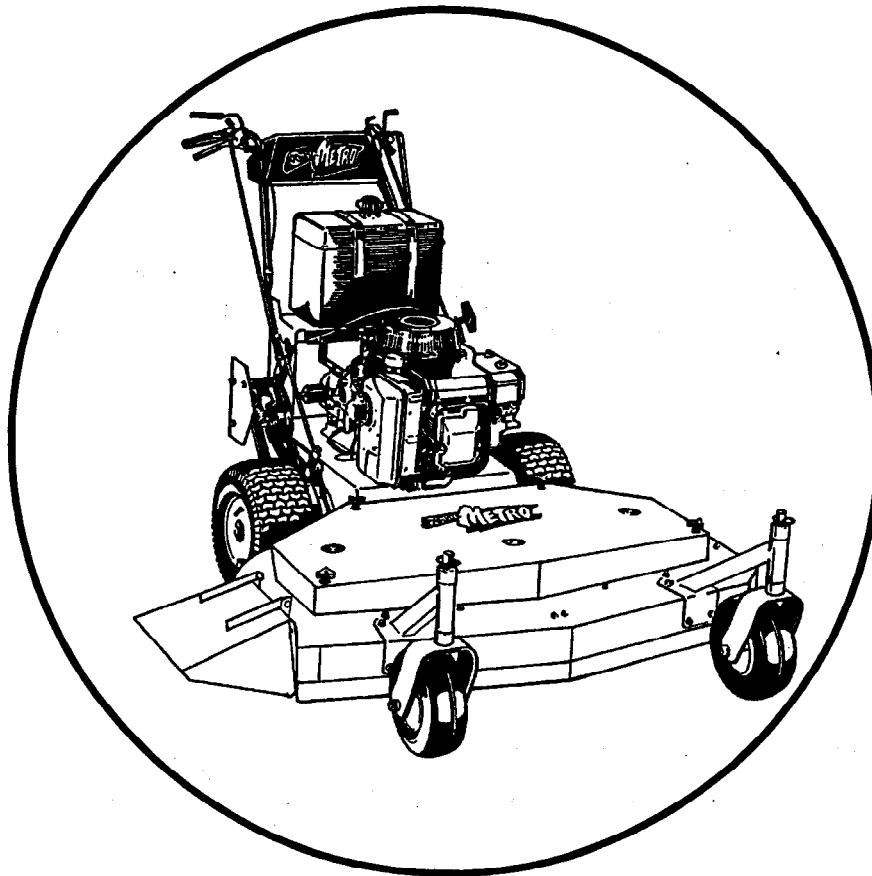




For Serial Numbers
90,000 to 129,999
and
130,000 and Higher

METRO

Operator's Manual



This Manual contains information regarding four (4) different Serial No. groups. When using this manual, be sure to use the correct information relating to the Serial No. of your unit.

This Operator's Manual replaces *all previous* Metro Operator's Manuals.

Part No. 850419

NOTES

WARNING

**FAILURE TO FOLLOW CAUTIOUS
OPERATING PRACTICES CAN RESULT IN
SERIOUS OPERATOR INJURY.**

CAUTION

1. Keep all shields, guards and safety devices (especially grass discharge system) in place and in proper working condition.
2. Stop engine and remove spark plug wire(s) or remove key before adjusting, servicing, or performing maintenance.
3. When mower deck becomes clogged, stop engine and remove spark plug wire(s) or remove key before cleaning blockage.
4. Keep hands, feet, and clothing away from power-driven parts.
5. Keep off mower unless seat or platform is provided.
6. Keep others off mower.

WARNING

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

HEALTH WARNING

GASOLINE

**Harmful or fatal if swallowed.
Long-term exposure to vapors has
caused cancer in laboratory animals.**

- 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.

**Failure to use caution may cause
serious injury or illness.**

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 arrive 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. 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.

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 quantity, part number and description of the part needed.

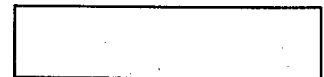
The serial number plate of the tractor is located on the top front engine frame on the right hand side of the machine. We suggest you record the numbers below for ready reference.

Model No. _____

OR

Serial No. _____

PASTE LABEL FROM
LITERATURE PACKET HERE



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!

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

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

When used with the word WARNING: IT DENOTES THAT A HAZARD EXISTS WHICH CAN RESULT IN INJURY OR DEATH IF PROPER PRECAUTIONS ARE NOT TAKEN.

When used with the word CAUTION: IT 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. Familiarize yourself with the controls and the proper use of the equipment.
- 1.2.3 Never allow children, 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.
- 1.3.2 While mowing, always wear substantial footwear and long trousers. Do not operate equipment when barefoot or when 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.

DANGER

- Fuel is *Highly Flammable*. *DO NOT* smoke while refueling. Refuel only in a well ventilated area, or refuel outdoors.
- Store fuel in containers specifically designed for this purpose.
- Add fuel before starting the engine. Never remove the cap of the fuel tank or add fuel when engine is running or when the engine is hot.
- 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.

DANGER

- *DO NOT* operate the engine in a small confined area where dangerous carbon monoxide fumes can collect.
- 1.4.2 Mow only in daylight or in good artificial light. *DO NOT* operate the mower when children or others are in the area.
- 1.4.3 When possible, 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 control could occur. Mow **across** slopes with walk behind mowers, never up and down. 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 and sustaining serious injury. Drive slower on slopes. *DO NOT* operate on slopes greater than 20 degrees. Watch for ditches, holes, rocks, dips, and rises which can cause erratic handlebar movement and loss of footing. Keep away from drop-offs and steep banks. Avoid sudden starts. Look down and behind you before and while moving backwards. *DO NOT* mow slopes when grass is wet - slippery conditions create hazardous footing, affect steering, and reduce traction and braking. The operator is responsible for safe operation on slopes.
- 1.4.5 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.
- 1.4.6 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.
- 1.4.7 *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.

- 1.4.8 Place transmission in neutral, disengage blade, and latch drive levers before starting engine.
- 1.4.9 Start the engine carefully with feet well away from the blades.
- 1.4.10 Keep hands, feet and clothing away from rotating parts while the mower is being operated.
- 1.4.11 Stop the engine and disconnect the spark plug wire(s) and/or remove 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).
- 1.4.12 Stop the engine:
 - a) Before clearing blockages.
 - b) Before removing the grass catcher.
 - c) Whenever you leave the mower.
 - d) Before refueling.
 - e) Before making height adjustments.
- 1.4.13 Before stopping the engine, return the throttle control to the idle position for 30 seconds to allow the engine to cool down.
- 1.4.14 The fuel system is provided with a shut-off valve. The fuel shut-off valve is used to shut off the fuel when:
 - a) The machine will not be used for a few days
 - b) During transport to and from the job
 - c) When parking inside a building
- 1.4.15 This mower was designed for one operator only. Keep all others away from mower during operation.
- 1.4.16 **Do Not** mow without the grass deflector or entire grass collection system in place and in proper working condition.
- 1.4.17 If jump starting is required: *(Electric Start Units Only)*
 - a) Connect the positive (+) power cable from the booster battery to the positive terminal post on the starter solenoid switch (this post has the positive battery cable attached to it).
 - b) Connect the negative or ground cable (-) to the negative post from the booster battery to any engine deck ground, preferably the engine block as far away from the battery as possible.
 - c) Disconnect battery cables in the reverse order after starting.

 **CAUTION**

- Failure to follow safety instructions and cautious operating practices can result in serious injury.

CAUTION

- 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 For engine maintenance, follow the engine manufacturer's recommendations precisely as stated in the engine manual.
- 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 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 flammable and may result in a fire.
- 1.5.4 Store fuel in a container specifically designed for this purpose. Store the fuel container 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 enclosed area, where open pilot lights or heat appliances are present.
- 1.5.7 Maximum mowing results and safety can only be achieved if the mower is properly maintained and operated correctly.
- 1.5.8. Check all bolts often to maintain proper tightness.
- 1.5.9. Keep all guards, shields and all safety devices in place and in safe working condition.
- 1.5.10 Check often for worn or damaged 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.

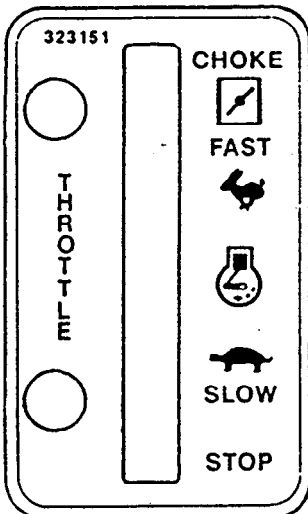
1.6 RIDING ATTACHMENTS

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

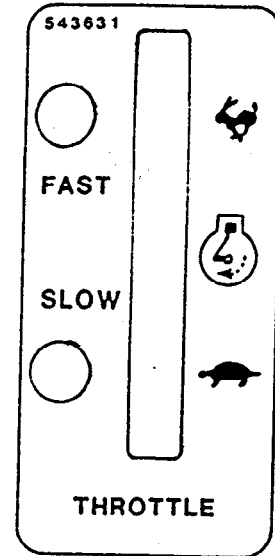
1.7 SAFETY SIGNS

- 1.7.1 Keep all safety signs legible. Remove all grease, dirt and debris from safety signs.
- 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 can 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.

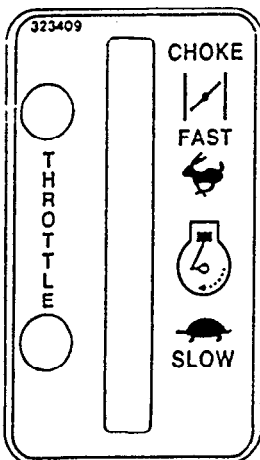
Location:
Upper Handle Console



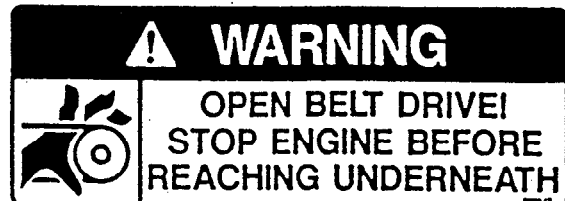
Kohler
&
Kawasaki
PART NO.
323151



B&S Vanguard
&
8.5 HP B&S
PART NO.
543631

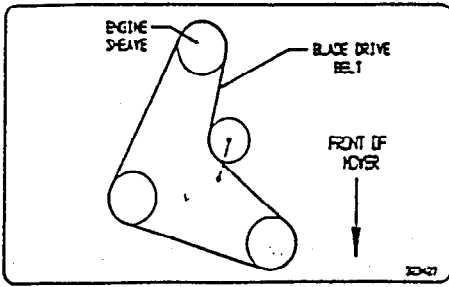


Kawasaki
Electric Start
PART NO.
323409

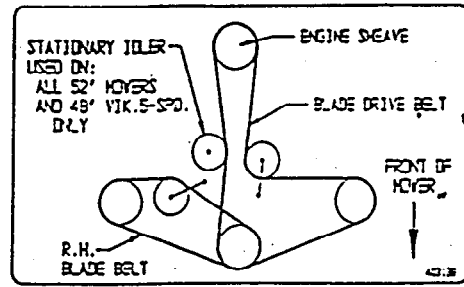


PART NO.
303517

Location:
Left Side, Rear Surface
(Engine Deck)



Part No. LOCATION: 32" & 36"
323437 DECKS

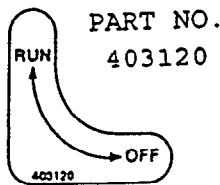


Part No. LOCATION: 48" & 52"
403139 DECKS

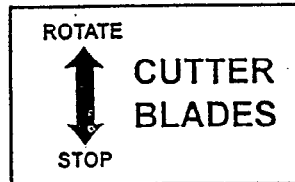
CAUTION

1. READ OPERATORS MANUAL BEFORE OPERATING EQUIPMENT
2. BE SURE THE OPERATING CONTROLS ARE LOCKED IN NEUTRAL BEFORE STARTING ENGINE.
3. KEEP SAFETY DEVICES (GUARDS, SHIELDS, AND OPC SYSTEM) IN PLACE AND IN PROPER WORKING CONDITION.
4. KEEP FEET, HANDS & ALL OBJECTS FROM UNDER DECK.
5. USE CAUTION ON SLOPES.
6. BEFORE LEAVING OPERATORS POSITION:
 - A. LOCK DRIVE LEVERS IN NEUTRAL WITH LATCHES.
 - B. DISENGAGE ATTACHMENT CLUTCH.
 - C. SHUT OFF ENGINE.
7. DISCONNECT SPARK PLUG WIRE(S) BEFORE ADJUSTING, SERVICING OR CLEANING.
8. DO NOT ADD FUEL WHILE ENGINE IS WARM OR RUNNING.
9. DO NOT PARK ON SLOPES UNLESS WHEELS ARE CHOCKED OR BLOCKED.

Location:
PART NO. Upper Handle Console
303085



Location
Switch Bracket, Front Left
of Fuel Tank Support
(B&S Vanguard 16 hp Only)



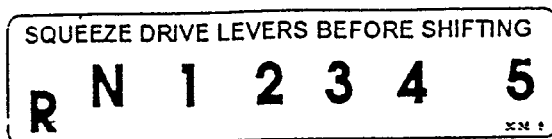
PART NO. 303100
Location:
Upper Handle Console

CAUTION
MUFFLER AND SHIELDS MAY EXCEED 150°F
513746

PART NO. 513746
Location:
Engine Blower Housing
Next to Muffler



PART NO. 303102
Location:
Upper Handle (both sides)



Location:
Transmission Shifter Plate
PART NO. 303518

⚠ DANGER

- USE EXTREME CAUTION WHEN OPERATING ON SLOPES
- MOW ACROSS SLOPE - NEVER UP AND DOWN
- DO NOT OPERATE ON SLOPES GREATER THAN 20°
- WATCH FOR DITCHES, HOLES, ROCKS, RISES, DIPS
- KEEP AWAY FROM DROP-OFFS AND STEEP BANKS
- LOOK BEHIND YOU BEFORE BACKING
- DRIVE SLOWER ON SLOPES
- EXECUTE TURNS SLOWLY
- DO NOT MOW WET SLOPES
- AVOID SUDDEN STARTS

323525






- KEEP ALL PEOPLE OUT OF AREA WHEN MOWING
- THROWN OBJECTS OR BLADE CONTACT CAN CAUSE SERIOUS INJURY OR DEATH



- DO NOT OPERATE IN AN ENCLOSED AREA
- ENGINES PRODUCE CARBON MONOXIDE WHICH IS AN ODORLESS DEADLY POISON

PART NO.
323525

LOCATION:
UPPER HANDLE CONSOLE

⚠ WARNING

DO NOT OPERATE WITHOUT DISCHARGE DEFLECTOR OR ENTIRE GRASS COLLECTION SYSTEM IN PLACE. DO NOT REMOVE GRASS CATCHER UNTIL BLADES HAVE STOPPED.

303508

PART NO.
1303508

LOCATION: Right Rear Corner
of Deck

DANGER

KEEP HANDS and FEET AWAY




403005

PART NO.
403005

LOCATION: Front Corners of Deck

⚠ WARNING



Use Only Exmark Riding Attachments. Use of Other Riding Attachments May Create a Hazardous Condition Resulting in Injury.

493143

PART NO.
403143

LOCATION: Right Rear of Engine Deck

PART NO.
303001



LOCATION: LH Side of Engine
(8.5 HP B & S)

⚠ WARNING

513747

BATTERY CONTAINS SULFURIC ACID. AVOID CONTACT AND ALWAYS SHIELD EYES, FACE, SKIN AND CLOTHING FROM BATTERY. CIGARETTES, FLAMES OR SPARKS COULD CAUSE BATTERY TO EXPLODE. DO NOT CHARGE

OR USE BOOSTER CABLES OR ADJUST POST CONNECTIONS WITHOUT PROPER TRAINING. IN EVENT OF AN ACCIDENT FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF REACH OF CHILDREN.

