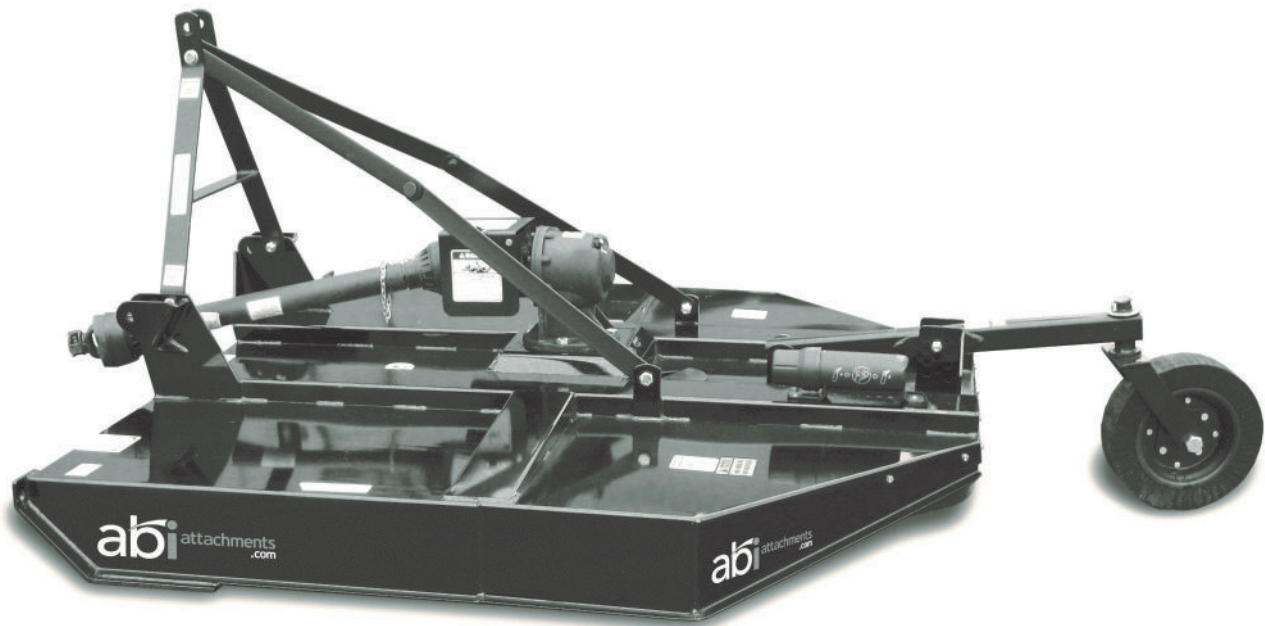




Rotary Mowers

FMX, RMS, RMX and RMH Models



RMX600 Model Shown



Operator's Manual



Safety related warnings and instructions follow this Alert Symbol and are used to get your attention so you may avoid serious injury or death to you and others. Read the Operator's Manual in it's entirety!

CUSTOMER PREPARATION CHECKLIST

ROTARY MOWERS

The following checklist should be completed using this Operator Manual for reference.

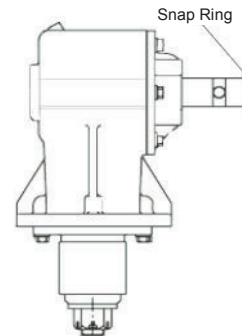
- ☐ Assemble Three-Point A-Frame
- ☐ Check Fluid levels in Gearboxes.
- ☐ Lubricate all fittings.
- ☐ Ensure all shields are secured and in good condition.
- ☐ Ensure all fasteners are secured.
- ☐ Ensure all Slip clutches have been checked for proper operation.
- ☐ Operators have read Owners Manual and understands the safe and proper use of the implement.
- ☐ I understand that unauthorized alteration voids the warranty.



RMS GEARBOX has a driveline snap ring already installed. The snap ring prevents the driveline from swinging if the shear pin breaks while in operation.

