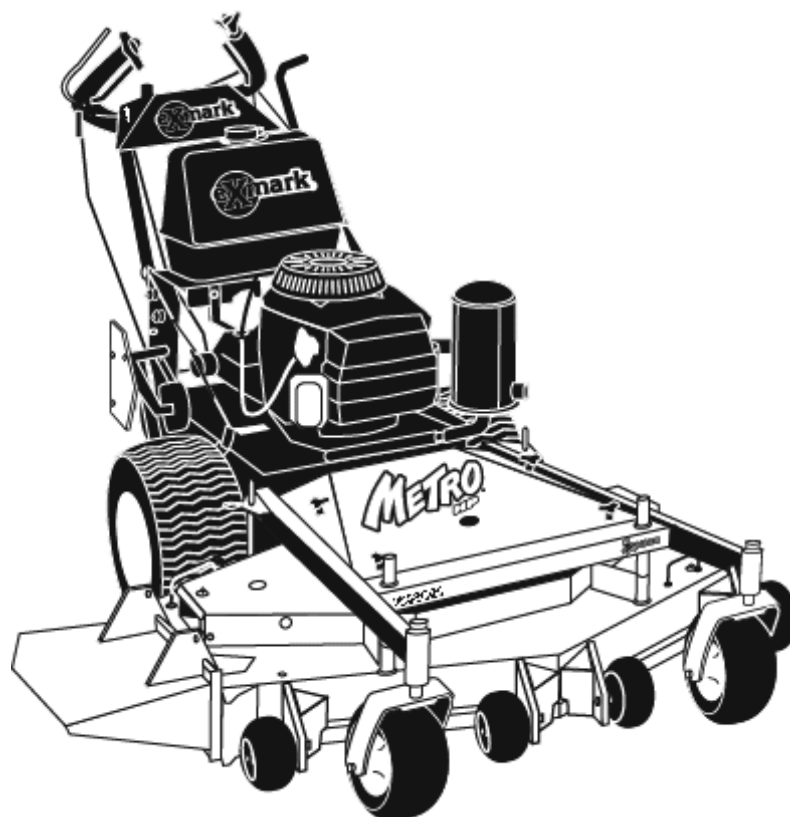




For Serial Nos.
510,000 & Higher



METRO[®] HP

OPERATOR'S MANUAL

CONGRATULATIONS on the purchase of your new Exmark mower. This product has been carefully designed and manufactured to give you a maximum amount of dependability and years of trouble-free operation. If additional information is needed, or should you require trained mechanic service, contact your authorized Exmark equipment dealer or distributor. If you need to order replacement parts from your dealer, always give the model number and serial number of your mower as well as the part number, description and quantity of the part needed.

The Serial No. plate is located next to the fuel tank on the top left hand side of the fuel tank support. For ease of ordering and reference, we suggest that you record the information requested in the following identification table.

Place Model No. and Serial No. Label Here
(Included in Literature Pack)
or Fill in Below

Model No. _____

Serial No. _____

Engine Model No. and Spec. No. (Code) _____

Engine Serial No. (E/No) _____

Date Purchased _____

Part No. 103-7195



WARNING

POTENTIAL HAZARD

- ◆ This product is a piece of power equipment.

WHAT CAN HAPPEN

- ◆ Failure to follow safe operating practices can result in serious operator injury or even death.

HOW TO AVOID THE HAZARD

- ◆ Keep all shields, guards, and safety devices (especially the grass discharge system) in place and in proper working condition.
- ◆ Stop engine and wait for all moving parts to stop. Remove spark plug wire(s) or remove key before adjusting, servicing, or performing maintenance.
- ◆ If mower deck becomes clogged, stop engine and wait for all moving parts to stop. Remove spark plug wire(s) or remove key before cleaning blockage.
- ◆ Keep hands, feet, and clothing away from power driven parts.
- ◆ Keep off mower unless seat platform is provided.
- ◆ Keep others off mower.



WARNING

POTENTIAL HAZARD

- ◆ Gasoline is harmful or fatal if swallowed. Long-term exposure to vapors has caused cancer in laboratory animals.

WHAT CAN HAPPEN

- ◆ Failure to use caution may cause serious injury or illness.

HOW TO AVOID THE HAZARD

- ◆ Avoid prolonged breathing of vapors.
- ◆ Keep face away from nozzle and gas tank/container opening.
- ◆ Keep away from eyes and skin.
- ◆ Never siphon by mouth.

IMPORTANT

When the mower is used or operated on any California forest, brush or grass covered land, a working spark arrester must be attached to the muffler. If not, the operator is violating state law, Section 4442 Public Resource Code. To acquire a spark arrester for your unit, see your Engine Service Dealer.

This spark ignition system complies with Canadian ICES-002

Ce système d'allumage par étincelle de véhicule est conforme à la norme NMB-002 du Canada

The enclosed Engine Owner's Manual is supplied for information regarding The U.S. Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance and warranty.

Keep this engine Owner's Manual with your unit. Should this engine Owner's Manual become damaged or illegible, replace immediately. Replacements may be ordered through the engine manufacturer.

Exmark reserves the right to make changes or add improvements to its products at any time without incurring any obligation to make such changes to products manufactured previously. Exmark, or its distributors and dealers, accept no responsibility for variations which may be evident in the actual specifications of its products and the statements and descriptions contained in this publication.

EXMARK PARTS PLUS® PROGRAM

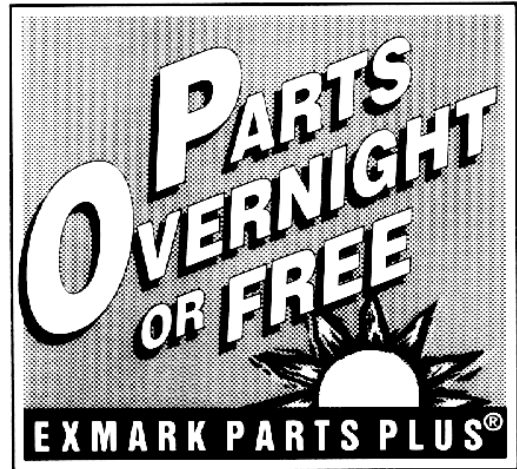
EFFECTIVE DATE: September 1, 1995

Program

If your Exmark dealer does not have the Exmark part in stock, Exmark will get the parts to the dealer the next business day or the part will be FREE* Guaranteed!!

How the Program Works

1. If dealer does not have part in stock for a "down" unit at the time of request by customer, the dealer contacts his distributor by 1:00 p.m., local time, and requests Exmark Parts Plus® shipment of six (6) line items or less.
2. Distributor ships part(s) to dealer or customer, as requested by dealer, same day, overnight UPS. Distributor bills dealer for part and freight charges where applicable.
3. If distributor does not have the part(s) in stock to satisfy Exmark Parts Plus® order, he contacts Exmark by 3:00 p.m., central time, with an Exmark Parts Plus® order of six (6) line items or less.
4. If order is received by 3:00 p.m., central time, Exmark ships part(s) direct to dealer or customer, as requested by distributor, same day, overnight UPS, Exmark bills the distributor for parts and shipping charges, where applicable.
5. The customer pays for the part and freight if it is shipped under the Exmark Parts Plus® and if it arrives in accordance to the program.
6. Who pays for the part and freight if it fails to arrive overnight in accordance to the program?
 - A. Under any circumstance the customer does not pay.
 - B. If the part does not arrive overnight due to:
 1. The dealer not submitting the Exmark Parts Plus® order to his Exmark distributor by 1:00 p.m., the dealer pays for the part and freight.
 2. The Distributor being unable to ship the part the same day or not submitting the Exmark Parts Plus® order to Exmark by 3:00 p.m., central time, the Distributor pays for the part and freight.
 3. Exmark being unable to ship the part and the Exmark parts order is received by 3:00 p.m., central time, Exmark pays for the part and freight.
 4. If the part does not arrive overnight due to the shipper (UPS), the shipper pays for the freight and Exmark pays for the part.



The following restrictions apply -- The Exmark Parts Plus® Program is available only through participating Exmark Dealers and applies only to orders submitted on this program Monday through Thursday. Parts Plus service is available only in the 48 contiguous United States. UPS has initiated a Saturday delivery program to many areas of the continental United States and can be requested for an overnight shipment on Friday to be delivered Saturday. The next day air charge, plus the Saturday delivery fee will be the responsibility of the purchaser. Exmark Mfg. will assume no responsibility for Saturday delivery shipments. To qualify, all Exmark Parts Plus® orders must be received by Exmark by 3:00 p.m., central time. Orders must be six (6) line items or less. Exclusions from the Exmark Parts Plus® Program are: Any wholegood or accessory in its entirety, engines and engine replacement parts, 5-speed Peerless transmissions and 5-speed transaxles, hydraulic or hydrostatic wheel motors, cutter decks and engine decks or any item exceeding United Parcel Service size and weight restrictions.

Due to UPS restrictions, aerosol spray paint is considered a hazardous material and cannot be shipped via UPS next day or Second Day Air.

Exmark Manufacturing stocks a limited supply of parts for transaxles, pumps, and wheel motors. These parts can be ordered for Next Day Air shipment but will not be guaranteed per the Parts Plus Program.

CONGRATULATIONS on the purchase of your Exmark Mower. This product has been carefully designed and manufactured to give you a maximum amount of dependability and years of trouble-free operation.

OPERATOR'S MANUAL

This manual contains assembly, operating, maintenance, adjustment, and safety instructions for your Exmark mower.

BEFORE OPERATING YOUR MOWER, CAREFULLY READ THIS MANUAL IN ITS ENTIRETY.

By following the operating, maintenance, and safety instructions, you will prolong the life of your mower, maintain its maximum efficiency, and promote safe operation.

If additional information is needed, or should you require trained mechanic service, contact your authorized Exmark equipment dealer or distributor.

All Exmark equipment dealers and distributors are kept informed of the latest methods of servicing and are equipped to provide prompt and efficient service in the field or at their service stations. They carry ample stock of service parts or can secure them promptly for you from the factory.


All Exmark parts are thoroughly tested and inspected before leaving the factory, however, attention is required on your part if you are to obtain the fullest measure of satisfaction and performance.

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1. SAFETY

1.1 SAFETY ALERT SYMBOL

This SAFETY ALERT SYMBOL  is used both in this manual and on the machine to identify important safety messages which must be followed to avoid accidents. This symbol means:

ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!

The safety alert symbol appears above information which alerts you to unsafe actions or situations and will be followed by the word **DANGER**, **WARNING**, or **CAUTION**.

DANGER: White lettering/Red background. Indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.

WARNING: Black lettering/Orange background. Indicates a potentially hazardous situation which, if not avoided, **COULD** result in death or serious injury.


CAUTION: Black lettering/Yellow background. Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury.

1.2 TRAINING

- 1.2.1 Regard the Exmark mower as a piece of power equipment and teach this regard to all who operate this unit.
- 1.2.2 Read the instructions carefully. Familiarize yourself with the controls and the proper use of the equipment. If the operator(s) or mechanic(s) can not read English it is the owner's responsibility to explain this material to them.
- 1.2.3 Do not allow operation of this machine by untrained personnel. Never allow children, teenagers, or people unfamiliar with these instructions to use the mower. Local regulations may restrict the age of the operator.
- 1.2.4 Avoid mowing while people, especially children, or pets, are nearby. Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people or their property.


1.3 PREPARATION


- 1.3.1 Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by Exmark.
- 1.3.2 The use of personal protective equipment, such as (but not limited to) protection for the eyes, ears, feet, and head is recommended.


 CAUTION	
POTENTIAL HAZARD	◆ This machine produces sound levels in excess of 85 dBA at the operator's ear when in operation.
WHAT CAN HAPPEN	◆ Exposure to sound levels of 85 dBA or above for extended periods of time can cause hearing loss.
HOW TO AVOID THE HAZARD	◆ Wear hearing protection when operating this machine.


- 1.3.3 While mowing, always wear substantial footwear and long trousers. Do not operate equipment when barefoot or when wearing open sandals.

- 1.3.4 Thoroughly inspect the area where the equipment is to be used and remove all stones, sticks, wires, bones, and other foreign objects which may damage the equipment or cause personal injury to the operator or bystanders.

 WARNING
POTENTIAL HAZARD <ul style="list-style-type: none">♦ Engine exhaust contains carbon monoxide, which is an odorless deadly poison.
WHAT CAN HAPPEN <ul style="list-style-type: none">♦ Carbon monoxide can kill you.
HOW TO AVOID THE HAZARD <ul style="list-style-type: none">♦ Do not run engine indoors or in a small confined area where dangerous carbon monoxide fumes can collect.