PART NO.
513747

LOCATION: Battery Cover
(Kawasaki Electric Start Only)

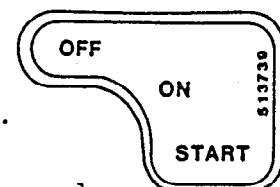
⚠ CAUTION

ALLOW ENGINE TO COOL FOR 2 MINUTES BEFORE REFUELING

PART NO.
303293

LOCATION: On Top Rear of
Fuel Tank

PART NO.
513739



LOCATION: Upper Handle Console
(Kawasaki Electric Start Only)

2. SPECIFICATIONS

2.1 MODEL NUMBER:

Serial No.s 130,000
and Higher
M329B; M3213KA; M3213KC,
M3613KA; M3613KC; M3614KA;
M3615KC; M4814KA; M4815KC
M5214KA; M5215KC.

Serial No.s 129,999 and Below
M32-8.5B-5; M32-12.5K-5, M36-12.5K-5,
M48-12.5K-5; M36-14K-5, M48-14K-5, M52-14K-5;
M32-12.5KO-5, M36-12.5KO-5, M48-12.5KO-5; M36-14KO-5,
M48-14KO-5, M52-14KO-5; M48-16BV-5 and M52-16BV-5;
M36-14K-5E, M48-14K-5E.

2.2 ENGINE

2.2.1 Engine Specifications: See your
engine owner's manual.

2.2.2 RPM (No Load): 3600 rpm

2.3 FUEL SYSTEM

2.3.1 Capacity: 5 gal. (18.9 liter)

2.3.2 Type of Fuel: Use only clean, fresh, regular grade,
unleaded gasoline with the pump sticker octane rating of
87 or higher. In countries using the research method, it
should be 90 octane minimum.

2.3.3 Fuel Filter: Replaceable in-line

2.3.4 Fuel Shut Off Valve: in-line, 1/4 turn

2.4 ELECTRICAL SYSTEM (ELECTRIC START MODELS ONLY)

2.4.1 Charging System: Flywheel Alternator

2.4.2 Charging Capacity: 13 amp

2.4.3 Battery Type: BCI Group U1 235 amps at 0° F

2.4.4 Battery Voltage: 12 Volt; Polarity, negative ground

2.4.5 Fuses: Blade type, 20 amp to charging circuit; 20 amp to 12 V supply

2.5 SAFETY INTERLOCK SYSTEM

Operator must have the transmission in neutral and blades
disengaged to start engine. Release of Operator Presence
Control (OPC) levers will cause engine to stop if *transmission
is not in neutral and/or blade drive is engaged.*

2.6 STEERING/BRAKE CONTROL

Finger tip drive control levers provide independent control of
traction, braking and neutral to each drive wheel for moving,
stopping & power turning.

2.7 TRANSMISSION

2.7.1 Peerless 700-061, five speeds forward and one reverse.

2.7.2 Speed range:

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

2.8 WHEEL DRIVE SYSTEM

Banded double A-Section V-belts, single top-side idlers and replaceable bolt-on drive sheaves and brake drums.
(Single B-Section V-belts for the 32" Model)

2.9 TIRES

	<u>Drive</u>	<u>Front Caster</u>
Size	13 x 6.50 - 6	9 x 3.50 - 4
(32" Model)	13 x 5.00 - 6	9 x 3.50 - 4
Quantity	2	2
Tread	Turf Saver	Smooth
Ply	4	4
Pressure	14 psi (97 kPa)	22 psi (152 kPa)
Bearings ...	Replaceable Ball	Replaceable Roller

2.10 DECK

2.10.1 Cutting Width:

Model 32	31.75 in. (80.7 cm)
Model 36	35.38 in. (89.9 cm)
Model 48	47.63 in. (120.98 cm)
Model 52	52.00 in. (132.08 cm)

2.10.2 Discharge: Right Side

2.10.3 Blade Size:

Model 32	16.25 (41.3 cm) - Qty. 2
Model 36	18.00 (45.7 cm) - Qty. 2
Model 48	16.25 (41.3 cm) - Qty. 3
Model 52	18.00 (45.7 cm) - Qty. 3

2.10.4 Type of Drive: Manual engagement of belt with over-center lock. Blade belt tension is adjustable via turnbuckle. The 48 and 52 in. units have an additional belt which is also adjustable.

2.10.5 Deck Mounting: Bolted directly to engine deck

2.10.6 Cutting Height: Adjusts in 1/4" (.63 cm) increments by various adjustments of caster spacers, blade spacers and axle height. Height adjustment capabilities for specific Serial No's. are as follows:

- 1" to 4" (2.5 cm - 10.2 cm) S/N 90,000 to 99,999.
- 1" to 4 1/2" (2.5 cm - 11.4 cm) S/N 100,000 to 101,999.
- 1" to 4 1/4" (2.5 cm - 10.8 cm) S/N 102,000 & higher.

2.11 DIMENSIONS

2.11.1 Overall Width:

	32"	36"	48"	52"
Discharge chute down	42.45 in. 107.8 cm	46.1 in. 117.1 cm	58.1 in. 147.6 cm	62.7 in. 159.26 cm
Up (transport only)	32.75 in. 83.2 cm	36.4 in. 92.5 cm	48.4 in. 122.9 cm	53.0 in. 134.62 cm

	32"	36"	48"	52"
Overall Length	78 in. 198.1 cm	78 in. 198.1 cm	74.7 in. 189.7 cm	75.3 in. 191.26 cm
Overall Height	40.0 in. 101.6 cm	40.0 in. 101.6 cm	40.0 in. 101.6 cm	40.0 in. 101.6 cm
Tread Width*	32.05 in. 81.4 cm	35.6 in. 90.4 cm	35.6 in. 90.4 cm	35.6 in. 90.4 cm
Curb Weight**	374 lbs 170 kg	391 lbs 177 kg	424 lbs 192 kg	452 lbs 205 kg

* To outside of tires.

** Weights will vary slightly depending on engine option.
Add Approximately 20 lbs.(9 kg) for electric start.

2.12 TORQUE REQUIREMENTS

BOLT LOCATION

TORQUE

Blade/Cutter Housing Spindle Bolt	75-80 ft/lbs.
Caster Bracket Mounts	30-35 ft/lbs.
Cutter Deck/Engine Deck Mount	30-35 ft/lbs.
Engine Mounting Bolts	
Briggs & Stratton	15-20 ft/lbs.
Kohler & Kawasaki	25-30 ft/lbs.

3. ASSEMBLY INSTRUCTIONS

- 3.1 Uncrate unit, leaving it on the pallet, place upper handle assembly, fuel tank, and shifter lever at the rear of the machine. Place casters at the front of the unit.
- 3.2 Place a length of 4" x 4" block between the front of the cutter deck and the pallet.
- 3.3 Remove the bolt bag from the top of the fuel tank support.
- 3.4 Refer to Parts Manual to help you identify and locate parts and their proper position.
- 3.5 Install casters to front of deck using appropriate hardware from the bolt bag (eight 3/8" x 3/4" bolts and eight 3/8" whizlock nuts); tightening the lower four bolts first, then the top four.

- 3.6 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.
- 3.7 Mount the fuel tank on the fuel tank support.

For Models with Serial No's. 129,999 and Below;

Install the two fuel tank straps so the fastening hardware will be located at the rear of the unit. Form the mounting straps around each corner of the fuel tank and fuel tank support. Loosely fasten the mounting straps using two 1/4" x 3" machine screws and two nylock wing nuts from the bolt bag.

IMPORTANT: Do not over tighten the fuel tank straps as the tank will expand once fuel is added.

For Models with Serial No's. 130,000 and Higher;

Install two threaded studs from the bolt bag 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 x 3/4 screws with a flatwasher and lockwasher into the threaded holes in the right side of the fuel tank. *Do not over tighten.* Place a 5/16 flatwasher and a spring over each of the studs and fasten with a 5/16 nyloc nut. *Do not over tighten.*

- 3.8 Install Handle Assembly

For Models with Serial No's. 90,000 to 99,999;

Position the lower end of the handle assembly on the outside of the upper rear section of the fuel tank & handle support. Install four 3/8-16 x 1" bolts (with a spring disk washer 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).

For Models with Serial No's. 100,000 and higher;

Position the lower end of the handle assembly on the outside of the upper rear section of the fuel tank & handle support. Install one 3/8-16 x 1" bolt (from the outside in) on the upper hole on each side of the handle.

Loosely secure each screw with a 3/8" nylock nut. The handle can now be pivoted to allow positioning in one of the three holes allowing various adjustments for operator comfort (See Figures 1 & 2). Once a proper position is found, install one 3/8 x 1" bolt in the bottom mounting holes on each side of the handle. Secure each bolt with a 3/8" nylock nut. Tighten all hardware.

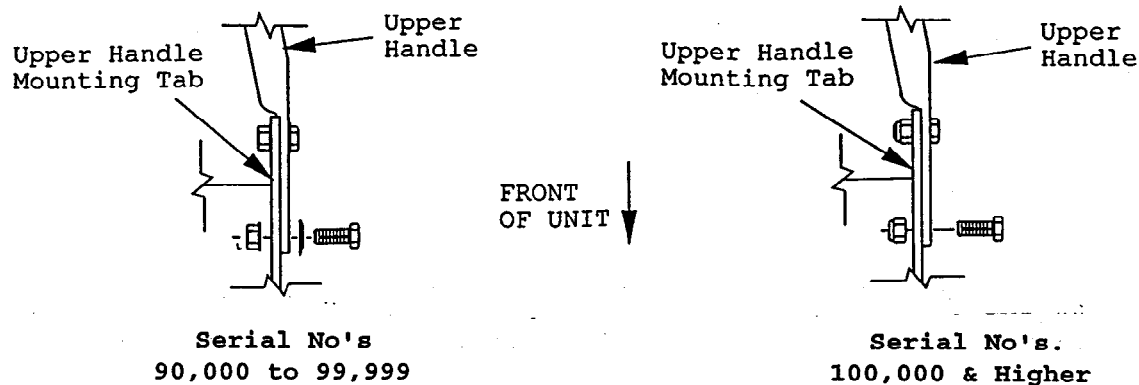


FIG. 1

UPPER HANDLE MOUNTING

IMPORTANT: If the mower has been *completely assembled* and the handle position *is changed*, it will be necessary to readjust the drive and brake linkage.

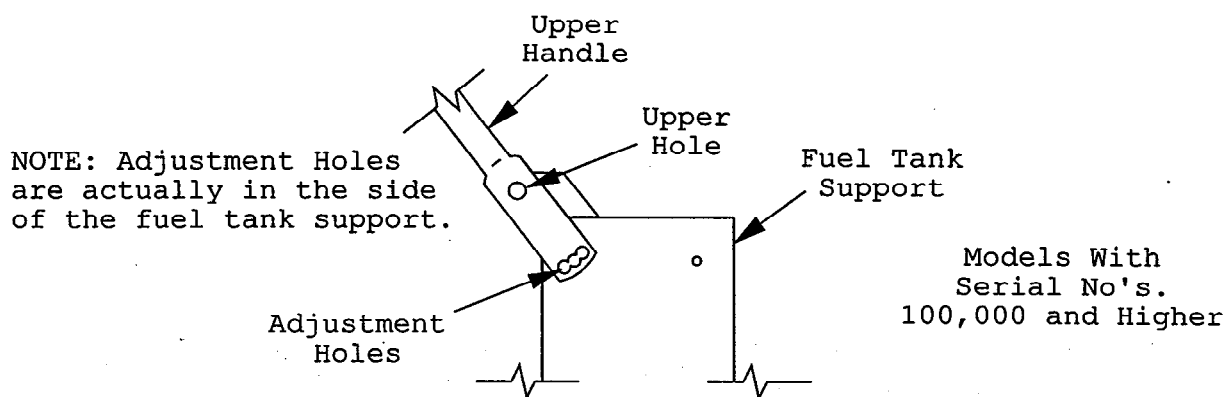


FIG. 2

UPPER HANDLE
HEIGHT ADJUSTMENT

3.8.1 Attach throttle cable to engine.

For Kohler and Kawasaki Engines with "positive" detents in throttle cable for both idle and full throttle positions.

For Models with Serial No's. 90,000 & higher.

If you are not sure your throttle control has two detents, pull the throttle control lever back (rearward) as far as it will go. Slowly push the lever forward. If there are detents, the lever will fall into place toward the left at "idle" position and as you continue to push forward, it will fall in the detent at "full throttle" position.

If there is no detent for the "idle" throttle positions, the lever can be pushed forward until it reaches a detent at the approximate "full throttle" position. Pushing forward past this detent is the "choke" position.

- a) Position the throttle control lever (on console) in the full throttle (but not choke) position. You will feel a detent when the throttle control lever

is approximately 3/4" from the upper end of the slot -- this is the full throttle position.

- b) Route the throttle cable along the right side of the upper handle, under the fuel tank support and to the left side of the engine.
- c) Loosen clamp on engine control plate. (See Figures 3 and 4). Attach inner wire of the throttle cable to the control plate lever and position cable under clamp, do not tighten clamp.

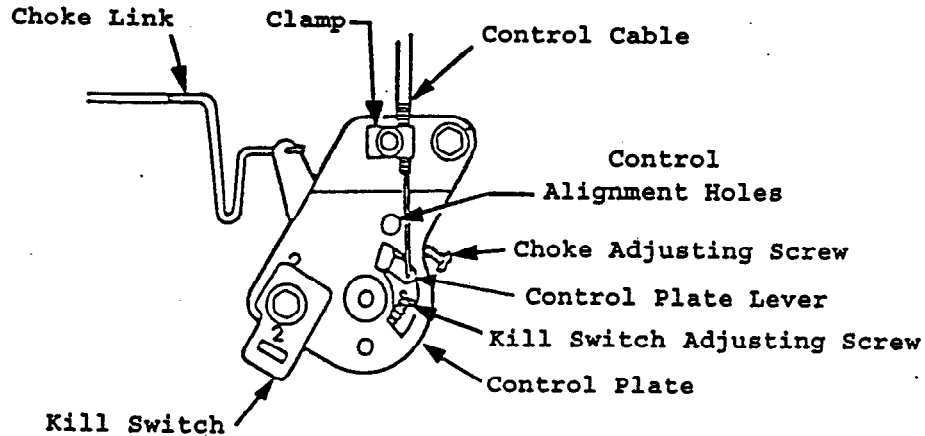


FIG 3
KOHLER SPEED CONTROL
(THROTTLE CABLE HOOK-UP)

For 12.5 hp and 14 hp Engines That Have Throttle Cables With Detents At The "Idle" and "Full Throttle" Positions

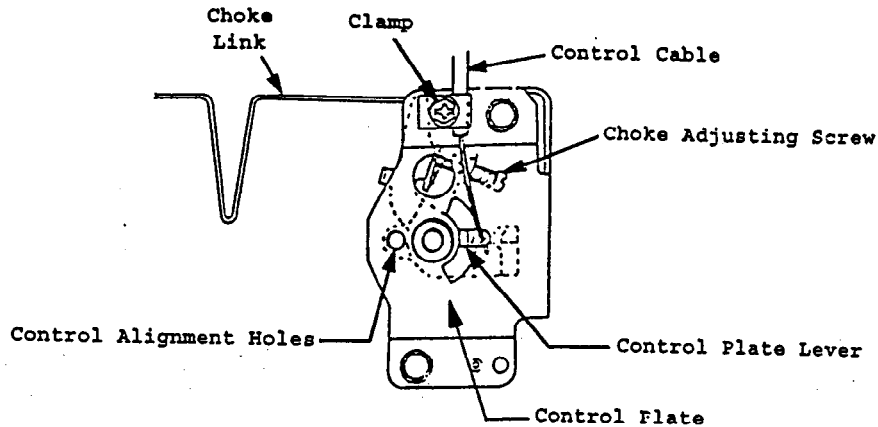


FIG 4
KAWASAKI SPEED CONTROL
(THROTTLE CABLE HOOK-UP)

For 12.5 hp and 14 hp Engines That Have Throttle Cables With Detents At The "Idle" and "Full Throttle" Positions

- d) Pull cable upward until alignment holes in control plate lever and control plate line up. For Kawasaki a 15/64 (6 mm) drill bit can be inserted through these two holes to align them. For Kohler use a 19/64 drill bit. Once holes are aligned, tighten clamp onto throttle cable.