- If the driveline is not connected to the gearbox, remove the snap ring before connecting the Driveline to the gearbox and immediately replace to secure the driveline.
- If the driveline is already installed, verify that the snap ring is present!

Failure to use the snap ring may cause serious injury or death!



WARNING

OSHA, ASABE, SAE and ANSI standards require the use of Chain Guards or other protective guards at all times for non-agricultural use. Abi strongly recommends that such guards should be used for Agricultural uses as well, to minimize risk of property damage, serious bodily injury or even death from thrown object hazards or by contacting rotating parts, i.e. driveline, implement blades.

Model Number: _____

Serial Number: _____

(Serial Number Plate location is shown on page 8)

Do not remove this checklist from the Operator's Manual.

It is the responsibility of the owner to complete the procedures listed above.

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IMPORTANT FEDERAL LAWS AND REGULATIONS FOR OPERATORS, EMPLOYERS AND EMPLOYEES

This section is not intended as a legal interpretation of the laws and regulations and should not be considered as such. The following information is intended to explain the concept and effect in the broadest of terms only.

U.S. Public Law 91-596 (Occupational Health and Safety Act of 1970) "To assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and training in the field of occupational safety and health; and for other purposes."

SECTION 5 DUTIES

a) Each employer

- (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
- (2) shall comply with occupational safety and health standards promulgated under the Act.

b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA Regulations

Title 29, Code of Federal Regulations Part 1928 (29 CFR 1928) - Occupational Safety and Health Administration. (OSHA) , as well as, **Title 29 Code of Federal Regulations Part 1910 (29 CFR 1910 Parts 142, 266, 1200 and 1027)** also contain applicable training standards.

Training Requirement

- (6) Operating Instructions. At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all covered equipment with which he is or will be involved, including at least the following safe operating practices.
 - (i) Keep all guards in place when the machine is in operation;
 - (ii) Permit no riders on farm field equipment other than persons required for instruction or assistance in machine operation;
 - (iii) Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning, or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment;
 - (iv) Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine;
 - (v) Lock out electrical power before performing maintenance or service on farmstead equipment.

Title 29, Code of Federal Regulations Part 570.70 (29 CFR 570.70) subpart E-1 — Child Labor Under 16 Years Old

The child labor rules that apply to agricultural employment depend on the age of the young worker and the kind of job to be performed. The rules are the same for all youth, migrant children as well as local resident children. In addition to the restrictions on hours, the Secretary of Labor has found that certain jobs in agriculture are too hazardous for anyone under 16 to perform. Specifically under the age of 16 may not operate power machinery. It is your responsibility to know what regulations are in your own area or situation.

Welcome

ABI Innovations would like to thank you for choosing the best built implement on the market today. With proper care and maintenance your implement will last for years to come.

ABI Innovations offers a variety of implements to fit any application. The capability of our mowing implements range from light duty (RMS) models (non-commercial use) that will give your small farmstead a professional appearance to our heavy-duty commercial grade RMH model.

ABI Innovations maintains an ongoing program of continuous product improvement. Therefore, ABI Innovations reserves the right to make improvements in design or specification changes without incurring any obligation to replace said items on units previously sold.

There is a possibility that some illustrations in our manuals were of prototype models, design of production models may vary in detail from those shown in our manuals.

IMPORTANT: Some photographs or illustrations may show safety shields removed for purposes of clarity. **DO NOT OPERATE THIS IMPLEMENT WITHOUT ALL SAFETY SHIELDS IN PLACE!**

REMEMBER SAFETY FIRST!

Be Alert - Eliminate unsafe habits and risky behavior, recognize hazards as they exist and read and follow the Operator's Manual for your ABI Innovations implement and your tractor!



Getting Started

This manual provides information necessary to effectively and safely operate your implement. This manual also provides manufacturer's recommendation of proper use and maintenance of the implement.

The information presented in this operator's manual is applicable only to the make and model of your implement at time of purchase. See your authorized dealer or manufacturer for any needed additional information.

