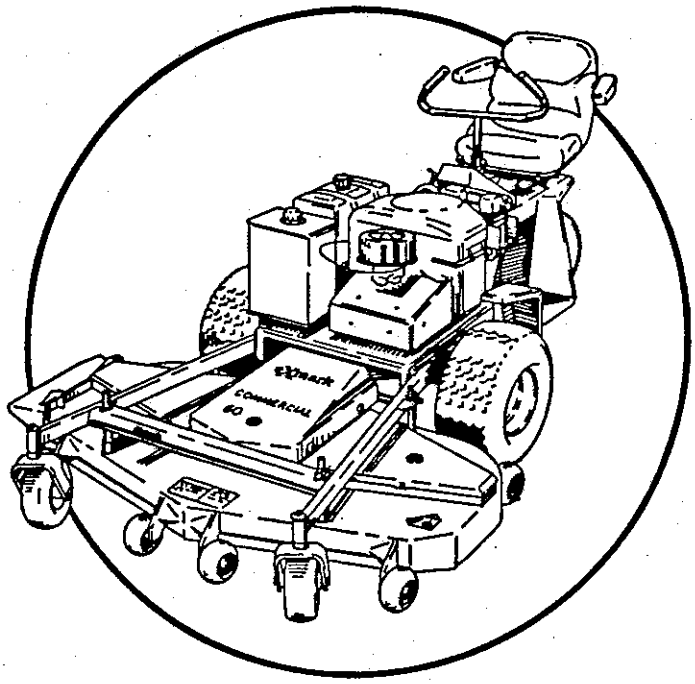
eXmark MFG. CO. INC.

# Turf Ranger 1800



## Operator's Manual

# Operator's Manual

This manual contains assembly, operating, maintenance, and adjustment instruction for your Exmark mower. Before you operate your mower, read this manual carefully in its entirety. By following the operating and maintenance instructions, you will prolong the life of your mower and maintain its maximum efficiency.

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

All Exmark equipment 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 stocks 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, some attention is required on your part. The amount of attention is slight, but important if you are to obtain the fullest measure of satisfaction and performance.

When ordering parts, always give the serial number and model of your mower as well as the quantity, part number and description of the part needed.

The serial number plate or the tractor unit is located on the top rear engine frame on the left hand side of the machine. The serial number plate for the deck is located on the front support pin gusset on the right hand side of the deck. We suggest you record numbers below for ready reference.

Tractor Unit Serial No. _____

Deck Serial No. _____

Date Purchased _____

Purchased From _____

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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!

This signal word used in conjunction with the safety alert symbol indicates the relative degree of a hazard:

DANGER: DENOTES THAT AN EXTREME HAZARD EXISTS WHICH WOULD RESULT IN HIGH PROBABILITY OF DEATH OR IRREPARABLE INJURY IF PROPER PRECAUTIONS ARE NOT TAKEN.

WARNING: DENOTES THAT A HAZARD EXISTS WHICH CAN RESULT IN INJURY OR DEATH IF PROPER PRECAUTIONS ARE NOT TAKEN.

CAUTION: DENOTES A REMINDER OF SAFETY PRACTICES OR DIRECTS ATTENTION TO UNSAFE PRACTICES WHICH COULD RESULT IN PERSONAL INJURY IF PROPER PRECAUTIONS ARE NOT TAKEN.

## 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. Be familiar with the controls and the proper use of the equipment.

1.2.3 Never allow children, young teenagers, or people unfamiliar with these instructions to use the mower.

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 The use of personal protective equipment, such as (but not limited to) protection for the eyes, ears, feet and head is recommended.

1.3 Preparation (Con't.)

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

1.3.3 Thoroughly inspect the area where the equipment is to be used and remove all stones, sticks, wires, bones and other foreign objects.

1.3.4 Always set parking brake before starting the engine.

1.3.5 ⚠ DANGER: FUEL IS HIGHLY FLAMMABLE.

a) STORE FUEL IN CONTAINERS SPECIFICALLY DESIGNED FOR THIS PURPOSE.
b) REFUEL OUTDOORS ONLY. DO NOT SMOKE WHILE REFUELING.
c) ADD FUEL BEFORE STARTING THE ENGINE. NEVER REMOVE THE CAP OF THE FUEL TANK OR ADD FUEL WHILE ENGINE IS RUNNING OR WHEN ENGINE IS HOT.
d) IF FUEL IS SPILLED, DO NOT 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.

1.4 Operation

1.4.1 Give complete, undivided attention to the job at hand.

1.4.2 Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.

1.4.3 Mow only in daylight or good artificial light.

1.4.4 Avoid operating the equipment in wet grass, when feasible.

1.4.5 Mow across the face of slopes, never up and down. Exercise extreme caution when changing direction on slopes. Do not mow excessively steep slopes.

1.4.6 Use extreme caution when backing up.

1.4 Operation (Con't.)

1.4.7 Stop the blades when crossing surfaces other than grass and when transporting the mower to and from the area to be mowed.

1.4.8 Never operate the mower with defective guards, shields, or without safety devices in place.

1.4.9 Do not change the engine governor settings or overspeed the engine. Operating an engine at excessive speed may increase the hazard of personal injury.

1.4.10 Disengage blade drive before starting.

1.4.11 Start the engine carefully with feet well away from the blades.

1.4.12 Keep hands, feet and clothing away from rotating parts while the mower is being operated.

1.4.13 Stop the engine and remove the ignition key:

a) Before checking, cleaning or working on the mower.
b) After striking a foreign object (inspect the mower for damage and make repairs before restarting and operating the mower).
c) Before clearing blockages.
d) Whenever you leave the mower.
e) Before refueling.
f) Before making height adjustments.

1.4.14 Return the throttle control to the idle position for 30 seconds for the engine cool down before stopping 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 machine will not be used for a few days, when parking inside a building, or during transport to and from the job.

1.4.16 This mower was designed for one operator only. Keep all others off mower during operation.

1.4.17 Do not mow without grass deflector or entire grass collection system in place.

1.4.18 Do not operate machine unless all guards, shields, and covers are in place and in proper working condition.

1.4 Operation (Con't)

1.4.19 If jump starting is required, connect positive (+) power cable from booster battery to positive power terminal post on starter solenoid switch. This pos has the positive battery cable attached to it. Connect the ground (-) cable from booster battery t any engine deck ground, preferably the engine block Disconnect cables in reverse order after starting.

⚠ CAUTION

1.4.20 ALTHOUGH HAZARD CONTROL AND ACCIDENT PREVENTION PARTIALLY ARE 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.

1.5 Maintenance and Storage

1.5.1 Precisely follow the engine manufacturer's recommendations for maintenance.

1.5.2 If carburetor adjustment is necessary, stand to one side and keep feet and hands clear while making adjustments.

1.5.3 Keep engine free from accumulation of grass, leaves or excessive grease or oil. An accumulation of these combustible materials may result in a fire.

1.5.4 Store fuel in a container specifically designed for this purpose in a cool, dry place.

1.5.5 Keep the mower and fuel container in locked storage to prevent children from playing or tampering with them.

1.5.6 Gasoline powered equipment or fuel containers should not be stored in a basement or any closed area, where heat appliances or open pilot lights are present, unless completely drained of fuel.