- e) Check that the choke adjusting screw just comes in contact with the choke lever when throttle control is in the full throttle position. Choke link should not move when throttle control is moved to the full throttle position. Be sure choke is fully closed when throttle lever is moved fully forward to the "CHOKE" position.
- f) This step needs to be done after the unit has been assembled and the engine has been started. Refer to Section 4 (Operation Instructions). Check the engine "STOP" position by moving throttle control fully to the rear. (Note: There is a detent toward the lower end of the slot in the console for "IDLE" "STOP" position is rearward from this detent). For Kohler, if engine continues to run in the "STOP" position, turn kill switch adjusting screw inward until engine stops, then give it an additional 1/2 to 3/4 turn to assure it will always function properly.
- (Kawasaki kill switch is not adjustable).

For Kohler and Kawasaki Engines without positive detents in the throttle cable for both idle and full throttle positions or with detent for full throttle position only.

For Models with Serial No's. 90,000 to 99,999.

- a) Position the throttle control lever (on console) 1/8" from the upper end of the slot. Route the throttle cable along the right side of the upper handle, under the fuel tank support, and position the cable on the left side of the engine.
- b) Attach the inner wire to the appropriate throttle control lever on the engine. Loosen the cable clamp on the engine, place the cable behind it and pull up on the cable to move the throttle linkage to the full choked position. Tighten the cable clamp screw.

For B&S Vanguard Engines, for Models with Serial No's. 90,000 and higher

- a) Position the throttle control lever (on console) 1/8" from the upper end of the slot. Route the throttle cable along the right side of the upper handle, under the fuel tank support, and position the cable on the right side of the engine between the oil fill tube and engine.
- b) Attach the inner wire to the appropriate throttle control lever on the engine. Loosen the cable clamp on the engine, place the cable behind it and pull up on the cable to move the throttle linkage to the full throttle position. Tighten the cable clamp screw.

For B&S 8.5 hp Engines, for Models with Serial No's. 100,000 and higher

- a) Position the throttle control lever (on console) 1/8" from the lower end of the slot. Route the throttle cable along the right side of the upper handle, under the fuel tank support, and position the cable on the left side of the engine.
 - b) Attach the inner wire to the appropriate throttle control slider on the engine. Loosen the cable clamp on the engine, place the cable behind it and push ahead on the cable to move the throttle linkage to the "stop" position. Tighten the cable clamp screw.
- 3.8.2 Attach the fuel tank hose to the tank fitting and secure with the clamp provided.
- 3.8.3 Install the blade engagement linkage to the bell crank on the *Left Hand* side of the engine deck. Insert rod through the hole from the outside and fasten with cotter hairpin.
- 3.8.4 Install and adjust shifter lever.
- For Models with Serial No's. 90,000 to 101,999;
- a) Remove the 1/4" bolt, the two (2) spring disk washers and the flat washer from shaft on top of transmission. Install shifter lever through slot in shifter plate and position onto shaft on top of transmission. Replace the 1/4" bolt, the two (2) spring disc washers and flat washer (See Figure 5).

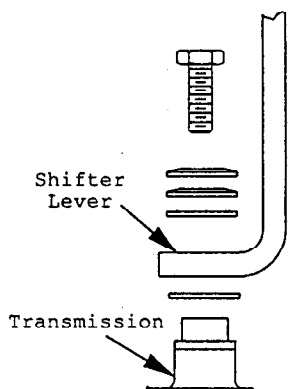


FIG. 5
SHIFTER LEVER
TO TRANSMISSION

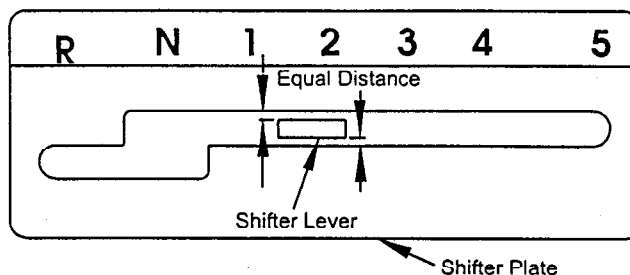


FIG. 6

THIS CLEARANCE SHOULD BE EQUAL

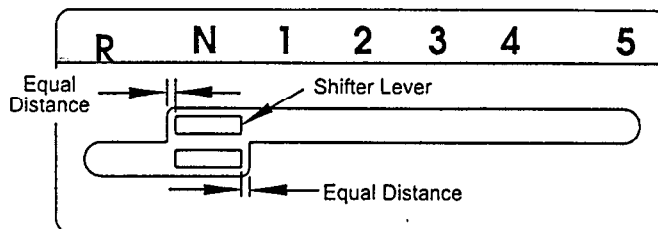


FIG. 7

THIS CLEARANCE SHOULD BE EQUAL

- 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 6). 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 7). Shifter plate can be adjusted side to side to adjust position of lever relative to the slot in plate. Loosen four bolts on top of transmission which hold shifter plate in place, adjust shifter plate and retighten bolts.

For Models with Serial No's. 102,000 and higher;

- a) Remove the 3/8" nylock 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 nylock nut (See Figure 8). Torque the 3/8" nut to 35 ft. lbs. (47 N·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 9). 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 10). 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.

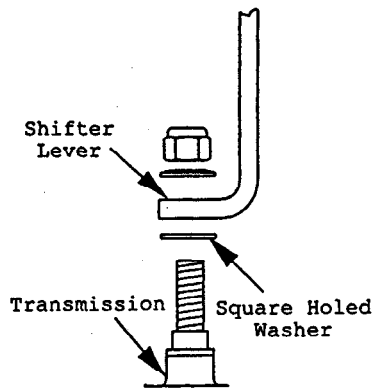


FIG. 8
SHIFTER LEVER
TO TRANSMISSION

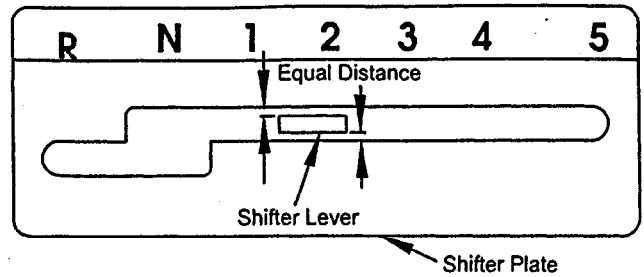


FIG. 9
THIS CLEARANCE SHOULD BE EQUAL

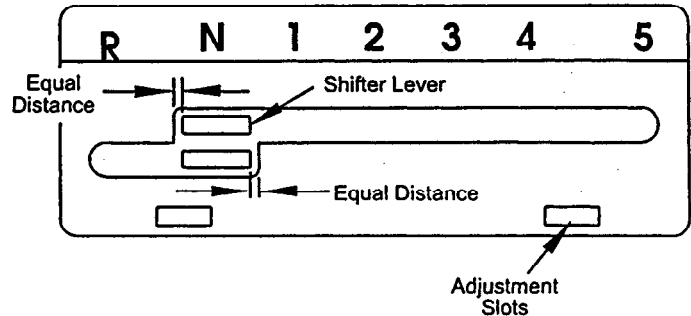


FIG. 10
THIS CLEARANCE SHOULD BE EQUAL

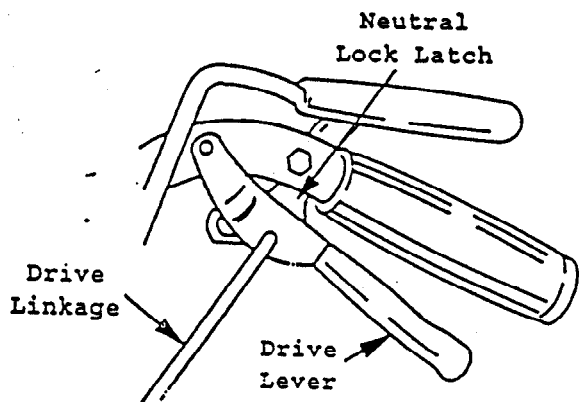
3.8.5 Install and adjust wheel drive linkages.

- a) Screw threaded end of drive linkages into swivels in wheel drive idler arms.
- b) Models with Serial No's. 90,000 to 99,999

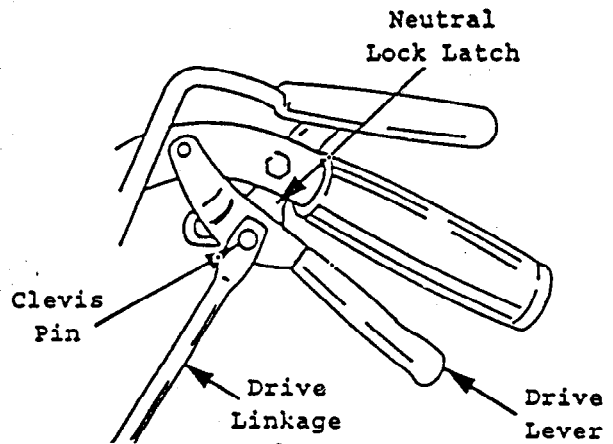
Insert the other end of each drive linkage back into place through hole in drive levers and the slot in the neutral lock latches (See Figure 11). Do not install washers and hairpins until length adjustments have been made.

Models with Serial No's. 100,000 and higher

Insert clevis pin through drive linkage, lever and slot in the neutral lock latches (See Figure 11). Make proper adjustments before adding washers and hairpins.



Serial No's.
90,000 to 99,999



Serial No's.
100,000 and higher

FIG. 11
LEVER AND ROD
ADJUSTMENT

- c) Adjust drive linkage length by threading into or out of the swivel until there is a $\frac{3}{16}$ " to $\frac{1}{4}$ " clearance between the linkage assembly and the bottom of the slot in the neutral lock lever. (See Figure 12).

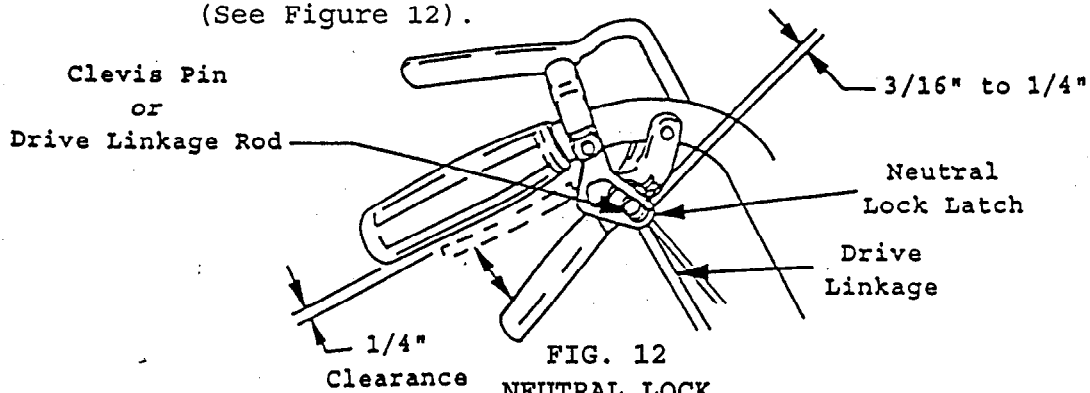


FIG. 12
NEUTRAL LOCK
LEVER CLEARANCE

NOTE: Neutral lock latch clearance should be checked when there is a slight upward force placed on the drive levers to remove any "slack" in the linkage.

- d) For Models with Serial No's. 90,000 to 99,999 After proper adjustments have been made, install the $\frac{5}{16}$ " flat washer onto drive linkage between drive lever and thumb latch (neutral lock latch). Install hairpin into hole on drive linkage between washer and drive lever (See Figure 13). Repeat on opposite side of unit.

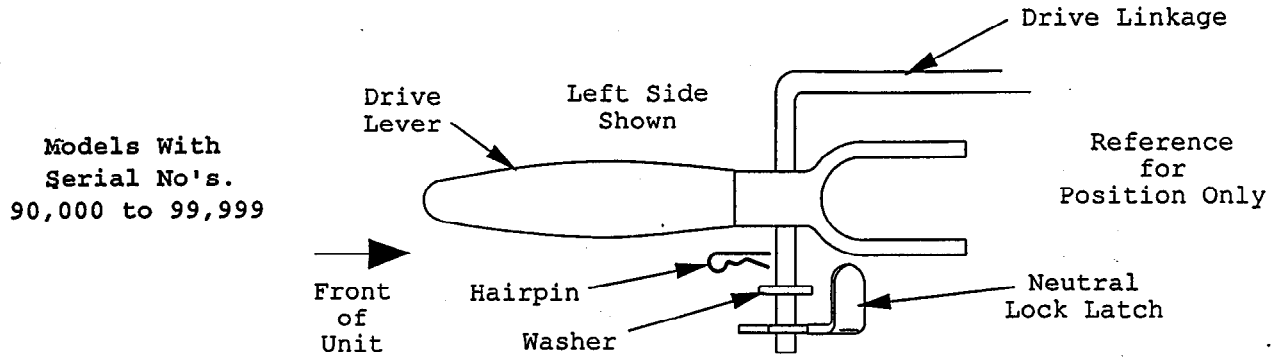


FIG. 13

Drive Lever Hardware Location

For Models with Serial No's. 100,000 and higher;
 After clevis pin has been inserted, install the 5/16" flat washer onto the clevis pin between the drive lever and thumb latch (neutral lock latch). Install hairpin into hole on the clevis pin between the washer and drive lever (See Figure 14). Repeat procedure on opposite side of unit.

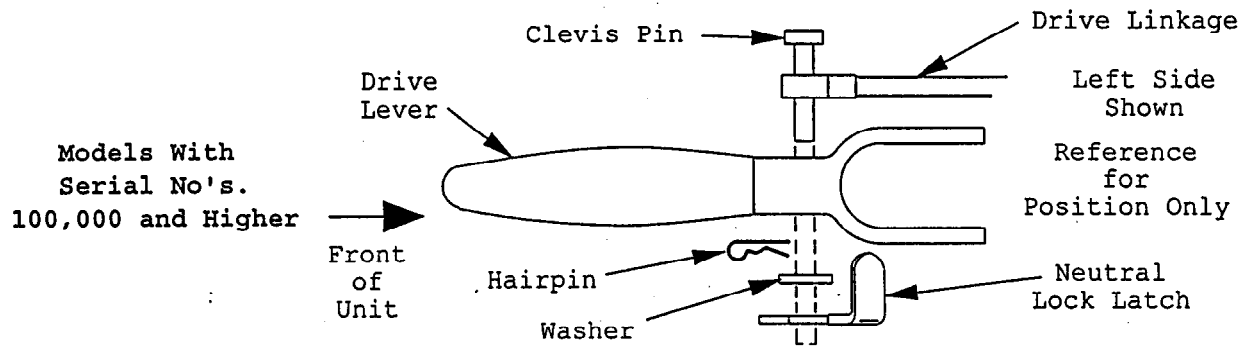


FIG. 14

Drive Lever Hardware Location

- 3.8.6 Adjust brakes by adjusting wingnut on upper end of each brake rod so that when brakes are engaged there is approximately 1/4" of clearance between ends of drive levers and handle grips (See Figure 12).

