JACOBSEN
A Textron Company

Safety, Operation & Maintenance Manual

Eclipse® 322 Riding Greens Mower with ROPS

62800 – Battery Power, 3WD
62801 – Battery Power, 2WD
62802 – Gas Hybrid Power, 3WD
62803 – Gas Hybrid Power, 2WD
62804 – Diesel Hybrid Power, 3WD
62805 – Diesel Hybrid Power, 2WD
62825 – Diesel Hybrid Power with Premium Seat, 2WD
62826 – Diesel Hybrid Power with Premium Seat, 3WD
62851 – Diesel Hybrid Power, 2WD
62852 – Diesel Hybrid Power with Premium Seat, 2WD
62853 – Diesel Hybrid Power, 3WD
62854 – Diesel Hybrid Power with Premium Seat, 3WD

⚠ WARNING

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

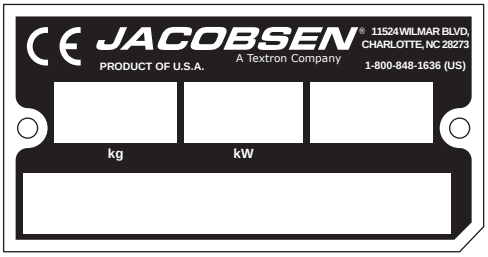
FOREWORD

This manual contains adjustment, maintenance, troubleshooting instructions, and parts list for your new Jacobsen machine. This manual should be stored with the equipment for reference during operation.

Before you operate your machine, you and each operator you employ should read the manual carefully in its entirety. By following the safety, operating, and maintenance instructions, you will prolong the life of your equipment and maintain its maximum efficiency.

If additional information is needed, contact your Jacobsen Dealer.

The serial plate is located on the rear frame rail. Jacobsen recommends you record these numbers below for easy reference.



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These are the original instructions verified by Jacobsen, A Textron Company.

Proposition 65 Warning

This product contains or emits chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

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1.1 HOW TO OPERATE SAFELY

⚠ WARNING

EQUIPMENT OPERATED INCORRECTLY OR WITHOUT TRAINING CAN BE DANGEROUS.

Know the location and correct operation of controls. Operators without experience must receive instruction from another person that knows the correct operation of the equipment before you operate the mower.

Only use parts, accessories and attachments approved by Jacobsen.

SAFE OPERATION

a Read the Operator's Manual and other training material. If the operator or technician can not read this manual, the owner is responsible to describe this material to the operators and technicians. Manuals in additional languages may be available on the Jacobsen or RansomesJacobsen website.

a Read all of the instructions for this mower carefully. Know the controls and the correct operation of the equipment.

b Children or persons who do not understand these instructions must not use the mower. The local regulations can limit the age of the operator.

c Never use a mower near persons, including children or animals.

d Remember that the operator or owner is responsible for accidents or hazards that occur to other persons or their property.

e Never carry passengers.

f Never allow persons to operate or service the mower or its attachments without correct instructions.

g Do not operate equipment while tired, sick or after you use alcohol or drugs.

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.

d Inspect the mower before you operate the mower. Check the tire pressure, engine oil level, the radiator coolant level and the air cleaner indicator. Fuel is flammable. Use caution when you add the fuel to the mower.

e Operate the mower in daylight or in good artificial light. Use caution when you operate the mower during bad weather. Never operate the mower with lightning in the area.

f Inspect the area to select the accessories and attachments that are needed to correctly and safely do the job. Only use parts, accessories and attachments approved by Jacobsen.

g Be careful of holes in the terrain and other hazards that are not visible.

h Inspect the area where the equipment is operated. Remove all objects you can find before you operate. Be careful of obstructions above the ground (low tree limbs, electrical wires) and also underground obstacles (sprinklers, pipes, tree roots). Enter a new area carefully. Look for possible hazards.

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.

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 parking 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 parking 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.

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. 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 the ROPS hardware fastened.

f Do not weld, drill, change or bend the ROPS. Replace a damaged ROPS. Do not try to correct a damaged ROPS.

g Do not remove the ROPS from the mower.

h Jacobsen must approve any changes to the ROPS.

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 (2.5 cm) 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.

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 parking 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 the jack. Always use the jack 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.

f When you put the mower on a trailer or put the mower in storage, close the fuel valve. Do not keep fuel near flames or drain the fuel inside a building.

g 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.

h 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.

i 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.

j 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.

k 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.

l Carefully release the pressure from components with stored energy.

m Keep the mower and the engine clean.

n Allow the engine to become cool before storage and always remove the ignition key.

o Keep all nuts, bolts and screws tight to make sure the equipment is in safe condition.

p Replace worn or damaged parts for safety. Replace damaged or worn decals. Only use parts, accessories and attachments approved by Jacobsen.

q To decrease the fire hazard, remove materials that burn from the engine, muffler, battery tray and fuel tank area.

r Disconnect the battery and controller connectors before you weld on this mower.

WHEN YOU PUT THE MOWER ON A TRAILER

a Be careful when you load or unload the mower on a trailer. 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 straps, chains, cables or ropes to fasten the mower to the trailer. Both front and rear straps must be sent down and toward sides of trailer.

d Make sure that all latches are correctly fastened.

1.2 IMPORTANT SAFETY NOTES

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

DANGER - Indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.

WARNING - Indicates a potentially hazardous situation which, if not avoided, **COULD** result in death or serious injury.

CAUTION - Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury and property damage. It may also be used to alert against unsafe practices.

NOTICE - Indicates a potentially hazardous situation which, if not avoided, **MAY** result in property damage. It may also be used to alert against unsafe practices.

For pictorial clarity, some illustrations in this manual may show shields, guards or plates open or removed. Under no circumstances should this equipment be operated without these devices securely fastened in place.

WARNING

The Interlock System on this mower prevents the mower from energizing unless the operator is in the seat, mow switch is OFF, and traction pedal is in Neutral. The mow, traction, and steering system will be disabled if the operator leaves the seat.

NEVER operate mower unless the Interlock System is working.

WARNING

1. Before leaving the operator's position for any reason:
   a. Disengage mow switch.
   b. Return traction pedal to Neutral and apply foot brake until unit comes to a complete stop. Automatic parking brake light on LDU should be on.
   c. Lower all implements to the ground.
   d. Shut down unit and remove the ignition key.
2. Keep hands, feet, and clothing away from moving parts. Wait for all movement to stop before you clean, adjust or service the mower.
3. Keep the area of operation clear of all bystanders and pets.
4. Never carry passengers, unless a seat is provided for them.
5. Never operate mowing equipment without the discharge deflector securely fastened in place.

By following all instructions in this manual, you will prolong the life of your mower and maintain its maximum efficiency. Adjustments and maintenance should always be performed by a qualified technician.

If additional information or service is needed, contact your Authorized Jacobsen Dealer who is kept informed of the latest methods to service this equipment and can provide prompt and efficient service.

2.1 PRODUCT IDENTIFICATION

62800 ..... Eclipse® 322, 3WD, 48 volt battery power module, power steering. Without batteries or mowers.

62801 ..... Eclipse® 322, 2WD, 48 volt battery power module, power steering. Without batteries or mowers.

62802 ..... Eclipse® 322, 3WD, 14 hp gas engine power module, power steering. Without mowers.

62803 ..... Eclipse® 322, 2WD, 14 hp gas engine power module, power steering. Without mowers.

62804 ..... Eclipse® 322, 3WD, 13.3 hp diesel engine power module, power steering. Without mowers.

62805 ..... Eclipse® 322, 2WD, 13.3 hp diesel engine power module, power steering. Without mowers.

62825 ..... Eclipse® 322, 2WD, 13.3 hp diesel engine power module, power steering, and premium seat. Without mowers.

62826 ..... Eclipse® 322, 3WD, 13.3 hp diesel engine power module, power steering, and premium seat. Without mowers.

62851 ..... Eclipse® 322, 2WD, 13.3 hp T4 diesel engine power module, power steering. Without mowers.

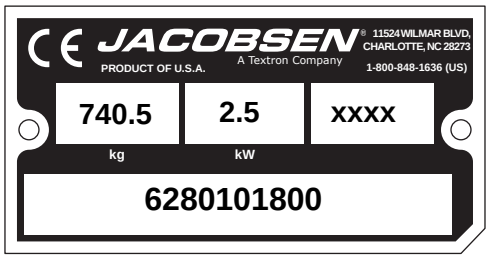
62852 ..... Eclipse® 322, 2WD, 13.3 hp T4 diesel engine power module, power steering, and premium seat. Without mowers.

62853 ..... Eclipse® 322,3WD, 13.3 hp T4 diesel engine power module, power steering. Without mowers.

62854 ..... Eclipse® 322, 3WD, 13.3 hp T4 diesel engine power module, power steering, and premium seat. Without mowers.

Serial Number ..... An identification plate, like the one shown, listing the serial number, is attached to the rear frame of the mower near the steering yoke.

Always provide the serial number of the unit when ordering replacement parts or requesting service information.



2.2 HYBRID ENGINES

62802 and 62803 Gasoline Engine

Make ..... Briggs &Stratton
Model ..... Vanguard V-Twin OHV
Horsepower ..... 13 hp (9.69 kW) @3600 rpm
Displacement ..... 29.3 cu. In. (480 cc)
Torque ..... 26 ft. lbs. (35 Nm) @ 2600 rpm
Fuel:
- Type ..... Unleaded Gasoline
- Rating ..... Min. 85 Octane
- Capacity ..... 5.3 U.S. Gal. (20 liters)

Governor ..... Flyweight Mechanical
Lubrication:
- Capacity ..... 3.5 pints (1.4 liters)
- Type ..... SAE 30W
- API Classification ..... SF, SG, SH

Air Filter ..... Replaceable Dual Element.
Cooling System ..... Air Cooled
Generator:
- Nominal Voltage ..... 48 Vdc
- Max Continuous Power Output ..... 7.8 hp (5.8 kW)
- Max Intermittent Power Output ..... 10.7 hp (8.0 kW)
- Max Current Output ..... 150 A

62804, 62805, 62825 and 62826 Diesel Engine

Make ..... Kubota
Model Z482-E3B
Horsepower..... 13.3 hp (9.3 kW) @3600 rpm
Displacement ..... 29.3 cu. In. (479 cc)
Torque ..... 21 ft. lbs. (28 Nm) @ 2600 rpm
Fuel:
- Type ..... No. 2 Diesel
- Rating..... Min. Cetane rating 45
- Capacity ..... 5.3 U.S. Gal. (20 liters)

Lubrication:
- Capacity ..... 3.4 quarts (3.2 liter) with filter
- Type ..... SAE 20W, SAE 30W
- API Classification ..... CD, CE

Air Filter..... Dry type with evacuator valve and service indicator.
Alternator ..... 40 amp
Cooling System..... Liquid Cooled
- Capacity..... 3qt. (2.8 l) 50/50 water ethylene glycol mix

Generator:
- Nominal Voltage..... ..... 48 Vdc
- Max Continuous Power Output ..... 7.8 hp (5.8 kW)
- Max Intermittent Power Output ..... 10.7 hp (8.0 kW)
- Max Current Output .. ..150 A

62851, 62851, 62853 and 62854 Diesel Engine

Make ..... Kubota
Model Z482-E4B
Horsepower ..... 13.3 hp (9.3 kW) @3600 rpm
Displacement ..... 29.3 cu. In. (479 cc)
Torque..... 21 ft. lbs. (28 Nm) @ 2600 rpm
Fuel:
- Type ..... No. 2 Diesel
- Rating ..... Min. Cetane rating 45
- Capacity..... 5.3 U.S. Gal. (20 liters)

Lubrication:
- Capacity..... 3.4 quarts (3.2 liter) with filter
- Type ..... SAE 20W, SAE 30W
- API Classification ..... CD, CE

Air Filter ..... Dry type with evacuator valve and service indicator.
Alternator ..... 40 amp
Cooling System..... Liquid Cooled
- Capacity..... 3qt. (2.8 l) 50/50 water ethylene glycol mix

Generator:
- Nominal Voltage..... ..... 48 Vdc
- Max Continuous Power Output.....7.8 hp (5.8 kW)
- Max Intermittent Power Output.....10.7 hp (8.0 kW)
- Max Current Output .. ..150 A

2.3 HYBRID BATTERIES

Buffer Battery

Full River is the Jacobsen recommended battery for use in Buffer Battery Set for the Eclipse 322 mower. Early mowers used the Genesis G16 EP battery.

Battery Brand				Battery Part Number		
Full River				HC-20		
Length in. (cm)	Width in. (cm)	Height in. (cm)	Weight lbs. (kg)	Rating Amp-Hr	Volts	Qty Req'd
7-1/8 (18.1)	3 (7.6)	6-9/16 (16.7)	13.5 (6.1)	20	12	4

Engine Battery

Interstate is the Jacobsen recommended battery for use in 12 Vdc Engine Battery for the Eclipse 322 mower.

Battery Brand				Battery Part Number		
Interstate				SP-40		
Length in. (cm)	Width in. (cm)	Height in. (cm)	Weight lbs. (kg)	Cranking Amps (CCA)	Volts	BCI Group Size
7-1/2 (19.1)	5-1/8 (13.0)	7-3/16 (18.3)	18.5 (8.4)	425 (340)	12	U1

2.4 BATTERY POWER MODULE

To ensure the longest battery life possible, the batteries are not shipped with the power module and must be ordered separately. For optimum range and performance use batteries that equal or exceed the Amp-hour rating listed.

System Voltage..... 48 Volt DC
Batteries ..... (6) 8 volt lead acid batteries.
Charger..... 18 Amp, 48 Volt DC, input voltage 85-265 Volt AC, 45-65 Hz. Three charging algorithms
Battery Filling System... Single connection used for adding water to all 24 battery cells simultaneously.

Recommended Battery:
Trojan T-890 battery is the Jacobsen recommended battery for use in the Eclipse 322 mower.

Battery Brand				Battery Part Number		
Trojan				T-890		
Length in. (cm)	Width in. (cm)	Height in. (cm)	Weight lbs. (kg)	5 Hr. Rate Amp-Hr	Volts	Qty Req'd
10-3/8 (26.4)	7-1/8 (18.1)	10-7/8 (276.)	69 (31)	155	8	6

Trojan T-890 batteries can be ordered from your Jacobsen Dealer, or from any local battery dealer.

2.5 CUTTING UNITS:

Reel ..... 3 Reels, 22 in. (55.9 cm) wide.
Reel Diameter..... 5 in. (12.7 cm)
Blade Options ..... 7, 9, 11, or 15 blades
Cutting Width..... 62 in. (157.5 cm)
Cutting Frequency ..... Variable, **See Section 4.6**
Height of Cut Range..... 1/16 to 7/16 in. (0.16 to 1.11 cm)

2.6 MOWER

Tires..... 18 x 10.5 - 8 tubeless
Pressure:
- Front ..... 16 psi (1.1 BAR)
- Rear..... 20 psi (1.3 BAR)

Parking Brake ..... Automatic, mounted on drive motor
Drive Axle:
- Differential Type..... Open
- Ratio 19.626:1
- Lubrication ..... 23 oz. (680 ml) Mobilfluid 424 or SAE 30 wt.

Drive Motor..... 48 Volt AC
Steering:
- Type..... Electric Power Steering
- Motor ..... 48 Volt AC Chain Drive

Speed:
- Mow ..... 1 - 5 mph (1.6 - 8.0 kph)
- Transport ..... 1 - 9 mph (1.6-14.5 kph)
- Reverse ..... 1 - 4.0 mph (6.4 kph)

2.7 DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY ▪ ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ ▪ PROHLÁŠENÍ O SHODĚ ▪ OVERENSSTEMMELSESERKLÆRING ▪ CONFORMITEITSVERKLARING ▪ VASTAVUSDEKLARATSIOON ▪ VAATIMUSTENMUKAISUUSVAKUUTUS ▪ DECLARATION DE CONFORMITE ▪ KONFORMITÄTSERKLÄRUNG ▪ ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ ▪ MEGFELELŐSÉGI NYILATKOZAT ▪ DICHIARAZIONE DI CONFORMITÀ ▪ ATBILSTĪBAS DEKLARĀCIJA ▪ ATITIKTIES DEKLARACIJA ▪ DIKJARAZZJONI TAL-KONFORMITÀ ▪ DEKLARACJA ZGODNOŚCI ▪ DECLARAÇÃO DE CONFORMIDADE ▪ DECLARAŢIE DE CONFORMITATE ▪ VYHLÁSENIE O ZHODE ▪ IZJAVA O SKLADNOSTI ▪ DECLARACIÓN DE CONFORMIDAD ▪ DEKLARATION OM ÖVERENSSTÄMMELSE ▪ SAMRÆMISYFIRLÝSING ▪ KONFORMITETSERKLÆRING ▪ 符合性声明 ▪ SAMRÆMISYFIRLÝSING ▪ 適合宣言 ▪ 적합성 선언서 ▪ UYGUNLUK BEYANI ▪ ДЕКЛАРАЦІЯ ПРО ВІДПОВІДНІСТЬ

Business name and full address of the manufacturer ▪ Търговско име и пълен адрес на производителя ▪ Obchodní jméno a plná adresa výrobce ▪ Producentens firmanavn og fulde adresse ▪ Bedrijfsnaam en volledig adres van de fabrikant ▪ Tootja ärinimi ja täielik aadress ▪ Valmistajan toiminimi ja täydellinen osoite ▪ Nom commercial et adresse complète du fabricant ▪ Firmenname und vollständige Adresse des Herstellers ▪ Επωνυμία και ταχυδρομική διεύθυνση κατασκευαστή ▪ A gyártó üzleti neve és teljes címe ▪ Ragione sociale e indirizzo completo del fabbricante ▪ Uzņēmuma nosaukums un pilna ražotāja adrese ▪ Verslo pavadinimas ir pilnas gamintojo adresas ▪ Isem kummerċjali u indirizz sħiħ tal-fabbrikant ▪ Nazwa firmy i pełny adres producenta ▪ Nome da empresa e endereço completo do fabricante ▪ Denumirea comercială şi adresa completă a producătorului ▪ Obchodný názov a úplná adresa výrobcu ▪ Naziv podjetja in polni naslov proizvajalca ▪ Nombre de la empresa y dirección completa del fabricante ▪ Tillverkarens företagsnamn och kompletta adress ▪ Fyrirtækisheiti og fullt heimilisfang framleiðanda ▪ Firmanavn og full adresse for produsenten ▪ 制造商的商业名称和完整地址 ▪ Nafn fyrirtækis og fullt heimilisfang framleiðanda ▪ 商号およびメーカーの正式住所 ▪ 제조자의 상호명 및 주소 ▪ İmalatçının ticari ünvanı ve açık adresi ▪ Фірмове найменування і повна адреса виробника	Jacobsen, A Textron Company 11524 Wilmar Blvd. Charlotte, NC 28273, USA
Product Code ▪ Код на продукта ▪ Kód výrobku ▪ Produktkode ▪ Productcode ▪ Toote kood ▪ Tuotekoodi ▪ Code produit ▪ Produktcode ▪ Κωδικός προϊόντος ▪ Termékkód ▪ Codice prodotto ▪ Produkta kods ▪ Produkto kodas ▪ Kodiċi tal-Prodott ▪ Kod produktu ▪ Código do Produto ▪ Cod produs ▪ Kód výrobku ▪ Oznaka proizvoda ▪ Código de producto ▪ Produktkod ▪ Vörunúmer ▪ Produktkode ▪ 产品代码 ▪ Framleiðslunúmer ▪ 製品コード ▪ 제품 코드 ▪ Ürün Kodu ▪ Код виробу	62800 62801 62802 62803 62804 62805 62825 62826 62851 62852 62853 62854
Machine Name ▪ Наименование на машината ▪ Název stroje ▪ Maskinnavn ▪ Machinenaam ▪ Masina nimi ▪ Laitteen nimi ▪ Nom de la machine ▪ Maschinenbezeichnung ▪ Ονομασία μηχανήματος ▪ Gépnév ▪ Denominazione della macchina ▪ Iekārtas nosaukums ▪ Mašinos pavadinimas ▪ Isem tal-Magna ▪ Nazwa urządzenia ▪ Nome da Máquina ▪ Numele echipamentului ▪ Názov stroja ▪ Naziv stroja ▪ Nombre de la máquina ▪ Maskinens namn ▪ Heiti tækis ▪ Maskinnavn ▪ 机器名称 ▪ Nafn vélar ▪ 機械名 ▪ 기기 명칭 ▪ Makine Adı ▪ Назва машини	Eclipse® 322 Battery, 3WD Eclipse® 322 Battery, 2WD Eclipse® 322 Gas Hybrid, 3WD Eclipse® 322 Gas Hybrid, 2WD Eclipse® 322 Diesel Hybrid, 3WD Eclipse® 322 Diesel Hybrid, 2WD Eclipse® 322 Diesel Hybrid, 2WD Eclipse® 322 Diesel Hybrid, 3WD Eclipse® 322 Diesel Hybrid, 2WD Eclipse® 322 Diesel Hybrid, 3WD Eclipse® 322 Diesel Hybrid, 2WD Eclipse® 322 Diesel Hybrid, 3WD
Designation ▪ Предназначение ▪ Označení ▪ Betegnelse ▪ Benaming ▪ Nimetus ▪ Tyyppimerkintä ▪ Pažymėjimas ▪ Bezeichnung ▪ Χαρακτηρισμός ▪ Megnevezés ▪ Funzione ▪ Apzīmējums ▪ Lithuanian ▪ Denominazzjoni ▪ Oznaczenie ▪ Designação ▪ Specificaţie ▪ Označenie ▪ Namen stroja ▪ Descripción ▪ Beteckning ▪ Merking ▪ Konstruksjon ▪ 名称 ▪ Útnefning ▪ 用途 ▪ 지정 ▪ Tanımı ▪ Позначення	Lawnmower, Article 12, Item 32
Serial Number ▪ Сериен номер ▪ Sériové číslo ▪ Serienummer ▪ Serienummer ▪ Seerianumber ▪ Valmistusnumero ▪ Numéro de série ▪ Seriennummer ▪ Σειριακός αριθμός ▪ Sorozatszám ▪ Numero di serie ▪ Sērijas numurs ▪ Serijos numeris ▪ Numru Serjali ▪ Numer seryjny ▪ Número de Série ▪ Număr de serie ▪ Sériové číslo ▪ Serijska številka ▪ Número de serie ▪ Serienummer ▪ Raðnúmer ▪ Serienummer ▪ 序列号 ▪ Raðnúmer ▪ シリアル番号 ▪ 일련 번호 ▪ Seri Numarası ▪ Серійний номер	6280003500-6280005000 6280103500-6280105000 6280203500-6280205000 6280303500-6280305000 6280403500-6280405000 6280503500-6280505000 6282503500-6282505000 6282603500-6282605000 6285101651-6285102500 6285201651-6285202500 6285301651-6285302500 6285401651-6285402500
Engine ▪ Двигател ▪ Motor ▪ Motor ▪ Motor ▪ Mootor ▪ Moottori ▪ Moteur ▪ Motor ▪ Μηχανή ▪ Modulnév ▪ Motore ▪ Dzinējs ▪ Variklis ▪ Saħħa Netta Installata ▪ Silnik ▪ Motor ▪ Motor ▪ Motor ▪ Motor ▪ Motor ▪ Motor ▪ Vél ▪ Motor ▪ 发动机 ▪ Aflvél ▪ エンジン ▪ 엔진 ▪ Motor ▪ Двигун	62800: Iskra Three Phase AC Motor 62801: Iskra Three Phase AC Motor 62802: Briggs & Stratton Vanguard 62803: Briggs & Stratton Vanguard 62804: Kubota Z482-E3B Diesel 62805: Kubota Z482-E3B Diesel 62825: Kubota Z482-E3B Diesel 62826: Kubota Z482-E3B Diesel 62851: Kubota Z482-E4B Diesel 62852: Kubota Z482-E4B Diesel 62853: Kubota Z482-E4B Diesel 62854: Kubota Z482-E4B Diesel

2 SPECIFICATIONS

Net Installed Power • Нетна инсталирана мощност • Čistý instalovaný výkon • Installeret nettoeffekt • Netto geïnstalleerd vermogen • Installeeritud netovõimsus • Asennettu nettoteho • Puissance nominale nette • Installierte Nettoleistung • Καθαρή εγκατεστημένη ισχύς • Nettó beépített teljesítmény • Potenza netta installata • Paredzētā tīkla jauda • Grynoji galia • Wisa' tal-Qtugħ • Moc zainstalowana netto • Potência instalada • Puterea instalată netă • Čistý inštalovaný výkon • Neto vgrajena moč • Potencia instalada neta • Nettoeffekt • Nettóafl vélar • Netto installert kraft • 装机净功率 • Netuppsetningarorka • 搭載する正味出力 • 정미 출력 • Net Kurulu Güç • Корисна встановлена потужність	62800: 2,1 kW @ 4650 RPM 62801: 2,1 kW @ 4650 RPM 62802: 9,69 kW @ 3600 RPM 62803: 9,69 kW @ 3600 RPM 62804: 9,3 kW @ 3300 RPM 62805: 9,3 kW @ 3300 RPM 62825: 9,3 kW @ 3300 RPM 62826: 9,3 kW @ 3300 RPM 62851: 9,3 kW @ 3300 RPM 62852: 9,3 kW @ 3300 RPM 62853: 9,3 kW @ 3300 RPM 62854: 9,3 kW @ 3300 RPM
Cutting Width • Широчина на рязане • Šířka řezu • Skærebredde • Maaibreedte • Lõikelaius • Leikkuuleveys • Largeur de coupe • Schnittbreite • Μήκος μισινέζας • Vágási szélesség • Larghezza di taglio • Griešanas platums • Pjovimo plotis • Tikkonforma mad-Direttivi • Szerokość cięcia • Largura de Corte • Lățimea de tăiere • Šírka záberu • Širina reza • Anchura de corte • Klippbredd • Skurðbreidd • Klippebredde • 剪草宽度 • Breidd sláttar • 刈り取り幅 • 절단 폭 • Kesme Genişliği • Ширина різання	157,5 cm
Conforms to Directives • В съответствие с директивите • Splňuje podmínky směrnic • Er i overensstemmelse med direktiver • Voldoet aan de richtlijnen • Vastab direktiividele • Direktiivien mukainen • Conforme aux directives • Entspricht Richtlinien • Ακολουθήστε πιστά τις Οδηγίες • Megfelel az irányelveknek • Conforme alle Direttive • Atbilst direktīvām • Atitinka direktyvų reikalavimus • Valutazzjoni tal-Konformità • Dyrektywy związane • Cumpre as Directivas • Respectă Directivele • Je v súlade so smernicami • Skladnost z direktivami • Cumple con las Directivas • Uppfyller direktiv • Samræmist tilskipunum • I samsvar med direktiv • 符合指令 • Í samræmi við reglugerðir • 適合指令 • 규정 준수 • Şu Yönergelere Uymaktadır • Відповідає директиві	2004/108/EC 98/37/EC, 2006/42/EC 2000/14/EC, 2005/88/EC 2006/66/EC, 2006/95/EC
Conformity Assessment • Оценка за съответствие • Hodnocení plnění podmínek • Overensstemmelsesvurdering • Conformiteitsbeoordeling • Vastavushindamine • Vaatimustenmukaisuuden arviointi • Evaluation de conformité • Konformitätsbeurteilung • Διαπίστωση Συμμόρφωσης • Megfelelőség-értékelés • Valutazione della conformità • Atbilstības novērtējums • Atitikties įvertinimas • Livell tal-Qawwa tal-Ħoss Imkejjel • Ocena zgodności • Avaliação de Conformidade • Evaluarea conformității • Vyhodnotenie zhodnosti • Ocena skladnosti • Evaluación de conformidad • Bedömning av överensstämmelse • Samræmismat • Konformitetsvurdering • 符合性评估 • Samræmismat • 適合性評価 • 적합성 평가 • Uygunluk Değerlendirmesi • Оцінка відповідності	2006/42/EC Annex VIII
Measured Sound Power Level • Измерено ниво на звукова мощност • Naměřený akustický výkon • Målte lydstyrkeniveau • Gemeten geluidsniveau • Mõõdetud helivõimsuse tase • Mitattu äänitehotaso • Niveau de puissance sonore mesuré • Gemessener Schalldruckpegel • Σταθμισμένο επίπεδο ηχητικής ισχύος • Mért hangteljesítményszint • Livello di potenza sonora misurato • Izmērītais skaņas jaudas līmenis • Išmatuotas garso stiprumo lygis • Livell tal-Qawwa tal-Ħoss Iggarantit • Moc akustyczna mierzona • Nível sonoro medido • Nivelul măsurat al puterii acustice • Nameraná hladina akustického výkonu • Izmerjena raven zvočne moči • Nivel de potencia sonora medido • Uppmätt ljudeffektsnivå • Mælt hljóðaflsstig • Målt lydeffektnivå • 测得声功率级 • Mældur hljóðstyrkur • 音出力レベル測定値 • 측정된 음향 파워 레벨 • Ölçülen Ses Gücü Düzeyi • Виміряний рівень звукової потужності	Battery 3WD 95 dB(A) LWA Battery 2WD 96 dB(A) LWA Gas Hybrid 3WD 101 dB(A) LWA Gas Hybrid 2WD 103 dB(A) LWA Diesel Hybrid 3WD 98 dB(A) LWA Diesel Hybrid 2WD 100 dB(A) LWA
Guaranteed Sound Power Level • Гарантирано ниво на звукова мощност • Garantovaný akustický výkon • Garanteret lydstyrkeniveau • Gegarandeerd geluidsniveau • Garanteeritud helivõimsuse tase • Taattu äänitehotaso • Niveau de puissance sonore garanti • Garantierter Schalldruckpegel • Εγγυημένο επίπεδο ηχητικής ισχύος • Szavatolt hangteljesítményszint • Livello di potenza sonora garantito • Garantētais skaņas jaudas līmenis • Garantuotas garso stiprumo lygis • Livell tal-Qawwa tal-Ħoss Iggarantit • Moc akustyczna gwarantowana • Nível sonoro farantido • Nivelul garantat al puterii acustice • Garantovaná hladina akustického výkonu • Zajamčena raven zvočne moči • Nivel de potencia sonora garantizado • Garanterad ljudeffektsnivå • Hljóðaflsstig sem ábyrgð er tekin á • Garanter lydeffektnivå • 保证声功率级 • Tryggður hljóðstyrkur • 音出力保証レベル • 보장된 음향 파워 레벨 • Garantili Ses Gücü Düzeyi • Гарантований рівень звукової потужності	Battery 3WD 95 dB(A) LWA Battery 2WD 97 dB(A) LWA Gas Hybrid 3WD 101 dB(A) LWA Gas Hybrid 2WD 103 dB(A) LWA Diesel Hybrid 3WD 99 dB(A) LWA Diesel Hybrid 2WD 101 dB(A) LWA
Conformity Assessment Procedure (Noise) • Оценка за съответствие на процедурата (Шум) • Postup hodnocení plnění podmínek (hluk) • Procedure for overensstemmelsesvurdering (Støj) • Procedure van de conformiteitsbeoordeling (geluid) • Vastavushindamismenetlus (müra) • Vaatimustenmukaisuuden arviointimenettely (Melu) • Procédure d'évaluation de conformité (bruit) • Konformitätsbeurteilungsverfahren (Geräusch) • Διαδικασία Αξιολόγησης Συμμόρφωσης (Θόρυβος) • Megfelelőség-értékelési eljárás (Zaj) • Procedura di valutazione della conformità (rumore) • Atbilstības novērtējuma procedūra (troksnis) • Atitikties įvertinimo procedūra (garsas) • Proċedura tal-Valutazzjoni tal-Konformità (Ħoss) • Procedura oceny zgodności (poziom hałasu) • Processo de avaliação de conformidade (nível sonoro) Procedura de evaluare a conformității (zgomot) • Postup vyhodnocovania zhodnosti (hluk) • Postopek za ugotavljanje skladnosti (hrup) • Procedimiento de evaluación de conformidad (ruido) • Procedur för bedömning av överensstämmelse (buller) • Samræmismatsaðferð (hávaði) • Prosedyre for konformitetsvurdering (støy) • 符合性评估程序（噪声）• Aðgerð fyrir samræmismat (Hávaði) • 適合性評価の手順（騒音）• 적합성 평가 절차 (소음) • Uygunluk Değerlendirme Prosedürü (Gürültü) • Регламент оцінки відповідності (шум)	2000/14/EC Annex VI, Part 1
UK Notified Body for 2000/14/EC • Нотифициран орган в Обединеното кралство за 2000/14/ЕО • Úřad certifikovaný podle směrnice č. 2000/14/EC • Det britiske bemyndigede organ for 2001/14/EF • Engels adviesorgaan voor 2000/14/EG • Ühendkuningriigi teavitatud asutus direktiivi 2000/14/EÜ mõistes • Direktiivin 2000/14/EY mukainen ilmoitettu tarkastuslaitos Isossa-Britanniassa • Organisme notifié concernant la directive 2000/14/CE • Britische benannte Stelle für 2000/14/EG • Κοινοποιημένος Οργανισμός Ηνωμένου Βασιλείου για 2000/14/ΕΚ • 2000/14/EK – egyesült királyságbeli bejelentett szervezet • Organismo Notificato in GB per 2000/14/CE • 2000/14/EK AK reġistrētā organizācija • JK notifikuotosios įstaigos 2000/14/EC • Korp Notifikat tar-Renju Unit għal 2000/14/KE • Dopuszczona jednostka badawcza w Wielkiej Brytanii wg 2000/14/WE • Entidade notificada no Reino Unido para 2000/14/CE • Organism notificat în Marea Britanie pentru 2000/14/CE • Notifikovaný orgán Spojeného kráľovstva pre smernicu 2000/14/ES • Britanski priglašeni organ za 2000/14/ES • Cuerpo notificado en el Reino Unido para 2000/14/CE • Anmält organ för 2000/14/EG i Storbritannien • Tilkynntur aðili í Bretlandi fyrir 2000/14/EC • Britisk teknisk for 2000/14/EF • 英国 2000/14/EC 认证机构 • Bretland Upplýsingar fyrir 2000/14/EB • UK（英国）公認機関、2000/14/EC • 2000/14/EC 에 대한 영국 인증 기관 • 2000/14/EC için BK Onaylı Kuruluş • Британський уповноважений орган для 2000/14/EC	Number: 1088 Sound Research Laboratories Limited Holbrook House, Little Waldingfield Sudbury, Suffolk CO10 0TH
Operator Ear Noise Level • Оператор на нивото на доловим от ухото шум • Hladina hluku v oblasti uší operátora • Støjniveau i førers ørehøjde • Geluidsniveau oor bestuurder • Müratase operaatori kõrvas • Melutaso käyttäjän korvan kohdalla • Niveau de bruit à hauteur des oreilles de l'opérateur • Schallpegel am Bedienerohr • Επίπεδο θορύβου σε λειτουργία • A kezelő fülénél mért zajszint • Livello di potenza sonora all'orecchio dell'operatore • Trokšņa līmenis pie operatora auss • Dirbančiojo su mašina patiriamo triukšmo lygis • Livell tal-Ħoss fil-Widna tal-Operatur • Dopuszczalny poziom hałasu dla operatora • Nível sonoro nos ouvidos do operador • Nivelul zgomotului la urechea operatorului • Hladina hluku pôsobiaca na sluch operátora • Raven hrupa pri ušesu upravljavca • Nivel sonoro en el oído del operador • Ljudnivå vid förarens öra • Hávaðastig fyrir stjórnanda • Støynivå ved operatørens øre • 操作员耳旁噪声级 • Hljóðstyrkur fyrir stjórnanda • オペレータが感じる騒音レベル • 사용자 청각 소음 레벨 • Operatör Kulak Gürültü Düzeyi • Рівень шуму, що впливає на оператора	Battery 2WD/3WD 80 dB(a) Leq (2006/42/EC) Gas 2WD/3WD 85 dB(a) Leq (2006/42/EC) Diesel 2WD/3WD 87 dB(a) Leq (2006/42/EC)
Harmonised standards used • Използвани хармонизирани стандарти • Použité harmonizované normy • Brugte harmoniserede standarder • Gebruikte geharmoniseerde standaards • Kasutatud ühtlustatud standardid • Käytetyt yhdenmukaistetut standarit • Normes harmonisées utilisées • Angewandte harmonisierte Normen • Εναρμονισμένα πρότυπα που χρησιμοποιήθηκαν • Harmonizált szabványok • Standard armonizzati applicati • Izmantotie saskaņotie standarti • Panaudoti suderinti standartai • Standards armonizzati użati • Normy spójne powiązane • Normas harmonizadas usadas • Standardele armonizate utilizate • Použité harmonizované normy • Uporabljeni usklajeni standardi • Estándares armonizados utilizados • Harmoniserade standarder som används • 所采用的协调标准 • Samstilltir staðlar notaðir • 整合規格 • 적용되는 조화 표준 • Kullanılan uyumlu standartlar • Використані гармонізовані стандарти	BS EN ISO 20643 BS EN ISO 5349-1 BS EN ISO 5349-2 BS EN ISO 5395-3

Technical standards and specifications used • Използвани технически стандарти и спецификации • Použité technické normy a specifikace • Brugte tekniske standarder og specifikationer • Gebruikte technische standaards en specificaties • Kasutatud tehnilised standardid ja spetsifikatsioonid • Käytetyt tekniset standardit ja eritelmät • Spécifications et normes techniques utilisées • Angewandte technische Normen und Spezifikationen • Τεχνικά πρότυπα και προδιαγραφές που χρησιμοποιήθηκαν • Műszaki szabványok és specifikációk • Standard tecnici e specifiche applicati • Izmantotie tehniskie standarti un specifikācijas • Panaudoti techniniai standartai ir techninė informacija • Standards u specifikazzjonijiet tekniċi użati • Normy i specyfikacje techniczne powiązane • Normas técnicas e especificações usadas • Standardele tehnice şi specificaţiile utilizate • Použité technické normy a špecifikácie • Uporabljeni tehnični standardi in specifikacije • Estándares y especificaciones técnicas utilizadas • Tekniska standarder och specifikationer som används • Samræmdir staðlar sem notaðir eru • Benyttede • harmoniserte standarder • 所采用的技术标准和规范 • Tæknistaðlar og -kröfur notaðar • 技術規格および仕様書 • 적용되는 기술 표준 및 규격 • Kullanılan teknik standartlar ve şartnameler • Використані технічні стандарти і умови	B71.4 ISO 2631-1 ISO 21299
The place and date of the declaration • Място и дата на декларацията • Místo a datum prohlášení • Sted og dato for erklæringen • Plaats en datum van de verklaring • Deklaratsiooni väljastamise koht ja kuupäev • Vakuutuksen paikka ja päivämäärä • Lieu et date de la déclaration • Ort und Datum der Erklärung • Τόπος και ημερομηνία δήλωσης • A nyilatkozat kelte (hely és idő) • Luogo e data della dichiarazione • Deklarācijas vieta un datums • Deklaracijos vieta ir data • Il-post u d-data tad-dikjarazzjoni • Miejsce i data wystawienia deklaracji • Local e data da declaração • Locul şi data declaraţiei • Miesto a dátum vyhlásenia • Kraj in datum izjave • Lugar y fecha de la declaración • Plats och datum för deklarationen • Tæknistaðlar og tæknilýsingar sem notaðar eru • Benyttede tekniske standarder og spesifikasjoner • Staður og dagsetning yfirlýsingar • Sted og dato for erklæringen • 声明的地点与日期 • Staður og dagsetning yfirlýsingarinnar • 宣言場所および日付 • 선언 장소 및 일자 • Beyan yeri ve tarihi • Місце і дата укладення декларації	Jacobsen, A Textron Company 11524 Wilmar Blvd. Charlotte, NC 28273, USA September 2nd, 2014
Signature of the person empowered to draw up the declaration on behalf of the manufacturer, holds the technical documentation and is authorised to compile the technical file, and who is established in the Community. Подпис на човека, упълномощен да състави декларацията от името на производителя, който поддържащ техническата документация и е оторизиран да изготви техническия файл и е регистриран в общността. Podpis osoby oprávněné sestavit prohlášení jménem výrobce, držet technickou dokumentaci a osoby oprávněné sestavit technické soubory a založené v rámci Evropského společenství. Underskrift af personen, der har fuldmagt til at udarbejde erklæringen på vegne af producenten, der er indehaver af dokumentationen og er bemyndiget til at udarbejde den tekniske journal, og som er baseret i nærområdet. Handtekening van de persoon die bevoegd is de verklaring namens de fabrikant te tekenen, de technische documentatie bewaart en bevoegd is om het technische bestand samen te stellen, en die is gevestigd in het Woongebied. Ühenduse registrisse kantud isiku allkiri, kes on volitatud tootja nimel deklaratsiooni koostama, kes omab tehnilist dokumentatsiooni ja kellel on õigus koostada tehniline toimik. Sen henkilön allekirjoitus, jolla on valmistajan valtuutus vakuutuksen laadintaan, jolla on hallussaan tekniset asiakirjat, joka on valtuutettu laatimaan tekniset asiakirjat ja joka on sijoittautunut yhteisöön. Signature de la personne habilitée à rédiger la déclaration au nom du fabricant, à détenir la documentation technique, à compiler les fichiers techniques et qui est implantée dans la Communauté. Unterschrift der Person, die berechtigt ist, die Erklärung im Namen des Herstellers abzugeben, die die technischen Unterlagen aufbewahrt und berechtigt ist, die technischen Unterlagen zusammenzustellen, und die in der Gemeinschaft niedergelassen ist. Υπογραφή ατόμου εξουσιοδοτημένου για την σύνταξη της δήλωσης εκ μέρους του κατασκευαστή, ο οποίος κατέχει την τεχνική έκθεση και έχει την εξουσιοδότηση να ταξινομήσει τον τεχνικό φάκελο και ο οποίος είναι διορισμένος στην Κοινότητα. A gyártó nevében meghatalmazott személy, akinek jogában áll módosítania a nyilatkozatot, a műszaki dokumentációt őrzi, engedéllyel rendelkezik a műszaki fájl összeállításához, és aki a közösségben letelepedett személy. Firma della persona autorizzata a redigere la dichiarazione a nome del fabbricante, in possesso Della documentazione tecnica ed autorizzata a costituire il fascicolo tecnico, che deve essere stabilita nella Comunità. Tās personas paraksts, kura ir pilnvarota deklarācijas sastādīšanai ražotāja vārdā, kurai ir tehniskā dokumentācija, kura ir pilnvarota sagatavot tehnisko reģistru un kura ir apstiprināta Kopienā. Asmuo, kuris yra gana žinomas, kuriam gamintojas suteikė įgaliojimus sudaryti šią deklaraciją, ir kuris ją pasirašė, turi visą techninę informaciją ir yra įgaliotas sudaryti techninės informacijos dokumentą. Il-firma tal-persuna awtorizzata li tfassal id-dikjarazzjoni f'isem il-fabbrikant, għandha d-dokumentazzjoni teknika u hija awtorizzata li tikkompila l-fajl tekniku u li hija stabbilita fil-Komunità. Podpis osoby upoważnionej do sporządzenia deklaracji w imieniu producenta, przechowującej dokumentację techniczną, upoważnioną do stworzenia dokumentacji technicznej oraz wyznaczonej ds. wspólnotowych. Assinatura da pessoa com poderes para emitir a declaração em nome do fabricante, que possui a documentação técnica, que está autorizada a compilar o processo técnico e que está estabelecida na Comunidade. Semnătura persoanei împuternicite să elaboreze declarația în numele producătorului, care deține documentația tehnică, este autorizată să compileze dosarul tehnic și este stabilită în Comunitate. Podpis osoby poverenej vystavením vyhlásenia v mene výrobcu, ktorá má technickú dokumentáciu a je oprávnená spracovať technické podklady a ktorá je umiestnená v Spoločenstve. Podpis osebe, pooblaščene za izdelavo izjave v imenu proizvajalca, ki ima tehnično dokumentacijo in lahko sestavlja spis tehnične dokumentacije, ter ima sedež v Skupnosti. Firma de la persona responsable de la declaración en nombre del fabricante, que posee la documentación técnica y está autorizada para recopilar el archivo técnico y que está establecido en la Comunidad. Undertecknas av den som bemyndigad att upprätta deklarationen å tillverkarens vägnar, innehar den tekniska dokumentationen och är bemyndigad att sammanställa den tekniska informationen och som är etablerad i gemenskapen. Undirskrift aðilans sem hefur umboð til að gera yfirlýsinguna fyrir hönd framleiðandans, hefur undir höndum tæknigögnin og hefur leyfi til að taka saman tækniskýrsluna, og er viðurkenndur innan evrópska efnahagssvæðisins. Signaturen til personen som har fullmakt til å utferdige erklæringen på vegne av produsenten, er i besittelse av den tekniske dokumentasjonen, har autorisasjon til å utarbeide den tekniske filen og som har tilhold i EU. 获得授权代表制造商起草声明者的签名，此人保留技术文档并获授权编译技术文件，且是社区中获得认可者。 Undirskrift starfsmanns sem hefur heimild til að rita yfirlýsinguna fyrir hendi framleiðandans, hefur umsjón með tæknigögnum og hefur heimild til að setja saman tæknilega skýrslu og sem er tengdur inn í samfélagið. メーカーを代表して宣言書を起草し、技術文書を保有し技術ファイルを編集する権限を有し、地域において確固たる地位を築いている人物の署名。 제조자를 대신하여 선언서를 작성하도록 위임받은 서명자는 기술 문서를 보유하고 기술 자료 수집의 허가를 받았으며 지역 공동체 내에 속해 있습니다 İmalatçı adına beyanı hazırlama yetkisi olan, teknik dokümantasyonu elinde bulunduran ve teknik dosyayı derleme yetkisine sahip, Topluluk içinde yerleşik kişinin imzası. Підпис особи, що уповноважена укласти декларацію від імені виробника, має технічну документацію, уповноважена укласти технічний паспорт і має добру репутацію в суспільстві.	2006/42/EC Annex II 1.A.2 Christian D. Clifford Senior Engineering Manager Ransomes Jacobsen Limited West Road, Ransomes Europark, Ipswich, IP3 9TT, England 2006/42/EC Annex II 1.A.10 Derek Mookhoek Director of Engineering Jacobsen, A Textron Company 11524 Wilmar Blvd, Charlotte, NC 28273, USA 
Certificate Number • Номер на сертификат • Číslo osvědčení • Certifikatnummer • Certificaatnummer • Sertifikaadi number • Hyväksyntänumero • Numéro de certificat • Bescheinigungsnummer • Αριθμός Πιστοποιητικού • Hitelesítési szám • Numero del certificato • Sertifikāta numurs • Sertifikato numeris • Numru taċ-Ċertifikat • Numer certyfikatu • Número do Certificado • Număr certificat • Číslo osvedčenia • Številka certifikata • Número de certificado • Certifikatsnummer • Númer skírteinis • Sertifikatnummer • 证书编号 • Skírteinisnúmer • 認証番号 • 인증 번호 • Sertifika Numarası • Номер сертифіката	4187721 Rev E

2.8 VIBRATION LEVEL

The mower 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, while the mower was not moving.