Terminology

"Right" or "Left" as used in this manual is determined by facing forward in the direction the machine will operate while in use unless otherwise stated.

"NOTE:" provides the operator a brief summary of information that will assist in operating the implement.

"IMPORTANT:" denotes that the following content has significance in the operation or maintenance of the implement.

Owner Assistance

Please contact your ABI Innovations Dealer if you have any questions regarding your implement, need repairs, or to order replacement parts.

The parts on your implement have been specifically designed and should only be replaced with approved ABI Innovations parts.

Customer Service

ABI Innovations wants you to be satisfied with your new ABI Rotary Mower. If for any reason you do not understand any part of this manual or are not satisfied with the service required, the following actions are suggested:

Contact our Customer Service Department: Our online support centers are available to you 24/7 and fill out our Help Desk form (We will respond within 24 hours; usually much more quickly.) Or you may contact our Customer Service by calling our toll free number 877-788-7253 ext. 208 during our normal business hours (Monday and Friday 8 am to 5 pm EST, Tuesday – Thursday 8 am to 7 pm EST). After hours or weekend support, simply leave a voice message for a specialist. He or she will be automatically notified to call you back promptly. Select Specialist. (Excluding Holidays)

For further assistance: contact our Online Support via web:
<http://www.abiabsolute.com/support/index.html>.
Or you may contact us in writing at:

Absolute Innovations, Inc.
1320 Third Street
Osceola, IN 46561

Online Support via web:
<http://www.abiabsolute.com/support/index.html>

Safety

For the Safe Operation of Your ABI Innovations Implement:



Owner and operator's responsibilities are to read and understand the Operator's Manual before operating the implement! This alert symbol found throughout this manual is to call your attention to the extra safety precautions within the instruction. All safety symbols are designed to ensure safe operation of your implement. Your safety and the safety of others depends upon your being alert, informed and properly trained while operating, transporting, storing and performing maintenance. Failure to understand follow the instructions included in this Operator's Manual may result in serious injury or death.

Your Operator's Manual contains the "Safety Label" decals that have been installed on your implement to warn you of certain potential hazards that exist. These safety decals are not substitutes for reading and understanding this Operator's Manual.

Do not allow anyone to operate this equipment who has not fully read and comprehended this manual and who has not been properly trained in the safe operation of the equipment.

- Operator should understand all functions of the tractor and implement.
- Do not attempt to operate implement from the ground or from the back of the tractor; operate implement from the driver's seat only.
- Inspect all guards and shields to ensure that these are in place, in good condition, and secured before operating the implement.

DO NOT OPERATE if any guards or shields are missing or not in operating condition!

- Always follow the proper shut down procedure for both the implement and the tractor any time you have to leave them unattended.
- Dismounting while a tractor is moving could cause serious injury or death.
- Never allow anyone to stand between the tractor and implement while an operator is backing up to the implement, or if PTO is engaged as this may cause serious injury or death.
- Keep hands, feet, hair, jewelry, and clothing away from equipment to avoid entanglement with power-driven parts.
- Watch out for obstacles such as bushes, fencing, trees, power lines, etc., when raising implement.
- Clear the work area of all bystanders, children, pets, livestock, etc., during operation.
- Avoid sharp turns as this may cause implement to ride up on the tractor's wheels that may result in serious injury and damage to your equipment.
- Your implement is not designed to carry passengers - **No Riders!**



SIGNAL WORDS: The appropriate signal word for each identified hazard has been selected using the following guidelines: ¹

DANGER Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations, typically for machine components that, for functional purposes cannot be guarded. ¹

CAUTION Indicates an imminently hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. ¹

WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices. ¹



Personal Protective Equipment

- Do not wear loose fitting clothing, dangling jewelry, long hair should be tied back to avoid entanglement.
- Wear steel-toe boots or other appropriate footwear. Soft cloth shoes or sandals are not safe around any type of equipment.
- Wear hearing protection such as earplugs or other devices that will minimize sounds, but will not interfere with your ability to hear traffic or other noises that may alert you to potential hazards.
- Do not operate any machinery while talking on a cell phone or using other portable devices such as MP3 players, as these are considered distractions. Operating any farm equipment requires the operator's full attention.