NOTE: The neutral lock latches must be able to be moved into the neutral lock position, if not, the brake linkages must be adjusted again.

- 3.8.7 Squeeze the drive levers and move both neutral lock latches into the neutral lock position. Mower should move forward and backward freely, if not, readjust as stated in Sections 3.8.5 and 3.8.6.
- 3.8.8 Route the long, unattached wiring harness lead up the left hand side of the handle and connect the two leads, in any order, to the operator presence control switch terminals on the inside of the control console. (On electric start models, plug harness into back of key switch). Fasten the lead to the handle with two large wire ties, from 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.

3.9 Service Battery *(Electric Start Only, Machine is shipped with battery dry)*

- 3.9.1 Remove battery from crate.
- 3.9.2 Place battery on a level surface and remove vent caps.
- 3.9.3 Fill cells with battery grade sulfuric acid (1.625 specific gravity) to halfway between top of separators and bottom of vent well.

DANGER

- Flames or sparks could cause the battery to explode. Always shield eyes and face from battery.
- 3.9.4 Check acid temperature and state of charge:
 - a) Acid temperature must be at least 80° F (26.7° C).
(Put 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.
 - 3.9.5 If acid temperature is not 80° F (26.7° C) or state of charge is not good, charge at 15 amps (20 amp maximum). Slow charging is permissible. **ACID TEMPERATURE MUST NEVER EXCEED 125° F (51.7° C) WHILE CHARGING.**
 - 3.9.6 After charging, add battery acid up to the 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".
 - 3.9.7 Install battery in machine and secure battery hold-down. **DO NOT** over-tighten.

CAUTION

- Be sure ignition switch is "OFF" and key is removed from ignition. Sparks could cause an explosion or moving parts could accidentally engage causing personal injury.

Connect battery cables - *positive (red) cable first*, then the negative (black) cable. Slip insulator boots over terminals.
- 3.10 If the unit is shipped without the muffler attached, install with hardware provided.
 - 3.11 Service Engine: Follow the recommendations in the Engine Operators Manual.

3.12 Grease unit.

NOTE: UNIT IS NOT GREASED AT THE FACTORY! Refer to Section 5.1.12 for locations and grease amounts.

3.13 Follow pre-start instructions as outlined in Section 4:2..

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 Drive Levers:

Located on each side of the upper handle assembly directly below the handle grips. These levers individually control clutching action of the wheel drive belts and brakes. When the drive levers are all the way down, the wheel drive belts engage and the brakes disengage. Squeezing the left or right hand drive lever causes the left hand or right hand wheel to slow down or stop, which makes the machine turn to the left or right respectively. The sharpness of the turn varies by how much the lever is squeezed. If both levers are squeezed all the way back, both brakes will engage and the machine will stop. For straight ahead motion, smoothly release both drive levers to engage both drive wheels simultaneously.

4.1.3 Neutral Lock Latches:

Located directly above the drive levers. The purpose of these levers is to allow the operator to lock the drive levers in a "neutral" position where neither the wheel drive belts nor the brakes engage. To lock the drive levers in neutral, squeeze the drive levers back, place thumbs on the upper portion of the neutral lock latches and move them to the rear. Release drive levers.

CAUTION

- Be sure the rods (or clevis pins) that protrude through the slots of each neutral lock latch are completely engaged in the rear slot of each latch, if not, the drive levers could unexpectedly slip into the drive position.

4.1.4 Operator Presence Control (OPC) Levers:

Located on the upper handle assembly directly above the handle grips. 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 the blade drive is engaged and/or the transmission is in gear.

4.1.5 Blade Engagement Lever:

Located on the left side of the upper handle. To engage the blades, push the lever forward, or away from the operator, until the turnbuckle locks over-center. To disengage the blades, pull the lever to the rear, or towards the operator, until the bell crank, located at the rear of the engine deck, contacts the deck.

4.1.6 Throttle-Choke Control:

Kawasaki and Kohler Engines:

The throttle-choke control lever is located on the control console right side. Choke aids in starting a cold engine. The choke control is a part of the throttle control and activates by moving the throttle control lever to the full forward position. You will notice a detent at the "full throttle" position (approximately 3/4" from top of slot) continue pushing forward into the "choke" position.

Once the engine has started, move the throttle control lever to the midway point and allow the engine to warm-up before going to full throttle.

All Kawasaki and Kohler engines *without electric start* are equipped with "throttle kill" as a standard feature. Moving the throttle control lever to the full rear position will kill the engine (on units manufactured after December 1993, you will notice the control lever will fall into a detent at the "idle" position, continuing rearward past this detent will shut off the engine).

Kawasaki Electric Start Engines:

The throttle-choke control lever is located on the control console right side. Choke aids in starting a cold engine. The choke control is a part of the throttle control and activates by moving the throttle control lever to the full forward position. You will notice a detent at the "full throttle" position (approximately 3/4" from top of slot) continue pushing forward into the "choke" position.

Once the engine has started, move the throttle control lever to the midway point and allow the engine to warm-up before going to full throttle.

On the Kawasaki Electric Start the throttle control there is no "throttle kill". To stop engine the ignition key must be turned fully counter-clockwise to the "OFF" position.

B&S Vanguard and 8.5 hp Engines:

On the B&S Vanguard, the choke control is located on the left, front corner (from operator's position) of the engine. To activate, pull the wire control ring outward (refer to Engine Owner's Manual).

Once the engine has started, move the choke control to the off position and move the throttle control to about medium throttle position to allow engine to warm-up before going to full throttle.

To stop the engine, place throttle control lever in the "slow" position, turn keyswitch to the "off" position.

For the B&S 8.5 hp engine the choke control is located on the left side of the engine (from operator's position). Pull the choke lever outward and to the rear (counter-clockwise from top).

Once the engine has started, move the choke control to the off position and move the throttle control to about medium throttle position to allow engine to warm-up before going to full throttle.

To stop the engine, move the throttle control lever to the full rearward position.

4.1.7 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.

4.1.8 Fuel Shut-Off Valve:

Located on the fuel line between the fuel tank and the engine. The fuel shut off valve shuts off the flow of fuel when the machine will not be used for a few days, when parking inside a building, and during transport to and from the job. Rotate the valve 1/4 turn clockwise to shut off fuel. Rotate the valve 1/4 turn counter-clockwise to turn on fuel.

4.1.9 "Off-Run" Switch (B&S Vanguard Only):

Located on front left corner of fuel tank support. Turn key to "RUN" position to allow engine to be started. Turn key to "OFF" position to shut off engine.

4.1.10 Ignition Switch (Electric Start Kawasaki Models Only):

Located on the control console. The ignition switch starts and stops the engine. The switch has three positions "OFF", "ON", and "START". Insert key into switch and rotate clockwise to the "ON" position. Rotate clockwise to the next position to engage the starter (key must be held against spring pressure in this position).

Operator must have transmission in neutral and blade engagement lever fully disengaged to start engine.

4.2 PRE-START

- 4.2.1 Refer to the Maintenance Section 5.1 and perform all of the necessary inspection and maintenance steps.

DANGER

- Fuel is *highly flammable*. Add fuel *before* starting the engine. Refuel outdoors or in a well ventilated area.
- *DO NOT* smoke when refueling or operating the equipment. Never remove the cap of the gas tank while engine is hot or when engine is running.

- 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.

NOTE: On Serial No.'s 129,999 and Under, 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.

WARNING

- If fuel is spilled, *DO NOT* attempt to start the engine. Move away from the spill and avoid creating any source of ignition.

4.3 OPERATING INSTRUCTIONS

- 4.3.1 Read the Engine Owner's Manual carefully for detailed operating instructions and maintenance regarding the engine.

Before attempting to operate the unit, refer to Section 1 (Safety) and follow all safety, operating, and preparation guidelines as stated in that section.

4.3.2 Starting Engine

Position mower on a level surface. Disengage blade drive and place transmission in neutral.

Open fuel shut-off valve.

NOTE: It is helpful to have the left and right neutral lock latches in the "neutral" lock position when starting the engine (See Section 4.1.3).

DANGER

- **DO NOT** operate the engine in a confined area where exhaust fumes can collect. Carbon monoxide present in the exhaust is an odorless and deadly gas. Provide proper ventilation.

With a cold engine (Kawasaki and Kohler) place the throttle in the full "choke" position. With a warm engine, place the throttle midway between the "slow" and "fast" position.

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

(Manual Start Models)

Pull recoil rope to start engine.

(Electric Start Models)

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

For the B&S Vanguard and 8.5 hp B&S (cold engine) place throttle in full forward position and move the choke control, on the left side of engine, fully to engaged position. Pull the recoil rope to start the engine. For Vanguard; turn key switch to "Run" position, pull recoil rope to start engine.

When engine is warm do not engage the choke control.

With any cold engine, after starting engine, allow it to warm up, gradually increase to full throttle.

4.3.3 Stopping Engine:

Disengage blade drive, shift transmission to neutral and lock the drive levers in neutral. Move throttle to "slow" position.

Allow engine to idle for 30 seconds to allow cool down then:

For Kawasaki and Kohler Engines: Move throttle to full rear position to stop the engine.

For Kawasaki Electric Start and B&S Vanguard Engines: Turn key switch to "OFF" position.

For 8.5 B&S Engines: Move throttle lever to the full rear 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 Wheel Engagement and Turning:

With drive levers in the neutral lock position, shift transmission into desired gear. Squeeze both drive levers and move both neutral lock latches from the neutral lock position.

For straight ahead motion, smoothly release both drive levers to engage drive wheels.

Squeeze right hand drive lever to turn right and left hand drive lever to turn left (See Section 4.1.2).

4.3.5 To Stop:

Squeeze drive levers all the way back to engage brakes. Move thumb lock latches into the neutral lock position and shift transmission into neutral. If unit is to be parked on a hillside, be sure to use appropriate chocks or blocks against the tires.

4.3.6 Blade Engagement:

DANGER

- *DO NOT* put hands or feet under the mower or mower deck when blades are engaged.

Be sure that all persons are clear of mower deck and discharge area before engaging the blades. Set throttle to "midway" (half throttle) position. Push the blade engagement lever forward to engage blades. Accelerate to full throttle to begin mowing. (See Section 4.1.5).

4.3.7 Blade Disengagement

Pull the blade engagement lever to the full rearward position to disengage the blades (See Section 4.1.5)

4.3.8 Changing Gears

When changing gears, always squeeze drive levers and/or engage neutral lock latches. The shift lever may be moved with a knee or by hand.

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

4.4 TRANSPORTING

WARNING

- If loading with ramps, be sure ramps are properly supported and strong enough to support the unit.
- If necessary, use assistance when loading or unloading. Keep feet and legs out from under the unit when loading and unloading

Be sure fuel shut-off valve is closed.

Use a heavy duty trailer to transport the machine. Engage the neutral lock latches 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 neutral lock latches. Failure to do so can result in damage and/or premature wear to drive train.

5. MAINTENANCE AND ADJUSTMENTS

5.1 PERIODIC MAINTENANCE

WARNING

- Disengage blade clutch, shut off engine and remove spark plug wire(s) before any adjusting, servicing, or cleaning
- The engine can become very hot. Always allow the engine to cool before servicing or making repairs around the engine area.

5.1.1 Check engine oil level.

Service Interval: See Engine Owner's Manual

- a) Make sure engine is stopped and on a level surface.
- b) Check with engine cold.
- c) Clean area around dipstick. Remove dip stick and wipe off oil. Reinsert the dipstick and:
Screw dipstick into place for the B/S Vanguard and the 8.5 hp B&S engines.
Do not screw into place for Kawasaki or Kohler engines.
Remove dipstick and check oil level.
- d) If the oil level is low, add oil as specified in the engine owners manual to bring the oil level up to the "F" mark on the dipstick. **DO NOT OVERFILL.**

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: See Engine Owner's Manual

- a) Stop engine and remove spark plug wire(s).
- b) 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

- When it is necessary to raise the deck or the mower, **DO NOT** rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands or equivalent support.
- a) Disengage blades.
 - b) Stop engine and remove spark plug wire(s).
 - c) Raise deck, support properly using safety precautions.
 - d) Clean out any grass build-up from underside of deck and in deck discharge chute.
 - e) Inspect blades and sharpen or replace as required.
 - f) If blade removal is necessary, be careful for the sharp cutting edges of the blades.
 - g) Re-install the blades (if they were removed) and torque blade bolts to 75-80 ft/lbs. Be sure the spring disc washer cone is installed toward the bolt head (See Figure 15).
 - h) Remove jack stands (or equivalent support) and lower deck to ground.

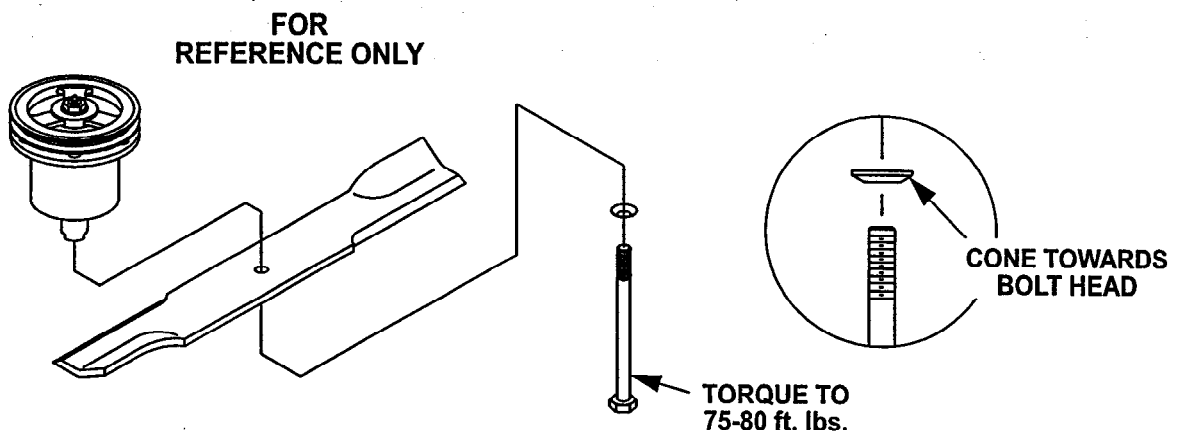


FIG. 15

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, referred to as (OPC). If either the mower blades or the traction drive is engaged and the operator removes both hands from the handles, the mower engine *must stop*.

- b) To determine if the OPC is in operating condition, clear area of bystanders, with the transmission in neutral and throttle lever at the "midway" position, engage the cutter blades and release the OPC levers. The mower engine *must stop*. With the blades disengaged, shift the transmission into gear and release the OPC levers. The engine *must stop*.

If the mower engine does not stop under any of the above mentioned conditions, contact your authorized Exmark service dealer.

CAUTION

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

5.1.5 Check Brake and Wheel Drive Linkage Adjustment.

Service Interval: Daily

Refer to Sections 3.8.5 and 3.8.6. Note any bent linkage or hardware which may need servicing or replacing.

5.1.6 Check for loose hardware.

Service Interval: Daily

- a) Stop engine and remove spark plug wire(s).
- b) Visually inspect machine for any loose hardware or any other possible problem. Tighten or replace any hardware before operating.

5.1.7 Service pre-cleaner element and air cleaner.

Service Interval: See Engine Owners Manual

- a) Stop engine and remove 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) hrs. of operation. Follow engine manufacturer's recommendations for future oil changes.

- a) Disengage blades.
- b) Stop engine and remove spark plug wires(s).
- c) Drain oil while engine is *warm* from operation or if oil is to be changed after the unit has been sitting for awhile, run engine for a few minutes to get it warm.