The Machinery Safety Directive 2006/42/EC
By compliance to:
The Lawnmower Standard BS EN ISO 5395-3
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 (2001)

Eclipse 322 Hand/Arm Acceleration Level	
	Maximum Left Hand or Right Hand Accelerations m/s^2
	Mean Value of X, Y, Z Aeq
Battery Powered Mowers	0.75 ± 0.6
Hybrid Powered Mowers	3.00 ± 0.6

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

The Machinery Safety Directive 2006/42/EC
By compliance to:
Whole Body EN1032:2003

Information Supplied for Physical Agents Directive 2002/44/EC
By reference to:
Whole Body Standards BS EN ISO 2631-1 (1997)

Eclipse 322 Whole Body Acceleration Level	
	Maximum Seat Pad Accelerations m/s^2
	Mean Value of X, Y, Z Aeq
Battery Powered Mowers	.341 ± 0.056
Hybrid Powered Mowers	.466 ± 0.056

2.9 WEIGHTS AND DIMENSIONS

Dimensions:	Inches	(cm)
Length - Grass Catchers On	101	(256.5)
Height - Top of ROPS	79.3	(201.4)
Wheel Base	52	(132.1)
Width - Mowing Position	67.7	(172.0)
Width - Wheel	59	(150.0)
Turning Radius	18	(45.7)

Weights:	Lbs.	(kg)
Working Weight Less Operator		
62800	1697	(770)
62801	1661	(753)
62802	1577	(715)
62803	1541	(699)
62804 and 62853	1665	(755)
62805 and 62851	1629	(739)
62825 and 62852	1629	(739)
62826 and 62854	1665	(755)
Mower with fuel tank empty		
62802	1544	(700)
62803	1508	(684)
62804 and 62853	1627	(738)
62805 and 62851	1591	(722)
62825 and 62852	1591	(722)
62826 and 62854	1627	(738)

2.10 ACCESSORIES & SUPPORT LITERATURE

Contact your area Jacobsen Dealer for a complete listing of accessories and attachments.

⚠ CAUTION

Use of other than Jacobsen authorized parts and accessories may cause personal injury or damage to the equipment.

Accessories

Traction Pedal Test Connector	4225240
Field Test Kit	4222802
Orange Touch-up Paint (12 oz. spray)	554598
Grass Catcher	4214180
Fine Bristle Brush	68536
Rear Roller Cleaner Brush	62818
Quick Roll™ (Set of 3) (Requires 4211921)	68664
Spiker (Set of 3) (Requires 4211921)	68665
Quick Roll™ or Spiker Mounting Kit	4211921
Traction Tire Kit	62817
Turf Groomer 1/4” Spacing	67966
Turf Groomer 1/2” Spacing	67968
Vertical Mower (Set of 3)	67138
Dew Whip Holder	62809
Tow Bar	62811
Premium Seat	62813
Clipping Deflector	62814
ROPS Mounted LED Light Kit	4214980
Discharger (Battery Units)	892857

Reels

TrueSet™ 7 Blade Reel	62830
TrueSet™ 9 Blade Reel	62831
TrueSet™ 11 Blade Reel	62832
TrueSet™ 15 Blade Reel	62833
Reel Conversion Kit	4218680

Rollers

Grooved Front Roller	68527
Solid Roller	68530
Grooved Front Roller (Steel)	68613
Grooved Front Roller (Aluminum)	68614
High Cut Roller 15/16 in.	68634
Solid Tube Steel Roller with Scraper	68641
Grooved Segmented Roller	68673
Rear Roller Scraper	338735
Solid Tube Rear Roller	1004990

MagSystem™

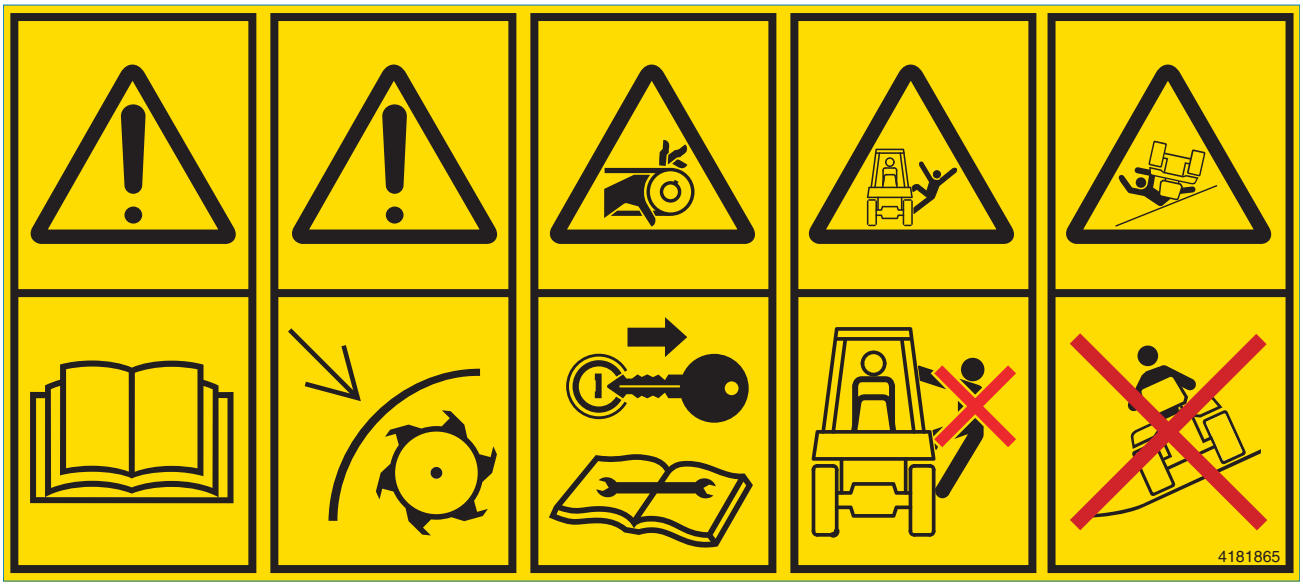
Super Tournament MagSystem Kit	4188500
Tournament MagSystem Kit	4158083

Support Literature

Safety & Operation Manual	4187720
Parts & Maintenance Manual	4187721
Diesel Engine Parts Catalog	4222980
Operator Training Video	4222982
Service & Repair Manual	4222983

3.1 DECALS

Familiarize yourself with the following decals. They are critical to the safe operation of the mower. REPLACE DAMAGED DECALS IMMEDIATELY.



- Read operator's manual. Do not allow untrained operators to use machine.
- Keep shields in place and hardware securely fastened.
- Keep hands, feet, and clothing away from moving parts.
- Before you clean, adjust, or repair this equipment, disengage all drives, engage parking brake, and stop engine.
- Never carry passengers.
- Keep bystanders away.
- Do not use on slopes greater than 17°.
- Always wear the seat belt.

Danger

To avoid injury when working with battery:

1. Always connect the black (-) ground last and remove it first.
2. Keep sparks and flames away, and avoid contact with acid.

To avoid injury when jumping battery:

1. Connect positive (+) terminal to positive (+) terminal.
2. Connect negative (-) terminal on good battery to frame of vehicle that has dead battery.

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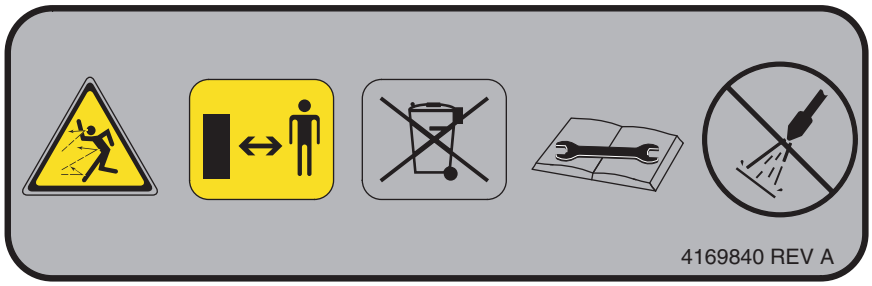
DANGER

To prevent injury, disengage all drives, engage parking brake, stop engine, and remove key before working on machine or emptying grass catchers.



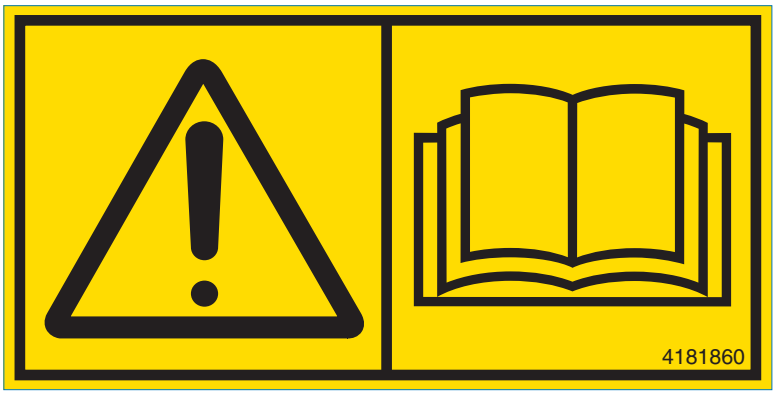
DANGER

1. Keep a safe distance from the machine. Keep bystanders away.

2. Properly dispose of components from this machine. Refer to local regulations for waste disposal and recycling.

3. Refer to the manual for maintenance and service procedures.

4. Do not spray water at electrical connectors, motors or controllers. Remove battery pack before pressure washing unit.



WARNING

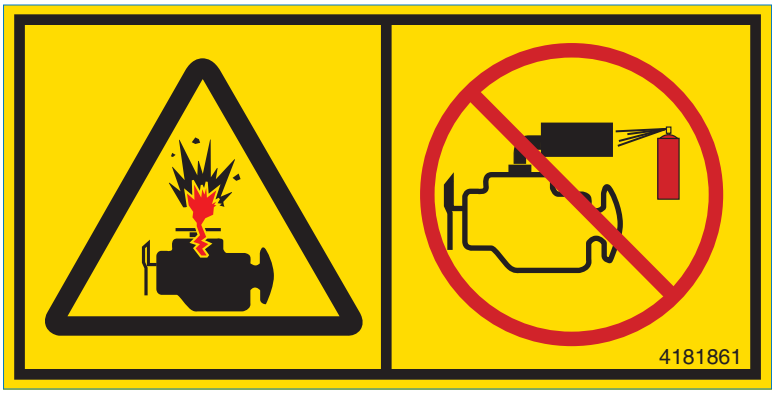
Read all mower manuals before operating or performing any maintenance.

WARNING
(Diesel Hybrid Power Units Only)

Radiator is under pressure. Remove cap slowly to avoid personal injury.

WARNING

Read manual before performing maintenance.

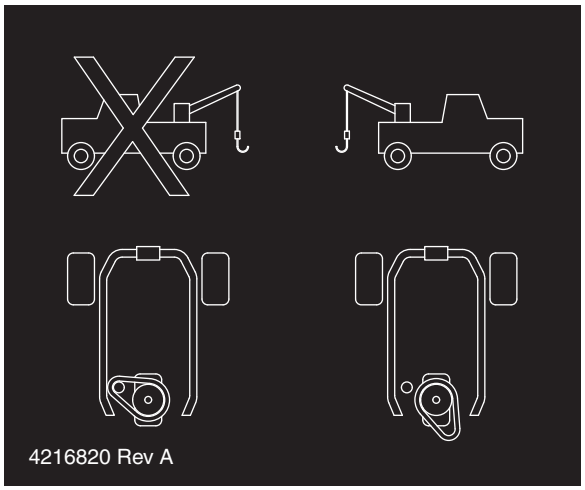


IMPORTANT

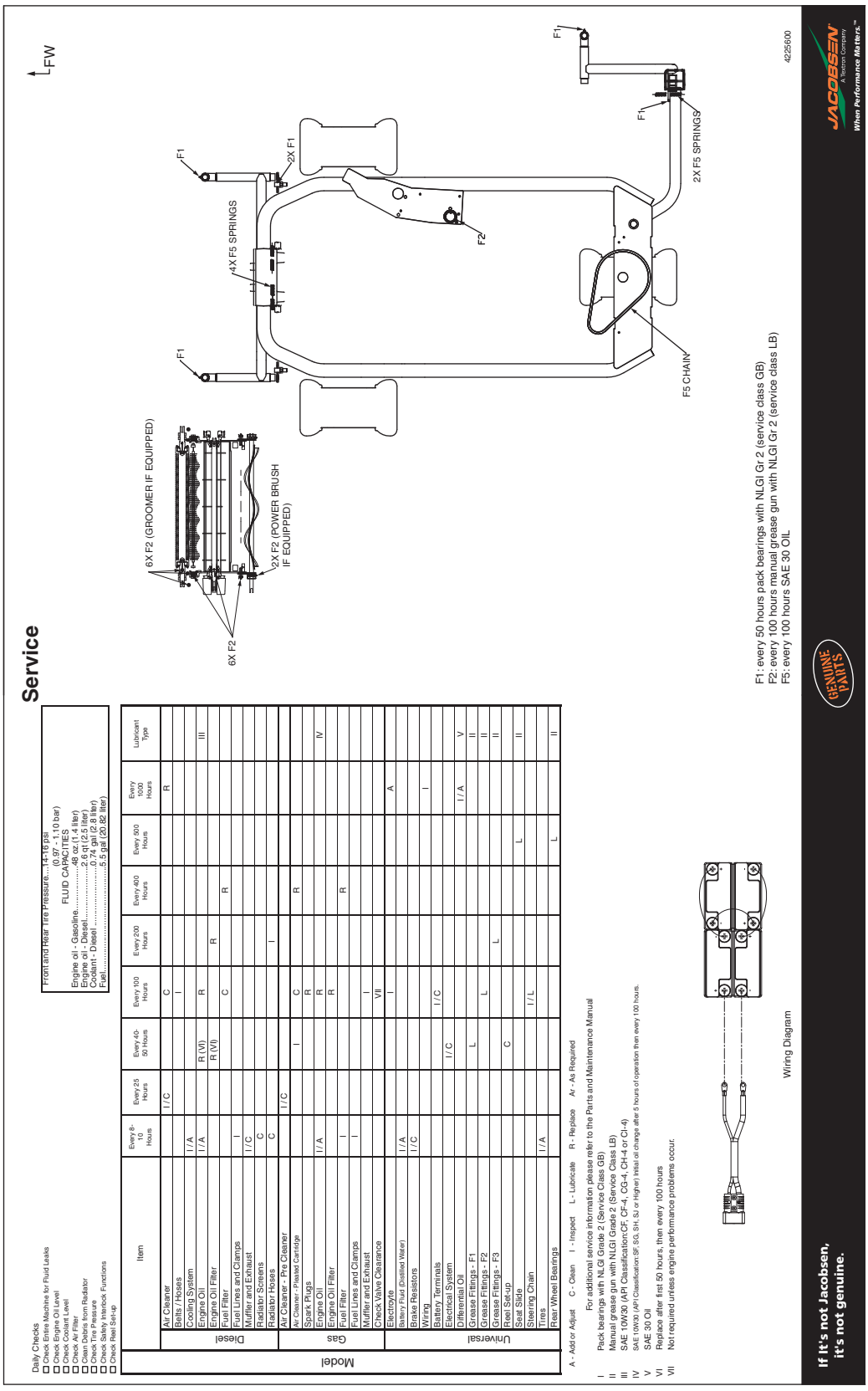
DO NOT USE STARTING ASSIST FLUIDS

Use of starting assist fluids in the air intake system may be potentially explosive or cause a “runaway” engine condition. This could result in serious engine damage.

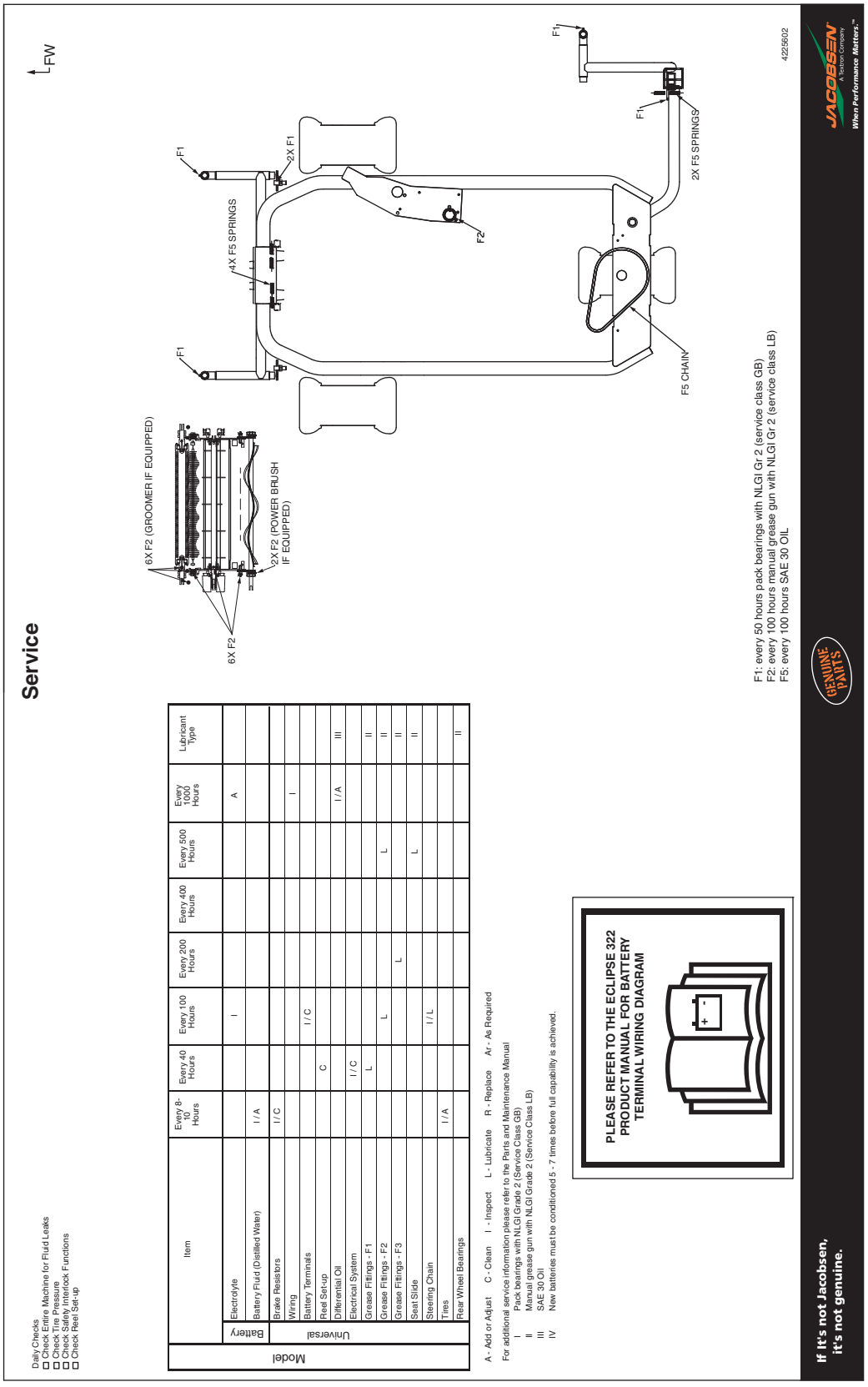
Familiarize yourself with the following decals. They are critical to the safe operation of the mower. REPLACE DAMAGED DECALS IMMEDIATELY.



Disconnect Steering Chain before towing mower.


Service
Daily Checks
Check Entire Machine for Fluid Leaks
Check Engine Oil Level
Check Coolant Level
Check Air Filter
Clean Debris from Radiator
Check Tire Pressure
Check Safety Interlock Functions
Check Reel Set-up
Front and Rear Tire Pressure....14-16 psi
(0.97 - 1.10 bar)
FLUID CAPACITIES
Engine oil - Gasoline.....48 oz (1.4 liter)
Engine oil - Diesel.....2.6 qt (2.5 liter)
Coolant - Diesel.....0.74 gal (2.8 liter)
Fuel.....5.5 gal (20.82 liter)
Model
Item
Every 8-10 Hours
Every 25 Hours
Every 40-50 Hours
Every 100 Hours
Every 200 Hours
Every 400 Hours
Every 500 Hours
Every 1000 Hours
Lubricant Type
Diesel
Air Cleaner
Belts / Hoses
Cooling System
Engine Oil
Engine Oil Filter
Fuel Filter
Fuel Lines and Clamps
Muffler and Exhaust
Radiator Screens
Radiator Hoses
Gas
Air Cleaner - Pre Cleaner
Air Cleaner - Pleated Cartridge
Spark Plugs
Engine Oil
Engine Oil Filter
Fuel Filter
Fuel Lines and Clamps
Muffler and Exhaust
Check Valve Clearance
Universal
Electrolyte
Battery Fluid (Distilled Water)
Brake Resistors
Wiring
Battery Terminals
Electrical System
Differential Oil
Grease Fittings - F1
Grease Fittings - F2
Grease Fittings - F3
Reel Set-up
Seat Slide
Steering Chain
Tires
Rear Wheel Bearings
A - Add or Adjust C - Clean I - Inspect L - Lubricate R - Replace Ar - As Required
For additional service information please refer to the Parts and Maintenance Manual
I Pack bearings with NLGI Grade 2 (Service Class GB)
II Manual grease gun with NLGI Grade 2 (Service Class LB)
III SAE 10W30 (API Classification:CF, CF-4, CG-4, CH-4 or CI-4)
IV SAE 10W30 (API Classification:SF, SG, SH, SJ or Higher) Initial oil change after 5 hours of operation then every 100 hours.
V SAE 30 Oil
VI Replace after first 50 hours, then every 100 hours
VII Not required unless engine performance problems occur.
Wiring Diagram
FW
6X F2 (GROOMER IF EQUIPPED)
2X F2 (POWER BRUSH IF EQUIPPED)
6X F2
F1
4X F5 SPRINGS
2X F1
F2
F5 CHAIN
2X F5 SPRINGS
F1: every 50 hours pack bearings with NLGI Gr 2 (service class GB)
F2: every 100 hours manual grease gun with NLGI Gr 2 (service class LB)
F5: every 100 hours SAE 30 OIL
GENUINE PARTS
JACOBSEN
A Textron Company
When Performance Matters.™
If it's not Jacobsen, it's not genuine.
4225600

Familiarize yourself with the following decals. They are critical to the safe operation of the mower. REPLACE DAMAGED DECALS IMMEDIATELY.



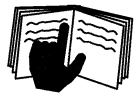
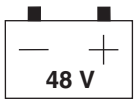
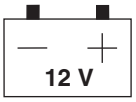
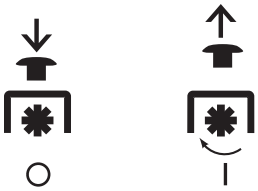
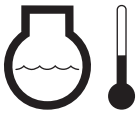
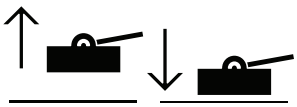
Model		Item	Every 8-10 Hours	Every 40 Hours	Every 100 Hours	Every 200 Hours	Every 400 Hours	Every 500 Hours	Every 1000 Hours	Lubricant Type
Battery		Electrolyte			I				A	
		Battery Fluid (Distilled Water)	I / A							
Universal		Brake Resistors	I / C						I	
		Wiring								
		Battery Terminals			I / C					
		Reel Set-up		C						
		Differential Oil							I / A	III
		Electrical System		I / C						
		Grease Fittings - F1		L						II
		Grease Fittings - F2			L			L		II
		Grease Fittings - F3				L				II
		Seat Slide						L		II
		Steering Chain			I / L					
		Tires	I / A							
		Rear Wheel Bearings								II

A - Add or Adjust C - Clean I - Inspect L - Lubricate R - Replace Ar - As Required

For additional service information please refer to the Parts and Maintenance Manual

I Pack bearings with NLGI Grade 2 (Service Class GB)
II Manual grease gun with NLGI Grade 2 (Service Class LB)
III SAE 30 Oil
IV New batteries must be conditioned 5 - 7 times before full capability is achieved.

4.1 ICONS

Read Manual 	**48 VDC Battery** LDU Light 	**12 VDC Battery** LDU Light 	**System** Off On Energize 	
Reel 	**Horn** 	**Lights** 	**Mow Switch** OFF ON 	
System Power LDU Light 	**Parking Brake** LDU Light 	**System Fault** LDU Light 	**Glow Plug** LDU Light 	**Engine Oil Pressure** LDU Light 
Water Temperature LDU Light 	**Surface may be hot** 	**Joystick** Raise Lower 		

⚠ WARNING

Never attempt to drive the mower unless you have read the Safety and Operation Manual and know how to operate all controls correctly.

Familiarize yourself with the icons shown above and what they represent. Learn the location and purpose of all of the controls and gauges before operating this mower.

4.2 INSTRUMENT PANEL

A. ***LCD Display Unit (LDU)***
Used to display and set operating conditions. **See Section 4.5.**

B. ***Mow Switch***
Enables and disables the three reel switches **(C, D and E)**, and switches lift system between service Mode and mow Mode. Pull up on the knob the enable the mowers, lower the reels to the one-touch position, and change the lift system to Mow Mode. Push down on the knob to disable the mowers, raise reels to transport position, and change lift system to Service Mode. See **Section 4.9** for lift system operation.

NOTE: *Mower will not start with mow switch in the ON position.*

C. ***Left Reel Switch***
Used to engage and disengage the left reel. Mow switch **(B)** must be in the ON (Push front of switch) position for switch to function. When left reel switch is moved to the OFF position, left reel will stop and raise to the crosscut position.

D. ***Center Reel Switch***
Used to engage and disengage the center reel. Mow switch **(B)** must be in the ON (Push front of switch) position for switch to function. When center reel switch is moved to the OFF position, center reel will stop and raise to the crosscut position.

E. ***Right Reel Switch***
Used to engage and disengage the right reel. Mow switch **(B)** must be in the ON (Push front of switch) position for switch to function. When right reel switch is moved to the OFF position, right reel will stop and raise to the crosscut position.

F. ***Horn Switch***
Used to sound the audible alarm. Switch is not active if system power switch is not in RUN position.

G. ***Light Switch***
Controls operation of the work lights. Press front of switch to turn lights ON. Press rear of switch to turn lights OFF. Switch is not active if system power switch is not in RUN position.

H. ***System Power Switch***
Used to energize the electrical system and start the hybrid engine if installed. Power switch has three positions, OFF, RUN, and START.

OFF Position - Power to mower is turned off, automatic parking brake is applied.

RUN Position - Controllers active, normal operating mode. Traction controller does not activate until switch is moved to START position and returned to RUN.

START Position - Used to activate the mow and traction system and start the hybrid engine if installed. **See Section 5.4.**

J. ***Reel Raise/Lower Joystick***
Used to raise and lower the three reels. Lift system operates in two modes, service mode and mow mode. Individual reels will not lower if the corresponding reel switch is in the OFF position. See **Section 4.9** for lift system operation.

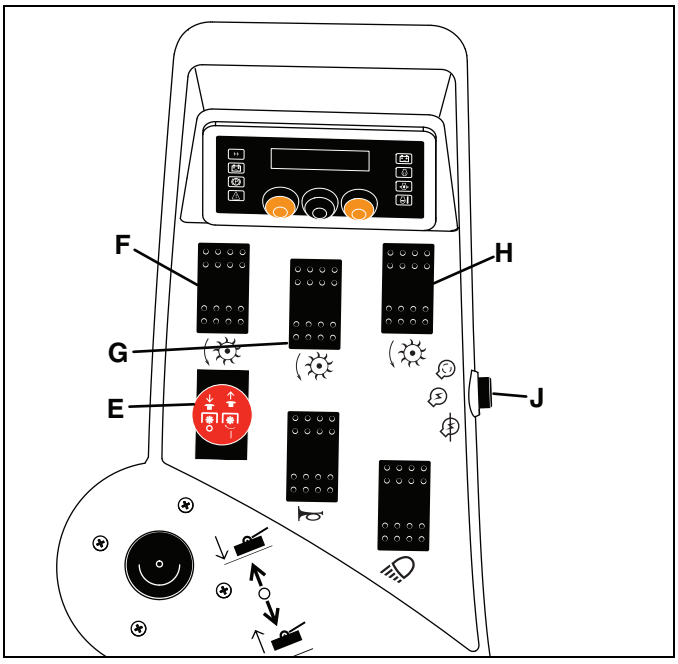


Figure 4A

4.3 OPERATOR CONTROLS

K. ***Forward Traction Pedal***
Press forward traction pedal down to move the mower forward. The further the pedal is pressed, the faster the mower will travel.

L. ***Reverse Traction Pedal***
Press reverse traction pedal down to move the mower in reverse. The further the pedal is pressed, the faster the mower will travel.

M. ***Brake Pedal***
The brake pedal is used to activate the traction motor brake.

Press the pedal slightly to act as a service brake. Traction motor brake will apply resistance to the motor and place mower into regen mode. Press pedal all the way down to fully engage the brake. **See Section 4.7 and 4.8.**

N. ***Steering Wheel Tilt Lever***
Push lever down to release steering column. Tilt column up or down to position desired. Release lever to lock steering column in place.

⚠ CAUTION

Never adjust tilt steering while mower is moving. Stop unit before adjusting.

P. ***Seat Adjustment Lever***
Pull lever up and slide seat forward or backward. Release lever to lock seat in place.

⚠ CAUTION

Never adjust seat while mower is moving. Stop unit before adjusting.

R. ***12 Volt Accessory Outlet***
Located inside armrest storage compartment. Allows operation of approved 12 volt accessories and attachments. To prevent excessive battery drain, only use 12 volt outlet with engine running. Only functional on hybrid powered mowers.

⚠ CAUTION

The 12 volt Accessory Outlet circuit is protected by a 10 amp fuse. Do not attempt to use attachment(s) with a combined power rating greater than 120 watts.

Engine must be running when using accessory outlet.

To prevent the risk of burns or fire do not replace 10 amp fuse with a higher amperage rating fuse.

S. ***Choke (Gas Hybrid Mower Only)***
Pull the choke control knob out to close the choke plate when starting a cold engine. A warm engine may not require “Choking” to start. Slowly push choke lever in once engine starts.

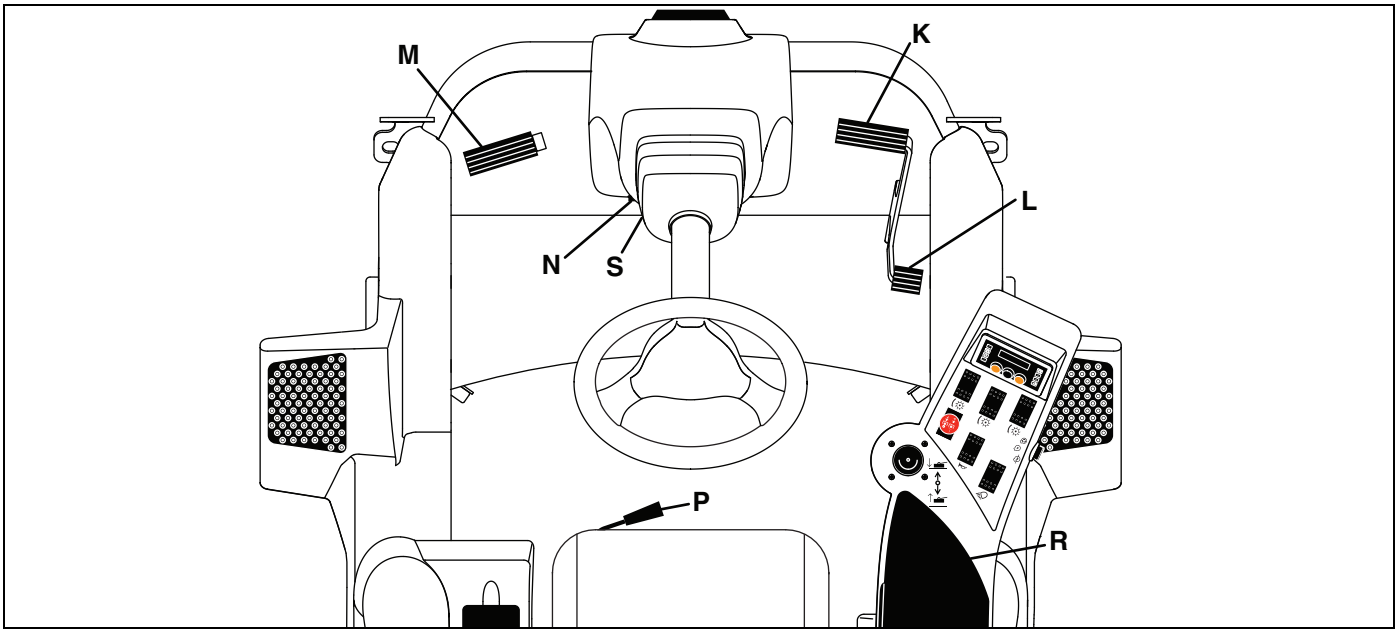


Figure 4B

4.4 OPERATOR CONVENIENCE

T. ***MCU Access Panel***
Remove thumbscrew and lift up on front of access panel to view MCU diagnostic lights. Always secure access panel with thumbscrew when operating.

U. ***Cup Holder***
Used to hold a beverage cup for the operator or may be used as additional storage pocket. Rubber portion of cup holder is removable for cleaning purposes.

V. ***Storage Compartment***
Used to store gloves and other necessary protective items for the operator.

W. ***Step***
Used to assist operator entering or exiting the operator's area.

X. ***Headlight***
Used to provide light when operating in the early morning or late evening. Light direction can be adjusted by the operator.

Y. ***Pivoting Armrest***
Used to position armrest for operator comfort. Armrest will also pivot out of the way for entering or exiting on the right side of the mower. Armrest can also be adjusted to three different heights.

Z. ***Center Reel Swing Arm Service Latch***
Used to secure center reel swing arm in service position.

AA. ***Fuel Filler Neck***
Used to add fuel to the mower. Only present on mowers equipped with gas or diesel power modules.

AB. ***Center Reel Swing Arm Handle***
Used to move center reel out from under mower for servicing. Raise center mower, remove grass catcher, unlatch arm to swing center reel out, and latch arm in service position **(Z)**. Do not operate mower without swing out arm securely latched in closed position.

AC. ***Running Light***
Light located under operator seat to provide illumination of center mower and floorboard. Light is always on with the system power switch **(H)** in the RUN position

AD. ***Hood Latch***
Lift handle up and rotate handle 180° counter-clockwise to unlatch hood. With hood closed rotate handle 180° clockwise to latch hood. Keep hood latched when operating mower.

AE. ***Tie Down***
Used to secure mower to trailer for transport.

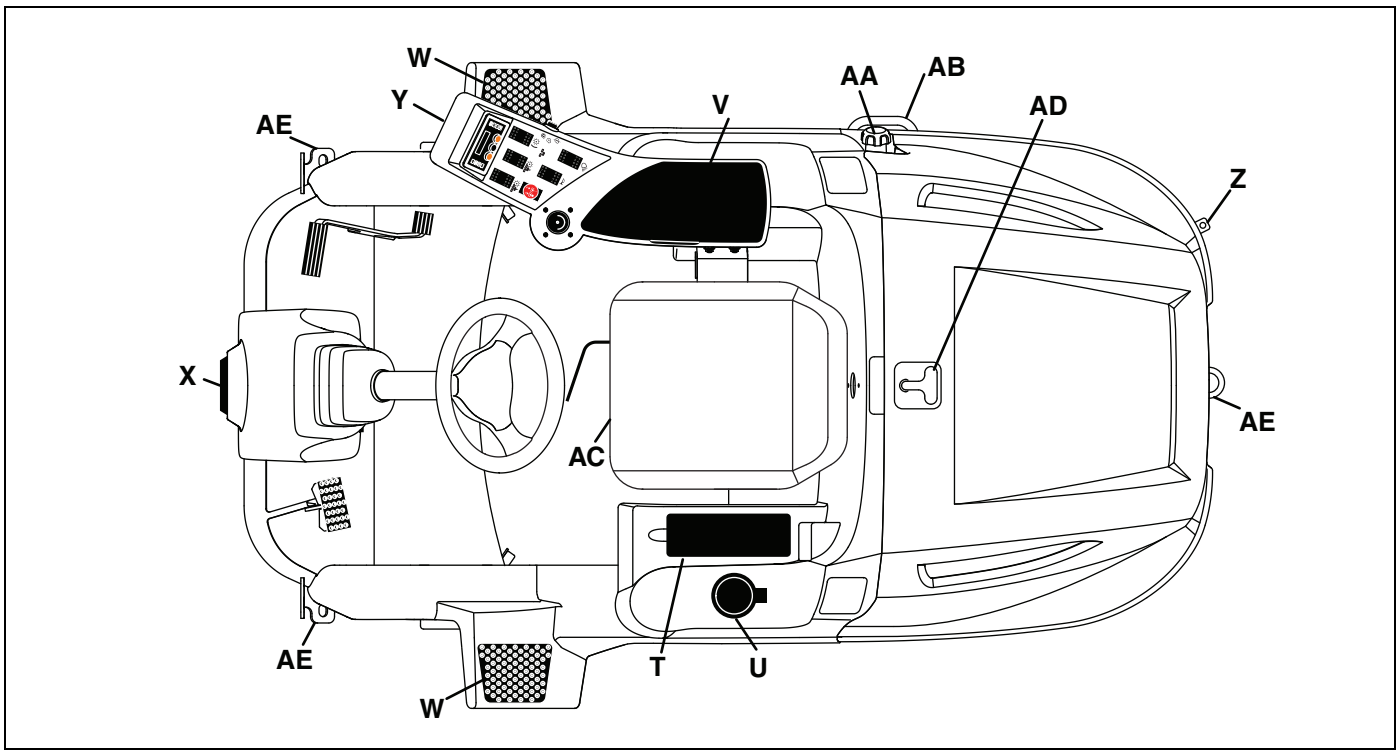


Figure 4C

4.5 LCD DISPLAY UNIT (LDU)

The LDU displays current functional values for the operation of the Eclipse mower, has indicator lights, and sounds audible warning alerts. The LDU operates in one of two modes, Operator Mode (Default) and Maintenance Mode. Use of Maintenance Mode requires a four digit pin number.

Press either of the orange buttons **(AM or AN)** to change screen display or change values. Push the right orange button **(AN)** to go forward in the display list or increase setting value, and push the left orange button **(AM)** to go back in the display list or decrease setting value. The black button **(AL)** is used to select, reset or change values.

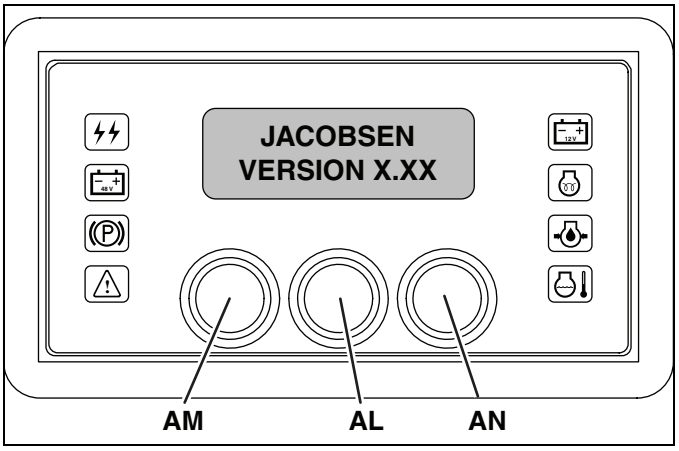


Figure 4D

4.5.1 Indicator Lights

The LDU has eight indicator lights to indicate system functions.

Power On Light: Green Power On light located on left side of the LDU indicates the controller system has power. A flashing Power On Light indicates controller systems has not been energized (started). A solid light indicates the unit is energized and in normal operation mode.

48V Light: Red 48V light located on left side of the LDU indicates system voltage is below 42 VDC or flashes when system voltage is above 59 VDC. Charge batteries or check generator output. LCD display will show corresponding message.

Parking Brake Light: Red parking brake light located on left side of the LDU indicates the automatic parking brake system is engaged or brake pedal is fully pressed.

Fault Light: Yellow fault light located on left side of the LDU indicates the controller system has detected a fault. See fault message displayed on LCD.

12V Light: (Hybrid Power Modules Only) Red 12V light located on right side of the LDU indicates the engine alternator is not producing proper voltage. Return unit to service area as soon as possible. Inspect 12V battery and battery charging system. 12V light has no function on battery power module units.

Glow Plug Light: (Diesel Hybrid Power Modules Only) Yellow glow plug light located on right side of the LDU indicates the diesel engine glow plugs are energized. Glow plug light has no function on battery or gas engine power module units.

Engine Oil Pressure Light: (Hybrid Power Modules Only) Red engine oil pressure light located on right side of the LDU indicates low engine oil pressure. Shut down unit immediately. Inspect oil level in engine. If oil light remains on with oil at proper level, shut off engine and tow or trailer mower back to a service area. **NEVER** operate engine with oil light on, severe damage to the engine can occur. Engine oil pressure light has no function on battery power module units.

Coolant Temperature Light: (Diesel Hybrid Power Modules Only) Red water temperature light located on right side of the LDU indicates an engine overheat condition. Shut down unit immediately. Remove debris such as leaves and grass clippings that may be restricting air flow through front screen and radiator. If engine continues to run hot, return mower to a service area. Coolant temperature light has no function on battery or gas engine power module units.

⚠ CAUTION

Diesel engine coolant is under pressure. Turn engine off and allow fluid to cool before checking fluid level or adding coolant to radiator.

4.5.2 Display Operating Hours

To check operating hours when system power switch is in the OFF position, press the center (Black) button. Operating hours will be displayed for 1 minute.

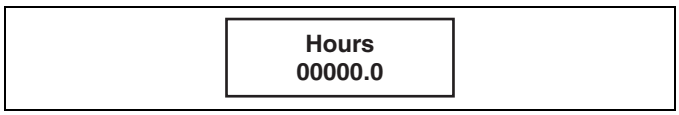


Figure 4E

4.5.3 Start Up Screen

The Jacobsen start up screen will display for 5 seconds when the system power switch is turned from the OFF to the RUN position. The software version of the controllers is displayed under Jacobsen.

Figure 4F

4.5.4 Alarm Codes

Refer to **Section 12** for a complete list of Eclipse error codes.

4.5.5 Mower Attachment Modes

The Eclipse mower, when in Operator Mode, has six mower attachment sub-modes for operation.

The values listed below for each mode are the defaults, but they can be changed if desired in the Maintenance Mode. Any changes made, will replace the defaults saved for each mode, until a factory reset is selected.

The six modes are:

Mode 1 - 11 Blade Reel: Use this mode when 11 blade reels are installed. Reel motor operation is enabled, number of reel blades are set to 11, reel speed is set to 2200 rpm, and FOC is set to 0.16 in. (0.4064 cm).