1.5.7 Maximum mowing results and safety can only be achieved if the mower is maintained and operated correctly.

1.5 Maintenance and Storage (Con't)

1.5.8 Check all bolts frequently to maintain proper tightness.

1.5.9 Keep all guards, shields and other safety devices in place and in safe working condition.

1.5.10 Check for worn or deteriorating components that could create a hazard.

1.5.11 All replacement parts must be the same as or equivalent to the parts supplied as original equipment.

1.6 Safety Signs

1.6.1 Keep all safety signs legible. Remove all grease, dirt and debris from safety signs.

1.6.2 Safety signs must be replaced if they are missing or illegible.

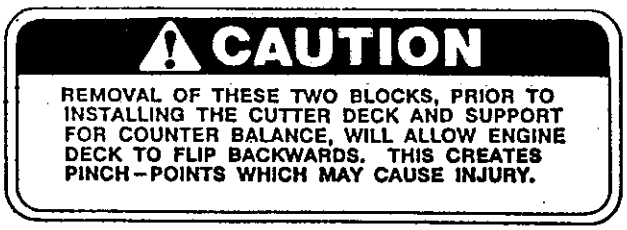
1.6.3 When new components are installed, be sure that current safety signs are affixed to the replaced components.

1.6.4 New safety signs may be obtained from your authorized Exmark equipment dealer or distributor or from Exmark Mfg. Co. Inc.

1.6.5 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.

1.6.6 Familiarize yourself with the following safety signs. They are critical to the safe operation of your Exmark commercial mower.

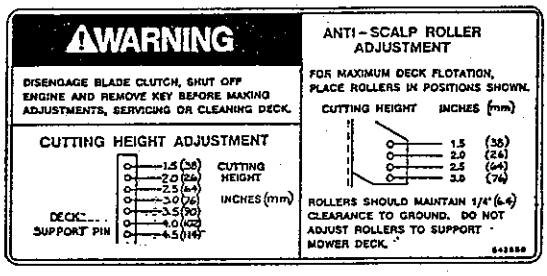
LOCATION: Under Engine Deck Pivot Stops Both Sides



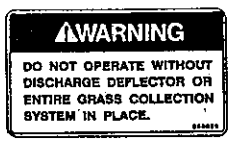

LOCATION: On Top Center of Battery Cover


LOCATION: LH and RH Front Top Surface of Mower Deck

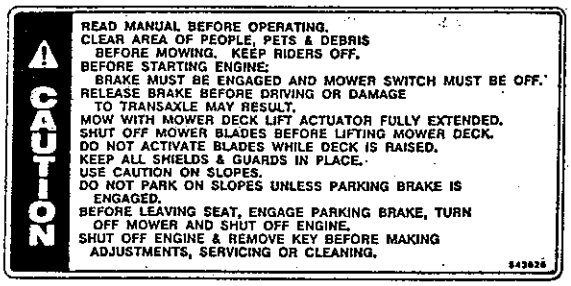

LOCATION: Bottom Center of Steering Console




LOCATION: Centered on Front of Mower Deck Top Surface




LOCATION: On Top Rear RH Surface of Mower Deck




LOCATION: Back Side of Battery Support


LOCATION: On Top Front LH Surface of Engine Deck Next to Muffler Shield


LOCATION: On Top Rear Strap of Fuel Tank


LOCATION: LH and RH Side Top of Fenders

## 2. SPECIFICATIONS

### 2.1 Model Number: TR-1800

### 2.2 Engine

2.2.1 Manufacturer: Kohler
2.2.2 Model Number: MV18S
2.2.3 Power: 18 HP (13.4 kw) @ 3600 RPM
2.2.4 Cooling: Air
2.2.5 Cylinders: Two
2.2.6 Strokes/Cycle: Four
2.2.7 Crankshaft Alignment: Vertical
2.2.8 Bore: 3.12 in. (79.2 mm)
2.2.9 Stroke: 2.75 in. (69.8 mm)
2.2.10 Displacement: 42.18 cu. in. (691.3 cc)
2.2.11 Compression Ratio: 6.0:1
2.2.12 Oil Type: SAE 30 weight. API service class SF for temperatures above 32° F (0° C).
2.2.13 Oil Capacity: 1.75 qt. (1.7 L.) with filter; 1.5 qt. (1.4 L.) without filter.
2.2.14 Oil Filter: Replaceable cartridge type
2.2.15 Air Filter: Dry cartridge type with foam precleaner
2.2.16 No Load RPM: 3400
2.2.17 Idle RPM: 1200

### 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
2.3.3 Fuel Filter: Replaceable in-line
2.3.4 Fuel Shut-Off Valve: 1/4 turn

### 2.4 Electrical System

2.4.1 Charging System: Flywheel Alternator
2.4.2 Charging Capacity: 15 amp
2.4.3 Battery Type: BCI Group U1
2.4.4 Battery Voltage: 12 Volt
2.4.5 Polarity: Negative Ground
2.4.6 Fuses: 20, and 30 amp blade type, 20 amp to charging circuit; 20 amp to electric clutch; 30 amp to electro-mechanical actuator.
2.4.7 Safety Interlock System: Operator must be in seat with cutting blades disengaged and brake engaged to start engine. Operator must be in seat when cutting blades are engaged or brake is disengaged or engine will stop.

## 2.5 Operator Controls

2.5.1 Steering Control: Aircraft-style steering yoke with foam hand grips.

2.5.2 Motion Control: Single foot pedal operated by the right foot provides forward and reverse speed control with little effort. Motion control pedal and its' linkages are protected by the motion override device when the parking brake is engaged.

2.5.3 Parking Brake Lever: Sets brake and locks drive system in neutral. Neutral lockout system prevents accidental engagement of drive system when parking brake is engaged and protects hydro-transaxle from potential damage.

## 2.6 Seat

2.6.1 Type: Contoured, molded nylon backed vinyl. Self draining.

2.6.2 Mounting: Hinged to activate seat switch and attached to leaf spring and helper spring for maximum comfort over rough terrain.

2.6.3 Armrests: Optional.

## 2.7 Hydrostatic Ground Drive System

2.7.1 Hydrostatic transmission Eaton 850 transaxle with 23:1 reduction ratio.

2.7.2 Hydrostatic direction control system is protected by a neutral lockout system.

2.7.3 Oil Type: Mobil DTE - 26

2.7.4 Oil Capacity: 10.0 qt. (9.5 L.)

2.7.5 Filter: Replaceable cartridge type

2.7.6 Speeds: 0 - 6 mph (9.7 km/hr) forward.
0 - 3 mph (4.8 km/hr) reverse.

2.7.7 Drive wheel release lever allows machine to be moved when engine is not running.

## 2.8 Tires

| | | Rear | Drive | Front Cstr. |
|---|---|---|---|---|
| 2.8.1 | Size: | 18 x 6.50-8 | 20 x 10.00-8 | 9 x 3.50-4 |
| 2.8.2 | Quantity: | 1 | 2 | 2 |
| 2.8.3 | Tread: | Turfsaver | Turfmate | Smooth |
| 2.8.4 | Ply Rating: | 2 | 4 | 4 |
| 2.8.5 | Pressure: | 14 psi (97 kPa) | 20 psi (138 kPa) | 22 psi (152 kPa) |

## 2.9 Deck

2.9.1 Cutting Width: 60 in. (152.4 cm.)

2.9.2 Discharge: Right Side

2.9.3 Blade Size: (3) 20.50 in. (52.1 cm.)

2.9.4 Type of Drive: Electric clutch mounted on engine shaft. Blades driven by two belts with self tensioning idlers.

2.9.5 Deck Mounting: Full floating deck is attached to out-front support frame. Removable for servicing. Can be raised by one-touch electro-mechanical deck lift system for servicing and cleaning, or transfer weight from front casters which aides in climbing hills.

