrest position while the mower is in motion.

5.7 TRACTION PEDAL

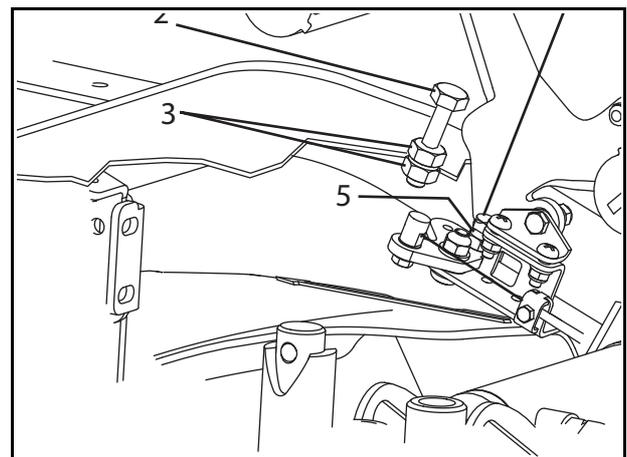
The traction pedal is found on the right side of the footplate.

Carefully press the top (A) of the foot pedal to reach the forward speed that you need.

To stop - Carefully return the foot pedal to the Neutral position.

To move in the reverse direction press the bottom (B) of the foot pedal.

There are adjustable stops for the forward transport speed (C) and for the reverse speed (D). When the mow speed lever is in the Mow Position, the pedal will contact the mow speed stop (E).



NOTICE

Allow the machine to come to a stop before you engage reverse drive.
When the parking brake is applied, DO NOT press the traction pedal.

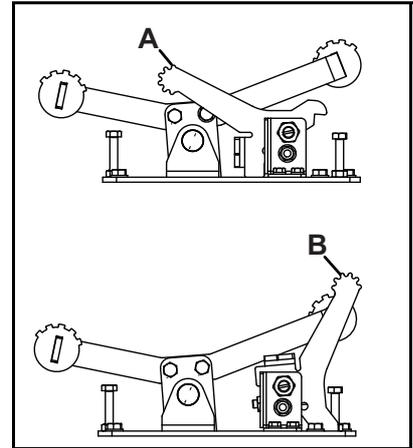
5 CONTROLS

5.8 MOW SPEED LEVER

The mow speed lever is used to limit the forward speed while mowing.

When you mow, rotate the mow speed stop lever to mow position (A) so the traction pedal contacts the stop when the traction pedal is pressed. The mow speed stop can be adjusted to set specific mow speeds.

To travel at full speed, rotate the mow speed lever to transport position (B).

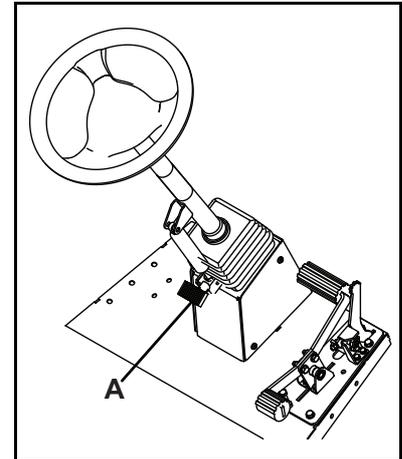


5.9 STEERING TILT CONTROL

Put the operators seat in a position that lets you have free use of all the controls.

Hold the steering wheel and press the small foot pedal (A) at the base of the steering column.

Tilt the column to a position in which you have a full range of movement and control. Release the small foot pedal to lock the steering column in position.



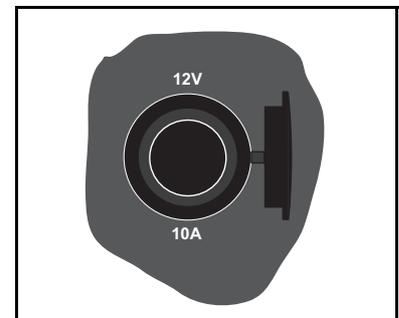
CAUTION

To prevent injury or property damage, do not adjust the armrest position while the mower is in motion.

5.10 POWER OUTLET

The auxiliary power outlet is located behind the seat on the left hand ROPS mount.

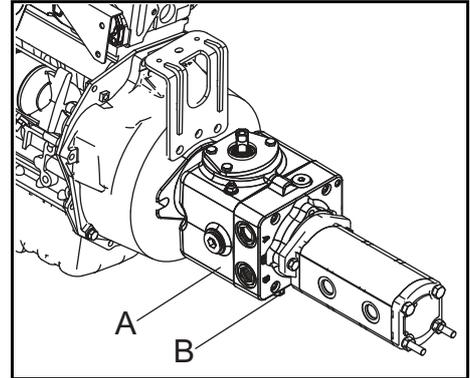
Used for mobile devices and accessories rated at 12 Volts up to 10 Amps only.



5.11 TOW VALVE

The valve (B) is located underneath the transmission pump (A) between the engine and two section gear pump.

1. To push the machine, disengage the parking brake, see section 6.10.
2. Turn the screw (C) found on the left side of the transmission pump, three complete turns to the left. Set the steering wheel so that the rear wheels toward the front.
3. After pushing the machine, return the parking brake valve, see section 6.10 to its normal position and screw (C) on the pump to its position for operation.

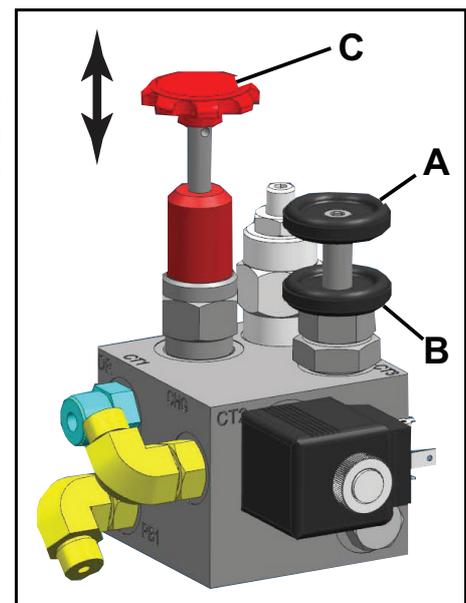


5.12 PARKING BRAKE RELEASE VALVE

The parking brake release valve is situated under the foot plate, on the left hand side of chassis plate. The parking brake release Valve is used to release the parking brake when the engine is not in operation.

The parking brake is released with the hand wheel (A) turned completely to the right (clockwise), after you release lock wheel (B). Use the hand pump (C) to create enough pressure to release the brakes (50 to 60 strokes will give 90 seconds of brake release). When complete, rotate the hand wheel (A) to the left (counter clockwise) completely and lock with wheel (B).

This method of brake release is to recover the vehicle a short distance only and should be carried out on level ground.



5 CONTROLS

5.13 FUEL GAUGE

The fuel gauge is located behind the left hand ROPS Mount.

Always check daily to ensure that there is sufficient fuel prior to cutting.



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. Do a visual inspection of the vehicle and look for indication of wear, loose hardware. Check for any components that are not included on the machine or damaged. Check for fuel and oil leaks to make sure that all connections are tight. Make sure that all hoses and tubes are in good condition.
2. Check the fuel supply, radiator coolant level, crankcase oil level and air cleaner is clean. All fluids must be at the full mark while the engine is cold.
3. Make sure all cutting units are adjusted to the same height of cut.
4. Check all tyres for the correct pressure.
5. Test the Operator Presence And Safety Interlock System.

6.2 OPERATOR PRESENCE AND SAFETY INTERLOCK SYSTEM

1. The Operator Presence And Safety Interlock System will not allow the engine to start unless the operator is sitting in the seat, the parking brake is engaged and the cutter switch is disengaged. The system stops the engine if the operator leaves the seat with the cutters engaged



WARNING

Do not operate the equipment with the operator presence and safety interlock system disengaged or while the equipment has defects. Do not disconnect any switch.

2. Do each of the tests as shown below, to make sure that the Operator Presence And Safety Interlock System operates. If any of the tests fail, stop the test and have the system inspected and repaired.
 - a. The engine does not start during test 1
 - b. The engine does start during tests 2, 3 and 4
 - c. The engine continues to run during tests 5 and 6

Refer to the chart below for each test and follow the check marks across the chart. Turn off the engine between each test.

TEST 1: The test shows the normal engine start procedure. The operator is in the seat, parking brake switch is in the ON position, the traction pedal is in the NEUTRAL position and the mow switch is in the OFF position. The engine will start.

TEST 2: The engine must not start if the mow switch is in the ON position.

TEST 3: The engine must not start if the parking brake switch is in the OFF position.

TEST 4: The engine must not start if the traction pedal is out of the NEUTRAL position.

TEST 5: Start the engine with the normal procedure. Turn on the mow switch and lift your weight off the seat. The engine must stop. The cutting unit reels must not rotate after seven (7) seconds.

TEST 6: Start the engine with the normal procedure. Turn off the parking brake switch and lift your weight off the seat. The engine must stop. The cutting unit reels must not rotate after seven (7) seconds.

Test	Operator Seated		Mow Switch OFF		Parking Brake Switch ON		Traction Pedal in Neutral		Engine Starts	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1	✓		✓		✓		✓		✓	
2	✓			✓	✓		✓			✓
3	✓		✓			✓	✓			✓
4	✓		✓		✓			✓		✓
5	✓	✘	✓	✘	✓		✓		✘	
6	✓	✘	✓		✓	✘	✓		✘	

✘ Start the engine with the normal procedure, move position of the switch and lift your weight off the seat. The engine must stop within 3 seconds and the cutting unit reels must not rotate after 7 seconds.

6 OPERATION

6.3 OPERATING PROCEDURE



WARNING

Do not operate the equipment with the operator presence and safety interlock system disengaged or while the equipment has defects. Do not disconnect any switch.



CAUTION

To prevent injury, always wear the safety glasses, protective footwear, a hard hat and ear protection.

1. You must not start the engine without the operator in the seat on the tractor.
2. Do not operate the mower and attachments with loose or damaged components.
3. First cut in a test area so that you completely understand the operation of the mower and controls.
4. Inspect the area and find the safest procedure for the vehicle. Check the height of the grass, the type of terrain and the condition of the surface. Each area condition needs the applicable adjustments and precautions.
5. You must not direct the cut material toward persons near the machine. When the vehicle is in operation, do not allow persons to stand near to the machine. The owner/operator maybe responsible for injuries caused to persons near the machine and any damage to their property.
6. Be careful when you cut surfaces that are near to gravel areas, roadway, parking areas, cart paths. Stones released from the equipment can cause injuries to persons and damage the equipment.



CAUTION

Remove all dangerous material from the area before you cut the grass.
Enter a new area carefully and always operate at speeds that allow you to control the mower safely.

7. When you move across the roads or paths, disengage the cutting motors and lift the equipment. Check for the traffic when you drive on the roads.
8. If you hit an obstruction or if the machine has a vibration that is not normal, stop and inspect the equipment for damage immediately. Repair damaged equipment before operation is continued.



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 15°.

6.4 TO FIT THE CUTTING UNITS TO THE MACHINE

NOTICE

For height of cut adjustments see section 8.2 and 8.3

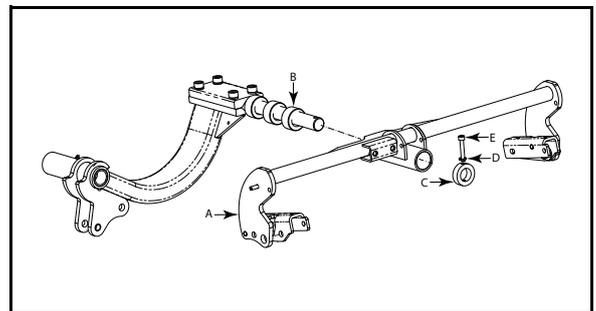
CAUTION

Blades are extremely sharp and can cause severe cuts.
For your protection, hold blade with thick leather work glove only.

Cutting Unit Mounting

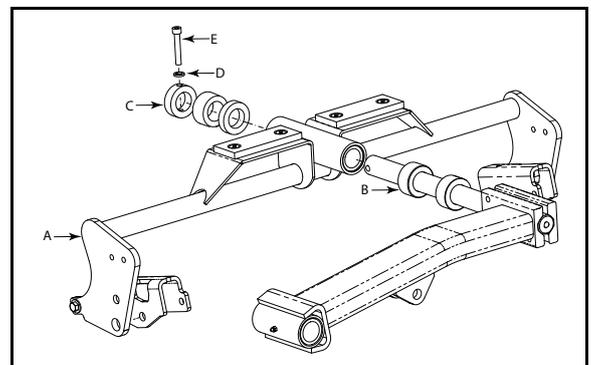
Front and wing units

1. With the lift arms in the lowered position slide the cutting unit pivot yoke (A) on to the lift arm.
2. Apply a small amount of Shell Darina R2 grease to the front surface of spacer (B), slide the cutting unit pivot yoke (A) onto the pivot shaft.
3. Position the locking collar (C) onto the pivot shaft, align the hole of the locking collar (C) to the hole in the pivot shaft (B), Place washer (D) onto the cap screw (E) and secure in place.



Centre unit

1. Remove the clamp plate and the shaft from the lift arm.
2. Slide shaft (B) through mounting bracket on the cutting unit top deck fitting spacer (D) and locking collar (E) to shaft, fasten with screw and washer (F).
3. Align the cutting unit with shaft fitted with the lift arm.
4. Re-fit the clamp plate holding the shaft to the lift arm.



Fitting the hydraulic motor

1. It is important not to contaminate the motor shaft or internal splines of the cutting cylinder. If for any reason they are contaminated, they must be cleaned by degreasing. Liberally lubricate the motor and cylinder splines with Shell Malleus B1 grease (Part no. MBE3927) before assembling.
2. Connect hydraulic motor to cutting unit bearing housing. Secure to studs using nuts and washers.

6 OPERATION

6.5 OPERATION OF THE MACHINE

1. Check the machine, look for worn, damaged or loose parts. Check the machine for fuel and oil leaks. Make sure that all connections are tight. Make sure that all hoses and tubes are in good condition.
2. Check the fuel level, radiator coolant level, crankcase oil level and air cleaner is clean. When the engine is cold, all additional fluids must be at the full level mark.
3. Make sure all cutting units are adjusted to the same height of cut.
4. Check all tyres for the correct pressure.
5. Test the Operator Presence And Safety Interlock System.

NOTICE

Adjust the seat to make sure all controls are within reach and will operate through the full range of movement.

1. Set the seat for the operators weight, height and reach.
2. Set the seat so that you can see the cutting units and the area around them.
3. Set the seat position for distance from the traction pedal. Check you can reach all the controls easily.

6.6 HOW TO START THE ENGINE

The following procedure is for starting cold engines.

1. Ensure the FWD/REV pedal is in the neutral position, the mow and parking brake switches are off, the throttle setting is in a mid position and the operator is in the seat.
2. The glow plugs are auto timed depending on the coolant temperature for operating the starter motor (This should only take a few seconds).
3. Turn the ignition switch to the "Run" position and wait until the yellow (Glow plug indicator) LED turns off, then turn ignition switch to the "Crank" position until the engine starts.
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 repeat the above procedure.

NOTICE

1. If the engine fails to start after two attempts, wait 20 seconds and try again.
2. The starter motor must not be run continuously for longer than 30 seconds or it may fail.
3. If the red LED's on the display flash whilst starting, one of the safety interlock switches has not been set correctly.