CAUTION

- Do Not service or make repairs near the engine area when the engine is hot.
- d) Remove the oil drain plug from the right hand side of the engine. Allow oil to drain, replace drain plug.
 - e) If your mower is equipped with an oil filter, replace the oil filter every *other* oil change. Clean around oil filter and unscrew filter to remove. Before the new

filter is installed, 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.

- f) Clean around oil dipstick and remove. Fill to specified capacity and replace dipstick. Refer to Engine Owner's Manual for correct oil level and the SAE Grade recommended by the manufacturer.

Do Not overfill.

- g) Start the engine and check for leaks.

5.1.9 Check tire pressures.

Service Interval: 25 hrs.

- a) Stop engine and remove spark plug wire(s).
- b) Inflate tires to pressures specified in Section 2.9 in the Specifications table. If tire repair is necessary, a permanent liquid sealant instead of inner tubes is recommended. Some temporary sealants will cause rust or corrosion to the rims. A permanent sealant will eliminate this problem. *(Units w/Serial No.s 115,000 and higher come with sealant in front casters.*

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

Service Interval: 150 hrs.

- a) Stop engine and remove spark plug wire(s).
- b) Place drive levers and thumb lock 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 output 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" 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 5.2.3.

5.1.11 Inspect belt wear.

Service Interval: 25 hrs.

- a) Stop engine and remove spark plug wire(s).

- b) Remove the cutter deck belt shield to check mower primary and secondary blade drive belt condition.

NOTE: A Secondary blade drive belt is used on 48" and 52" units.

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

5.1.12 Lubrication:

Service Interval: Refer to Chart

- a) Stop engine and remove spark plug wire(s).
- b) Lubricate fittings with one to two pumps of SAE No. 2 multi-purpose gun grease (see recommended lubricants following the lubrication chart).

Refer to the following chart for fitting locations and lubrication schedule.

LUBRICATION CHART

FITTING LOCATIONS	INITIAL PUMPS	FITTING QUANTITY				SERVICE INTERVAL*
		32"	36"	48"	52"	
1. Caster Wheel Bearings	12	2	2	2	2	Daily
2. Caster Pivots	2	2	2	2	2	Daily
3. Cutter Spindles	10	2	2	3	3	† Weekly
4. Drive Wheels	18	2	2	2	2	Daily
5. Drive Wheel Idler Arm	2	2	2	2	2	Daily
6. Brake Lever	2	2	2	2	2	Weekly
7. Trans. Output Shaft Coupler	2	2	2	2	2	Weekly
8. Cutter Deck Idler Pivots S/N's 115,000 and Higher	2	1	1	2	2	Weekly

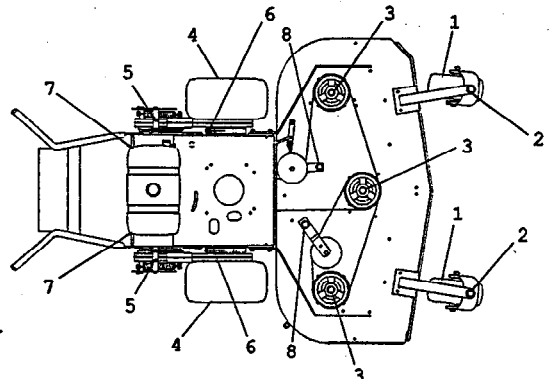
* More often if operating under severe conditions.

† Under severe cutting conditions, two pumps of grease each day may be more beneficial.

No.3 (Cutter Spindle)
Located Under Deck

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

48" Deck
Shown for
Reference Only



Recommended SAE No. 2 Greases:

U.S. Lithium MP White Grease 2125

Pennzoil #705; Pennzoil #707L; Pennzoil #TTM 302

Mobil Grease CM-P; Mobilith SHC220; Mobil Grease Special; Mobilith SHC460 (Available at Mobil Stations)

Ronex MP - (Available at Exxon Stations)

Shell Alvania #2 - (Available at Shell Stations)

Super Lube M EP #2 or Super Stay M #2 (Available at Conoco Stations)

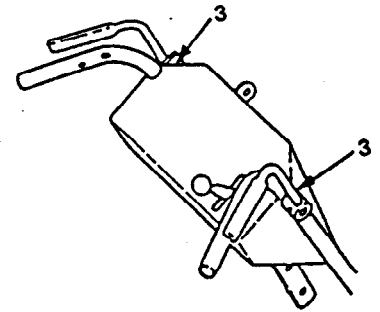
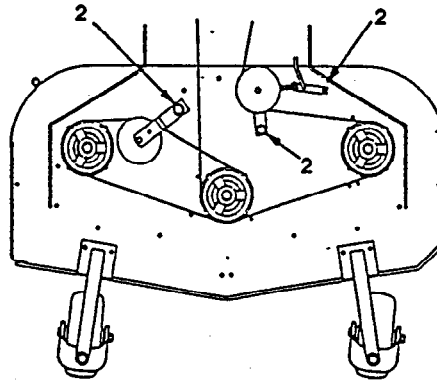
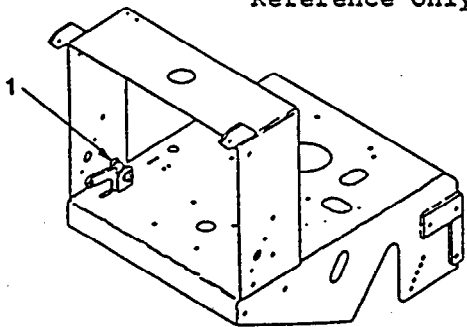
c) Replace 5-speed gearbox grease yearly. Use 18 oz. Of Peerless grease (Part No. 788067). See Section 5.1.10.

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

SPRAY LUBRICANT CHART

PIVOT POINTS	NO. of PLACES				SERVICE INTERVAL
	32"	36"	48"	52"	
1. Blade Engagement Bellcrank	1	1	1	1	Weekly
2. Cutter Deck Idler Pivots S/N's 114,999 and Lower	1	1	2	2	Weekly
3. OPC (LH Bearing\Switch Ball) S/N's 129,999 and Lower	2	2	2	2	Weekly

Illustrations
for
Reference Only



48" Deck Shown

5.1.13 Remove engine shrouds and clean cooling fins.

Service Interval: See Engine Owner's Manual

- a) Stop engine and remove 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 that 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.

5.1.14 Check spark plugs.

Service Interval: See Engine Owner's Manual

Remove spark plug, check condition and adjust plug gap, or replace with new plug as stated in the engine manual.

5.1.15 Change fuel filter.

Service Interval: As Required

A fuel filter is installed in the fuel line between the fuel tank and the engine. Replace when necessary. If the engine keeps cutting out, runs erratically, or will not start, it is possible the fuel filter may be to blame. Replace as necessary.

5.1.16 Engine maintenance.

Service Interval: See Engine Owner's Manual

Refer to the Engine Owner's Manual regarding maintenance required for the engine.

5.1.17 Check all safety signs for visibility. Replace as needed.

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

- a) All belt drive pulley setscrews.
- b) OPC lever setscrews.

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) Blade drive pulleys on the mower deck.
- b) Transmission drive pulley on engine crankshaft.
- c) OPC lever hubs and cross-shaft.

NOTE: When applying any locking adhesives, care must be used not to bond the bearing (next to each OPC hub) to the cross-shaft. This could cause binding of the OPC levers and erratic operation.

5.1.19 An anti-seize compound is used on the blade drive pulley hub, located on the engine PTO shaft (this allows for ease of removal of the pulley).




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

5.1.21 Check battery electrolyte level: (Electric Start Only)

Service Interval: 25 hrs.

- a) Stop engine and remove key.
- b) Remove battery cover.

- c) Remove vent caps from battery. If needed, fill with water (distilled is recommended) to bottom of vent wells and replace vent caps.
- d) See Assembly Section 3.9 for servicing a new battery.

			⚠ WARNING	513747
BATTERY CONTAINS SULFURIC ACID. AVOID CONTACT AND ALWAYS SHIELD EYES, FACE, SKIN AND CLOTHING FROM BATTERY. CIGARETTES, FLAMES OR SPARKS COULD CAUSE BATTERY TO EXPLODE. DO NOT CHARGE			OR USE BOOSTER CABLES OR ADJUST POST CONNECTIONS WITHOUT PROPER TRAINING. IN EVENT OF AN ACCIDENT FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF REACH OF CHILDREN.	

PART NO. 513747 LOCATION: Battery Cover

5.2 ADJUSTMENTS

5.2.1 Adjusting cutting height with blade spacers.

For Models with Serial No's. 90,000 to 101,999:

Blades may be adjusted for cutting height by using the five 1/4" spacers found on the blade spindle bolts. This allows a 1-1/4" range in 1/4" increments of cutting height in any axle position. The same number of blade spacers must be used on all blades to achieve a level cut (three above and two below, two above and three below, etc.).

For the best cut and discharge, place a minimum of three spacers between the blade and spindle shaft.

For the highest quality cut, place all five spacers between the blade and the spindle shaft.

If the mulching kit is installed, the highest quality cut can be obtained with 4 spacers between the blade and spindle (minimum is 2 for a good cut).

For Models with Serial No's. 102,000 & higher:

Blades may be adjusted for cutting height by using the four 1/4" spacers found on the blade spindle bolts (factory setting is two above and two below). This allows a 1" range in 1/4" increments of cutting height in any axle position. The same number of blade spacers must be used on all blades to achieve a level cut (two above and two below, one above and three below, etc.).

For the best cut and discharge, place a minimum of two spacers between the blade and spindle shaft.

For the highest quality cut, place all four spacers between the blade and the spindle shaft.

If the mulching kit is installed, the highest quality cut can be obtained with 3 spacers between the blade and spindle (minimum is 1 for a good cut).

If you need to cut higher or lower than what the spacers will allow, it will be necessary to adjust the rear axle height and caster position. See Section 5.2.2 below.

5.2.2 Axle height and caster position.

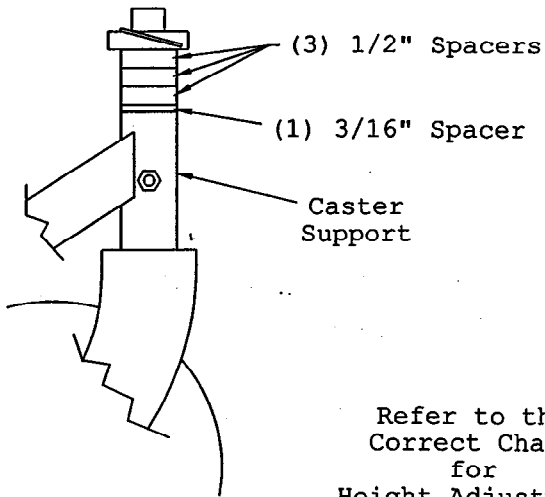
Desired cutting height range can be obtained by adjusting the rear axle and placing caster spacers above or below the caster arm (See Figure 15). It may be necessary to readjust wheel drive and brake linkages.

To adjust rear axle:

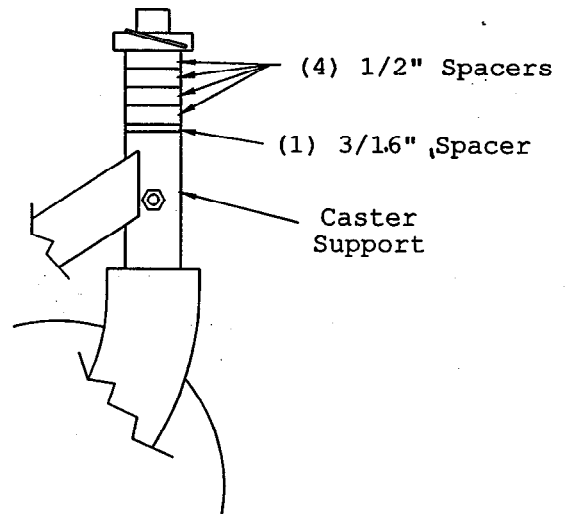
- a) Stop engine and remove spark plug wire(s).
- b) Place the drive levers in the neutral lock position.
- c) Remove mower deck belt shield for access to axle adjustment belts.
- d) Loosen but do not remove the two (2) axle pivot bolts and the two (2) axle adjustment bolts (See Figure 16).
- e) Place a jack under the rear center of the engine deck.
- f) Raise the back end of the engine deck up enough to remove the two (2) axle adjustment bolts.
- g) With the jack, raise or lower the back end of the engine deck so that two (2) axle adjustment bolts can be reinstalled in desired hole location. A tapered punch can be used to help align the holes.
- h) Retighten all four (4) bolts, lower unit and remove jack.
- i) Install mower deck belt shield.
- j) Adjust wheel drive and brake linkages as required. (See Sections 3.8.5 and 3.8.6).
- k) Using the appropriate chart for your unit, adjust the caster spacers as directed to match with the axle hole selected. (See Figure 15)

Refer to the charts and illustrations on the following pages to properly adjust for desired cutting height.

NOTE: Each succeeding chart refers to a specific range of Serial No's. Be sure to use the correct chart to correspond with the Serial No. of your machine.



Serial No's.
90,000 TO 99,999

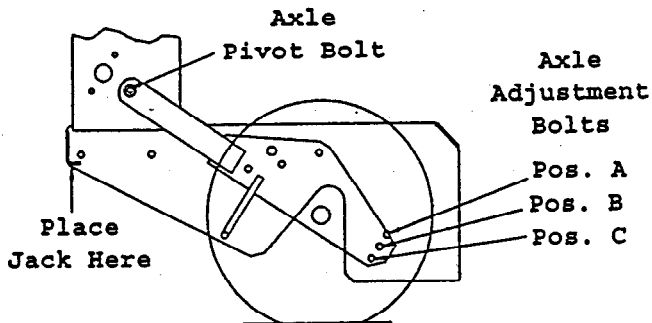


Serial No's.
100,000 & Higher

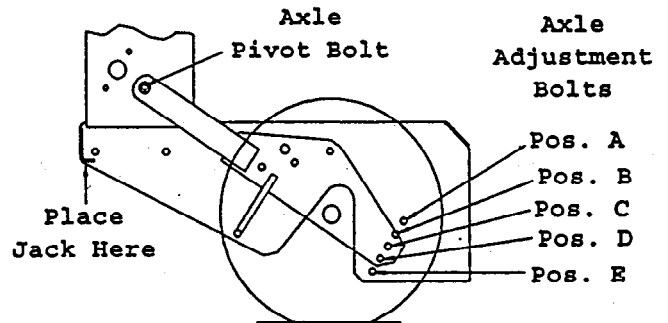
Refer to the
Correct Chart
for
Height Adjustment

FIG. 16
CASTER HEIGHT ADJUSTMENT

Axle Adjustment Holes
are Actually in the Side
of the Rear Deck



Serial No's.
90,000 TO 99,999



Serial No's.
100,000 & Higher

FIG. 17
AXLE HEIGHT ADJUSTMENT

The following chart refers to Serial No's. 90,000 to 99,999. These models have three (3) axle positions; three (3) 1/2" caster spacers; one (1) 3/16" caster spacer, and five (5) blade spacers.

CUTTING HEIGHT ADJUSTMENT (1" TO 4")

FOR MODELS WITH SERIAL NO'S. 90,000 to 99,999:

AXLE POSITION	NO. OF SPACERS BELOW CASTER		NUMBER OF 1/4" BLADE SPACERS BELOW SPINDLE					
	1/2"	3/16"	5	4	3	2	1	0
A	0	0	1"	1 1/4"	1 1/2"	1 3/4"	2"	2 1/4"
A	0	1	1 1/8"	1 3/8"	1 5/8"	1 7/8"	2 1/8"	2 3/8"
A	1	0	1 3/8"	1 5/8"	1 7/8"	2 1/8"	2 3/8"	2 5/8"
B	1	0	1 5/8"	1 7/8"	2 1/8"	2 3/8"	2 5/8"	2 7/8"
B	1	1	1 3/4"	2"	2 1/4"	2 1/2"	2 3/4"	3"
B	2	0	2"	2 1/4"	2 1/2"	2 3/4"	3"	3 1/4"
B	2	1	2 1/8"	2 3/8"	2 5/8"	2 7/8"	3 1/8"	3 3/8"
C	2	0	2 1/8"	2 3/8"	2 5/8"	2 7/8"	3 1/8"	3 3/8"
C	2	1	2 1/4"	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"
C	3	0	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"
C	3	1	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"	4"

IMPORTANT: To achieve the highest quality of cut, the blades should be level with the ground, or tipped slightly down at the front.