2.9.6 Cutting Height: Adjusts from 1.5 in. (3.8 cm.) to 4.5 in. (11.5 cm.) in .5 inch (1.3 cm.) increments.

## 2.10 Dimensions

2.11.1 Overall Width: 70.5 in. (179.1 cm.) with deflector down; 60.9 in. (154.6 cm.) with deflector up; 48.3 in. (122.7 cm.) without deck

2.11.2 Overall Length: 108.8 in. (276.4 cm.) with deck; 70.2 in. (178.3 cm.) without deck

2.11.3 Overall Height: 44.0 in. (111.8 cm.)

2.11.4 Wheel Base: 50.5 in. (128.3 cm.)

2.11.5 Tread Width: 39.75 in. (101.0 cm.) drive wheels

2.11.6 Curb Weight: 705 lb. (320 kg) Tractor Unit
235 lb. (106 kg) Deck
940 lb. (426 kg) Total

## 3. ASSEMBLY INSTRUCTIONS

3.1 Uncrate tractor and cutter deck.

3.2 Install seat assembly to seat mounting plate with four 5/16-18 hex nuts and four 5/16-18 x 3/4 carriage bolts. Check seat switch connection to connector for positive contact.

3.3 Install rear caster wheel with 5/8-11 x 10-1/2 HHCS (hex head capscrew), lockwasher and torque nut. Tighten torque nut sufficiently to create slight drag on wheel assembly while rotating wheel. Inflate tire to 14 psi (95 kPa). Install drive wheels with 1/2-20 wheel nuts (8). Inflate tires to 20 psi (138 kPa).

3.4 Install steering handle bar with 3/8-16 x 1-1/2 HHCS, hex head capscrew 3/8 flat washer and 3/8-16 whizlok nut.

3.5 Install cutter deck to tractor.

3.5.1 Remove the center cutter deck belt shield only.

3.5.2 Activate drive wheel release lever (see Controls in Operate on Instructions Section) and roll tractor to cutter deck support frame and cutter deck.

3.5.3 Remove cutter deck support frame from cutter deck by removing two large hairpins and washers from front deck support pins and by removing two small hairpins and washers from rear deck support pins.

3.5.4 Install cutter deck support frame to tractor engine deck and secure with eight 3/8-16 x 1 HHCS hex head capscrews; eight 3/8 disc spring washers and eight 3/8-16 whizlock nuts. Note: Place spring washer cone against bolt head and install whizlock nut to inside of engine deck for the two rear holes on both sides and install whizlock nut to the outside for the two front bolt holes on each side of the cutter deck support frame. Tighten until spring washers are flat. See Figures 1 and 2.

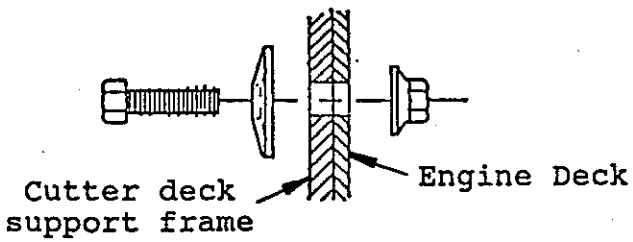



Fig. 1 Whizlock nuts to inside of engine deck for the rear two holes.

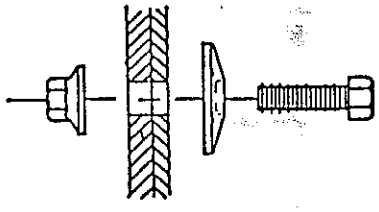


Fig. 2 Whizlock nuts to outside of cutter deck support frame for the front two holes.

3.5 Install Cutter Deck to Tractor (Con't)

3.5.5 Position tractor with cutter deck support frame in place, over the cutter deck. Align and re-engage the cutter deck support pins into the support frame. Re-install two large hairpins and washers into the front support pins and then two smaller hairpins and washers onto the rear support pins.

3.5.6 After the cutter deck support frame and the attached cutter deck are in place, it is necessary to remove two wooden blocks under the engine deck pivot stops.

⚠ CAUTION: KEEP HANDS CLEAR AS THESE ARE POTENTIAL PINCH POINTS.

3.5.7 Install cutter deck drive belt. First slip belt between clutch drive sheave and drive wheel release rod and make sure belt is in the sheave groove. Place the other end of the belt over the cutter deck drive sheave and rotate this sheave for belt to slip into sheave groove. Next, pull idler assembly back to allow belt to engage idler sheave. Last, check fixed idler sheave to make sure belt travels in the idler sheave groove also. Replace the center cutter deck belt shield. See Figure 3.

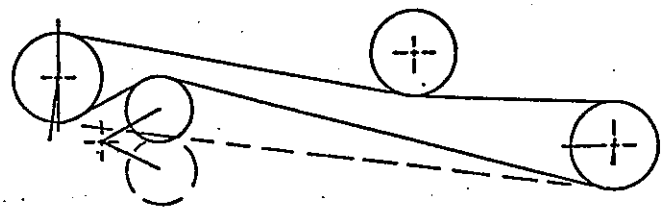
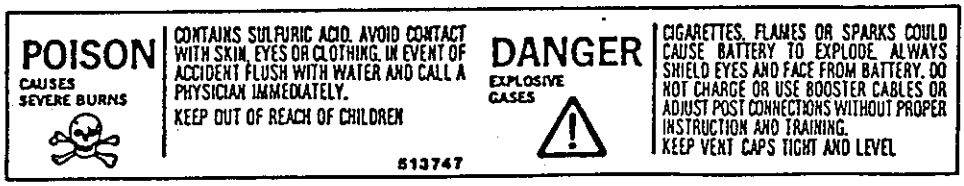



Fig. 3. Cutter Deck Drive Belt

3.5.8 Adjust cutting height of deck (See Operation Instructions Section).

3.6 Service engine. Engine is shipped with Mobil SAE 30W installed at the factory. If engine oil level is low, fill with SAE 30W, AP1 service class SF for operating in temperatures above 30° F (0° C). See Engine Operator's Manual.

3.7 Service battery. Machine is shipped with battery dry.



3.7 Service Battery (Con't)

3.7.1 Remove battery cover from machine. Disconnect battery cables - negative (black) cable first and lift battery out.

3.7.2 Place battery on a level surface and remove vent caps.

3.7.3 Fill cells with battery grade sulfuric acid (1.625 specific gravity) to halfway between top of separators and bottom of vent well. KEEP SPARKS AND FLAMES AWAY FROM BATTERY AT ALL TIMES.

3.7.4 Check acid temperature and state of charge:

A. Acid temperature must be at least 80° F (26.7° C). (Put battery thermometer in center cell.)

B. State of charge must be good.

1. Check with electrical battery tester according to instructions on the tester OR
2. Use a battery hydrometer - specific gravity must be at least 1.250.