6.7 HOW TO DRIVE

1. Move the throttle control lever to the "Fast" position.
2. Release the brake. Make sure the parking brake is completely released before you move in a forward or reverse direction.
3. Forward - Carefully press the top of the "Forward / Reverse" foot pedal to reach the ground speed that you need.
4. Reverse - Carefully press the bottom of the "Forward / Reverse" foot pedal to reach the ground speed that you need.
5. To stop - carefully return the "Forward / Reverse" foot pedal to the neutral position then decrease throttle.
6. To stop the vehicle on a slope it may be necessary to apply traction in the opposite direction to which the machine is trying to roll.

NOTICE

1. Use complete foot to operate both forward and reverse.
2. Always operate the traction pedal carefully. Do not move the pedal from forward to reverse quickly.

6.8 HOW TO MOW

1. Set the mow / transport speed selector to the mow position, this will set the maximum cutting speed.
2. Lower the cutting units.
3. To engage the cutting mechanism, press the lower half of cutting unit switch, found on the control panel.
4. Release the parking brake and drive in a forward direction.

NOTICE

Always set the throttle to maximum engine rpm. To mow when the grass is heavy and the engine can not give enough power, decrease the forward speed.

To remove or install grass catchers:

Set the mow switch in the "Off" (down) position, lower the cutting units to the ground, put the parking brake switch in the "On" position and stop the engine. Release latch and slide grass catcher off or back onto the lift yoke.

6.9 TO STOP THE ENGINE

1. Disengage the drive to the cutting units with the cutting unit switch.
2. Return the forward / reverse foot 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 the OFF position.

6 OPERATION

6.10 HOW TO REMOVE A BLOCKAGE FROM CUTTING UNITS

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.

1. Disengage the power to the cutting units with the cutting unit switch.
2. When all rotation has stopped, lift the cutting units into the transport position.
3. Move the machine to a flat level surface.
4. Set the parking brake.
5. Move the throttle control lever to the slow position.
6. Turn the ignition key to the OFF position and remove the key.
7. Use the Ransomes Jacobsen "Cutting Unit Tool" part number 4184540, see below or stout stick, put into the cutting cylinder between the blades.

CAUTION

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



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

6.11 BACKLAPPING

DANGER

Always keep hands and clothing far away from powered reels to prevent severe personal injury.
Never backlap reels with the engine running in an enclosed building.

CAUTION

Make sure correctly selected PPE is worn before you backlap the reels.

This mower has the ability to allow the cylinders to be driven in reverse direction for backlapping:

1. Backlapping is a process which will lightly grind the cylinder to the bottom blade while installed on the mower.

2. If significant amounts of metal are to be removed then the cutting unit must be reground on a special grinding machine.
3. Before any backlapping is done, Ransomes Jacobsen recommends that the backlapping procedure must be risk assessed as a workshop process by the manager of the machine.
4. Backlapping must only be done by approved personnel.
5. Ransomes Jacobsen recommend that grinding paste is only applied to the cylinder when it is stationary, the engine is off and the parking brake applied.
6. When applying grinding paste the cylinder must only be rotated by appropriately sized piece of wood and not by hand.
7. Place cylinders in the most accessible position for applying the paste.
8. After applying the grinding paste the person backlapping must return to the seat, engage the relevant controls and run the cylinders in reverse.
9. When the desired finish is achieved switch off the mower, clean off any surplus paste, reset the cylinder to bottom blade and return the controls to the normal mow positions.

Ransomes 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

PROCEDURE

1. Apply an even coat of grinding paste to the entire length of each blade of the cylinder.
2. Turn the cylinder Speed Control valve to allow cylinders to rotate at their slowest speed.
3. Set the Backlap switch to the Backlap position.
4. Start the engine and set the throttle to maximum engine speed. Switch the cutting unit switch (PTO) to the "ON" position.
5. If necessary adjust the speed control valve until the desired cylinder rotation speed is attained. It must be slow enough so that the cylinder will not throw off the Backlapping compound as it spins.
6. Once all the blades on the cylinder are uniformly sharp, shut off the engine and switch the cutting unit switch (PTO to the off position. Set the Backlap switch to off and close the cylinder Speed Control (all the way clockwise).

NOTICE

To ensure proper cylinder rotation, make sure the cylinder Speed Control has been reset to normal running.

7. Wash all of the grinding paste from all of the heads. Once they are thoroughly cleaned and dry, apply a light film of oil to the cutting edges to help prevent rust.
8. After Backlapping, the cylinder to bottom blade adjustment must be made again.

6 OPERATION

6.12 TRANSPORTING

1. Start the engine and set the throttle lever to full speed position.
2. Release the parking brake and after ensuring that the pedal control lever is in the transport position, press the upper part of the foot pedal. The machine will move in a forward direction.
3. Continue to push down on the foot pedal until the desired speed of the machine is reached. The foot should always be kept firmly on the pedal to maintain full control of the drive pedal.

6.13 TRANSPORTING ON A TRAILER OR FLATBED

Once the vehicle is loaded onto the trailer or flatbed truck, lower the units down onto the trailer. If the cutting units cannot be lowered onto the trailer, a secondary restraint should be placed around the cutting units when transporting on a trailer or flatbed.

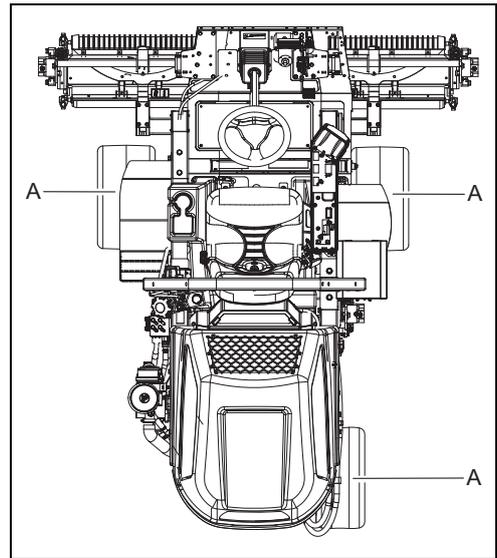
Use straps over the front and rear wheels (A).

Make sure that all tie down straps are tight.

Check the fuel and hydraulic tank caps are tight. Make sure that no part of the mower can fall during transport.

Check that the hood is securely latched down using the mechanism provided.

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



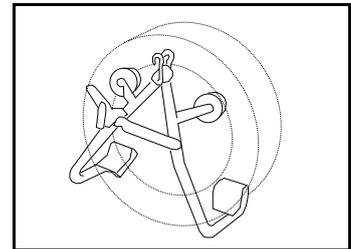
Do NOT carry more than the maximum weight shown on the transport vehicle plate.

Slinging

When slinging the mower, damage free clamps must be used, see the illustration, with an approved lift frame. Information is available at www.tipnlift.co.uk.

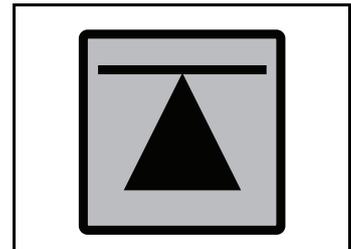
WARNING

Care should be taken when jacking or slinging machines. Only trained personal should carry out this procedure.



Jacking

The machine jack points indicated by the decal shown. Two for each axle on four wheel vehicles. Other axle types are different, check the Safety and Operations Manual for the safe jack points.



6.14 MOWING ON SLOPES

The mower is assembled for good traction and stability in normal conditions. For operation on wet grass and gradients use caution, vehicle control will be decreased in these conditions

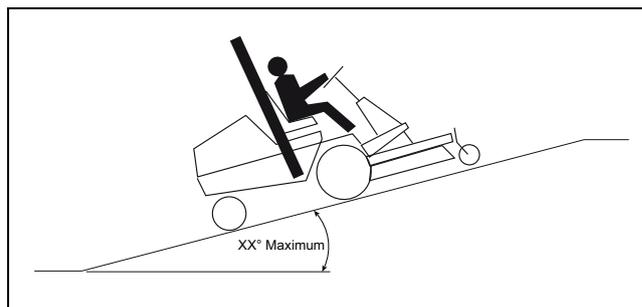


WARNING

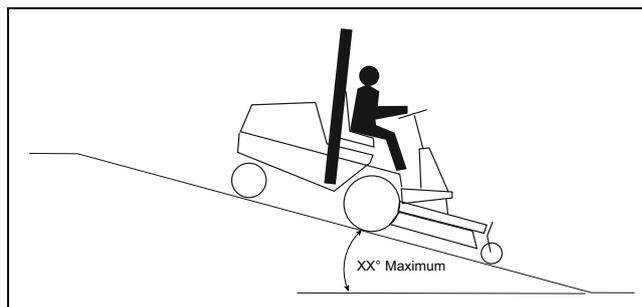
The vehicle can turn over in some conditions. The method for the correct operation on the gradients and terraces is:

1. To travel up and down the face of the slope (vertically) but not across the face (horizontally).
2. Do not make a turn that is not necessary.
3. Travel at decreased speeds and look for hazards.

For best stability, always cut with all three units.

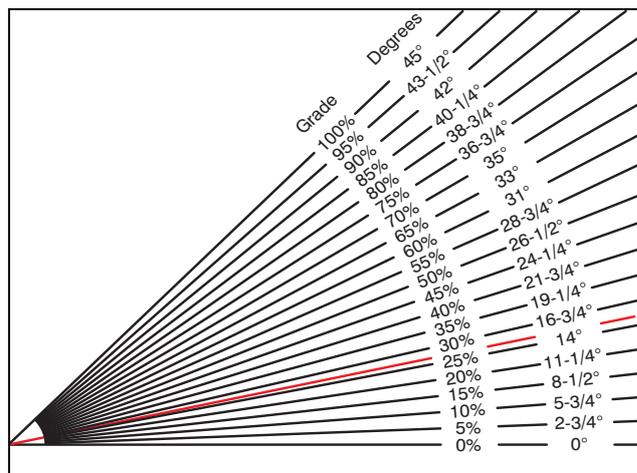


A = Maximum Allowed Slope



A = Maximum Allowed Slope

1. Always mow with the engine at full throttle, control forward speed with the traction foot pedal.
2. Use the weight transfer control to improve the weight distribution between decks and mower.
3. If traction is lost turn the mower on to a lower gradient.
4. If the mower continues to move or mark the turf, the slope is more than the normal limit. Do not try to move toward the top, move backward slowly.
5. When you move across a slope, to keep the vehicle stable lower equipment to the ground.



Degrees are shown to the nearest 1/4".

Correct tyre pressure is necessary for maximum traction. See Specification (Section 3.3).

- General slope of roadway embankment - 45°
- Steepest grass area - 31°
- Slope of average roof - 19-1/4°
- 2nd class highway maximum grade 4-1/2°
- Toll road or freeway - 1-3/4°

7 MAINTENANCE

7.1 MAINTENANCE AND LUBRICATION CHARTS

MAINTENANCE AND LUBRICATION CHART		
Interval	Item	Section
First 50 hours	<ul style="list-style-type: none"> ● Change Engine Oil & Filter ● Check Fan Belt Tension ● Change Hydraulic Oil Filter 	7.4.1 7.6 7.7
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 Service Indicator* ● Check for Hydraulic Leaks ● Check Oil Cooler Screen ● Check Oil Cooler Fins ● Check Bedknife & Reel Blades ● Walk-Around Inspection 	7.4.1 6.2 7.5.2 7.8 3.3 7.10 7.10.4 6.1
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 ● Drain & Clean Fuel Tank 	7.10.11 7.6 7.10.11 7.10.6
Every 100 hours	<ul style="list-style-type: none"> ● Change Engine Oil Filter ● Check Fuel Filter For Water Contamination 	7.4.1 7.9.2
Every 200 hours	<ul style="list-style-type: none"> ● Change Engine Oil ● Change Inline Fuel Filter 	7.4.1 7.9.2
Every 250 hours	<ul style="list-style-type: none"> ● Change Hydraulic Oil & Filters ● Alternator and Fan Belts - Inspect / Adjust 	7.6
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 	6.2 7.8.1 7.5
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 	7.5
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
	Engine Oil (with filter)	4 liters	0.880 Imp gals	1.06 US gals
Hydraulic Oil (with filter)	28.4 liters	6.2 Imp gals	7.5 US gals	Greenscare 46 Total Equivis ZS46 (ISO VG 46)
Radiator Coolant	7.6 liters	1.67 Imp gals	2.0 US gals	50% Anti-Freeze
Fuel	28.4 liters	6.2 Imp gals	7.5 US gals	Unleaded Gasoline minimum 87 octane (91 RON)

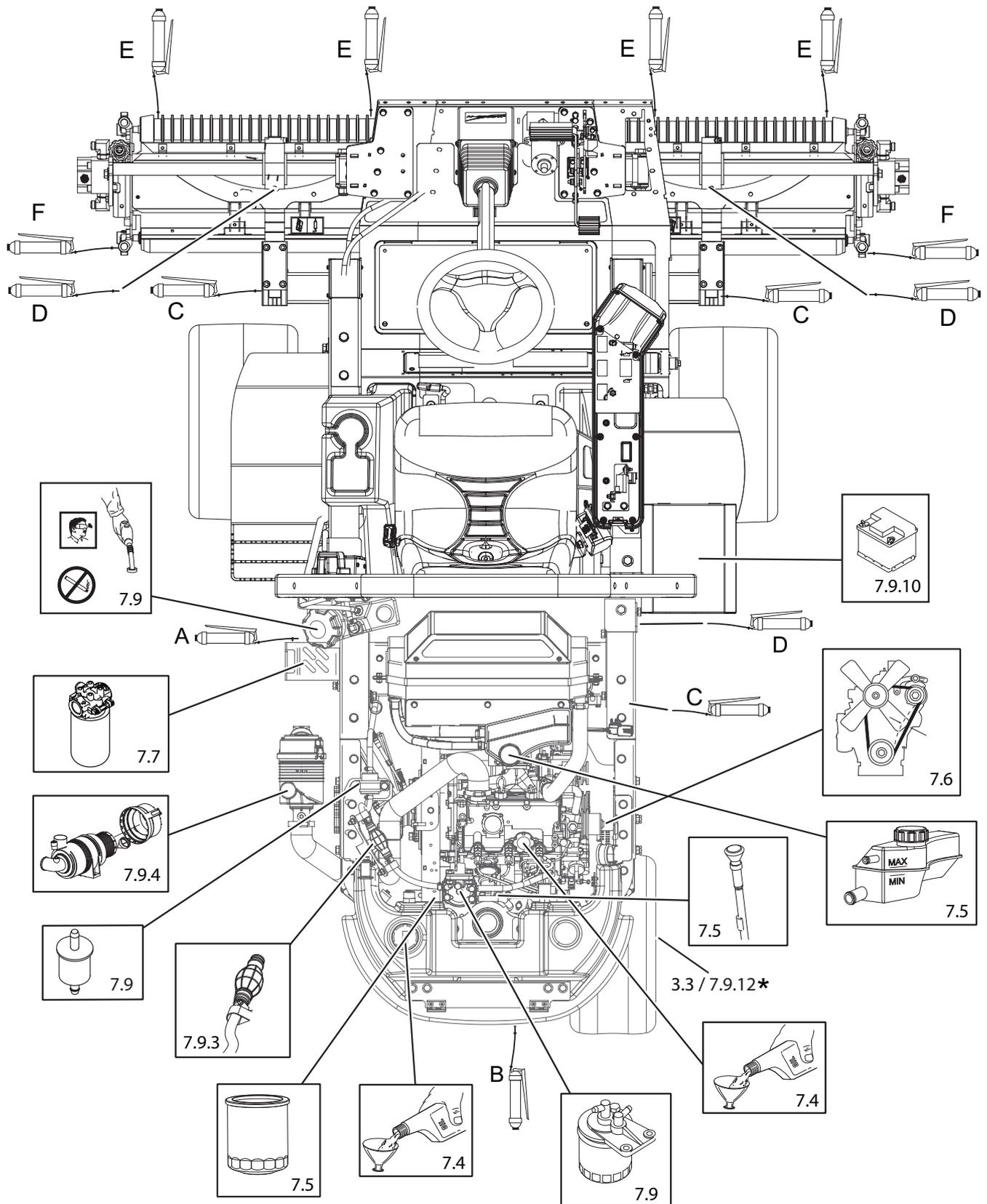
Engine Oil: Must meet A.P.I. CK-4	
TEMPERATURE	VISCOSITY
-18°C to 40°C (-0.4°F to 104°F)	SAE10W-30

Lubrication Points (Grease Every 50 Hours)	
A. Tie Rod Ball Joints (1).	D. Yoke Pivot Assembly (3).
B. Steering Cylinder Ball Joints (1).	E. Rear Roller (6).
C. Lift Arm Pivot (3).	