Mode 2 - 9 Blade Reel: Use this mode when 9 blade reels are installed. Reel motor operation is enabled, number of reel blades are set to 9, reel speed is set to 2200 rpm, and FOC is set to 0.196 in. (0.4967 cm).

Mode 3 - Roller: This mode is used when the reels are removed and the optional Quick Roll™ greens rollers are installed. Reel motor operation is disabled.

Mode 4 - Verticut: This mode is used when optional verticut mowers are installed. Reel motor operation is enabled, 1800 rpm reel speed, and FOC is set to 0.

Mode 5 - Spiker: This mode is used when the reels are removed and optional spiker attachments are installed. Reel motor operation is disabled.

Mode 6 - Other: This mode is used when 7 blade reels, or an attachment other than those listed above are installed. Reel motor operation is enabled, reel speed is set to 2200 rpm, and FOC is set to 0. Number of reel blades, and FOC must be set manually.

Setting	Mode 1 Reel	Mode 2 Reel	Mode 3 Roller	Mode 4 Verticut	Mode 5 Spiker	Mode 6 Other
Reel Speed	2200 rpm	2200 rpm	0	1800 rpm	0	2200 rpm
Number of reel blades	11	9	0	0	0	0
FOC Setting	0.160 in. (0.4064 cm)	0.196 in. (0.4967 cm)	0	0	0	0
Reels Disabled ▲	No	No	Yes	No	Yes	No
Reel Motor Direction	CCW	CCW	CCW	CCW	CCW	CCW
Maximum Mow Speed	4 mph (6.4 kph)	4 mph (6.4 kph)	4 mph (6.4 kph)	4 mph (6.4 kph)	4 mph (6.4 kph)	4 mph (6.4 kph)
Maximum Transport Speed	9 mph (14.5 kph)	9 mph (14.5 kph)	9 mph (14.5 kph)	9 mph (14.5 kph)	9 mph (14.5 kph)	9 mph (14.5 kph)
Display Units	English	English	English	English	English	English
▲ This setting can not be changed in the maintenance mode. Another mower attachment mode must be selected to enable or disable reel motors. See Maintenance mode for changing mower attachment mode.						

4.5.6 Operator Mode

Operator mode is used by the operator to view attachment mode, system voltage information, travel speed, reel motor current, reel motor speed, switch status, operation hours, and stored alarms. Press the orange buttons **(AM and AN)** on the LDU to toggle between the different displays.

Mower Attachment Mode: Displays current mower attachment mode.

Reel Motor On/Off: Allows reel motor operation to be disabled for training purposes or practice cutting. Mow and lift system will function normally, with the exception of the reel motors operating. Press black button **(AL)** to toggle between reel on and off. LDU screen will be locked on **REEL MOTORS OFF** screen until reel motors are turned back on. Reel motors will also be enabled by cycling the system power switch.

NOTE: *Enabling reel motors on this screen will not enable reel motors in Mode 3 Roller or Mode 5 Spiker.*

System Volts: Displays the system voltage. Normal operating voltage is between 43 and 60.5 volts, depending on the power module installed. High or low voltage faults may occur of system voltage goes above 60.5 volts for 5 seconds or drops below 43 volts for ten seconds. Some machine functions may be disabled in cases of high or low system voltage.

Travel Speed: Displays speed mower is traveling. Travel speed may be limited due to Maximum Mow Speed and Travel Speed values set in Maintenance Mode, or to meet current FOC setting.

Reel Motor Current: The reel motor current screen is provided for the operator and mechanic to help identify problems before damage to the reel motor occurs. Notify maintenance personnel if one reel motor is drawing a higher current load than the other two motors. The screen displays the reel motor current for all three reels. The number in the upper left corner of the screen is for the left reel motor, the number in the upper right corner of the screen is for the right reel motor, and the number on the second row of the screen is for the center reel motor. A fault will occur if reel motor current is over 35 amps for 30 seconds.

Reel Motor Screen: The reel motor speed screen displays the reel motor speed for all three reels. The number in the upper left corner of the screen is for the left reel motor, the number in the upper right corner of the screen is for the right reel motor, and the number on the second row of the screen is for the center reel motor. All three reel motors should be operating within 50 rpm of each other.

Enter Pin? Screen: Used to enter Maintenance Mode. Enter the four digit pin number to access Maintenance Mode.

Alarms Screens: Used to view alarms stored in system memory. Alarm message will appear on the screen as they occur for a few seconds, and a beep may sound, depending on the fault encountered. The alarm is then stored in system memory until key switch is turned to off position.

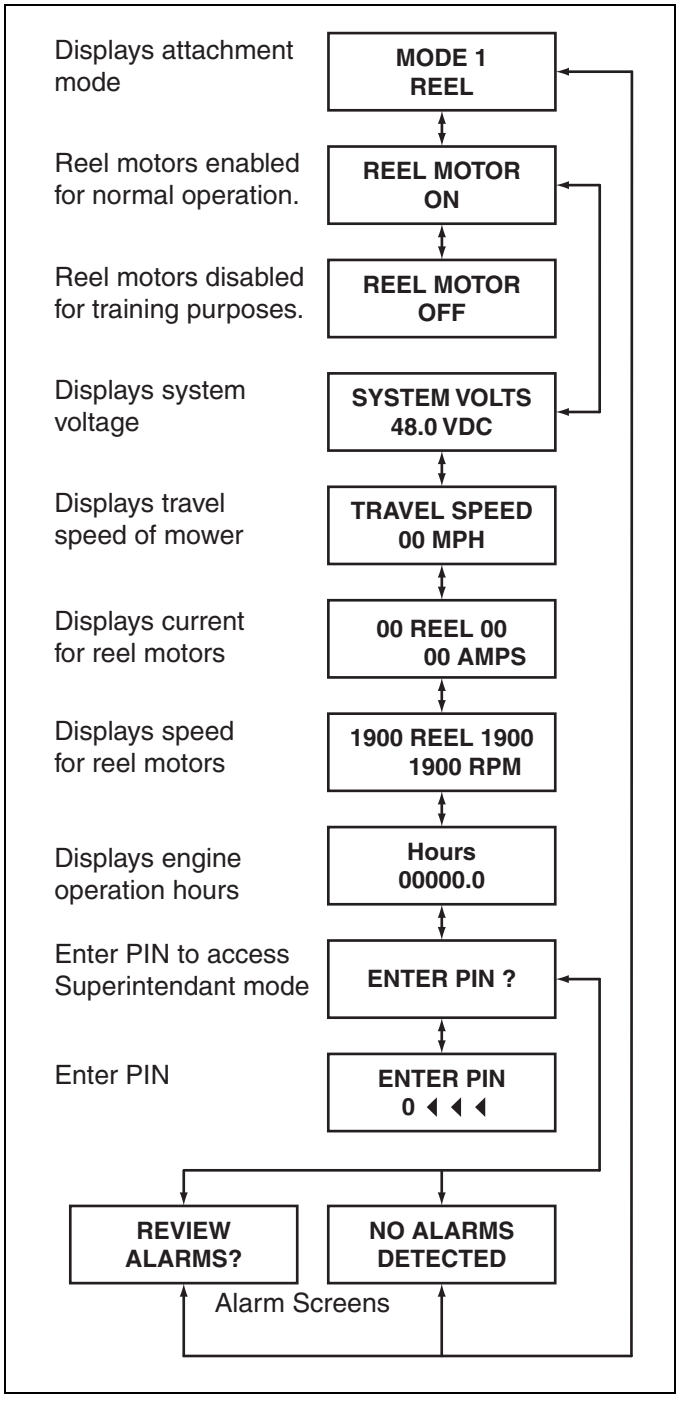


Figure 4G

4.5.7 Maintenance Mode

Maintenance Mode is used by the superintendent to set and adjust all functional values for the Eclipse Mower. LCD displays available in Maintenance Mode are, mower attachment mode, system voltage, travel speed, reel motor current, reel motor speed, total hours on machine, actuator motor current, reel motor temperature, TCU/ traction motor temperature, traction motor current, select display units, calibrate actuators, configure reel motor direction, software code revision levels, CAN status, switch status, maximum mow and travel speed, number of blades, fixed FOC, backlap, factory reset and alarm screens.

NOTICE

Any changes made to settings in the Maintenance Mode will not be active until the mower is powered off and restarted.

Changes made will also save settings in current mower attachment mode, unless factory reset is selected.

To enter Maintenance Mode, press either orange buttons **(AM or AN)** until **ENTER PIN?** screen is on the display and press the black button. Use the orange buttons **(AM or AN)** to select and the black button **(AL)** to enter the digits for the Maintenance Mode PIN.

NOTE: *The PIN for Maintenance Mode is **0000**.*

NOTE: *The Maintenance Mode PIN can be customized to a setting of your choice. Please contact your Jacobsen Dealer or Jacobsen Technical Support (1800-848-1636 Option 2) for complete instructions.*

System voltage, travel speed, reel motor current draw and reel motor speed screens are the same as for Operator Mode. See **Section 4.5.6**.

For actuator calibration screens, see **Section 9.5**.

For backlap screens, see **Section 9.6**.

Fixed Reel Speed: To set the fixed reel speed, the FOC setting must be set to 0, then press either of the orange buttons **(AM or AN)** on the LDU until the **SET REEL SPEED** screen is on the LCD display. Press the black button **(AL)** to enter set mode. Use the orange buttons to raise **(AN)** or lower **(AM)** the reel speed to the desired setting.

Fixed reel speed must be set between 1000 and 2200 rpm.

Actuator Motor Current: Displays the current draw for each actuator motor. The first number is for the left actuator motor, the second number is for the center actuator mower, and the third number is for the right actuator motor.

Reel Temperature: Displays the temperature for each reel motor. The number in the upper left corner of the screen is for the left reel motor, the number in the upper right corner of the screen is for the right reel motor, and the number on the second row of the screen is for the center reel motor.

TCU/Traction Motor Temperature: Displays the temperature of the TCU case and traction motor.

Traction Motor Current: Displays the traction motor current draw.

Maintenance Hours: To display maintenance hours, press either of the orange buttons **(AM or AN)** on the LDU until the maintenance hours screen is on the LCD display. To reset maintenance hours, press the black button **(AL)**.

Select Units: To set the display units, press either of the orange buttons **(AM or AN)** on the LDU until the **SELECT UNITS?** screen is on the LCD display. Press the black button **(AL)** to enter set mode. Use the orange buttons to select the desired setting.

Units must be set to either English or metric.

CFG Reel Direction: To set reel rotation direction, press either of the orange buttons **(AM or AN)** on the LDU until the reel direction screen is on the LCD display. Press the black button **(AL)** to enter set mode. Set reel direction for each reel, pressing black button to change between each reel. Direction is viewed from front of motor shaft

Reel ..... Counter-Clockwise (CCW)
Vertical Mower ..... Clockwise (CW) or CCW

Software Code Revision Level: Displays the revision level for software loaded for each controller. This information is shown on two screens. The software revision levels may be an aid for service technicians working on the mower.

The first screen displays the software revision levels for the 3WD (If installed), TCU, and SCU.

The second screen displays the software revision levels for the MCU, RCU, and LDU.

CAN Network Status: Displays the CAN (Controller Area Network) status for each of the controllers. A steady (non flashing) controller name indicates CAN traffic has been detected from controller within the last two seconds. A flashing controller name indicates CAN traffic has not been detected from controller.

Switch Status: Displays the current switch settings, and is used to diagnose switch problems. A status of 0 indicates the switch is in the OFF position. A status of 1 indicates the switch is in the ON position. Check the wiring and operation of any switch that is not displaying the correct status.

The switches are broken up into three sets of numbers, with a gap between each set. Refer to **Safety & Operation Manual** for switch references.

The first set of numbers displays the status of the left, center, and right reel switches **(C, D, and E)** on the instrument panel.

The second set of numbers displays the status of the mow switch **(B)**, light switch **(F)**, horn switch **(G)**, and system power switch in start position **(H)**.

The third set of numbers displays the status of the lower and raise switches that are part of the joystick **(J)**, and the seat switch.

Maximum Mow Speed: To set the maximum mow speed, press either of the orange buttons **(AM or AN)** on the LDU until the set **MAX MOW SPEED** screen is on the LCD display. Press the black button **(AL)** to enter set mode. Use the orange buttons to raise **(AN)** or lower **(AM)** the maximum mow speed to the desired speed. press the black button to set speed.

Maximum mow speed must be between 1.0 and 5.0 mph (1.6 and 8.0 kph), and is adjustable in 0.5 mph (0.8 kph) increments.

Maximum Transport Speed: To set the maximum transport speed, press either of the orange buttons **(AM or AN)** on the LDU until the set **MAX SPEED** screen is on the LCD display. Press the black button **(AL)** to enter set mode. Use the orange buttons to raise **(AN)** or lower **(AM)** the maximum transport speed to the desired speed. press the black button to set speed.

Maximum transport speed must be between 1.0 and 9 mph (1.6 and 14.5 kph), and is adjustable in 0.5 mph (0.8 kph) increments.

Number of Reel Blades: To set the number of blades on each reel, press either of the orange buttons **(AM or AN)** on the LDU until the reel blades screen is on the LCD display. Press the black button **(AL)** to enter set mode. Use the orange buttons to raise **(AN)** or lower **(AM)** the number of reel blades. press the black button to set speed. Entering the wrong number of blades will affect the fixed FOC setting.The only reels currently available are 7, 9, 11, or 15 blade reels.

2WD/3WD Mode: pressing black button **(AL)** toggles mower between 2WD and 3WD modes. Do not set mower to 3WD if the 3WD system is not installed.

Fixed FOC Setting: To set the fixed FOC, press either of the orange buttons **(AM or AN)** on the LDU until the **FOC x.xxx CHANGE?** screen is on the LCD display. Press the black button **(AL)** to enter set mode. Use the orange buttons to raise **(AN)** or lower **(AM)** the FOC value to the desired setting. press the black button to set speed. The minimum and maximum fixed FOC setting varies, depending on the number of blades. **[See Section 4.6].**

15 Blade Reel ..... 0.05 - 0.25 in. (0.12 - 0.63 cm)
11 Blade Reel ..... 0.05 - 0.25 in. (0.12 - 0.63 cm)
9 Blade Reel ..... 0.06 - 0.30 in. (0.15 - 0.77 cm)
7 Blade Reel ..... 0.07 - 0.39 in. (0.19 - 0.99 cm)

Factory Reset: To reset controller to factory default values, press either of the orange buttons **(AM or AN)** on the LDU until the Factory Reset screen is on the LCD display. Press the black button **(AL)** to reset values back to factory default settings. All values saved in mower attachment modes will also revert to their original factory default settings.

Mower Attachment Mode 1 (11 Blade Reel)
Reel Direction ..... CW
Reel Speed ..... 2200 rpm
Mow Speed ..... 4 mph
Transport Speed ..... 9 mph
FOC ..... 0.160 in.
Reel Blades 11
Display Units ..... English
Backlap Timer ..... 10 Minutes

Mower Attachment Mode: To set the mower attachment mode, press either of the orange buttons **(AM or AN)** until the **MODE CHANGE?** screen is on the lcd display. Press the back button **(AL)** to enter set mode. Press the right orange button until the desired mode is on the screen, then press the black button to select it. See **Section 4.5.5** for default values.

NOTICE

If a mower attachment mode change is required, change mower attachment mode first before setting other values. Values stored in new mode will override previous settings for reel speed, FOC, maximum mow and travel speeds, reel direction, and display units.

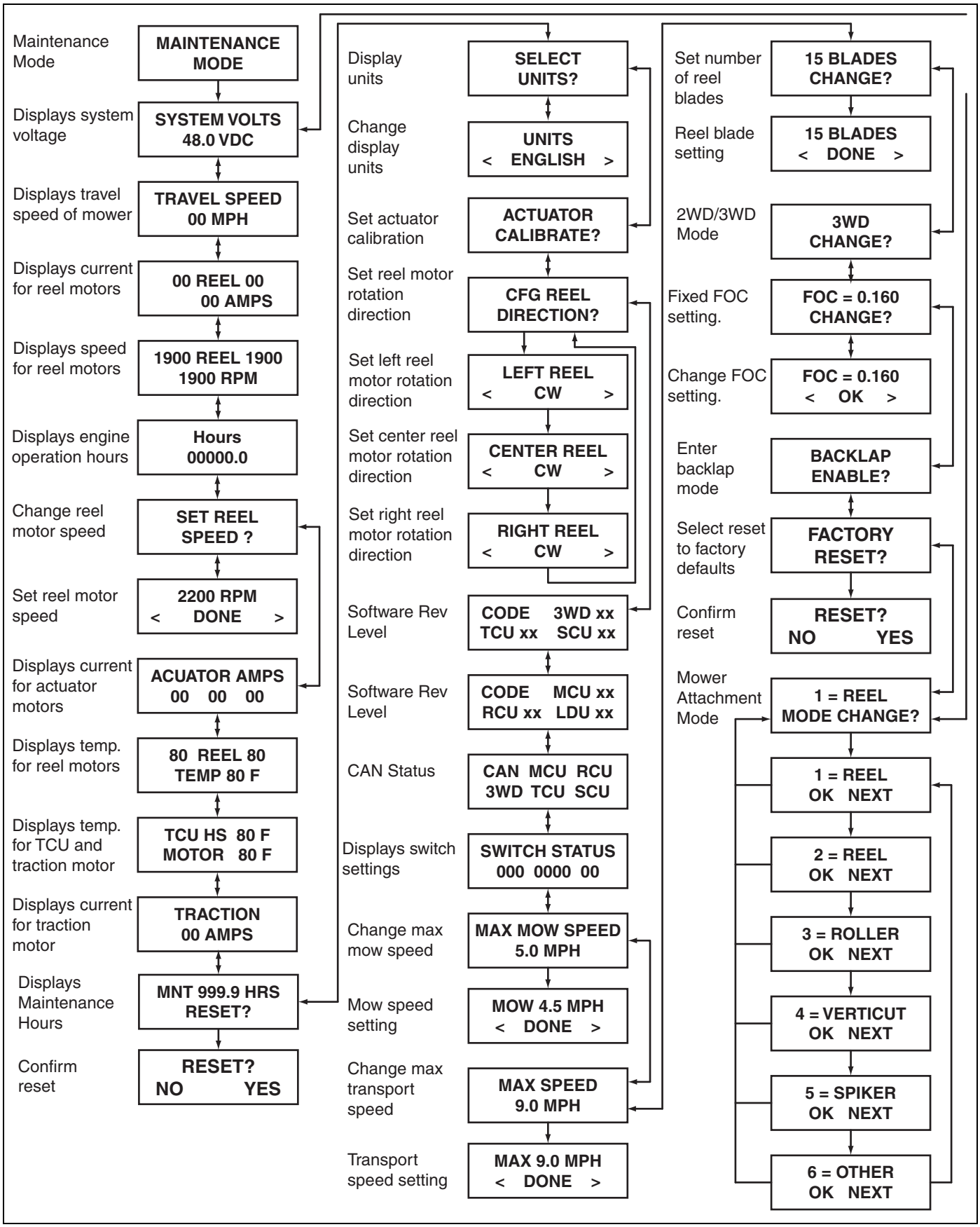

Maintenance Mode
MAINTENANCE MODE
Displays system voltage
SYSTEM VOLTS 48.0 VDC
Displays travel speed of mower
TRAVEL SPEED 00 MPH
Displays current for reel motors
00 REEL 00 00 AMPS
Displays speed for reel motors
1900 REEL 1900 1900 RPM
Displays engine operation hours
Hours 00000.0
Change reel motor speed
SET REEL SPEED ?
Set reel motor speed
2200 RPM < DONE >
Displays current for actuator motors
ACUATOR AMPS 00 00 00
Displays temp. for reel motors
80 REEL 80 TEMP 80 F
Displays temp. for TCU and traction motor
TCU HS 80 F MOTOR 80 F
Displays current for traction motor
TRACTION 00 AMPS
Displays Maintenance Hours
MNT 999.9 HRS RESET?
Confirm reset
RESET? NO YES
Display units
SELECT UNITS?
Change display units
UNITS < ENGLISH >
Set actuator calibration
ACTUATOR CALIBRATE?
Set reel motor rotation direction
CFG REEL DIRECTION?
Set left reel motor rotation direction
LEFT REEL < CW >
Set center reel motor rotation direction
CENTER REEL < CW >
Set right reel motor rotation direction
RIGHT REEL < CW >
Software Rev Level
CODE 3WD xx TCU xx SCU xx
Software Rev Level
CODE MCU xx RCU xx LDU xx
CAN Status
CAN MCU RCU 3WD TCU SCU
Displays switch settings
SWITCH STATUS 000 0000 00
Change max mow speed
MAX MOW SPEED 5.0 MPH
Mow speed setting
MOW 4.5 MPH < DONE >
Change max transport speed
MAX SPEED 9.0 MPH
Transport speed setting
MAX 9.0 MPH < DONE >
Set number of reel blades
15 BLADES CHANGE?
Reel blade setting
15 BLADES < DONE >
2WD/3WD Mode
3WD CHANGE?
Fixed FOC setting.
FOC = 0.160 CHANGE?
Change FOC setting.
FOC = 0.160 < OK >
Enter backlap mode
BACKLAP ENABLE?
Select reset to factory defaults
FACTORY RESET?
Confirm reset
RESET? NO YES
Mower Attachment Mode
1 = REEL MODE CHANGE?
1 = REEL OK NEXT
2 = REEL OK NEXT
3 = ROLLER OK NEXT
4 = VERTICUT OK NEXT
5 = SPIKER OK NEXT
6 = OTHER OK NEXT

Figure 4J

4.6 FREQUENCY OF CUT

The FOC (Frequency of Cut) is the distance, in inches (cm), the machine travels forward between reel blades contacting the bedknife. The FOC can be adjusted either by changing the Fixed FOC setting or by changing the maximum mow speed and the fixed reel speed on the LCD display.

Adjust FOC with Fixed FOC setting

Changing the FOC setting to a value other than 0 will enable the fixed FOC mode and overrides the reel speed setting. As mower travel speed increases or decreases, reel speed will automatically adjust as required to maintain set FOC.

NOTICE

When using a fixed FOC setting, the reels will not turn if the mower is not moving.

Maximum mow speed may be lower than what is set in the LDU when using a very low FOC.

Adjust FOC with Reel Speed Setting

1. Using the FOC charts, determine the maximum mow speed and fixed reel speed required for the desired FOC.
2. Switch to Maintenance Mode. **[Section 4.7]**
3. Set fixed FOC setting to 0.
4. Set desired Maximum Mow Speed.
5. Set desired Fixed Reel Speed.

NOTE: *Mow speed is measured in mph (kph), FOC is measured in inches (millimeters).*

15 Blade Reel FOC Table

Mow Speed	Reel RPM								
	1800	1850	1900	1950	2000	2050	2100	2150	2200
MPH (KPH)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)
1.0	0.039	0.038	0.037	0.036	0.035	0.034	0.034	0.033	0.032
(1.61)	(0.993)	(0.967)	(0.941)	(0.917)	(0.894)	(0.872)	(0.852)	(0.832)	(0.813)
1.25	0.049	0.048	0.046	0.045	0.044	0.043	0.042	0.041	0.040
(2.01)	(1.242)	(1.208)	(1.176)	(1.146)	(1.118)	(1.090)	(1.064)	(1.040)	(1.016)
1.50	0.059	0.057	0.056	0.054	0.053	0.052	0.050	0.049	0.048
(2.41)	(1.490)	(1.450)	(1.412)	(1.376)	(1.341)	(1.308)	(1.277)	(1.248)	(1.219)
1.75	0.068	0.067	0.065	0.063	0.062	0.060	0.059	0.057	0.056
(2.82)	(1.738)	(1.692)	(1.647)	(1.605)	(1.565)	(1.526)	(1.490)	(1.455)	(1.422)
2.00	0.078	0.076	0.074	0.072	0.070	0.069	0.067	0.065	0.064
(3.22)	(1.987)	(1.933)	(1.882)	(1.834)	(1.788)	(1.745)	(1.703)	(1.663)	(1.626)
2.25	0.088	0.086	0.083	0.081	0.079	0.077	0.075	0.074	0.072
(3.62)	(2.235)	(2.175)	(2.118)	(2.063)	(2.012)	(1.963)	(1.916)	(1.871)	(1.829)
2.50	0.098	0.095	0.093	0.090	0.088	0.086	0.084	0.082	0.080
(4.02)	(2.484)	(2.416)	(2.353)	(2.293)	(2.235)	(2.181)	(2.129)	(2.079)	(2.032)
2.75	0.108	0.105	0.102	0.099	0.097	0.094	0.092	0.090	0.088
(4.43)	(2.732)	(2.658)	(2.588)	(2.522)	(2.459)	(2.399)	(2.342)	(2.287)	(2.235)
3.00	0.117	0.114	0.111	0.108	0.106	0.103	0.101	0.098	0.096
(4.83)	(2.980)	(2.900)	(2.823)	(2.751)	(2.682)	(2.617)	(2.555)	(2.495)	(2.438)
3.25	0.127	0.124	0.120	0.117	0.114	0.112	0.109	0.106	0.104
(5.23)	(3.229)	(3.141)	(3.059)	(2.980)	(2.906)	(2.835)	(2.767)	(2.703)	(2.642)
3.50	0.137	0.133	0.130	0.126	0.123	0.120	0.117	0.115	0.112
(5.63)	(3.477)	(3.383)	(3.294)	(3.210)	(3.129)	(3.053)	(2.980)	(2.911)	(2.845)
3.75	0.147	0.143	0.139	0.135	0.132	0.129	0.126	0.123	0.120
(6.04)	(3.725)	(3.625)	(3.529)	(3.439)	(3.353)	(3.271)	(3.193)	(3.119)	(3.048)
4.00	0.156	0.152	0.148	0.144	0.141	0.137	0.134	0.131	0.128
(6.44)	(3.974)	(3.866)	(3.765)	(3.668)	(3.576)	(3.489)	(3.406)	(3.327)	(3.251)
4.25	0.166	0.162	0.157	0.153	0.150	0.146	0.142	0.139	0.136
(6.84)	(4.222)	(4.108)	(4.000)	(3.897)	(3.800)	(3.707)	(3.619)	(3.535)	(3.454)
4.50	0.176	0.171	0.167	0.162	0.158	0.155	0.151	0.147	0.144
(7.24)	(4.470)	(4.350)	(4.235)	(4.127)	(4.023)	(3.925)	(3.832)	(3.743)	(3.658)

11 Blade Reel FOC Table

Mow Speed	Reel RPM								
	1800	1850	1900	1950	2000	2050	2100	2150	2200
MPH (KPH)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)
1.0 (1.61)	0.053 (1.355)	0.052 (1.318)	0.051 (1.283)	0.049 (1.250)	0.048 (1.219)	0.047 (1.189)	0.046 (1.161)	0.045 (1.134)	0.044 (1.108)
1.25 (2.01)	0.067 (1.693)	0.065 (1.648)	0.063 (1.604)	0.062 (1.563)	0.060 (1.524)	0.059 (1.487)	0.057 (1.451)	0.056 (1.418)	0.055 (1.385)
1.50 (2.41)	0.080 (2.032)	0.078 (1.977)	0.076 (1.925)	0.074 (1.876)	0.072 (1.829)	0.070 (1.784)	0.069 (1.742)	0.067 (1.701)	0.065 (1.663)
1.75 (2.82)	0.093 (2.371)	0.091 (2.307)	0.088 (2.246)	0.086 (2.188)	0.084 (2.134)	0.082 (2.082)	0.080 (2.032)	0.078 (1.985)	0.076 (1.940)
2.00 (3.22)	0.107 (2.709)	0.104 (2.636)	0.101 (2.567)	0.098 (2.501)	0.096 (2.438)	0.094 (2.379)	0.091 (2.322)	0.089 (2.268)	0.087 (2.217)
2.25 (3.62)	0.120 (3.048)	0.117 (2.966)	0.114 (2.888)	0.111 (2.814)	0.108 (2.743)	0.105 (2.676)	0.103 (2.613)	0.100 (2.552)	0.098 (2.494)
2.50 (4.02)	0.133 (3.387)	0.130 (3.295)	0.126 (3.208)	0.123 (3.126)	0.120 (3.048)	0.117 (2.974)	0.114 (2.903)	0.112 (2.835)	0.109 (2.771)
2.75 (4.43)	0.147 (3.725)	0.143 (3.625)	0.139 (3.529)	0.135 (3.439)	0.132 (3.353)	0.129 (3.271)	0.126 (3.193)	0.123 (3.119)	0.120 (3.048)
3.00 (4.83)	0.160 (4.064)	0.156 (3.954)	0.152 (3.850)	0.148 (3.751)	0.144 (3.658)	0.140 (3.568)	0.137 (3.483)	0.134 (3.402)	0.131 (3.325)
3.25 (5.23)	0.173 (4.403)	0.169 (4.284)	0.164 (4.171)	0.160 (4.064)	0.156 (3.962)	0.152 (3.866)	0.149 (3.774)	0.145 (3.686)	0.142 (3.602)
3.50 (5.63)	0.187 (4.741)	0.182 (4.613)	0.177 (4.492)	0.172 (4.377)	0.168 (4.267)	0.164 (4.163)	0.160 (4.064)	0.156 (3.969)	0.153 (3.879)
3.75 (6.04)	0.200 (5.080)	0.195 (4.943)	0.189 (4.813)	0.185 (4.689)	0.180 (4.572)	0.176 (4.460)	0.171 (4.354)	0.167 (4.253)	0.164 (4.156)
4.00 (6.44)	0.213 (5.419)	0.208 (5.272)	0.202 (5.133)	0.197 (5.002)	0.192 (4.877)	0.187 (4.758)	0.183 (4.645)	0.179 (4.537)	0.175 (4.433)
4.25 (6.84)	0.227 (5.757)	0.221 (5.602)	0.215 (5.454)	0.209 (5.314)	0.204 (5.182)	0.199 (5.055)	0.194 (4.935)	0.190 (4.820)	0.185 (4.711)
4.50 (7.24)	0.240 (6.096)	0.234 (5.931)	0.227 (5.775)	0.222 (5.627)	0.216 (5.486)	0.211 (5.353)	0.206 (5.225)	0.201 (5.104)	0.196 (4.988)

9 Blade Reel FOC Table

Mow Speed	Reel RPM								
	1800	1850	1900	1950	2000	2050	2100	2150	2200
MPH (KPH)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)
1.0 (1.61)	0.065 (1.656)	0.063 (1.611)	0.062 (1.569)	0.060 (1.528)	0.059 (1.490)	0.057 (1.454)	0.056 (1.419)	0.055 (1.386)	0.053 (1.355)
1.25 (2.01)	0.081 (2.070)	0.079 (2.014)	0.077 (1.961)	0.075 (1.910)	0.073 (1.863)	0.072 (1.817)	0.070 (1.774)	0.068 (1.733)	0.067 (1.693)
1.50 (2.41)	0.098 (2.484)	0.095 (2.416)	0.093 (2.353)	0.090 (2.293)	0.088 (2.235)	0.086 (2.181)	0.084 (2.129)	0.082 (2.079)	0.080 (2.032)
1.75 (2.82)	0.114 (2.897)	0.111 (2.819)	0.108 (2.745)	0.105 (2.675)	0.103 (2.608)	0.100 (2.544)	0.098 (2.484)	0.096 (2.426)	0.093 (2.371)
2.00 (3.22)	0.130 (3.311)	0.127 (3.222)	0.124 (3.137)	0.120 (3.057)	0.117 (2.980)	0.114 (2.908)	0.112 (2.838)	0.109 (2.772)	0.107 (2.709)
2.25 (3.62)	0.147 (3.725)	0.143 (3.625)	0.139 (3.529)	0.135 (3.439)	0.132 (3.353)	0.129 (3.271)	0.126 (3.193)	0.123 (3.119)	0.120 (3.048)
2.50 (4.02)	0.163 (4.139)	0.159 (4.027)	0.154 (3.921)	0.150 (3.821)	0.147 (3.725)	0.143 (3.634)	0.140 (3.548)	0.136 (3.465)	0.133 (3.387)
2.75 (4.43)	0.179 (4.553)	0.174 (4.430)	0.170 (4.314)	0.165 (4.203)	0.161 (4.098)	0.157 (3.998)	0.154 (3.903)	0.150 (3.812)	0.147 (3.725)
3.00 (4.83)	0.196 (4.967)	0.190 (4.833)	0.185 (4.706)	0.181 (4.585)	0.176 (4.470)	0.172 (4.361)	0.168 (4.258)	0.164 (4.159)	0.160 (4.064)
3.25 (5.23)	0.212 (5.381)	0.206 (5.236)	0.201 (5.098)	0.196 (4.967)	0.191 (4.843)	0.186 (4.725)	0.182 (4.612)	0.177 (4.505)	0.173 (4.403)
3.50 (5.63)	0.228 (5.795)	0.222 (5.638)	0.216 (5.490)	0.211 (5.349)	0.205 (5.215)	0.200 (5.088)	0.196 (4.967)	0.191 (4.852)	0.187 (4.741)
3.75 (6.04)	0.244 (6.209)	0.238 (6.041)	0.232 (5.882)	0.226 (5.731)	0.220 (5.588)	0.215 (5.452)	0.210 (5.322)	0.205 (5.198)	0.200 (5.080)
4.00 (6.44)	0.261 (6.623)	0.254 (6.444)	0.247 (6.274)	0.241 (6.113)	0.235 (5.961)	0.229 (5.815)	0.223 (5.677)	0.218 (5.545)	0.213 (5.419)
4.25 (6.84)	0.277 (7.037)	0.270 (6.847)	0.262 (6.666)	0.256 (6.495)	0.249 (6.333)	0.243 (6.179)	0.237 (6.031)	0.232 (5.891)	0.227 (5.757)
4.50 (7.24)	0.293 (7.451)	0.285 (7.249)	0.278 (7.059)	0.271 (6.878)	0.264 (6.706)	0.258 (6.542)	0.251 (6.386)	0.246 (6.238)	0.240 (6.096)

7 Blade Reel FOC Table

Mow Speed	Reel RPM								
	1800	1850	1900	1950	2000	2050	2100	2150	2200
MPH (KPH)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)	Inch (cm)
1.0 (1.61)	0.084 (2.129)	0.082 (2.071)	0.079 (2.017)	0.077 (1.965)	0.075 (1.916)	0.074 (1.869)	0.072 (1.825)	0.070 (1.782)	0.069 (1.742)
1.25 (2.01)	0.105 (2.661)	0.102 (2.589)	0.099 (2.521)	0.097 (2.456)	0.094 (2.395)	0.092 (2.336)	0.090 (2.281)	0.088 (2.228)	0.086 (2.177)
1.50 (2.41)	0.126 (3.193)	0.122 (3.107)	0.119 (3.025)	0.116 (2.948)	0.113 (2.874)	0.110 (2.804)	0.108 (2.737)	0.105 (2.673)	0.103 (2.613)
1.75 (2.82)	0.147 (3.725)	0.143 (3.625)	0.139 (3.529)	0.135 (3.439)	0.132 (3.353)	0.129 (3.271)	0.126 (3.193)	0.123 (3.119)	0.120 (3.048)
2.00 (3.22)	0.168 (4.258)	0.163 (4.142)	0.159 (4.033)	0.155 (3.930)	0.151 (3.832)	0.147 (3.738)	0.144 (3.649)	0.140 (3.564)	0.137 (3.483)
2.25 (3.62)	0.189 (4.790)	0.183 (4.660)	0.179 (4.538)	0.174 (4.421)	0.170 (4.311)	0.166 (4.206)	0.162 (4.105)	0.158 (4.010)	0.154 (3.919)
2.50 (4.02)	0.210 (5.322)	0.204 (5.178)	0.198 (5.042)	0.193 (4.913)	0.189 (4.790)	0.184 (4.673)	0.180 (4.562)	0.175 (4.456)	0.171 (4.354)
2.75 (4.43)	0.230 (5.854)	0.224 (5.696)	0.218 (5.546)	0.213 (5.404)	0.207 (5.269)	0.202 (5.140)	0.198 (5.018)	0.193 (4.901)	0.189 (4.790)
3.00 (4.83)	0.251 (6.386)	0.245 (6.214)	0.238 (6.050)	0.232 (5.895)	0.226 (5.748)	0.221 (5.607)	0.216 (5.474)	0.210 (5.347)	0.206 (5.225)
3.25 (5.23)	0.272 (6.918)	0.265 (6.731)	0.258 (6.554)	0.251 (6.386)	0.245 (6.227)	0.239 (6.075)	0.233 (5.930)	0.228 (5.792)	0.223 (5.661)
3.50 (5.63)	0.293 (7.451)	0.285 (7.249)	0.278 (7.059)	0.271 (6.878)	0.264 (6.706)	0.258 (6.542)	0.251 (6.386)	0.246 (6.238)	0.240 (6.096)
3.75 (6.04)	0.314 (7.983)	0.306 (7.767)	0.298 (7.563)	0.290 (7.369)	0.283 (7.185)	0.276 (7.009)	0.269 (6.842)	0.263 (6.683)	0.257 (6.531)
4.00 (6.44)	0.335 (8.515)	0.326 (8.285)	0.318 (8.067)	0.309 (7.860)	0.302 (7.664)	0.294 (7.477)	0.287 (7.299)	0.281 (7.129)	0.274 (6.967)
4.25 (6.84)	0.356 (9.047)	0.347 (8.803)	0.337 (8.571)	0.329 (8.351)	0.321 (8.143)	0.313 (7.944)	0.305 (7.755)	0.298 (7.574)	0.291 (7.402)
4.50 (7.24)	0.377 (9.579)	0.367 (9.321)	0.357 (9.075)	0.348 (8.843)	0.339 (8.621)	0.331 (8.411)	0.323 (8.211)	0.316 (8.020)	0.309 (7.838)

4.7 ELECTRONIC TRACTION CONTROL SYSTEM

The Eclipse is equipped with an electronic traction control system which utilizes a controller and software to regulate speed and optimize the driveability of the unit. A speed sensor in the drive motor reports the exact vehicle speed to the controller which electronically controls the drive motor to maintain a smooth and constant speed whether the unit is going uphill or downhill.

When the direction/speed pedal is returned to Neutral, the controller uses regenerative braking by essentially turning the drive motor into a generator and putting energy back into the battery pack or automatically adjusting the engine throttle on hybrid powered mowers to control proper generator output.

To prevent an overvoltage condition, any excess power created by the regenerative action is sent through the resistor banks located on the right side of the machine. System voltage over 60 VDC could cause damage to the controllers.

4.8 AUTOMATIC PARKING BRAKE

The Eclipse mower is equipped with an automatic parking brake. When the parking brake is applied, the parking brake light on the LDU will be lit. The parking brake is automatically applied whenever the vehicle is not moving or the brake pedal is fully depressed.

Additionally, the parking brake will be engaged with the keyswitch in the OFF position.

If the parking brake does not disengage when the traction pedal is pressed, or does not engage when the vehicle is stopped, shut mower down and have the system inspected.

To disengage parking brake: The parking brake will automatically disengage when the traction system is enabled (mower is started), and the traction pedal is pressed in either the forward or reverse direction.

To engage parking brake: With the vehicle in motion, release the traction pedal and gently apply the foot brake to switch the traction motor to regenerative mode. The further the brake pedal is pressed, the greater the regenerative action. Once the vehicle comes to a complete stop, the parking brake will automatically be applied.

⚠ CAUTION

Pressing the pedal all the way down, will fully engage the automatic parking brake, and act as an emergency stop.

4.9 LIFT SYSTEM

The Eclipse 322 lift system operates in one of two modes, service mode and mow mode, depending on the position of the mow switch **(B)**.

Service Mode - Service mode is active with mow switch **(B)** in OFF (down) position and automatic parking brake engaged. Service mode is used to raise or lower the individual reels for servicing, without activating reel motors. Push forward on joystick **(J)** to lower reels, or pull back on joystick to raise reels. Only reels with corresponding reel switches **(C, D, or E)** in the ON position will lower.

If reels are lowered or in the crosscut position, mow switch is off, and mower starts moving, reels will automatically raise to the transport position.

NOTICE

A ratcheting sound will come from the lift actuators if joystick **(J)** is pulled back with reels fully raised. The sound is produced by a clutch in the actuator, and is designed to prevent damage to the actuator.

Mow Mode - Mow mode is active with mow switch **(B)** in ON (up) position. Reels will automatically lower to crosscut position when mow switch is turned ON. Push forward and release joystick **(J)** to fully lower reels and activate reel motors. Pull back on joystick and release to raise reels to crosscut position and deactivate reel motors. Pull back and release a second time to fully raise reels to transport position.

Only reels with corresponding reel switches **(C, D, or E)** in the ON position will lower and activate reel motors. This allows operation of one, two, or all three reels, depending on area to be cut or operation being performed (clean up pass, etc.).

NOTE: *When operating, depending on mower speed, there will be up to a two second delay before center reel raises or lowers.* ***See Section 5.8.***

If reel(s) fail to raise in mow mode, or an error code appears in the LDU, stop mower, push down on mow switch **(B)**, and try to raise the reel in service mode. Return mower to the service area to have the lift system inspected.

5.1 DAILY INSPECTION

⚠ CAUTION

The daily inspection should be performed only when the system power is off. Turn mow switch OFF, lower reels to the ground, turn system power switch to OFF position, and remove the key.

1. Perform a visual inspection of the entire unit, look for signs of wear, loose hardware, and missing or damaged components. Check for fuel or oil leaks to ensure connections are tight and hoses and tubes are in good condition.
2. Check the fuel supply, radiator coolant level, crankcase oil, and air cleaner indicator. All fluids must be at the FULL level mark with engine cold.

   Battery units, check battery water level.
3. Make sure all mowers are adjusted to the same cutting height.
4. Check tires for proper inflation.
5. Test the Interlock System.

   Note: For more detailed maintenance information, adjustments and maintenance/lube charts, see the **Parts & Maintenance** manual.

5.2 INTERLOCK SYSTEM

1. The Interlock System prevents the mower from starting unless the operator is in the seat, mow switch is OFF, and the traction pedal is in Neutral. The system also disables the mow, traction, and steering functions without the operator in the seat.

⚠ WARNING

Never operate equipment with the Interlock System disconnected or malfunctioning. Do not disconnect or bypass any switch.

2. Perform each of the following tests to insure the Interlock System is functioning properly. Stop the test and have the system inspected and repaired if any of the tests **fail** as listed below:
   - the system **does not** start in test 1;
   - the system **does** start in test 4;
   - the traction function **is not disabled** in test 3;
   - the mow, traction, and steering functions **are not disabled** during test 2 and 5.
3. Refer to the chart below for each test and follow the check (✔) marks across the chart. Shut engine off between each test.

   Test 1: Represents normal starting procedure. The operator is seated, mow switch is OFF, and the traction pedal is in Neutral. The mower should start.

   Test 2: The mower must start with mow, traction, and steering functions disabled if operator is not in the seat.

   Test 3: The mower must start with traction function disabled if the traction pedal is not in Neutral. Traction function will be disabled until traction pedal is returned to Neutral.

   Test 4: The mower must not start if the mow switch is ON.

   Test 5: Start the mower in the normal manner then lift your weight off the seat. Mow, traction, and steering functions should be disabled until operator sits back in seat.

Interlock System Check

Test	Operator Seated		Traction Pedal in Neutral		Mow Switch OFF		System Starts	
	Yes	No	Yes	No	Yes	No	Yes	No
1	✔		✔		✔		✔	
2		✔	✔		✔		★	
3	✔			✔	✔		★★	
4	✔		✔			✔		✔
5	✔	★	✔		✔		★	

★ The mow, traction, and steering functions are disabled without operator in seat.

★★ System starts with traction function disabled until traction pedal is returned to Neutral.

5.3 OPERATING PROCEDURES

⚠ WARNING

A Roll Over Protection Structure (ROPS) for this mower is standard equipment. Seat belts must always be worn. Always keep seat belt snugly adjusted.

If the mower is overturning, hold onto the steering wheel. Do not attempt to jump out or leave the seat.

⚠ CAUTION

To prevent injury, always wear safety glasses, leather work shoes or boots, a hard hat, and ear protection.

1. Under no circumstances should the engine be started without the operator seated on the mower.
2. Do not operate mower or attachments with loose, damaged, or missing components. Whenever possible mow when grass is dry.
3. First mow in a test area to become thoroughly familiar with the operation of the mower and controls.

NOTICE

To prevent damage to the reel and bedknife, never operate reels when they are not cutting grass. Heat will develop between the bedknife and reel and damage the cutting edge.

4. Study the area to determine the best and safest operating procedure. Consider the height of the grass, type of terrain, location of any drop offs or sandtraps, and condition of the surface. Each condition will require certain adjustments or precautions.
5. Never direct discharge of material toward bystanders, nor allow anyone near the mower while in operation. The owner/operator is responsible for injuries inflicted to bystanders and/or damage to their property.

⚠ CAUTION

Before mowing, pick up all debris such as rocks, toys, sticks, and wire which can be thrown by the mower. Enter a new area cautiously. Always operate at speeds that allow you to have complete control of the mower.