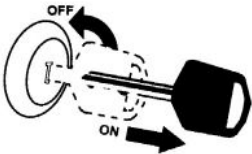
Emergency Preparedness

- Keep a fire extinguisher on your tractor and check the expiration date periodically!
- Keep a well stocked first aid kit on your tractor.
- Save In Case of Emergency (I.C.E) numbers on your cell phone (including doctors, hospital and 911 services).
- Keep I.C.E. numbers next to a home or office phone.



No Passengers Allowed!

- Passengers may obstruct the operator's view that may result in an accident.
- This implement is not designed to carry passengers and may cause failure in the PTO driveline or other malfunctions that may result in serious injury or death.



Shutdown and Storage

- Disengage PTO driveline before inspecting, working around the driveline or during shutdown.
- Lower machine to ground, put tractor in park, turn off engine, and remove the key.
- Detach and store implements in an area where children normally do not play.
- Secure implement by using blocks and/or supports.



Equipment Safety Guidelines

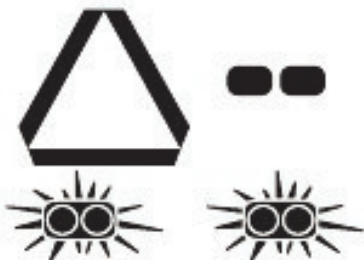
- Review safety instructions for both the tractor and this implement annually.
- Never exceed the limits of the tractor or the implement.
- If the ability to accomplish the job or to operate safely is in question, **DO NOT TRY IT!**
- This equipment is dangerous to children and those unfamiliar with it's operation. **DO NOT ALLOW** children to operate or play on the equipment.
- Operator should be an adult who is familiar with operating the tractor and the implement.
- Operator should be physically and mentally fit before operating machinery. Fatigue, stress, medications, alcohol and drugs may impair the ability to focus on safe farm machinery operation.
- Check all equipment before operating this implement.
- Refer to the tractor's operator manual for additional safety information (such as hydraulic pressure, tire safety, etc.)
- Check all safety decals and/or signs - if any of these have been damaged, illegible, removed or parts replaced without these decals, new decals must be reapplied. Contact your local ABI Innovations Dealer or our office to order replacements.

Safety

Transportation

A high percentage of fatalities and injuries involve farm equipment on roads and highways. It is very important to use common sense while operating equipment and vehicles.

1. Plan your route.
 2. Be aware of surface conditions, visibility, pedestrian and vehicular traffic, curves, on-ramps and intersections.
 3. Safest time to transport farm equipment on public roads is between sunrise and sunset.
 4. Ensure that the hitches are properly secured and fastened.
 5. Use the Slowing Moving Vehicle (SMV) emblem, if required by your local and state laws, properly attached and visible.
- Comply with state and local laws.
 - Perform a safety inspection on the tractor and correct any hazards before you begin operating equipment.
 - Use approved lighting, flags, and necessary warning devices on your farm equipment to alert other vehicles on the highway.
 - Inspect all warning lights and turn signals be sure these are operational. If necessary you may need to purchase accessory lighting devices that are available through your tractor dealership or farm equipment store.
 - Use the safety devices that are installed on your tractor such as ROPS, and seat belts. Never modify any safety device that has been provided with your equipment.
 - Reduce speed if towed load is not equipped with brakes.
 - Keep the brake pedals locked together at all times and make sure the brakes are properly adjusted.
 - 20 MPH is the maximum transport speed for towed implements without brake devices. DO NOT EXCEED.
 - If your tow weight is double the weight of the tractor do not exceed 10 mph.
 - If towed weight is more than double the weight of the tractor do not operate the equipment; select a larger tractor.
 - Operator must have control of steering and braking at all times. Slow down if your travel speed affects handling of farm equipment.
 - Slow down for turns and curves and avoid sudden uphill turns.
 - Sudden braking may cause loss of control over the implement.
 - Never travel at a speed which does not allow adequate control of steering or lessens the ability to stop. Some rough terrain may require a slower speed.