Service Interval Chart				
Interval	Item			
First 25 hours	• Roller bearings			
First 50 hours	• Yoke pivots • Rear roll bearings • Rear roller adjusters			
Every 40 hours	• Levers, pivot points any friction points			

7 MAINTENANCE

7.2 ENGINE LUBRICATION



*Rear wheel position moved for clarity.

7.3 GENERAL PRECAUTIONS



WARNING

Before you clean, adjust or repair this equipment, ensure the cutter switch is in the OFF position. Lower all the cutting units to the ground, apply the parking brake, stop the engine and remove the key. Make sure the mower is parked on a solid and level surface. Never work on the mower that is only held by a jack. Always use the jack stands.

A qualified technician must do any adjustment and all maintenance. If the correct adjustments can not be made, contact your Jacobsen Dealer.

Inspect the equipment according to the maintenance schedule and keep complete records for warranty purposes.

1. Keep the equipment clean.
2. Keep all moving parts correctly adjusted and lubricated.
3. Replace worn or damaged parts before you operate the mower.
4. Keep all fluids at the correct level.
5. Keep the shields in position and all hardware tight.
6. Keep the tyres inflated to the recommended pressure.
When you do any maintenance, do not wear jewelry or loose fitting clothing.
Refer to the illustrations in the Parts Manual for the removal and assembly of parts.
When you discard hazardous materials (batteries, lubricants, fuel, anti-freeze), follow your local, recommended procedures.

NOTICE

Only use the tool attached to the key ring to open the engine hood catches.

7.4 ENGINE

IMPORTANT - An engine service manual is available through a Jacobsen dealer and is either included with the mower or is available on our website. Read this engine manual to understand the operation and maintenance of the engine. When you follow the engine manufacturer instructions, you will make sure of the maximum service life of the engine. The replacement engine manuals are available from the engine manufacturer.

During the first 50 hours of operation, Jacobsen recommends the following:

- 1 Allow the engine to reach a temperature of at least 60° C (140° F) before operation at full load.
- 2 Check engine oil at startup check on daily basis. Higher than normal oil use can occur during the first 50 hours.
- 3 Change the engine oil and oil filter after the first 50 hours of operation.
- 4 Check the alternator belt.
- 5 Refer to the Engine manual for specified maintenance intervals. If the injection pump, injectors or the fuel system need service, contact your Jacobsen Dealer.

NOTICE

The mower operates and cuts correctly at the preset governor setting. Do not change the engine governor setting or run at more than the maximum permitted engine speed.

7 MAINTENANCE

7.4.1 CHECK ENGINE OIL LEVEL

Check the engine oil level before you start or at least five minutes after you stop the engine.

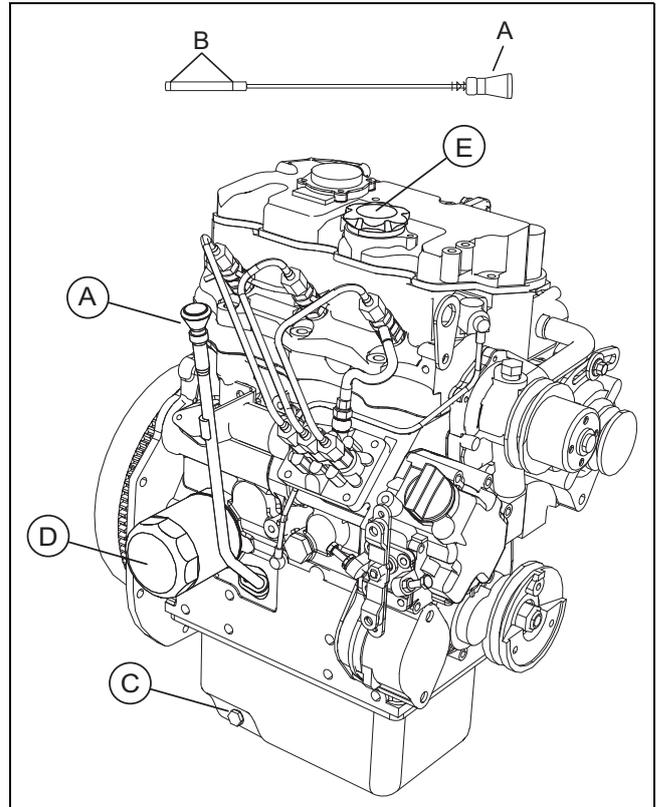
1. Park the machine on level ground, remove the dipstick (A), clean with a cloth and replace in position.
2. Remove the dipstick (A) again and check the oil level. The oil must be between the two level indicators (B) on the dipstick.

Change Engine Oil

1. Start the engine to increase the temperature, then turn off the engine. Remove the oil drain plug (C) from the bottom of the crankcase and clean with a cloth.
2. Drain the engine oil into a container.
3. Replace the drain plug (C) and fill the engine with the correct quantity and grade of oil through the filler (E).

Change Engine Oil Filter

1. Remove the oil filter cartridge (D).
2. Let the engine oil flow into a container.
3. Clean area on the crankcase.
4. Apply a thin layer of oil to cartridge gasket before you install the filter.
5. Only use your hand to tighten the filter cartridge (D).
6. Check for oil leaks around the cartridge gasket after the engine is started.



CAUTION

Engine oil can damage your skin. Use the applicable safety equipment.
If engine oil touches the skin, clean the area immediately.
Discard used engine oil in accordance with local regulations.

7.5 ENGINE COOLANT

WARNING

To prevent injury from the hot-engine coolant or steam, never remove the expansion tank 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 expansion tank cap.

CAUTION

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

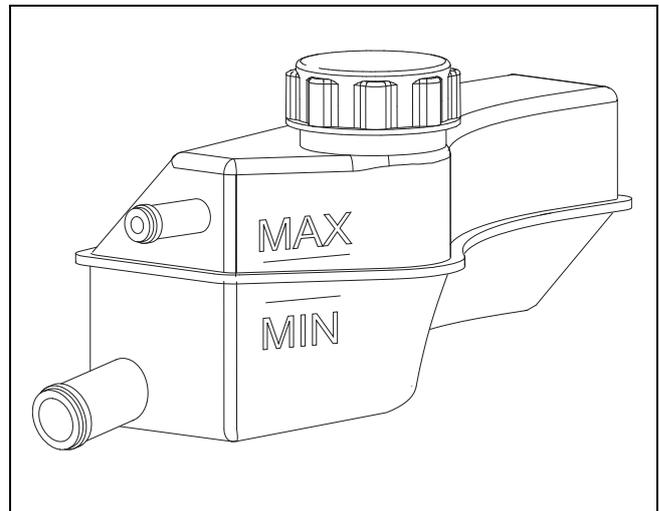
Check coolant level each day. The radiator must be full and the recovery bottle must be at the cold mark. Drain and fill the cooling system each year. Empty and clean the recovery bottle. Mix clean water with coolant for the coldest ambient temperature. Read and follow the instructions on the coolant container and the engine manual. Keep the radiator, engine oil cooler and hydraulic oil cooler air passages clean, use compressed air to blow out dust. Avoid using water to clean radiator. Check and tighten the engine fan belt at the specified intervals listed in the maintenance chart. Replace the belt, Clamps and hoses at the specified intervals listed in the maintenance chart. Have your Jacobsen Dealer check the cooling system if you need to add coolant more than one time a month or you add more than a liter of coolant at a time.

7.5.2 CHECK THE ENGINE COOLANT LEVEL

1. The level of coolant in a cold expansion tank must be between the MIN and MAX indicators.

WARNING

To prevent injury from the hot-engine coolant or steam, never remove the expansion tank 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 expansion tank cap.



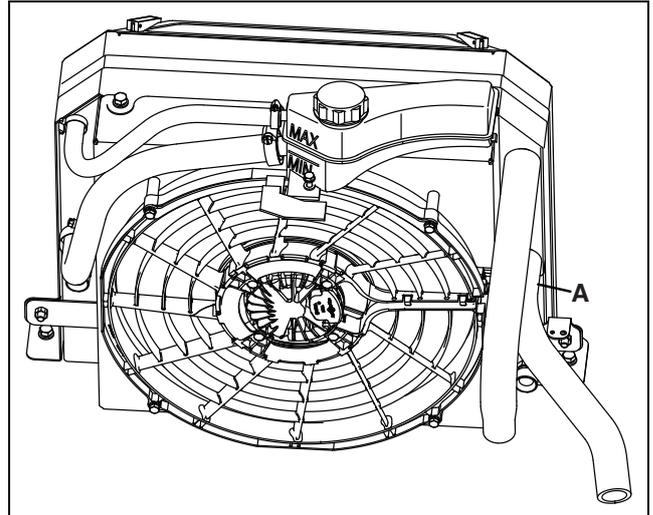
2. If you need to fill the tank, remove the expansion tank cap and fill with the correct anti-freeze mixture.
3. Replace the plastic cap.

7 MAINTENANCE

Check The Engine Coolant Level Continued:

How To Change Coolant

1. To drain coolant, remove the bottom hose (A) from the radiator. Drain the engine coolant into a container.
2. Replace the bottom hose (A) on to the radiator. Make sure all the hose clamps are tight.
3. Fill the cooling system with the correct anti-freeze mixture).
Fill system through the expansion tank.
4. The level of coolant in a cold expansion tank must be between the MIN and MAX indicators.
5. Run the engine for approximately 5 minutes or until the thermostat opens.
6. Check the level of coolant in expansion tank.
Fill the tank if more coolant is needed.



CAUTION

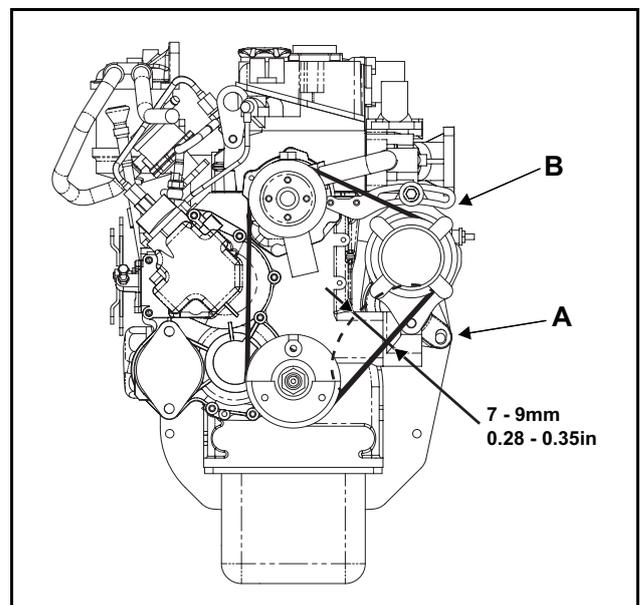
The anti-freeze can damage your skin. Use gloves when you use anti-freeze. If anti-freeze touches your skin, clean the area immediately.
Discard anti-freeze in accordance with local regulations.

7.6 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-span 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.



7.7 HYDRAULIC FILTER

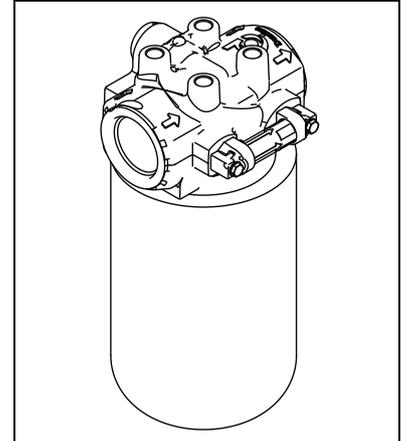
NOTICE

If you open the closed hydraulic transmission circuit, it is important that the hydraulic oil is flushed through a 25micron filter and topped up with clean filtered oil before the circuit is used again.

The hydraulic system is protected by one 10 micron filter. A 25 psi (1.7 BAR) visual indicator (A) is on the side of the filter head to indicate when service is needed.

When you replace the filter:

1. Fill the new filter with hydraulic fluid and lubricate the filter O-ring with hydraulic fluid before you assemble the new filter. Tighten the filter with your hand before tightening the filter to 25Nm, do not exceed 25Nm (18.5lbf-ft).
2. Operate the engine at the idle speed for five minutes to remove the air from the hydraulic system. The hydraulic filter warning light may illuminate for up to thirty minutes in cold conditions.
3. Stop the engine and check the level of hydraulic fluid in the tank. Add the hydraulic fluid to the full mark on the dipstick.



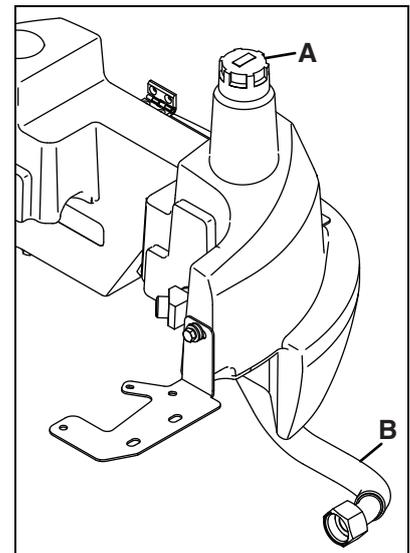
7.8 HYDRAULIC SYSTEM

Drain and replace the hydraulic oil if one of the following occurs:

1. Component failure.
2. Water or foam is in the hydraulic fluid.
3. The hydraulic fluid has a rancid odor (indication of high heat).
4. When required by maintenance schedule,
Always replace the hydraulic filter when you replace the hydraulic fluid.

Change The Hydraulic Oil.

1. Clean the area around the oil cap to prevent contaminates from entering the hydraulic system.
2. Disconnect the hose (B) from the gear pump. Allow the oil to drain into a container.
3. After the oil has drained, reinstall the hose and fill the tank with hydraulic fluid through filler (A).
4. Start the engine and remove the air from the hydraulic system. Operate all mower functions for 5 minutes to remove the air and to balance the hydraulic fluid level.
5. When all air is removed from the hydraulic-fluid, check the level, add the hydraulic fluid to the full mark on the dipstick.



CAUTION

Hydraulic oil can damage your skin. Use the applicable safety equipment. If engine oil touches the skin, clean the area immediately.

Discard used hydraulic oil in accordance with local regulations.

7 MAINTENANCE

7.8.1 HYDRAULIC HOSES

WARNING

To prevent injury from hot high pressure oil, never use your hands to check for oil leaks. Use the paper or cardboard to find leaks.

The hydraulic fluid pressure can have enough force to enter your skin. If hydraulic fluid has entered your skin, a doctor must remove the hydraulic fluid surgically within a few hours or gangrene can occur.

Always lower the cutting units to the ground, disengage all drives, engage parking brake, stop the engine and remove the key before you inspect or disconnect hydraulic lines or hoses.

Check visible hoses and tubes each day. Look for wet hoses or oil marks. Replace worn or damaged hoses and tubes before you operate the mower.

The replacement tube or hoses must follow the same path as the original hose. Do not move the clamps, brackets and cable-ties to a new location.