6. Use discretion when mowing near gravel areas (roadway, parking areas, cart paths, etc.). Stones discharged from the implement may cause serious injuries to bystanders and/or damage the equipment.
7. Always turn mow switch OFF to stop blades when not mowing.
8. Turn mow switch OFF and raise the reels when crossing paths or roadways. Look out for traffic.
9. Stop and inspect the equipment for damage immediately after striking an obstruction or if the mower begins to vibrate abnormally. Have the equipment repaired before resuming operation.

⚠ WARNING

Before you clean, adjust, or repair this equipment, always disengage all drives, lower implements to the ground, turn system power switch to OFF position, and remove key to prevent injuries.

10. Slow down and use extra care on hillsides. Read Section 5.11. Use caution when operating near drop offs.
11. Look behind and down before backing up to be sure the path is clear. Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
12. Never use your hands to clean reels. Use a brush to remove grass clippings from blades. Blades are extremely sharp and can cause serious injuries.

5.4 STARTING

IMPORTANT: ***Do not use starting assist fluids.*** Use of such fluids in the air intake system may be potentially explosive or cause a “Runaway” engine condition and could result in serious engine damage.

1. Sit in operator’s seat, make sure mow switch **(B)** is OFF, and traction pedal **(K and L, Figure 4B)** is in Neutral.
2. Turn system power switch **(H)** to RUN. Steering controller will initialize, LDU **(A)** will display Jacobsen start up screen, and all lights on LDU will be on for two seconds.

⚠ WARNING

When steering controller initializes, the rear steering motor will turn slightly. To prevent injury, do not turn power switch to RUN with hood open or performing work on steering system.

After LDU initializes, green power light will be flashing two times per second and parking brake light will be on. Engine oil pressure light will be on for diesel and gas power modules.

Gas Power Modules: Pull the choke control knob out to close the choke plate when starting a cold engine. A warm engine may not require “Choking” to start.

Diesel Power Modules: Glow plug light will be on for 1 to 6 seconds during initialization, do not attempt to start engine until glow plug light turns off.

3. Turn system power switch **(H)** to START position.

Battery Power Module: Release key, green power light will be solid on and traction and mow systems will be active.

Gas and Diesel Power Modules: Release as soon as engine starts. Do not hold switch in the START position for more than 10 seconds. Once engine starts, engine oil light **(P)** should go out, green power light will be solid on and traction and mow systems will be active.

NOTE: *Engine speed is adjusted by the engine controller and cannot be changed by the operator.*

4. **Gas Power Modules:** Slowly push the choke knob in once engine has started.
5. Allow the engine to become warm and properly lubricated before operating.

NOTICE

Gas and Diesel Power Modules: To prevent possible damage to, or shortened life of, the buffer batteries, reels will be disabled and mower speed limited to 3 mph (4.8 kph) if key is not held in the start position until engine starts.

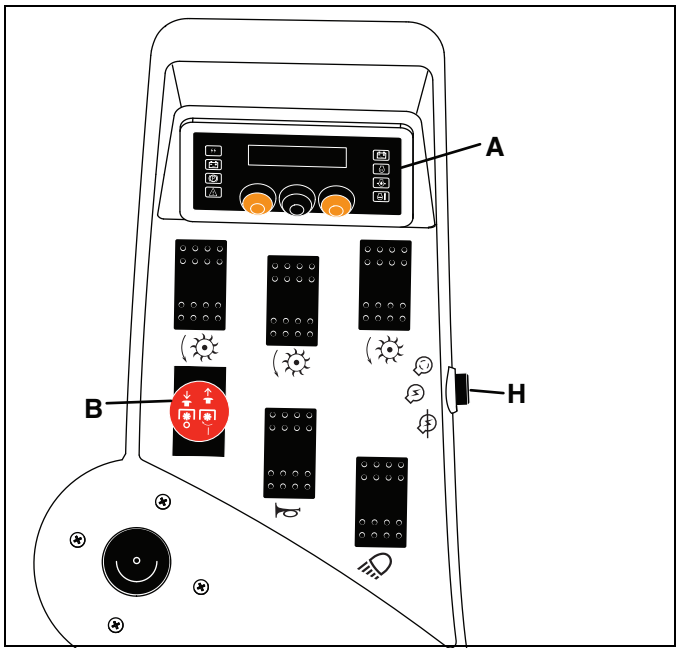


Figure 5A

5.5 STOPPING / PARKING

To stop:

Remove your foot from traction pedal, regen braking will start, bringing the mower to a complete stop. To increase regen braking, slowly depress the brake pedal. When mower stops, the automatic parking brake will engage and the parking brake light on the LDU will turn on.

To park the mower under normal conditions:

1. Disengage the mow switch, raise the implements, and move away from the area of operation.
2. Select a flat and level area to park.
   a. Release traction pedal to bring the mower to a complete stop. Automatic parking brake light should come on once mower stops.
   b. Disengage all drives, lower reels to the ground.
   c. **Hybrid Powered Mowers:** Allow engine to operate at no load for several minutes.
3. Turn system power switch to OFF position, and always remove key.

If an emergency arises and the mower must be parked in the area of operation, follow the guidelines outlined by the grounds superintendent. If the mower is parked on an incline, chock or block the wheels.

5.6 WHISPER MODE

On Eclipse mowers equipped with a gas or diesel hybrid power module, there are two hybrid operating modes available:

Normal Mode: Normal mode is the default operating mode. Engine speed is automatically adjusted by the APU controller to meet generator output needs of the mower.

Whisper Mode - Whisper mode keeps the engine at low idle. Any power needs exceeding generator output at low idle is supplied by the buffer batteries. Transport speed is limited to 3 mph (4.8 kph) and reels are disabled.

NOTICE

The buffer batteries on Gas and Diesel hybrid power modules do not have the same capacity as the batteries in the battery power module and are not designed to operate in Whisper Mode for long periods of time. Excessive use of Whisper Mode will shorten the life of the buffer batteries.

Only use Whisper Mode for short periods of time, and allow buffer batteries to fully recharge before switching to Whisper Mode again.

To switch to whisper mode, start the engine in the normal manner. With the engine running, turn system power switch to the start position and release. Engine speed will drop to low idle, transport speed will be reduced to 3 mph (4.8 kph) and green power light on LDU will flash.

To return to Normal Mode operation, turn system power switch to the start position and release. Green power light will be steady, engine speed will increase, mower will increase to normal transport speed, and mower will be in Normal Mode.

5.7 TO DRIVE / TRANSPORT

Read and follow all safety notes contained in this manual when driving or transporting mower. Refer to **Section 5.3** for general operating instructions. When operating in reverse, look behind you to ensure you have a clear path.

Important: If this mower is driven on public roads, it must comply with federal, state, and local ordinances. Contact local authorities for regulations and equipment requirements.

1. Disengage mow switch **(B)**. Reels will automatically raise to the transport position once mower starts moving.
2. Depress traction pedal slowly. Automatic parking brake should disengage and mower will start moving.

⚠ CAUTION

To prevent tipping or loss of control, travel at reduced speed when making turns.

5.8 CENTER REEL DELAY

The raising and lowering of the center reel is slightly delayed from the front reels. When mowing, this allows the center reel to contact the ground at the same location as the front reels, resulting in an accurate cut.

The length of delay is automatically adjusted for any change in vehicle speed, which is determined by the speed sensor in the drive motor. If the unit is not in motion or if there is no speed sensor signal, the center reel delay will default to a time of approximately 2 seconds. There is no delay when lift system is in service mode (Mow switch is OFF).

5.9 OVERLOAD PROTECTION

The reel drive motors and lift actuators are controlled by the RCU. The RCU has built–in overload protection and will disable the motor or actuator if it is drawing too much electrical current.

If there is an overload on a reel drive motor, the circuit breaker will trip, the motor will be disabled, the reel will raise to the up position and the fault light on the LDU will flash two times per second.

If there is an overload on a lift actuator, the actuator will be disabled and the fault light on the LDU will flash two times per second.

To reset an overload fault condition, the mower must be shut down and re-started. If the problem persists, inspect the device and the electrical system to determine the cause of the overload or contact an authorized Jacobsen dealer.

5.10 MOWING

⚠ WARNING

To prevent serious injuries, keep hands, feet, and clothing away from reel when the blades are moving.

NEVER use your hands to clean reels. Use a brush to remove grass clippings from blades. Blades can be sharp and could cause injuries.

To clear obstructions from reel, turn mow switch OFF, stop the mower, turn system power switch to OFF, and remove key, then remove obstruction.

NOTICE

To prevent damage to the reel and bedknife, never operate reels when they are not cutting grass.

Operators should practice mowing in a clear area to become familiar with raising and lowering the reels. Practicing, by turning reel motors off **(See Section 4.5.6)**, will help the operator become proficient at starting and stopping each pass within a foot or two of the edge of the green. Then only one final pass around the green will be required to finish the operation.

NOTICE

Always remove the flag and inspect the green before mowing. Remove debris or other objects that may damage the reels and/or bedknives.

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

1. Stop the unit just before reaching the green and raise the reels. Set the mow switch to ON.
2. Proceed toward the green at mowing speed. Refer to **Section 5** for matching mowing speed to desired Frequency of Cut.
3. Lower the reels as the front grass catchers cross the edge of the green. At the end of the pass, raise the reels as the just before grass catchers cross the edge of the green.
4. Always make mowing passes across the green in a straight line. Do NOT start to make the turn for the next pass until the center wheel is off the green, this will eliminate the possibility of the tires tearing the turf during the turn.
5. Each successive pass should overlap the previous one by a few inches.
6. After all of the straight passes have been made, make one final pass around the outer edge of the green. This final pass should always be in the opposite direction from the last time the green was mowed.
7. Empty the grass catchers before proceeding to the next green. To remove or install the grass catchers, turn mow switch OFF, lower the reels to the ground, and shut off the unit. Tilt the grass catcher body so the front edge clears the mower frame, and slide the catcher onto or off the catcher frame.
8. Stop and raise the mowers to the transport position when crossing paths or roadways. Look out for traffic.

NOTICE

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

NOTICE

When verticutting with the Eclipse 322 Jacobsen recommends setting the reel speed at 1800 rpm. If the reel motor temperature or current exceeds limits, reduce ground speed of mower, reduce reel speed, or adjust verticutter depth.

5.11 HILLSIDE OPERATION

⚠ WARNING

To minimize the possibility of overturning, the safest method for operating on hills and terraces is to travel up and down the face of the slope (vertically), not across the face (horizontally). Avoid unnecessary turns, travel at reduced speeds, and stay alert for hidden hazards and drop offs.

⚠ CAUTION

Do not operate this mower on side slopes greater than 17° or 31% grade.

The mower has been designed for good traction and stability under normal mowing conditions; however, use caution when operating on slopes, especially over rough terrain or when the grass is wet. Wet grass reduces traction and steering control.

1. If the mower tends to slide or the tires begin to “mark” the turf, angle mower into a less steep grade until traction is regained or tire marking stops.
2. If mower continues to slide or mark the turf, the grade is too steep for safe operation. Do not make another attempt to climb, and back down slowly.

Correct tire pressure is essential for maximum traction.
Front - 16 psi (1.11 BAR)

Rear - 20 psi (1.38 BAR)

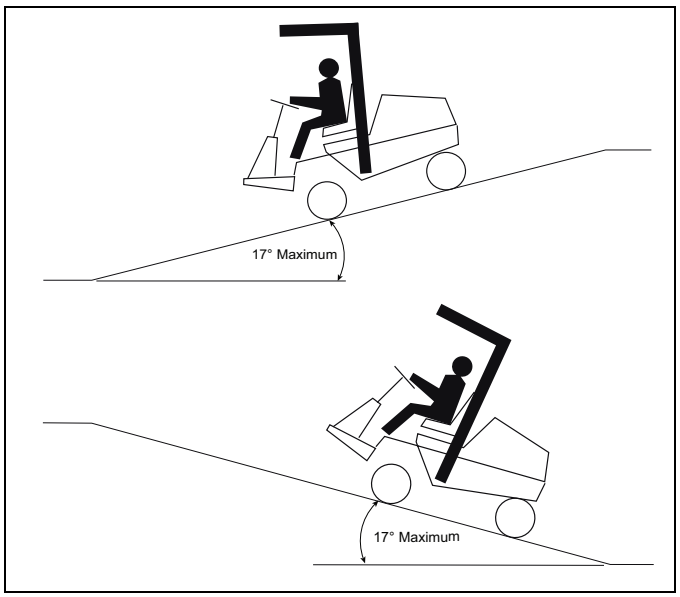


Figure 5B

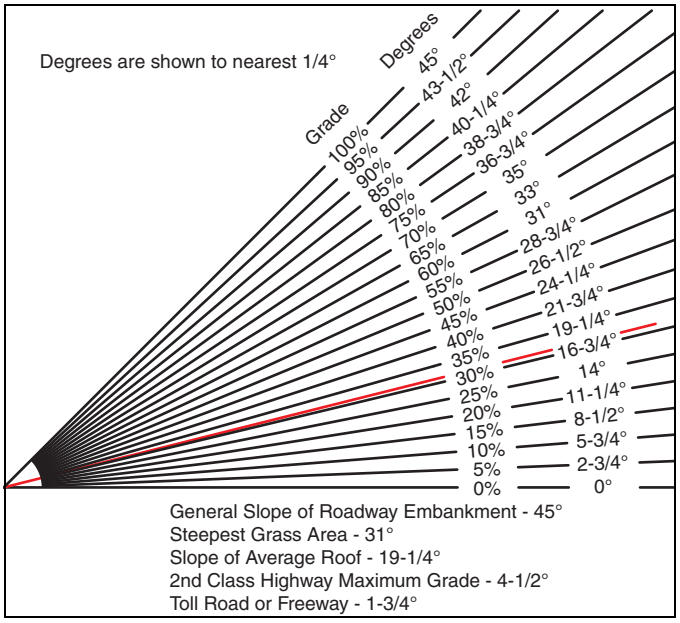


Figure 5C

How to calculate a slope:

Tools Required:
Level **(A)**, either 1 yard, or 1 meter long.
Tape measure **(B)**.

With the level **(A)** positioned horizontally, measure the distance **(C)** with tape measure **(B)**. Use the chart to calculate either the slope angle or the % grade of the slope **(D)**.

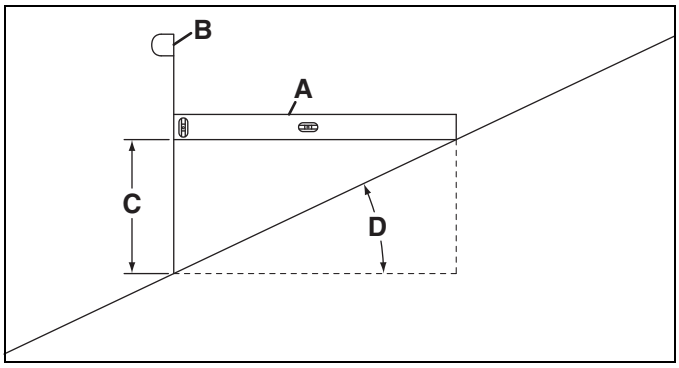


Figure 5D

Height (C)		Result (D)	
Inches with 1 Yard Level (A)	**Millimeters with 1 Meter Level (A)**	**Slope in Degrees**	**Slope Grade %**
3		4.8	8.3
	100	5.7	10.0
	150	8.5	15
6		9.5	16.7
	200	11.3	20.0
7.5		11.8	20.8
	225	12.7	22.5
9	250	14	25.0
	275	15.4	27.5
10		15.5	27.8
	300	16.7	30.0
11		17.0	30.6
	325	18.0	32.5
12		18.4	33.3
	350	19.3	35.0
13		19.9	36.1
	375	20.6	37.5
14		21.3	38.9
	400	21.8	40.0
15		22.6	41.7
	425	23.0	42.5
16		24	44.4
	475	25.4	47.5
18	500	26.6	50.0
20		29.1	55.6
	600	31.0	60.0
25		34.8	69.4
	800	38.7	80.0
30		39.8	83.3
	900	42.0	90
36	1000	45.0	100

5.12 LOADING MOWER ON TRAILER

Use care when loading and unloading mower onto trailer. Fasten mower to trailer, using tie downs on left and right side and rear of mower **(AE - Figure 4C)**, to prevent mower from rolling or shifting during transport.

If the mower experiences problems and must be shut down and removed from the area, it should be towed back to the maintenance area, or loaded onto a trailer for transport. See **Section 5.13** for towing instructions.

Fully raise reels before driving up trailer ramp. Lift arms must be in lift locks and bumpers properly adjusted to prevent damage to reels, mower, or other objects.

If the mower is to be trailered on the highway, before strapping to trailer, inflate tires to 22 psi (1.5 BAR). After unloading mower, reduce tire pressure to normal operating pressure. **See Section 5.8.**

Always secure armrest cover in closed position with a strap when transporting.

NOTICE

Failure to properly secure armrest cover in the closed position when transporting may result in armrest cover damage.

Make certain key switch is in OFF position and key removed.

If mower is unable to drive onto trailer on its own power, follow this procedure:

1. Follow procedure for disengaging automatic parking brake. **See Section 5.13.**
2. Make sure reels are raised. If they cannot be raised, remove them from the mower.
3. Make certain key switch is in OFF position and key removed.
4. Use a winch or other device to load mower onto trailer. Mower must be moved in a straight line to prevent damage to steering system.

   Use tie down at rear of mower for attaching winch. If front tie downs must be used, winch must be connected to both the left and right tie downs.
5. With mower strapped down to trailer, remove brake release screws to apply parking brake. Brake must be disengaged again before unloading mower.
6. Carefully unload mower from trailer using a winch or other device to slowly get mower down trailer ramp. Mower brakes have been disabled and are not able to stop mower.

⚠ WARNING

To prevent injury, keep bystanders away when loading or unloading a disabled mower on trailer. Mower brakes have been disabled and may not be used to stop mower.

Do not attempt to roll mower down trailer ramp without use of winch or similar device to restrain mower.

7. After unloading mower, remove brake disengage screws from brake and insert orange plugs. Store screws in pouch on back of seat. **Do Not** operate mower with automatic parking brake manually disengaged.

5.13 TOWING MOWER

If the mower experiences problems and a trailer is not available, the unit can be towed slowly short distances.

1. Automatic parking brake under right side of floorboard must be disengaged.

⚠ WARNING

If mower is on an incline, chock or block the wheels before manually disengaging automatic parking brake. Mower will roll with parking brake disengaged.

Towing vehicle must be capable of stopping mower without assistance from mower brakes.

   a. Remove two orange plugs **(ZZ)** from right side of brake.

   b. Disconnect brake electrical connector **(ZX)**.

   c. Obtain two brake disengage screws **(ZY)** from pouch on back of seat, or use two M5 x 35 mm full thread hex head screws.

   d. Hand thread screws into brake armature. Tighten with wrench 1 to 2 additional turns. Brake should be disengaged. If brake is still binding, tighten screws an additional 1/2 turn. Do not overtighten screws.

2. Open hood, remove four thumbscrews **(ZU)**, and lift steering cover **(ZV)** off mower.

3. Remove steering chain master link **(ZW)**. Remove chain from steering motor.

4. Attach tow bar accessory, Part No. 62811, to rear steering yoke (Refer to tow bar instruction sheet). Do not use tow strap to tow mower. Connect other end of tow bar to towing vehicle equipped with 1-7/8 in. ball hitch and vehicle tow bar 10-15 in. (25.4 - 38.1cm) from ground.

5. Before towing make sure reels are raised. If they cannot be raised, remove them from the mower.

6. Make certain key switch is in off position and key is removed.

⚠ WARNING

To prevent injury or damage to mower, do not tow mower with system power switch in RUN position.

NOTICE

Do not exceed 2 MPH (3.2 KPH) while towing. Long distance towing is not recommended.

7. Use caution when towing. Avoid steep inclines. Steep inclines may cause tow bar to contact and damage hood and hood hinges. To prevent damage to steering proximity switches or steering yoke, avoid turns that will cause rear wheel to turn more than 55° in either direction.

8. After towing mower, remove tow bar accessory, attach steering chain, remove screws **(ZY)**, connect brake electrical connector **(ZY)**, and insert orange plugs **(ZZ)**. Store screws in pouch on back of mower.

⚠ WARNING

Do Not operate mower with automatic parking brake manually disengaged.

Remove brake release screws and connect steering chain before returning mower to normal operation.

NOTICE

If brake electrical connector is disconnected, and mower is started, then brake light will turn off, and mower will not move under traction power.

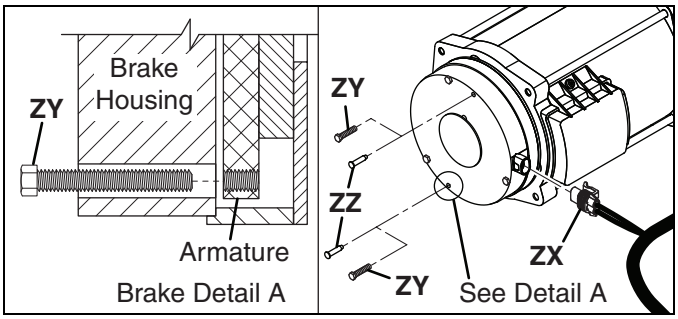


Figure 5E

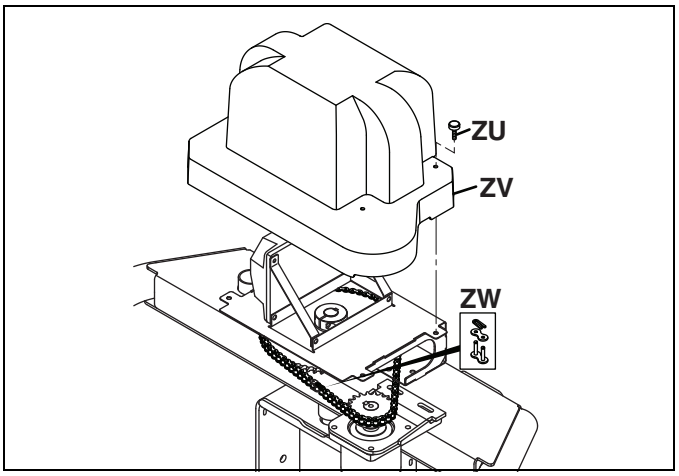


Figure 5F

5.14 DAILY MAINTENANCE

Important: For more detailed maintenance information, adjustments and maintenance/lubrication charts, see the **Parts & Maintenance** manual.

1. Park the mower on a flat, level surface. Fully lower the reels to the ground, stop the engine and remove key from ignition switch.
2. Grease and lubricate all points if required. Lubricate with grease that meets or exceeds NLGI Grade 2 LB specifications. Apply grease with a manual grease gun and fill slowly until grease begins to seep out. Do not use compressed air.

NOTICE

To prevent damage to reel motor, do not over-grease reel bearings. Damage of this nature is not covered by the factory warranty.

3. To prevent fires, clean the reels and mower after each use.
   a. Whenever possible, use compressed air to clean mower.
   b. Use only fresh water for cleaning your equipment.

NOTICE

Use of salt water or effluent water has been known to encourage rust and corrosion of metal parts resulting in premature deterioration or failure. Damage of this nature is not covered by the factory warranty.

NOTICE

Do not use high pressure spray.

   c. Do not pressure wash mower.
   d. Do not spray water directly at instrument panel, electrical connectors, generator, controllers, motors, or any other electrical components.
   e. Do not spray water into the cooling air intake or the engine air intake.

NOTICE

Do not wash a hot or running engine. Use compressed air to clean the mower, engine and radiator fins to reduce the potential for corrosion and moisture contamination.

   f. Clean all plastic or rubber components with a mild soap solution and warm water, or use commercially available vinyl/rubber cleaners.
4. Remove any dirt or other debris from both steering proximity switches.

Battery Powered Mowers:

Disconnect power connector and connect battery pack to charger.

Fuel (Hybrid Powered Mowers)

Fill mower's fuel tank at the end of each operating day to within 1 in., (2.5 cm) below the filler neck. Only fill fuel tank with mower sitting on a flat and level surface.

Diesel Engine - Use clean, fresh #2 low or ultra-low sulfur diesel fuel. Minimum Cetane Rating 45.

Gasoline Engine - Use clean, fresh, unleaded gasoline, 85 octane minimum.

Handle fuel with care - it is highly flammable. Use an approved container; the spout must fit inside the fuel filler neck. Avoid using cans and funnels to transfer fuel.

⚠ WARNING

Never remove the fuel cap from the fuel tank, or add fuel, when the engine is running or while the engine is hot.

Do not smoke when handling fuel. Never fill or drain the fuel tank indoors.

Do not spill fuel. Clean spilled fuel immediately.

Never handle or store fuel containers near an open flame or any device that may create sparks and ignite the fuel or fuel vapors.

Be sure to reinstall and tighten fuel cap securely.

- Store fuel according to local, state, or federal ordinances and recommendations from your fuel supplier.
- Never overfill or allow the tank to become empty.

6 MAINTENANCE & LUBRICATION CHARTS

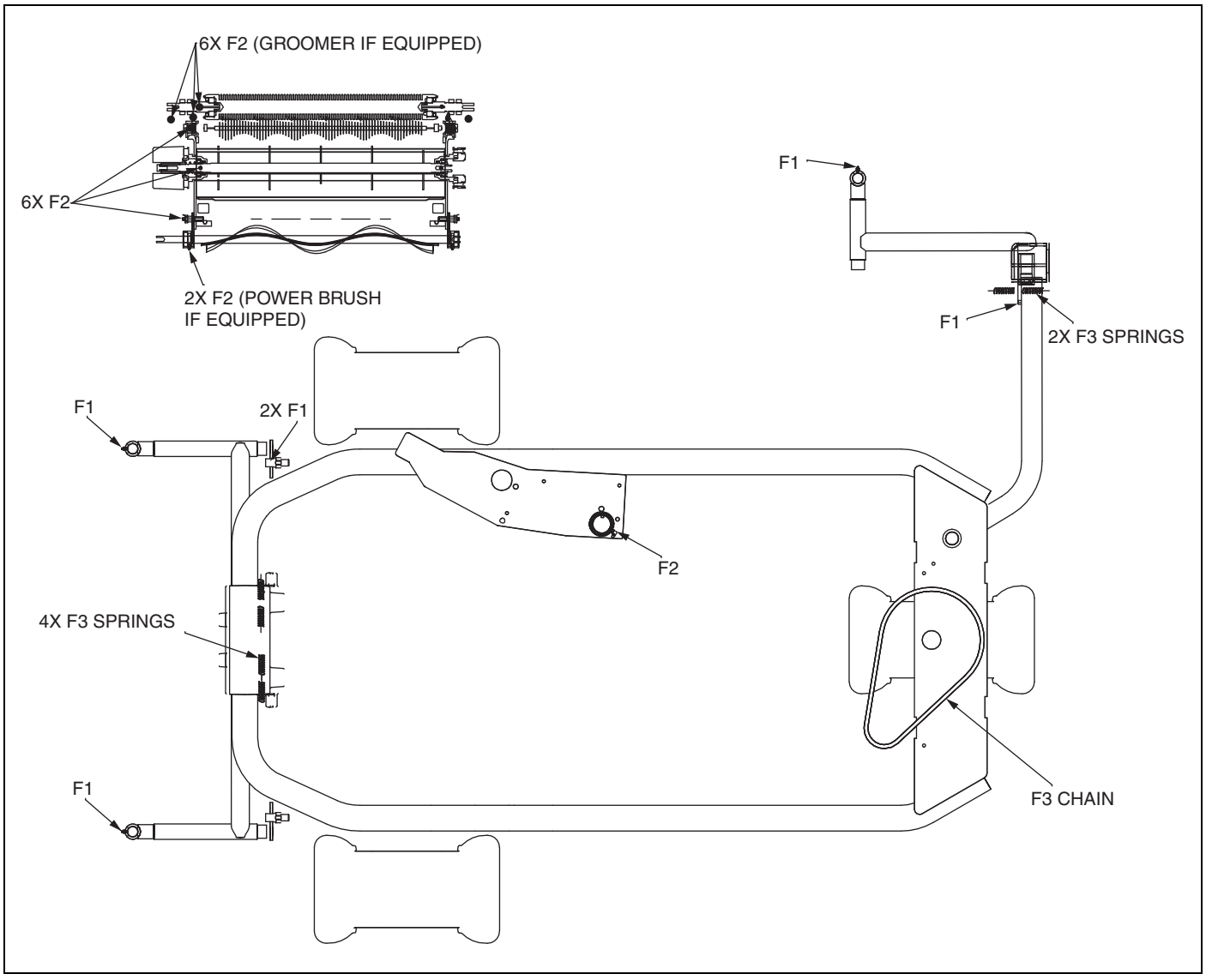
6.1 GENERAL

⚠ WARNING

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

1. Always clean the grease fitting before and after lubricating.
2. Lubricate with grease that meets or exceeds NLGI Grade 2 LB specifications. Apply grease with a manual grease gun and fill slowly until grease begins to seep out. Do not use compressed air guns.
3. Periodically apply a small amount of lithium based grease to the seat runners.
4. 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 or as required.
5. Grease fittings **(F1)** every 50 hours, fittings **(F2)** every 100 hours, and fittings **(F3)** every 200 hours.

6.2 LUBRICATION CHART



6.3 MAINTENANCE CHARTS

Recommended Service and Lubrication Intervals

	Every 8-10 Hours	Every 25 Hours	Every 40-50 Hours	Every 100 Hours	Every 200 Hours	Every 300 Hours	Every 400 Hours	Every 500 Hours	Every 1000 Hours	See Section	Lubricant Type
Air Filter (Diesel)		I/C							R	**8.5**	
Air Filter Pre-Cleaner (Gas)		I/C								**8.4**	
Air Filter Cartridge (Gas)			I	C			R			**8.4**	
Battery Electrolyte (Battery)				I					A		
Battery Fluid (Battery)	I/A									**7.3**	
Battery Terminals				I/C						**7.10**	
Belts	I-A*			I-A						**11.17**	
Brake Resistors	I/C										
Cooling System (Diesel)	I-C-A								R	**9.10**	IV
Front Axle Fluid									I/A	**9.2**	III
Front Axle Hub						I***				**9.3**	
Electrical System			I/C							**10.1**	
Engine Oil (Diesel)	I		R*	R						**8.3**	II
Engine Oil (Gas)	I-R*		R							**8.3**	II
Engine Oil Filter (Diesel)			R*		R						
Engine Oil Filter (Gas)			R								
Fuel System	I									**8.7**	
Fuel Filter (Diesel)				C			R			**8.7**	
Fuel Filter (Gas)	I						R			**8.7**	
Grease Fittings - F1			L							**6.2**	I
Grease Fittings - F2				L						**6.2**	I
Grease Fittings - F3					L					**6.2**	I
Muffler and Exhaust	I			I						**9.7**	
Parking Brake								IC****		**9.4**	
Radiator Hoses	C				I					**9.10**	
Radiator Screens	I-C/AR									**9.10**	
Rear Wheel Bearings								L			I
Steering Chain				I/L							V
Tires			I-A							**9.7**	
Valve Clearance (Gas)				C**							

A - Add or Adjust C - Clean I - Inspect L- Lubricate R - Replace AR - As Required

* Indicates initial service for new machines.

** Not required unless engine problems occur.

*** Every 300 hours or Yearly, whichever occurs first.

**** Every 500 hours or Yearly, whichever occurs first.

I - Manual grease gun with NLGI Grade 2 (Service Class LB).

II - Engine Oil - See **Section 8.3**.

III - Mobilfluid 424 or SAE 30 wt.

IV - Capacity: 3qt. (2.8 l) 50/50 water ethylene glycol mix.

7 BATTERIES

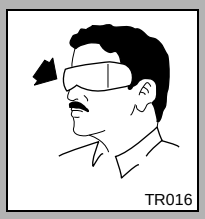
7.1 BATTERY SAFETY

Batteries contain dilute sulfuric acid which can result in severe burns.

Hydrogen gas is formed within a battery during the charging cycle. Hydrogen in concentrations of 4% and higher are explosive and can be ignited by open flame or an electrical spark. A battery explosion will cause sulfuric acid and battery components to be thrown over a large area with considerable force.

Always observe the following warnings when working on or near batteries:

⚠ WARNING


TR016

The electrolyte in a storage battery is a dilute acid which can cause severe burns to the skin and eyes. Treat all electrolyte spills to the body and eyes with extended flushing with clear water. Contact a physician immediately. Always wear a safety shield or approved safety goggles when charging batteries.

Hydrogen is explosive in concentrations as low as 4% and is generated in the charging cycle of electric mowers. Because it is lighter than air, it will collect in the ceiling of buildings necessitating proper ventilation. Air exchanges of 5 changes per hour is considered the minimum requirement.

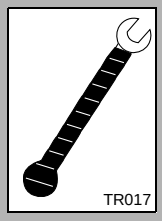
Never smoke around batteries.

Never charge batteries in an area that has open flame or electrical equipment that could cause an electrical arc.

Be sure that the key switch is off, all electrical accessories are turned off and power connector is disconnected before starting work on vehicle.

Remove all jewelry (watches, rings, etc.).

⚠ WARNING


TR017

Wrap wrenches with vinyl tape to prevent the possibility of a dropped wrench from ‘shorting out’ a battery, which could result in an explosion and severe personal injury.

Electrolyte spills should be neutralized with a solution of 1/4 cup (59.1ml) of sodium bicarbonate (baking soda) dissolved in 1-1/2 gallons (5.7 liters) of water and flushed with water.

Never disconnect a circuit under load at a battery terminal.

Wear appropriate protective clothing when working with batteries. Electrolyte can cause severe burns to the eyes, skin, and clothing.

Batteries, battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash your hands after handling.**

7.2 BATTERY CONDITIONING

A new battery set must go through a conditioning process before it will develop its maximum capacity. Conditioning may take up to 50 charge/discharge cycles until full capacity and run time are achieved. A battery has a maximum life, therefore good maintenance is designed to maximize the **available** life and reduce the factors that can reduce the life of the battery. Refer to **Figure 7A** for battery age vs. capacity chart.

NOTICE

Chart shown in **Figure 7A** refers to an 80% Depth of Discharge (DOD) with theoretical life of 750 cycles.

The charts shown in **Figure 7A** and **Figure 7B** are provided for reference only and is to be used as a guideline for estimating capacity of a battery pack. Actual battery life may be shorter or longer, depending on the actual DOD experienced by the battery set, and maintenance battery set receives.

The conditioning process can be monitored by checking the ***specific gravity*** of the battery cells. After the battery set has been recharged, spot check two or more battery cells. A fully charged fully conditioned battery with an electrolyte temperature of 80° F (27° C) has a gravity reading of 1.280.

Once the battery set has completed 50 charge/discharge cycles, Depth of Discharge (DOD) can be measured.

To determine the DOD, measure the battery pack voltage after mowing for a period of two weeks. Average the results and look up the DOD, using the left side chart in **Figure 7B**. These values are based on a standard 78° F (25.5° C) battery temperature. Using the DOD refer to the right side chart in **Figure 7B** to determine theoretical life cycles.

As a battery ages, it still performs adequately except the expected run time, or capacity, will decrease. Capacity describes the time that a battery can continue to provide its design amperes from a full charge.

Temperature is important when conducting tests on a battery and test results must be corrected to compensate for temperature differences.

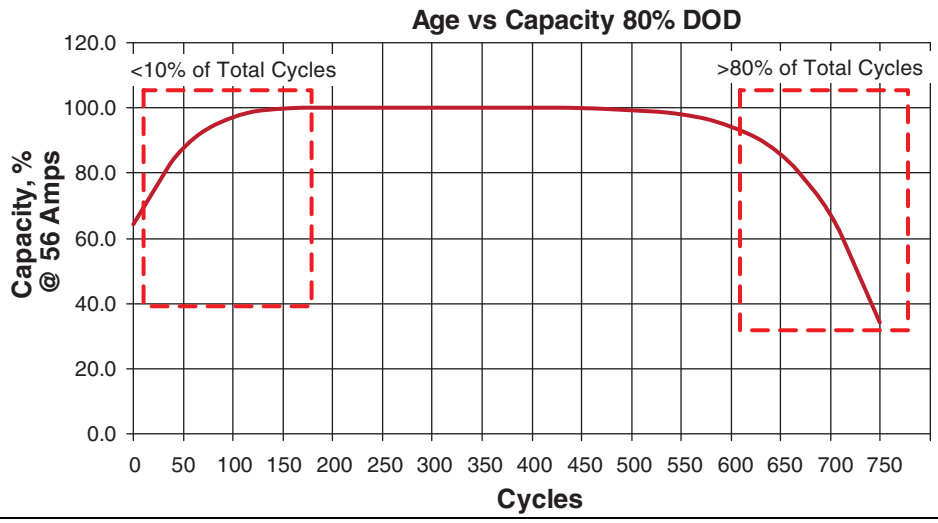


Figure 7A

Depth of Discharge

DOD %	End of mowing Voltage (V)
0	50.928
10	50.472
20	49.992
30	49.488
40	48.960
50	48.408
60	47.832
70	47.256
80	46.632
90	46.032

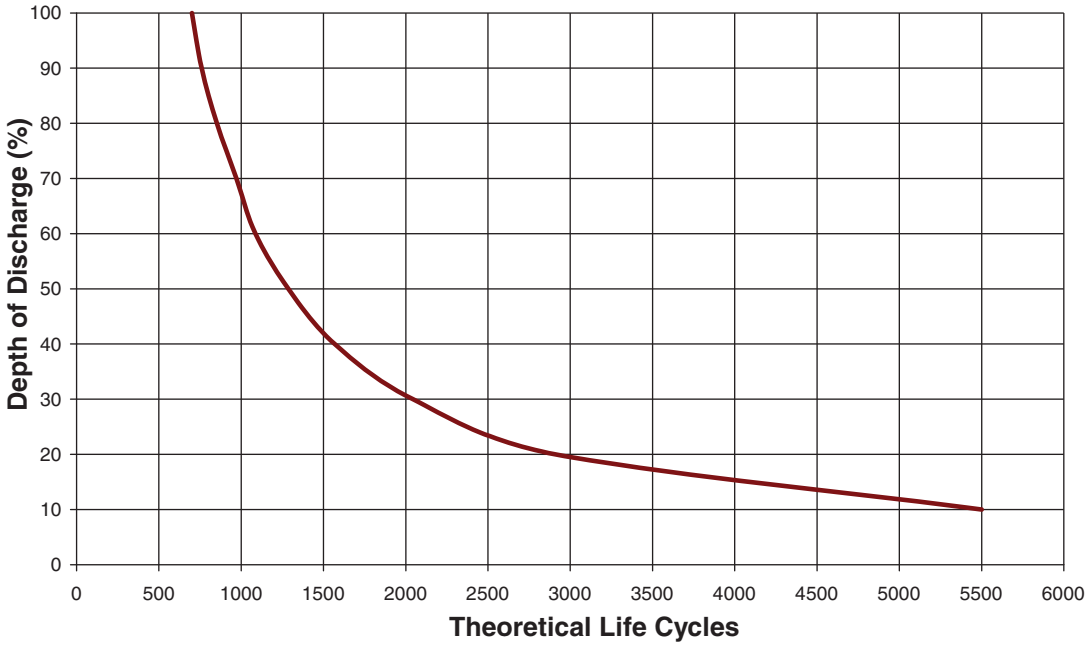


Figure 7B

7.3 BATTERY SYSTEMS

The Eclipse mower is available with either a battery power module, a gas engine hybrid power module, or a diesel engine hybrid power module.

1. The battery powered Eclipse has six, 8 VDC batteries wired in series. Batteries must be disconnected from the mower for charging.
2. The gas and diesel hybrid powered mowers contain two separate battery systems.
   a. A 48 VDC buffer battery pack, comprised of four 12VDC batteries wired in series. The buffer batteries are charged by the hybrid generator during operation. See **Section 7.8** for charging buffer batteries using an external charger.

NOTICE

The buffer batteries can be charged using the same battery charger that is used on battery power modules. The charger is not included with hybrid power modules and must be ordered separately.

   b. A 12 VDC battery for engine operation.

7.4 BATTERY FILLING (BATTERY POWERED MOWERS)

⚠ CAUTION

Battery electrolyte is an acidic solution and should be handled with care. If electrolyte is splashed on any part of the body, immediately flush the exposed area with liberal amounts of water, and obtain medical aid immediately.

NOTICE

The 12 VDC batteries used on hybrid powered mowers are sealed and do not require filling.

When the batteries require additional water, distilled water is recommended (never use water with high mineral content).

The Eclipse mower with battery power module is equipped with a battery filling system. Water should be added **AFTER** the batteries have been charged so that it will not overflow during charging.

However, batteries should **NOT** be charged if the electrolyte level is below the top of the plates. If the level has been allowed to go below the top of the plates, add just enough water to cover the plates before charging. Then after charging, check the level again, and add water as required to bring it to the proper level.

To fill batteries using the battery filling system:

1. Fully charge the battery pack.
2. Fill battery filling system tank with distilled water. Support tank at least 36 in. (1 meter) above batteries.
3. Locate filling system connector on right side of battery tray and connect to tank hose.
4. Flow indicator will start spinning and distilled water will flow down to any batteries that require additional water. Each battery connection has a float to prevent over filling.
5. Observe flow indicator on tank hose. Keep tank connected to batteries until flow indicator stops spinning. Disconnect hose and store tank in secure location for future use. Do not operate mower with tank connected to batteries.
6. Periodically spot check the electrolyte level in the cells. Excessive water consumption indicates one or all of the following:
   a. Overcharging.
   b. High temperature operation.
   c. The battery is nearing the end of its service life.

7.5 BATTERY MAINTENANCE

A regularly scheduled maintenance program is vital to the performance and maximum life of the batteries.

1. Keep the batteries clean at all times. Make sure the cell caps are in place to prevent water of debris from getting in the cells.
2. Be sure the batteries are fully charged before using the unit each day.
   a. Never allow the batteries to become completely discharged at any time. Do not operate unit with low voltage shown on LDU for any length of time.
   b. Always fully recharge the batteries after every use, no matter how short.
   c. After use in hot weather, the batteries should be allowed to cool for at least an hour before charging.
   d. In cold weather, it is better to charge the batteries just before use.
3. ***DO NOT*** allow discharged batteries to be stored or to sit idle for an extended period of time.
4. ***DO NOT*** use battery additives; they will shorten the life of the batteries.
5. Once a week during the regular mowing season, spot check the specific gravity of two or more battery cells, after fully charging the batteries.
6. Periodically spot check the electrolyte level in the cells.

7.6 BATTERY PERFORMANCE

To ensure maximum battery life:

1. Never allow the batteries to become completely discharged at any time.
2. Always fully recharge the batteries after every use.
3. Check for conditions that will affect battery performance and life.
   a. Too little clearance between the bedknife and reel
   b. Improper cutting head lubrication
   c. Low tire pressure
   c. Excessive use of Whisper mode on hybrid power modules.
   d. Improper operation of electrical system
   e. Poor condition of charger plug and receptacle
4. Battery performance is also affected by the ambient temperature. Battery capacity is **increased** by 7 percent for every 15° F (8° C) the temperature is **above** 77° F (25° C). Battery capacity is **decreased** by 7 percent for every 15° F (8° C) the temperature is **below** 77° F (25° C).

7.7 BATTERY DISPOSAL

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL OF LEAD-ACID BATTERIES. Laws prohibit disposal of batteries in land fills and requires dealers to accept them for recycling. Spent lead acid batteries must be returned to the dealer for proper disposal and/or recycling.

7.8 BATTERY CHARGER

The battery charger is designed to fully charge the battery pack and will shut off automatically when the batteries are fully charged. Read the instruction manual included with the charger for proper operating procedure.

An AC power extension cord, not included with mower, is required to use the battery charger. The cord should be as short as possible (must be less than 100 feet long) and a minimum of 12 AWG.

Always connect the charger to a dedicated, grounded outlet protected by a 15 or 20 amp circuit breaker.

Before charging, the following should be observed:

⚠ WARNING

Hydrogen is explosive in concentrations as low as 4% and is generated in the charging cycle of electric mowers. Because it is lighter than air, it will collect in the ceiling of buildings necessitating proper ventilation. Air exchanges of 5 changes per hour is considered the minimum requirement.

Never smoke around batteries.

Never charge batteries in an area that has open flame or electrical equipment that could cause an electrical arc.

Be sure that the key switch is off, all electrical accessories are turned off, and power connector is disconnected before starting work on vehicle.

Remove all jewelry (watches, rings, etc.).

The charging must take place in an area that is well ventilated and capable of removing the hydrogen gas that is generated by the charging process. A **minimum** of five air exchanges per hour is recommended.

The charger AC cord is fully inserted into the charger receptacle.

The charger AC cord is protected from damage and is located in an area to prevent injury that may result from personnel running over or tripping over the cord set.

If the charger is not operating correctly, unplug charger from both the AC outlet and the mower and check the fuse.

Battery Power Modules:
The battery charger is installed under the hood of the vehicle, and is always connected to the battery pack.