 DANGER
POTENTIAL HAZARD <ul style="list-style-type: none">♦ In certain conditions gasoline is extremely flammable and highly explosive.
WHAT CAN HAPPEN <ul style="list-style-type: none">♦ A fire or explosion from gasoline can burn you, others, and cause property damage.
HOW TO AVOID THE HAZARD <ul style="list-style-type: none">♦ <i>DO NOT</i> smoke while refueling, and stay away from an open flame or where gasoline fumes may be ignited by spark.♦ Refuel only outdoors.♦ Store gasoline in an approved container and keep it out of the reach of children.♦ Add fuel before starting the engine. <i>Never</i> remove the cap of the fuel tank or add fuel when engine is running or when the engine is hot.♦ Never fill the fuel tank so that the gasoline level rises above a level that is 1/2" below the bottom of the filler neck to allow for gasoline expansion and prevent fuel spillage.♦ If fuel is spilled, <i>DO NOT</i> attempt to start the engine. Move away from the area of the spill and avoid creating any source of ignition until fuel vapors have dissipated.♦ Do not operate without entire exhaust system in place and in proper working condition.

 DANGER
POTENTIAL HAZARD <ul style="list-style-type: none"> ◆ In certain conditions gasoline is extremely flammable and highly explosive.
WHAT CAN HAPPEN <ul style="list-style-type: none"> ◆ A static charge can ignite gasoline vapors. A fire or explosion from gasoline can burn you, others, and cause property damage.
HOW TO AVOID THE HAZARD <ul style="list-style-type: none"> ◆ Purchase and store gasoline only in an approved container. ◆ Always place gasoline containers on the ground away from your vehicle before filling. ◆ Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge. ◆ When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground. ◆ If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle. ◆ If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.

 WARNING
POTENTIAL HAZARD <ul style="list-style-type: none"> ◆ Gasoline vapor can collect inside enclosed trailers and may be ignited by electrical sparks or hot engine/exhaust components.
WHAT CAN HAPPEN <ul style="list-style-type: none"> ◆ Explosion and fire may occur, resulting in property damage, personal injury, and/or death.
HOW TO AVOID THE HAZARD <ul style="list-style-type: none"> ◆ Provide adequate ventilation of any enclosed trailer to prevent build up of gasoline vapors, especially at floor level. ◆ Refuel only outdoors, never inside an enclosed trailer. ◆ Be sure all fuel tanks and gasoline storage containers have proper caps installed to prevent spillage and minimize vapor escaping into the trailer. ◆ Do not place any equipment that is leaking gasoline in an enclosed trailer.

1.4 OPERATION

Although hazard control and accident prevention are partially dependent upon the design and configuration of the equipment, these factors are also dependent upon the awareness, concern, prudence, and proper training of the personnel involved in the operation, transport, maintenance, and storage of the equipment. It is essential that all Operator Safety Mechanisms be connected and in operating condition prior to use for mowing.

WARNING

POTENTIAL HAZARD

- ◆ Operating engine parts, especially the muffler, become extremely hot.

WHAT CAN HAPPEN

- ◆ Severe burns can occur on contact.
- ◆ Debris, such as leaves, grass, brush, etc. can catch fire.

HOW TO AVOID THE HAZARD

- ◆ Allow engine parts, especially the muffler, to cool before touching.
- ◆ Remove accumulated debris from muffler and engine area.
- ◆ Install and maintain in working order a spark arrester before using equipment on forest-covered, grass-covered, or brush-covered unimproved land.

WARNING

POTENTIAL HAZARD

- ◆ Hands, feet, hair, clothing, or accessories can become entangled in rotating parts.

WHAT CAN HAPPEN

- ◆ Contact with rotating parts can cause traumatic amputation or severe lacerations.

HOW TO AVOID THE HAZARD

- ◆ Do not operate the machine without guards, shields, and safety devices in place and working.
- ◆ Keep hands, feet, hair, jewelry, or clothing away from rotating parts.

- 1.4.1 Give complete, undivided attention to the job at hand.
- 1.4.2 Mow only in daylight or good artificial light, keeping away from holes and hidden hazards. **Do Not** operate the mower when children or others are in the area!
- 1.4.3 When feasible, avoid operating the equipment in wet grass.
- 1.4.4 Use **EXTREME** caution when mowing and/or turning on slopes as loss of traction and/or tip-over could occur. The operator is responsible for safe operation on slopes.

DANGER

POTENTIAL HAZARD

- ◆ Mowing on wet grass or steep slopes can cause sliding and loss of control.

WHAT CAN HAPPEN

- ◆ Loss of control and/or loss of operator's footing could result in a fall with an arm or leg getting under the mower or engine deck, which may result in serious injury or death.

HOW TO AVOID THE HAZARD

- ◆ Mow across slopes, never up and down.
- ◆ Do not mow slopes when grass is wet.
- ◆ Do not mow near drop-offs or near water.
- ◆ Do not mow slopes greater than 20 degrees.
- ◆ Reduce speed and use extreme caution on slopes.
- ◆ Avoid sudden turns or rapid speed changes.

- See inside the back cover to determine the approximate slope angle of the area to be mowed.
 - Progressively greater care is needed as the slope increases.
 - Always avoid sudden starting or stopping on a slope. If tires lose traction, disengage the blades and proceed slowly off the slope.
 - Be aware that loss of traction may occur going downhill. Weight transfer to the front wheels may cause drive wheels to slip and cause loss of braking and steering.
 - Watch for ditches, holes, rocks, dips, and rises that change the operating angle, as rough terrain could overturn the machine.
 - Remove or mark obstacles such as rocks, tree limbs, etc. from the mowing area. Tall grass can hide obstacles.
 - Use extreme care with grass catchers or attachments. These can change the stability of the machine and cause loss of control.
- 1.4.5 Use **EXTREME** caution when backing up. **LOOK BEHIND YOU!!**
- 1.4.6 Stop the blades when crossing surfaces other than grass, if mower must be tilted for transportation, and when transporting the mower to and from the area to be mowed.
- 1.4.7 Never operate the mower with defective guards, shields, or covers. Always have safety shields, guards, switches, and other devices in place and in proper working condition.
- 1.4.8 **Do Not** change the engine governor settings or over-speed the engine. Operating an engine at excessive speed may increase the hazard of personal injury.
- 1.4.9 Place transmission in neutral, disengage PTO and engage park brake before starting engine.
- 1.4.10 Start the engine carefully with feet well away from blades.
- 1.4.11 Keep hands, feet, and clothing away from rotating parts while the mower is being operated.
- 1.4.12 Stop the engine, wait for all moving parts to stop, and remove spark plug wire(s) or ignition key:
- Before checking, cleaning, or working on the mower.
 - After striking a foreign object (inspect the mower for damage and make repairs before restarting and operating the mower).
 - Before clearing blockages.
 - Whenever you leave the mower.
- 1.4.13 Stop the engine and wait for all moving parts to stop:
- Before removing the grass catcher.
 - Before refueling.
 - Before making height adjustments.
- 1.4.14 Before stopping the engine, place the throttle control **midway** between the “slow” and “fast” positions. Allow the engine to run a minimum of 15 seconds; then stop the engine.
- 1.4.15 The fuel system is provided with a shut-off valve. The fuel shut-off valve is used to shut off the fuel when:
- The machine will not be used for a few days.
 - During transport to and from the job.
 - When parking inside a building.
- 1.4.16 This mower was designed for one operator only. Keep all others away from mower during operation.

- 1.4.17 **Do Not** mow with the grass deflector raised, removed or altered unless there is a grass collection system or mulch kit in place and working properly.
- 1.4.18 Be aware of the mower discharge and direct discharge away from others.
- 1.4.19 Do NOT operate the mower under the influence of alcohol or drugs.
- 1.4.20 Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

1.5 MAINTENANCE AND STORAGE

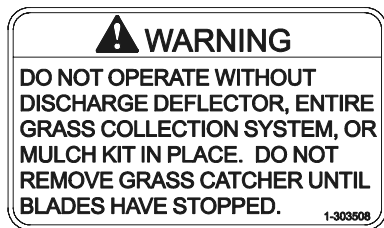
- 1.5.1 For engine maintenance, follow the engine manufacture's recommendations precisely as stated in the engine manual.
- 1.5.2 Keep engine and engine area free from accumulation of grass, leaves, excessive grease or oil and other debris which can accumulate in these areas. These materials can become combustible and may result in a fire.
- 1.5.3 Store fuel in a container specifically designed for this purpose in a cool, dry place.
- 1.5.4 Keep the mower and fuel container in locked storage to prevent children from playing or tampering with them.
- 1.5.5 Gasoline powered equipment or fuel containers should not be stored in a basement or any enclosed area where open pilot lights or heat appliances are present.
- 1.5.6 Maximum mowing results and safety can only be achieved if the mower is properly maintained and operated correctly.
- 1.5.7 Check all bolts frequently to maintain proper tightness.
- 1.5.8 Keep all guards, shields, and all safety devices in place and in safe working condition.
- 1.5.9 Frequently check for worn or deteriorating components that could create a hazard.
- 1.5.10 All replacement parts must be the same as or equivalent to the parts supplied as original equipment.

1.6 RIDING ATTACHMENTS

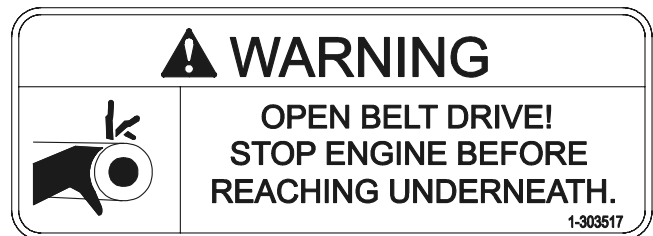
- 1.6.1 Use only **Exmark** riding attachments. The use of other than Exmark riding attachments may create a hazardous condition resulting in injury.

1.7 SAFETY SIGNS

- 1.7.1 Keep all safety signs legible. Remove all grease, dirt, and debris from safety signs and instructional labels.
- 1.7.2 Safety signs must be replaced if they are missing or illegible.
- 1.7.3 When new components are installed, be sure that current safety signs are affixed to the replaced components.
- 1.7.4 New safety signs may be obtained from your authorized Exmark equipment dealer or distributor or from Exmark Mfg. Co. Inc.
- 1.7.5 Safety signs may be affixed by peeling off the backing to expose the adhesive surface. Apply only to a clean, dry surface. Smooth to remove any air bubbles.
- 1.7.6 Familiarize yourself with the following safety signs and instruction labels. They are critical to the safe operation of your Exmark commercial mower.



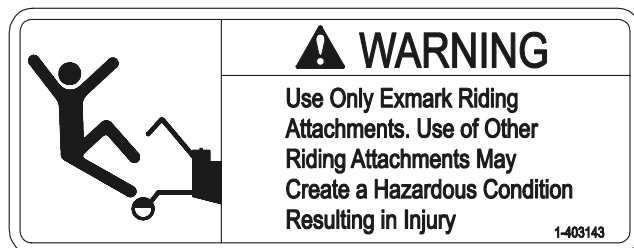
PART NO. 1-303508
LOCATION: Front of Mower Deck, Top Surface



PART NO. 1-303517
LOCATION: LH Side of Rear Surface of Mower Deck



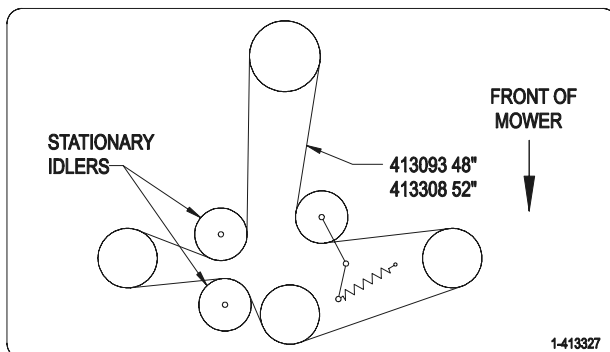
PART NO. 1-303518
LOCATION: Transmission Shifter Plate



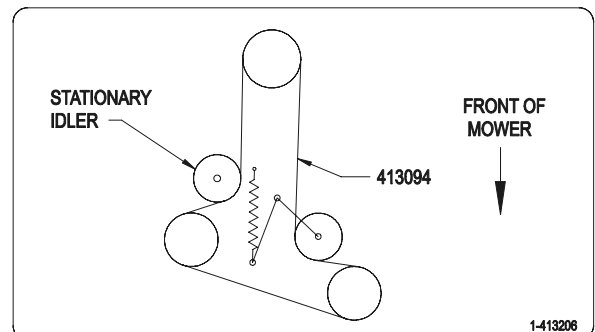
PART NO. 1-403143
LOCATION: RH Side of Rear Surface of Engine Deck



PART NO. 1-403005
LOCATION: RH & LH Corners of Mower Deck



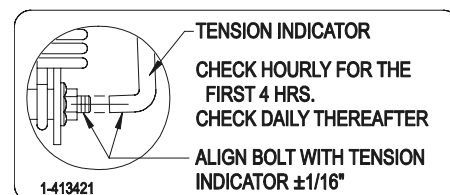
PART NO. 1-413327
LOCATION: Top of Cutter Deck, Under Belt Shield (48" & 52" Decks)



PART NO. 1-413206
LOCATION: Top of Cutter Deck, Under Center Belt Shield (36")



PART NO. 1-513746
LOCATION: On Engine Blower Housing next to Muffler & on Center Belt Cover



PART NO. 1-413421
LOCATION: Left Rear on Top of Engine Deck

! WARNING

DISENGAGE BLADE CLUTCH, SHUT OFF ENGINE AND REMOVE KEY BEFORE MAKING ADJUSTMENTS, SERVICING OR CLEANING DECK

CUTTING HEIGHT ADJUSTMENT

DECK SUPPORT PIN	CUTTING HEIGHT INCHES (mm)
1.5(38)	
2.0(51)	
2.5(64)	
3.0(76)	
3.5(90)	
4.0(102)	
4.5(114)	

ANTI-SCALP ROLLER ADJUSTMENT

FOR NORMAL OPERATING CONDITIONS, PLACE ROLLERS IN POSITIONS SHOWN FOR 3/4" (19 mm) GROUND CLEARANCE.