Maintenance and Your Safety

Read and understand the Operator's Manual before performing any maintenance. If you are unfamiliar with performing maintenance then enlist someone with experience to assist you.

- Wear appropriate protective clothing such as steel-toe boots, eye protection, gloves, etc.
- Work in a clean dry area.
- Buildings should have adequate ventilation for the starting, running, and stopping of machinery while performing maintenance and/or repairs.
- Park the tractor and implement on level ground, disconnect the PTO and remove the key.
- Allow your equipment to cool completely.
- Raise or lower the implement to the height needed to perform maintenance or repairs. Blocks and/or jacks should be used to prevent machinery from moving or falling.
- Never attempt to grease or oil implement while in operation.
- Perform routine maintenance regularly and in accordance with the Operator Manual.
- Inspect your implement before and after each use; any worn or broken parts should be replaced immediately. Repair in accordance with the Operator Manual.
- Clean your implement after every use; and wipe away any excess grease or oil that may have accumulated.
- Check brakes, safety chains, blades, pins and clevis for wear, breaks, missing parts or cracks.



Safety

Safety Labels

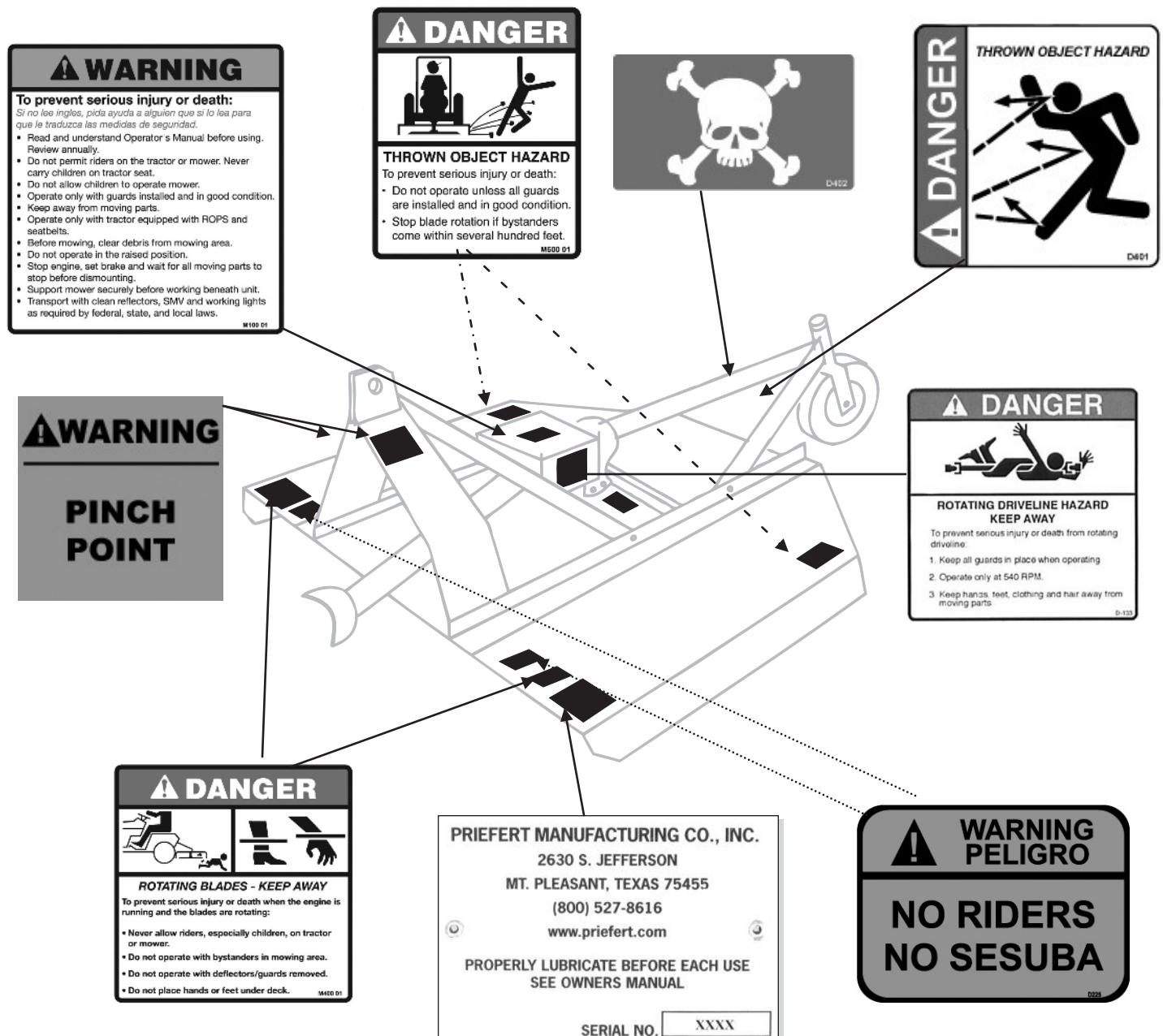
Your implement comes equipped with all safety labels in place. They were designed to help you safely operate your implement.