Completely inspect all tubes, hoses and connections in accordance with the maintenance chart

NOTICE

If the hydraulic fluid becomes contaminated, damage to the hydraulic system can occur.

Before you disconnect any hydraulic component, clean the area around the fittings and the ends of the hoses to stop the entry of contaminants into the system.

Before you disconnect any hydraulic component, tag or mark the location of each hose then clean the area around the fittings.

To stop the entry of contaminants into the system when you disconnect the component, be prepared to assemble plugs or caps to the ends of hoses and open ports. Clean any hydraulic fluid that spills.

Make sure "O" rings are clean and hose fittings are correctly installed before you tighten.

Prevent the hose from twisting. Twisted hoses can cause the hose connections to loosen as the hose moves while you operate the mower and can cause oil leaks.

The hydraulic hoses that are twisted or have sharp bends can decrease the oil flow and cause damage to the hoses. The decreased oil flow can cause system problems and increase the temperature of the hydraulic fluid.

WARNING

Only trained personnel must service the hydraulic system.

CAUTION

Hydraulic oil can damage your skin. Use gloves when you use hydraulic oil. If hydraulic oil touches your skin, clean the area immediately.

Discard used hydraulic oil in accordance with local regulations.

7.9 FUEL

WARNING

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.

Refuel outdoors only and do not smoke when you add fuel.

If the fuel spills, do not try to start the engine, but move the mower away from the area. Until fuel vapors are removed, do not allow the sparks, open flame or other types of ignition.

Never keep fuel containers near an open flame or any device that can cause the ignition of fuel or fuel vapors. Always tighten the fuel tank cap and container cap after you add fuel.

CAUTION

Diesel fuel is flammable. Use caution when you add the fuel to the mower.

Only use an approved container. The spout on the container must fit inside the fuel filler neck. Never use the containers that are not approved to keep or transfer fuel.

Fill the fuel tank to less than 25 mm (1 inch) below the filler neck.

Use clean low sulfur Diesel fuel to the recommended specification. The use of Diesel fuel additives is not recommended. If fuel additives are used, the fuel additives must be approved for use in the engine type used in your machine. Refer to the engine manual for additional information.

Check fuel hoses and clamps at service interval (see chart). Replace the fuel hoses and clamps at first indication of wear or damage.

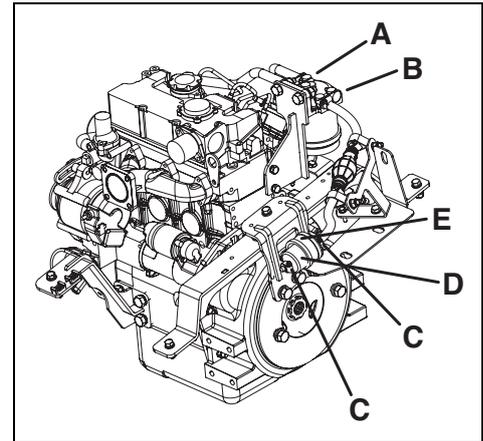
Keep the fuel according to your local, state or federal regulations. Below are some items you should be aware of.

What you need to do	Reasons to do it
Inspect your Diesel fuel tank, pipes and fittings. If there is Brass, Copper, Lead or Zinc in contact with the fuel, plan to change the parts.	Low emission Diesel engines use higher pressure injection equipment. The presence of Copper, Lead and Zinc in Diesel fuel can accelerate wear in fuel pumps and injectors. Diesel fuel can absorb these metals when in prolonged contact.
Check your fuel supplier is supplying ultra low sulfur Diesel. It has to meet ASTM D975 S15 or EN590:2009 or equivalent fuel with a sulfur content of less than 15 ppm (parts per million)	Low emission Diesel engines, use Particle Filters (DPF). The use of high sulfur fuel will block the DPF and damage the engine. Any engine damage caused by high sulfur fuel is not covered by warranty.
Ask your fuel supplier if there are records showing the amount of water mixed in with the Diesel fuel supplied.	Water in the fuel is harmful to the high-pressure injection equipment. Cat® recommends that water content must not be more than 0.05%.
Ensure that Bio content to your Diesel fuel does not exceed 5% as described in ASTM D6751 or EN 14214.	Higher Bio Diesel content has been proven to absorb more moisture from the atmosphere. The moisture and Bio content can result in the development of molds and bacteria. These accelerate the blocking of fuel filters.
Ask your fuel supplier to verify that fuel being delivered meets the lubricity level required set in ASTM D6079.	Low emission Diesel engines use higher pressure injection equipment. The tolerances in the injection equipment require the fuel to provide lubrication.
Ask your fuel supplier to verify that fuel being delivered has less than 1 milligram of solid contaminant per litre of fuel.	Any particles in the fuel can damage parts within the fuel injection system, reducing performance. The vehicle fuel system will provide protection, but the cleaner the fuel into the vehicle, the lower the chance of a particle by passing the filtration system.

7 MAINTENANCE

7.9.1 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).



WARNING

Fuel and its vapors are extremely flammable and explosive.
Fire or explosion can cause severe burns or death.

7.9.2 PRIMING FUEL SYSTEM

The fuel system must be bled and primed when:

- Starting the engine for the first time.
- The fuel tank becomes completely empty.
- The engine has not been used for an extended period of time.
- The fuel filter and/or fuel lines have been loosened, removed or replaced.

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

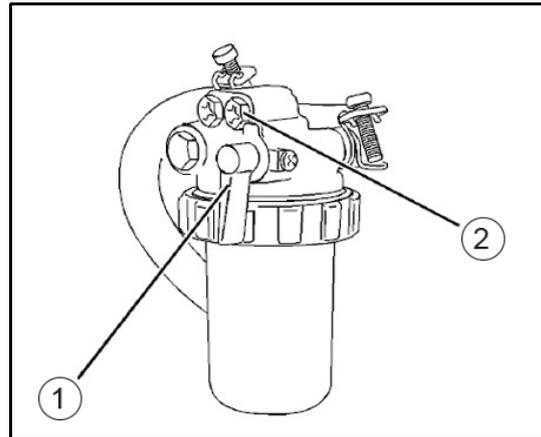
In-line Priming Pump

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.

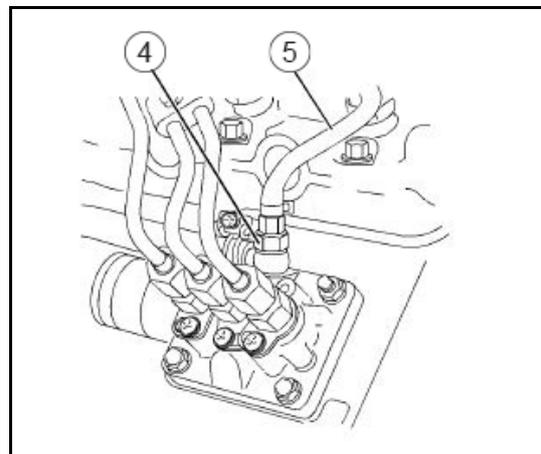
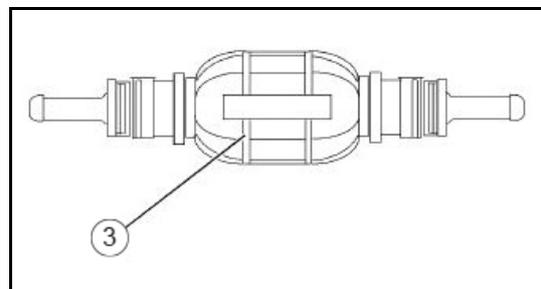
Note: Fuel return line (5) may need to be removed to prime the fuel system.

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.

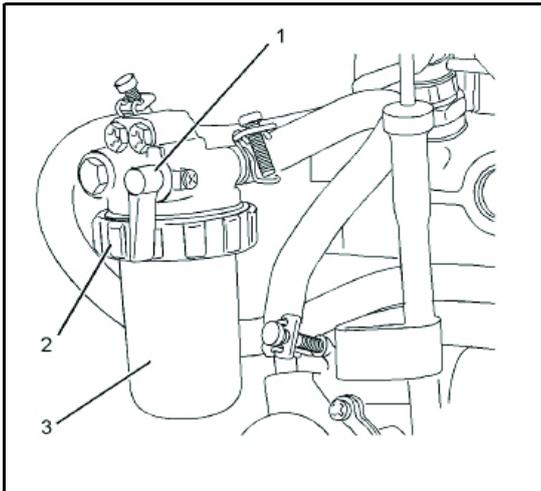
Note: Do not operate the starting motor for more than 15 seconds. If the engine does not start after 15 seconds, stop and wait for 30 seconds before trying again.



Secondary Fuel Filter

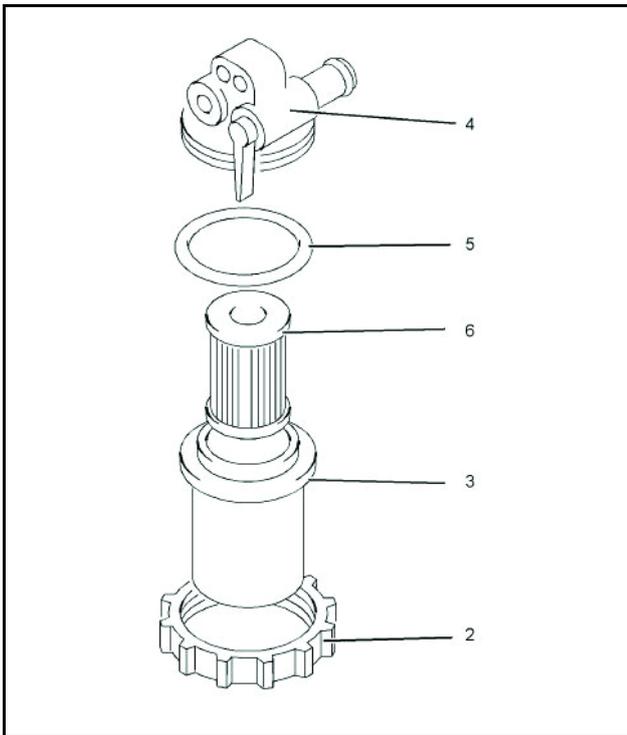


7 MAINTENANCE



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 (4) 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 AIR CLEANER

CAUTION

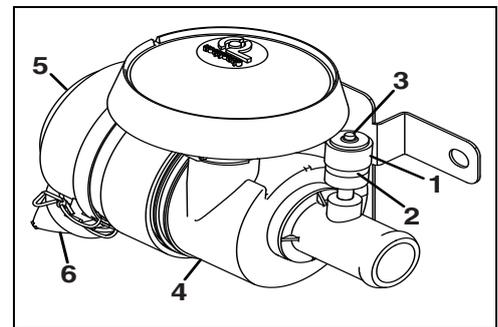
Never start and run the engine with the air cleaner assembly or the air filter removed.

NOTICE

Do not use pressurized air or solvents to clean the filter. Pressurized air can damage the filter and solvents will dissolve the filter. See the Maintenance Schedule for service requirements.

Service Air Filter

1. Remove end cap of air filter cartridge.
2. Remove loose contaminants from element with compressed air working from the clean to contaminated side, using the max 6 bar, with nozzle 5cm from element.
3. Reinstall filter element (press firmly against rear shoulder).
4. Replace end cap and fasten with clips.
5. Change air filter (A) Raise engine cover.



1. Remove end cap of air filter cartridge.
2. Remove accumulated dust or dirt.
3. Remove filter element (A) (pull straight out firmly)
4. Install new filter element (press firmly against rear shoulder).
5. Replace end cap and fasten with clips.

7.10.1 ENGINE EXHAUST

WARNING

The exhaust fumes contain carbon monoxide. The Carbon Monoxide in exhaust fumes can increase to dangerous levels if the exhaust is damaged or you operate in closed spaces. Inspect the complete-exhaust system every month and replace damaged components immediately.

NEVER operate the engine without enough ventilation.

The temperature of the exhaust components can be more than 300° F (149° C). To prevent the burns, do not touch a hot exhaust system.

If the exhaust note or color changes, stop the engine immediately. Identify the problem and have the system repaired.

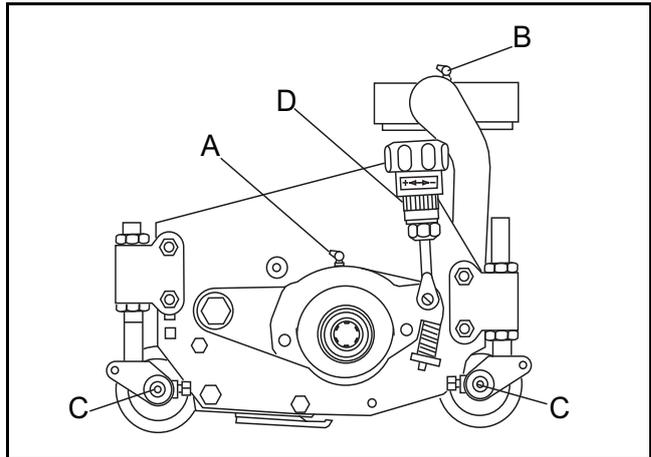
Torque all exhaust manifold hardware equally. Tighten or replace the exhaust clamps.

7 MAINTENANCE

7.10.2 CUTTING UNIT 673953, 54 & 55 / 671604, 05 & 06 / 673956, 57 & 58 LUBRICATION

Always clean the grease fitting before and after lubricating.

- Lubricate the following with Shell Darina R2 grease.
- Reel bearings (A) weekly or every 25 hours.
- Unit pivot (B) weekly or every 25 hours.
- Roll bearings (C) weekly or every 25 hours.
- Handwheel adjuster (D) weekly or every 25 hours.
- Hydraulic motor and drive coupling every 400 hours.



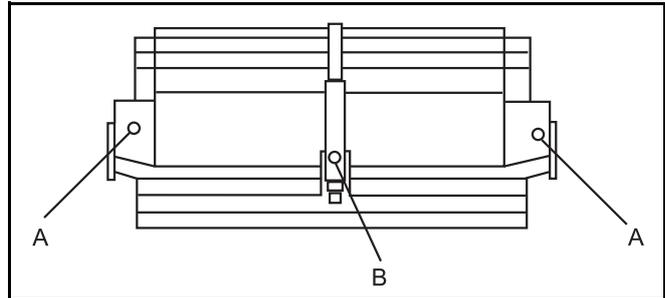
7.10.3 CUTTING UNITS 67114 / 67115 / 67116 LUBRICATION

Always clean the grease fitting before and after lubricating.

Lubricate the following with Shell Darina R2 grease:

- Mower pivot (A).
- Front and centre lift arm (B).

Apply grease with a manual grease gun, do not use a compressed air gun. Fill slowly until grease begins to seep out.



Periodically apply a small amount of lithium based grease to the seat runners.

For smooth operation of all levers, pivot points and other friction points that are not shown on the lubrication chart apply several drops of SAE 30 oil every 40 hours of operation or as needed.

- Grease fittings (A Mower Pivot, 3 Fittings).
- Front and Centre Lift Arm (B).

7.10.4 BACKLAP

Start the engine. Press the left  or right  arrow key to display the main menu.

Use the up  and down  arrow keys to until the green arrow  is next to backlap.

Press the select button  to select backlap.

Select debris clear to operate the reels in the reverse direction for a few seconds to clear a blockage in the reels.

Select enable to start backlap.

Use the up  or down  arrow keys to increase or decrease the backlap timer. Press the select button  to confirm.

The parking brake switch must be in the on position, the traction pedal must be in the neutral position, the cutting units must be lowered and the mow switch must be in the on position.

The reels will start to operate in the reverse direction and the backlap timer will start. Press the back, home or select buttons to cancel backlap.