If this is the first time charging the batteries, or if charger was removed from this mower to charge buffer batteries on a hybrid mower, check charger algorithm before charging. Algorithm 38 (Preferred) or 11 (Alternate) should be used. See **Section 7.9**.

1. Make certain ignition switch is off. Disconnect battery pack power connector.
2. Lift up on the charger receptacle cover on the left side of the machine. Plug end of the AC extension cord into charger receptacle.
3. Plug the AC power cord from the charger into a suitable wall outlet.
4. Charging time should be between 4-6 hours.
5. When the batteries are fully charged, the charger will turn off automatically. Unplug the charger AC cord from the wall outlet first, then disconnect the cord from the mower. Store the AC cord in a safe location for the next time charging is required.

Buffer Batteries on Hybrid Power Modules:

The buffer batteries were designed to be charged by the generator, however they can be recharged using an external charger if needed. An external charger is not included with the mower and must be purchased separately. Order charger part number 4203742 (Delta-Q). Batteries can also be removed from mower and changed individually using a 12 volt charger.

The 4203742 Delta-Q charger comes with the default algorithm programming set for charging the battery power module batteries and must be switched to a different algorithm for charging the buffer batteries. Set charger to use algorithm 66. See **Section 7.9**.

1. Make certain ignition switch is off. Disconnect buffer battery pack connector.
2. **Delta Q Charger:** Using insulated tools, connect charger leads to buffer battery pack, using same terminals buffer battery connector is attached to.

   Eclipse Walker Charger: Connect harness adapter 4229560 (Order Separately) to both charger connector and buffer battery connector.
3. Plug end of the AC extension cord into charger receptacle.
4. Plug the AC power cord from the charger into a suitable wall outlet.
5. When the batteries are fully charged, the charger will turn off automatically. Unplug the charger AC cord from the wall outlet first, then disconnect the cord from the mower. Store the AC cord in a safe location for the next time charging is required.
6. Disconnect charger from buffer battery pack.

7.9 BATTERY CHARGER ALGORITHM

Three algorithms are programmed into the Delta-Q charger. Make sure correct algorithm is set for the batteries being charged.

⚠ WARNING

Use charger only with the algorithm that is appropriate to the specific battery type. Using incorrect algorithm may cause personal injury and damage.

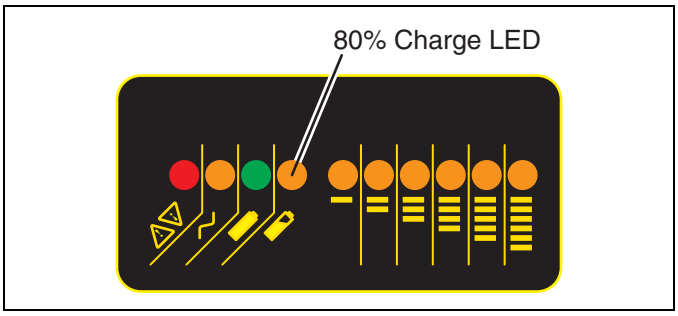
Algorithm	Description
11	Used as alternate algorithm for charging Trojan T890 batteries, but without random equalization.
38	Default setting for charger. Used for charging Trojan T890 batteries with random equalization. Used with battery power module batteries.
66	Used to charge buffer batteries on hybrid power modules.

Checking Charge Algorithm

1. Make sure system power switch is in off position and key is removed.
2. Disconnect battery pack power connector from mower.
3. Disconnect AC cord from wall outlet and charger receptacle.
4. **Battery Power Modules:** Using insulated tools, disconnect positive lead for charger from battery pack.

   Hybrid Power Modules: Using insulated tools, connect negative lead for charger to same battery terminal negative cable for battery connector is connected to.

   All Units: Be careful not to allow positive lead from charger to contact the mower or other battery terminals.
5. Connect charger to wall outlet. Charger will do a Power On Self Test, then display the algorithm code by flashing the amber 80% charge led on the left side of the charger.



   The number will flash for the first digit, then a pause, then the second digit, then a pause, and then repeat for 11 seconds.

   For algorithm 38, the following sequence will flash on the LED.

   Flash - Flash - Flash - Pause - Flash - Flash - Flash - Flash - Flash - Flash - Flash - Flash - Pause - Repeat
6. Disconnect charger from wall outlet.

Changing Charge Algorithm

1. Follow instructions for checking charge algorithm.
2. When 80% Charge LED is flashing the algorithm code, touch the positive lead from charger to positive battery terminal for 3 seconds, then remove positive lead. Charger will switch to next algorithm program in charger.
3. Touch positive lead to positive terminal until relay clicks (approximately 10 seconds or more). New algorithm is now active.
4. Disconnect AC power cord and positive lead. Recheck to be certain correct algorithm is active.

7.10 CLEANING BATTERIES

When cleaning the batteries, do not use a water hose without first spraying with a solution of sodium bicarbonate (baking soda) and water to neutralize any acid deposits. Use of a water hose without first neutralizing any acid, will move acid from the top of the batteries to another area of the mower or storage facility where it will attack the metal structure or the concrete/ asphalt floor. After hosing down the batteries, a residue will be left on the batteries which is conductive and will contribute to corrosion and the discharge of the batteries. Make sure the battery filling system caps are in place before cleaning batteries. Use care to insure the soda and water solution does not enter the battery through the vent caps.

When cleaning the batteries, be sure all of the batteries on the mower are cleaned. Particular attention should be placed on cleaning batteries on bottom level of battery tray as they will tend to pick up more sand and debris.

The correct cleaning technique is to spray the top and sides of the batteries with a solution of sodium bicarbonate (baking soda) and water. This solution is best applied with a garden type sprayer equipped with a **non metallic spray wand**. The solution should consist of 1/4 cup (59.1 ml) of sodium bicarbonate (baking soda) mixed with 1-1/2 gallons (5.7 l) of clear water. In addition to the batteries, metallic components (battery tray, hold downs, etc.) adjacent to the batteries should also be sprayed with the sodium bicarbonate (baking soda) solution.

Allow the solution to sit for at least three minutes; use a soft bristle brush or cloth to wipe the tops of the batteries in order to remove any residue that could cause the self discharge of the battery. Be careful not to disconnect or dislodge battery filling system components (hoses, caps). Rinse the entire area with low pressure clear water. Cleaning should take place weekly or more often under extreme conditions.

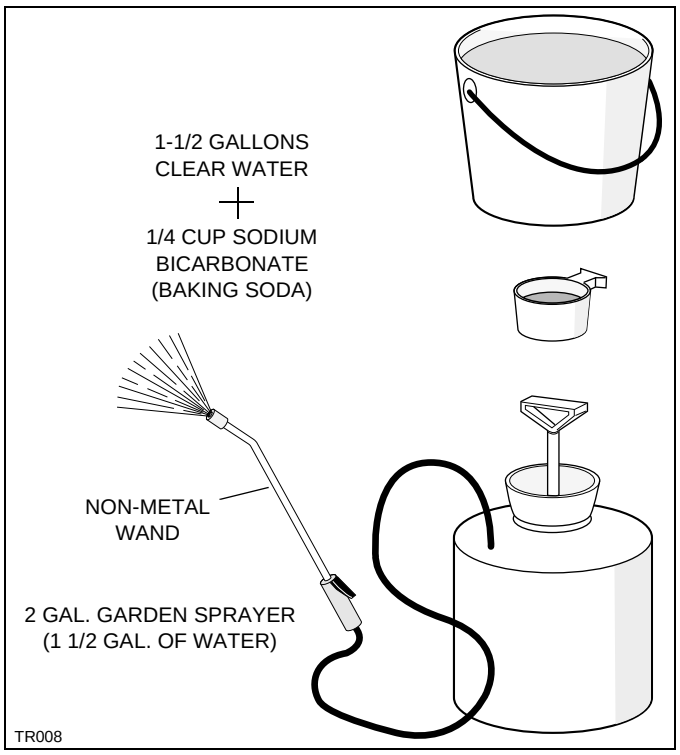


Figure 7C

7.11 SPECIFIC GRAVITY (62801 ONLY)

The normal specific gravity readings for a fully charged battery should be between 1.250 and 1.280 after correcting for temperature.

Check the specific gravity **after** the batteries have been charged and **before** adding water to the cells

It is possible to purchase a combination hydrometer-thermometer which measures both specific gravity and the electrolyte temperature, otherwise use a standard hydrometer and a separate battery thermometer.

Temperature is important when measuring specific gravity and test results must be corrected to compensate for temperature differences. To compensate for different temperatures, **subtract** one point (0.001) from the measured reading for every 3° F (1.7° C) **below** 80° F (26.7° C) or **add** one point (0.001) from the measured reading for every 3° F **above** 80° F.

> ***EXAMPLE:*** A reading of 1.282 taken at 65° F (18.3° C) is compensated for temperature to 1.277 (1.282 minus five points (0.005) equals 1.277).

If low specific gravity readings are found:

1. Make sure the cells you checked have a sufficient electrolyte level.
2. Check all battery connections for tightness and corrosion. A non metallic grease or protective spray may be applied to the connections to inhibit further corrosion
3. Check for cracked or damaged battery case.
4. Check for broken or frayed battery cables.

If the hydrometer reading varies 30 points (0.030) or more, it may indicate an aging or defective battery. Mark the cells with low specific gravity readings. Check electrolyte levels and recharge the batteries.

Take another gravity reading from all of the cells. If the hydrometer reading varies by more than 30 points (0.030) between two cells in the same battery, and the electrolyte level is not low, it is a bad cell and the battery should be replaced.

If one of the batteries have been found defective, mark the bad battery and recharge with the bad battery still in place. Once the batteries are charged, replace the defective battery with a fully charged one (either a new battery or one of equal age.

Below 80° (26.7° C)			**Above 80° (26.7° C)**		
° F	**° C**	**Subtract**	**° F**	**° C**	**Add**
77	25	0.001	83	28.3	0.001
74	23.3	0.002	86	30	0.002
71	21.6	0.003	89	31.6	0.003
68	20	0.004	92	33.3	0.004
65	18.3	0.005	95	35	0.005
62	16.6	0.006	98	36.6	0.006
59	15	0.007	101	38.3	0.007
56	13.3	0.008	104	40	0.008
53	11.6	0.009	107	41.6	0.009
50	10	0.010	110	43.3	0.010
47	8.3	0.011	113	45	0.011
44	6.6	0.012	116	46.6	0.012

7.12 END OF CHARGE VOLTAGE TEST (62801 ONLY)

This test is made using a voltmeter, also on fully charged batteries and with the charger connected. Check end of charge voltage whenever LDU displays less than 50 VDC immediately after a full charge.

1. Verify the batteries have been fully charged. Restart the charger by disconnecting the AC cord from the wall and reconnecting it.
2. After 15 minutes (with the charger still running) measure the individual battery voltages using a volt-ohm meter. Place the **Black** probe on the **Negative** (–) terminal of the battery and the **Red** probe on the **Positive** (+) terminal. Record all readings for the batteries.
   a. A fully charged battery should have a voltage reading between 9.3 and 10.4 volts.
   b. A reading of less than 9.3 volts from every battery indicates they are all nearing the end of their working life.
   c. If one battery has a reading of less than 9.3 volts or varies by more than 0.5 volts from the other batteries, check the specific gravity reading and/ or perform a battery discharge test.

7.13 DISCHARGE TEST (62801 ONLY)

Battery serviceability can be tested using a Battery Discharge tester of the same voltage as the system to be tested (48 volts for the Eclipse 322).

The Battery Discharge Tester will discharge the batteries until the battery pack reaches terminal voltage (48 volt systems terminal voltage is 42 volts).The time it takes to reach a terminal voltage is a useful test of battery discharge time.

Items required for the test:

- Battery Discharge Tester
- Battery Thermometer or use
- Hydrometer/thermometer

⚠ WARNING

Use care when using tools around the battery terminals, and when possible, use insulated tools. Charge batteries in a well ventilated area to prevent explosive gas build up.

Battery discharge time is affected by temperature and rate of discharge (amps). If the Jacobsen discharger (Part No. 892857) is being used in this test, the discharge rate for the batteries is 56.25 amps at 48 volts (if another discharger is being used, the discharge rate will have to be determined before continuing).

The following charts and instructions will be used for the discharge test.

Use **Discharge Test Temperature Correction** table for the temperature compensation needed in step 6.

Use **Battery Discharge Rates** table to determine the optimum amount of discharge time for the type of battery being tested.

1. Connect the discharger to a fully charged set of batteries. Connect the clamps of the discharger to the same terminals charger and battery connector cables are assembled to.
2. Turn on the discharger.
3. The discharger should automatically turn off when the terminal voltage is reached (48 volt system, the terminal voltage is 42 volts).
4. During the discharge time, periodically measure the battery pack voltage. Use a volt-ohm meter, set to measure DC volts. Connect the black lead of the volt-ohm meter to the black cable of the discharge tester. Connect the red lead to the red cable of the discharge tester.
5. When the voltage is within 0.5 volts of the terminal voltage for the pack (42.5 volts), measure and record the voltage of the individual batteries. If the discharger shuts of before all the measurements can be taken, record the discharge time and then restart the discharger and finish taking the readings.
6. Take the electrolyte temperature reading and find the correction factor for that reading in Chart 1 (See Page 10).
7. Multiply the discharge time by the correction factor. The new value is the temperature compensated discharge time.

   EXAMPLE:
   The discharge rate for a matured Trojan T890 is 132 minutes. If the electrolyte temperature is 75° F (23.9° C), multiply 132 x 1.025 = 135.
8. If the number of minutes required to reach the terminal voltage is 60% or more of the battery's discharge time rating, then the batteries are in good condition.
9. If the discharge time is below 60%, compare the individual battery readings taken in step 5.
10. If any of the battery readings vary more than 0.5 volts, then that battery is nearing the end of its useful life and should be replaced.
11. If all the individual battery readings are within the 0.5 volts and the discharge time was low, then the battery pack is nearing the end of its useful life and will need to be replaced soon.

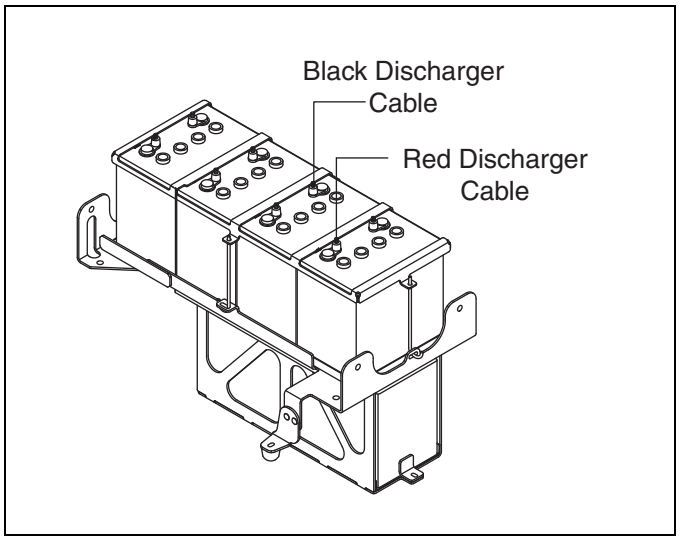


Figure 7D

Discharge Test Temperature Correction

Below 80° (26.7° C)			Above 80° (26.7° C)		
° F	° C	Correction Factor	° F	° C	Correction Factor
75	23.9	1.025	85	29.4	0.975
70	21.1	1.050	90	32.2	0.950
65	18.3	1.075	95	35	0.925
60	15.6	1.100	100	37.7	0.900
55	12.8	1.125	105	40.6	0.875
50	10	1.150	110	43.3	0.850
45	7.2	1.175	115	46.1	0.825
40	4.4	1.200	120	48.9	0.800
			125	51.7	0.775
			130	54.4	0.750
			135	57.2	0.725

Battery Discharge Rates
(48 Volt System)

Discharge time at 80° (26.7° C)		
Battery Type	Number or complete discharge and recharge cycles from new	
	0-50 Cycles	50 Plus Cycles
Trojan T890	95 minutes	132 minutes

7.14 BUFFER BATTERY WIRING

Refer to the following diagram for buffer battery wiring.

After battery cables are properly installed and torqued, the use of standard battery terminal anti corrosion spray is recommended.

⚠ WARNING

Use care when using tools around the battery terminals, and when possible, use insulated tools.

Always disconnect power connectors before connecting or disconnecting battery cables.

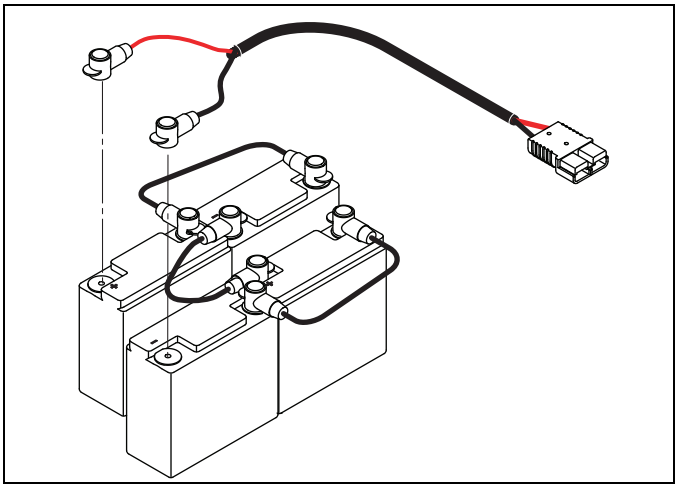


Figure 7E

7.15 BUFFER BATTERY TESTING

Testing batteries can be complex and there are many application specific variables that cannot be considered in one simple test. This section is a guide to help you determine the over all condition of the buffer batteries. Contact you Jacobsen Dealer for assistance.

1. Test Preparation
   a. Check that battery cables are in good condition. Replace damaged or broken cables.
   b. Check that all terminal connections are tightened to the proper torque.
   c. Fully charge the buffer batter pack.
   d. Disconnect the large blue Anderson plug to remove all load from the battery pack.
   e. Let the batteries rest for at least 1/2 to 1 hour after the charge is complete.
2. Open circuit voltage test.
   a. Check and record open circuit voltage of each battery. All batteries in a good set should be above 12.7 volts when fully charged.
   b. If all of the batteries are below 12.1 volts, the buffer battery pack has failed, Replace the entire set of batteries.
   c. Any battery that is 0.5 volt lower than the highest battery voltage, may have failed. Make a note of the battery location in the pack.

7.16 BATTERY POWER MODULE WIRING

Refer to the following diagrams for battery power module wiring.

⚠ WARNING

Use care when using tools around the battery terminals, and when possible, use insulated tools.

Always disconnect power connectors before connecting or disconnecting battery cables.

1. Label four battery cables with numbers 1~4.
2. Slide **Cable 1** and **Cable 3** through grommet at rear of battery tray. Slide **Cable 2** and **Cable 4** through grommet at front of battery tray. Slide two boots onto each cable.
3. Assemble cables to battery posts in order, starting at the right side with **Cable 1**, and ending on the left side of mower with **Cable 4**. Torque battery connections to 95-120 in. lbs. (10.7-13.5 Nm). Apply battery terminal anti-corrosion spray and/or dielectric grease to battery terminals and cover using boots.

⚠ WARNING

To prevent injury to yourself or others, or damage to batteries, use caution not to let unconnected ends of cables touch each other, or any metal surface.

4. Label upper batteries A ~ D.
5. Connect cables to upper batteries. Torque battery connections to 95-120 in. lbs. (10.7-13.5 Nm). Apply battery terminal anti-corrosion spray and/or dielectric grease to battery terminals and cover using boots.
   a. Connect **Cable 1** to Negative terminal of **Battery C**.
   b. Connect **Cable 2** to Positive terminal of **Battery D**.
   c. Connect **Cable 3** to Negative terminal of **Battery A**.
   d. Connect **Cable 4** to Positive terminal of **Battery C**.
   e. Slide boots onto remaining cable. Connect cable to Negative terminal of **Battery D**, and Positive terminal of **Battery B**.
   f. Connect red power connector cable and red wire from battery charger to Positive terminal of **Battery A**.
   g. Connect black power connector cable and black wire from battery charger to Negative terminal of **Battery B**.

NOTE: *Green wire from battery charger is not used, and should be left unconnected. Do not remove cap from end of green wire.*

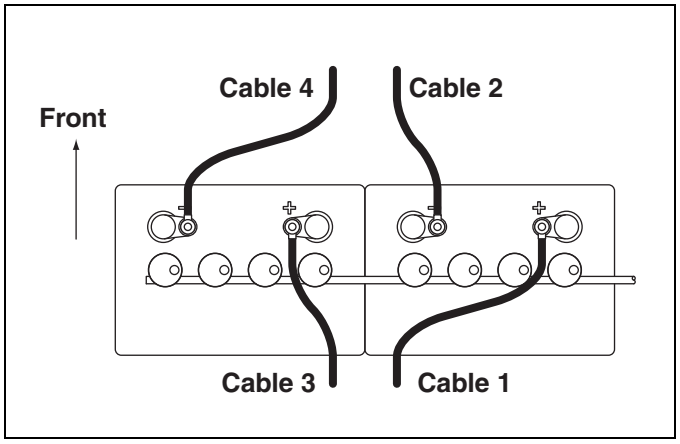


Figure 7F - Lower Battery Wiring

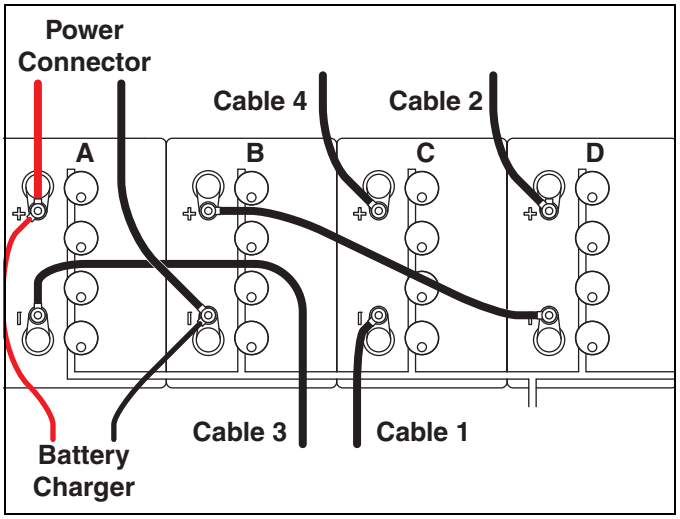


Figure 7G - Upper Battery Wiring

8.1 GENERAL

⚠ WARNING

Before you clean, adjust, or repair this equipment, disengage all drives, lower implements to the ground, turn system power off, remove key from ignition switch, and disconnect battery pack(s) to prevent injuries

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.

1. Adjustment and maintenance should always be performed by a qualified technician. If proper adjustments cannot be made, contact an Authorized Jacobsen Dealer.
2. Inspect the equipment on a regular basis, establish a maintenance schedule and keep detailed records.
   a. Keep the equipment clean.
   b. Keep all moving parts properly adjusted and lubricated.
   c. Replace worn or damaged parts before operating the machine.
   d. Keep all fluids at their proper levels.
   e. Keep shields in place and all hardware securely fastened.
   f. Keep tires properly inflated.
3. Do not wear jewelry or loose fitting clothing when making adjustments or repairs.
4. Use the illustrations in the Parts Catalog as reference for the disassembly and reassembly of components.
5. Recycle or dispose of all hazardous materials (batteries, fuel, lubricants, anti-freeze, etc.) according to local, state, or federal regulations.

8.2 ENGINE

IMPORTANT: A separate Engine Manual, prepared by the engine manufacturer, is supplied with this mower. Read the engine manual carefully until you are familiar with the operation and maintenance of the engine. Proper attention to the engine manufacturer's directions will assure maximum service life of the engine. To order replacement engine manuals contact the engine manufacturer.

The proper break-in of a new engine can make a considerable difference to the performance and life of the engine.

Note: *The mower is designed to operate and cut most efficiently at the preset governor setting. Do not change the engine governor settings or overspeed the engine.*

During the break-in period, Jacobsen recommends the following:

Diesel Engine:

1. During the first 50 hours of operation, a new engine should be allowed to reach an operating temperature of at least 140°F (60°C) prior to operation at full load.
2. Check the engine oil level twice daily during the first 50 hours of operation. Higher than normal oil consumption is not uncommon during the initial break-in period.
3. Change engine oil and oil filter element after first 50 hours of operation.
4. Check and adjust alternator belt.
5. Refer to Section 6.3 and Engine Manual for specific maintenance intervals.

If the injection pump, injectors, or the fuel system require service, contact an authorized Jacobsen Dealer.

Gasoline Engine:

1. Operate modestly for the first 25 hours.
2. Allow the engine to reach operating temperature before operating at full load.
3. Change the oil and filter after the first 8 hours of operation.
4. Refer to Section 6.3 and Engine Manual for specific maintenance intervals.

8.3 ENGINE OIL

Check the engine oil at the start of each day, before starting the engine. If the oil level is low, remove oil filler cap, and add oil as required.

Diesel Engine:

Perform initial oil change after first 50 hours of operation and every 100 hours thereafter. See Engine Manual.

Use only engine oils with API classification CD/CE.

Above 77°F (25°C)	SAE 30W or SAE10W30/10W40
32 to 77°F (0 to 25°C)	SAE 20W or SAE 10W30/ 10W40
Below 32° (0°C)	SAE10W or SAE 10W30/10W40

Gas Engine:

Perform initial oil change after the first 8 hours of operation. Change oil every 50 hours thereafter.

See the engine manufacturer's Owners's Manual for detailed service information.

After adding or changing oil, start and run engine for 30 seconds. Shut engine off. Wait 30 seconds and check oil level. Add oil to bring up to FULL mark on dipstick.

Use only engine oils with API classification SF, SG,SH.

Above 40° F (5° C)	SAE 30W
0 to 40° F (-18 to 5° C)	SAE 5W30 or SAE 10W30

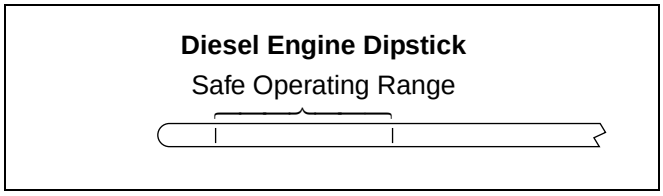


Figure 8A

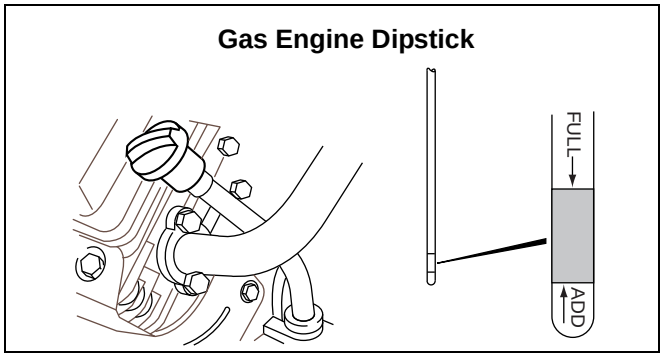


Figure 8B

8.4 GAS ENGINE AIR FILTER

1. Remove and service the foam pre-cleaner every 25 hours. Replace if dirty or damaged.

   To service pre-cleaner, wash in a liquid detergent and water. Squeeze dry in a clean cloth. Saturate in clean engine oil and squeeze out excess oil in a clean, absorbent cloth.

2. Replace the air cleaner cartridge every 400 hours, more often when operating in dusty conditions.

   Note: Do not use petroleum solvents such as kerosene to clean cartridge. Do not use pressurized air to clean cartridge.

See the engine manufacturer's Owners's Manual for detailed service information.

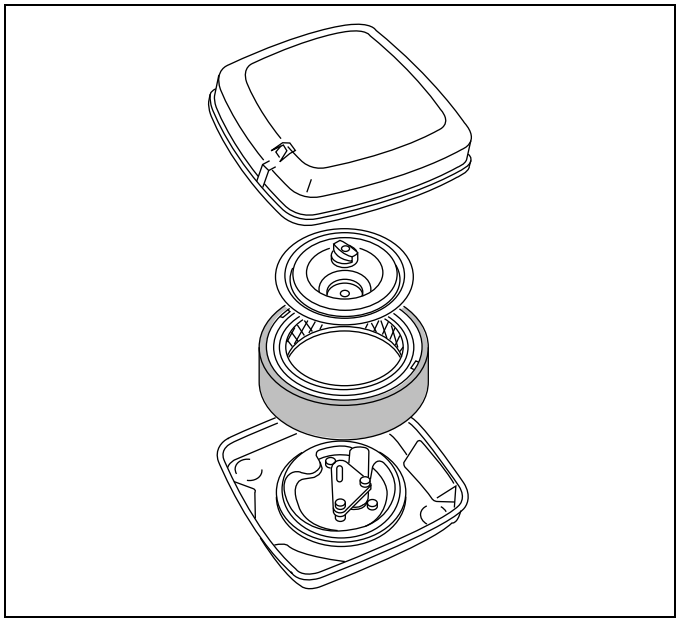


Figure 8C

8.5 DIESEL AIR FILTER

Do not remove the element for inspection or cleaning. Unnecessary removal of the filter increases the risk of injecting dust and other impurities into the engine.

When service is required, first clean the outside of the filter housing; then remove the old element as gently as possible and discard.

1. Carefully clean the inside of the filter housing without allowing dust into the air intake.
2. Inspect the new element. Do not use a damaged element and never use an incorrect element.
3. Assemble the new element and make sure it seats properly.
4. Reassemble cap making sure it seals completely around the filter housing. Dust evacuator must be facing down, at approximately the 5 o-clock position.
5. Check all hoses and air ducts. Tighten hose clamps.

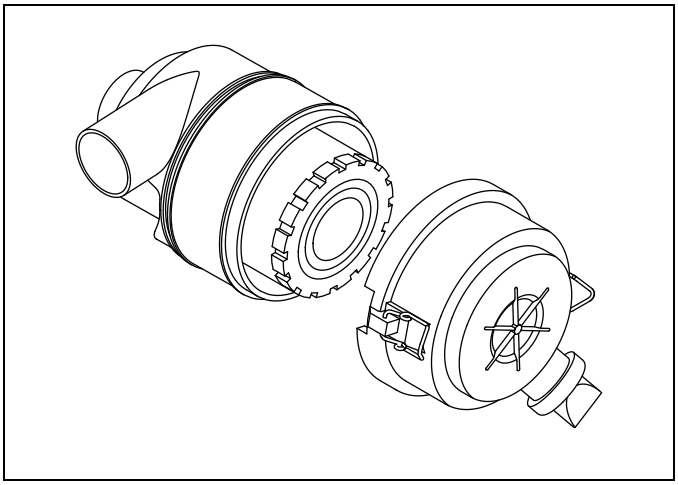


Figure 8D

8.6 FUEL

Handle fuel with care - it is highly flammable. Use an approved container, the spout must fit inside the fuel filler neck. Avoid using cans and funnels to transfer fuel.

⚠ WARNING

Never remove the fuel cap from the fuel tank, or add fuel, when the engine is running or while the engine is hot.

Do not smoke when handling fuel. Never fill or drain the fuel tank indoors.

Do not spill fuel and clean spilled fuel immediately.

Never handle or store fuel containers near an open flame or any device that may create sparks and ignite the fuel or fuel vapors.

Be sure to reinstall and tighten fuel cap securely.

- Fill the fuel tank to within 1 in. (2.5 cm) of the bottom of the filler neck.
- Store fuel according to local, state or federal ordinances and recommendations from your fuel supplier.
- Never overfill or allow the tank to become empty.
- Check fuel lines and clamps every 50 hours. Replace fuel lines and clamps at the first sign of damage.

Diesel Engine:

- Use clean, fresh, low or ultra low sulfur #2 Diesel fuel. Minimum Cetane rating 45. Refer to Engine Manual for additional information.

Gas Engine:

- Use clean, fresh, regular grade, unleaded gasoline minimum 85 Octane.
- Do not use hi-test gasoline or an oil-gasoline mixture. When using blended fuel, do not use a blend with more than 10% ethanol. Under no circumstances should you use a blend with methanol.

8.7 FUEL SYSTEM

Refer to Section 6.3 for specific maintenance intervals.

Before replacing any filter, thoroughly clean the filter housing and the area around the filter. Dirt must not be allowed to enter into fuel system.

For diesel engines, refer to the Engine Manual for instructions to bleed the fuel system if the fuel filter and lines have been removed, or the fuel tank has become empty.

8.8 12 VOLT ENGINE BATTERY

Make absolutely certain the system power switch is OFF and the key has been removed before servicing the battery.

⚠ CAUTION

Always use insulated tools, wear protective glasses or goggles, and protective clothing when working with batteries. You must read and obey all battery manufacturer's instructions.

Tighten cables securely to battery terminals and apply a light coat of silicone dielectric grease to terminals and cable ends to prevent corrosion. Keep vent caps and terminal covers in place

Check the electrolyte level every 100 hours. Keep the cable ends, battery, and battery posts clean.

Verify battery polarity before connecting or disconnecting the battery cables.

1. When installing the battery, always assemble the RED, positive (+) battery cable first and the ground, BLACK, negative (-) cable last.
2. When removing the battery, always remove the ground, BLACK, negative (-) cable first and the RED, positive (+) cable last.
3. Make sure battery is properly installed and secured to the battery tray.

⚠ WARNING

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. **Wash your hands after handling.**

8.9 JUMP STARTING ENGINE BATTERY

Before attempting to “jump start” the mower, check the condition of the discharged battery. **Section 8.8**.

NOTICE

Do not use 12 volt studs on PDU unit to connect jumper cables.

When connecting jumper cables:

1. Stop the engine on the vehicle with a good battery.
2. Connect RED jumper cable to the positive (+) terminal on the good battery and to the positive (+) terminal on the “discharged” battery.
3. Connect the BLACK jumper cable from the negative (-) terminal on the good battery to the negative (+) terminal on the “discharged” battery.

After cables have been connected, start the engine on the vehicle with the good battery then start the mower.

8.10 CHARGING BATTERY

⚠ WARNING

Charge battery in a well ventilated area. Batteries generate explosive gases. To prevent an explosion, keep any device that may create sparks or flames away from the battery.

To prevent injury, stand away from battery when the charger is turned on. A damaged battery could explode.

1. Refer to Section 8.8. Read the Charger’s manual for specific instructions.
2. Always disconnect the blue 12 volt battery connector from the mower before charging. If battery is not sealed, check that the electrolyte covers the plates in all the cells.
3. Make sure the charger is “Off”. Then connect the charger to the battery terminals as specified in the charger’s manual.
4. Always turn the charger “Off” before disconnecting charger from the battery terminals.

8.11 MUFFLER AND EXHAUST

WARNING

Exhaust fumes contain carbon monoxide that is toxic and can be fatal when inhaled.

NEVER operate an engine without proper ventilation.

To protect from carbon monoxide poisoning, inspect the complete exhaust system regularly and always replace a defective muffler.

If you notice a change in the color or sound of the exhaust, stop the engine immediately. Identify the problem and have the system repaired.

Torque all exhaust manifold hardware evenly. Tighten or replace exhaust clamps.

8.12 RADIATOR (DIESEL ENGINES)

WARNING

To prevent serious bodily injury from hot coolant or steam blow-out, never attempt to remove the radiator cap while the engine is running. Stop the engine and wait until it is cool. Even then, use extreme care when removing the cap.

CAUTION

Do not pour cold water into a hot radiator. Do not operate engine without a proper coolant mixture. Install cap and tighten securely.

Check coolant level daily. Radiator should be full and recovery bottle should be up to the **cold** mark.

Drain and refill annually. Remove the radiator cap, open the engine block drain and the radiator drain. Empty and clean the recovery bottle.

Combine 50/50 mixture of clean water and ethylene glycol based anti-freeze for 50/50 mixture. Read and follow the instructions on the anti-freeze container and engine manual.

Keep radiator air passages clean. Use compressed air (30 psi (2.1 BAR) maximum) to clean the fins.

Check and tighten the fan belt. Replace clamps and hoses every two years.

If you have to add coolant more than once a month, or add more than one quart at a time, have a authorized Jacobsen Dealer check the cooling system.

9.1 GENERAL

⚠ WARNING

Before you clean, adjust, or repair this equipment, disengage all drives, lower implements to the ground, turn system power off, remove key from ignition switch, and disconnect battery pack(s) to prevent injuries.

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.

1. Adjustment and maintenance should always be performed by a qualified technician. If proper adjustments cannot be made, contact an Authorized Jacobsen Dealer.
2. Inspect the equipment on a regular basis, establish a maintenance schedule and keep detailed records.
   a. Keep the equipment clean.
   b. Keep all moving parts properly adjusted and lubricated.
   c. Replace worn or damaged parts before operating the machine.
   d. Keep all fluids at their proper levels.
   e. Keep shields in place and all hardware securely fastened.
   f. Keep tires properly inflated.
3. Do not wear jewelry or loose fitting clothing when making adjustments or repairs.
4. Use the illustrations in the Parts Catalog as reference for the disassembly and reassembly of components.
5. Recycle or dispose of all hazardous materials (batteries, fuel, lubricants, anti-freeze, etc.) according to local, state, or federal regulations.

9.2 FRONT AXLE

To check front axle fluid, determine which axle is used on your mower. Early mowers have a rubber plug aligned with the axle shafts center line. Later mowers have a hex plug below the level of the axle shafts center line.

Early Style: Remove rubber plug **(A-Early)** from differential cover. Fluid level should be between 1-1/8 in. (2.8 cm) and 1-1/4 in. (3.2 cm) below fill hole. Add Mobilfluid 424 or SAE 30 wt. as required to bring fluid to correct level. Insert plug and clean up any spilled fluid.

Later Style: Remove hex plug and check fluid level. Fluid should be up to the bottom of the plug. Add Mobilfluid 424 or SAE 30 wt. as required to bring fluid to correct level. Insert plug and clean up any spilled fluid.

To drain fluid:

1. Place a suitable container under front axle.
2. Remove bottom five screws **(B)**, and loosen remaining screws from differential cover.
3. Being careful not to damage sealing surface, or deform cover, break seal to drain fluid into pan.
4. Remove differential cover and apply bead of RTV sealant to axle housing, inside of cover holes.
5. Assemble cover bolts. Torque bolts to 16 - 24 ft. lbs. (21 - 32 Nm).
6. Remove plug **(A)**, and fill with 23 ounces (680 ml) (Early Style) or 18 ounces (532 ml) (Later Style) of Mobilfluid 424 or SAE 30 wt. oil to bring fluid to correct level. Inert plug and clean up any spilled fluid.

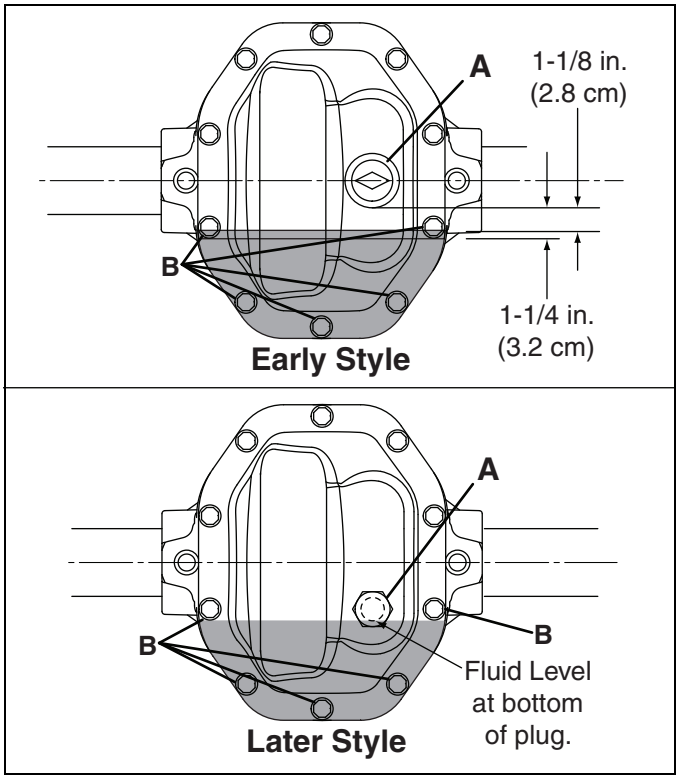


Figure 9A

9.3 AXLE HUB INSPECTION

1. Remove and discard cotter pin **(A)** from the axle.
2. With tire on ground, break castle nut **(B)** free. Do not fully remove the castle nut.
3. Raise the mower and support front axle on jack stands. Remove lug nuts and wheel.

⚠ 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 raised, place chocks in front of and behind the wheels that are not raised.

4. Remove castle nut **(B)**, washer **(C)** and hub **(D)**.
5. Inspect the both ends of hub splines for wear or damage. Refer to **Figure 9B** for examples of hub wear.
   a. If no wear to light wear is present, hub can be used.
   b. If medium to extreme wear is present, hub must be replaced. Order and install the Hub Replacement Kit **4240327** before proceeding with these instructions. **Do not operate mower until hub is replaced.**

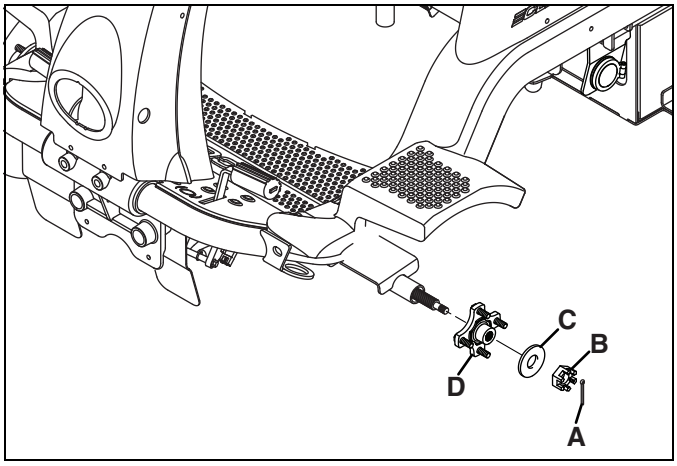


Figure 1

6. Apply anti-seize to axle shafts.
7. Slide hubs **(D)** onto axle shafts.
8. Assemble washers **(C)** and castle nuts **(B)** to axle shafts.
9. Torque castle nut **(Item 2)** to 95 ft. lb. (129 Nm). Tighten nut as required to align cotter pin hole with slot in nut.
10. Install new cotter pin **(A)**.
11. Assemble tire and lug nuts. Lower mower to the ground.
12. Repeat procedure on opposite side of the mower.

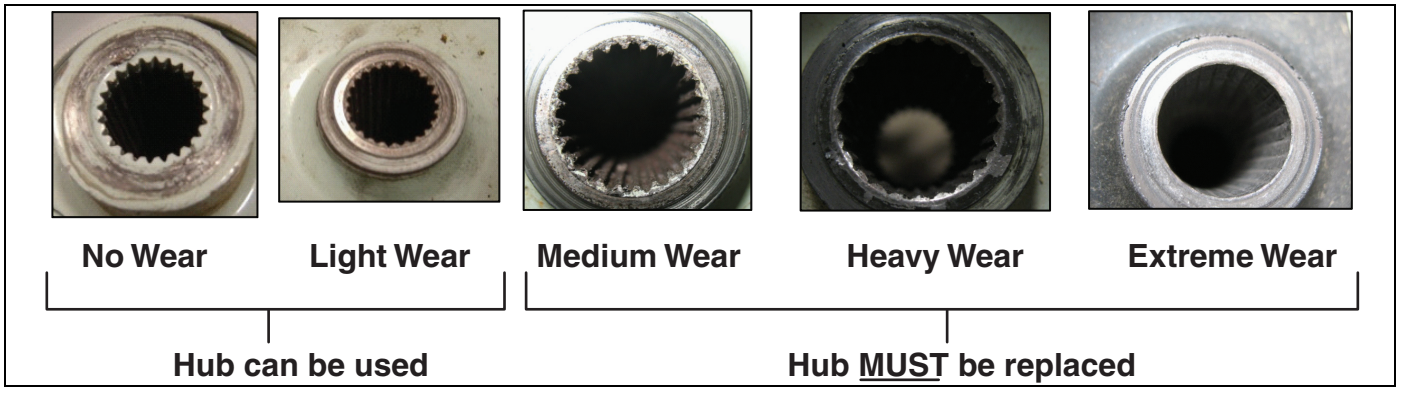


Figure 9B

9.4 PARKING BRAKE INSPECTION

Refer to the parts catalog as an aid for the removal and assembly of components.

NOTE: *The motor brake may be removed with the front axle motor in the vehicle.*

Use a dust mask and gloves to protect lungs and hands from brake dust.

1. Disconnect the main power connector.
2. Remove the traction pedal sensor.
   a. Remove the right fender and the screws securing the floor mat to the floor.
   b. Remove hardware **(A)** securing traction pedal to the sensor bracket.
   c. Remove hardware **(B)** securing traction pedal to the sensor shaft.
   d. Remove the traction pedal **(C)**.
   e. Raise the mower and support front axle on jack stands.