3.7.5 If acid temperature is not 80° F (26.7° C) or state of charge is not good, charge at 15 amps (20 amp maximum). ACID TEMPERATURE MUST NEVER EXCEED 125° F (51.7° C) WHILE CHARGING. Slow charging is permissible.

3.7.6 After charging, add battery acid to bottom of vent wells and install vent caps. Prior to installation, check battery with a hi-rate load tester following the printed instructions on the tester - "State of Charge" and "Condition" must be indicated as "good" or "OK".

3.7.7 Install battery in machine. ⚠ CAUTION: BE SURE IGNITION IS OFF AND KEY IS REMOVED. CONNECT CABLES - POSITIVE (RED) CABLE FIRST, THEN NEGATIVE (BLACK) CABLE. RE-INSTALL BATTERY COVER.

## 4. OPERATION INSTRUCTIONS

4.1 Pre-Start

4.1.1 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.

4.1. Pre-Start (Con't)

NOTE: Fuel tank may appear loose at setup, however, once fuel is added in tank, tank will slowly expand to fit tank strap.

Do not add oil to gasoline.

Do not overfill fuel tank. Leave room for fuel to expand.

4.1.2 Refer to maintenance section and perform all of the necessary inspection and maintenance steps.

4.1.3 Familiarize yourself with controls. See Controls Section.

4.2 Controls

4.2.1 Steering Handle Bar - Located in center of steering console in front of operators seat. During forward operation of the machine, a movement of the steering handle to the right will cause the machine to turn to the right and vice versa. The steering system is chain connected from steering shaft sprocket with reversing roller to the yoke sprocket. The chain has two adjustable connectors.

4.2.2 Motion Control Pedal - Located on the right side of steering console. The foot pedal controls forward and reverse operation with foot motion. To increase forward speed press pedal forward until desired speed is obtained, to increase reverse speed, press pedal backward until desired speed is obtained.

Movement of the foot pedal forward will cause the machine to go forward. To stop forward travel, remove foot from pedal. The neutral centering device moves the motion pedal back to the neutral position. For reverse motion place foot heel on pedal rear pad and press downward. Remove foot from pedal to stop reverse motion. The pedal automatically returns to neutral. When parking brake is engaged, the motion control pedal can be moved, but will not function.

4.2.3 Electro-mechanical deck lift control - Switch is located on left side of control console. Moving the toggle switch lever forward will lower the

cutting deck. Moving the lever backward will raise the deck. Normal operation is with the actuator fully extended. The electro-mechanical actuator has an internal clutch to protect it from excessive loads. When a "ratcheting" sound is heard when raising or lowering, release switch lever.

4.2.4 Electric Blade Clutch Engagement - Switch is located on right side of control console with safety guard. Moving the toggle switch ahead will engage the blade clutch and moving it to the rear will disengage the blade clutch. Operator must be in the seat when blades are engaged or engine will stop.

4.2.5 Choke Control - Located on the control console left side. Choke is used to aid in starting a cold engine. "Off" position is to the rear and "on" position to the front. Do not run a warm engine with choke in the "on" position.

4.2.6 Throttle Control - Located on the control console right side next to the choke control. Throttle is used to control engine speed. Moving throttle control ahead will increase engine speed and moving it to the rear will decrease engine speed.

4.2.7 Hand Brake Lever - Located ahead and near the right side of control console. Hand brake lever engages a parking brake on the drive wheels and also locks the hydrostatic drive system in neutral. Moving the lever rearward will engage the brake. To disenage brake, lift finger latch and move brake ahead. Operator must be in the seat when brake is disengaged or engine will stop.

4.2.8 Ignition Switch - Located on the control console just ahead of the steering handle. The ignition switch has three positions - off, on and start. Insert key into switch and rotate to the right to the "on" position. Rotate to the right to the next position to engage the starter (key must be held against spring pressure in this position). Operator must be in seat with brake engaged and blade clutch disengaged to start engine. When engine starts, release key.

4.2 Controls (Con't)

4.2.9 Hour Meter - Located on the steering console just below the steering wheel. The hour meter records the number of hours that the engine has run. If ignition switch is left on without engine running, hour meter will not run.

4.2.10 Fuel Shut-Off Value - Located on the right front lower support member of fuel tank. The fuel shut-off valve is used to shut off the fuel when machine will not be used for a few days, when parking inside a building, or during transport to and from the job. Rotate value 1/4 turn clockwise to shut fuel off. Rotate value 1/4 turn counterclockwise to turn fuel on.

4.2.11 Drive Wheel Release Lever - Located on the left rear corner of engine deck. The drive wheel release lever is used to release the hydrostatic drive system to allow machine to be pushed. Rotate lever 1/4 turn counterclockwise to release drive system. Rotate 1/4 turn clockwise to set drive system.

Do not tow machine or transmission damage may result.

4.3 Mowing

4.3.1 Starting Engine - Operator must be in seat with the parking brake engaged and the blade clutch disengaged.

Open fuel shut-off value.

On a cold engine, place the throttle midway between "slow" and "fast" positions and place the choke in the "on" position. On a warm engine, place the throttle midway between "slow" and "fast" positions and leave the choke in the "off" position.

Turn ignition switch to "start" position. Release the switch as soon as the engine starts.

On a cold engine, gradually return choke to "off" position after engine starts and warms up.

IMPORTANT: Do not crank the engine continuously for more than ten (10) seconds at a time. If the engine does not start, allow a 60 second starter cool-down period between starting attempts. Failure to follow these guidelines can burn out the starter motor.

4.3 Mowing (Con't)

4.3.2 Stopping Engine - Disengage blade clutch and set parking brake. Move throttle to "slow" position. Allow engine to idle for 30 seconds to allow cool down. Rotate ignition switch to "off" position. Remove key to prevent children or other unauthorized persons from starting engine. Close fuel shut-off value when machine will not be used for a few days or when parking inside a building, or when transporting.

4.3.3 Engaging Electric Blade Clutch - The electric blade clutch toggle switch engages the cutting blades. Be sure that all persons are clear of mower deck and discharge area before engaging the blade clutch.

Set throttle to "midway" position. Lift the toggle switch guard. Flip toggle switch ahead to the "on" position. Accelerate to full throttle to begin mowing.

4.3.4 Stopping Electric Blade Clutch - Flip the toggle switch guard rearward with a quick positive motion. This moves the toggle switch to the off position to stop the cutting blades.

4.4 Transporting

Use a heavy duty trailer to transport the machine. Engage parking brake and block wheels. 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.

## 5. MAINTENANCE & ADJUSTMENTS

5.1 Periodic Maintenance

5.1.1 Check engine oil level.
Service Interval: Daily

a. Make sure engine is stopped and on a level surface.
b. Check with engine cold.
c. Clean area around dipstick. Remove dipstick and wipe oil off. Reinsert the dipstick and push it all the way into the tube. Again, remove dipstick and check oil level.

5.1 Periodic Maintenance (Con't)

d. If the oil level is low, wipe off the area around the oil fill cap, then remove oil fill cap and fill to the "F" mark on the dipstick. Use oil as specified in Specifications Section and in engine owners manual. Do not overfill.
e. IMPORTANT: Do not operate the engine with oil level below the "L" mark on the dipstick, or over the "F" mark.