1. Read and follow their directions.
2. Keep all safety labels clean and legible.
3. Replace all damaged or missing labels. To order new labels go to your nearest ABI Innovations Dealer.
4. Some new equipment installed during repair requires safety labels to be affixed to the replaced component as specified by ABI Innovations. When ordering new components make sure the correct safety labels are included in the request.
5. Refer to this section for proper label placement.

To install new labels:

1. Clean the area the label is to be placed.
2. Wipe the surface dry.
3. Peel backing from label.
4. Press firmly onto the surface.

Use a small straight edge plastic (credit card) to squeeze out air bubbles working from the center out towards the sides.



Section 1: Set-Up Requirements

Tractor Requirements

This unit is shipped completely assembled. Carefully follow instructions for final assembly. Hitch clevises and lock pins are sold separately.

RMX and RMH models are designed with a 3-point category I hitch, which may be adapted to a category II. The RMS model is designed with a 3-point category I hitch and will require an adjustment to fit a category II hitch. Horse power rating of the tractor should not exceed the PTO rating of the gearbox.

Model	Width	Hitch Type	Recommended Maximum HP
FMX500	5'	I/ II*	40
FMX600	6'	I/ II*	50
RMS400	4'	I	40
RMS500	5'	I/ II*	60
RMS600	6'	I/ II*	60
RMX500	5'	I/ II*	60
RMX600	6'	I/ II*	75
RMH700	7'	II	90

*May require the use of hitch bushings.

Three-Point Hitch

See Chart below for Tractor Categories and Three-Point Standards

The stabilizing arms are the 2-steel or cast arms that extend rearward and provide the lift and are the pull-point for the implement (referred to as lower link). The Upper Link is the 3rd mounting point and extends from a top middle position at the rear of the tractor. Comparatively little rearward force is applied from the top link.

The implement has been designed for front to back flotation while moving on uneven terrain. Adjust the tractor's top link to place the upper hitch vertically above the lower lifting arms.