⚠ 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 raised, place chocks in front of and behind the wheels that are not raised.

   f. Disconnect the traction pedal sensor electrical connector.
   g. Remove hardware **(D)**. Remove the traction pedal sensor **(E)**.
3. Make alignment marks on parking brake and motor.
4. Disconnect the parking brake electrical connector.
5. Remove three screws and lock washers securing parking brake to the motor. Remove the parking brake.Put the parking brake, brake disk side up, on a workbench.

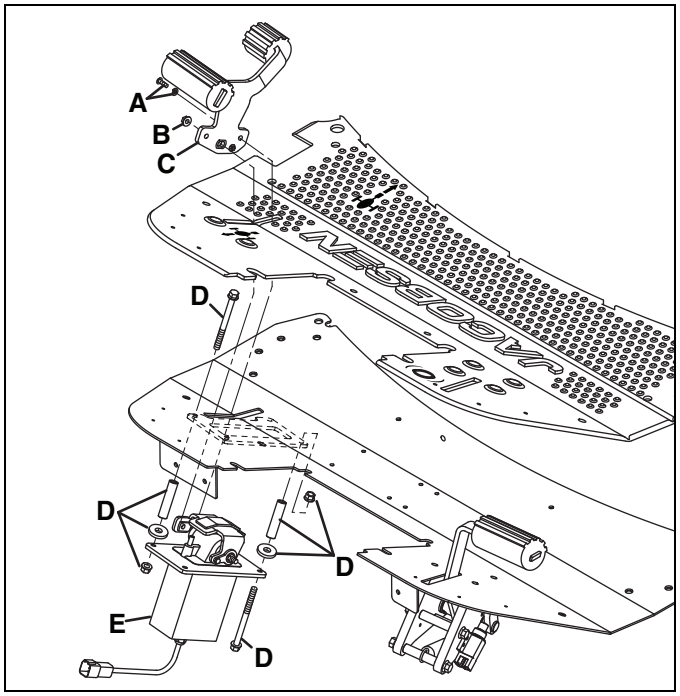


Figure 9C

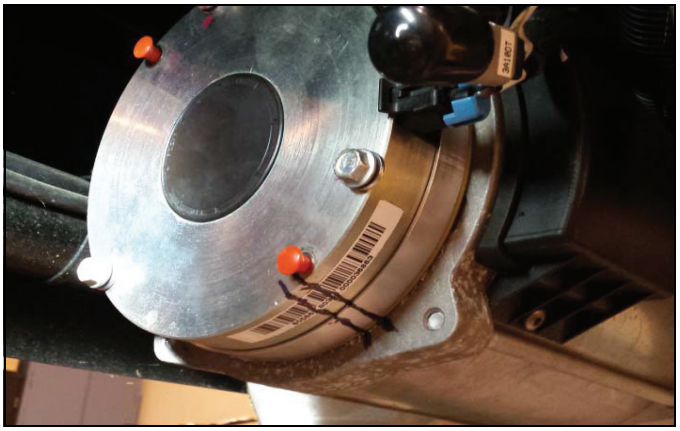


Figure 9D

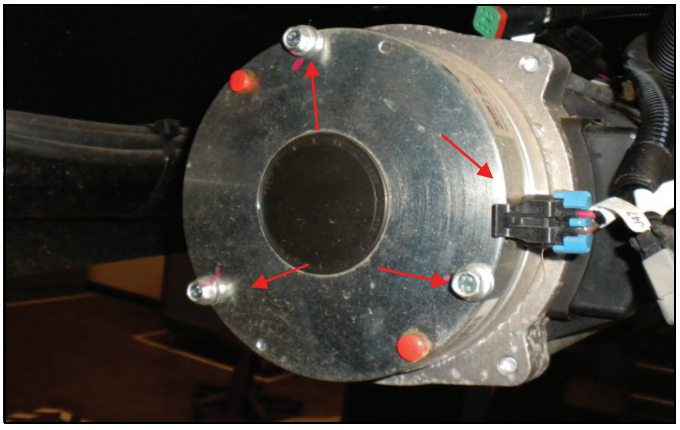


Figure 9E

6. Extend the alignment marks onto the stationary plate. Remove two screws, cover plate and brake disk.

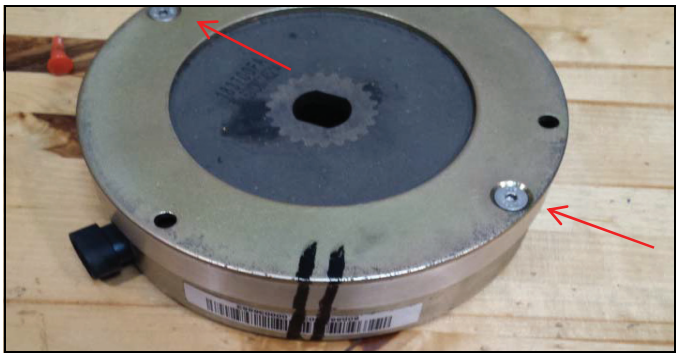


Figure 9F

7. Extend the alignment marks onto the pressure plate.
8. Remove the pressure plate, spacer band, five clutch springs and coil from the brake housing.

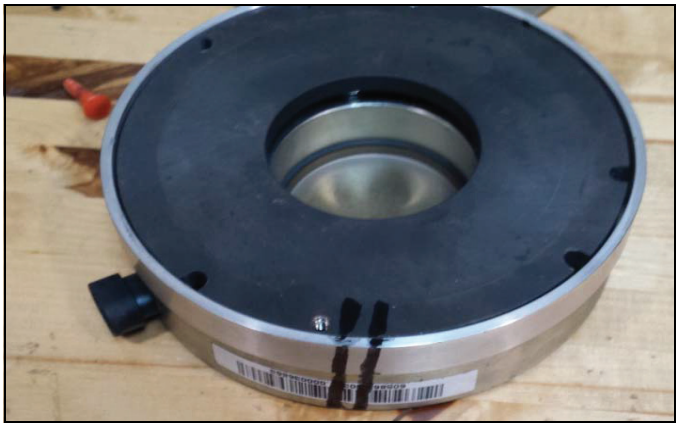


Figure 9G

9. Clean and inspect all components.
   a. Thoroughly clean all debris and corrosion from all components.
   b. If any components is damaged, excessively worn or corroded, the entire parking brake assembly must be replaced.
   c. Check for approximately 25 ohms at the brake coil. If the coil resistance is out of range, the entire parking brake assembly must be replaced.
   d. If the brake assembly must be replaced, proceed with **Step 17.** If brake will be reused, proceed with **Step 10.**

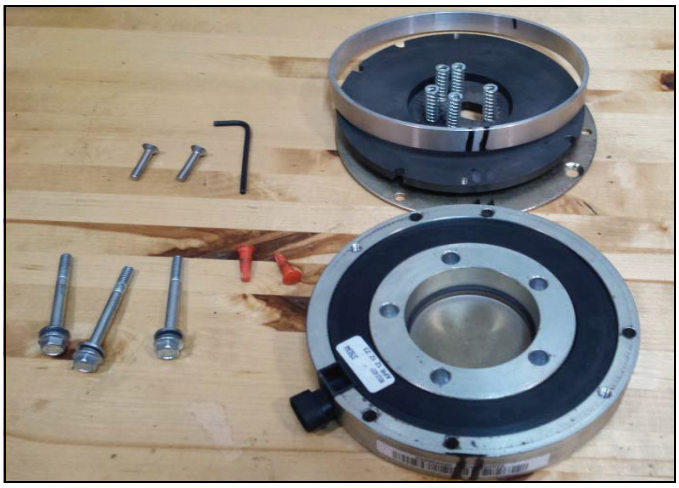


Figure 9H

10. Apply a bead of RTV sealant completely around bottom and sides of the brake coil connector receiver.

Figure 9J

11. Assemble the brake coil to the brake housing. Install the five clutch springs.

Figure 9K

12. Apply a thin bead of high temperature RTV sealant to one edge of the spacer band. Align marks and assemble spacer band to brake housing.

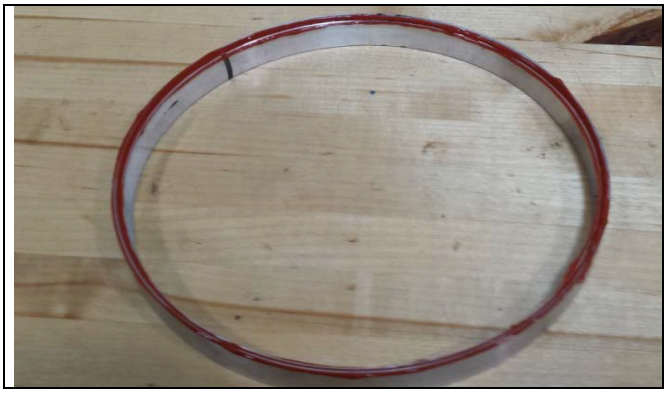


Figure 9L

13. Align marks and install the pressure plate and the brake disk.
14. Apply a thin bead of high temperature RTV sealant around top edge of the spacer band.

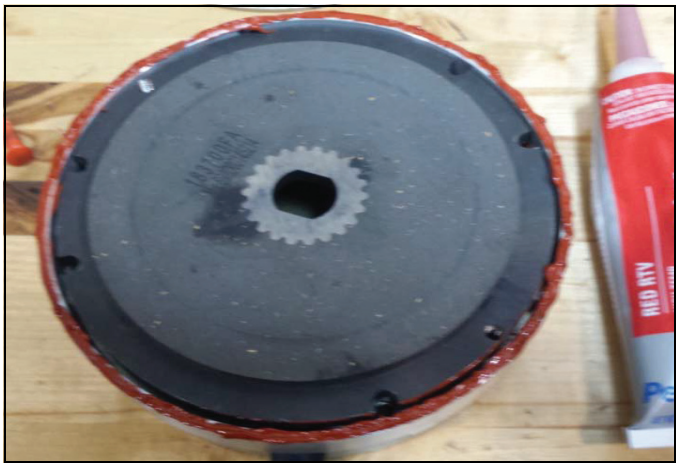


Figure 9M

15. Align marks and assemble cover plate and two screws. Alternate tightening the screws a little at a time to compress the brake springs. Torque the screws to 35 in. lbs. (3.9 Nm).
16. Clean any excess sealant that was squeezed out of the brake assembly.
17. Install the two 5 x 30 mm brake release screws. Tighten the screws just enough to allow some movement with moderate force, but with enough spring tension remaining to hold the disk centered in the brake housing.
18. Apply a thin bead of high temperature RTV sealant to the outer perimeter of the cover plate.
19. Clean the parking brake mounting area of the front axle motor and clean the motor shaft.

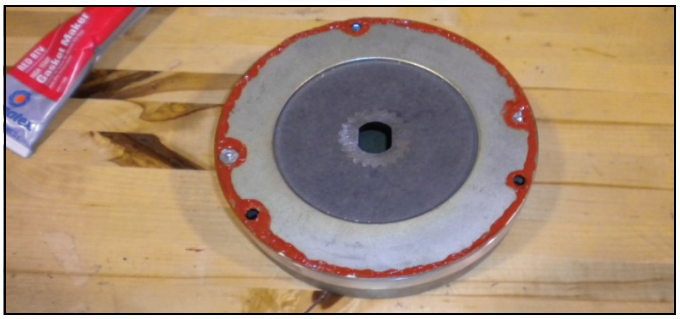


Figure 9N

20. Apply a thin film of high temperature anti-seize to the motor shaft.
21. Fill pockets on the motor end cap with high temperature RTV sealant.

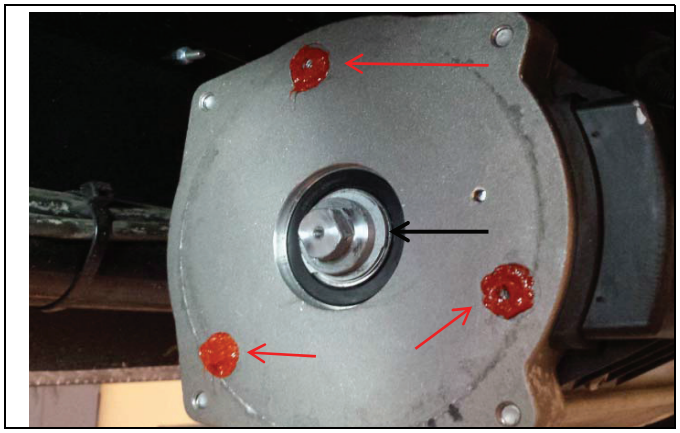


Figure 9P

22. Install the parking brake to the motor. Torque the three screws evenly and in small increments to 53-71 in. lb. (6-8 Nm).
23. Remove brake release screws and install the orange plugs. Store the screws in pouch behind the seat.
24. Apply dielectric grease and connect the brake electrical connector.
25. Assemble the traction pedal sensor in reverse order of removal.
26. Connect main power connector. Test the operation of the brake.

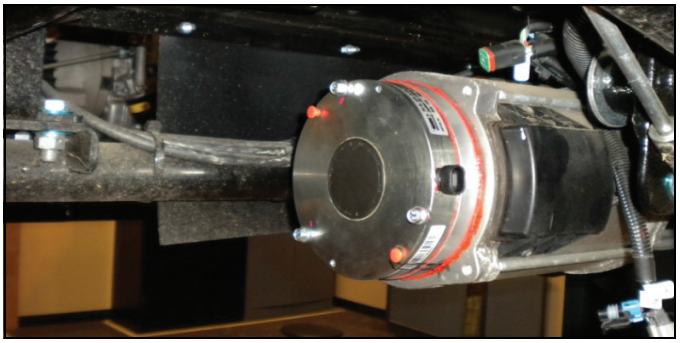


Figure 9R

9.5 LIFT ACTUATOR CALIBRATION

The actuators need to be calibrated at initial setup, whenever an actuator or the RDU was replaced, or when switching from reels to vertical mowers.

NOTICE

Any changes made to settings in the Maintenance Mode will not be active until the mower is powered down and restarted.

Before calibrating, reels or vertical mowers must be properly set-up with rollers, and installed on the Eclipse mower.

To calibrate the actuators:

1. Park the mower on a flat and level surface.
2. Enter Maintenance Mode. **[See Section 4.7]**.
3. Press either of the orange buttons **(AM or AN)** on the LDU until the **ACTUATOR CALIBRATE?** screen is on the LCD display. Press the black button **(AL)** to enter set mode.
4. With mow switch off, all three mower switches on, and automatic parking brake engaged, raise or lower all three reels until the left reel is at the desired crosscut position. Crosscut position may be measured by the distance actuator is extended, or by measuring the distance from the ground to the reel.

NOTICE

To ensure all three reels lower and start cutting at the same point, the crosscut position should be the same distance from the ground for each reel.

   a. Press the left orange button **(AN)** on the LDU to save the crosscut position for the left reel.
   b. Raise or lower the center reel as required to match the crosscut position of the left reel. Press the left orange button **(AN)** on the LDU to save the crosscut position for the center reel. Repeat for the right reel.
   c. Lower all three reels until the left reel actuator pin **(D)** is centered in the lift arm slot **(C)**. Save the lowered position for the left reel.
   d. Raise or lower the center reel as required until the center reel actuator pin **(D)** is centered in the lift yoke bracket slot **(C)**. Press the left orange button **(AN)** on the LDU to save the lowered position for the center reel. Repeat for the right reel.

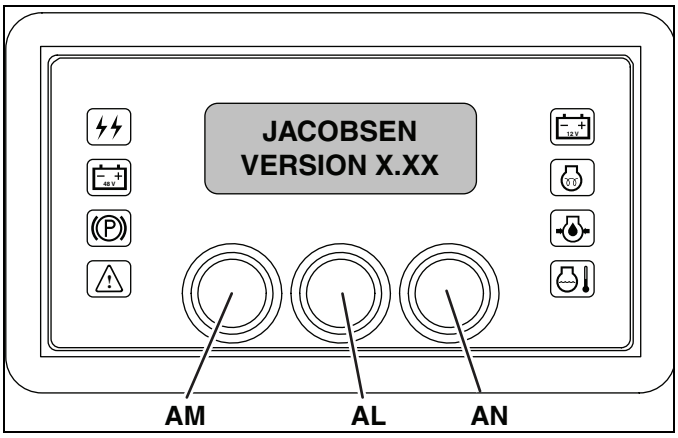


Figure 9S

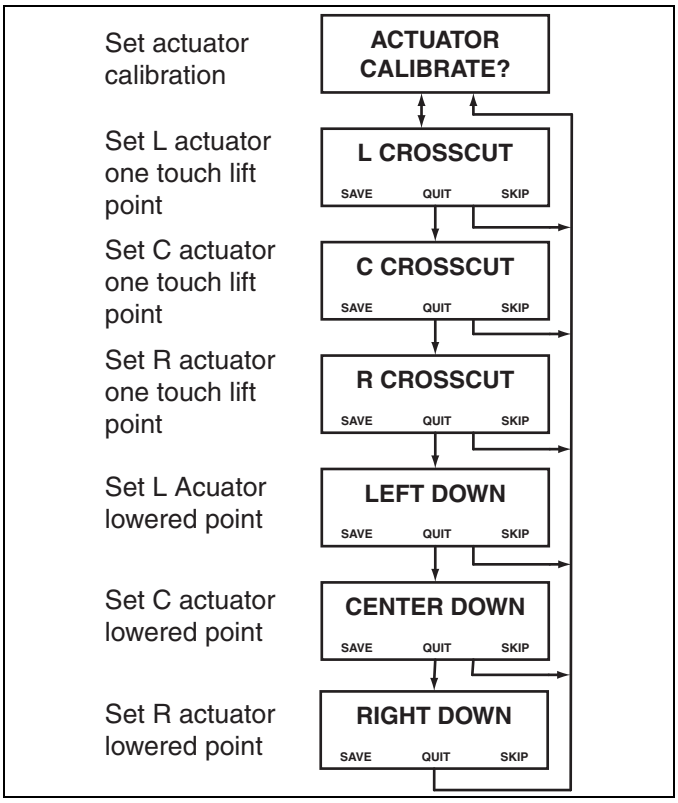


Figure 9T

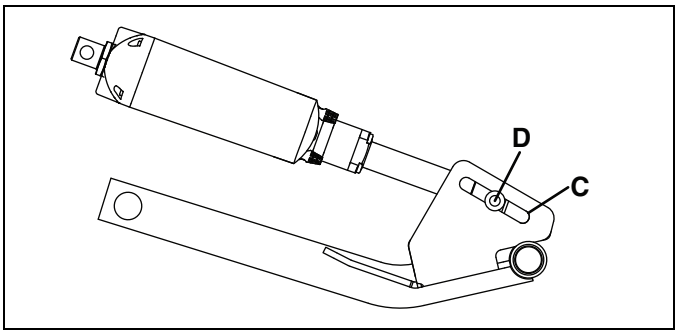


Figure 9U

9.6 BACKLAPPING AND GRINDING

To backlap:

1. Park the mower on a flat and level surface.
2. Enter Maintenance Mode. **[See Section 4.7]**.
3. Press either of the orange buttons **(AM or AN)** on the LDU until the **BACKLAP ENABLE?** screen is on the LCD display. Press the black button **(AL)** to enter backlap mode.
4. If reels are not lowered, the **LOWER ALL ACTUATORS** will display on the LDU. Lower reels to the ground. Pressing any of the three buttons **(AL, AM, or AN)** with **LOWER ALL ACTUATORS** on the display will cancel backlap mode.
5. Use orange buttons **(AM and AN)** to adjust timer. Press black button **(AL)** to start backlapping. Selected motors will start rotating and horn will periodically chirp.
6. Turn mow switch **(E)** and desired reel switches **(F, G, and H)** to ON position.
7. Adjust reel speed between 150 and 400 rpm using the orange buttons **(AM or AN)**.
8. Apply lapping compound with a long handle brush along the entire length of the reel.
9. Continue lapping and at the same time make a fine adjustment on the reel and bedknife until there is a uniform clearance along the full length of the cutting edges.
10. Exit backlap mode by allowing the timer to end, or pressing the black button **(AL)** to select **QUIT**.
11. Turn key switch **(J)** to off position.
12. Carefully and thoroughly remove all lapping compound from reel and bedknife *before running the reel in forward direction*.

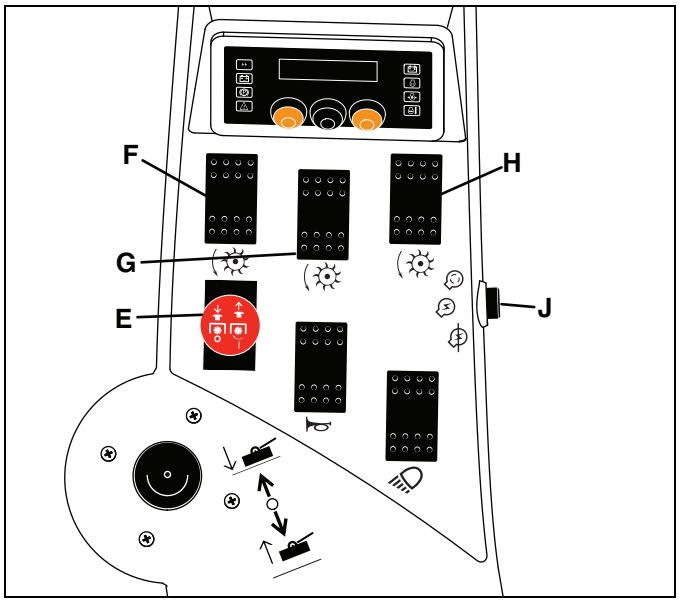
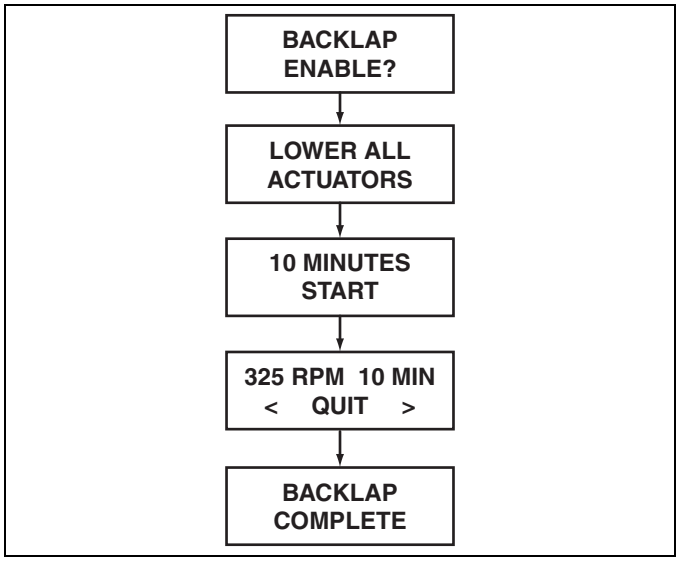


Figure 9V



9.7 TIRES

1. Keep tires properly inflated to prolong tire life. Check inflation pressure while the tires are cool. Inspect tread wear.
2. Check the pressure with an accurate, low pressure tire gauge.
3. Keep tires inflated to:

   Front..... 16 psi (1.1 BAR)
   Rear ..... 20 psi (1.3 BAR)

NOTICE

Under inflated tires may leave tire marks in turf. For soft turf, tire inflation pressure may need to be increased to 22 psi (1.5 BAR).

⚠ CAUTION

Unless you have the proper training, tools and experience, DO NOT attempt to mount a tire on a rim. Improper mounting can produce an explosion which may result in serious injury.

9.8 WHEEL MOUNTING PROCEDURE

⚠ 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 raised, place chocks in front of and behind the wheels that are not raised.

1. Remove dirt, grease and oil from stud thread. Do not lubricate threads.
2. Position wheel on hub and inspect to insure full contact between mounting surface of wheel and hub or brake drum.
3. Finger tighten all hardware then torque hardware in criss-cross order; always tighten nuts in the top position.
4. Check and retorque daily until torque is maintained, 85-95 ft.lbs. (115-128 Nm)

9.9 CARE AND CLEANING

Clean the mower and implements after each use. Keep the equipment clean. Whenever possible, use compressed air to clean mower.

NOTICE

Do not wash any portion of the equipment while it is hot. Do not use high pressure spray or steam. Use cold water and automotive cleaners.

1. Use compressed air to clean engine and radiator fins (30 psi (2.1 BAR) maximum).
2. Use only fresh water for cleaning your equipment.

NOTICE

Use of salt water or affluent water has been known to encourage rust and corrosion of metal parts resulting in premature deterioration or failure. Damage of this nature is not covered by the factory warranty.

3. Do not spray water directly at the instrument panel, ignition switch, controller, or any other electrical components, or at bearing housings and seals.
4. Clean all plastic or rubber components with a mild soap solution and warm water, or use commercially available vinyl/rubber cleaners.

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

⚠ CAUTION

Clean grass and debris from cutting units, drives, muffler, and engine to prevent fires.

⚠ WARNING

NEVER use your hands to clean cutting units. Use a brush to remove grass clippings from blades. Blades are extremely sharp and can cause serious injuries.

9.10 STORAGE

General

1. Clean the mower thoroughly and lubricate. Repair and paint damaged or exposed metal.
2. Inspect the mower, tighten all hardware, replace worn or damaged components.
3. Drain and refill radiator.
4. Clean the tires thoroughly and store the mower so the load is off the tires. If mower is not on jack stands, check tires at regular intervals and reinflate as necessary.
5. Keep the machine and all its accessories clean, dry and protected from the elements during storage. Never store equipment near an open flame or spark which could ignite fuel or fuel vapors.

Battery (Trojan, Buffer, and 12 Volt Batteries)

1. Before storing the vehicle or batteries for an extended period, the batteries should be cleaned, fully charged, and the electrolyte brought up to the correct level.
2. Remove and store battery in upright position in a cool, dry place. If batteries are stored on the vehicle, disconnect the power connector.
3. During storage, batteries should be periodically recharged. Charging intervals depend on the average temperature in which the batteries are stored.
   Below 40° (4° C)Charge every 6 Months.
   40° to 60° F (4° to 15° C)Charge every two months.
   Above 60° F (15° C)Charge once a month.
4. Store batteries in a cool, dry place. To reduce the self discharge rate, room temperature should not be above 80°F (27°C) or fall below 20°F (-7°C) to prevent electrolyte from freezing.

Hybrid Engine (General)

1. While the engine is warm, remove the drain plug, drain the oil from the crankcase, and change oil filter. Install drain plug and refill with fresh oil. Let engine cool before storing.
2. Clean exterior of engine. Paint exposed metal, or apply a light coat of rust preventative oil.

Diesel Hybrid - Add a fuel conditioner or biocide to prevent gelling or bacterial growth in fuel. See your local fuel supplier.

Gas Hybrid - For engine protection Jacobsen recommends the use of a fuel additive such as STABIL®. Mix additive following instructions on container. Run engine for a short time to circulate additive through carburetor.

Remove spark plugs and pour 1 oz. (30 ml) of engine oil into each cylinder. Replace spark plugs and crank slowly (do not start) to distribute oil in cylinder.

If storing indoors, drain fuel from tank.

Close fuel shut off valve.

Note: *Do not use fuel with ethanol during storage.*

Cutting Units

1. Wash the cutting units thoroughly, then repair and paint any damaged or exposed metal.
2. Lubricate all fittings and friction points.
3. Backlap the reels then back the reel away from the bedknife. Apply a light coat of rust preventative oil to the sharpened edges of the reel and bedknife.

⚠ CAUTION

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

After Storage

1. Clean, inspect and test the batteries before putting them back into service.
2. Check or service fuel filter and air cleaner.
3. Check the radiator coolant level.
4. Check oil level in the engine crankcase.
5. Fill the fuel tank with fresh fuel. Open fuel shut off valve and bleed the fuel system.
6. Make certain that the tires are properly inflated.
7. Remove all oil from the reels and bedknife. Adjust bedknife and cutting height.
8. Start the engine. Allow enough time for the engine to become properly warmed and lubricated.

⚠ WARNING

Never operate the engine without proper ventilation; exhaust fumes can be fatal when inhaled.

10.1 GENERAL INFORMATION

⚠ CAUTION

Always turn the system power switch off, remove key, and disconnect battery connector(s), before inspecting or working on the electrical system.

General precautions that can be taken to reduce electrical problems are listed below.

1. Make certain all terminals and connections are clean and properly secured.
2. Check the interlock system, fuses, and circuit breakers regularly. If the interlock does not function properly and the problem cannot be corrected, contact an authorized Jacobsen Dealer.
3. Keep the wire harness and all individual wires away from moving parts to prevent damage.
4. Make sure the seat switch harness is connected to the main wire harness.
5. Check the battery and battery charging circuit.
6. Do not wash or pressure spray around electrical connections and components.

The electrical system is monitored and controlled by the multiple controllers. The controllers are equipped with LED's which can be used when troubleshooting the electrical system.

10.2 CONTROLLERS

Controller	Location/Function
Traction Controller (TCU)	Located to the right of the operator seat, under the right cowling. Traction controller is used to control the operation of the traction drive motor. The traction controller has one green light for diagnostics.
Steering Controller (SCU)	Located at the rear of the unit below the hood. Steering controller is used to control the power steering system. The steering controller has one green light for diagnostics.
Main Controller Unit (MCU)	Located to the left of the operator seat, under the left cowling. MCU is used to control communications between the different controllers. The MCU has diagnostic lights to help troubleshoot controller functions. **See Section 10.5**.
Reel Controller Unit (RCU)	Located on the right side of the steering column, under the steering column cover. RCU is used to control the operation of the reel motors and the lift/lower actuators. The RCU has diagnostic lights to help troubleshoot controller functions. **See Section 10.4**.
LCD Display Unit (LDU)	Located on the instrument panel. Used to display and set functions. **See Section 4.5**.
Over-Voltage Limit Module Controller (OLM)	(Early Units) Located under the operator's seat. OLM controller is used to cycle the over-voltage resistors on the side of the machine. **See Section 10.6**.
Braking Resistor Controller (BRC)	(Later Units) Located on side of TCU. BRC controller is used to energize the four over-voltage resistors on the side of the machine.
Power Distribution Unit (PDU)	Located to the left of the operator seat, under the MCU. PDU is used to switch 48V and 12V motor/controller outputs on or off. Three circuit breakers are located on the rear of the PDU.
Genset Controller (APU) (Hybrid Powered Mowers only)	Located on the engine side of the fuel tank. Used to control engine speed and generator functions.
3WD Controller (3WD)	Located at the rear of the unit below the hood. 3WD controller is used to control the rear wheel motor. The 3WD controller has one green light for diagnostics.

10.3 PDU AND CONTROLLER LOCATIONS

A. Power Distribution Unit (PDU) Circuit Breakers
Used to protect electrical system. Three manual reset circuit breakers located on the PDU are accessible by opening the hood and looking towards the left ROPS post. Push down on rubber boot to reset circuit breaker.

B. *Main Controller Unit (MCU) Diagnostic Lights*
Twenty four lights are used to indicate active MCU functions. Lift MCU access panel to access MCU.

C. *Reel Controller Unit (RCU) Diagnostic Lights*
Eighteen lights are used to indicate active RCU functions. Remove access plug from right side of steering column to view RCU diagnostic lights.

D. *Over-Voltage Limit Module (OLM) Diagnostic Lights (Early Units)*
Six lights are used to indicate communication, power, and energized resistors.

D. *Braking Resistor Controller (BRC) (Later Units)*
Remove right side operator platform cover to access BRC.

E. *Traction Controller Diagnostic Light*
Single green light on traction controller indicates power and faults. A steady light indicates the controller is active. A flashing light indicates a traction system fault/error has occurred. Remove right side operator platform cover to access traction controller.

F. *Steering Controller Diagnostic Light*
Single green light on steering controller indicates power and faults. A steady light indicates the controller is active. A flashing light indicates a steering system fault/error has occurred. Open the hood and remove controller cover to access the steering controller.

G. *3WD Controller Diagnosic Light*
Single green light on 3WD controller indicates power and faults. A steady light indicates the controller is active. A flashing light indicates a 3WD system fault/error has occurred. Open the hood and remove controller cover to access the 3WD controller.

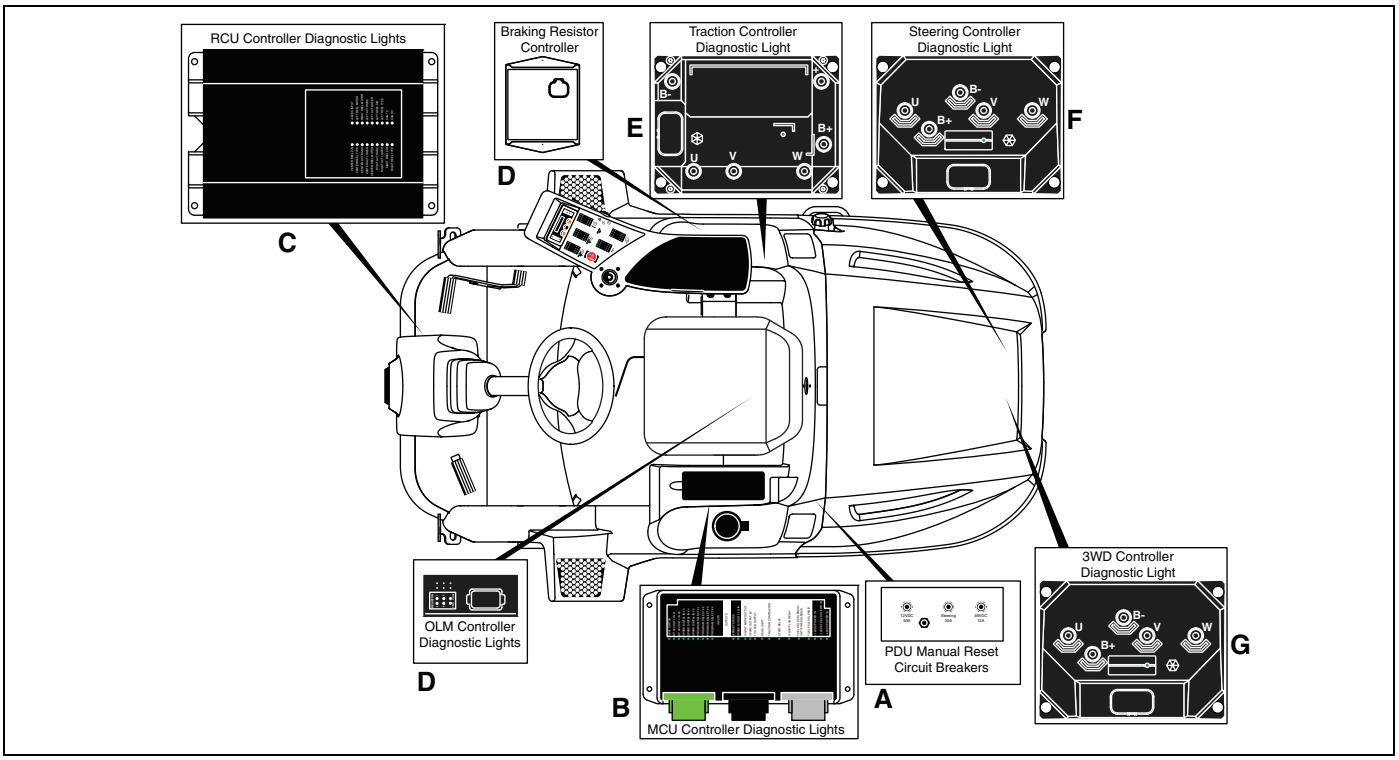


Figure 10A

10.4 RCU CONTROLLER LIGHTS

The RCU controller is a solid state device that monitors and controls reel and lift electrical functions. The RCU communicates with the MCU via the CAN network.

Each input and output signal is displayed through lamps located on front face of the controller. An active circuit will turn an input lamp on, an inactive circuit will turn a lamp off. Outputs are active when their lights are on.

Controller Functions by Lamp Number

Lamp On - Circuit is active
Lamp Off - Circuit is inactive

INPUTS		OUTPUTS	
Lamp	**Circuit**	**Lamp**	**Circuit**
1	CAN Low	**3**	Left Reel Clockwise/Counter-Clockwise
2	CAN High	**4**	Left Reel Forward/Reverse
9	48 Volt DC	**5**	Left Reel Raise
		6	Left Reel Lower
		7	Right Reel Motor
		8	Left Reel Motor
		10	Right Reel Clockwise/Counter-Clockwise
		11	Right Reel Forward/Reverse
		12	Right Reel Lower
		13	Right Reel Raise
		14	Center Reel Motor
		15	Center Reel Lower
		16	Center Reel Raise
		17	Center Reel Clockwise/Counter-Clockwise
		18	Center Reel Forward/Reverse

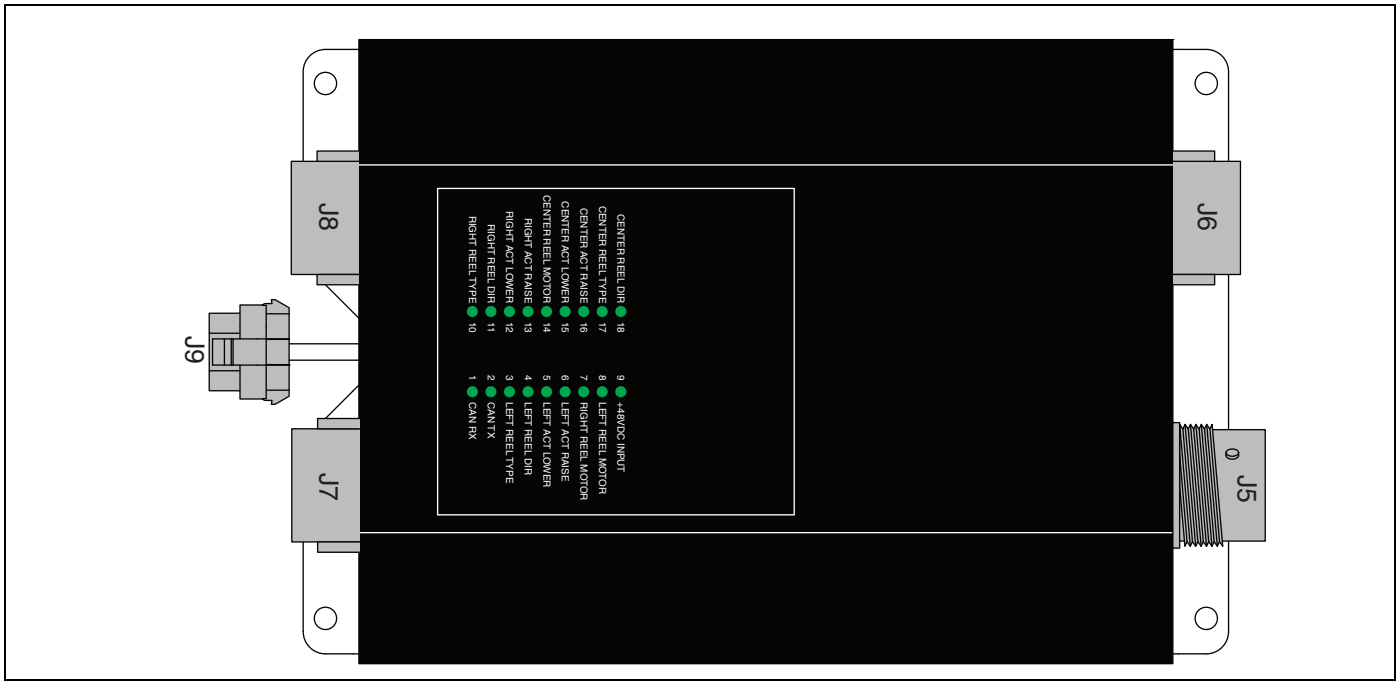


Figure 10B

10.5 MCU CONTROLLER LIGHTS

The MCU controller is a solid state device that monitors and controls mower functions. The MCU communicates with the other controllers via the CAN network.

Each input and output signal is displayed through lamps located on top face of the controller. A closed input switch indicates an active circuit and will turn an input lamp on, an open switch an inactive circuit and will turn a lamp off. Outputs are active when their lights are on.

Controller Functions by Lamp Number

Lamp On - Circuit is active
Lamp Off - Circuit is inactive

INPUTS		OUTPUTS	
Lamp	**Circuit**	**Lamp**	**Circuit**
1	+48 Volt DC Power In	**4**	Fuel Pull Solenoid
2	+12 Volt DC Fuel Solenoid Power In	**5**	Fuel Hold Solenoid/Anti-Fire Solenoid
3	+12 Volt DC Power In	**6**	Glow Plug Relay
13	Spare 12 Volt Digital Low In	**7**	Start Relay
14	Genset Status	**8**	Traction Contactor Output
15	Program Select #4	**9**	Head Light
16	Program Select #3	**10**	TCU Fan Output
17	Program Select #2 (Diesel)	**11**	Spare Output #2
18	Program Select #1 (Gas)	**12**	Silent Mode Output
19	Spare 48 Volt Digital In #5		
20	Spare 48 Volt Digital In #4		
21	Spare 48 Volt Digital In #3		
22	Spare 48 Volt Digital In #2		
23	Spare 48 Volt Digital In #1		
24	Seat Switch		

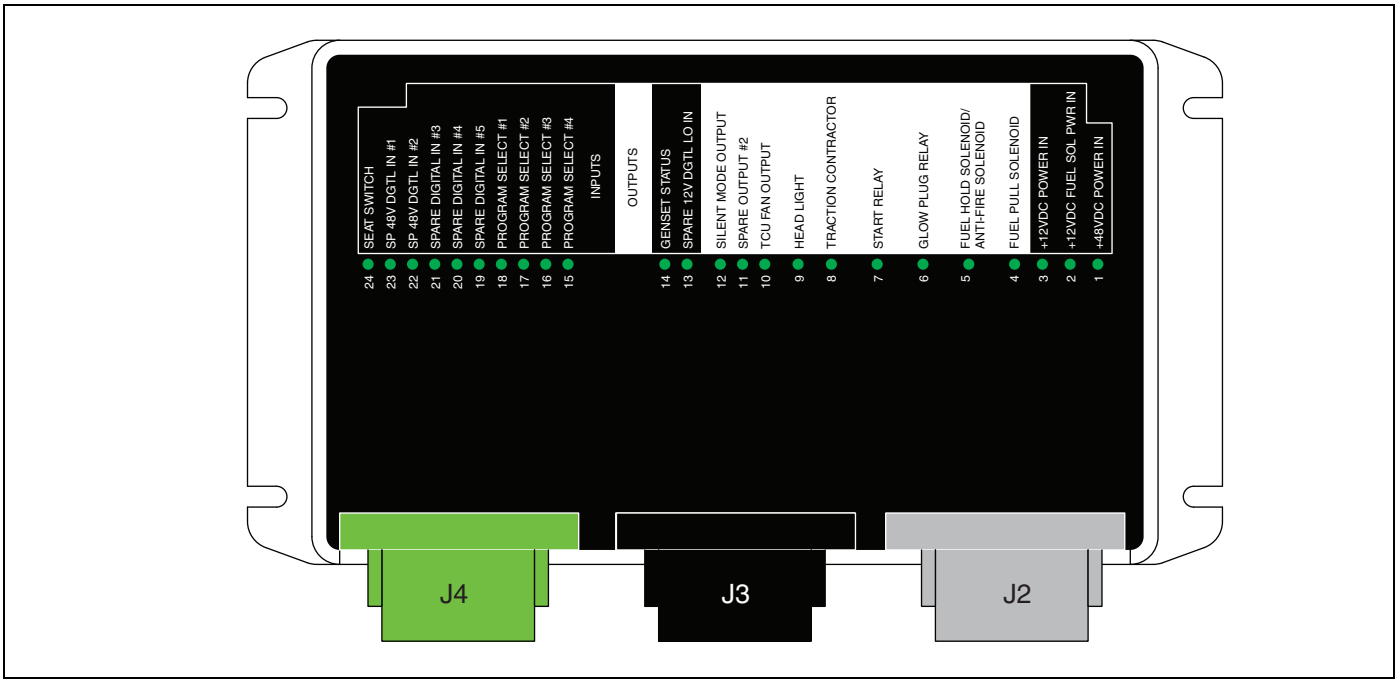


Figure 10C

10.6 OLM CONTROLLER LIGHTS (EARLY UNITS)

The OLM controller is a solid state device that monitors and controls resistor functions. The controller communicates with the MCU controller via the CAN network.

Each input and output signal is displayed through lamps located on front face of the controller. A closed input switch indicates an active circuit and will turn an input lamp on, an open switch an inactive circuit and will turn a lamp off. Outputs are active when their lights are on.