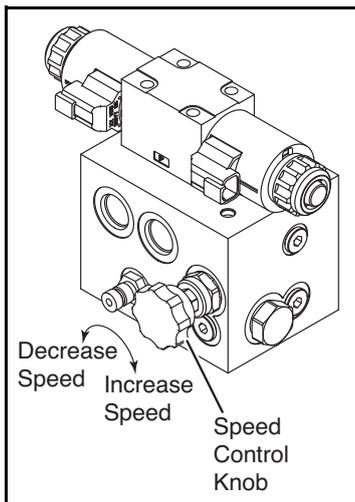
The reel valve contains an adjustable valve to control the speed of the reels.

Loosen the lock nut located behind the speed control knob, turn the speed control knob to the left to decrease the reel speed. Once the desired speed has been reached tighten the locknut.

Apply lapping compound, with a long handle brush, along the full length of the reel.

When the reels are honed, carefully and completely wash off the remaining mixture.

Repeat the full procedure on the other reels.



CAUTION

Ensure that the correct PPE is worn whilst performing the backlap process.

7 MAINTENANCE

7.10.5 BATTERY

Before you service the battery, make sure the ignition switch is in the OFF position and the key is removed.

CAUTION

When you service the battery, always use insulated tools. Wear applicable eye protection and clothing. Discard used batteries in accordance with local regulations.

WARNING

The battery contains corrosive acid. Prevent any contact with the battery acid.
Always Wash the Hands after you service a Battery.

WARNING

The battery posts, terminals and related parts contain lead and lead compounds.
The State of California understands Lead to be a cause of cancer and reproductive harm.

Keep the battery terminal hardware tight, to prevent corrosion, apply a layer of silicone dielectric grease to battery terminals and ends of cables. Keep the vent caps and battery terminal covers in position.
Before welding any part on the Mower, disconnect the battery cables.

Battery Access

1. Loosen and remove the black socket head screw (A).
2. Lift the battery cover and set it to the side.
3. Confirm the battery polarity before you connect or you disconnect the battery cables.

When you remove the battery, always disconnect the negative (BLACK) battery cable before the positive (RED) battery cable.

When you install the battery, always connect the positive (RED) battery cable before the negative (BLACK) battery cable.



Flat Battery Start

1. Before you try to start the mower, check the condition of the drained battery.
2. Connect the positive (+) battery terminal of the charged battery to positive battery terminal of the drained battery.
3. Connect the negative (-) battery terminal of the charged battery to frame of vehicle with the drained battery.
4. Start the engine on the vehicle with the good battery, then start the mower.
5. Disconnect and remove the cables from the charged battery first.

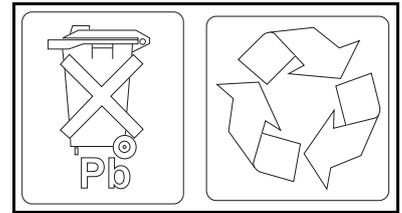
7.10.6 CHARGING THE BATTERY

Read the battery charger manual for specified instructions on the operation of the battery charger.

Remove the battery from the mower before you charge the battery. Check the level of the electrolyte is above the plates in all of the cells, unless the battery is a closed unit.

Make sure the battery charger is turned OFF, then connect the battery charger to the battery terminals as shown in the battery charger manual.

Always turn OFF the battery charger before you disconnect the battery charger from the battery terminals.



WARNING

The battery can release hydrogen gas that is explosive. Work in an area with good ventilation and shield from any type of ignition.

Always connect the negative jumper cable to the frame of the mower with the drained battery.

7 MAINTENANCE

7.10.7 TYRES

Check the tyre pressure as indicated in the Maintenance and Lubrication Charts, while the tyres are cool. Use an accurate low-pressure tyre gauge.

Keep the tyres inflated at the correct pressure and do a check each day for wear (see section 3)

CAUTION

Do NOT try to put a tyre on the rim unless you have the training, tools and experience. Incorrect mounting can cause injury.

7.10.8 WHEEL MOUNTING PROCEDURE

Remove any contaminants, grease or oil from the stud threads. Do not lubricate threads.

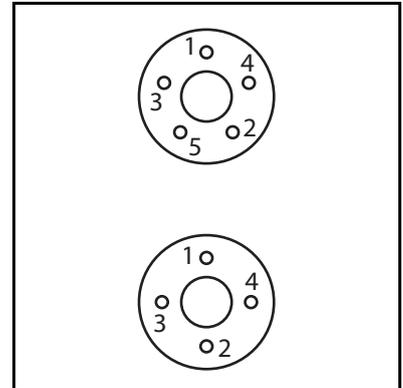
Put the wheel on the hub. Inspect the wheel to make sure of full contact between surface of wheel and hub.

Tighten all hardware with your fingers, then torque hardware in the order shown. Tighten each of the nuts in the top position (1).

Check and torque hardware as indicated in the Maintenance and Lubrication Charts. Torque wheel nuts as follows:

Front wheels 112 ± 10 Nm (83 ± 7 lbf-ft).

Rear wheels 75 ± 10 Nm (55 ± 7 lbf-ft)



WARNING

Make sure the mower is parked on a solid and level surface. Never work on a mower that is supported only by the jack. Always use jack stands.

If only the front or rear of the mower is lifted, put the chocks in front of and behind the wheels that are not lifted.

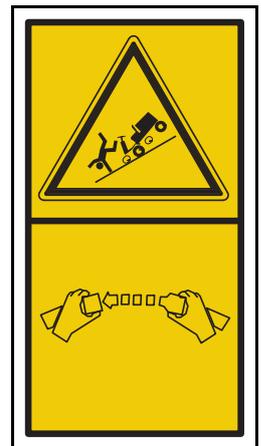
7.10.9 ROPS

A Roll Over Protective Structure (ROPS) is included with this mower. Inspect the ROPS as indicated in the Maintenance chart for loose hardware or damage.

CAUTION

Keep the ROPS hardware correctly fastened. Do not do any welding operations.
Do not drill, change or bend the ROPS. Replace damaged ROPS. Do not try to correct a damaged ROPS.

Inspect the seat, seat belt, ROPS mounting hardware and ROPS frame for damage. Replace all damaged parts immediately. All the replacement parts for the ROPS must be approved by Ransomes Jacobsen Limited as shown in the Parts Manual.
Check and torque all ROPS hardware as indicated in the Parts Manual.



DANGER

The seat belt must always be worn. The ROPS frame must be in the position for operation.

This instruction is given to meet:

The Machinery Directive, 2006/42/EC sections 3.2.2, seating & 3.4.3, rollover. (ANSI B71.4-2012 section 20.7)

Ransomes Jacobsen recommends that the owner operator of the machine complete a local risk assessment on the machine to find any conditions that do not follow this rule.

7 MAINTENANCE

7.10.10 CARE AND CLEANING



CAUTION

To prevent fire, clean the grass clippings and debris from the cutting units, drives, engine and exhaust components.

Clean the mower and cutter decks after each use. To prevent damage to the engine, do not wash the mower with the engine in operation

NOTICE

Do not wash any part of the mower that is hot. Do not use the high-pressure spray or steam. Use only cold water and automotive cleaners. When you use compressed air, use the correct eye protection.

Use clean water to wash your equipment.



CAUTION

It is important not to use high pressure water to clean radiator fins. Do not pressure wash engine.

NOTICE

The use of salt water or grey water is known to cause rust and corrosion of metal parts and can cause damage or failure. This damage is not covered by the factory warranty.

Do not spray water at the instrument panel, ignition switch, controller or other electrical components or at bearing housings and seals.

Clean all plastic or rubber parts with a weak soap solution or use commercially available rubber cleaners.

To keep the original high polish of the plastic parts, wax with a good grade of one-step cleaner wax.

Repair damaged metal surfaces and use Jacobsen touch-up paint. Apply wax to the equipment for maximum paint protection.



WARNING

Never use your hands to clean the cutting units. Use a brush to remove the grass clippings from the blades. The blades are sharp and can cause injuries.

7.10.11 MOWER STORAGE

General

1. Clean the mower and lubricate. Repair and paint damaged or open metal.
2. Inspect the mower, tighten all hardware, replace worn or damaged components.
3. Drain and fill the radiator as indicated in the Maintenance and Lubrication Charts.
4. Drain fuel tank.
5. Clean the tyres.
6. 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. Decrease the tyre pressure before the vehicle is put into operation.
7. Keep the mower and all accessories clean, dry and protected from the elements. Never keep the mower near an open flame or spark which can cause ignition of the fuel or fuel vapors.
8. When a label is damaged or removed from the machine, make sure that the label is replaced. See the Decals section 4 of this manual or the Parts Manual.

Battery

1. Remove, clean and keep the battery in the upright position on a surface that is not metal in a cool dry location. To prevent increased battery discharge, do not keep the battery on a metal surface.
2. Check and charge the battery every 60 to 90 days.
3. Keep the battery in a cool dry location. To decrease the self discharge rate, the temperature must not be more than 80° F (27° C) or less than 20° F (-7° C).

Engine

1. While the engine is warm, remove the drain plug, drain the oil from the crankcase and change the oil filter. Install the drain plug and fill the engine with oil.
2. Clean the outside surface of the engine. Paint bare metal or apply a thin layer of rust preventative oil.

Cutting Units

1. Completely clean the cutting units. Repair and paint any damaged or bare metal surfaces.
2. Lubricate all grease fittings and friction points.
3. Apply a thin layer of rust preventative oil to the sharpened edges of the blades



CAUTION

The cutting unit blades can have sharp edges.
To prevent injury, use caution when you service or hold the blade.

After Storage

1. Check and install the battery. If necessary, charge the battery.
2. Check or service the fuel filter and air cleaner.
3. Check the radiator coolant level.
4. Check the level of engine oil and hydraulic fluid.
5. Fill the fuel tank with fuel. Bleed the fuel system.
6. Make sure the tyres are correctly inflated.
7. Remove all oil from the blades. Adjust the cutting height.
8. Start the engine at 1/2 throttle. Allow the engine to become warm and lubricated.



WARNING

Never operate the engine without enough ventilation or in an enclosed area.
The carbon monoxide in the exhaust fumes can increase to dangerous levels.

8 ADJUSTMENTS

7.1 GENERAL PRECAUTIONS

WARNING

When you clean, adjust or repair this equipment, lower all the cutting units to the ground. Engage the parking brake switch, stop the engine and remove the key. Make sure the mower is parked on a solid and level surface. Never work on the mower, if the mower is only supported by the jack. Always use jack stands.

A trained technician must always do the adjustments and maintenance.

Inspect the equipment according to the maintenance schedule and keep complete records.

1. Keep the equipment clean.
2. Keep all the moving parts correctly adjusted and lubricated.
3. Replace worn or damaged parts before you operate the mower.
4. Keep all fluids at the correct level.
5. Keep the guards in position and all hardware tight.
6. Keep the tyres inflated to the correct pressure.
7. Do not wear jewelry or loose fitting clothing, when you make adjustments or carry out maintenance.

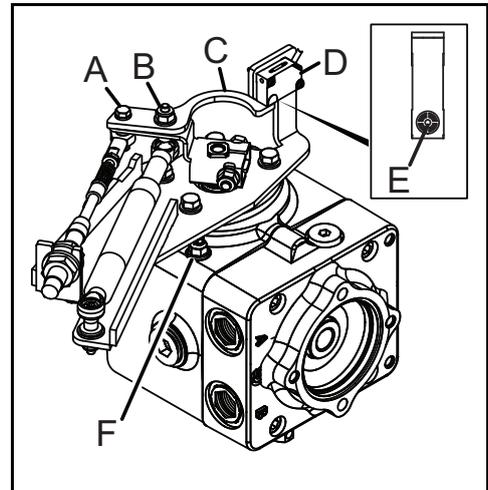
Refer to the illustrations in the Parts Manual for the removal and assembly of parts.

When you discard hazardous materials (batteries, lubricants, fuel, anti-freeze), follow your local, state or federal-recommended procedures.

7.2 TRACTION CONTROL

The LPV transmission pump has a maintenance free drive limiter. If the machine does start to move slowly at idle speed, do this maintenance.

1. Lift and safely support the vehicle with all wheels off the ground.
2. Remove the ball-joint A from pump lever B to allow the pump to become neutral.
3. Start the engine, manually move the pump control lever and release to make sure the wheels stop rotating.
4. Where it has been identified that the transmission pump is not returning to neutral, adjust the mechanical neutral (F) within the pump (**This should only be adjusted by a trained technician**).
5. Operate the foot pedal to make sure the cable is free.
6. Attach the ball joint A to pump lever B.
7. Move the foot pedal through forward and reverse to make sure there is no movement at the idle speed with the drive in the Neutral position.

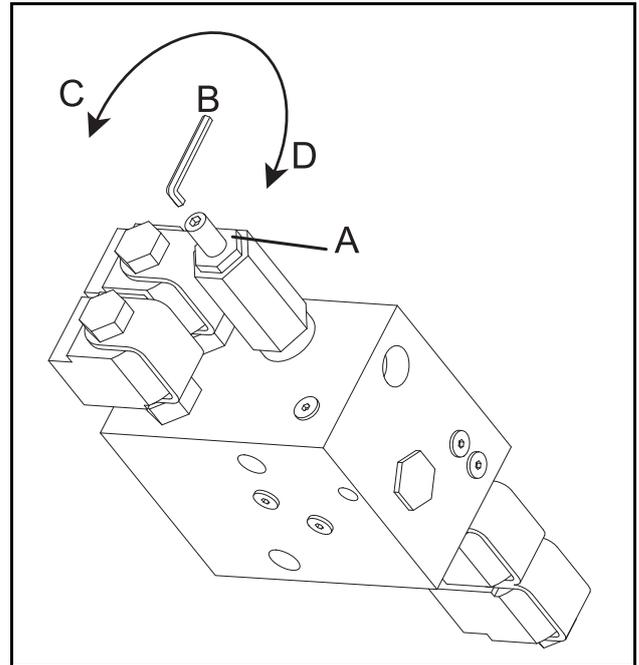


7.3 WEIGHT TRANSFER ADJUSTMENT

The weight transfer bias can be adjusted on the lift valve. The valve is accessible from the front of the machine and is situated under the right hand side of the footplate when facing the machine (left hand side when viewed from the operating position).

To adjust.

1. Loosen the locknut A. Hold the threaded shaft with the Allen Key B.
2. Use the Allen key B rotate the shaft in the direction D to increase the weight on the drive wheels. To decrease the weight transfer to the drive wheels, rotate the shaft in direction C. When the traction control button is operated on the control pod, the weight distribution you set will engage. Use the Weight Transfer to adjust for the cutting unit movement on rough ground and for traction on slopes. To set the Weight Transfer, use 1/4-turn at a time then test the weight transfer.
3. Hold the threaded shaft with the Allen Key B. Tighten the Locknut A.