5.1.2 Clean engine air cooling system.
Service Interval: Daily

a. Stop engine and remove ignition key.
b. Clean all debris from engine air intake screen and from around engine shrouding.

5.1.3 Clean transmission cooling compartment.
Service Interval: Daily

a. Stop engine and remove ignition key.
b. Clean all debris from screens that encompass cooling compartment, and then remove the compartment screen.
c. Clean all debris from the fan blades and the transmission cooling fins (to insure maximum hydrostatic transmission life).
d. Replace the compartment screen.

5.1.4 Clean grass build-up under deck and check mower blades.
Service Interval: Daily

a. Disengage electric blade clutch.
b. Raise deck by holding deck lift toggle switch lever to it's rearward position.
c. Stop engine and remove ignition key.
d. Clean out any grass build-up from underside of deck and in deck discharge chute.
e. Lower deck to the ground. Be sure to extend until electromechanical actuator is in its' fully extended position for proper deck floatation.
f. Inspect blades and sharpen or replace as required.
g. Torgue blade bolts to 40 FT-LBS. Be sure the spring disk washer cone is installed toward the bolt head. (See Figure 4.)

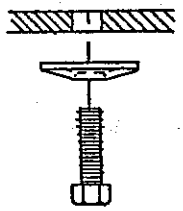


Fig. 4 Blade Bolt Installation

5.1.5 Check safety interlock system.
Service Interval: Daily

a. Check starting circuit. Starter should crank with operator in seat, parking brake engaged with electric blade clutch disengaged. Try to start with operator out of seat, parking brake engaged and electric blade clutch disengaged - starter must not crank. Try to start with operator in seat, parking brake disengaged and electric blade clutch disengaged - starter must not crank. Try to start with operator in seat, parking brake engaged and electric blade clutch engaged - starter must not crank.
b. Check operator presence control (OPC) circuits. Run engine at one-third throttle, then disengage parking brake and raise off of seat, but do not get off of machine - engine must stop. Again, run engine at one-third throttle, engage parking brake, engage electric blade clutch and raise off of seat, but do not get off of machine - engine must stop.
c. If machine does not pass any of these tests, do not operate. Contact your authorized EXMARK SERVICING DEALER.

⚠ CAUTION: IT IS ESSENTIAL THAT OPERATOR-SAFETY MECHANISMS BE CONNECTED AND IN PROPER OPERATING CONDITION PRIOR TO USE FOR MOWING.

5.1 Periodic Maintenance (Con't)

5.1.6 Check for loose hardware.
Service Interval: Daily

a. Stop engine and remove ignition key.
b. Visually inspect machine for any loose hardware or any other possible problem. Tighten hardware or correct the problem before operating.

5.1.7 Service pre-cleaner element and air cleaner.
Service Interval: 25 hrs. and 100 hrs.

a. Stop engine and remove ignition key.
b. Remove wing nuts and remove air cleaner cover.
c. Remove foam pre-cleaner element and wash in warm water with detergent, then rinse until all traces and detergent are eliminated. Squeeze out excess water (do not wring). Air dry.
d. Check paper element. Service interval: 100 hours. Gently tap the flat side of the paper element to dislodge any dirt. Do not wash and do not use compressed air to clean filter as small holes could develop in the element and cause engine damage. Replace if dirty, bent or damaged.
e. Reinstall foam pre-cleaner to paper element, the reinstall paper element and cover and tighten wingnut.

5.1.8 Change engine oil.
Service Interval: 50 hrs.

NOTE: Change oil and filter after first five (5) hrs. of operation.

a. Disengage electric blade clutch.
b. Raise cutter deck so as to tilt the engine for draining.
c. Stop engine and remove ignition key.
d. Drain oil while engine is warm from operation.
e. Remove the oil drain cap from the rear of the engine. Allow oil to drain then replace drain cap.
f. Replace the oil filter every other oil change. Clean around oil filter and unscrew filter to remove. Before reinstalling new filter, apply a thin coating of oil on the surace 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.

g. Clean around oil fill cap and remove cap. Fill to specified capacity and replace cap. Use oil as specified in Specifications Section and in Engine Owners Manual. Do not overfill.

h. Start the engine and check for leaks.

5.1.9 Check hydraulic oil level.
Service Interval: 25 hrs.

a. Make sure mower is on a level surface.
b. Stop engine and remove ignition key.
c. Visually inspect the sight gauge on hydraulic tank. Oil level should be visible to top of the sight gauge. If not, clean area around hydraulic reservoir cap, remove cap, and add oil as specified in Specifications Section. Replace cap.

CAUTION: HYDRAULIC FLUID ESCAPING UNDER PRESSURE MAY HAVE SUFFICIENT FORCE TO PENETRATE SKIN AND CAUSE SERIOUS INJURY. IF FOREIGN FLUID IS INJECTED INTO THE SKIN, IT MUST BE SURGICALLY REMOVED WITHIN A FEW HOURS BY A DOCTOR FAMILIAR WITH THIS FORM OF INJURY OR GANGRENE MAY RESULT.

CAUTION: KEEP BODY AND HANDS AWAY FROM PIN HOLES OR NOZZLES THAT EJECT HYDRAULIC FLUID UNDER HIGH PRESSURE. USE PAPER OR CARDBOARD AND NOT HANDS TO SEARCH FOR LEAKS.

CAUTION: SAFELY RELIEVE ALL PRESSURE IN THE SYSTEM BEFORE DISCONNECTING THE LINES OR PERFORMING WORK ON THE SYSTEM.

CAUTION: MAKE SURE ALL HYDRAULIC FLUID CONNECTIONS ARE TIGHT AND ALL HYDRAULIC HOSES AND LINES ARE IN GOOD CONDITION BEFORE APPLYING PRESSURE TO THE SYSTEM.

5.1 Periodic Maintenance (Con't)

5.1.10 Check tire pressures.
Service Interval: 25 hrs.

a. Stop engine and remove ignition key.
b. Inflate tires to pressures specified in Specifications Section.

5.1.11 Check battery electrolyte level.
Service Interval: 25 hrs.

a. Stop engine and remove ignition key.
b. Remove battery cover.
c. Remove vent caps from battery. Fill with drinking water to bottom of vent wells and replace vent caps.
d. See Assembly Section for servicing a new battery.


5.1.12 Inspect Beltwear.
Service Interval: 25 hrs.

a. Stop engine and remove ignition key.
b. Remove the three cutter deck belt shields to check mower primary and secondary belt condition.
c. Look under engine deck to check the transmission drive belt condition.
d. See Adjustment Section 5.2.2 for adjustment of transmission drive belt.

5.1.13 Lubricate grease fittings.

a. Stop engine and remove ignition key.
b. Lubricate fittings with one to two pumps of SAE No. 2 multi-purpose gun grease.

c.

| Fitting Locations | No. of Places | Service Interval |
|---|---|---|
| Front Caster Wheel Bearings | 2 | Daily |
| Front Casters | 2 | Daily |
| Chain Roller (Steering) | 1 | 25 hrs. |
| Cutter Housing Spindles | 3 | 25 hrs. |
| Engine Deck Pivots | 2 | 25 hrs. |
| Steering Column | 1 | 25 hrs. |

5.1 Periodic Maintenance (Con't)

5.1.14 Remove engine shrouds and clean cooling fins.
Service Interval: 50 hrs.

a. Stop engine and remove ignition key.
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.