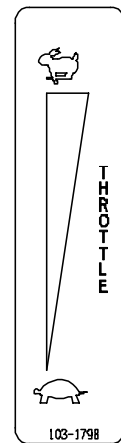
CUTTING HEIGHT INCHES(mm)

2.0(51)
2.5(64)
3.0(76)
3.5(90)

FOR MAXIMUM FLOTATION, ROLLERS MAY BE POSITIONED LOWER, BUT MUST MAINTAIN A MINIMUM OF 1/4" (6.4 mm) GROUND CLEARANCE. NEVER POSITION THE ROLLERS TO SUPPORT MOWER DECK.

1-553049

PART NO. 1-553049
LOCATION: Front of Mower Deck Top Surface



PART NO. 103-1798
LOCATION: RH Side of Console

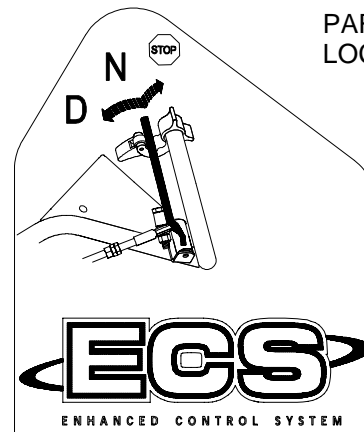
! CAUTION

- LOOSE OR DAMAGED BLADE BOLT MAY ALLOW BLADE TO COME OUT FROM UNDER DECK AT HIGH SPEED.
- REPLACE BLADE BOLT AFTER STRIKING A FOREIGN OBJECT.
- TORQUE BLADE BOLT TO 115-120 FT-LBS(156-163N m)

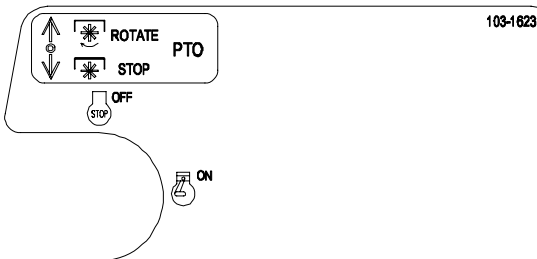
SEE OPERATOR'S MANUAL

103-1077

PART NO. 103-1077
LOCATION: On Top LH Side of Mower Deck



PART NO. 103-2244
LOCATION: LH Side of Console



! WARNING

- Read operator's manual before operating.
- Do NOT operate unless trained to safely operate this machine.
- Do NOT operate without shields, guards and safety devices in place and working.
- Do NOT carry passengers.
- Clear area of debris before mowing.
- Before leaving operator's position:
 - Disengage PTO.
 - Shift transmission to neutral.
 - Engage park brakes.
- Shut off engine and remove key before adjusting, servicing or cleaning.
- Use extreme caution when operating on slopes.
 - Do NOT operate on slopes greater than 20°.
 - Mow across slope - NOT up and down.
 - Do NOT mow wet slopes.

MAX 20°

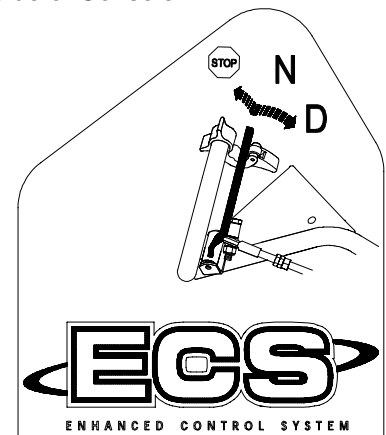
PART NO. 103-1623
LOCATION: Console

! DANGER

- Thrown objects or blade contact can cause serious injury or death.
- Keep all people and pets out of area when mowing.
- Avoid blades unless blades and engine are stopped.

! CAUTION

- Hearing protection recommended.
- Do NOT park on slope unless park brake is engaged.



PART NO. 103-2245
LOCATION: RH Side of Console

! DANGER

COVER IS MISSING. DO NOT OPERATE THIS UNIT WHEN COVER IS NOT IN PLACE.

98-5954

PART NO. 98-5954
LOCATION: Under Mower Deck Belt Shield(s)

2. SPECIFICATIONS

2.1 MODEL NUMBER: MHP3615KAC; MHP4815KAC

2.2 ENGINE

2.2.1 Engine Specifications: See your Engine Owner's Manual.

2.2.2 3600 RPM (No Load).

2.3 FUEL SYSTEM

2.3.1 Capacity: 5.0 gal. (18.9 L.)

2.3.2 Type of Fuel: Regular **unleaded** gasoline, 87 octane or higher. In countries using the research method, it should be a 90 octane *minimum*.

2.3.3 Fuel Filter: Replaceable in-line

2.3.4 Fuel Shut-Off Valve: 1/4 turn

2.4 SAFETY INTERLOCK SYSTEM

Operator must have transmission in neutral and PTO disengaged to start engine.

Release of OPC levers will cause the engine to stop if *transmission is **not** in neutral and/or PTO is **engaged***.

2.5 STEERING/BRAKE CONTROL:

Fingertip drive control levers provide independent speed control, braking, and neutral to each drive wheel for moving, stopping, and power turning. Parking brakes are engaged by locking drive control levers in the "brake" position.

2.6 TRANSMISSION:

2.6.1 Peerless 700-070A, five speeds forward and one reverse.

2.6.2 Speed Range:	1 st 2.0 mph (3.22 km/h)	4 th 4.1 mph (6.60 km/h)
	2 nd 2.7 mph (4.35 km/h)	5 th 6.2 mph (9.98 km/h)
	3 rd 3.5 mph (5.63 km/h)	Rev. 3.1 mph (4.99 km/h)

2.7 WHEEL DRIVE SYSTEM:

Banded double A-Section V-Belts, single topside idlers, and replaceable bolt-on drive sheaves and brake drums.

2.8 TIRES:

	Drive	Front Caster
	Pneumatic (Air-Filled)	Semi-Pneumatic
Size	16 x 6.50-8	9 x 3.50-4
Quantity	2	2
Tread	Turf Master	Smooth
Ply Rating	4	
Pressure	14 psi (97 kPa)	

2.9 DECK

2.9.1 Cutting Width: Model 36 in.35.25 in. (89.5 cm)
Model 48 in.47.25 in. (120.0 cm)

2.9.2 Discharge: Right Side

2.9.3 Blade Size: Model 36 in.18.00 in. (45.7 cm).... Qty. 2
Model 48 in.16.25 in. (41.3 cm).... Qty. 3

2.9.4 Type of Drive: Manual engagement of belt with over-center lock. Belt tension is adjustable via turnbuckle.

2.9.5 Deck Mounting: Full floating deck is attached to out-front support frame, removable for service.

2.9.6 Cutting Height: Adjusts in 1/2" (1.3 cm) increments from 1.5" (3.8 cm) to 4 1/2" (11.4 cm).

2.10 DIMENSIONS

2.10.1 Overall Width:		36"	48"
	Discharge chute down	46.25" (117.5 cm)	58.25" (148.0 cm)
	Discharge chute up (Transport only)	36.1" (91.7 cm)	48.1" (122.2 cm)
2.10.2 Overall Length:		36"	48"
		77.0" (196 cm)	73.0" (185 cm)
2.10.3 Curb Weight:		36"	48"
		517 lbs. (234 kg)	565 lbs. (256 kg)
* Weights will vary slightly depending on engine option.			
2.10.4 Overall Height:		36"	48"
		44.1" (112 cm)	44.1" (112 cm)
2.10.5 Tread Width (to outside of tires):		36"	48"
		35.2" (89.4 cm)	35.2" (89.4 cm)

2.11 TORQUE REQUIREMENTS

<u>BOLT LOCATION</u>	<u>TORQUE</u>
Blade Mounting Bolt	115-120 ft-lbs. (156-163 N-m)
Cutter Housing Spindle Nut	140-145 ft-lbs. (190-197 N-m)
Mower Deck Support/Engine Deck Mount	30-35 ft-lbs. (40-47 N-m)
Engine Mounting Bolts (15 HP Kawasaki)	15-20 ft-lbs. (20-27 N-m)
Transmission Shifter-lever Nut	30-35 ft-lbs. (40-47 N-m)
Anti-Scalp Roller Bolts.....	40-45 ft-lbs. (54-61 N-m)
Wheel Lug Nuts	90-95 ft-lbs. (122-129 N-m)

3. ASSEMBLY INSTRUCTIONS

- 3.1 Uncrate unit, and remove upper handle assembly, fuel tank, and linkages from top of crate.
- 3.2 Remove and open the bolt bag.
- 3.3 Loosen the 5/16" hardware at the two (2) discharge deflector hinge points so that the deflector is snug, but can be moved up and down freely.
- 3.4 Refer to Parts Manual to help you identify and locate parts and their proper position.
- 3.5 Apply retaining adhesive "Fel-Pro Retaining I or Retaining II" or "Loctite RC609 or 680" on the two threaded studs from the bolt bag and install into the two left holes underneath fuel tank. Install the fuel tank on top of the fuel tank support with the studs going through the slots in the support. Install two 5/16-18 x 3/4" screws with a 5/16" SAE flat washer and 5/16" lock washer into the threaded holes in the right side of the fuel tank. **Do not over tighten.** Place a 5/16" SAE flat washer, then a spring, over each of the studs and fasten with a 5/16 nyloc nut. Tighten 5/16 nyloc nut fully then back off a 1/2 turn. This is to allow for normal fuel tank expansion with changes in temperature and fuel levels.
- 3.6 Attach the fuel tank hose to the tank fitting and secure with the clamp provided.
- 3.7 Position the lower end of the handle assembly on the outside of the upper rear section of the fuel tank and handle support. Install four 3/8-16 x 1" bolts (with four spring disk washers against the head of each bolt) from the outside in. Secure using four 3/8" whizlock nuts on the inside of each handle support and tighten until the spring disk washers are flat (See Figure 1).

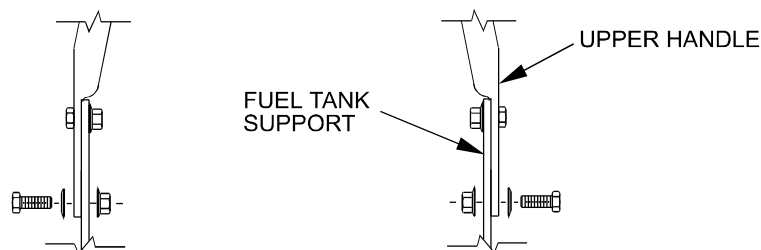


FIGURE 1
UPPER HANDLE MOUNTING

- 3.8 Route the throttle cable along the right side of the upper handle, through the clip, under the fuel tank support, and position the cable on the **left** side of the engine.

Attach throttle cable to engine:

- Position the throttle control lever (located on console) $\frac{1}{4}$ " (6mm) from the upper end of the slot.
- Attach inner wire of the throttle cable to the top hole in the throttle control lever as shown in Figure 2.
- Loosen the clamp, place the cable behind it, and pull on the cable to move the throttle linkage to the full throttle position. Tighten the cable clamp screw.