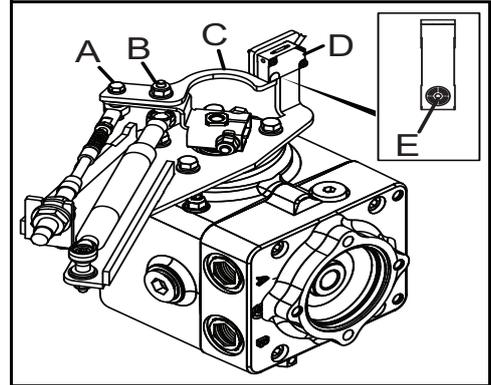


8 ADJUSTMENTS

7.4 NEUTRAL SWITCH ADJUSTMENT

The mower has a proximity switch (D) located on the traction pump, which signals the controller when the traction pedal is in the Neutral position. The proximity switch has a red LED to signal when the switch contacts are closed. To adjust the neutral switch:

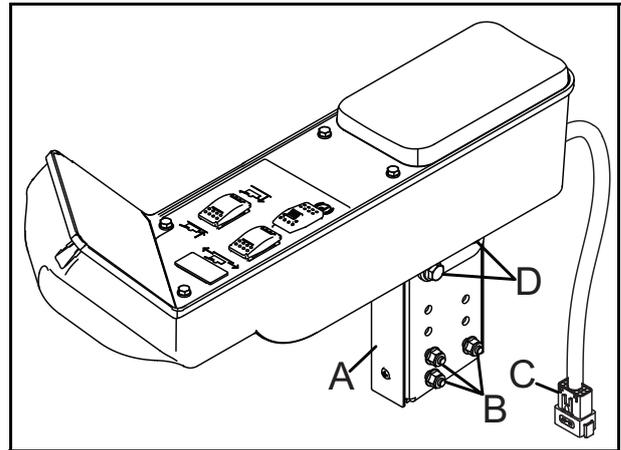
1. Turn the ignition switch to the "Run" position to provide power to the neutral switch (D). Do not start the engine.
2. Adjust the neutral switch (D) as required to get an 1/8 to 3/16 in. (0.3 to 0.5 cm) air gap between the switch and the lift arm.
3. Loosen the traction cable hardware (A) and the damper hardware (B). Adjust the bracket (C) until bracket is centred under the sensing portion of the switch (E). The switch contacts will close and the red LED will turn on. Tighten hardware (A and B).



7.5 ARMREST HEIGHT ADJUSTMENT

The armrest has three available height settings and can tilt for the operator.

1. Stop the engine and remove the key.
1. Remove the hardware cover (A).
2. Remove the armrest hardware (B) from the bracket on the right side of the seat.
3. Lift or lower the armrest as needed until another set of holes in the armrest bracket align with the seat bracket. Install the armrest hardware (B).
4. To adjust the armrest angle, loosen screws (D) and lift or lower the front of the armrest.
5. After you adjust the armrest, check the armrest wire harness connector (C) for a tight connection to the mower harness.
6. Install the hardware cover (A).



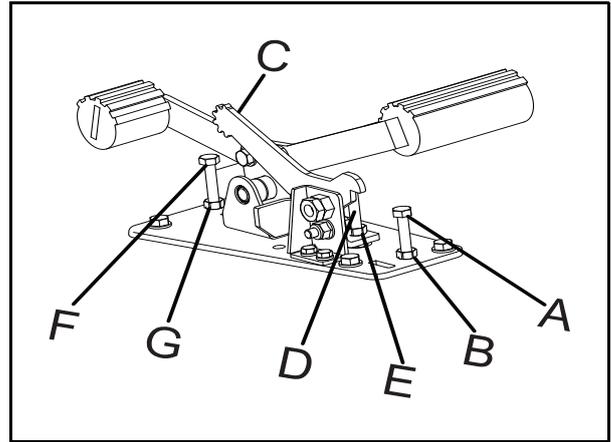
7.6 TRACTION PEDAL STOPS

The traction pedal has three pedal stops to limit the speed of the mower.

The forward transport speed stop (A) is used to set the maximum transport speed. Make sure the mow speed lever (C) is in the transport position. Loosen nut (B) and adjust the stop to set the desired speed. Tighten the nut.

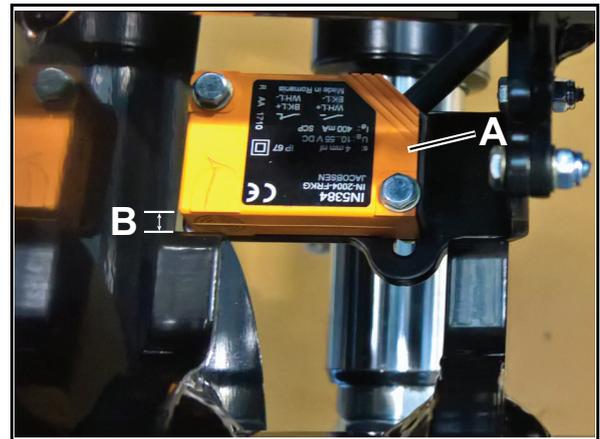
The forward mow speed stop (D) is used to set the maximum mow speed. Rotate the mow speed lever (C) to the mow position. Loosen nut (E) and adjust the stop to set the desired speed. Tighten the nut.

The reverse speed stop (F) is used to set the maximum reverse transport speed. Loosen nut (G) and adjust the stop to set the desired speed (See section 12.3 for specifications).



7.7 CUTTING UNIT LIMIT SWITCH

The mower has a proximity switch (A), which signals the cutting circuit to turn off the blades. The switch is installed on the mower frame behind the centre lift arm. If the blades continue to rotate when lifted or do not rotate when lowered, inspect the switch. Adjust or replace the switch as required. The proximity switch has a red LED to signal when the switch contacts are closed.



To adjust switch:

1. Park the mower on a flat and level surface.
2. Lower the cutting units.
3. Remove the cutting unit from the centre lift arm.
4. Raise the remaining cutting units into the cross cut position.
5. Remove the access panel from within the operators platform.
6. Turn the ignition switch to the RUN position to activate the electrical system. Do not run the reels or start the engine.
7. Adjust the lift arm switch (A) as required to get an 0.3 to 0.5 cm (1/8 to 3/16 in.) air gap between the switch and the lift arm (B) until the switch contacts close and the red LED turns on. Fasten the switch in this position.
8. Start engine and lower the cutting units to the ground.
9. Install centre cutting unit.
10. Test vehicle and make sure that the reels turn off when lifted above 400 mm.

8 ADJUSTMENTS

CUTTING UNITS MODELS - 068093,068094, 068097.

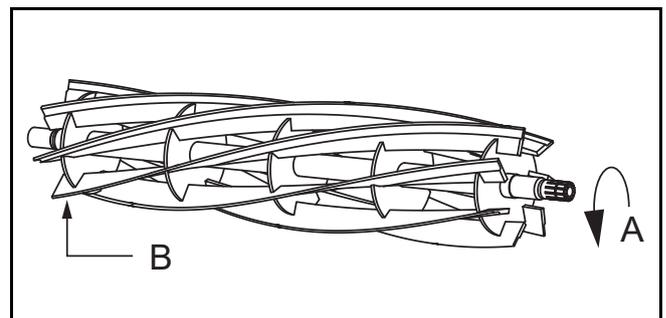
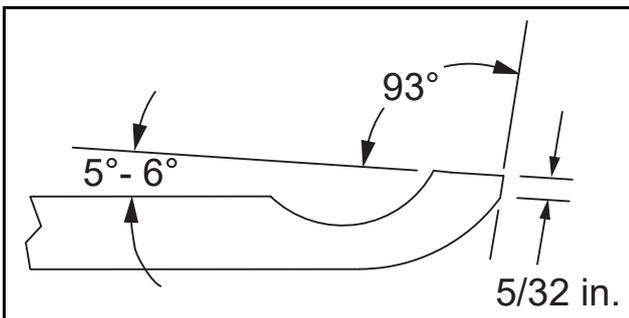
7.8 REEL TO BEDKNIFE

1. Check the reel bearings for end play or radial play. If there is any abnormal movement of the reel, up and down or side to side, adjust or replace components as needed

CAUTION

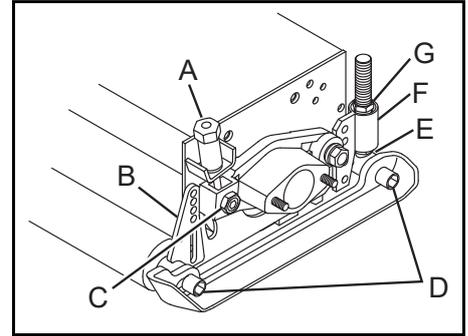
To prevent personal injury and damage to the cutting edges, handle the reel with extreme care.

2. Inspect the reel blades and bedknife to insure good sharp edges without bends or nicks.
 - a. The cutting edges of the reel blades and bedknife 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 5/32 in. (4 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 in. (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).



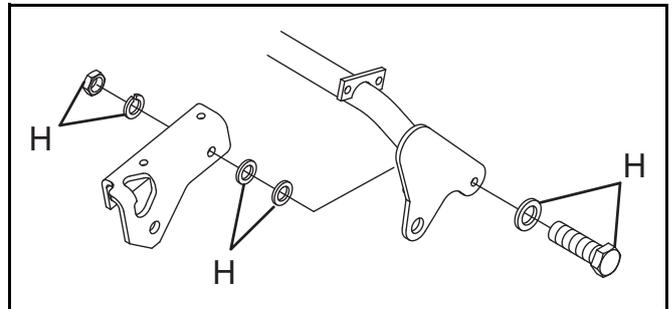
7.9 BEDKNIFE ADJUSTMENT

1. Read **Section 5.13** before making the adjustment.
2. Start adjustment at the leading edge of the reel, followed by the trailing end. The leading end of the blade is the end that passes over the bedknife first during normal rotation.
3. Loosen nut (**C**) 1/4 turn on both ends of the cutting unit.
4. Turn adjuster (**A**) in 1/16 to 1/8 turn increments.
5. Slide a feeler gauge or shim stock .001 in. (.025 mm) between the reel blade and the bedknife. Do not turn reel.
6. Adjust the trailing end of the reel in the same manner then recheck the adjustment at the leading end.
7. Tighten all hardware and recheck the adjustment.
8. When properly adjusted, the reel will spin freely, and you should be able to cut a pieces of “reel to bedknife setting paper” (Jacobsen part number 4185600) along the reel.



7.10 CUTTING MODES

1. The mower may be operated in the Fixed Mode or the Floating Mode.
2. Fixed Mode is generally used for cutting heights greater than 1 in. (25 mm) and the mower does not require a front roller unless the terrain is rough and uneven.
3. If a front roller is required, the roller should be raised 1/4 in. (6 mm) higher than the rear roller and used for anti-scalp purposes only.
4. Floating Mode is generally used for cutting heights less than one inch (25 mm) and a front roller is required.
5. If a 2-1/2 in. (63 mm) solid front roller is used, the cutting height will range from 3/8 to 2-1/8 in. (9 to 54 mm).
6. If a 3 in. (76 mm) grooved front roller is used, the cutting height will range from 3/8 to 2-1/4 in. (9 to 57 mm).
7. To convert the mower from Fixed to Floating Mode, remove hardware (**H**) from each side of the three mower frames.
8. Install a front roller and store hardware (**H**) for future conversion to fixed mode.
9. To convert the mower from Floating to Fixed Mode, assemble hardware (**H**) as shown and remove or raise the front roller.

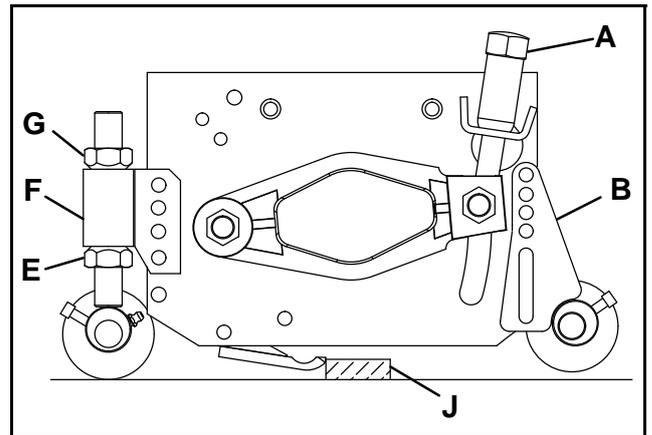
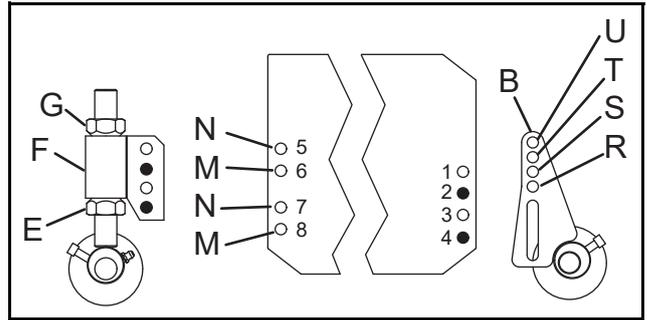


8 ADJUSTMENTS

7.11 CUTTING HEIGHT ADJUSTMENT

1. Raise and lock the lift arms in transport mode.
2. For easier access to the height adjusters on the motor end of the front reels, Jacobsen recommends raising the front end of the mower just a few inches off the ground then, being careful not to damage the hydraulic hoses, tilt the front mowers 90 degrees, and tether the mowers together.
3. On the rear mower (centre) remove the pin and collar on the shaft and slide the mower backwards.
4. Always make the reel-to bedknife adjustment (**Sections 5.13 and 7.12**) **before** making the cutting height adjustment.
5. Select Fixed or Floating Mode and convert the mower accordingly.

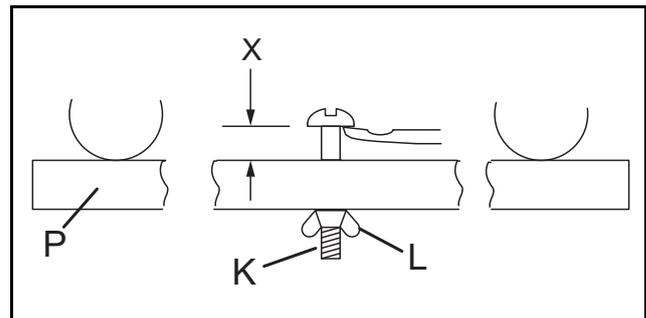
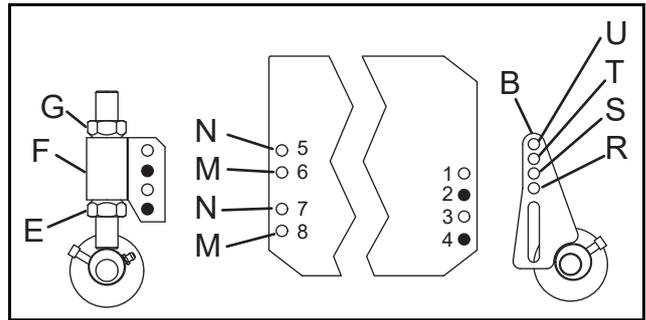
Loosen skid mounting hardware (**D - Figure 5N**) then adjust the cutting height. (A special tool is provided with the mowers. A 5/8 in. socket and ratchet are required).



7.12 CUTTING HEIGHT FLOATING

Follow the procedures outlined in Section 7.14.

1. Assemble the front roller adjuster (**B**) to holes number 2 and 4 only of the mower frame. Do not use hole numbers 1 and 3. Refer to the chart below for correct hole of front roller adjuster to use.
2. Reposition the rear roller adjusters (**F**).
 - a. For cutting heights from 3/8 to 1-3/4 in. (9 to 44 mm), use holes (**M**) on the mower frame, and two holes (shown in black) of adjuster (**F**) as shown.
 - b. For cutting heights greater than 1-3/4 in. (44 mm), disassemble adjuster (**F**) and turn the mounting bracket upside down; then use holes (**N**) of the frame, and the two holes (shown in black) of adjuster (**F**).
3. Loosen nut (**L**) and adjust screw (**K**) to obtain desired cutting height (**X**) then lock nut (**L**) against gauge (**P**).
4. Place one end of the gauge under the front roller at either end of the reel, and slide the head of screw (**K**) over the bedknife.
 - a. Adjust nut (**G**) to lower the rear roller to the gauge, then tighten nut (**E**) against the adjuster.
 - b. Move the gauge to the other end of the reel and repeat Steps 4a and 4b.