5.1.15 Lubrication of steering wheel axle and steering yoke pivot.
Service Interval: 50 hrs.

a. Both the steering wheel axle assembly and steering yoke pivot are permanently sealed and should require no additional lubrication. If there is evidence of seal leakage, replace the seals or bearings and fill with SAE No. 2 multi-purpose grease or wheel bearing grease.

5.1.16 Check spark plugs.
Service Interval: 100 hrs.

a. Remove spark plugs, check condition and adjust plug gap, or replace with new plugs. See Engine Owners Manual.

5.1.17 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.

5.1.18 Change hydraulic system filter.
Service Interval: After first 150 hrs. Then each 250 hrs. thereafter

a. Stop engine and remove key.
b. Carefully clean area around filter. It is important that no dirt or contamination enter hydraulic system.
c. Unscrew filter to remove. Before reinstalling new filter, apply a thin coat of oil on the surface of the rubber seal. Turn filter clockwise until rubber seal contacts the filter adapter, then tighten the filter an additional 2/3 to 3/4 turn.

5.1 Periodic Maintenance (Con't)

Use only EATON filter element, which is EXMARK Part Number 543811.

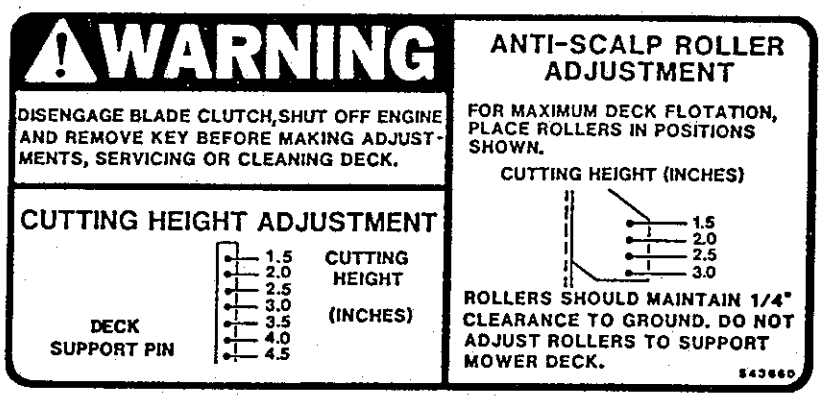
d. Start engine and run several minutes.
e. Check hydraulic oil level as outlined in 5.1.9

5.1.19 Change hydraulic system oil.
Service Interval: First time 250 hrs.
Thereafter every 500 hrs.

a. Do not change hydraulic system oil unless it is felt that oil has been contaminated or has overheated. Changing oil unnecessarily could damage hydraulic system by introducing contaminates into the system.
b. See Specifications Section for oil type.

5.2 Adjustments

5.2.1 Cutting height and antiscalp roller adjustment.




a. Install hairpin clips in the holes shown on above sketch for the desired cutting height.

b. For maximum deck floatation, place rollers in position shown on sketch. Roller should maintain 1/4 in. (6.4 mm) clearance to ground. Do not adjust rollers to support deck. Be sure locking nut is properly torqued or loss of antiscalp roller may result.

5.2.2 Transmission drive belt tension adjustment.

a. Disengage electric clutch toggle switch.
b. Stop engine and remove ignition key.

5.2 Adjustments (Con't)

c. The transmission drive belt runs from the engine pulley to the hydrostatic transmission pulley to the idler pulley. Adjustment is by the 3/8 eye bolt on the left hand underside of the engine deck. Begin with bolt just tight enough to take the slack out of the spring and linkage. Spring should not be extended yet. Tighten 3/8 eye bolt to obtain 5-1/2 in. spring length measured from end to end.

5.2.3 Cutter deck drive belt. No adjustment necessary.

5.2.4 Blade drive belt tension. No adjustment necessary.

5.2.5 Neutral Centering Adjustment

a. The Neutral Centering Device adjustment should be made with the engine running at full throttle. First raise the frame and securely block up so that drive wheels can rotate freely without contacting the ground.
b. Remove the electrical connection from the parking brake safety switch located on the right-hand underside at the front of the engine deck. Temporarily install a jumper wire across the terminals in the connector of the wiring harness.
c. Release brake lever.
d. The Neutral Centering Device is located on the righthand underside of the engine deck. Loosen jamnut from the ball joint which connects the override assembly to the engine deck anchor mounting. See figure 5.
e. Start engine. Operator must be in seat to crank engine. Open to full throttle.
f. Adjust neutral centering device length by rotating the neutral centering device barrel clockwise or counterclockwise until wheels stop turning or no longer creeps. Tighten jamnut.
g. Remove jumper and reconnect electrical connection to parking brake safety switch.
h. Check safety interlock system as outlined in 5.1.5.

⚠ CAUTION: KEEP CLEAR OF WHEELS AND OTHER MOVING PARTS WHEN MAKING THESE ADJUSTMENTS.

## 5.2 Adjustments (Con't)

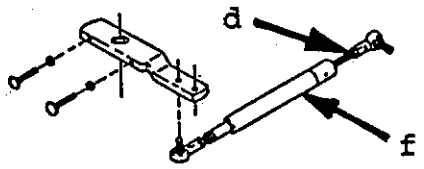



Fig. 5 Neutral Centering Device Adjustment

### 5.2.6 Parking Brake Quadrant Adjustment

a. Loosen the two 5/16-18 HHCS that clamp the brake quadrant to the engine deck.
b. Pull parking brake lever towards the operator to the brake "on" position.
c. Check linkage to ensure that they butt up against the overcentering stop bolt and tighten down the two 5/16-18 HHCS. See Figure 6.

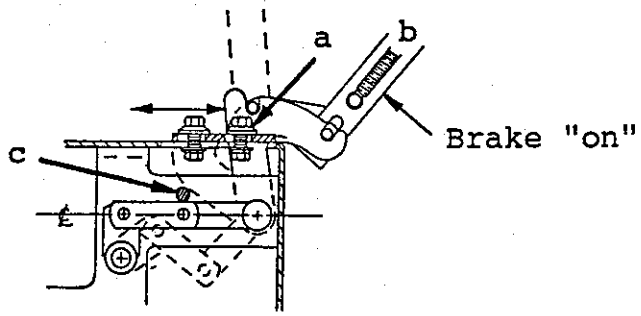



Fig. 6 Parking Brake Quadrant Adjustment

### 5.2.7 Parking Brake Spring Adjustment

a. Check the pin to pin length and adjust to 11.63 as required.
b. Check the compression spring length and adjust to 3.25 as required. See Figure 7.