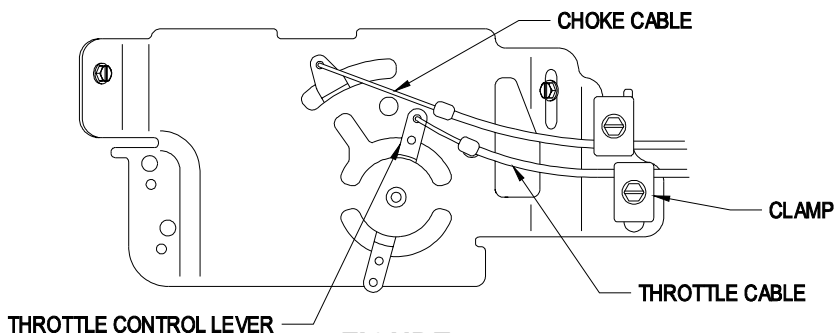


FIGURE 2
SPEED CONTROL (THROTTLE CABLE HOOK-UP)

- 3.9 Connect the PTO engagement linkages. Loosen jam nut and remove turnbuckle from lower linkage. Screw turnbuckle onto both upper and lower linkages simultaneously. (See figure 3) Note that the threads on upper linkage are left hand. See 5.2.2 for linkage adjustment.

Note: ECS handles have the PTO linkage on the inside of the PTO engagement lever tab and the hairpin on the outside.

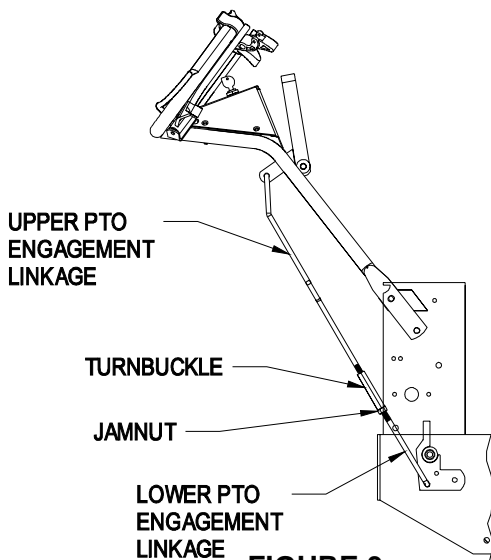


FIGURE 3
PTO ENGAGEMENT LINKAGE

3.10 Install and adjust shifter lever.

- a) Remove the 3/8" nyloc nut and spring disc washer from the stud on top of the transmission. Install the shifter lever through slot in shifter lever plate and onto the stud on top of transmission. Be sure the square-hole washer remains between the lever and transmission. Replace the spring disc washer and nyloc nut (see figure 4). Torque the 3/8" nut to 35ft-lbs. (47N.M).
- b) Shift lever to second gear and check alignment of lever in slot of shifter plate. Clearance between top of lever and the top of the slot should be about equal to the clearance between bottom of the lever and the bottom of the slot (See figure 5). If it is not, remove lever and bend it slightly to adjust. DO NOT bend lever while it is attached to transmission. Reinstall lever and tighten hardware.
- c) Shift to neutral position. Lever should not contact the left edge of the upper slot. Push lever down. Lever should not contact the right edge of the bottom slot (See Figure 6). Shifter plate can be adjusted side to side to adjust position of lever relative to the slot in plate. Loosen the two bolts securing the shifter plate to the shifter lever legs. Adjust shifter plate and retighten bolts.

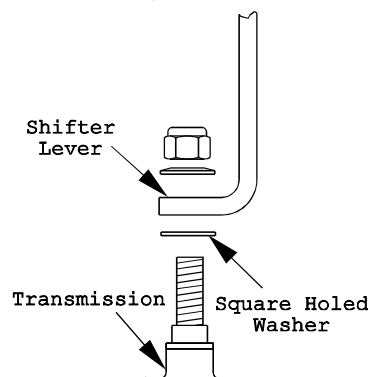


FIGURE 4
SHIFTER LEVER
TO TRANSMISSION

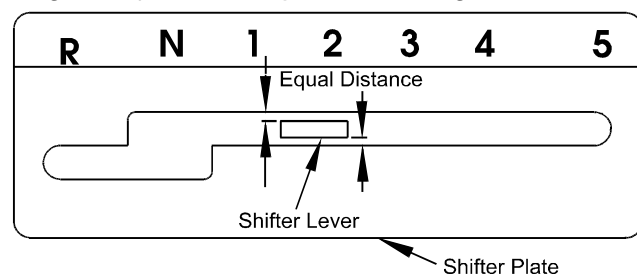


FIGURE 5
THIS CLEARANCE SHOULD BE EQUAL

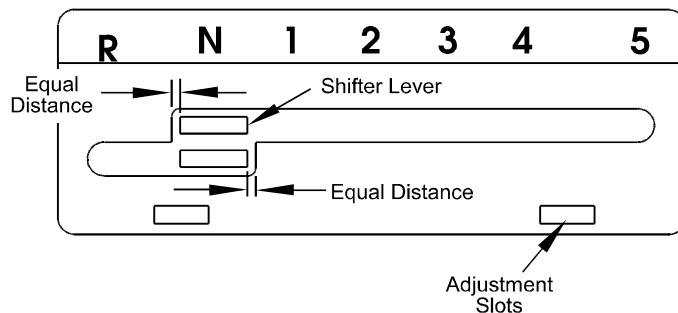


FIGURE 6
THIS CLEARANCE SHOULD BE EQUAL

3.11 Install and adjust wheel drive linkages.

- a) Locate the (2) drive lever linkages which have a balljoint and jam nut installed on one end.

Locate the (2) 5/16-18x1-3/4 hex head cap screws and (2) 5/16-18 nyloc nuts in the bolt bag.

NOTE: During set up at the factory, an "L" or "R" may have been marked on the flats of the balljoints. If the balljoints are marked, assemble accordingly. If the balljoints are not marked, they may be assembled on either side.

Thread the linkage into the swivel located on the wheel drive idler arm.

Thread in until the flat edge of the drive lever aligns with the bottom of the roller notch in the neutral lock/park brake latch when the cap screw is inserted through the hole in the drive lever and the hole in the ball joint. Secure with a nyloc nut. Tighten nyloc nut. Repeat for the other side. See figures 7 and 8.

- b) The bend in the drive lever linkages should be positioned downward and slightly outward. If adjustment is needed, loosen jam nut below balljoint and rotate linkage. Tighten jam nut.

Shift transmission lever to fifth gear. Insure that bend in right hand linkage is rotated outward enough that linkage clears shifter lever.

If linkage is rotated too far out, ball joint may bind when drive lever is released into the "drive" position. Insure that this does not happen.

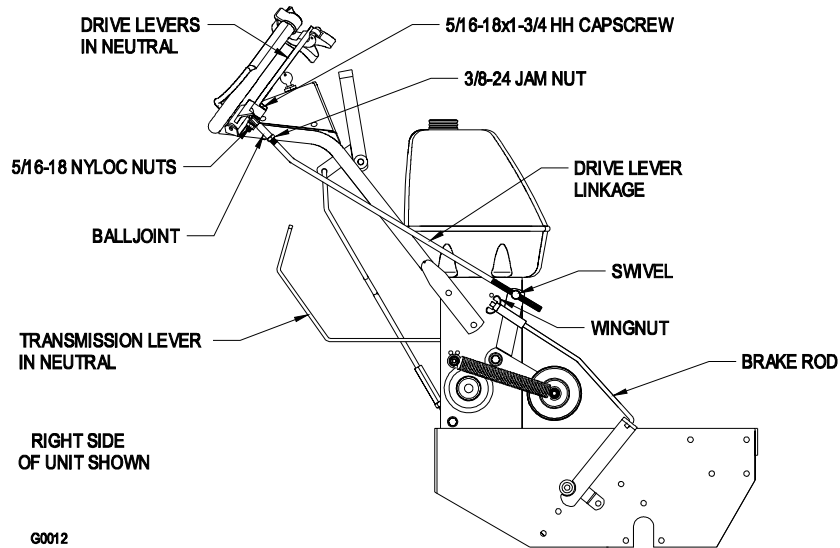


FIGURE 7
DRIVE LEVER LINKAGE INSTALLATION

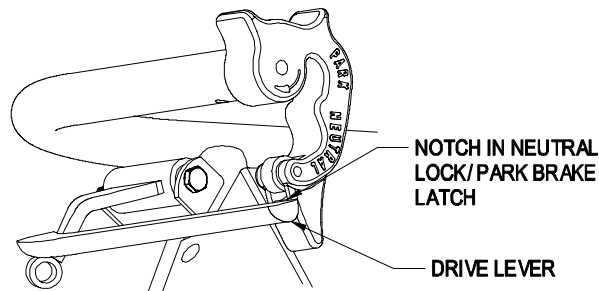


FIGURE 8
DRIVE LEVER SETTING

- c) Adjust brakes by adjusting wingnut on the upper end of each brake rod. Tighten the wingnut until the brakes engage when the drive levers are squeezed enough allow the neutral lock/park brake latches to be placed into the "park brake" position. See Figure 7.

- d) Check for correct adjustment:

Place the drive levers in the "**park brake**" position. The mower **should not** move forward or backward. If it does, tighten the wingnuts.

Place the drive levers in the "**neutral lock**" position. The mower **should** move forward and backward freely. If it does not, loosen the wingnuts.

NOTE: The neutral lock/park brake latches must be easily moved into the park brake position; if not the brake linkages must be adjusted again.

- 3.12 Route the long unattached wiring harness lead, up the left hand side of the handle and connect the connector on the end of the shorter lead to the key switch. Connect the two flag terminals that are on the longer lead (in any order) to the operator presence control switch terminals underneath the control console.
- Fasten the lead to the handle with two small wire ties from the bolt bag, one at the upper end of the handle next to the console, and one at the very lower end of the handle where it attaches to the fuel tank support. Fasten the lead to the small hole in the channel under the console using another small tie from the bolt bag.
- 3.13 If machine is shipped without muffler installed, install muffler with hardware provided.
- 3.14 Service Engine: Refer to Engine Owner's Manual.
- 3.15 **GREASE UNIT: NOTE: UNIT IS NOT GREASED AT THE FACTORY.**
Refer to 5.1.13, for locations and grease amounts.
- 3.16 Follow pre-start instructions as outlined in 4.2.
- 3.17 Perform any needed adjustments as outlined in the Adjustment Section.

4. OPERATION INSTRUCTIONS

4.1 Controls

- 4.1.1 Familiarize yourself with the controls and operation of the unit.
- Carefully read the following information about the controls and their operation.*
- 4.1.2 Operator Presence Control (OPC) Levers: Located on the upper handle assembly directly above the handle grips. See Figure 9. ***When these levers are depressed, the OPC system senses that the operator is in the normal operator's position. When the levers are released, the OPC system senses that the operator has moved from the normal operating position*** and will kill the engine if either the transmission shift lever is ***not in the neutral*** position or the ***PTO is engaged***. See Figure 9.
- 4.1.3 Drive Levers: Located on each side of the upper handle assembly directly below the handle grips. See Figure 9. These levers individually control the clutching action of the wheel drive belts and the brakes. When the drive levers are all of the way out, the brakes disengage and the wheel drive belts engage.
- Gradually squeezing the left or right hand drive lever disengages the wheel drive belts, causing the left hand or right hand wheel to slow down until they reach neutral or stop. This makes the machine turn to the left or right respectively. Squeezing further engages the park brakes. The sharpness of the turn varies by how much the lever is squeezed. For straight ahead motion, smoothly release both drive levers to engage both drive wheels simultaneously.
- 4.1.4 Neutral Lock/Parking Brake Latch: Located at the end of the handles. The purpose of these latches is to allow the operator to lock the drive levers in a "neutral" position where neither the wheel drive belts nor the brakes engage, or in a "park brake" position where the wheel drive belts are not engaged and the park brake is engaged. See Figure 9.
- Apply parking brakes whenever leaving the operators position.***