Range of Cut					
Grooved Roller		Solid Roller		Front	Rear
Inches	Millimeters	Inches	Millimeters		
3/8 - 3/4	10 - 19	3/8 - 5/8	10 - 16	R	M
3/4 - 1-1/4	19 - 32	5/8 - 1-1/8	16 - 29	S	M
1-1/4 - 1-3/4	32 - 44	1-1/8 - 1-5/8	29 - 41	T	M
1-3/4 - 2-1/4	44 - 57	1-5/8 - 2-1/8	41 - 54	U	N

8 ADJUSTMENTS

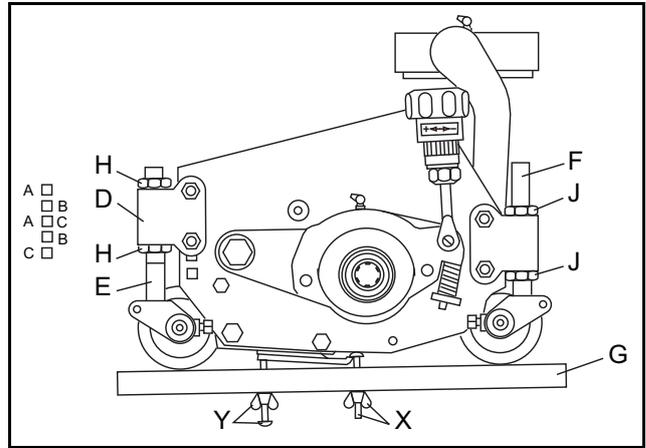
CUTTING UNITS LMAC195 / LMAC196 / LMAC197

7.13 HEIGHT OF CUT

It is important to set the rear roll parallel to the bedknife in order to achieve the minimum height of cut setting for the three ranges of height, in the three sets of mounting housing (D) bolt holes. Positions 'A', 'B' & 'C'.

Setting the minimum height with the mounting housings (D) in position 'A' will allow minimum height and parallelism to be achieved in each of the other two positions 'B' & 'C'.

Once the range has been chosen the actual height of cut is set by adjusting the front roll only by carriage screw (F) and locknuts (J).



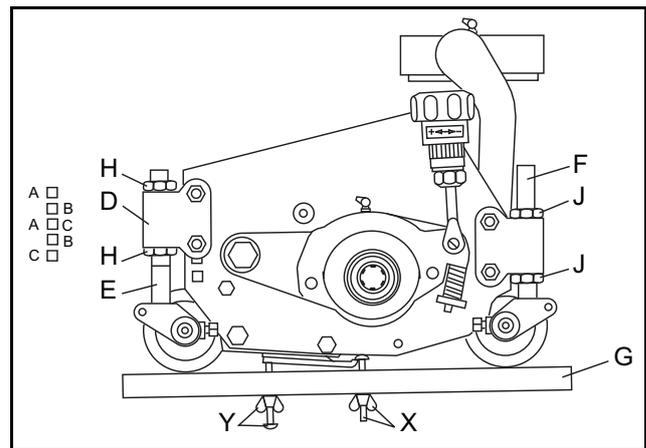
7.14 TO SET REAR ROLL

With a new bedknife

1. Set the height of cut setting bar (G) as follows:
 - a. Screw X to 12mm (15/32in) under the head.
 - b. Screw Y to 6.5mm (1/4in) to screw thread tip.

Note: The difference between screw X and screw Y is 0.8mm (1/32").

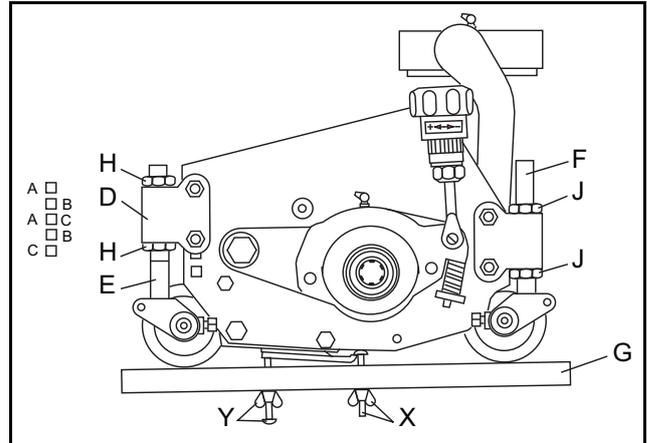
2. Set roll carriage mounting housing (D) bolts into holes 'A'.
3. Place the setting bar (G) as shown at one end of the bottom blade with the screw head X over the lip and screw thread Y tip against base of blade.
4. Adjust the roll to the setting bar (G) with the two locknuts (H) holding setting bar screws in contact.
5. Repeat for other end of bedknife.



7.15 SET HEIGHT OF CUT

Chose the range of height in which cutting is to be carried out and then adjust front roll only.

1. Preset the height of cut setting bar (G) as follows:
 - a. Screw X to the required height of cut under the head.
 - b. Screw Y is not used.
2. At one end of the bedknife lay setting bar (G) on rear roll with screw head over bedknife lip.
3. Adjust front roll to the setting bar by means of the two front locknuts (J).



CAUTION

The height of cut range for each set of holes takes into account the requirement of the cutting unit to float. Increasing the maximum height of cut in any of the hole setting ranges could restrict the ability of the cutting unit to float.

Height of Cut Range	Minimum Height of Cut	Maximum Height of Cut
Holes 'A'	12 mm	19 mm
Holes 'B'	19 mm	35 mm
Holes 'C'	27 mm	47 mm

8 ADJUSTMENTS

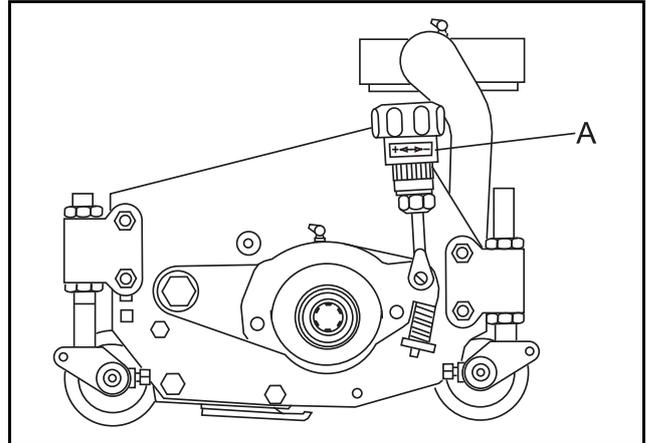
7.16 REEL TO BEDKNIFE ADJUSTMENT

To check that the reel is set to the bedknife correctly, hold a piece of Jacobsen “Reel to bedknife setting paper” between the edge of the blade and the spiral cutters and turn the reel manually.

The paper should be cut cleanly along the total length of the bedknife, if not, some adjustment may be necessary, **BUT DO NOT OVERTIGHTEN**. Alternatively if the cylinder is worn it may require back lapping before adjusting.

To adjust:

To adjust the reel to the bedknife lift and turn alternately left and right hand handwheels (A) either clockwise to put on cut or anticlockwise to take off cut, and release, keep turning the handwheel until it locates into the serrated locking ring.



The adjuster is of the notched type and each notch is moving the cylinder in increments of approximately 0.04mm (0.0015in).

NOTICE

This is a self locking mechanism.

NOTICE

In rough ground conditions it may be necessary to lock the nuts securing the bearing housings to the side frame where they run in adjusting slots to retain reel to bedknife settings.

The nuts should normally be tightened fully and then backed off 1/2 a turn to allow handwheel adjustment without the need to unlock the nuts first.

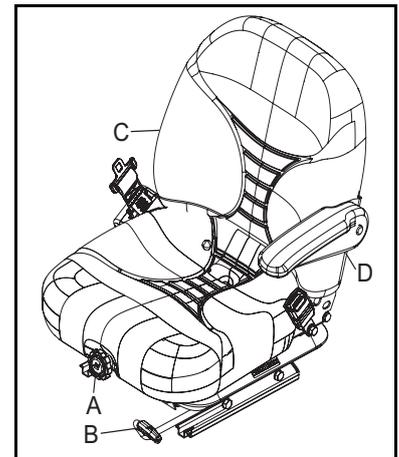
7.17 SEAT (MILSCO V-2853) STANDARD

Adjust the seat to the best location based on leg reach.

A. FORE AND AFT ADJUSTMENT.

To Adjust.

The adjusting lever is on the left hand side of the seat below the seat cushion (B). By moving the lever upwards, the seat can slide backwards and forwards. When in the desired position release the lever to lock the seat into one of the pre-set positions.



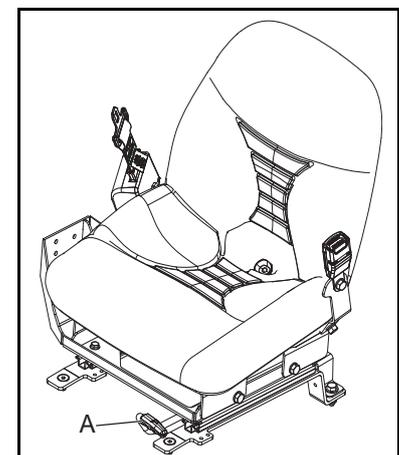
7.18 SEAT (MICHIGAN V-5300) PREMIUM

Adjust the seat to the best location based on leg reach.

A. ADJUSTMENT FOR OPERATOR WEIGHT

To Adjust.

Whilst standing in front of the machine, rotate knob (A) clockwise or anticlockwise to move the red indicator to the approximate operator weight.



WARNING

The Operator Weight must be set to the actual weight of the Operator. Safety Systems will be compromised if this is not done.

B. FORE AND AFT ADJUSTMENT.

To Adjust.

The adjusting lever is on the left hand side of the seat below the seat cushion (B). By moving the lever upwards, the seat can slide backwards and forwards. When in the desired position release the lever to lock the seat into one of the pre-set positions.

C. BACKREST ADJUSTMENT.

To Adjust.

Rotate the adjuster (C) clockwise or anticlockwise until a comfortable position is achieved.

D. ARM REST ADJUSTMENT.

To Adjust.

Raise the arm rest to the vertical position and rotate the adjustable stop to achieve a comfortable position.

NOTICE

Adjust the seat to make sure all controls are within reach and will operate through the full range of movement.

1. The seat has a microswitch fitted to sense that the operator is in the seat, therefore it is important to set the seat to match the operators weight.
2. Set the seat position for distance from the traction pedal, check that you can reach all the controls.
3. Set the seat so that you can see the cutting units and area around them.

9 PROBLEM SOLVING

9.1 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 coolant 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.

10 QUALITY OF CUT

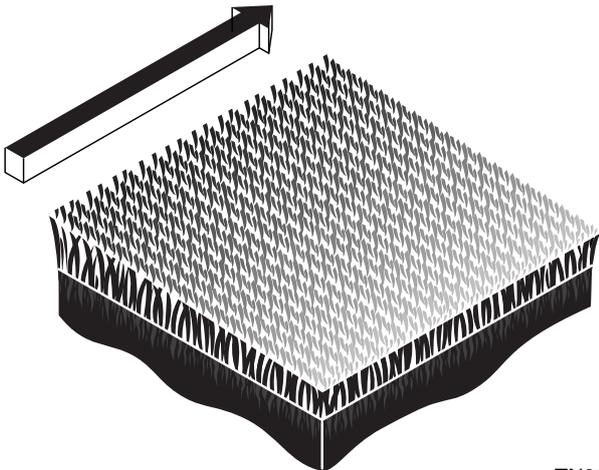
10.1 QUALITY OF CUT PROBLEM SOLVING

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

10.2 STEP CUTTING



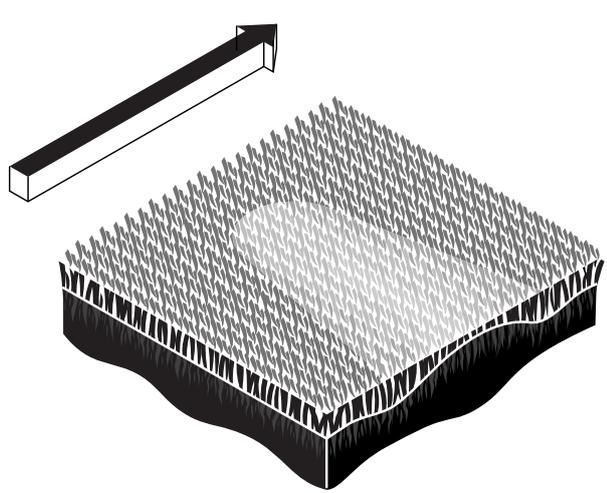
“Step cutting” occurs when the grass is cut higher on one side. The cause is mechanical wear or incorrect setting of the roller or deck caster.

TN0221

NOTE: Arrow indicates direction of travel.

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 4)
General wear and tear of the machine.	Check machine for any damaged or worn parts.

10.3 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.

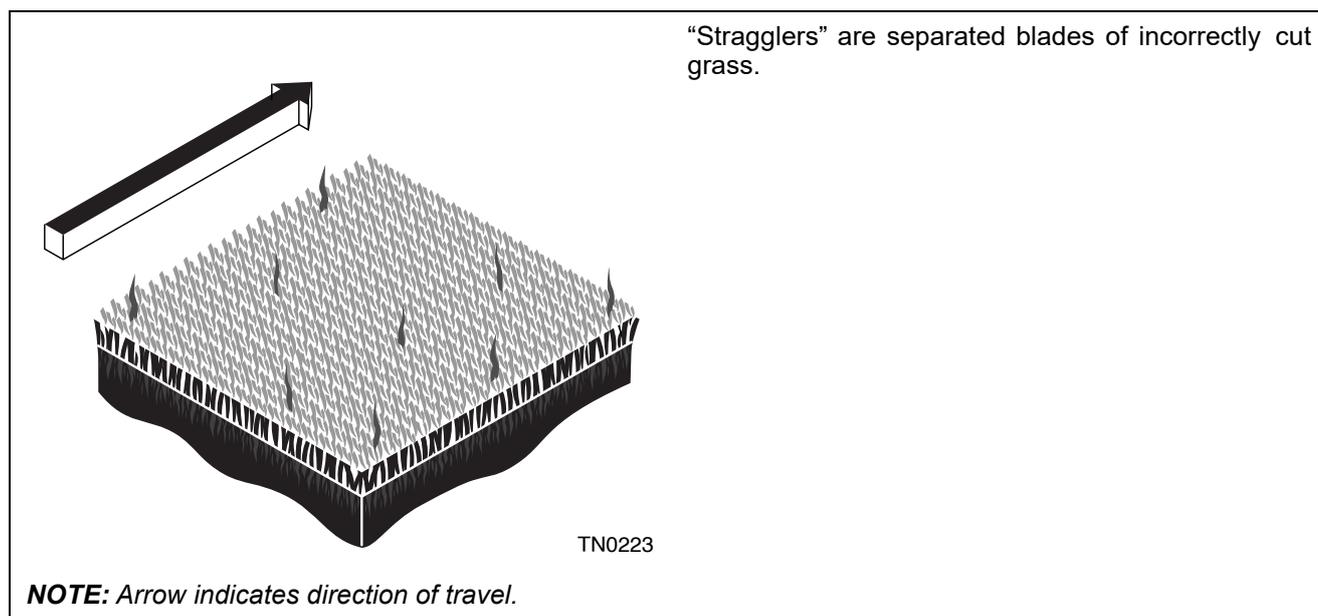
TN0222

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 9.9)
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

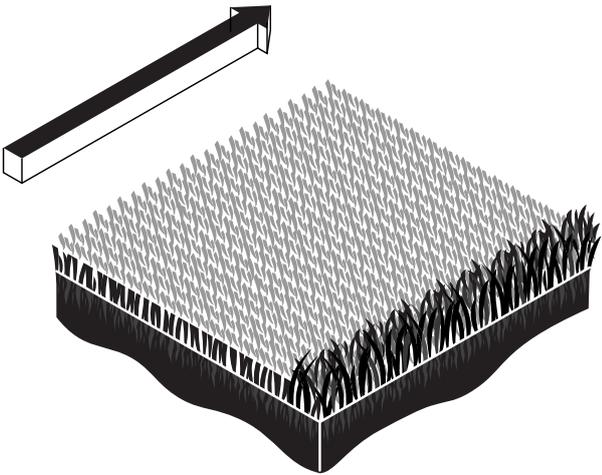
10 QUALITY OF CUT

10.4 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.