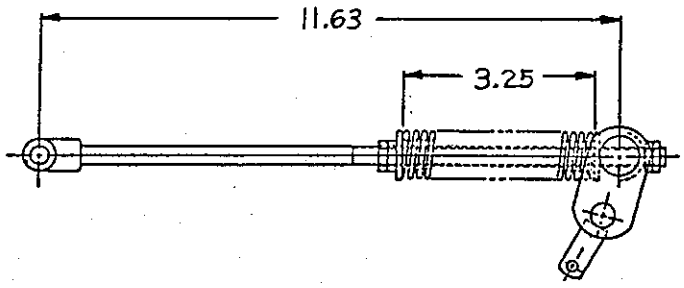



Fig. 7 Brake Control Link and Spring Adjustment

5.2 Adjustments (Con't)

5.2.8 Parking Brake Neutral Lockout Adjustment.

⚠ CAUTION: STOP ENGINE AND REMOVE IGNITION KEY.

a. Remove inlet screen and fan.

b. Engage parking brake. Loosen the jamnuts securing the two 5/16 x 1-1/2 carriage bolts to the hydro control arm. Be sure the hydro control arm is in the neutral position as outlined in previous adjustment 5.2.5 and the parking brake as adjusted in 5.2.6. Adjust two 5/16 x 1-1/2 carriage bolts in the hydro control arm in or out until the head contacts the butterfly plate, and then tighten jamnuts.

NOTE: When the bolts are properly adjusted, there will be no rotational movement of the hydro control arm when brake is engaged.

c. Restart engine and open to full throttle.
d. Step down on the forward pedal, then the rear pedal of the motion control pedal. Listen for a "whine" from the hydro transaxle. If any "whine" is heard during any of the above conditions, repeat adjustment steps b, c and d.
e. Replace fan and inlet screen. See Figure 8.

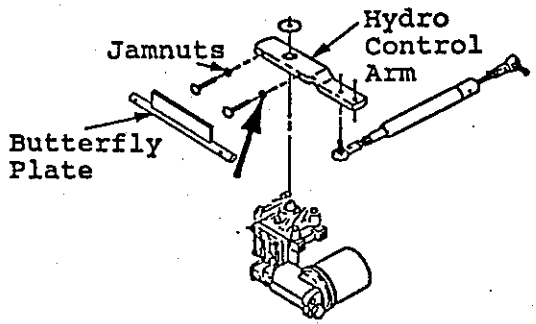



Fig. 8 Parking Brake Neutral Lockout Adjustment

5.2.9 Parking brake switch adjustment.

a. Stop engine and remove ignition key.
b. Engage parking brake. Adjust the parking brake switch mounting bracket until jackshaft engagement arm depresses brake safety switch by at least 1/4 of an inch.
c. Check safety interlock system as outlined in 5.1.5.

## 5.2 Adjustments (Con't)

### 5.2.10 Motion Control Linkage Adjustment

a. Step down on the forward pedal until it touches the foot rest.
b. Check the gap between the motion override tube and the spacer. This gap should measure 1/16 in. as shown in Fig. 9.
c. If adjustment is required, remove clevis pin at foot pedal end and turn yoke in or out as required to obtain 1/16" gap.

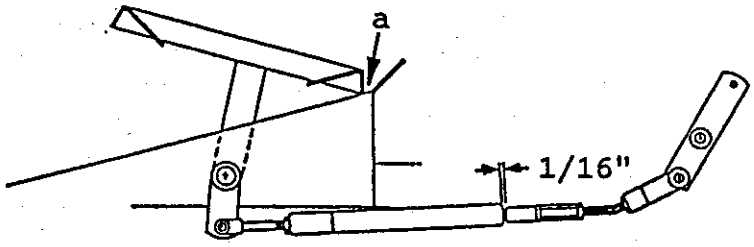



Fig. 9 Motion Control Linkage Adjustment

### 5.2.11 Seat Switch Adjustment

a. With operator out of seat and the seat in the "up" position, adjust the seat switch to provide a clearance of 1/16 to 1/8 in. between the switch plunger and the plunger striker plate.
b. To adjust, loosen switch mounting hardware and move switch up or down for proper clearance. Re-tighten hardware.
c. Check safety interlock system as outlined in 5.1.5.

### 5.2.12 Electric Clutch Adjustment

a. Stop engine and remove ignition key.
b. Engage parking brake.
c. Place .015 - .021 inch feeler gauge through each of the three clutch gap holes. If gap exceeds this range, tighten the three adjusting nuts until the proper gap is obtained. See Figure 10.

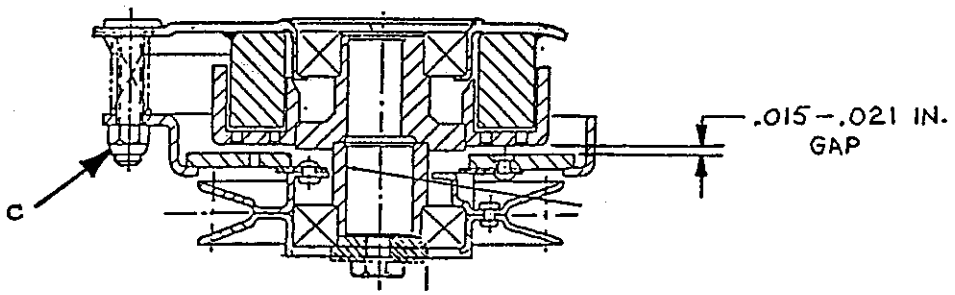



Fig. 10 Electric Clutch Adjustment

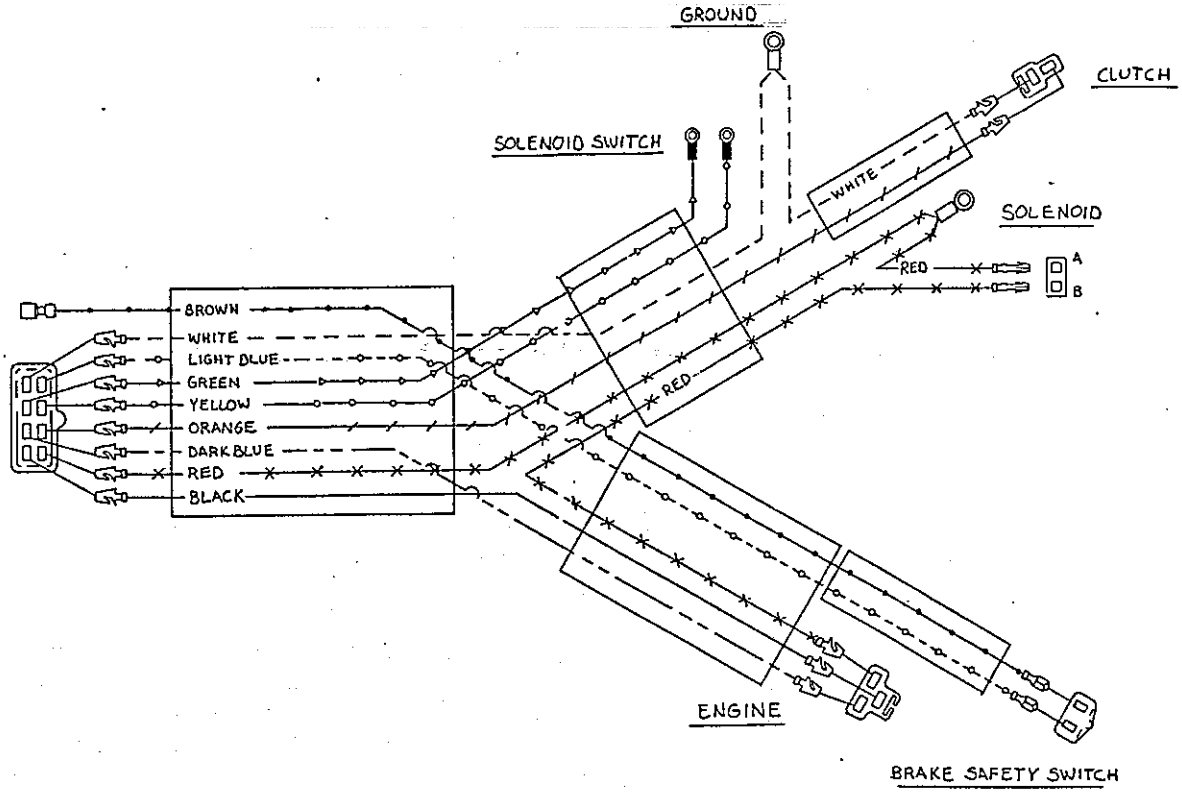



Fig. 11 Engine Deck Wiring Diagram (NOTE: All connectors are viewed from the wire input side of the connectors). Reference 543769.