The following chart is for Serial No's. 100,000 to 101,999. These models have five (5) axle positions; four (4) 1/2" caster spacers; one (1) 3/16" caster spacer, and five (5) blade spacers.

NOTE: On models with Serial No's. 100,000 and higher, the axle positions are in 1/2" increments and the large caster spacers are 1/2" thick. Therefore, by adjusting the same number of 1/2" caster spacers as axle hole positions the blades will retain the same front-to-back tip (rake).

CUTTING HEIGHT ADJUSTMENT (1" to 4 1/2")

FOR MODELS WITH SERIAL NO'S. 100,000 to 101,999:

AXLE POSITION	NO. OF SPACERS BELOW CASTER		NUMBER OF 1/4" BLADE SPACERS BELOW SPINDLE					
	1/2"	3/16"	5	4	3	2	1	0
A	0	0	1"	1 1/4"	1 1/2"	1 3/4"	2"	2 1/4"
A	0	1	1 1/8"	1 3/8"	1 5/8"	1 7/8"	2 1/8"	2 3/8"
A	1	0	1 3/8"	1 5/8"	1 7/8"	2 1/8"	2 3/8"	2 5/8"
B	0	1	1 3/8"	1 5/8"	1 7/8"	2 1/8"	2 3/8"	2 5/8"
B	1	0	1 5/8"	1 7/8"	2 1/8"	2 3/8"	2 5/8"	2 7/8"
B	1	1	1 3/4"	2"	2 1/4"	2 1/2"	2 3/4"	3"
B	2	0	2"	2 1/4"	2 1/2"	2 3/4"	3"	3 1/4"
C	1	1	1 7/8"	2 1/8"	2 3/8"	2 5/8"	2 7/8"	3 1/8"
C	2	0	2 1/8"	2 3/8"	2 5/8"	2 7/8"	3 1/8"	3 3/8"
C	2	1	2 1/4"	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"
C	3	0	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"
D	2	1	2 3/8"	2 5/8"	2 7/8"	3 1/8"	3 3/8"	3 5/8"
D	3	0	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"
D	3	1	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"	4"
D	4	0	3"	3 1/4"	3 1/2"	3 3/4"	4"	4 1/4"
E	3	1	2 7/8"	3 1/8"	3 3/8"	3 5/8"	3 7/8"	4 1/8"
E	4	0	3 1/8"	3 3/8"	3 5/8"	3 7/8"	4 1/8"	4 3/8"
E	4	1	3 1/4"	3 1/2"	3 3/4"	4"	4 1/4"	4 1/2"

IMPORTANT: To achieve the highest quality of cut, the blades should be level with the ground, or tipped slightly down at the front.

The following chart is for Serial No's. 102,000 and higher. These models have five (5) axle positions; four (4) 1/2" caster spacers; one (1) 3/16" caster spacer, and five (5) blade spacers.

NOTE: On models with Serial No's. 100,000 and higher, the axle positions are in 1/2" increments and the large caster spacers are 1/2" thick. Therefore, by adjusting the same number of 1/2" caster spacers as axle hole positions the blades will retain the same front-to-back tip (rake).

CUTTING HEIGHT ADJUSTMENT (1" to 4 1/4")

FOR MODELS WITH SERIAL NO'S. 102,000 and higher:

AXLE POSITION (FIG. 10)	NO. OF SPACERS BELOW CASTER		NUMBER OF 1/4" BLADE SPACERS BELOW SPINDLE				
	1/2"	3/16"	4	3	2	1	0
A	0	0	1"	1 1/4"	1 1/2"	1 3/4"	2"
A	0	1	1 1/8"	1 3/8"	1 5/8"	1 7/8"	2 1/8"
A	1	0	1 3/8"	1 5/8"	1 7/8"	2 1/8"	2 3/8"
B	0	1	1 3/8"	1 5/8"	1 7/8"	2 1/8"	2 3/8"
B	1	0	1 5/8"	1 7/8"	2 1/8"	2 3/8"	2 5/8"
B	1	1	1 3/4"	2"	2 1/4"	2 1/2"	2 3/4"
B	2	0	2"	2 1/4"	2 1/2"	2 3/4"	3"
C	1	1	1 7/8"	2 1/8"	2 3/8"	2 5/8"	2 7/8"
C	2	0	2 1/8"	2 3/8"	2 5/8"	2 7/8"	3 1/8"
C	2	1	2 1/4"	2 1/2"	2 3/4"	3"	3 1/4"
C	3	0	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"
D	2	1	2 3/8"	2 5/8"	2 7/8"	3 1/8"	3 3/8"
D	3	0	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"
D	3	1	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"
D	4	0	3"	3 1/4"	3 1/2"	3 3/4"	4"
E	3	1	2 7/8"	3 1/8"	3 3/8"	3 5/8"	3 7/8"
E	4	0	3 1/8"	3 3/8"	3 5/8"	3 7/8"	4 1/8"
E	4	1	3 1/4"	3 1/2"	3 3/4"	4"	4 1/4"

IMPORTANT: To achieve the highest quality of cut, the blades should be level with the ground, or tipped slightly down at the front.

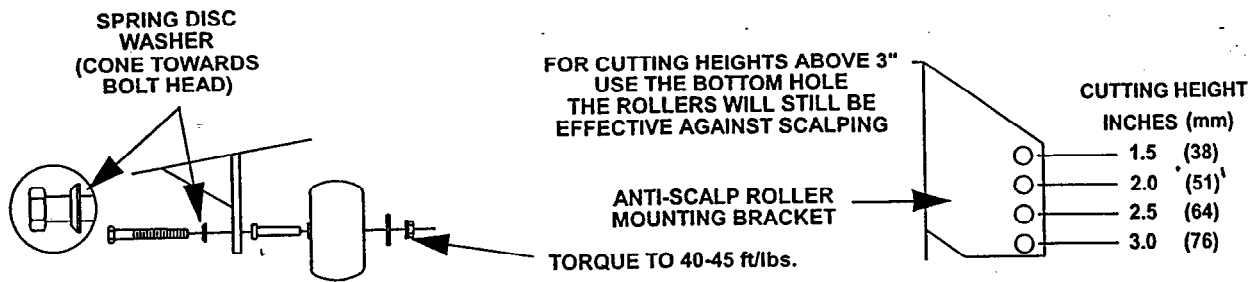


FIG 18

ANTI-SCALP ROLLER ADJUSTMENT (52" MODELS ONLY)

(52" MODELS ONLY)

- 1) For maximum deck flotation, rollers should maintain 1/4-1/2 in. clearance to ground. Do Not adjust rollers to support the deck. Be sure roller bolts are tight or loss of roller may result (See Figure 18).

5.2.3 Transmission belt adjustment.

- a) Stop engine and remove spark plug wire(s).
- b) To tighten transmission belt, loosen the 3/8" nylock nut on transmission belt idler pulley. Slide bolt inward in slot and retighten nylock nut.
- c) When properly adjusted, the belt should have 1/2" of deflection with three pounds of pressure on the belt midway between the transmission and engine pulley.

5.2.4 Wheel drive belts and scrapers.

- a) If wheel traction appears to be slipping, drive lever rods may be touching bottom of thumb latch slot. To adjust, refer to directions in Section 3.8.5.

NOTE: Models with Serial No's. 100,000 & higher have three (3) adjustment holes for the wheel drive spring tension bolt (Refer to Section 5.2.15).

- b) 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.

5.2.5 Engine to cutter deck belt.

- a) Stop engine and remove spark plug wire(s).
- b) For proper adjustment of lower blade drive linkage, lengthen or shorten linkage. When properly adjusted, there should be 1/16" to 1/8" of clearance between bell-crank and transmission output shaft when belt is engaged.
- c) Check belt guides under rear engine and front mower deck to see that they are properly set. (See Section 5.2.7).
- d) Belt must be tight enough to not slip during heavy loads while cutting grass. Overtensioning will

reduce belt and spindle bearing life. To adjust belt tension, loosen the 5/16" whizlock nut on turnbuckle and rotate the turnbuckle; rotate turnbuckle toward rear of mower to tighten, and toward front of mower to loosen belt tension (See Figure 19).

Check belt tension after the first hour of operation and at least twice during the first 24 hours of operation. Adjust as necessary.

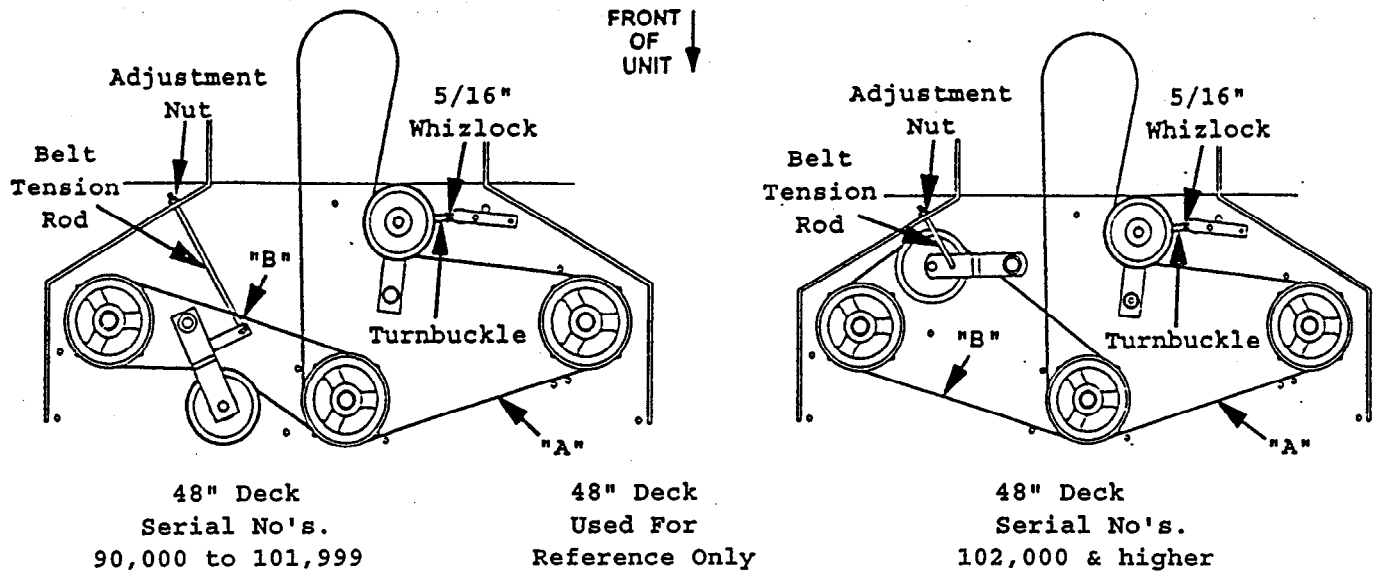


FIG. 19
CUTTER DECK BELT ADJUSTMENT

e) For the 8.5, 12.5 and 14 hp engines, proper belt tension will require about 10 lbs. side pull on belt, halfway between pulleys (See Figure 19, Point A) to deflect belt 1/2".

For the 16 hp engines, proper belt tension will be about 12 lbs. of pull to deflect belt 1/2".

5.2.6 Secondary belt (48" and 52" units only).

- a) Stop engine and remove spark plug wire(s).
- b) The secondary drive belt is adjusted via the belt tension rod (See Figure 19). The 5/16" nylock adjustment nut is located at the rear, right corner of engine deck.
- c) Proper belt tension (for the secondary belt) will require about 10 lbs. side pull on belt, halfway between pulleys (See Point B, Figure 19) to deflect belt 1/2".

5.2.7 Belt Guide Adjustment

- a) Stop engine and remove spark plug wire(s).
- b) Engage the blade drive belt.
- c) Check belt guide clearance on the mower deck. The four welded belt guides on the mower deck should be located 1/8" from belt. Adjust if necessary.
- d) Check belt guides under the engine deck for proper

e) adjustment (See Figures 20, and 21). Adjust as necessary.

The disengaged belt should not drag or fall off pulley when guides are properly adjusted.

NOTE: Belt guides are not installed on the same bolts on the 32" and 36" models as on the 48" and 52" models.

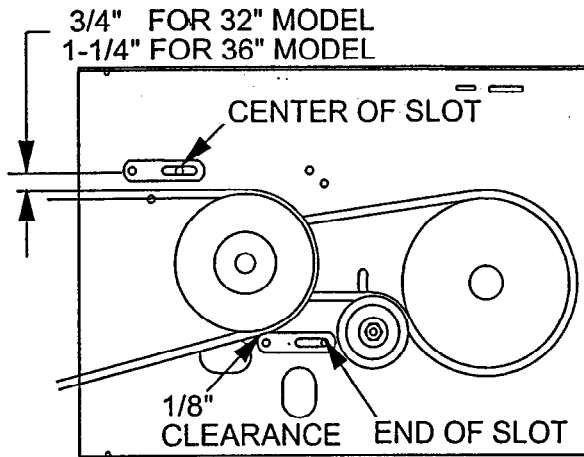


FIG. 20
BELT GUIDE LOCATION
32" & 36"

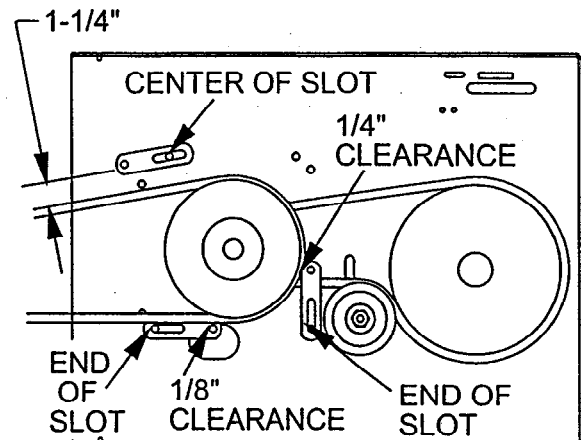


FIG. 21
BELT GUIDE LOCATION
48" & 52"

NOTE: These drawings are viewed from underneath engine deck.

5.2.8 Brake adjustment - See 3.8.6.

5.2.9 Wheel drive linkage adjustment - See 3.8.5.

5.2.10 Shifter lever adjustment - See 3.8.4.

5.2.11 Shifter detent adjustment - Transmission shifter detent can be adjusted by adjusting the setscrew on the back side 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.

5.2.12 Blade safety switch.

- Stop engine and remove spark plug wire(s).
- With the blades disengaged and the bellcrank touching the engine deck, adjust the blade safety switch (if needed) until the bellcrank depresses the plunger by 1/4".
- Be sure the bellcrank does not contact the switch body to prevent damage to the switch.
- Retighten switch mounting hardware.

5.2.13 Fuel tank straps. Serial No's: 129,999 and lower only.

NOTE: Fuel tank may appear loose at set-up, however, once fuel is added in tank, the tank will slowly expand to fit tank straps.

- a) Should the fuel tank begin to buckle, relieve pressure on the tank by loosening the tank straps.

5.2.14 Handle height adjustment. See Section 3.8.

Adjustment for handle height refers to Serial No's. 100,000 and higher only.

IMPORTANT: When the handle height adjustment is changed, it will be necessary to readjust the wheel drive and brake linkage (See Sections 3.8.5 and 3.8.6.