10.5 STREAKS



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

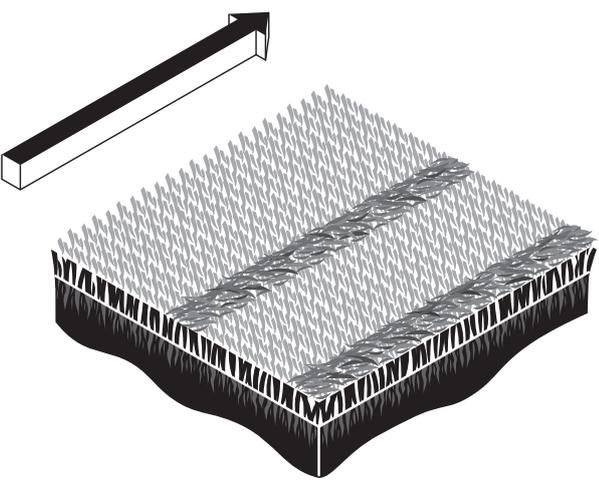
TN0224

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 cast or 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.

10 QUALITY OF CUT

10.6 WINDROWING



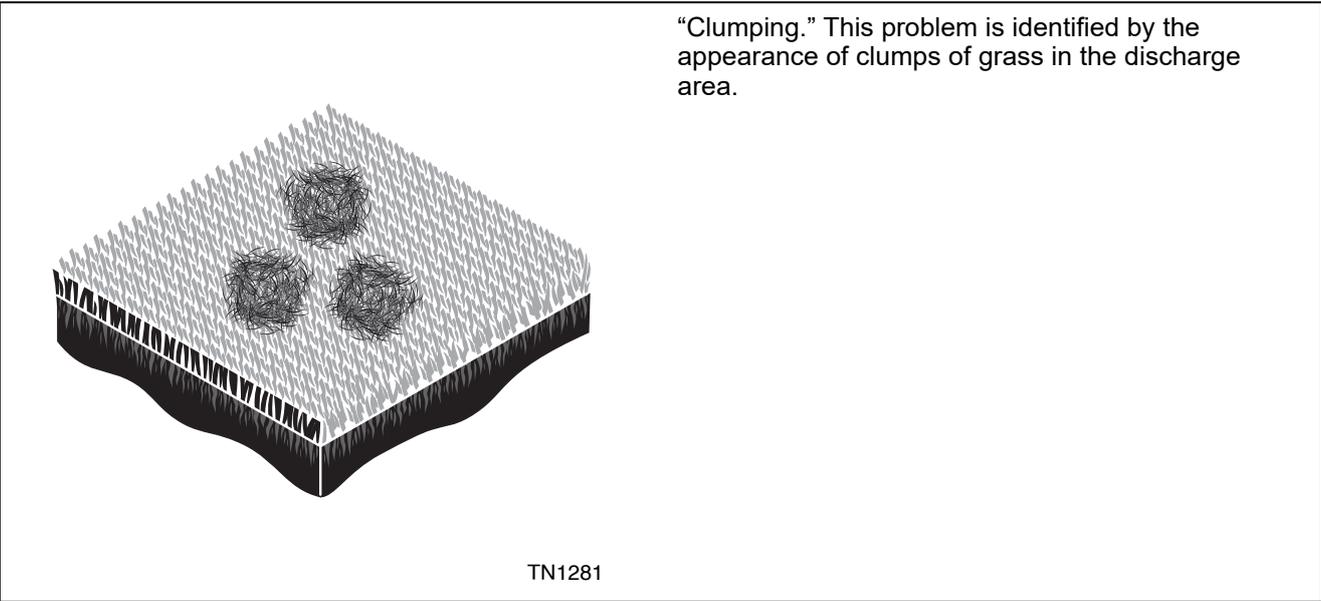
“Windrowing” is an increase of cut grass arranged in rows in the discharge area of the rotary cutting implement, this appears as cut grass in the direction of travel.

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.

10.7 CLUMPING

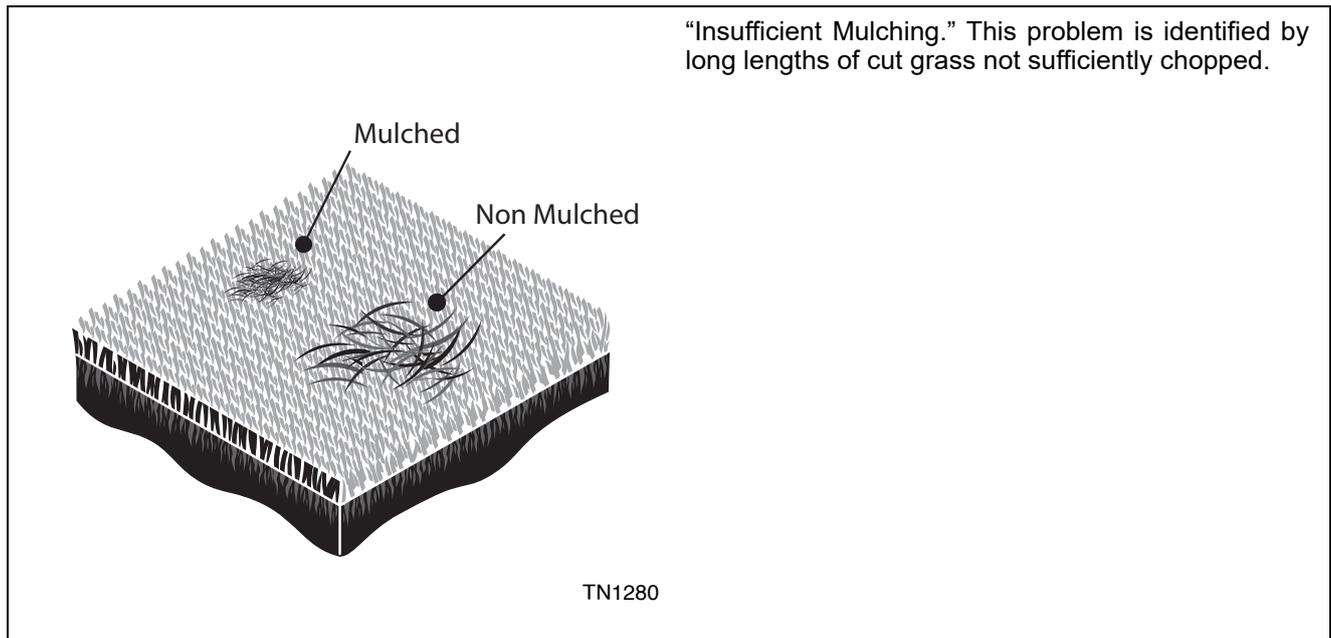


“Clumping.” This problem is identified by the appearance of clumps of grass in the discharge area.

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.

10 QUALITY OF CUT

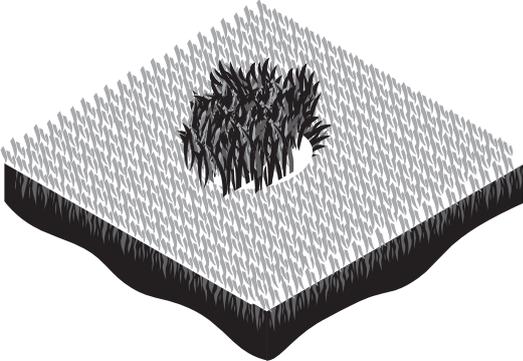
10.8 INSUFFICIENT MULCHING



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.

10.9 TORN CROWNS

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

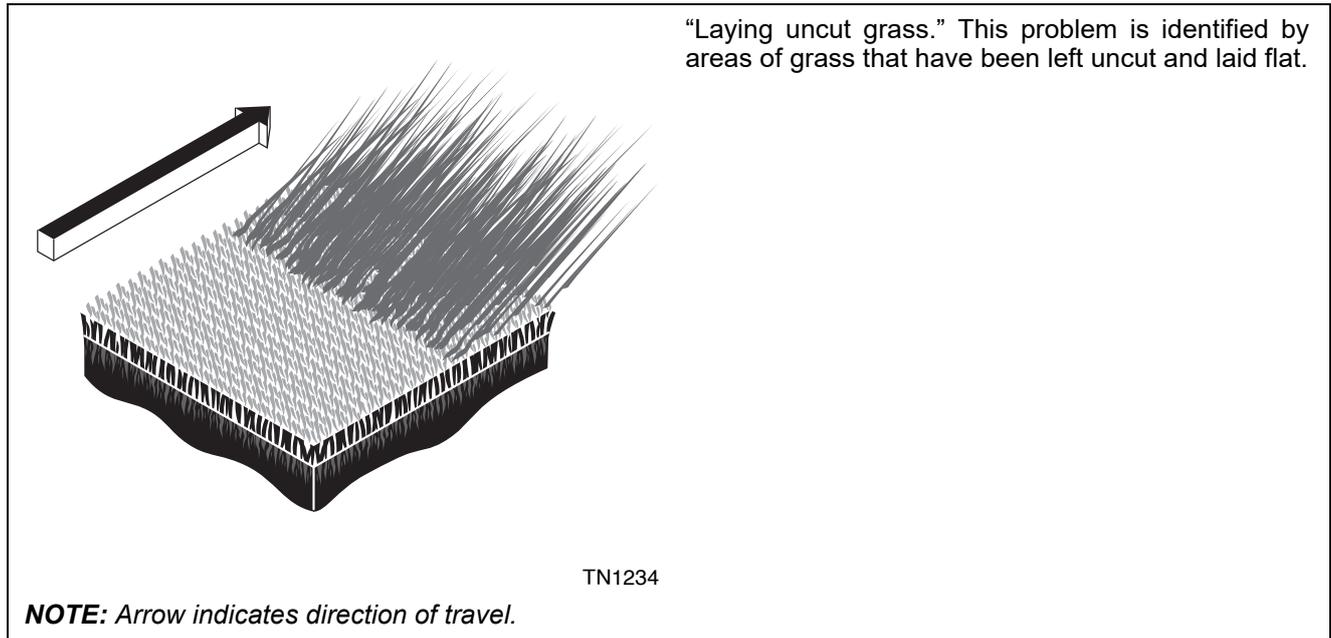


TN1234

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.

10 QUALITY OF CUT

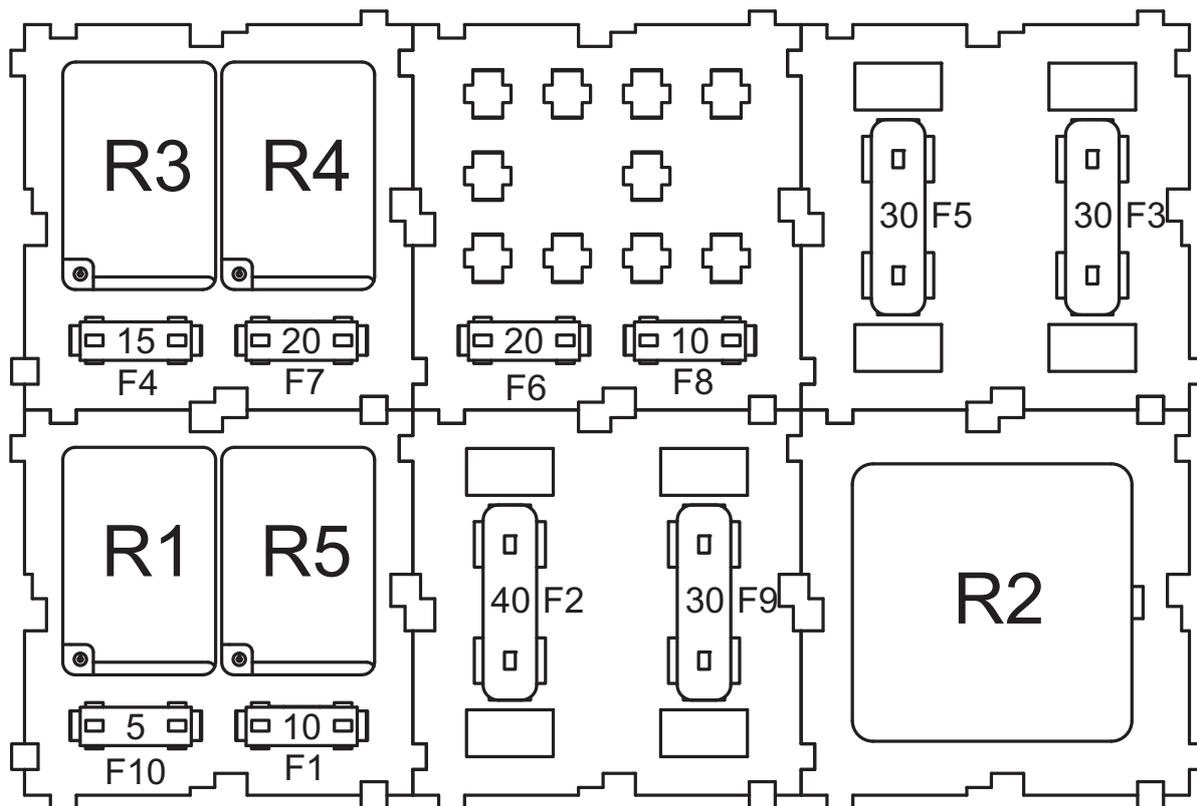
10.10 LAYING UNCUT GRASS



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.

11 SCHEMATICS

11.1 FUSE AND RELAY/COMPONENT IDENTIFICATION



FUSES

Component	Rating	Type	Description
F1	10 Amp	Mini	Accessory Socket, 4WD Relay (R5).
F2	40 Amp	Mini	Glow Plug Relay (R2), Glow Plugs.
F3	30 Amp	Mini	Run Relay (R1).
F4	15 Amp	Mini	Console Interlock, Work Light.
F5	30 Amp	Mini	Fan Power.
F6	20 Amp	Mini	Marlin Controller Power Feed (Pin 6 &7), Ignition Run.
F7	20 Amp	Mini	Marlin Controller Power Feed (Pin 1 &4), Run Relay.
F8	10 Amp	Mini	Cross Cut Switch, Console Interlock, Forward Proximity Switch, Seat Switch, Seat Switch (Air Ride Seat, Fan Relay (R4).
F9	30 Amp	Mini	Starter Relay (R3), Starter Motor.
F10	5 Amp	Mini	Run Relay (R1), Marlin Controller.

RELAYS

Component	Rating	Type	Description
R1	SPDT N/C=20 Amp + N/O 35 Amp	Micro 280	Run Relay (Part Number 4333409), also known as K1.
R2		Standard	Glow Plug Relay (Part Number 4193880), also known as K2.
R3	SPDT N/C=20 Amp + N/O 35 Amp	Micro 280	Starter Relay (Part Number 4333409), also known as K3.
R4	SPDT N/C=20 Amp + N/O 35 Amp	Micro 280	Fan Relay/ Fan Control (Part Number 4333409), also known as K4.
R5	SPDT N/C=20 Amp + N/O 35 Amp	Micro 280	4WD Relay (Part Number 4333409), also known as K5.

12 TORQUES

12.1 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

13.1 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.

Take

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