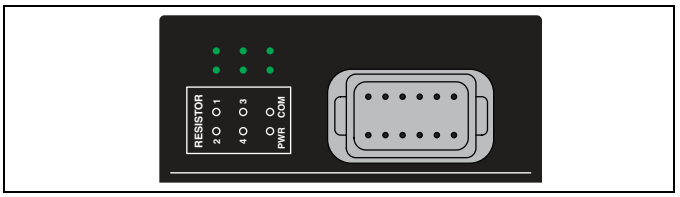


Figure 10D

Controller Functions by Lamp Number

Lamp On - Circuit is active
Lamp Off - Circuit is inactive

INPUTS		OUTPUTS	
Lamp	**Circuit**	**Lamp**	**Circuit**
PWR	+48 Volt DC Power In	**1**	Resistor #1
COM	CAN Network	**2**	Resistor #2
		3	Resistor #3
		4	Resistor #4

10.7 PDU (EARLY UNITS)

The PDU is located to the left of the operator seat, under the MCU, and is used to switch 48V and 12V motor/ controller outputs on or off. Three circuit breakers are located on the rear of the PDU.

Before working on, or opening the PDU, shut mower off, remove key, disconnect 48 volt battery connector, and disconnect 12 volt battery connector (Hybrid mowers). Use caution to prevent shorting between PDU input, output, and ground cable studs.

Inside the PDU are the following components:

Traction Contactor - Used to control 48 volt power output to TCU and OLM.

48 Volt Contactor - Used to control 48 volt power output to MCU, RCU, SCU, and other components.

12 Volt Contactor - Used to control 12 volt power output to MCU, 12 volt lights, and engine components.

150 Amp Fuse - Used to provide circuit protection for 48 volt contactor.

300 Amp Fuse - Used to provide circuit protection for traction contactor.

12 Amp Circuit Breaker - Used to provide circuit protect for 48 volt contactor output except for RCU and SCU.

30 Amp Circuit Breaker - Used to provide circuit protection for SCU.

50 Amp Circuit Breaker - Used to provide circuit protection for 12 volt contactor.

Printed Circuit Board - Used for controlling PDU inputs and outputs.

Glow Plug Relay - Used to control glow plug operation for Diesel hybrid engines.

Start Relay - Used to control starter motor operation for Gas and Diesel hybrid engines.

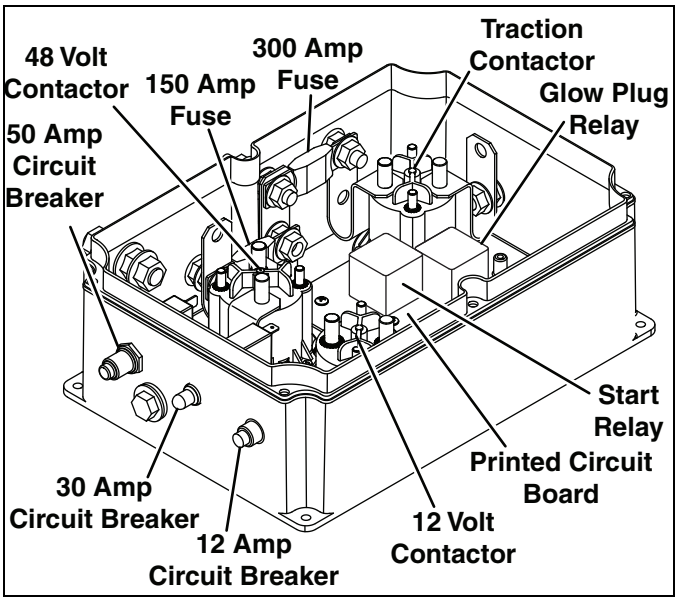


Figure 10E

10.8 PDU (LATER UNITS)

The PDU is located to the left of the operator seat, under the MCU, and is used to switch 48V and 12V motor/ controller outputs on or off. Three circuit breakers are located on the rear of the PDU.

Before working on, or opening the PDU, shut mower off, remove key, disconnect 48 volt battery connector, and disconnect 12 volt battery connector (Hybrid mowers). Use caution to prevent shorting between PDU input, output, and ground cable studs.

Inside the PDU are the following components:

Traction Contactor - Used to control 48 volt power output to TCU and OLM.

48 Volt Contactor - Used to control 48 volt power output to MCU, RCU, SCU, and other components.

12 Volt Relay - Used to control 12 volt power output to MCU, 12 volt lights, and engine components.

150 Amp Fuse - Used to provide circuit protection for 48 volt contactor.

300 Amp Fuse - Used to provide circuit protection for traction contactor.

12 Amp Circuit Breaker - Used to provide circuit protect for 48 volt contactor output except for RCU and SCU.

30 Amp Circuit Breaker - Used to provide circuit protection for SCU.

50 Amp Circuit Breaker - Used to provide circuit protection for 12 volt contactor.

Printed Circuit Board - Used for controlling PDU inputs and outputs.

Glow Plug Relay - Used to control glow plug operation for Diesel hybrid engines.

Start Relay - Used to control starter motor operation for Gas and Diesel hybrid engines.

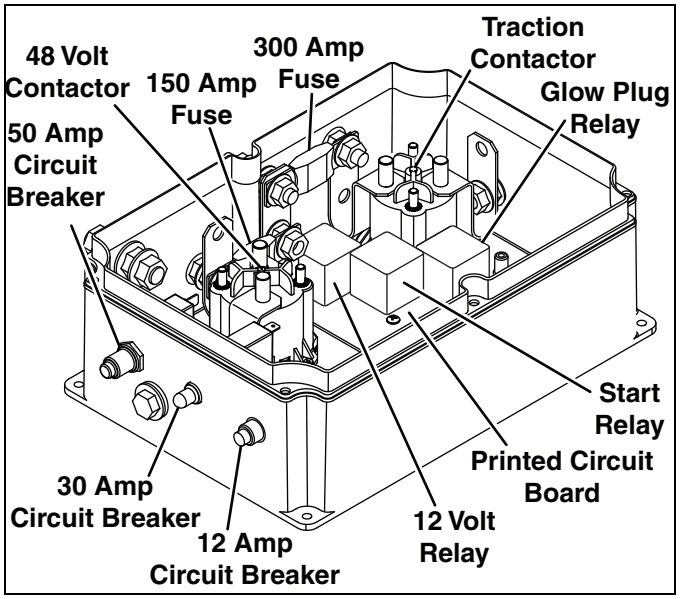


Figure 10F

11.1 GENERAL

⚠ WARNING

Before you clean, adjust, or repair this equipment, disengage all drives, lower implements to the ground, turn system power off, remove key from ignition switch, and disconnect battery pack(s) to prevent injuries

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.

1. Adjustments and maintenance should always be performed by a qualified technician. If proper adjustment cannot be made, contact an authorized Jacobsen Dealer.
2. Replace, do not adjust, worn or damaged components.
3. Long hair, jewelry or loose fitting clothing may get tangled in moving parts.

⚠ CAUTION

Be careful to prevent entrapment of the hands and fingers between moving and fixed components of the machine.

4. Do not change speed limit settings or overspeed the drive motors.

11.2 BEDKNIFE-TO-REEL (Pre-adjustment Check)

1. Check the reel bearings for end play or radial play. There should be no end play or radial play. See Section 11.24.

⚠ CAUTION

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

2. Inspect the reel blades and bedknife to insure good sharp edges without bends or nicks.
   a. The leading edge of the reel blades must be sharp, free of burrs and show no signs of rounding off.
   b. The bedknife and bedknife backing must be securely tightened. The bedknife must be straight and sharp.
   c. A flat surface of at least 1/32 in. (0.08 cm) minimum must be maintained on the front face of the bedknife. Use a standard flat file to dress the bedknife.
3. If wear or damage is beyond the point where the reel or bedknife can be corrected by the lapping process, they must be reground.
4. Proper reel-to-bedknife adjustment is critical. A gap of 0.001 to 0.003” (0.0025 to 0.0076 cm) 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).

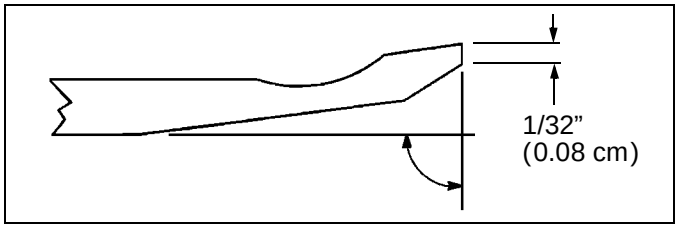


Figure 11A

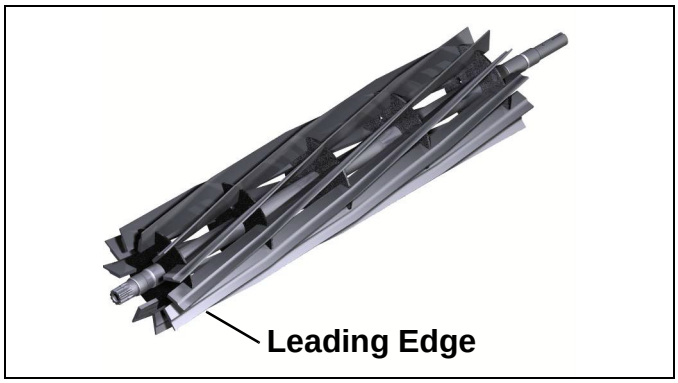


Figure 11B

11.3 BEDKNIFE ADJUSTMENT

1. Read Section 11.2 before making the adjustment.
2. Start adjustment at the leading end of the reel, followed by the trailing end. *The leading end of the reel blades is that end which passes over the bedknife first during normal reel rotation.*
3. Use adjusters **(B** and **C)**, to adjust gap. Rotate adjusters (Clockwise) to close gap. Each click of the adjuster moves the bedknife 0.001” (0.0025 cm) closer to the reel.
   a. Slide a feeler gauge or shim stock 0.001” - 0.003” (0.0025 - 0.0075 cm) between the reel blade and the bedknife. Do not turn the reel.
   b. Adjust the trailing end of the reel to the same gap in a similar manner then recheck the adjustment at the leading end.
   c. When the reel is properly adjusted to the bedknife, the reel will spin freely and you should be able to cut a piece of newspaper, along the full length of the reel, when the paper is held at 90° to the bedknife.

NOTICE

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

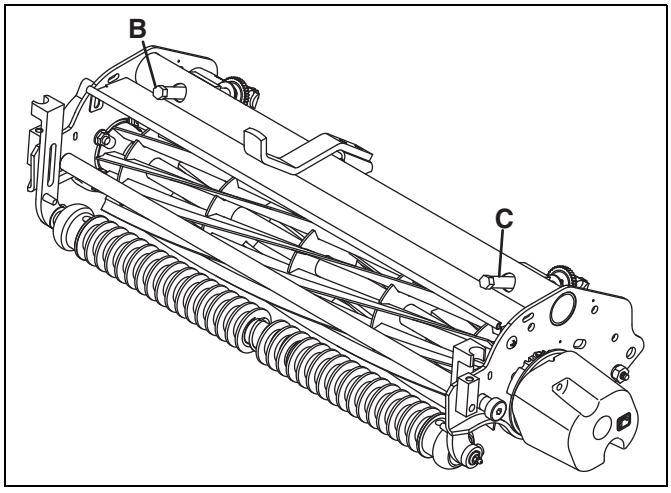


Figure 11C

11.4 CUTTING HEIGHT

Note: *Always make the reel to bedknife adjustment before adjusting height of cut. (Sections 11.2 and 11.3)*.

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

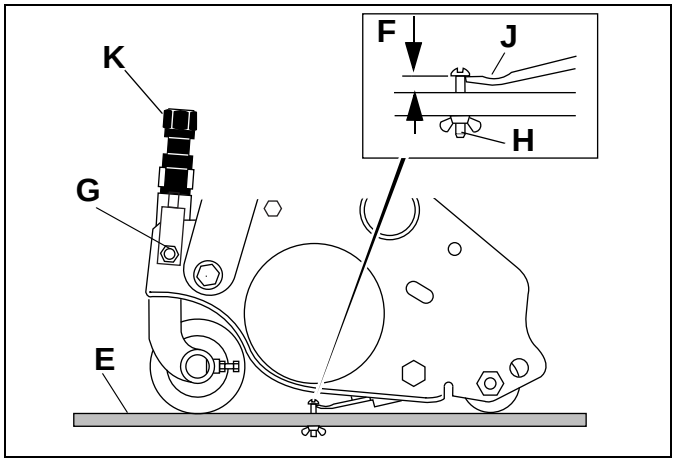


Figure 11D

11.5 REEL ASSEMBLY

1. Slide splined end of coupler **(AC)** onto reel shaft
2. Assemble o-ring **(AD)** onto motor adapter on reel.
3. Insert key **(AE)** into motor shaft.
4. Slide motor **(AF)** into coupler **(AC)**, and secure to reel using three 1/4-20 x 1-3/4" socket head screws **(AG)**. Torque hardware to 75 in. lbs. (8.5 Nm).
5. Assemble lift yoke **(AH)** to reel, using shoulder bolts **(AJ)** included with reel.
6. Start mower, and lower lift arms. Shut mower off.
7. Move reel into position, lift up on lift arms, and slide lift yoke shaft into lift pivot. Secure with lock pin **(AP)**, and assemble cap **(AR)**.
8. Route right front reel motor harnesses along lift yoke to lift arm. Open connector cover **(AU)** and assemble motor harness to mower harness. Check to be certain harness does not contact moving parts, and secure harness to lift arm using one cable tie **(AW)** and lift yoke using two cable ties **(AV)**.
9. Route left front reel motor harness along lift yoke and under lift arm. Open connector cover **(AU)** and assemble motor harness to mower harness. Check to be certain harness does not contact moving parts, and secure harness to lift arm using one cable tie **(AW)** and lift yoke using two cable ties **(AV)**.
10. Route center reel motor harness along lift yoke and under lift arm. Open connector cover **(AU)** and assemble motor harness to mower harness. Check to be certain harness does not contact moving parts, and secure harness to lift yoke using three cable ties **(AV)**.
11. Assemble harness clips **(AX)** onto back of connector assemblies and press clips into holes in lift arm bracketss.
12. Place grass catchers **(AS)** in place on all three reels.
13. **Center Reel Only:** Connect centering spring **(AT)** to pin on lift yoke.

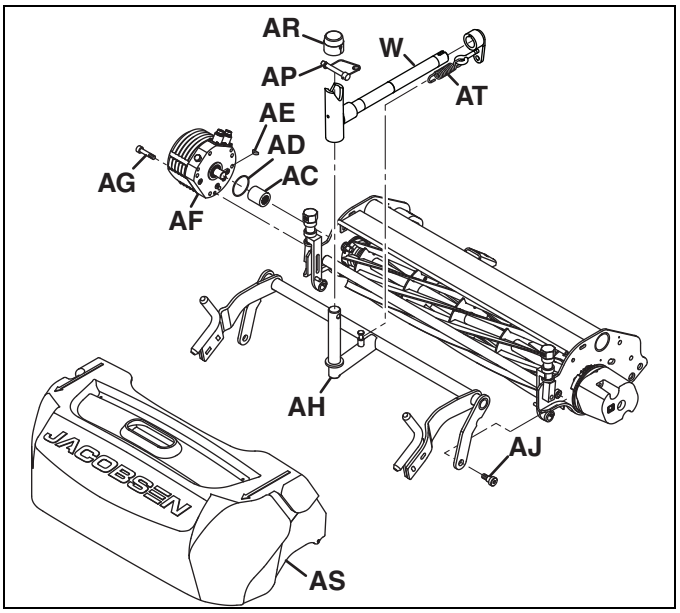


Figure 11J

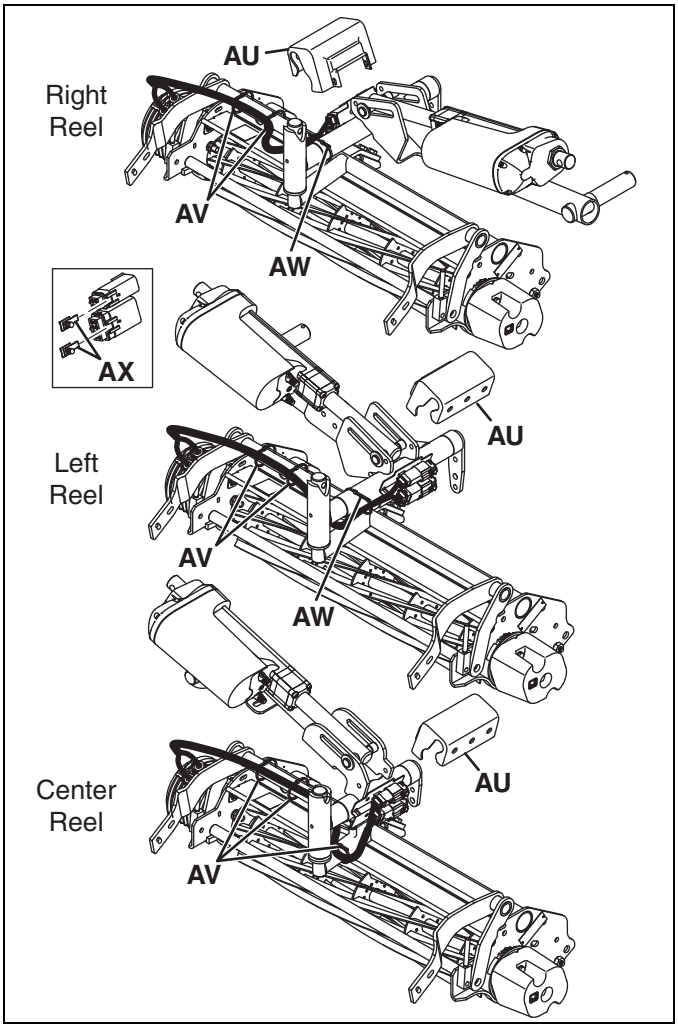


Figure 11K

11.6 REEL BEARING

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

1. Check bearing housing mounting hardware. Tighten or replace components as required. Carefully clean threads with degreaser.
2. Apply a medium strength grade of Loctite to nut **(P)**, then thread nut onto the reel shaft until the nut is 1-27/32” (4.6 cm) from the end of the reel shaft.
3. Fill reel bearing housings with NLGI - Grade O grease after adjusting spring.

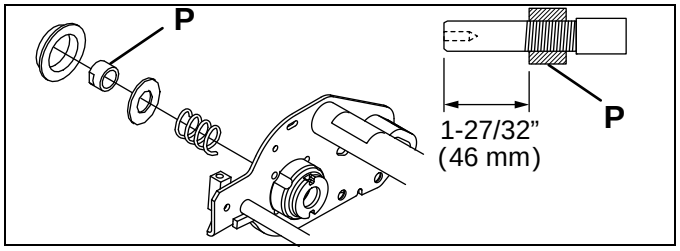


Figure 11L

11.7 REEL STABILIZER RODS

The reel stabilizer rods help keep the reels level when raising or lowering reels or making turns.

Pre-Adjustment

On the end of the reel stabilizer rod with the springs and lock collar, the adjustment is set at the factory, and should not need to be changed. To set adjustment after replacement of components, use the following procedure.

1. Lower reels to the ground, and disconnect pin **(T)**. from lift arm.
2. Measure distance from end of rod **(CA)** to face of collar **(CB)**. if required, loosen set screw **(CC)** and adjust position of collar to acheive a dimension of 5-1/4 in. (13.33 cm). Tighten set screw.
3. Measure distance from end of rod **(CA)** to face of nut **(CD)**. Adjust position of nut as required to acheive a dimension of 1/8 in. (0.32 cm).

Adjustment

1. Lower reels to one-touch position. Shut mower off.
2. Loosen hex nut **(S)**.
3. Turn stabilizer rod **(U)** in or out of connecting pin **(T)** as required until reel is leveled. Tighten hex nut **(S)**.
4. Repeat for remaining reels.

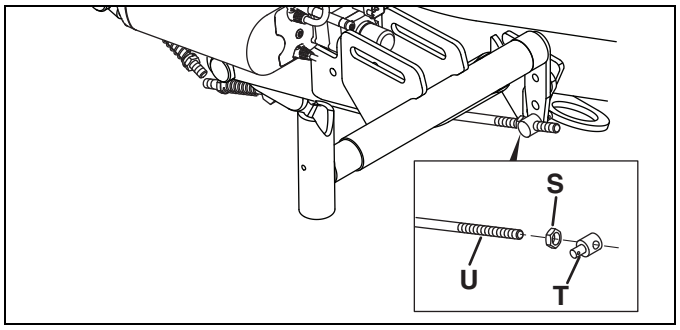


Figure 11N

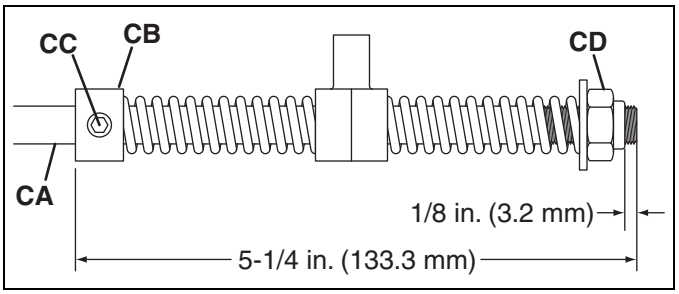


Figure 11M

11.8 BEDKNIFE ADJUSTER SPRING

For proper operation, bedknife adjuster spring should be compressed to a dimension of 1-7/16 - 1-1/2 in. (3.65-3.8 cm).

To adjust spring compression, loosen or tighten nut **(R)** to obtain a distance of 1-7/16 - 1-1/2 in. (3.65-3.8 cm).

After adjusting spring, check reel to bedknife adjustment.

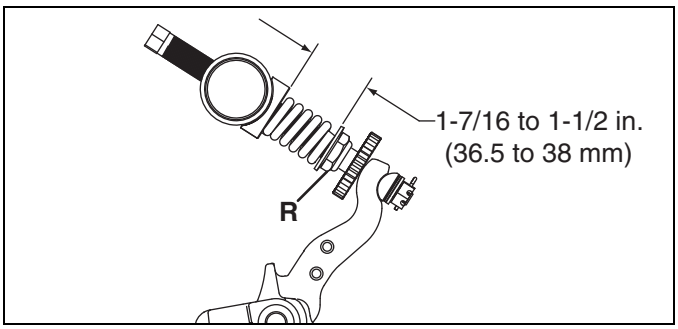


Figure 11O

11.9 BEDKNIFE ADJUSTER TENSION

NOTICE

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

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

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

After adjusting nut, check reel to bedknife adjustment.

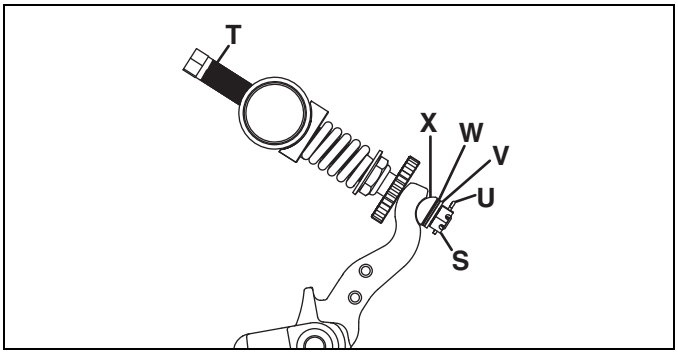


Figure 11P

11.10 GRINDING BEDKNIFE

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

1. Remove cotter pin **(U)**, slotted nut **(S)**, belleville washer **(V)**, shim washer **(W-If required)**, and half trunnion **(X)**. **See Figure 11P**
4. Press down on adjuster end of rod **(T)** to rotate other end of the adjuster out of the bedknife finger.
5. Rotate bedknife backing to access the reel and bedknife for grinding.
6. After grinding, assemble bedknife using reverse order of removal. Check adjustment of bedknife adjuster tension **(Section 11.9)**, and reel to bedknife adjustment **(Section 11.3)**.

11.11 STEERING CHAIN TENSION

1. Loosen hardware **(Y)**.
2. Adjust steering motor position to obtain 1/16 to 1/4 in. (0.15 to 0.6 cm) deflection, with 2 to 10 lb. (9 to 45 N) push at mid span of chain.

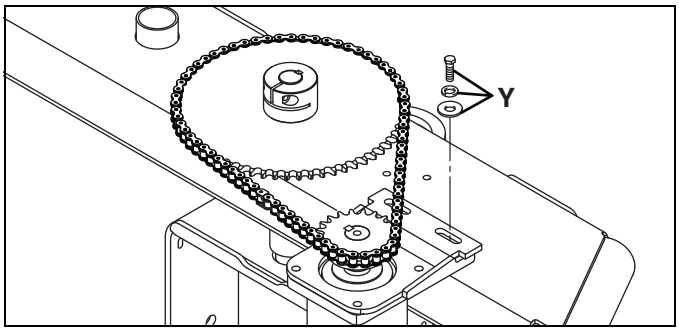


Figure 11J

11.12 ARMREST HEIGHT ADJUSTMENT

The armrest has three available height settings for operator convenience. To adjust armrest height:

1. Shut mower off and remove key.
2. Remove three bolts **(V)** from bracket on right side of seat.
3. Raise or lower armrest as needed until another set of holes in armrest bracket line up with seat bracket. Assemble hardware **(V)**.
4. After adjusting height, check three armrest wire harness connectors for a tight connection to main harness.

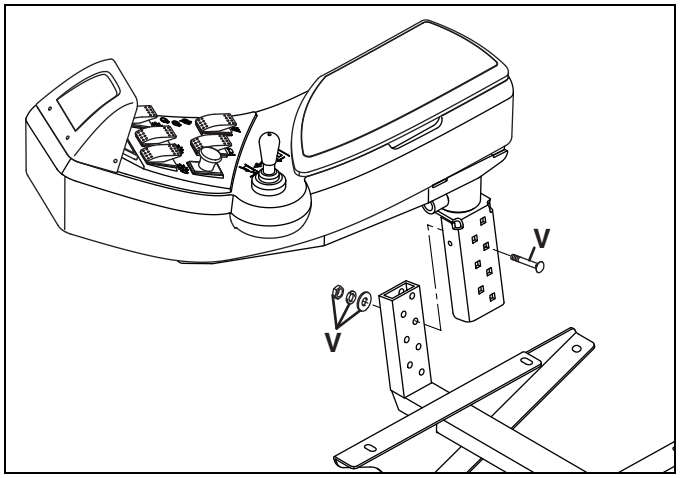


Figure 11K

11.13 ARMREST PIVOT

1. Tighten or loosen pivot plunger **(W)** as required so plunger button stops the armrest at both ends of armrest pivot slots, and plunger body does not contact armrest pivot. Do not use plunger to increase pivot tension.
2. Adjust hardware **(X)** as required to obtain 2 to 6 lbs (9 to 26.7 N) of force required, at visor end of armrest, to pivot armrest. Do not overtighten pivot hardware or leave too loose.

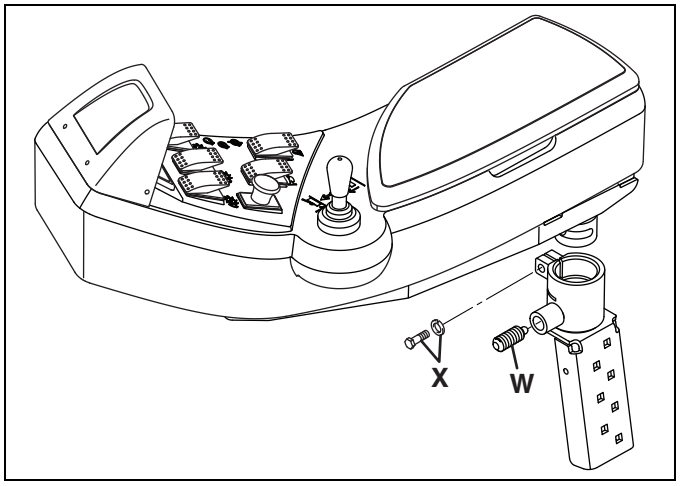


Figure 11L

11.14 GRASS CATCHER YOKE ADJUSTMENT

1. Loosen hardware **(AT)**.
2. Adjust yoke **(AU)** as required so lip of grass catcher is resting on reel crossbar **(AV)**.
3. Tighten hardware **(AT)**.

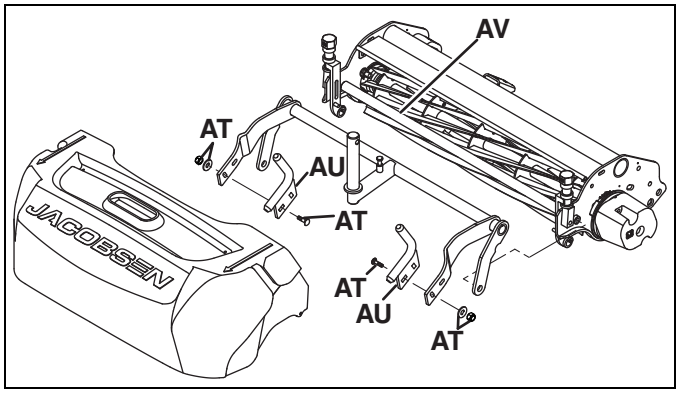


Figure 11M

11.15 HOOD STOPS

1. Adjust position of hood stop bumpers **(Z)** as required so hood contacts bumpers with approximately 1/8 in. (0.3 cm) clearance between hood and cowlings.
2. Adjust left and right side bumpers as required so hood is level.
3. Test operation of hood latch. Hood latch must be able to latch hood.

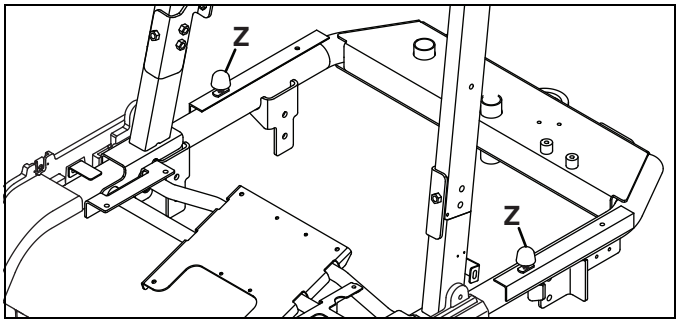


Figure 11N

11.16 LIFT STOPS

If the lift actuators make a ratcheting sound when being raised, lift stop adjustment may be required. Lift stops must be adjusted with lift system in Mow Mode. Refer to **Safety & Operation manual, Section 4.9**.

1. Loosen left and right reel stop hardware **(AA)**.
2. Start mower, turn mow switch on, and fully raise reels. Shut off mower.
3. Adjust left reel stop bracket **(AB)** so reel stop pin **(AC)** is resting in bracket slot. Tighten hardware **(AA)**. If additional adjustment is needed, adjust position of stop pin **(AC)**.
4. Repeat for right reel stop bracket.
5. Loosen hardware **(AD)**. Adjust left reel bumper and bracket **(AE)** to contact left reel in fully raised position.
6. Repeat bumper adjustment for right reel bumper.
7. Loosen hardware **(AF)**. Adjust left side bumper **(AG)** to contact center reel in fully raised position. Hardware **(AF)** is located on battery tray on battery power modules and buffer battery tray on hybrid power modules.
8. Loosen hardware **(AJ)**. Adjust right side center reel bumper **(AH)** to contact center reel. Adjust center bumper **(AK)** if required.

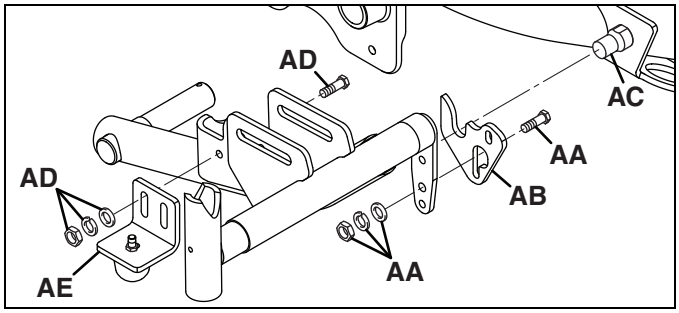


Figure 11O

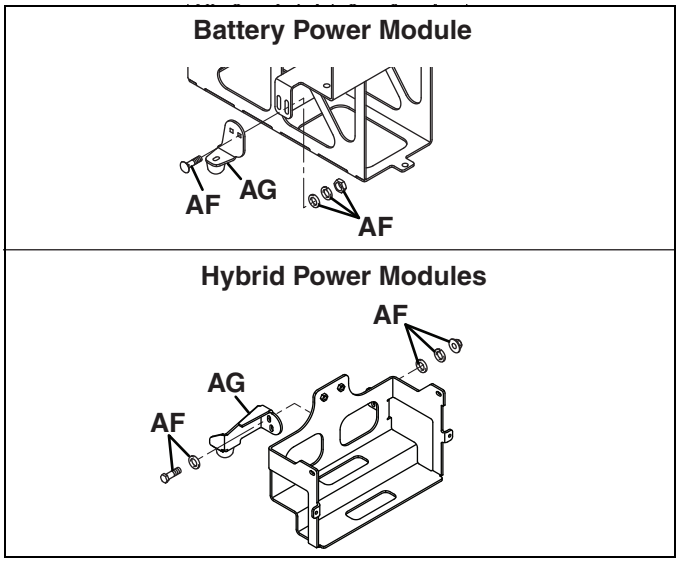


Figure 11P

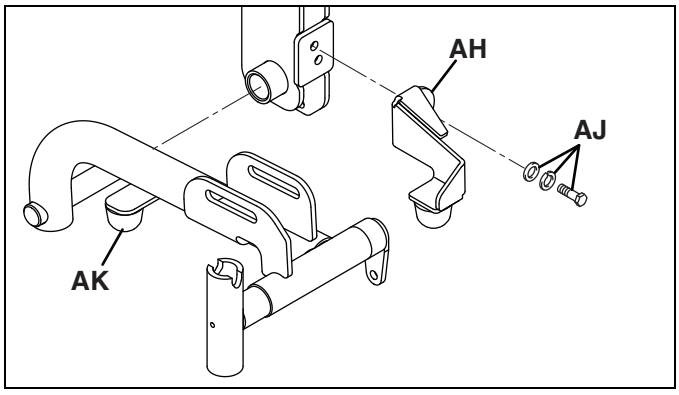


Figure 11P

11.17 DIESEL ENGINE ALTERNATOR BELT

1. Inspect and adjust new alternator belt after the first 10 hours of operation. Check and adjust every 100 hours thereafter.
2. Adjust the alternator pulley so the belt deflects 9/32 to 11/32 in. (0.7 - 0.9 cm) with 22 lbs. (10 kg) push at midpoint between pulleys. Refer to your engine manual.
3. To adjust, loosen alternator mounting bolts **(AL)**, and adjust alternator until the proper belt tension is achieved.

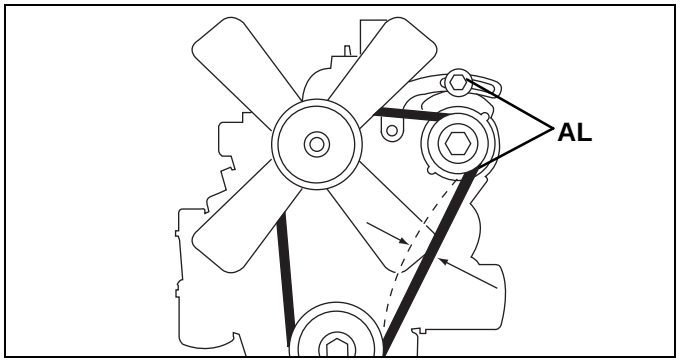


Figure 11R

11.18 HEADLIGHT ADJUSTMENT

Headlight has four adjustment positions to change distance head light beam lights up. To Adjust headlight:

1. Remove access plug **(AM)** from left side of steering column.
2. Raise or lower adjustment tab **(AN)** until headlight latches in desired detent position.
3. Insert access plug.

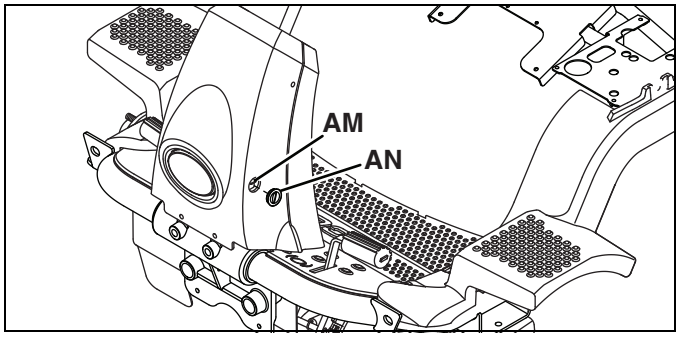


Figure 11S

11.19 TRACTION PEDAL ADJUSTMENT

Check traction pedal adjustment if mower is not maintaining correct speeds.

1. Obtain optional pedal test connector **(AS)** (Part Number 4225240). Connect test connector to main harness and traction pedal.
2. Turn mow switch to RUN position. Do not start mower.
3. Measure voltage using White and Black wires on test connector **(AS)**. If test connector is not used, measure directly at Orange and Black wires in pedal connector, pins 2 and 3.
4. Press pedal for full forward movement. If voltage reading is between 3.8 and 4.8, no adjustment is needed.
5. If voltage is below 3.8 volts, loosen jam nut and turn stop screw **(AP)** clockwise, until correct reading is obtained. Tighten jam nut.
6. If voltage is above 4.8 volts, loosen jam nut and turn stop screw **(AP)** counter-clockwise, until correct reading is obtained. Tighten jam nut.
7. Repeat steps 4, 5, and 6 for reverse pedal movement, adjusting stop screw **(AR)**.
8. Remove test connector **(AS)**.

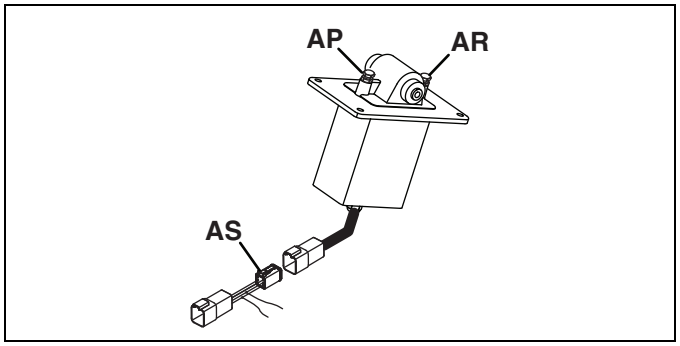


Figure 11T

11.20 STEERING PROXIMITY SWITCHES

Only used on 2WD mowers with the following serial numbers:

6280101601~6280102499
6280301601~6280302499
6280501601~6280502499
6282501601~6282502499

1. Clean any dirt or debris off sensing portion of steering proximity switches.
2. Adjust steering proximity switches **(AD)** so orange sensing portion is flush with the face of the mounting bracket. Tighten both jam nuts on back of switch.

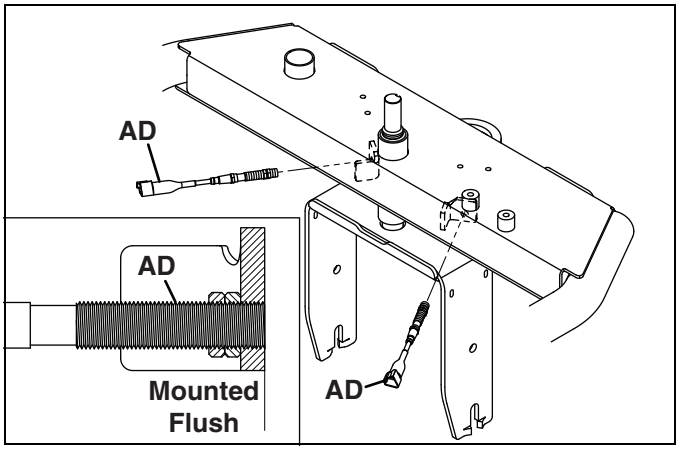


Figure 11U

11.21 STEERING SENSOR ADJUSTMENT (3WD UNITS)

Used on all 3WD units, and 2WD units with the following serial numbers.

6280102500 and Up
6280302500 and Up
6280502500 and Up
6282502500 and Up

1. Open hood and remove controller cover.
2. Loosen controller brace hardware **(ZA)**.
3. Adjust position of controller brace **(ZD)** as required to allow an air gap of 1/8 to 3/16 in. (0.32 to 0.48 cm) between magnetic portion of sensor **(ZB)** and sensor body **(ZC)**. Torque hardware **(ZA)** to 53 in. lb. (6 Nm).

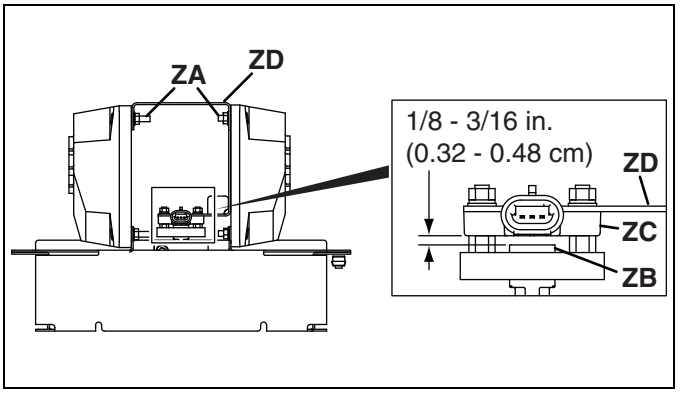


Figure 11V

11.22 DIESEL THROTTLE ACTUATOR ADJUSTMENT

1. Open hood.
2. With mower off, and actuator fully retracted, loosen jam nuts **(AW)** and move engine throttle lever as required so engine throttle lever is resting against low idle stop and actuator against its internal stop. Tighten jam nuts **(AW)**.
3. Manually pull actuator linkage towards generator. Engine throttle lever should contact full throttle stop.

NOTICE

Improper adjustment of the throttle adjustment can result in generator output voltage that exceeds the system limits and may result in damage to mower components.

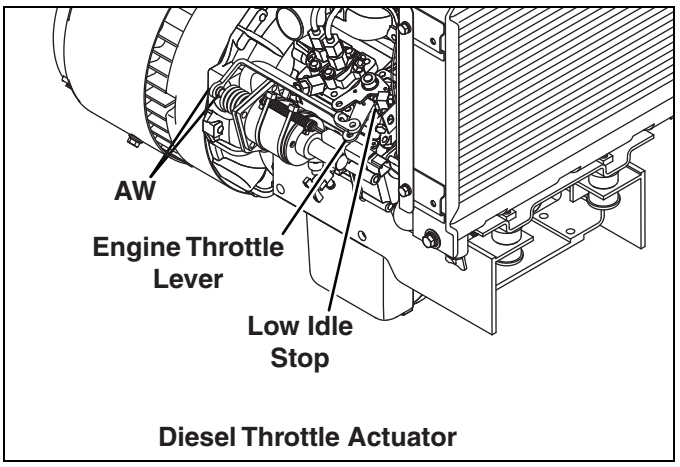


Figure 11W

11.23 GAS THROTTLE ACTUATOR ADJUSTMENT

1. Open hood.
2. With mower off, remove air filter cover **(BD)**, element **(BE)**, and base housing **(BF)** from engine.

NOTICE

To prevent hardware from dropping into intake manifold, close choke plate before removing air filter base.

NOTICE

To prevent serious engine damage, never operate the engine with the air filter removed.

3. Disconnect spring **(AY)** from spring clip **(AZ)** at the carburetor.
4. Unlatch the spring clip **(AZ)** from throttle linkage **(BA)** by rotating upwards. Remove engine throttle linkage from throttle lever **(BB)**.
5. Loosen jam nut **(AW)** on the actuator.
6. Disconnect engine throttle linkage **(BA)** and spring **(AY)** from throttle link **(AX)**.
7. Insert the throttle linkage **(BA)** into the engine side throttle bushing, but do not attach the spring clip.
8. Pull the linkage away from the engine so throttle lever **(BB)** is against the idle stop **(BC)**.
9. With engine throttle linkage in low idle position (against stop **(BC)**) and actuator fully retracted (against internal stop), loosen nut **(AW)** and turn throttle link **(AX)** as required so hole in throttle link **(AX)** visually aligns with throttle linkage **(BA)**. TIghten nut **(AW)**.
10. Remove throttle linkage **(BA)** from lever **(BB)**.
11. Connect throttle linkage **(BA)** and spring **(AY)** to throttle link **(AX)**.
12. Insert throttle linkage **(BA)** in throttle lever **(BB)**. Secure by rotating spring clip **(AZ)** down and latching onto linkage. Connect spring **(AY)** to spring clip **(AZ)**.
13. Check that throttle lever **(BB)** is still against stop **(BC)** and actuator is fully retracted.
14. Manually pull actuator linkage towards engine. Throttle lever should contact full throttle stop.

NOTICE

Improper adjustment of the throttle actuator can result in generator output voltage that exceeds the system limits and may result in damage to mower components.