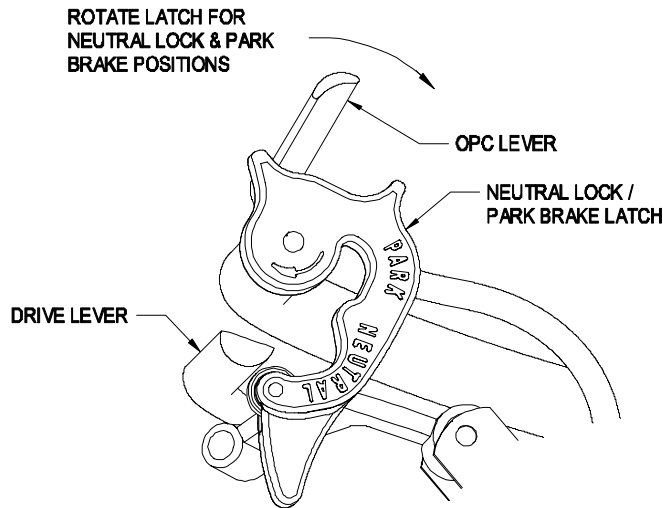


FIGURE 9
NEUTRAL LOCK/PARK BRAKE LATCH

- 4.1.5 **PTO Engagement:** Located on the left side of the upper handle.
To engage the blades, push the lever forward, or away from the operator, until the linkage locks over-center.
To disengage the blades, pull the lever to the rear, or towards the operator.
- 4.1.6 **Choke Control:** Choke is used to aid in starting a cold engine.
The choke control is located on the front left corner of the fuel tank support and is activated by pulling the control outward. Once the engine has started move the choke control to the "OFF" position. **DO NOT** run warm engine with the choke in the "ON" position.
- 4.1.7 **Throttle Control:** Located on the control console's right side. The throttle is used to control engine speed. Moving the throttle control forward will increase engine speed and moving it to the rear will decrease engine speed.
- 4.1.8 **"Off-Run" Switch:** Located on the console. Turn key to the "Run" position to allow the engine to be started. Turn key to the "Off" position to shut engine off.
- 4.1.9 **Fuel Shut-Off Valve:** Installed in the fuel line midway between the tank and the engine. The fuel shut-off valve is used to shut off the flow of fuel when parking inside a building, during transportation to and from the job sites, and when the machine will not be used for a few days.
Rotate valve 1/4 turn clockwise to shut fuel off. Rotate valve 1/4 turn counter-clockwise to turn fuel on.
- 4.1.10 **Transmission Shift Lever:**
Located under the control console and behind the fuel tank. It shifts the 5-speed transmission into five forward gears, neutral, and reverse. Shift transmission only when drive levers are in the **neutral** position. Shifting without drive levers in neutral may cause damage to the transmission.

NOTE: Reverse is "reverse assist" only, meaning when the transmission is in reverse, the operator has to pull the unit backward to "assist" with the movement of the unit.

4.2 PRE-START

- 4.2.1 Refer to Maintenance and Adjustment Section 5 and perform all of the necessary inspection and maintenance steps.
- 4.2.2 Fill fuel tank. For best results use only clean fresh regular grade **unleaded** gasoline with an octane rating of 87 or higher. Regular grade leaded gasoline may also be used; however, combustion chamber and cylinder head will require more frequent service. See Engine Owner's Manual.

Do not add oil to gasoline.

Do not overfill fuel tank. Never fill the fuel tank so that the fuel level rises above a level that is 1/2" (1.3 cm) below the bottom of the filler neck to allow for fuel expansion and prevent fuel spillage.

- 4.2.3 Make sure you understand the controls, their locations, their functions and their safety requirements.

4.3 OPERATING INSTRUCTIONS

- 4.3.1 Refer to Engine Owner's Manual for detailed operating instructions regarding the engine.

- 4.3.2 Starting Engine: Operator must have **PTO disengaged** and **transmission in neutral**. **Open** fuel shut-off valve.

NOTE: Always engage the left and right neutral lock/park brake latches in the "park brake" position when starting the engine (See Figure 10 (d)).

Pull out the choke control. Place the throttle control **midway** between the "Slow" and "Fast" positions. Turn the key to "Run" position. Pull recoil rope to start engine. After the engine warms up, gradually push in choke control. **DO NOT** run warm engine with the choke in the "ON" position.

NOTE: Kawasaki engines generally need to be "choked" even when warm.


- 4.3.3 Stopping Engine: Lock the drive levers in the "park brake" position, disengage PTO, and position transmission in neutral. Place the throttle control **midway** between the "slow" and "fast" positions. Allow the engine to run a minimum of 15 seconds; then turn the key to the "OFF" position.

Close fuel shut-off valve if machine will **not** be used for a few days, when parking inside a building, or when transporting the unit.

- 4.3.4 Drive Lever/Neutral Lock/Park Brake Latch Operation:

To lock the drive levers in "**neutral lock**", squeeze the drive levers to the "neutral" position. See Figure 10 (b). Place thumbs on the inner thumb lobe of the neutral lock /park brake latches and rotate them to the "neutral" position. See Figure 10 (c). Release the drive levers.

To lock the drive levers in "**park brake**", squeeze the drive levers farther to the "brake" position. Place thumbs on the inner thumb lobe of the neutral lock/park brake latches and rotate them to the "park" position. See Figure 10 (d). Release the drive levers.

 CAUTION	
POTENTIAL HAZARD	◆ If the neutral lock/park brake latches are not completely engaged the drive levers could unexpectedly slip into the forward drive position.
WHAT CAN HAPPEN	◆ If the drive levers slip into the drive position, the unit could lurch forward and cause injury or property damage.
HOW TO AVOID THE HAZARD	◆ Be sure the drive levers are securely seated at the bottom of the "neutral" or "park" areas of the neutral lock latches.

To place the drive levers in the "**drive**" position, slightly squeeze the drive levers while placing thumbs on the outer thumb lobe of the neutral lock/park brake latches (or the index finger on the front lobe) and rotate them from under the drive levers. **Slowly** and **carefully** release the drive levers. See Figure 10 (a).

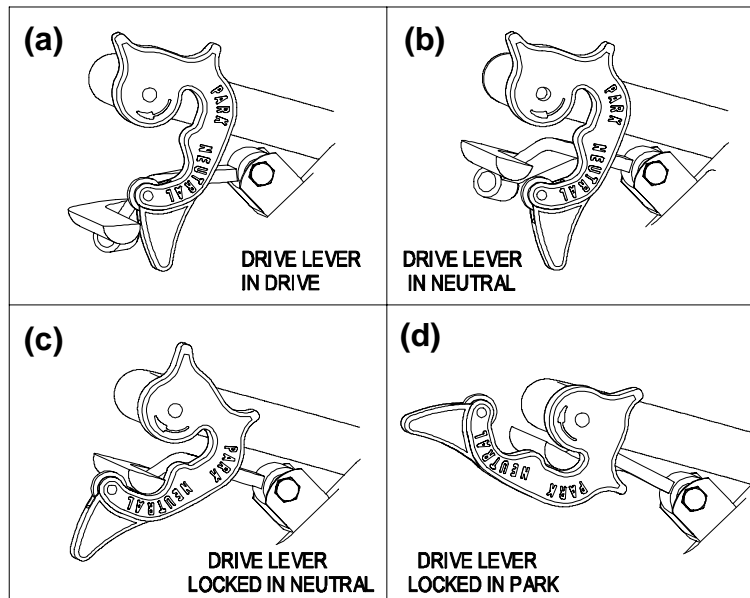


FIGURE 10

DRIVE LEVER, NEUTRAL LOCK/PARK BRAKE LATCH OPERATION


- 4.3.5 **Drive Wheel Engagement and Turning:** With drive levers in “neutral” or “park brake” position, shift transmission into desired gear. Squeeze both drive levers and move both neutral lock/park brake latches from the “neutral” or “park brake” position to the “drive” position.


For straight ahead motion: Smoothly release both drive levers to engage drive wheels.

For turning: Squeeze the right hand drive lever to turn right and the left hand drive lever to turn left (See Section 4.1.2).

- 4.3.6 **To Stop:** Squeeze drive levers back to engage brakes. Move neutral lock/park brake latches into the “park brake” position and release the drive levers. Shift transmission to neutral.

- 4.3.7 **PTO Engagement:**

 DANGER
POTENTIAL HAZARD ♦ The rotating blades under the mower deck are dangerous.
WHAT CAN HAPPEN ♦ Blade contact can cause serious injury or kill you.
HOW TO AVOID THE HAZARD ♦ <i>DO NOT</i> put hands or feet under the mower or mower deck when the blades are engaged.

 DANGER
POTENTIAL HAZARD <ul style="list-style-type: none"> ◆ An uncovered discharge opening will allow objects to be thrown in an operator's or bystander's direction. Also, contact with the blade could occur.
WHAT CAN HAPPEN <ul style="list-style-type: none"> ◆ Thrown objects or blade contact can cause serious injury or death.
HOW TO AVOID THE HAZARD <ul style="list-style-type: none"> ◆ Never operate the mower with the discharge deflector raised, removed, or altered unless there is a grass collection system or mulch kit in place and working properly.

Be sure that all persons are clear of mower deck and discharge area before engaging the PTO. Set throttle to "midway" position. Push the PTO engagement arm forward and down to engage blades. Accelerate to full throttle to begin mowing (See Section 4.1.4).


4.3.8 PTO Disengagement: Pull upward and back completely on the PTO engagement arm to disengage the blades. (See Section 4.1.4)

4.3.9 Changing Gears

When changing gears, **always** squeeze drive levers to the neutral position. The shift lever may be moved with a knee or by hand (engage the neutral lock latches if shifting by hand).

NOTE: Reverse gear is reverse assist only, the operator must pull the unit backwards.

4.4 TRANSPORTING

 WARNING
POTENTIAL HAZARD <ul style="list-style-type: none"> ◆ Loading the mower onto a trailer without strong enough or properly supported ramps could be dangerous.
WHAT CAN HAPPEN <ul style="list-style-type: none"> ◆ The ramps could collapse causing the unit to fall, which could cause injury.
HOW TO AVOID THE HAZARD <ul style="list-style-type: none"> ◆ Use proper ramps that are secured to the truck or trailer. ◆ Keep feet and legs out from under the unit when loading and unloading. ◆ If necessary, use assistance when loading.


Be sure fuel shut-off valve is closed.


Use a heavy duty trailer to transport the machine. *Engage the park brakes* and block wheels. After the wheels have been properly blocked, securely fasten the machine to the trailer with straps, chains, cables, or ropes. Be sure that the trailer has all necessary lighting and marking as required by law and use a safety chain.

NOTE: When transporting machine, be sure to engage the park brakes. Failure to do so can result in damage and/or premature wear to drive train.

Do not rely solely on the parking brake to hold machine on trailer.

5. MAINTENANCE & ADJUSTMENTS

 WARNING
POTENTIAL HAZARD <ul style="list-style-type: none">◆ While maintenance or adjustments are being made, someone could start the engine.
WHAT CAN HAPPEN <ul style="list-style-type: none">◆ Accidental starting of the engine could seriously injure you or other bystanders.
HOW TO AVOID THE HAZARD <ul style="list-style-type: none">◆ Remove the key from the ignition switch and/or pull the wire(s) off the spark plug(s) before you do any maintenance. Also push the wire(s) aside so it does not accidentally contact the spark plug(s).

 WARNING
POTENTIAL HAZARD <ul style="list-style-type: none">◆ The engine can become very hot.
WHAT CAN HAPPEN <ul style="list-style-type: none">◆ Touching a hot engine can cause severe burns.
HOW TO AVOID THE HAZARD <ul style="list-style-type: none">◆ Allow the engine to cool completely before service or making repairs around the engine area.

5.1 PERIODIC MAINTENANCE

5.1.1 Check engine oil level.

Service Interval: **See Engine Owner's Manual**

- Stop engine and wait for all moving parts to stop. Make sure machine is on a level surface.
- Check with engine cool.
- Clean area around dipstick. Remove dipstick and wipe oil off. Reinsert the dipstick (**DO NOT** screw into place). Remove dipstick and check oil level.
- If the oil level is low, add oil as specified in the Engine Owner's Manual to bring the oil level up to the "FULL" mark on the dipstick.

DO NOT OVERFILL.

IMPORTANT: DO NOT operate the engine with oil level below the "LOW" (or "ADD") mark or over the "FULL" mark.

5.1.2 Clean engine air cooling system.

Service Interval: **See Engine Owner's Manual**

- Stop engine and wait for all moving parts to stop. Remove key or spark plug wire(s).
- Clean all debris from engine air intake screen and from around engine shrouding.

5.1.3 Clean grass build-up under deck and check mower blades.

Service Interval: **Daily**



CAUTION

POTENTIAL HAZARD

- ♦ Raising the mower deck for service or maintenance relying solely on mechanical or hydraulic jacks could be dangerous.

WHAT CAN HAPPEN

- ♦ The mechanical or hydraulic jacks may not be enough support or may malfunction allowing the unit to fall, which could cause injury.

HOW TO AVOID THE HAZARD

- ♦ DO NOT rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands or equivalent support.