5.2.15 Wheel drive spring tension adjustment.

Adjustment refers to Models with

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

- a) Stop engine and remove spark plug wire(s).
- b) Disengage latches and release 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 22).

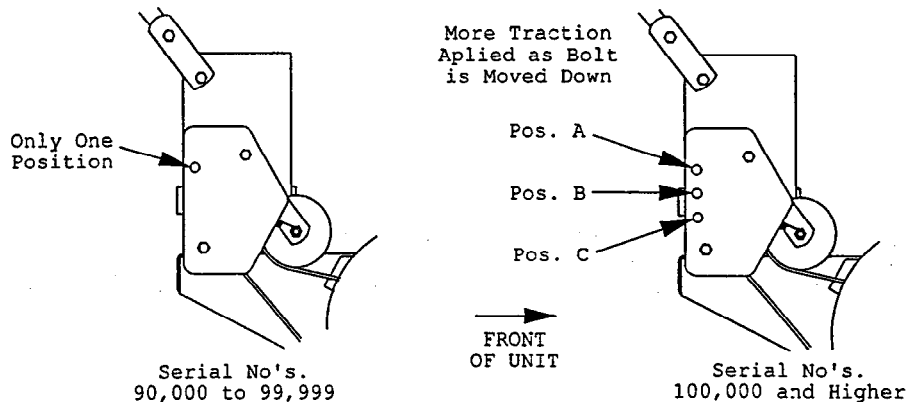


FIG. 22

DRIVE BELT TENSION
ADJUSTMENT POSITIONS

5.2.16 Adjust throttle lever tension (B&S Engines only).

- a) Stop engine and remove key (Vanguard engine).
- b) Tension in throttle levers can be increased or decreased by adjusting the tightness of the lever pivot bolt which is located under the console.

6. TROUBLE SHOOTING

6.1 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 5.2.4.
- 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 3.8.5.
- e) Check for proper tire pressure in drive tires. Recommended tire pressure for the drive tires is 12 to 14 psi (83 to 97 kPa). Higher pressures may be used in the tire that it pulls to (up to 28 psi).
Note: Different pressures may make mower cut unevenly.

6.2 MOWER CUTS UNEVENLY.

- a) Check air pressure in tires;
Rear tires: 12 to 14 psi (83 to 97 kPa). Pneumatic casters: 22 psi (152 kPa). A more uniform cutting height may be obtained with higher tire pressure on rough terrain. A lower tire pressure provides more flotation.
- b) Check blade spacers, axle positions, and front caster spacers. They must be equal on each blade.
- c) Check caster mounting brackets to be sure all bolts are tight.
- d) Check blades tip to tip for straightness. (They should be within 3/16" or one blade width from being in line.)

6.3 BLADES DO NOT STOP WHEN DISENGAGED.

Check belt guides to see that they are properly set.
See Belt Guide Adjustment 5.2.7.

6.4 ENGINE WILL NOT START.

- a) Refer to Section 4.3.2 and follow directions to make sure engine is being properly choked.
- b) Check that key switch is in "ON" position. (B/S Vanguard Engine Only.)
- c) Make sure transmission is in "true neutral" position. See Sections 3.8.4(c).
- d) Check that the blades are disengaged and the blade switch is depressed (See Section 5.2.12).
- e) Check that there is fuel in the tank and that the fuel valve is open.
- f) Check that the spark plug wire(s) is/are properly connected.
- g) Check for loose or faulty wiring connections.

h) Check for corrosion at all wiring connections. Even minor corrosion may cause a faulty connection. Clean connector terminals thoroughly, apply dielectric grease and reconnect.

NOTE: After carefully checking the previous 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, key switch not "ON" etc. The following tables list some common causes of troubles. Do not attempt to service or replace major items or any items that call for special timing or adjustment procedures (governor, valves, etc.). Have this work done by your Engine Service Dealer.

ENGINE TROUBLESHOOTING TABLE 1

PROBLEM	NO FUEL	IMPROPER FUEL	DIRT IN FUEL LINE	KEY SWITCH NOT "ON" (B/S Vanguard)	DIRTY AIR FILTER
Will not start	X		X	X	X
Hard starting	X	X	X		X
Stops suddenly	X		X		X
Lacks power		X	X		X
Operates erratically		X	X		X
Knocks or pings		X			X
Skips or misfires		X	X		X
Backfires			X		X
Overheats			X		X
High fuel consumption					X

ENGINE TROUBLESHOOTING TABLE 2

PROBLEM	FAULTY SPARK PLUG	ENGINE OVERLOADED	BLOCKED FUEL FILTER	INCORRECT OIL LEVEL	DIRTY AIR SCREEN
Will not start	X	X	X		
Hard starting	X	X	X		
Stops suddenly		X	X	X	X
Lacks power	X	X	X	X	X
Operates erratically	X	X	X		X
Knocks or pings		X			X
Skips or misfires	X				X
Backfires	X	X			
Overheats		X		X	X
High fuel Use	X	X			X

7. MOWER DECK BELT ROUTING

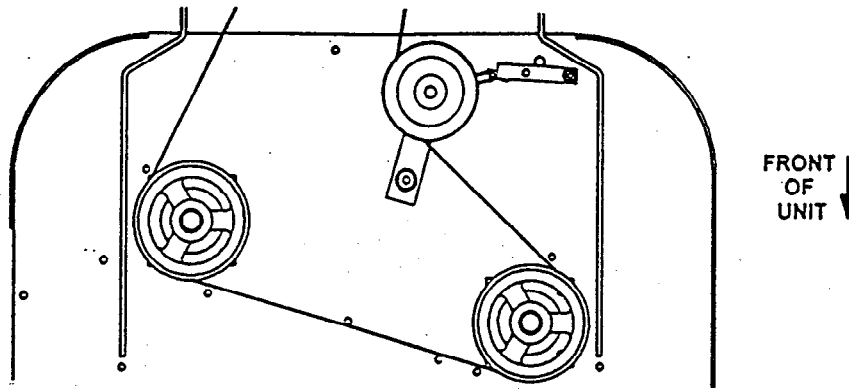
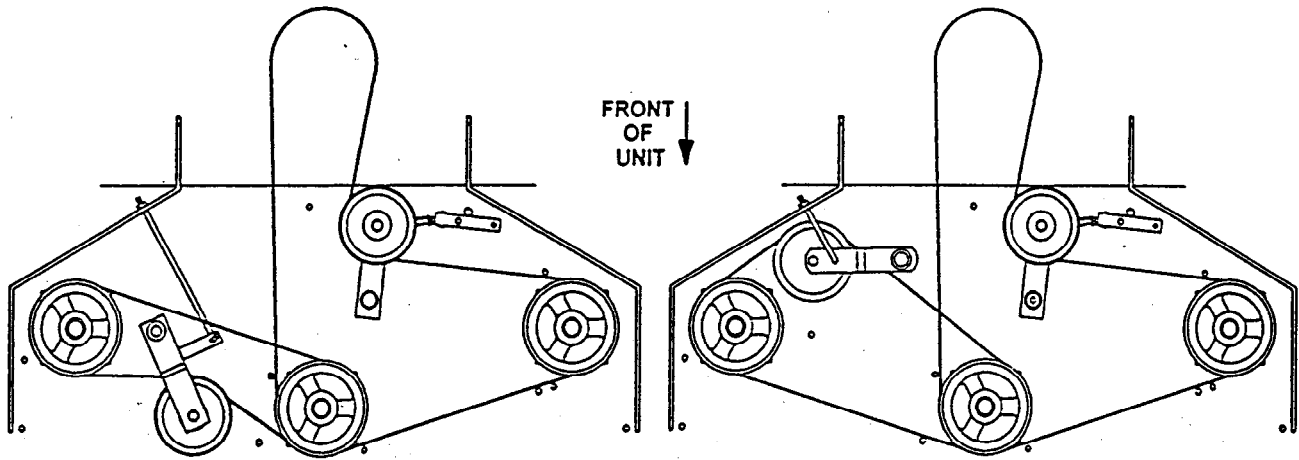


FIG. 23
32" and 36" MOWER DECK



Serial No's.
90,000 to 101,999

FIG. 24
48" MOWER DECK

Serial No's.
102,000 and Higher

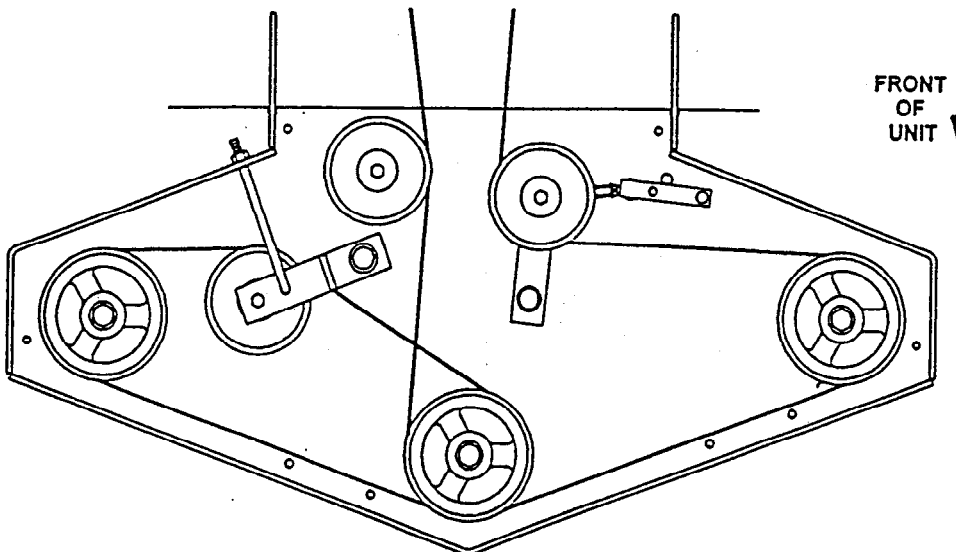
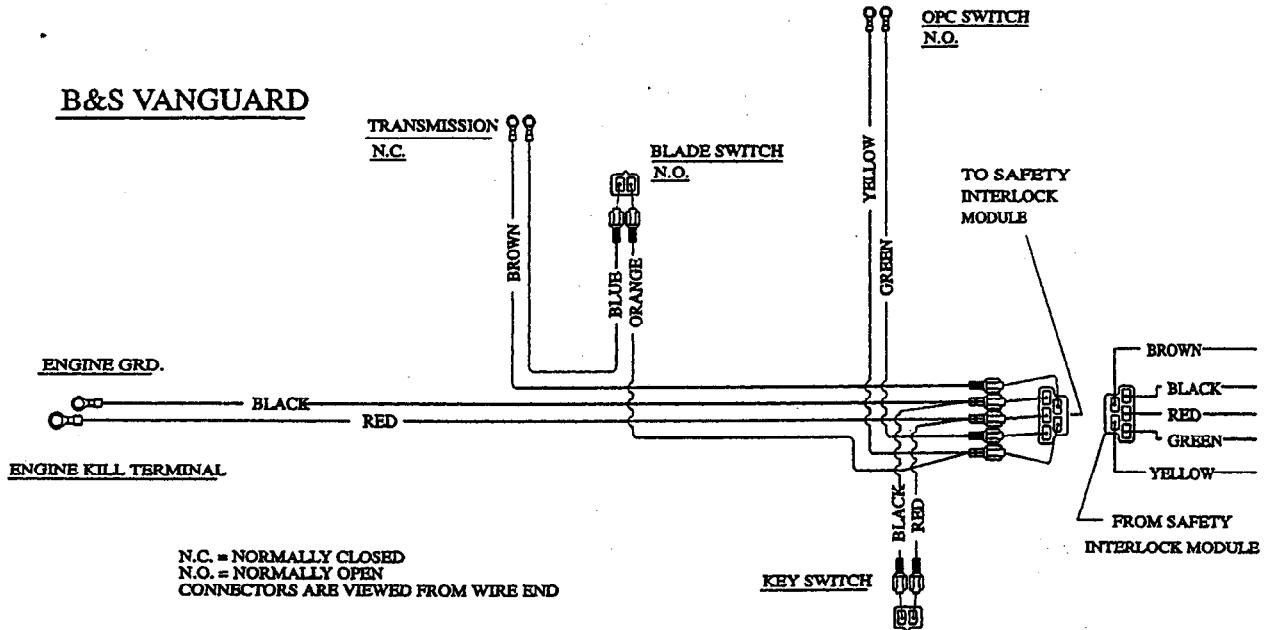