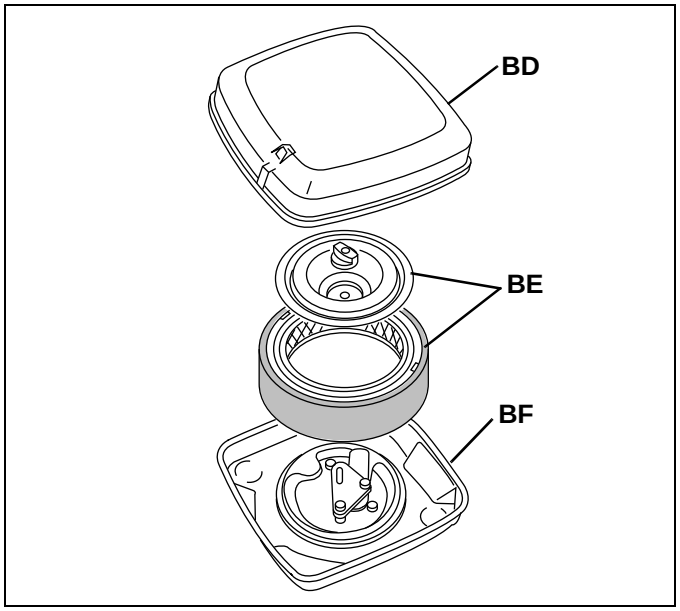


Figure 11X

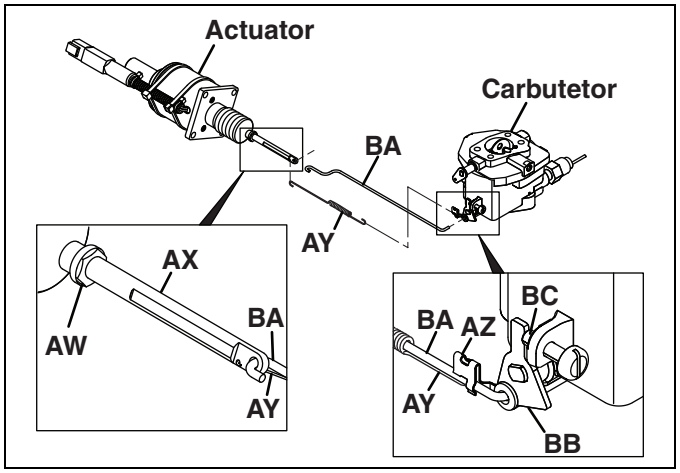


Figure 11Y

11.24 TORQUE SPECIFICATION

NOTICE

All torque values included in these charts are approximate and are for reference only. Use of these torque values is at your sole risk. Jacobsen is not responsible for any loss, claim, or damage arising from the use of these charts.
Extreme caution should always be used when using any torque value.

Jacobsen uses Grade 5 Plated bolts as standard unless otherwise noted. For tightening plated bolts use the value given for lubricated.

AMERICAN NATIONAL STANDARD FASTENERS

SIZE	UNITS	GRADE 5		GRADE 8		SIZE	UNITS	GRADE 5		GRADE 8	
		Lubricated	Dry	Lubricated	Dry			Lubri-cated	Dry	Lubri-cated	Dry
#6-32	in-lb (Nm)	–	20 (2.3)	–	–	7/16-14	ft-lb (Nm)	37 (50.1)	50 (67.8)	53 (71.8)	70 (94.9)
#8-32	in-lb (Nm)	–	24 (2.7)	–	30 (3.4)	7/16-20	ft-lb (Nm)	42 (56.9)	55 (74.6)	59 (80.0)	78 (105)
#10-24	in-lb (Nm)	–	35 (4.0)	–	45 (5.1)	1/2-13	ft-lb (Nm)	57 (77.2)	75 (101)	80 (108)	107 (145)
#10-32	in-lb (Nm)	–	40 (4.5)	–	50 (5.7)	1/2-20	ft-lb (Nm)	64 (86.7)	85 (115)	90 (122)	120 (162)
#12-24	in-lb (Nm)	–	50 (5.7)	–	65 (7.3)	9/16-12	ft-lb (Nm)	82 (111)	109 (148)	115 (156)	154 (209)
1/4-20	in-lb (Nm)	75 (8.4)	100 (11.3)	107 (12.1)	143 (16.1)	9/16-18	ft-lb (Nm)	92 (124)	122 (165)	129 (174)	172 (233)
1/4-28	in-lb (Nm)	85 (9.6)	115 (13.0)	120 (13.5)	163 (18.4)	5/8-11	ft-lb (Nm)	113 (153)	151 (204)	159 (215)	211 (286)
5/16-18	in-lb (Nm)	157 (17.7)	210 (23.7)	220 (24.8)	305 (34.4)	5/8-18	ft-lb (Nm)	128 (173)	170 (230)	180 (244)	240 (325)
5/16-24	in-lb (Nm)	173 (19.5)	230 (26.0)	245 (27.6)	325 (36.7)	3/4-10	ft-lb (Nm)	200 (271)	266 (360)	282 (382)	376 (509)
3/8-16	ft-lb (Nm)	23 (31.1)	31 (42.0)	32 (43.3)	44 (59.6)	3/4-16	ft-lb (Nm)	223 (302)	298 404	315 (427)	420 (569)
3/8-24	ft-lb (Nm)	26 (35.2)	35 (47.4)	37 (50.1)	50 (67.8)	7/8-14	ft-lb (Nm)	355 (481)	473 (641)	500 (678)	668 (905)

METRIC FASTENERS

SIZE	UNITS	4.6		8.8		10.9		12.9		Non Critical Fasteners into Aluminum
		Lubricated	Dry	Lubricated	Dry	Lubricated	Dry	Lubricated	Dry	
M4	Nm (in-lb)	–	–	–	–	–	–	3.83 (34)	5.11 (45)	2.0 (18)
M5	Nm (in-lb)	1.80 (16)	2.40 (21)	4.63 (41)	6.18 (54)	6.63 (59)	8.84 (78)	7.75 (68)	10.3 (910	4.0 (35)
M6	Nm (in-lb)	3.05 (27)	4.07 (36)	7.87 (69)	10.5 (93)	11.3 (102)	15.0 (133)	13.2 (117)	17.6 (156)	6.8 (60)
M8	Nm (in-lb)	7.41 (65)	9.98 (88)	19.1 (69)	25.5 (226)	27.3 (241)	36.5 (323)	32.0 (283)	42.6 (377)	17.0 (150)
M10	Nm (ft-lb)	14.7 (11)	19.6 (14)	37.8 (29)	50.5 (37)	54.1 (40)	72.2 (53)	63.3 (46)	84.4 (62)	33.9 (25)
M12	Nm (ft-lb)	25.6 (19)	34.1 (25)	66.0 (48)	88.0 (65)	94.5 (70)	125 (92)	110 (81)	147 (108)	61.0 (45)
M14	Nm (ft-lb)	40.8 (30)	54.3 (40)	105 (77)	140 (103)	150 (110)	200 (147)	175 (129)	234 (172)	94.9 (70)

11.25 SPECIFIC TORQUE

Rear Axle Shaft.....150 ft. lbs. (203 Nm)
Tire Lug Nuts.....85-95 ft. lbs (115-128 Nm)
T890 Battery Posts.....95-120 in. lbs. (10.7-13.5 Nm)
12 Volt Battery Posts.....80 in. lbs. (9 Nm)

12 LDU ERROR CODES

12.1 GENERAL INFORMATION

When the Eclipse mower encounters an error or fault in one of the controllers, an error code will display on the LDU, and certain machine functions may shut down.

Record any error codes that appear on the LDU, and notify maintenance at the end of the day.

Refer to the following list for LDU error codes and machine functions.

12.2 SYSTEM ERROR CODES

LDU Error Message	Error Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
OIL PRESSURE ALARM	Engine oil pressure low. Return mower to maintenance shed. Transport speed will be limited to 3 mph (4.8 kph).	✓		✓		✓			✓	✓	
TEMPERATURE HIGH ALARM	Diesel engine coolant above 230°vF. (110° C). Return mower to maintenance shed. Transport speed will be limited to 3 mph (4.8 kph).	✓		✓		✓			✓	✓	
12 VOLT SYSTEM LOW	12 VDC system below 12.5 VDC. Return mower to maintenance shed.	✓		✓			✓		✓		✓
48 VOLT SYSTEM LOW	System voltage drops below 43 VDC for 10 seconds or more. Return mower to maintenance shed. Transport speed will be limited to 4 mph (6.4 kph).	✓		✓			✓		✓	✓	
48 VOLT SYSTEM HIGH	System voltage above 60 VDC. Return mower to maintenance shed. Transport speed will be limited to 3 mph (4.8 kph).	✓		✓		✓			✓	✓	
LOW FUEL WARNING	Fuel level in tank is low. Less than 2 qts (1.9 l) fuel remaining in tank. Return to fueling area. Do not allow tank to completely empty.	✓		✓			✓		✓		✓

12.3 REEL CONTROL UNIT ERROR CODES

RCU error codes are displayed on the LDU as a message.

LDU Error Message	Error Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
LEFT REEL TEMPERATURE	Left Reel Motor Temperature above 266° F (130° C).	✓		✓			✓		✓		✓
CENTER REEL TEMPERATURE	Center Reel Motor Temperature above 266° F (130° C).	✓		✓			✓		✓		✓
RIGHT REEL TEMPERATURE	Right Reel Motor Temperature above above 266° F (130° C).	✓		✓			✓		✓		✓
LEFT REEL FAULT	Left Reel Motor Short Circuit. Shut mower off, and remove key. Check reel for blockage. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓	✓●	
CENTER REEL FAULT	Center Reel Motor Short Circuit. Shut mower off, and remove key. Check reel for blockage. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓	✓●	
RIGHT REEL FAULT	Right Reel Motor Short Circuit. Shut mower off, and remove key. Check reel for blockage. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓	✓●	
LEFT REEL OVERCURRENT	Left Reel Motor current over 35 Amps for 30 seconds. Shut mower off, and remove key. Check reel for blockage. Restart mower. If fault returns, return mower to maintenance shed. Excessive grass height being mowed.	✓		✓			✓		✓	✓●	
CENTER REEL OVERCURRENT	Center Reel Motor current over 35 Amps for 30 seconds. Shut mower off, and remove key. Check reel for blockage. Restart mower. If fault returns, return mower to maintenance shed. Excessive grass height being mowed.	✓		✓			✓		✓	✓●	
	● If fault returns after shutting down and restarting mower, mowing can continue with other reels if reel enable switch for indicated reel is turned OFF.										

12 LDU ERROR CODES

LDU Error Message	Error Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
RIGHT REEL OVERCURRENT	Right Reel Motor current over 35 Amps for 30 seconds. Shut mower off, and remove key. Check reel for blockage. Restart mower. If fault returns, return mower to maintenance shed. Excessive grass height being mowed.	✓		✓			✓		✓	✓●	
LEFT REEL VOLTS LOW	Left Reel Motor fuse blown. Return mower to maintenance shed. Check 150 amp fuse in PDU.	✓		✓			✓		✓	✓	
CENTER REEL VOLTS LOW	Center Reel Motor fuse blown. Return mower to maintenance shed. Check 150 amp fuse in PDU.	✓		✓			✓		✓	✓	
RIGHT REEL VOLTS LOW	Right Reel Motor fuse blown. Return mower to maintenance shed. Check 150 amp fuse in PDU.	✓		✓			✓		✓	✓	
CHECK LEFT REEL	Left Reel Motor RPM is not within the range of the set point. Shut mower off, and remove key. Check reel for blockage. Restart mower. If fault returns, return mower to maintenance shed. Excessive grass height being mowed.	✓		✓			✓		✓	✓	
CHECK CENTER REEL	Center Reel Motor RPM is not within the range of the set point. Shut mower off, and remove key. Check reel for blockage. Restart mower. If fault returns, return mower to maintenance shed. Excessive grass height being mowed.	✓		✓			✓		✓	✓	
CHECK RIGHT REEL	Right Reel Motor RPM is not within the range of the set point. Shut mower off, and remove key. Check reel for blockage. Restart mower. If fault returns, return mower to maintenance shed. Excessive grass height being mowed.	✓		✓			✓		✓	✓	
L ACTUATOR OVERCURRENT	Left Actuator Overcurrent. Shut mower off, and remove key. Check grass catcher for excessive weight. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓	✓●	
	● If fault returns after shutting down and restarting mower, mowing can continue with other reels if reel enable switch for indicated reel is turned OFF.										

LDU Error Message	Error Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
C ACTUATOR OVERCURRENT	Center Actuator Overcurrent. Shut mower off, and remove key. Check grass catcher for excessive weight. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓	✓●	
R ACTUATOR OVERCURRENT	Right Actuator Overcurrent. Shut mower off, and remove key. Check grass catcher for excessive weight. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓	✓●	
L ACTUATOR FAULT	Left Actuator or wiring Short Circuit. Shut off mower and remove key. Check both actuator connectors for a tight connection. Check visible portion of wire harness for damage. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓	✓	
C ACTUATOR FAULT	Center Actuator or wiring Short Circuit. Shut off mower and remove key. Check both actuator connectors for a tight connection. Check visible portion of wire harness for damage. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓	✓	
R ACTUATOR FAULT	Right Actuator or wiring Short Circuit. Shut off mower and remove key. Check both actuator connectors for a tight connection. Check visible portion of wire harness for damage. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓	✓	
CHECK LEFT ACTUATOR	Left actuator did not reach position within 6 seconds. Shut mower off, and remove key. Check grass catcher for excessive weight. Restart mower. If fault returns, return mower to maintenance shed.	✓			✓		✓		✓		✓
CHECK CENTER ACTUATOR	Center actuator did not reach position within 6 seconds. Shut mower off, and remove key. Check grass catcher for excessive weight. Restart mower. If fault returns, return mower to maintenance shed.	✓			✓		✓		✓		✓
	● If fault returns after shutting down and restarting mower, mowing can continue with other reels if reel enable switch for indicated reel is turned OFF.										

LDU Error Message	Error Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
CHECK RIGHT ACTUATOR	Right actuator did not reach position within 6 seconds. Shut mower off, and remove key. Check grass catcher for excessive weight. Restart mower. If fault returns, return mower to maintenance shed.	✓			✓		✓		✓		✓

12.4 TRACTION & STEERING CONTROLLER ERROR CODES

Traction and steering controller error/fault codes display on the LDU as a four digit error code.

LDU Error Code	Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
TRACTION FAULT 2310	Software detected short circuit in controller, cabling to motor or in motor. Measured current is 50% above the 2 min., rating current. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 2310		✓		✓			✓	✓			✓
3WD TRACTION FAULT 2310		✓		✓			✓	✓			✓
TRACTION FAULT 2340	Hardware detected short circuit in controller, cabling to motor or in motor. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 2340		✓		✓			✓	✓			✓
3WD TRACTION FAULT 2340		✓		✓			✓	✓			✓
TRACTION FAULT 3120	The DC Bus charging is not finished within 10 seconds. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 3120		✓		✓			✓	✓			✓
3WD TRACTION FAULT 3120		✓		✓			✓	✓			✓

LDU Error Code	Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
TRACTION FAULT 3211	DC Voltage is above the High Trip level. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 3211		✓		✓			✓	✓			✓
3WD TRACTION FAULT 3211		✓		✓			✓	✓			✓
TRACTION FAULT 3212	DC Voltage is above the hardware defined trip level. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 3212		✓		✓			✓	✓			✓
3WD TRACTION FAULT 3212		✓		✓			✓	✓			✓
TRACTION FAULT 3221	DC Bus voltage is below the Low Trip Level. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 3221		✓		✓			✓	✓			✓
3WD TRACTION FAULT 3221		✓		✓			✓	✓			✓
TRACTION FAULT 4210	Motor temperature is above 356° F (180° C). Shut mower off and wait ten minutes. Restart mower. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 4210		✓		✓			✓	✓			✓
3WD TRACTION FAULT 4210		✓		✓			✓	✓			✓
TRACTION FAULT 4310	Heatsink temperature is above 185° F (85° C). Shut mower off and wait ten minutes. Restart mower. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 4310		✓		✓			✓	✓			✓
3WD TRACTION FAULT 4310		✓		✓			✓	✓			✓

12 LDU ERROR CODES

LDU Error Code	Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
TRACTION FAULT 5111	15 V Supply voltage on the DSP board is too low. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 5111		✓		✓			✓	✓			✓
3WD TRACTION FAULT 5111		✓		✓			✓	✓			✓
TRACTION FAULT 5113	5V Supply voltage on the DSP board is too high or too low. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 5113		✓		✓			✓	✓			✓
3WD TRACTION FAULT 5113		✓		✓			✓	✓			✓
TRACTION FAULT 5210	The offset in the current measurement is too high. The offset is adjusted during power-up of the drive. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 5210		✓		✓			✓	✓			✓
3WD TRACTION FAULT 5210		✓		✓			✓	✓			✓
TRACTION FAULT 5410	Current is above the error limit. Open drain outputs disabled and drive is tripped. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 5410		✓		✓			✓	✓			✓
3WD TRACTION FAULT 5410		✓		✓			✓	✓			✓
TRACTION FAULT 6210	Direction Error. Traction fault: Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed. Steering fault: Shut mower off. Check steering proximity switches for debris or obstruction. Restart mower. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 6210		✓		✓			✓	✓			✓

LDU Error Code	Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
TRACTION FAULT 6211	Throttle Sensor Error. Shut mower off, then restart, making certain traction pedal is in neutral. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 6211		✓		✓			✓	✓			✓
TRACTION FAULT 6212	Reverse Alarm Test Failed. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 6212		✓		✓			✓	✓			✓
TRACTION FAULT 6213	Mechanical Brake Test failed. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 6213		✓		✓			✓	✓			✓
TRACTION FAULT 6214	Brake sensor error. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 6214		✓		✓			✓	✓			✓
STEERING FAULT 7310	Speed Sensor feedback error. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 7320	Center switch has not reached cam end within 6 seconds. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 7321	The position error during the calibration is greater than the error window. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 7322	wheel angle and cam center switch signal are not synchronized. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓

12 LDU ERROR CODES

LDU Error Code	Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
STEERING FAULT 7380	Reference generator not connected or short circuited. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 8010	Difference between set value and actual value for current regulator are above limit. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 8020	Difference between set value and actual value for position regulator are above limit. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 8030	One or more of the motor cables are not connected. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 8040	8040 Difference between set value and actual value for speed regulator are above limit. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 8050	8050 The estimated speed is above limit. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
TRACTION FAULT 8100	Controller has not received an expected CANopen message within the time out time. Shut mower off, then restart. If fault returns, mower must be towed back to maintenance shed.	✓		✓			✓	✓			✓
STEERING FAULT 8100		✓		✓			✓	✓			✓
3WD TRACTION FAULT 8100		✓		✓			✓	✓			✓

12.5 OVER-VOLTAGE LIMIT CONTROLLER ERROR CODES

Only used on 2WD mowers with the following serial numbers:

6280101601~6280102499
6280301601~6280302499
6280501601~6280502499
6282501601~6282502499

LDU Error Code	Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
OLM WARNING 05	OLM internal temperature high. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 11	OLM detects a short circuit to ground in resistor 1. Resistor is no longer operable. Check wiring and/or resistor. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 12	OLM detects no current through resistor 1. Check wiring/resistor and resistor bank ground connection. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 13	OLM detects less current than expected through resistor 1. Inspect wiring and connectors. Resistor may be degraded. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 21	OLM detects a short circuit to ground in resistor 2. Resistor is no longer operable. Check wiring and/or resistor. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 22	OLM detects no current through resistor 2. Check wiring/resistor and resistor bank ground connection. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓

12 LDU ERROR CODES

LDU Error Code	Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
OLM WARNING 23	OLM detects less current than expected through resistor 2. Inspect wiring and connectors. Resistor may be degraded. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 31	OLM detects a short circuit to ground in resistor 3. Resistor is no longer operable. Check wiring and/or resistor. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 32	OLM detects no current through resistor 3. Check wiring/resistor and resistor bank ground connection. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 33	OLM detects less current than expected through resistor 3. Inspect wiring and connectors. Resistor may be degraded. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 41	OLM detects a short circuit to ground in resistor 4. Resistor is no longer operable. Check wiring and/or resistor. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 42	OLM detects no current through resistor 4. Check wiring/resistor and resistor bank ground connection. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
OLM WARNING 43	OLM detects less current than expected through resistor 4. Inspect wiring and connectors. Resistor may be degraded. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓

12.6 HYBRID ENGINE CONTROLLER ERROR CODES

Hybrid engine controller error/fault codes display on the LDU as a two digit error code.

LDU Error Code	Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
GENERATOR FAULT 14	Pack Voltage too high. Engine speed is set to idle. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
GENERATOR FAULT 15	Pack Voltage too low. Engine speed is set to idle. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
GENERATOR FAULT 21	Generator temperature greater than 266° F (130° C). Engine speed is set to idle. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
GENERATOR FAULT 22	Generator temperature greater than 212° F (100° C) or rectifier temperature greater than 176° F (80° C). Generator derates. Shut mower down and wait ten minutes. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓		✓
GENERATOR FAULT 23	Throttle actuator Fault. Engine speed is set to idle/spring return. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓		✓
GENERATOR FAULT 31	Rectifier temperature greater than 212° F (100° C) for 3 seconds. Generator derates. Restart mower. Continue with normal operation. Notify maintenance personnel at end of shift.	✓		✓			✓		✓		✓
GENERATOR FAULT 54	Pack voltage sensor greater than 70 VDC for 3 seconds. Engine shut down. Restart mower and return to maintenance shop	✓		✓		✓			✓		✓
GENERATOR FAULT 55	Pack voltage sensor 2VDC for 2 seconds. Engine speed set to idle.Return mower to maintenance shop.	✓		✓			✓		✓		✓

12 LDU ERROR CODES

LDU Error Code	Description	Caution LED		Alarm Sounding		Engine Stop		Traction Stop		Mow Stop	
		On	Off	Yes	No	Yes	No	Yes	No	Yes	No
GENERATOR FAULT 56	Generator temperature greater than 340° F (171° C). Engine speed is set to idle.Shut mower down and wait ten minutes. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓		✓
GENERATOR FAULT 57	Generator temperature less than -20° F (-29° C). Engine speed is set to idle. Allow engine to run until generator warms up.	✓		✓			✓		✓		✓
GENERATOR FAULT 58	Rectifier temperature greater than 340° F (171° C). Engine speed is set to idle.Shut mower down and wait ten minutes. Restart mower. If fault returns, return mower to maintenance shed.	✓		✓			✓		✓		✓
GENERATOR FAULT 59	Rectifier temperature less than -20° F (-29° C). Engine speed is set to idle. Allow engine to run until generator warms up.	✓		✓			✓		✓		✓
GENERATOR FAULT 88	Current sense fault. Current less than 20A when engine above 2900 rpm. Restart mower. Return to maintenance shed.	✓		✓			✓		✓		✓

13.1 TROUBLE SHOOTING

Problem	Possible Cause/Items to Check	Additional Items to Check
Key switch ON - No power to LDU	48VDC Battery or 48VDC Buffer Battery not connected or discharged.	Check battery connections and voltage.
	No 12V power to LDU. Overcurrent protection device in PDU may be tripped. Check for open connection or shorted wire to GND for LDU 48V power.	Cycle power once corrected.
Key switch ON - No power to MCU or RCU	Main Contactor not on due to circuit breaker tripped.	Check to see if circuit breaker 4 is tripped.
	Fault Code on LDU	Review any fault codes and take appropriate action.
	Overcurrent protection device in LDU tripped. Check for open connection or shorted wire to battery for main contactor coil power.	
Key switch START - Engine won't crank	Note: Only 1 start sequence per Ignition on is allowed. Must recycle keyswitch for another start sequence.	
	12VDC Battery not connected or discharged.	Check battery connections.
	Operator not on seat	Operator must be seated to start engine.
	Check MCU LED's #2 and #3 to see if they are on.	If not on check to see if circuit breaker 6 is tripped.
	Ensure a Genset program is selected. Check MCU LED #18 on for Gas, or #17 on for Diesel.	If neither are on check engine harness connections.
	Overcurrent protection device in LDU tripped. Check for open connection or shorted wire to battery for 12V contactor coil power.	Check that three armrest connectors for tight connection.
	Overcurrent protection device in MCU tripped. Check for open connection or shorted wire to GND for Start relay coil power.	
	No power to genset logic. Overcurrent protection device in PDU may be tripped. Check for open connection or shorted wire to GND for genset 12V power.	Cycle power once corrected.
	No power to starter from start relay contact. Overcurrent protection device in PDU may be tripped. Check for open connection or shorted wire to GND for Start relay output.	Cycle power once corrected.
	No 12V power to MCU. Overcurrent protection device in PDU may be tripped. Check for open connection or shorted wire to GND for MCU 12V power.	Cycle power once corrected.
	Fault Code on LDU	Review any fault codes and take appropriate action.
	No CAN communication.	Check that three armrest connectors for tight connection. Check to make sure CAN resistor terminator has tight connection

No Glowplug operation	Ensure Diesel Genset is selected. Check MCU LED #17 should be on.	Check engine harness connections.
	Check MCU LED #6 should be on when glowplugs should be on (i.e. Pre-glow, during cranking, and post-glow)	If not on check to see if circuit breaker 6 is tripped.
	Overcurrent protection device in MCU tripped. Check for open connection or shorted wire to GND for Glow Plug relay coil power.	
	No 12V power to MCU. Overcurrent protection device in PDU may be tripped. Check for open connection or shorted wire to GND for MCU 12V power.	Cycle power once corrected.
	Fault Code on LDU	Review any fault codes and take appropriate action.
	No CAN communication.	Check connections.
Engine cranks but won't start (Diesel)	Ensure Diesel Genset is selected. Check MCU LED #17 should be on.	Check harness connections.
	Check for Fuel Solenoid power. Check MCU LED #2 should be on.	If not on check to see if CB 6 is tripped
	Fault Code on LDU	Review any fault codes and take appropriate action.
	Check to see if Fuel Solenoid Pulls and Holds. Check MCU LED'S #4 for Pull on for 0.5 sec then #5 on for Hold.	Overcurrent protection device in MCU tripped. Check for open connection or shorted wire to GND for Pull and Hold solenoids power.
	No 12V power to MCU. Overcurrent protection device in PDU may be tripped. Check for open connection or shorted wire to GND for MCU 12V power.	Cycle power once corrected.
Engine cranks but won't start (Gas)	Ensure Gas Genset is selected. Check MCU LED #18 should be on.	Check engine harness connection.
No Traction Movement	Ensure Machine was started. Check LDU Green Lightning Bolt for steady on.	If flashing initiate start sequence.
	Fault Code on LDU	Review any fault codes and take appropriate action.
	Traction Contactor is off. Check MCU LED # 8 should be on when contactor is on. If off see next item.	Overcurrent protection device in MCU tripped. Check for open connection or shorted wire to battery for traction contactor power.
	Check if Seat Switch is functioning. Check MCU LED #24 should be on when on seat and off when off seat.	Check switch and harness connection.
	No CAN communication.	Check connections.
	Automatic Parking Brake not releasing	Manually release parking brake, then remove release screws. Cycle power.
	Overcurrent protection device in PDU tripped. Check for open connection or shorted wire to GND for throttle pedal power, TCU logic power, and park brake power.	Cycle power once corrected.
	Overcurrent protection device in MCU tripped. Check for open connection or shorted wire to battery for traction contactor coil power.	

No steering (Electric steering system)	Check if Seat Switch is functioning. Check MCU LED #24 should be on when on seat and off when off seat.	Check switch and harness connection.
	SCU does not have power.	Check to see if circuit breaker 5 is tripped.
	Fault Code on LDU	Review any fault codes and take appropriate action.
	Overcurrent protection device in PDU tripped. Check for open connection or shorted wire to GND for SCU logic power.	Cycle power once corrected.
	Proximity switches dirty.	Clean all dirt or debris from proximity switch. Check for obstructions that may interfere with switch operations.
Manual Actuator Mode not working	Park brake off. Check LDU Park Brake LED should be on.	Cycle power.
	No CAN communication.	Check connections.
	Fault Code on LDU	Review any fault codes and take appropriate action.
	Mow switch is in ON position.	Ensure Mow switch is in OFF position.
One or more reel motors won't run	Mow switch is in OFF position.	Ensure Mow switch is in ON position.
	Reel enable switches are in OFF position.	Ensure to enable reels.
	Machine not moving. (applicable if FOC is not zero)	Reel motors should come on when machine starts moving forward.
	Fault Code on LDU	Review any fault codes and take appropriate action.
	No power to reels. When actuators are down check RCU LED's #8 for Left, #14 for Center, #7 for right should be on.	Check PDU circuit breakers for tripped: CB3 for left, CB2 for center, CB1 for right.
Reel motor temperature or current high when mowing.	Excessive amount of grass being cut.	Reduce mower speed, increase FOC, or change height of cut.
Actuators raise and motors shut off while mowing	Low Battery Power. LDU-Red 48V Battery LED will be on.	Recharge Batteries.
	Reel or Actuator Fault. LDU-Yellow Caution LED will be on.	Review fault codes to determine which reel or actuator is faulted.
Steering wheel has no resistance	Overcurrent protection device in PDU tripped. Check for open connection or shorted wire to GND for Lord brake, Lord protection diode.	Cycle power once corrected.
Headlights don't turn on	Overcurrent protection device in PDU tripped. Check for open connection or shorted wire to GND for headlight(s).	Cycle power once corrected.
Genset overheating.	Genset fan not running. Overcurrent protection device in PDU may be tripped. Check for open connection or shorted wire to GND for genset fan 12V power.	Cycle power once corrected.

14 QUALITY OF CUT

14.1 QUALITY OF CUT TROUBLESHOOTING

It is recommended that a “test cut” be performed to evaluate the mower’s performance before beginning repairs.

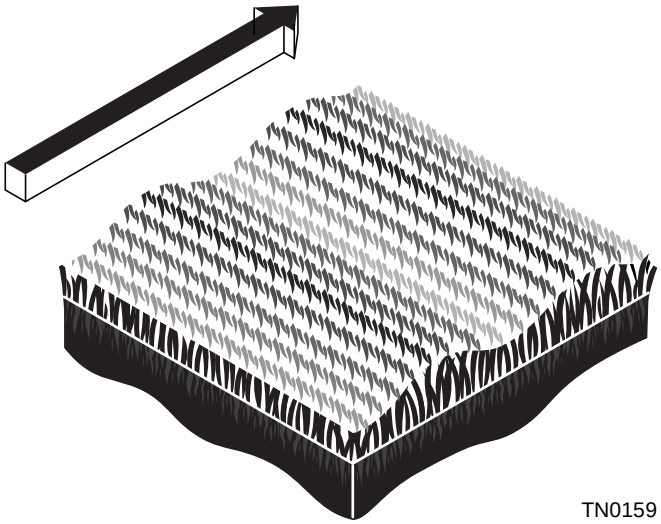
An area should be available where “test cuts” can be made. This area should provide known and consistent turf conditions to allow accurate evaluation of the mower’s performance.

Another “test cut” should be performed after the completion of the repairs and/or adjustments to verify the mower’s performance.

Before performing a “test cut” to diagnose cut appearance and mower performance, the following items should be verified to ensure an accurate “test cut.”

1. Mowing (Ground) Speed. **Section 4.5.6**.
2. Reel Bearing Condition and Pre-Load (End Play) Adjustment.
3. Reel and Bedknife Sharpness
4. Bedknife Alignment to Reel.
5. Reel-to-Bedknife Contact.
6. Height-of-Cut (HOC).
7. Roller and Roller Bearing Condition
8. Reel Speed.

14.2 WASHBOARDING



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NOTE: *Arrow indicates direction of travel.*

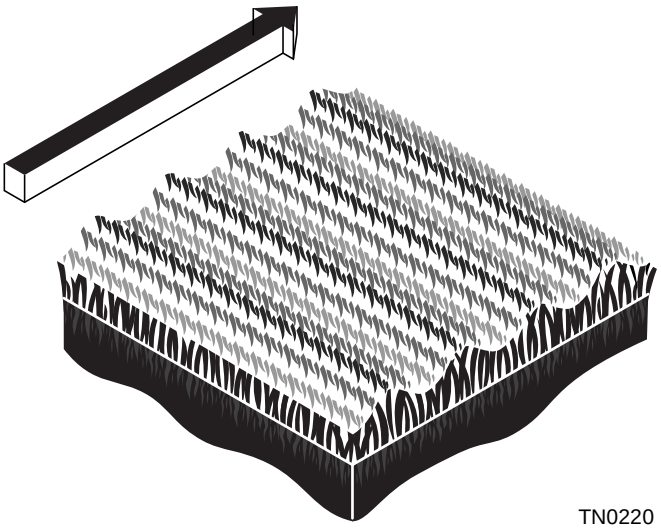
Washboarding is a cyclical pattern of varying cutting heights, resulting in a wave-like cut appearance. In most cases, the wave tip-to-tip distance is approximately 6—8 in. (15—20 cm). Color variation (light-to-dark) may also be noticed.

This condition is usually caused by a rocking motion in the cutting unit(s). This condition is found mostly on mowers with multiple (suspended) cutting units, but other causes can produce the same result.

Washboarding may also be caused by variations in the turf.

Probable Cause	Remedy
Mowing (ground) speed is too fast.	Reduce mowing (ground) speed.
Grass build-up on roller.	Clean the roller and use scrapers or brushes.
Roller is out of round.	Replace roller.
Mowing in the same direction.	Change mowing direction regularly.
Use of a groomer on cleanup pass.	Groomers should be used only in a straight line.
Reel drive motor performance is reduced.	Check LDU for excessive reel motor current and/or temperature. Check/remove cutting reel movement obstruction.

14.3 MARCELLING

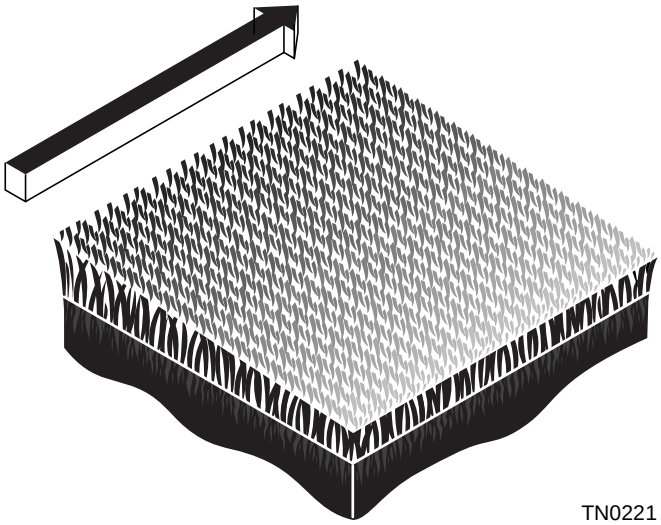


Marcelling, like washboarding, is a cyclical pattern of varying cutting heights, resulting in a wave-like cut appearance. In most cases, the wave tip-to-tip distance is 2 in. (5 cm) or less.

NOTE: *Arrow indicates direction of travel.*

Probable Cause	Remedy
Mowing (ground) speed is too fast.	Reduce mowing (ground) speed.
HOC (height-of-cut) setting is too low for turf conditions.	Check/adjust HOC to turf conditions.
Cutting reel diameter is worn.	Check cutting reel diameter and replace if worn.
Reel drive motor performance is reduced.	Check LDU for excessive reel motor current and/or temperature. Check/remove cutting reel movement obstruction.

14.4 STEP CUTTING

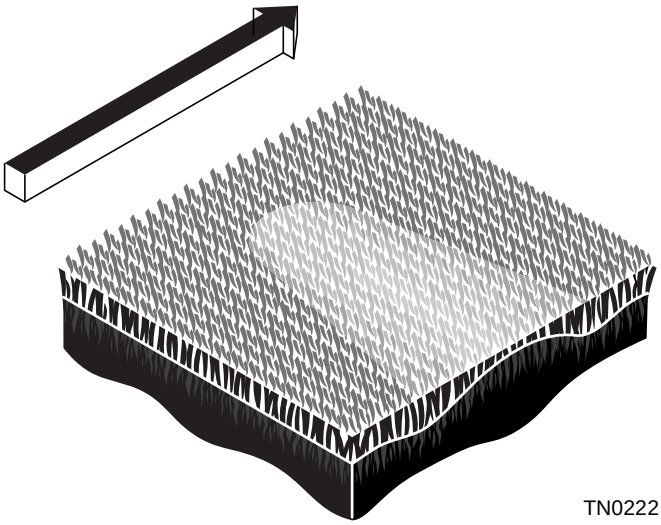


Step cutting occurs when grass is cut taller on one side of a reel than the other or one cutting unit to another. This is usually caused by mechanical wear or an incorrect roller or HOC (height-of-cut) adjustment.

NOTE: *Arrow indicates direction of travel.*

Probable Cause	Remedy
HOC (height-of-cut) settings are different from one side of a reel to the other or from one cutting unit to another.	Check HOC adjustment of cutting units.
Worn front roller bearings.	Check/replace front roller bearings.
Reel-to-bedknife contact is different from one side of the cutting unit to the other or from one cutting unit to another.	Check reel-to-bedknife contact.
Cutting reel movement is restricted.	Check/remove cutting reel movement obstruction.
Variations in turf density.	Change mowing direction.
Machine weight distribution is uneven.	Check/adjust tire inflation pressure.

14.5 SCALPING

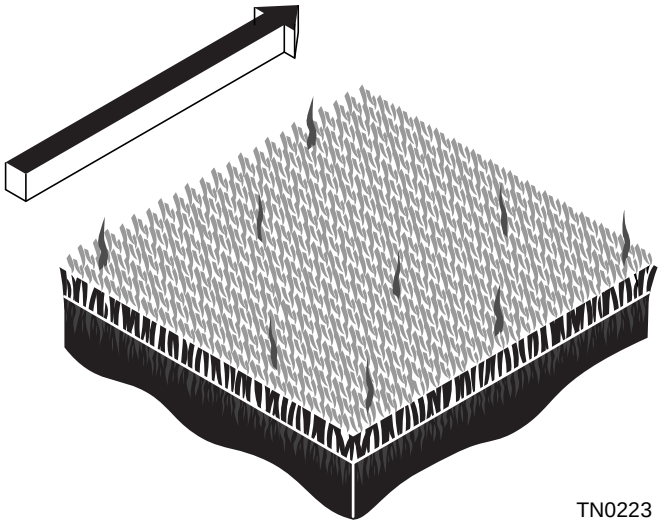


Scalping is a condition in which areas of grass are cut noticeably shorter than the surrounding areas, resulting in a light green or even brown patch. This is usually caused by an excessively low height-of-cut (HOC) setting and/or uneven turf.

NOTE: *Arrow indicates direction of travel.*

Probable Cause	Remedy
HOC (height-of-cut) settings are lower than normal.	Check/adjust the HOC settings.
Improper reel-to-bedknife adjustment.	Adjust reel-to-bedknife setting for desired HOC.
Turf too uneven for the mower to follow.	Change mowing direction.
Cutting too much grass at one time.	Mow more often.
Mowing (ground) speed is too fast.	Reduce mowing (ground) speed.

14.6 STRAGGLERS

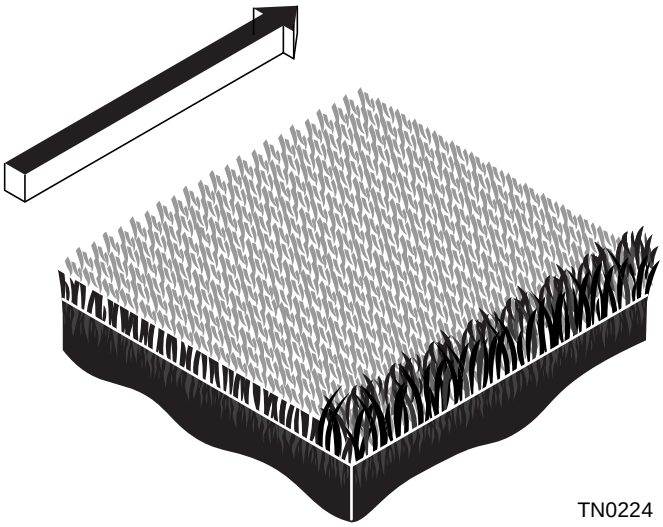


Stragglers are scattered blades of uncut or poorly cut grass.

NOTE: *Arrow indicates direction of travel.*

Probable Cause	Remedy
Bedknife improperly adjusted.	Adjust reel-to-bedknife setting.
Dull reel or bedknife cutting edges.	Sharpen or replace reel blade and bedknife as necessary.
Mowing (ground) speed is too fast.	Reduce mowing (ground) speed.
Grass is too tall.	Mow more often.
Mowing in the same direction.	Change mowing direction regularly.
Nicks in reel or bedknife.	Grind, sharpen or replace reel blades and bedknife as necessary.

14.7 STREAKS

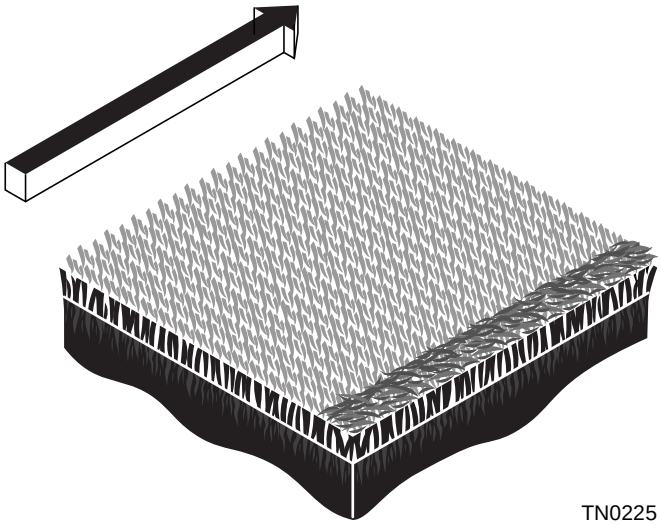


A streak is a line of uncut grass. This is usually caused by a nicked or bent bedknife.

NOTE: *Arrow indicates direction of travel.*

Probable Cause	Remedy
Damaged bedknife.	Replace bedknife.
Damaged or unevenly worn reel.	Inspect reel. Replace as needed.
Loose or missing bedknife fasteners.	Check bedknife screws. Tighten loose screws; replace missing screws.
Turning too aggressively. Cutting units don't overlap around turns or on side hills.	Turn less aggressively to allow cutting units to overlap. Change mowing direction or pattern on side hills.
Tire mats down grass before it is cut.	Check/adjust tire inflation pressure.
Wet grass is matted down before it is cut.	Mow when grass is dry.

14.8 WINDROWING

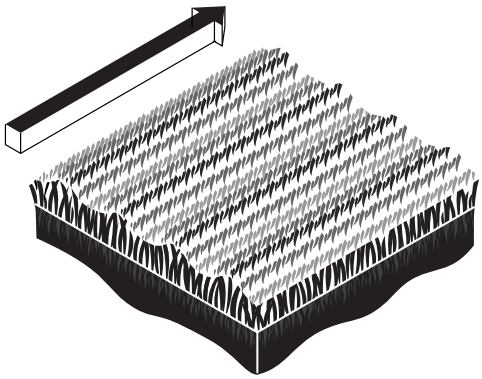


Windrowing is the deposit of clippings concentrated at one end of cutting unit(s) or between two cutting units, forming a line in the direction of travel.

NOTE: *Arrow indicates direction of travel.*

Probable Cause	Remedy
Grass is too tall.	Mow more often.
Mowing while grass is wet.	Mow when grass is dry.
Grass built up on roller(s).	Clean roller(s) and scraper(s).
Grass collecting on bedknife.	Adjust reel-to-bedknife setting.

14.9 RIFLING OR TRAMLINING

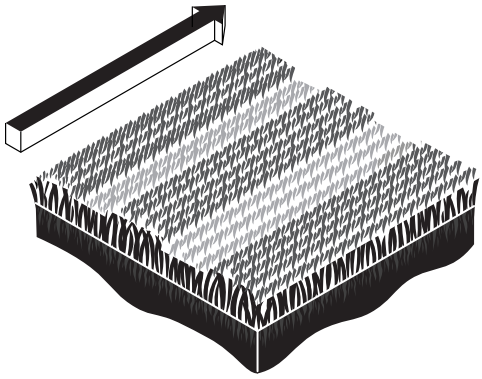


Rifling or tramlining is a pattern of varying cutting heights, resulting in a wave-like cut appearance, usually due to heavy contact points across a reel and/or bedknife.

NOTE: *Arrow indicates direction of travel.*

Probable Cause	Remedy
Reel and/or bedknife unevenly worn.	Inspect bedknife and reel. Sharpen or replace reel and bedknife as necessary.
Missing, loose, or overtorqued bedknife screws.	Install, replace or tighten bedknife screws to proper torque setting.
Mowing (ground) speed is too fast.	Reduce mowing (ground) speed.

14.10 MISMATCHED CUTTING UNITS



Mismatched cutting units is a pattern of varying cutting heights, resulting in a stepped cut appearance, usually due to mismatched HOC (height-of-cut) adjustment from one cutting unit to another.

NOTE: *Arrow indicates direction of travel.*

Probable Cause	Remedy
HOC inconsistent from one cutting unit to another.	Check/adjust HOC on cutting units.
Difference in mower ride height side to side.	Check/adjust tire inflation pressure.

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