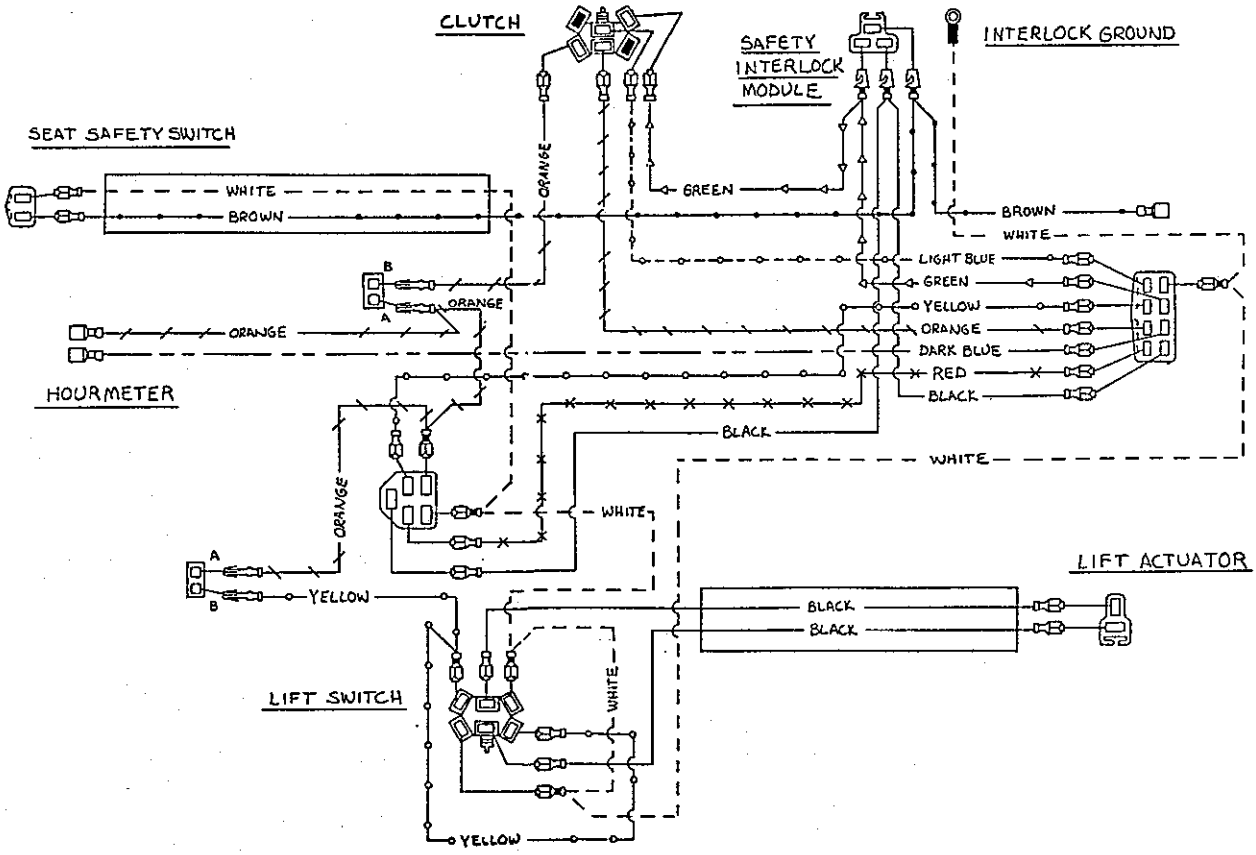



Fig. 12 Console Wiring Diagram (NOTE: All Connectors are viewed from the wire input side of the connectors). Reference 543768.

## 6. WARRANTY

### Limited Warranty Exmark Commercial Turf Equipment

This warranty extends to the original retail purchase only and commences on the date of original retail purchase.

Any part of the Exmark commercial power mower manufactured by Exmark Mfg. Co. Inc. ("Exmark") and found in the reasonable judgment of Exmark to be defective in material or workmanship, will be repaired or replaced by an authorized Exmark dealer without charge for parts and labor.

The Exmark mower, including any defective part, must be returned to an authorized Exmark service dealer within the warranty period. The expense of delivering the mower to the dealer for warranty work and the expense of returning it back to the owner after repair or replacement will be paid for by the owner. Exmark's responsibility in respect to claims is limited to making the required repairs or replacement, and no claim of breach of warranty shall be cause for cancellation or recission of the contract of sale of any Exmark mower. Proof of purchase will be required by the dealer to substantiate any warranty claim. All warranty work must be performed by an authorized Exmark service dealer.

This warranty is limited to two years from the date of original retail purchase for any Exmark mower.

This warranty does not cover any Exmark mower that has been subject to misuse, neglect, negligence, or accident, or that has been operated in any way contrary to the operating instructions as specified in the Operator's Manual. The warranty does not apply to any damage to an Exmark mower that has been altered or modified so as to adversely affect the product. In addition, the warranty does not extend to repairs made necessary by normal wear, or by the use of parts or accessories which, in the reasonable judgment of Exmark, are either incompatible with the mower or adversely affect its operation, performance or durability, or by repair or service by anyone other than an authorized Exmark service dealer. This warranty does not cover the engine, which is warranted separately by the engine manufacturer and for a different period of time.

Exmark reserves the right to change or improve the design of any mower without assuming any obligation to modify any mower previously manufactured. Exmark's obligation under this warranty is strictly and exclusively limited to the repair or replacement of defective parts by genuine Exmark parts. Exmark does not assume or authorize anyone to assume for them any other obligation.

In no event shall any implied warranty of merchantability or of fitness for a particular purpose exceed the two year warranty period. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

Exmark assumes no responsibility for incidental, consequential or other damages including, but not limited to, expense for gasoline, expense of delivering the mower to an authized Exmark service dealer and the expense of returning it back to the owner mechanic's travel time telephone or telegram charges, rental of a like product during the time warranty repairs being performed, travel, loss or damage to personal property, damage to the mower in transit, loss of revenue loss of use of the mower, loss of time or inconveniences. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion 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.

This warranty applies to all Exmark mowers sold in the United States, and Canada, whether the mowers are used for commercial, rental or other purposes.

EXMARK MFG. CO., INC.
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402/223-4010

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