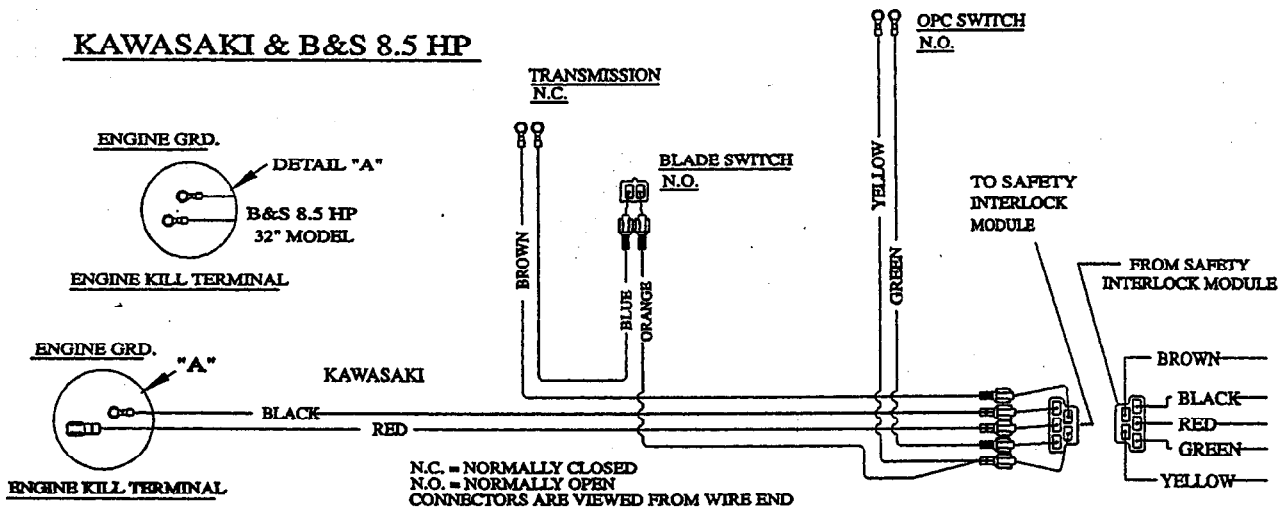
FIG. 25
52" MOWER DECK

8. WIRING DIAGRAMS (Serial No.'s 90,000 to 114,999)

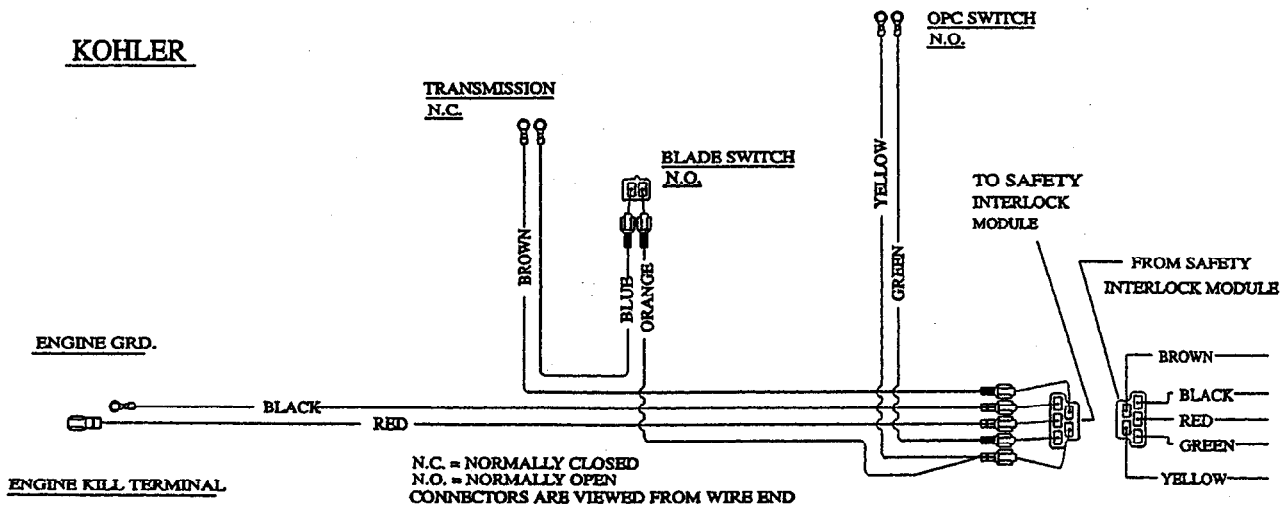
B&S VANGUARD



KAWASAKI & B&S 8.5 HP

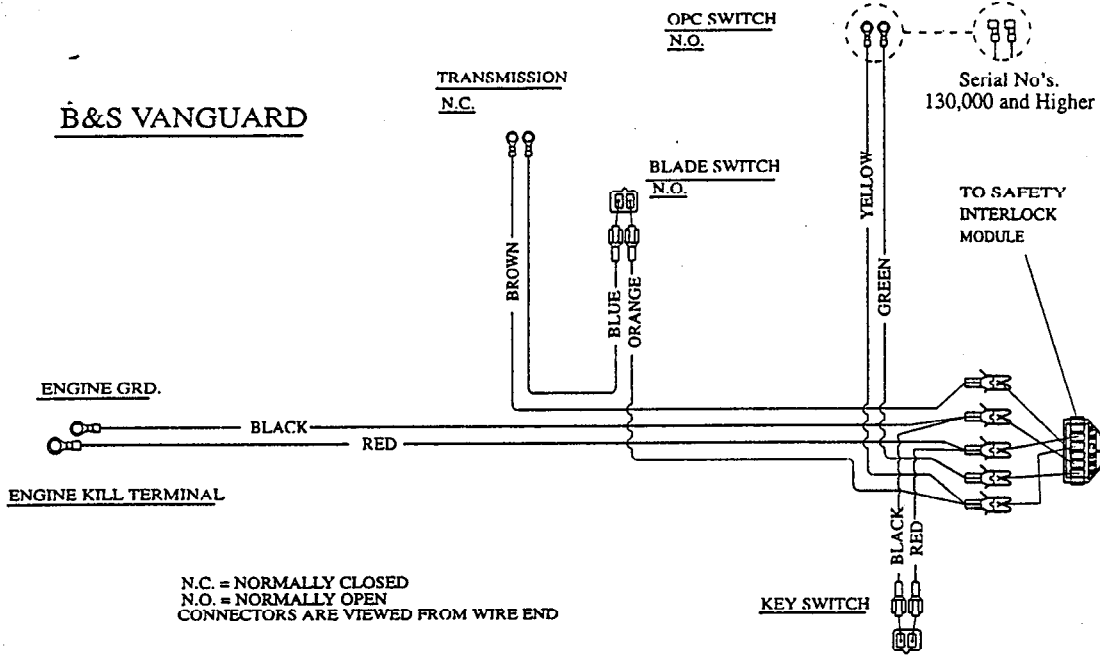


KOHLER

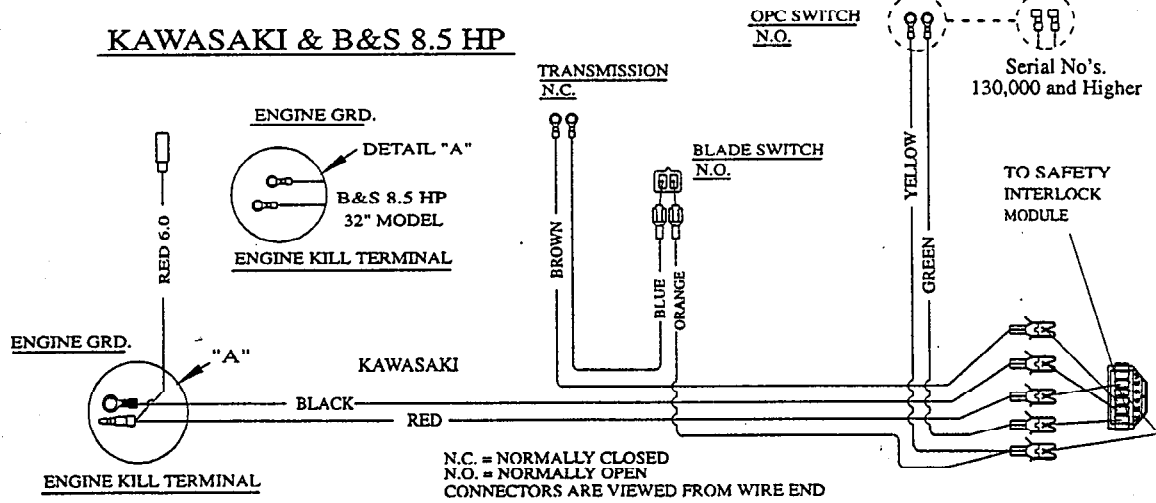


8. WIRING DIAGRAMS (Serial No.'s 115,000 and up)

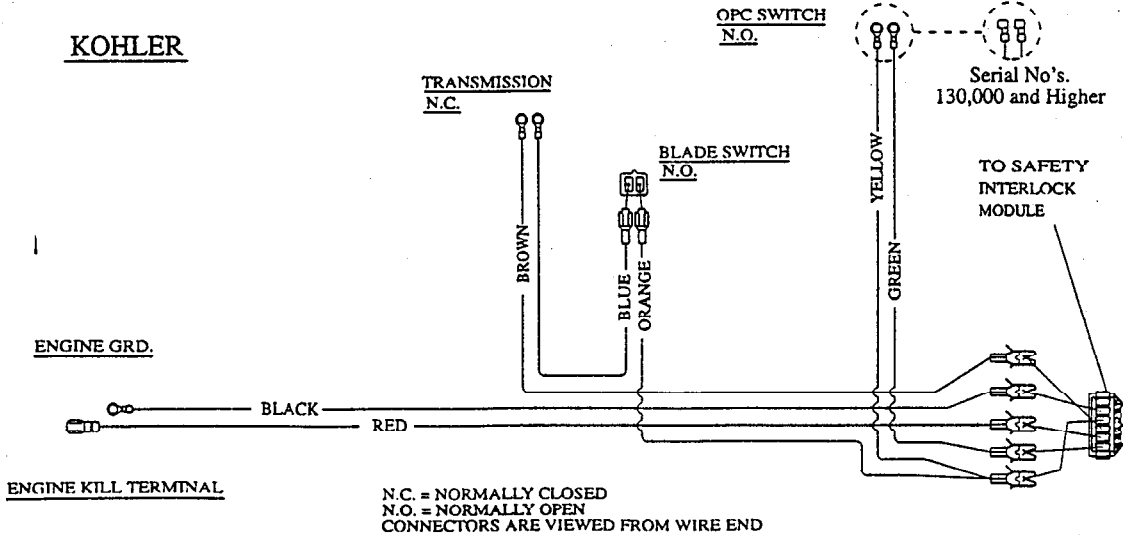
B&S VANGUARD



KAWASAKI & B&S 8.5 HP

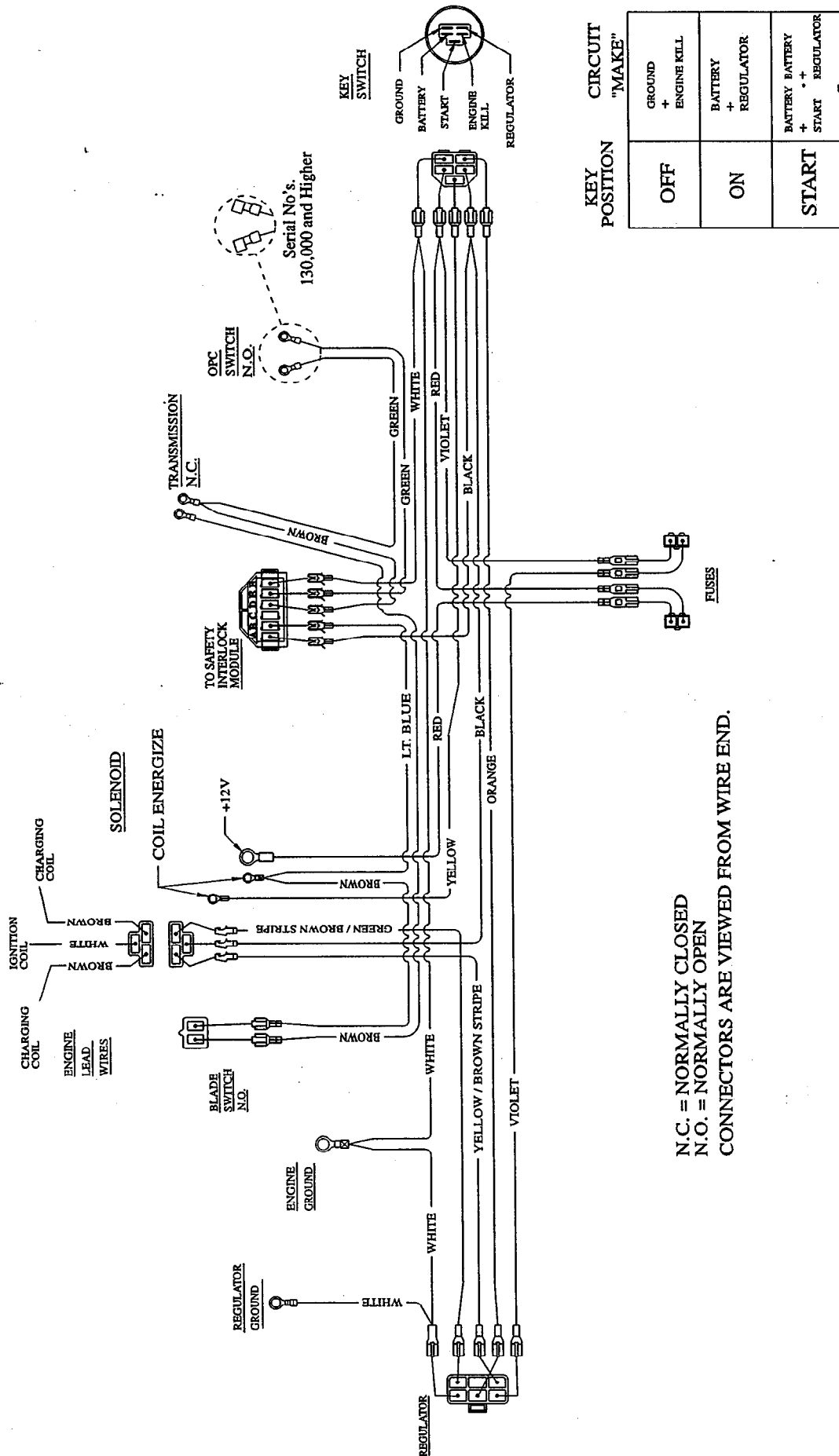


KOHLER



8. WIRING DIAGRAMS (Serial No.'s 115,000 and up)

KAWASAKI WITH ELECTRIC START



N.C. = NORMALLY CLOSED
 N.O. = NORMALLY OPEN
 CONNECTORS ARE VIEWED FROM WIRE END.

9. WARRANTY

Limited Warranty Exmark Commercial Turf Equipment Exmark Mfg. Co. Inc. ("Exmark") warrants on the terms and conditions herein, that it will repair, replace or adjust any part manufactured by Exmark and found by Exmark (in the exercise of its reasonable discretion) to be defective in factory material or workmanship.

This warranty is limited to one year from the date of original retail purchase (90 days for rental use) for any Exmark mower that is used for commercial or any other income producing purpose. The hydrostatic traction drive system will be warranted for two full years from date of original retail purchase against defects in materials or workmanship excluding hoses. Exmark Mfg will extend the Peerless 5-speed transmission manufacturer's warranty from 90 days to one year. Belts and tires are warranted for 90 days against defects in materials or workmanship.

The engine warranty is covered by its respective engine manufacturer. Please refer to the engine manufacturers warranty statement that is included in the literature packet. Exmark is not authorized to handle warranty adjustments on engines. Engine warranties should be referred to the nearest authorized service outlet of the engine manufacturer.

This warranty extends only to the original retail purchaser of the equipment. The warranty may not be assigned or transferred without the prior express written consent of Exmark. The warranty commences upon the date of the original retail purchase.

The Exmark turf equipment, including any defective part, must be returned to an authorized Exmark service dealer within the warranty period. The warranty shall extend to cost to repair or replace (as determined by Exmark) the defective part, including labor. 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 replacements, and no claim of breach of warranty shall be cause for cancellation or rescission of the contract of sale of any Exmark mower. Proof of purchase may be required by the dealer to substantiate any warranty claim. All warranty work must be performed by an authorized Exmark service dealer.

This warranty extends only to turf equipment operated under normal conditions and properly serviced and maintained. The warranty expressly does not cover: (i) any defects, damage or deterioration due to normal use, wear and tear, or exposure; (ii) normal maintenance services, such as oil change, cleaning, lubrication; (iii) replacement of service items, such as oil, lubricants, spark plugs, belts, rubber hoses or other items subject to normal service replacement; (iv) damage or defects arising out of or relating to misuse, neglect, alteration, negligence or accident; (v) repair or replacement arising from operation of or use of the turf equipment which is not in accordance with operating instructions as specified in the operator's manual or other operational instructions provided by Exmark; (vi) repair or replacement arising as a result of any operation from turf equipment that has been altered or modified so as to, in the determination of Exmark, adversely affect the operation, performance or durability of the equipment or that has altered, modified or affected the turf equipment so as to change the intended use of the product; (vii) repair or replacement necessitated by 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; (viii) repairs or replacements resulting from parts or accessories which have adversely affected the operation, performance or durability of the turf equipment; or (ix) damage or defects due to or arising out of repair of turf equipment by person or persons other than an authorized Exmark service dealer or the installation of parts other than genuine Exmark or Exmark recommended parts.

As a condition to this warranty, customer shall have read the operator's manual and shall have returned to Exmark, within the prescribed time, the enclosed warranty registration card.

The sole liability of Exmark with respect to this warranty shall be repair and replacement as set forth herein. Exmark shall have no liability for any other cost, loss or damage, including but not limited to, any incidental or consequential loss or damage. In particular, Exmark shall have no liability or responsibility for: (i) expenses relating to gasoline, oil or lubricants; (ii) loss, cost or expense relating to transportation or delivery of turf equipment from the location of owner or location where used by owner to or from any authorized Exmark service dealer; (iii) 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; (iv) rental of like or similar replacement equipment during the period of any warranty, repair or replacement work; (v) any telephone or telegram charges or travel charges; (vi) loss or damage to person or property other than that covered by the terms of this warranty; (vii) any claims for lost revenue, lost profit or additional cost as a result of a claim of breach of warranty; or (viii) attorney's fees.

There are no representations or warranties which have been authorized and provided to the buyer of the turf equipment, other than as set forth in this warranty. Any and all statements or representations made by any seller of this equipment, including those set forth in any sales literature or made orally by any sales representative, are superseded by the terms of this warranty. Any affirmation of fact or promise made by Exmark or any of its representatives to the buyer which relates to the goods that are the subject of this warranty shall not be regarded as part of the basis of the bargain and shall not be deemed to create any express warranty that such goods shall conform to the affirmation or promise.

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This warranty applies to all Exmark turf equipment sold in the United States and Canada and intended to be used for commercial purposes.

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