- Disengage PTO.
- Stop engine and wait for all moving parts to stop. Remove key or spark plug wire(s).
- Raise deck and block up using proper safety precautions.
- Clean out any grass build-up from underside of deck and in deck discharge chute.
- Inspect blades and sharpen or replace as required.
- If blade removal is necessary, be careful for the sharp cutting edges of the blades.
- Re-install the blades (if they were removed) and torque blade bolts to 115-120 ft. lbs. Be sure the spring disc washer cone is installed toward the bolt head (See Figure 11).



CAUTION

POTENTIAL HAZARD

- ♦ Operating a mower deck with loose or weakened blade bolts can be dangerous.

WHAT CAN HAPPEN

- ♦ A loose or weakend blade bolt could allow a blade rotating at a high speed to come out from under the deck, causing serious injury or property damage.

HOW TO AVOID THE HAZARD

- ♦ Replace the blade bolt after striking a foreign object. (Use only Exmark replacement parts PN 103-1026 - blade bolt and PN 1-513208 – spring disc washer).
- ♦ DO NOT lubricate the threads of the bolt or spindle before assembly.
- ♦ Torque the blade bolt to 115-120 ft. lbs.

- Remove jack stands (or equivalent support) and lower deck to ground.

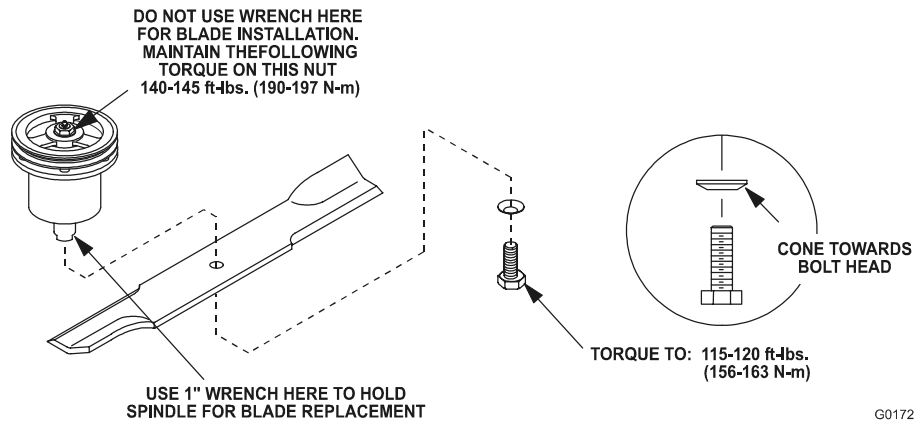


FIGURE 11
BLADE BOLT INSTALLATION

5.1.4 Check safety interlock system.

Service Interval: **Daily**

- a) For your safety, your Exmark mower is equipped with Operator Presence Controls (OPC). When either the PTO is engaged, or the transmission shift lever is not in neutral and both hands are removed from the handles, the mower engine **MUST stop**.
- b) Check OPC circuits. Clear the area. Run engine at one-third throttle, then with drive levers and neutral lock/park brake latches in **“park brake” position**, Shift the transmission into gear and release OPC levers – **engine MUST stop**.

Again, run engine at one-third throttle, move the transmission shifter lever to **neutral**, engage PTO and release OPC levers - **engine MUST stop**.

- c) **If machine does not pass any of these tests, DO NOT operate. Contact your authorized EXMARK SERVICE DEALER.**

IMPORTANT: It is essential that all Operator Safety Mechanisms, be in place and in proper operating condition prior to mowing.

5.1.5 Check for loose hardware.

Service Interval: **Daily**

- a) Stop engine and wait for all moving parts to stop. Remove ignition key or spark plug wire(s).
- b) Visually inspect machine for any loose hardware or any other possible problem. Tighten hardware or correct the problem before operating.

5.1.6 Check Brake and Wheel Drive Linkage Adjustment

Service Interval: **Daily**

Refer to Section 3.11. Note any bent linkage or hardware, which may need servicing or replacing.

5.1.7 Service pre-cleaner element and air cleaner.

Service Interval: **See Engine Owner's Manual**

- a) Stop engine and wait for all moving parts to stop. Remove key or spark plug wire(s).
- b) See engine owners manual for cleaning instructions.

5.1.8 Change engine oil.

Service Interval: **See Engine Owner's Manual**

NOTE: Change oil after first five (5) hours of operation. Follow engine manufacturer's recommendations for future oil changes.

- a) Stop engine and wait for all moving parts to stop. Remove key or spark plug wire(s).
- b) Drain oil while engine is warm from operation.
- c) The oil drain valve is located on left hand side of engine.
Place pan under machine to catch oil and turn valve counter clockwise with a 10 mm wrench to open valve. Allow oil to drain, then turn valve clockwise to close.
- d) Replace the oil filter as per Engine Owner's Manual. Clean around oil filter and unscrew filter to remove. Before reinstalling new filter, apply a thin coating of oil on the surface of the rubber seal. Turn filter clockwise until rubber seal contacts the filter adapter then tighten filter an additional 2/3 to 3/4 turn.
- e) Clean around oil fill cap and remove cap. Fill to the specified capacity and replace cap. Use oil as specified in Engine Owners Manual. **Do not overfill.**
- f) Start the engine and check for leaks. Stop engine and recheck oil levels.

5.1.9 Check grease level, input and output shaft bearing wear on Peerless Transmission. (Replace gearbox grease yearly)

Service Interval: **160 hrs.**

- a) Stop engine, wait for all moving parts to stop, and remove key or spark plug wire(s).
- b) Place drive levers and neutral lock/park brake latches in the neutral lock position.
- c) Remove shifter lever from top of transmission.
- d) Remove shifter plate from top of transmission and the two leads from the neutral start switch.
- e) Release the tension on the transmission belt.
- f) Check for side play caused by bearing wear on the input and out put shafts of the transmission. Replace bearings if necessary.
- g) Remove the six bolts that fasten the upper case to the lower case and carefully remove the upper case half.
- h) Check the grease level in the lower case. The grease level should be approximately 1-1/2" to 1-3/4" (3.8 to 4.4 cm) from the gearbox bottom. If necessary, fill to proper level with Peerless grease (Part No. 788067).
- i) Reinstall upper case half and fasten in place with six bolts previously removed.
- j) Reinstall all parts removed in Steps c and d. Install drive belt and adjust tension as stated in Section 5.2.5.

5.1.10 Check tire pressures.

Service Interval: **Pneumatic (air-filled) Drive Tires – 40 hrs.**

Semi-pneumatic Caster Tires – No Maintenance

- a) Stop engine and wait for all moving parts to stop. Remove key or spark plug wire(s). Check air pressure in drive tires; recommended tire pressure is: 12 to 16 psi (83-110 kPa);
- b) Inflate tires to pressures stated above. Measure the circumference of each drive tire. Adjust tire pressures within the above range to try to make tire circumferences match as closely as possible.

5.1.11 Inspect Belt wear.

Service Interval: **40 hrs.**

- a) Stop engine and wait for all moving parts to stop. Remove key or spark plug wire(s).

- b) Remove deck support belt shield to check mower deck drive belt condition.
- c) Look under engine deck to check the transmission drive and clutching belt condition.
- d) Inspect wheel drive belt conditions
- e) Check the wheel drive idler arms to be sure they pivot freely. Disassemble, clean and grease pivot bushings if necessary.

5.1.12 Inspect PTO Clutching Belt Tension.

Service Interval: **Check every 2 hrs. for first 8 hrs. operation then check every 40 hrs. thereafter.**

- a) Stop engine and wait for all moving parts to stop.
- b) Engage PTO lever.
- c) Look through the round hole in the left rear corner of the engine deck to inspect PTO clutching belt tension. Bolt on PTO engagement linkage bellcrank and indicator arm should align within 1/16" (See figure 14). Refer to section 5.2.2 for adjustment.

5.1.13 Lubrication

Service Interval: **Refer to Chart.**

- a) Stop engine, wait for all moving parts to stop, and remove key or spark plug wire(s).
- b) Lubricate fittings with one to two pumps of NGLI grade no. 2 multi-purpose gun grease. Refer to the following chart for fitting locations and lubrication schedule.

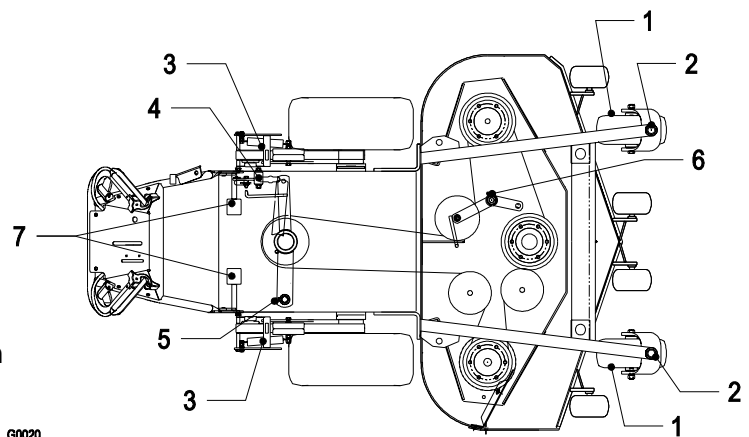
GREASE LUBRICATION CHART

FITTING LOCATIONS	INITIAL PUMP	QUANTITY		SERVICE INTERVAL
		36"	48"	
1. Caster Wheel Bearings	12	2	2	8 hours
2. Caster Pivots	2	2	2	8 hours
3. Drive Wheel Idler Arm	2	2	2	8 hours
4. PTO Engagement Bellcrank	1	1	1	40 hours
5. Clutch Arm Pivot	1	1	1	40 hours
6. Mower Deck Idler Pivots	2	1	1	Yearly
7. Trans. Output Shaft Coupler	2	2	2	40 hours

No. 5 (Clutch Arm Pivot)
Located Under Engine Deck

No. 7 (Trans. Coupler)
Located Below Fuel Tank Support

No. 3 (Idler Arm Pivots)
Disassemble and grease once a Month under a "No Load" condition



G0020

- c) Lubricate pivot points with a spray penetrating lubricant as directed below.

SPRAY LUBRICANT CHART

PIVOT POINT	NO. OF PLACES	SERVICE INTERVAL
1. PTO Engagement Lever	1	Weekly

- d) Lubricate drive wheel hubs once a year. First remove wheel, then remove hub cap. Lubricate the grease fitting on each wheel hub with an NGLI grade no. 2 multipurpose gun grease, until grease appears through outer bearing. Reinstall hub caps and wheels.
- e) Replace 5-speed gearbox grease yearly. Use 18 oz. of Peerless grease (Part No. 788067). See Section 5.1.9.

5.1.14 Check spark plugs.

Service Interval: **160 hrs.**

- a) Remove spark plugs, check condition and adjust plug gap or replace with new plugs. See Engine Owner's Manual.

5.1.15 Remove engine shrouds and clean cooling fins.

Service Interval: **See Engine Owner's Manual**

- a) Stop engine, wait for all moving parts to stop, and remove key or spark plug wire(s).
- b) Remove cooling shrouds from engine and clean cooling fins. Also clean dust, dirt and oil from external surfaces of engine which can cause improper cooling.
- c) Make sure cooling shrouds are properly reinstalled. Operating the engine without cooling shrouds will cause engine damage due to overheating.

5.1.16 Change fuel filter.

Service Interval: **As Required**

- a) A fuel filter is installed in the fuel line between the fuel tank and the engine. Replace when necessary.

5.1.17 Refer to Engine Operators Manual for detailed maintenance regarding the engine.

5.1.18 Thread locking adhesives such as "Loctite 242" or "Fel-Pro, Pro-Lock Nut-Type" are used on the following fasteners:

- a) Transmission drive sheave setscrews.
- b) Wheel drive sheave setscrews on transmission output shafts.
- c) OPC lever setscrews.
- d) Sheave retaining bolt in end of engine crankshaft.
- e) Lower Sheave retaining bolt on clutch arm.
- f) Fuel tank bulkhead fitting threads (S/N 370,000 & higher).
- g) Cutter housing spindle nut.

Adhesives such as "Loctite RC/609 or RC/680" or "Fel-Pro Pro-Lock Retaining I or Retaining II" are used on the following:

- a) OPC lever hubs and cross-shaft

NOTE: Care must be used *not* to bond the bearing, next to each OPC hub, to the cross shaft which could cause binding of the OPC levers and erratic operation.

- b) Fuel tank studs, where studs are inserted into tank.

5.1.19 An anti-seize compound is used on the following locations:

- a) Between engine crankshaft and transmission and blade drive sheaves.
- b) On clutch arm assembly between bearings and shaft and between lower sheave and shaft.
- c) Between transmission input shaft and sheaves.
- d) Between transmission output shafts and sheaves.
- e) Between transmission output shafts and bearings.


5.1.20 Mobil HTS grease (or food-grade antisieze) is used in the following locations:

- a) Between the cutter housing spindle and bearings.
- b) Between the cutter housing spindle and sheave.
- c) Under top cutter housing bearing guard.

5.1.21 Dielectric grease is used on all blade type electrical connections to prevent corrosion and loss of contact.

5.2 ADJUSTMENTS

5.2.1 Cutting height and anti-scalp roller adjustment.

 WARNING	
POTENTIAL HAZARD	◆ When the two front support rod hairpins are removed from the mower deck, the weight of the tractor section may cause the front frame to rise suddenly
WHAT CAN HAPPEN	◆ If the unit rises suddenly, injury may occur.
HOW TO AVOID THE HAZARD	◆ Securely hold down the front of the unit when the front support rod hairpins are removed.

- a) Stop engine, wait for all moving parts to stop, and remove key or spark plug wire(s).
- b) Install hairpin clips in the holes shown on sketch below for the desired cutting height (See Figure 13).

IMPORTANT: To maintain correct cutting height and rake, check the following for proper adjustment.

1. The front and rear hairpins are in the same holes with the proper spacers under the hair pins (See Figure 12).
2. The tire pressures are set as directed in Section 5.1.10.
3. The length of the rear deck support link assemblies should average 6.89" (approximately 6 7/8") (17.5 cm) from the center of the balljoint to the center of the furthest hole (See Figure 12).

NOTE: All (4) pins must equally support the weight of the deck. Adjustment in the length of the rear deck support assemblies may be necessary. If one side of the frame is longer than 6.89" (17.5 cm), than the opposite side must be shorter by the same amount.

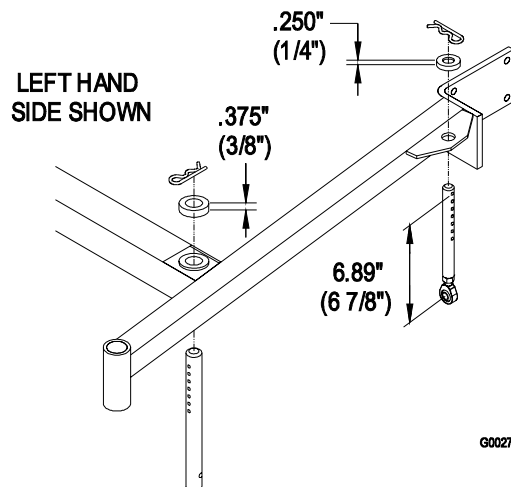


FIGURE 12
CUTTING HEIGHT ADJUSTMENT

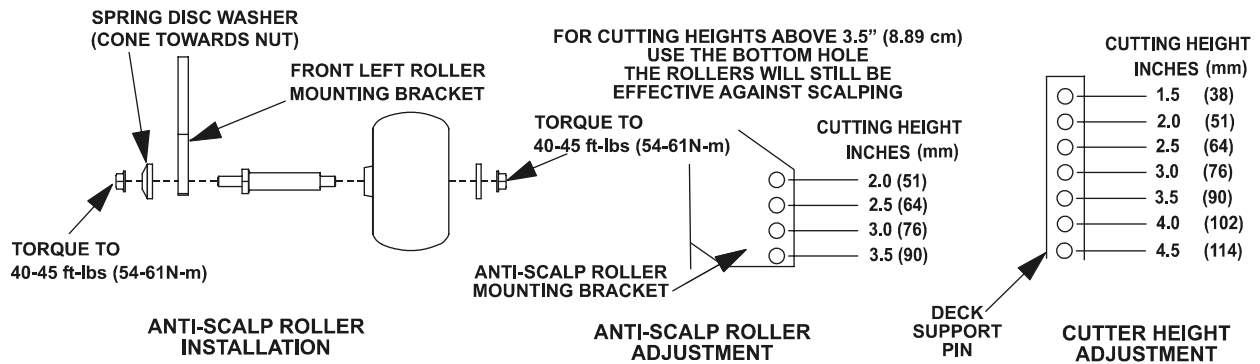


FIGURE 13

ANTI-SCALP ROLLER BOLT INSTALLATION

ANTI-SCALP ROLLER AND CUTTING HEIGHT ADJUSTMENT

G0280

- c) Adjust anti-scalp rollers for Normal Operating Conditions. Stop engine and wait for all moving parts to stop. Place rollers in one of the positions shown in Figure 13. Rollers will maintain 3/4 in. (19 mm) clearance to the ground to minimize gouging and roller wear or damage. **For Maximum Deck Flotation**, place rollers one hole position lower. Rollers should maintain 1/4 in. (6.4 mm) minimum clearance to ground. **Do Not** adjust rollers to support the deck. Be sure the spring disc washer is installed with the cone towards the nut. Tighten nuts properly.
- d) When operating in extremely rough conditions it may be necessary to position the anti-scalp rollers one or two holes higher than described in "b" to prevent damage to the rollers and/or bolt failure (See Figure 13).

NOTE: When anti-scalp rollers are placed in these positions, reduced deck flotation will result.

5.2.2 PTO engagement Linkage: Located between the PTO engagement lever on the left handle and the left rear corner of the engine deck.

- a) Stop engine and wait for all moving parts to stop.
- b) With PTO engaged, adjust the linkage length by loosening the lock nut on the turnbuckle and adjusting the turnbuckle so that the bolt on the bellcrank and the indicator arm align with each other within 1/16" (1.6 mm). See Figure 14. Tighten locknut against turnbuckle.

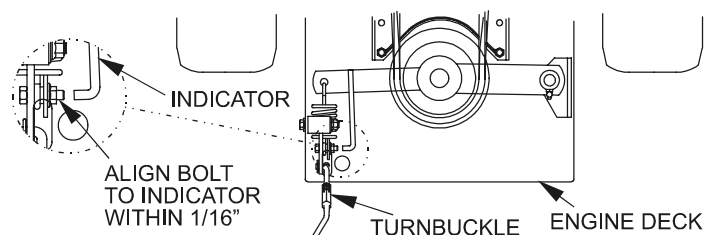


FIGURE 14

PTO ENGAGEMENT LINKAGE

5.2.3 PTO Safety Switch: Mounted to a tab on the inside left side of the fuel tank support.

- a) Stop engine and wait for all moving parts to stop. Remove key or spark plug wire(s).
- b) With PTO disengaged and the bellcrank touching the rear of the slot in the engine deck, adjust the PTO safety switch (if needed) until the bellcrank arm is 5/16" (8 mm) from the switch body.
- c) Be sure the bellcrank **DOES NOT** touch the switch body or damage to the switch could occur.
- d) Retighten PTO switch mounting hardware.

5.2.4 Engine to Cutter Deck Belt:

No adjustment necessary.

5.2.5 Transmission Belt Adjustment:

- a) Stop engine and wait for all moving parts to stop. Remove key or spark plug wire(s).
- b) To tighten transmission belt, loosen the 3/8" nyloc nut on transmission belt idler pulley. Slide bolt inward in slot and retighten nyloc nut.
- c) When properly adjusted, the belt should have 1/2" (12 mm) of deflection with three pounds (13.3 Nt) of pressure on the belt midway between the transmission and engine pulley.

5.2.6 Wheel drive belts and scrapers:

Be sure mud and grass scraper, on each side, is adjusted properly and centered in the pulley grooves. The pointed part of the scraper should be centered and as deep in the pulley groove as possible without rubbing at any point.

NOTE: Wheel drive springs have three tension settings. See Section 5.2.11.

5.2.7 Brake Adjustment:

See 3.11 steps c) and d)

5.2.8 Wheel drive linkage adjustment:

See 3.11 steps a) and b)

5.2.9 Shifter lever adjustment:

See 3.10

5.2.10 Shifter detent adjustment:

Transmission shifter detent can be adjusted by adjusting the setscrew on the backside of transmission located just behind the neutral start switch. Turn setscrew in (clockwise) to hold the transmission shifter more positively in each gear and to increase the force on the lever required to shift gears.

Turn setscrew out (counterclockwise) to decrease force on lever required to shift gears. Factory setting is to turn setscrew all the way in then back out 1-1/2 turns.

IMPORTANT: Screwing setscrew in too far will prevent the transmission from shifting.

5.2.11 Wheel drive spring tension adjustment:

It may be necessary to increase wheel drive belt tension under certain conditions such as, wet grass, hilly terrain, or while pulling a sulky.

- a) Stop engine, wait for all moving parts to stop, and remove key or spark plug wire(s).
- b) Disengage neutral lock/park brake latches and release drive levers to lower spring force.
- c) Remove the 5/16-18 whizlock nut securing the adjustment bolt to the drive wheel shield. Locate bolt assembly in the desired position as follows

Position A - Normal Conditions

Position B - More Severe

Position C - Most Severe

NOTE: Lever force is lowest with bolt assembly in Position A and will increase in Positions B and C (See Figure 15).

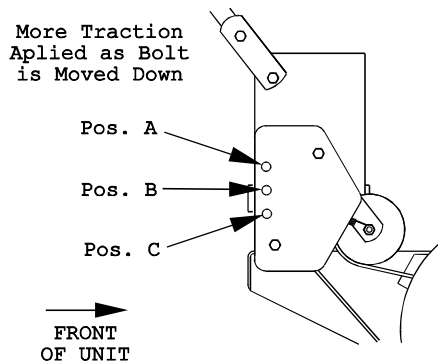


FIGURE 15
DRIVE BELT TENSION
ADJUSTMENT POSITIONS

6. WASTE DISPOSAL

6.1 MOTOR OIL DISPOSAL

Engine oil is a pollutant to the environment. Dispose of used oil at a certified recycling center or according to your state and local regulations.

7. TROUBLE SHOOTING

7.1 MOWER PULLING LEFT OR RIGHT.

- a) Check idler arm pulleys and drive sheaves for mud and/or grass buildup. Check for proper scraper position. See 5.2.6.
- b) Check to be sure idler arms pivot freely, if not lubricate idler pivots.
- c) Check for worn drive belts.

NOTE: Wheel drive belts should be replaced as a set. A new belt should not be mixed with a worn belt.

- d) Check drive linkage adjustment - See 3.11 steps a) and b)
- e) Check for proper tire pressure in drive tires. Recommended tire pressure for the drive tires is 12 to 16 psi. (82-110 kPa) Higher pressures may be used in the tire on the side that it pulls to (up to 28 psi. (193 kPa)).

Note: *Different pressures may make mower cut unevenly.*

7.2 MOWER CUTS UNEVENLY.

- a) Check the drive tire pressure and tire circumference. See 5.1.10. A more uniform cutting height may be obtained with higher tire pressure on rough terrain. A lower tire pressure provides more flotation.
- b) Check deck support pins. Hairpin clips must be in the same hole position on each support pin.
- c) Check deck support alignment and check mounting brackets to be sure all bolts are tight.
- d) Check blades tip to tip for straightness. (They should be within 3/16" (4.8 mm), or one blade width from being in line.)

7.3 ENGINE WILL NOT START.

- a) Check that choke is in the "ON" position for a cold engine.

NOTE: Kawasaki engines may need to be choked even when warm.

- b) Make sure the key switch is in the "ON" position
- c) Make sure transmission is in "true neutral" position. (See section 3.10c).
- d) Check that the PTO is disengaged and the PTO switch is depressed.
- e) Check that there is fuel in the tank and that the fuel valve is open.

- f) Check that the spark plug wire(s) are properly connected.
- g) Check for loose or faulty wiring connections. If it is necessary to disconnect wire connectors, **Do Not** pull on the wires while disconnecting.
- h) Check for corrosion at all wiring connections. Even minor corrosion may cause a faulty connection. Clean connector terminals thoroughly with electrical contact cleaner, apply dielectric grease and reconnect.

IMPORTANT: It is essential that all operator safety mechanisms be connected and in proper operating condition prior to mower use.

NOTE: After carefully checking the above steps, attempt to start the engine. If it does not start, contact your authorized Exmark service dealer.

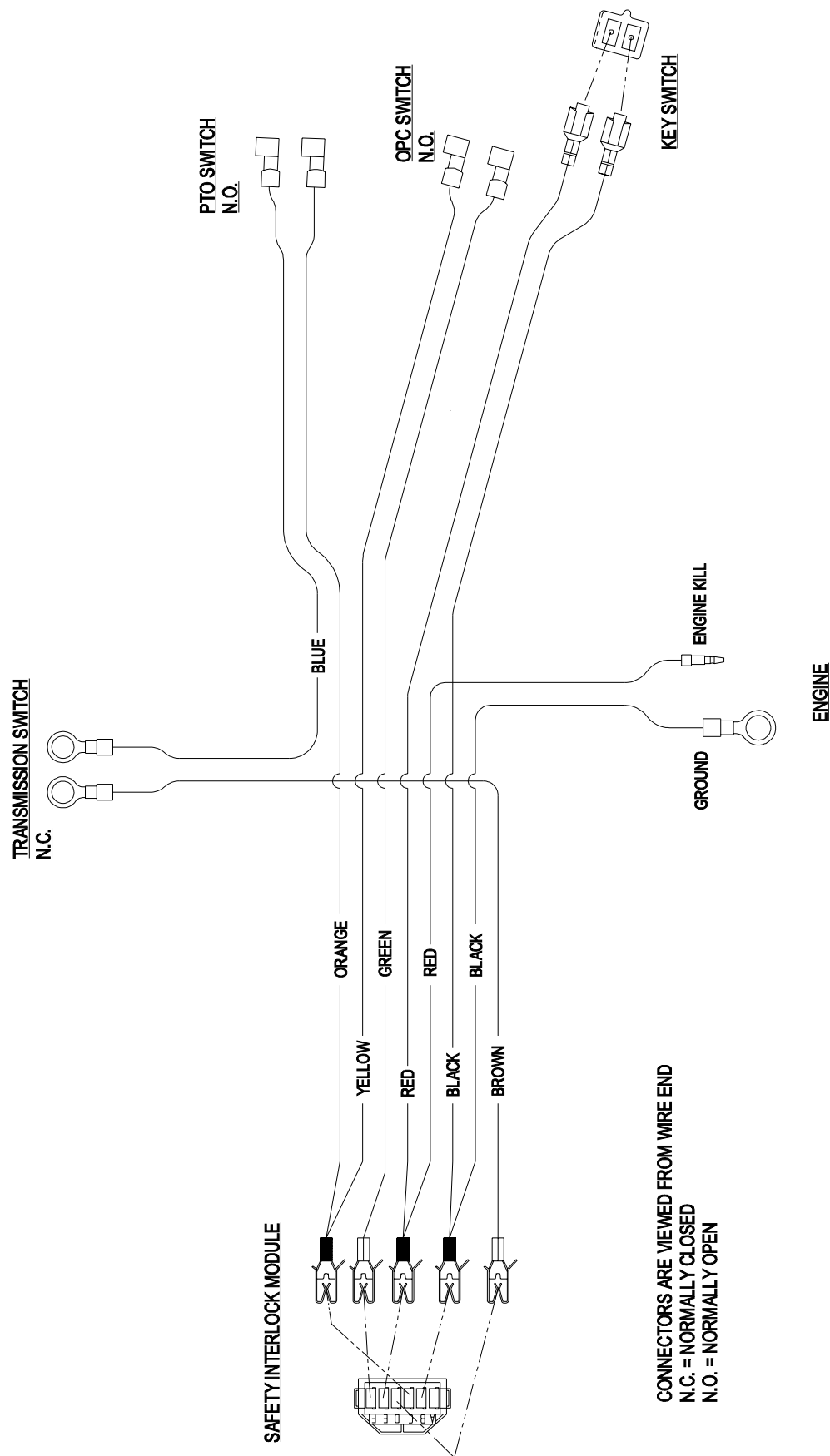
ENGINE TROUBLESHOOTING

When a problem occurs, do not overlook the simple causes. For example, starting problems could be caused by an empty fuel tank. The following table lists some of the common causes of trouble. Do not attempt to service or replace major items or any items that call for special timing or adjustment procedures (such as valves, governor, etc.). Have this work done by your Engine Service Dealer.

ENGINE TROUBLESHOOTING TABLE

PROBLEM	NO FUEL	IMPROPER FUEL	DIRT IN FUEL LINE	DIRTY AIR FILTER	FAULTY SPARK PLUG	ENGINE OVERLOADED	BLOCKED FUEL FILTER	INCORRECT OIL LEVEL	DIRTY AIR SCREEN
Will not start	X		X	X	X	X	X		
Hard starting	X	X	X	X	X	X	X		
Stops suddenly	X		X	X		X	X	X	X
Lacks power		X	X	X	X	X	X	X	X
Operates erratically		X	X	X	X	X	X		X
Knocks or pings		X				X			X
Skips or misfires		X	X	X	X				X
Backfires			X	X	X	X			X
Overheats			X	X		X		X	X
High fuel consumption				X	X	X			X

8. WIRING DIAGRAM – 15 HP KAWASAKI



2-Year Limited Warranty Exmark Turf Equipment

(For units purchased on or after October 1, 2004)

Conditions and Products Covered

Exmark Mfg. Co. Inc. and its affiliate, Exmark Warranty Company, pursuant to an agreement between them, jointly warrant on the terms and conditions herein, that we will repair, replace or adjust any part manufactured by Exmark and found by us (in the exercise of our reasonable discretion) to be defective in factory materials or workmanship for a period of two years.

This warranty applies to Exmark turf equipment purchased on or after October 1, 2004 sold in the US or Canada. This warranty may only be assigned or transferred to a second (or third) owner by an authorized Exmark dealer. The warranty period commences upon the date of the original retail purchase.

<u>Products</u>	<u>Warranty Period</u>
• All Products (except as noted below)	2 years
• All Attachments and Accessories	1 year
• Metro 21 Series	1 year
• Belts and Tires	90 days
• Battery	1 Year Prorated
• Engine*	Warranty is covered by engine manufacturer

*Please refer to the engine manufacturer's warranty statement that is included in the literature packet. We are not authorized to handle warranty adjustments on engines.

This warranty only includes the cost of parts and labor.

Items and Conditions Not Covered

This warranty does not cover the following:

- Pickup and delivery charges to and from any authorized Exmark Service Dealer.
- Any damage or deterioration due to normal use, wear and tear, or exposure.
- Cost of regular maintenance service or parts, such as filters, fuel, lubricants, tune-up parts, and adjustments.
- Any product or part which has been altered or misused or required replacement or repair due to normal wear, accidents, or lack of proper maintenance.
- Any repairs necessary due to use of parts, accessories or supplies, including gasoline, oil or lubricants, incompatible with the turf equipment or other than as recommended in the operator's manual or other operational instructions provided by Exmark.

All warranty work must be performed by an authorized Exmark Service Dealer using Exmark approved replacement parts.

Instructions for Obtaining Warranty Service

1. Contact any Exmark Service Dealer to arrange service at their dealership. To locate a dealer convenient to you, access our website at www.exmark.com. U.S. Customers may also call 402-223-6375.
2. Bring the product and your proof of purchase (sales receipt) to the Exmark Service Dealer.

If for any reason you are dissatisfied with the Service Dealer's analysis or with the assistance provided, contact us at:

Exmark Customer Service Department
The Exmark Warranty Company
2101 Ashland Avenue
Beatrice, NE 68310
402-223-6375 or
service@exmark.com

Owner's Responsibilities

The Exmark turf equipment, including any defective part, must be returned to an authorized Exmark service dealer within the warranty period. This warranty extends only to turf equipment operated under normal conditions. You must properly service and maintain your Exmark product as described in the operator's manual. Such routine maintenance, whether performed by a dealer or by you, is at your expense.

As a condition to this warranty, customer shall have read the operator's manual and shall have completed and submitted to Exmark Warranty Company, within the prescribed time, the Exmark warranty registration.

General Conditions

The sole liability of Exmark and Exmark Warranty Company with respect to this warranty shall be repair and replacement as set forth herein. **Neither Exmark nor Exmark Warranty Company shall have any liability for any other cost, loss or damage, including but not limited to, any incidental or consequential loss or damage.**

In particular, we shall have no liability or responsibility for:

- Expenses related to gasoline, oil or lubricants.
- Travel time, overtime, after hours time or other extraordinary repair charges or charge relating to repairs or replacements outside of normal business hours at the place of business of the authorized Exmark service dealer.
- Rental of like or similar replacement equipment during the period of any warranty, repair or replacement work.
- Any telephone or telegram charges or travel charges.
- Loss or damage to person or property other than that covered by the terms of this warranty.
- Any claims for lost revenue, lost profit or additional cost as a result of a claim of breach of warranty.
- Attorney's fees.

No Claim of breach of warranty shall be cause for cancellation or rescission of the contract of sale of any Exmark mower.

There are no understandings, agreements, representations, or warranties, express or implied, including but not limited to any regarding the merchantability (that product is fit for ordinary use) or fitness for use (that product is fit for a particular purpose), not specified herein, respecting the equipment which is the subject of this warranty.

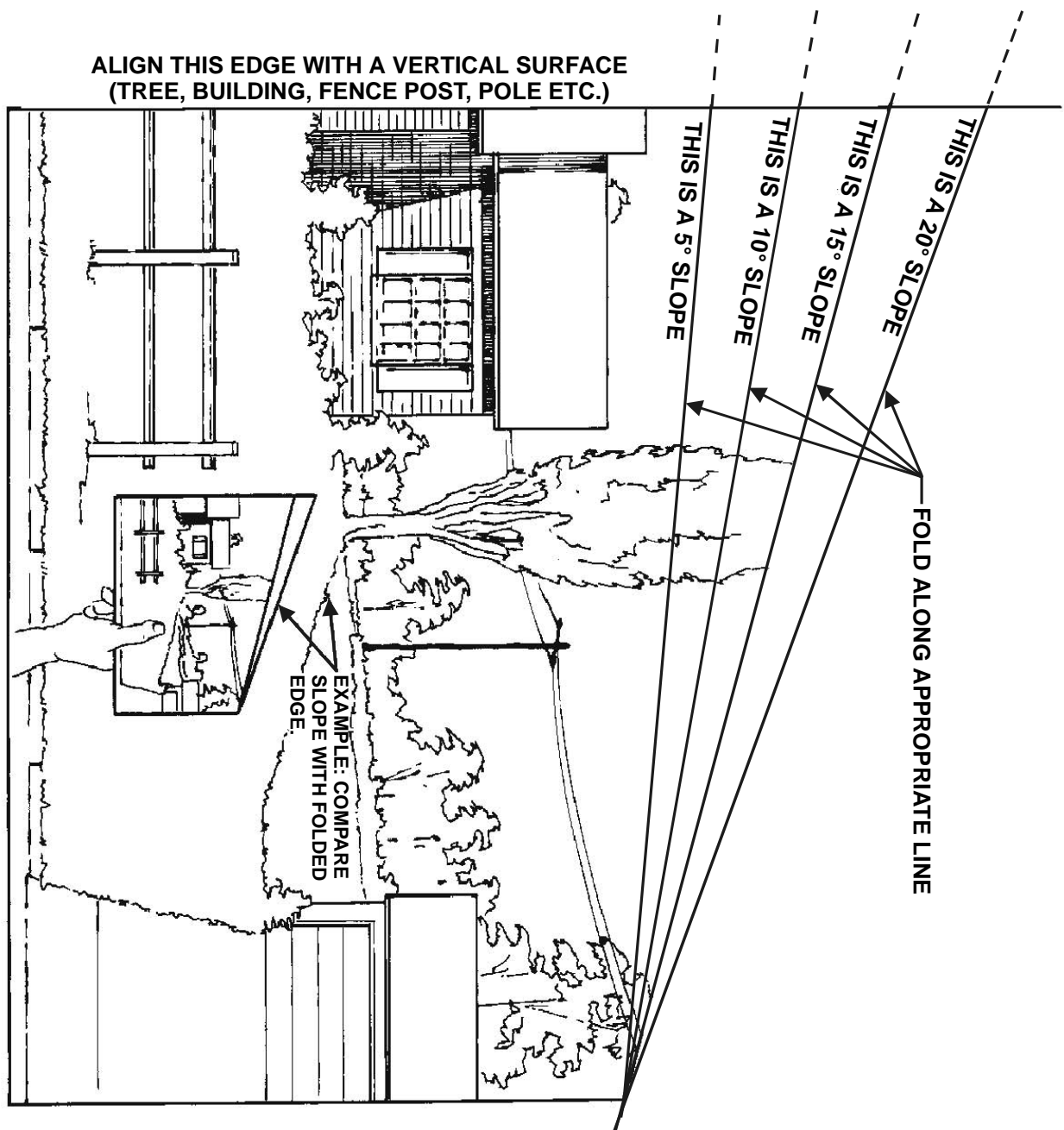
Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

NOTES

SERVICE RECORD

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SUN SHADE
TRASH CONTAINER
TURF STRIPER
ULTRA VAC COLLECTION SYSTEM
ULTRA VAC QUICK DISPOSAL SYSTEM

WALK BEHIND ACCESSORIES

GRASS CATCHER
MICRO-MULCH SYSTEM
STEERABLE SULKY
SULKY HITCH KIT
TURF STRIPER

Check us out on the Web:
www.exmark.com



WARNING

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

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