Tractor Hook-Up

1. If your tractor has a multi-speed PTO, be certain that the PTO is set for 540 RPM.
2. Back tractor up to implement until lower 3-point links are aligned with the hitch clevises on your implement. Always stop the tractor, set the brake, shut off engine and remove the key before dismounting from tractor.
3. Secure tractor's 3-point lower links to the lower hitch clevises using 7/8" hitch pins. Use appropriate hitch pins for your hitch classification. Refer to "Tractor Categories and Three-Point Hitch Specification" table below.
4. Secure the tractor's top link to the implement's top hitch using a 3/4" hitch pin (supplied by customer). Adjust the tractor top link in order to level the implement.
5. Start tractor engine and lift implement from the ground about 12-14 inches. Turn off the tractor.
6. Adjust the tractor's 3-point hitch lift height so that the implement is not lifted more than 14" off the ground while the PTO Driveline is attached to implement and tractor to avoid damaging the driveline.
7. Install the stabilizer arms, anti-sway blocks or chains, refer to your tractor's operating manual to limit side sway of hitch. Side to side oscillation of about 2 inches is recommended.
8. Level the implement at the sides by adjusting the tractor lift links.
9. Measure the blade tip height on both sides, if these are not the same refer to Section 2 "Adjustments for Deck Mowing Height" on page 16.
10. Mount the driveline to determine if this needs to be adjusted.
11. Carefully raise and lower the implement and ensure that tractor's tires, drawbars, and other equipment on the tractor do not come into contact with the implement's frame or PTO Driveline.
12. Use the lift control limiting stop on the tractor control lever to limit the upward travel of the lever so the lift cannot be raised high enough to cause contact between the drive shaft shield and front shielding.

³Tractor Categories and Three-Point Hitch Specifications

Category	Hitch Pin Size				Lower Hitch Spacing (Spread)	
	Upper Link		Lower Link			
	Inches	Metric	Inches	Metric	Inches	Metric
I	3/4"	19mm	7/8"	22.4mm	26"	718mm
II	1"	25.5mm	1-1/8"	28.7mm	32"	870mm
III	1-1/4"	31.75mm	1-7/16"	37.4mm	38"	1010mm

Section 1: Set-Up Requirements

Driveline Installation

The FMX and RMS model driveline is connected with a push-pin coupling to the tractor and a shear bolt coupling to the implement. **Refer to Figure 1-1a Driveline with Push-Pin Coupling.** The RMX uses a push-pin coupling to the tractor and a 2-plate slip clutch to the implement. The RMH uses a push-pin coupling to the tractor and a 4-plate slip clutch to the implement. **Refer to Figure 1-1b Driveline with Slip Clutch Coupling.**

To minimize torque on the driveline when starting up; remember to always engage the PTO at a low engine RPM.

Note: If your ABI Innovations implement is equipped with a friction clutch; then it must go through a “run-in” operation prior to initial use and after long periods of inactivity. (Refer to Slip Clutch Specifications on page 13).



CAUTION

Tractor PTO shield and all implement guards must be in place at all times during operation!

IMPORTANT: If you are switching tractors or going to use a quick connect hitch then you will need to check the driveline maximum and minimum lengths to ensure the safe operation of your equipment. You may find it necessary to use different drivelines.

IMPORTANT: Before connecting the PTO Drivelines, clean and lubricate driveline connection points. When checking PTO driveline minimum length, it is important to have the tractor's PTO driveline level with the implement's gearbox shaft. Engage the tractor's hydraulic 3-point to raise or lower the lower arms until the implement's gearbox shaft is level with the tractor's PTO Shaft.



DANGER

ABI Innovations advises against the use of PTO adapters as these may defeat the purpose of the master shield on your tractor. PTO adapters create an unguarded shaft area between the tractor and the driveline guards that may cause entanglement that may result in serious injury or death.

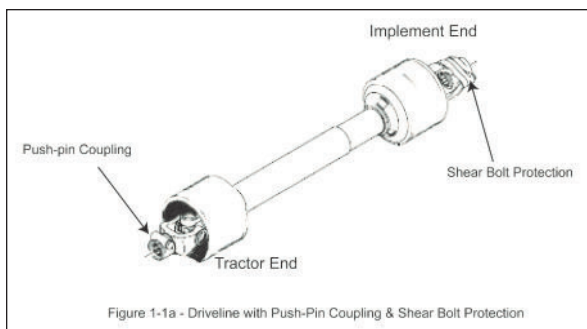


Figure 1-1a - Driveline with Push-Pin Coupling & Shear Bolt Protection

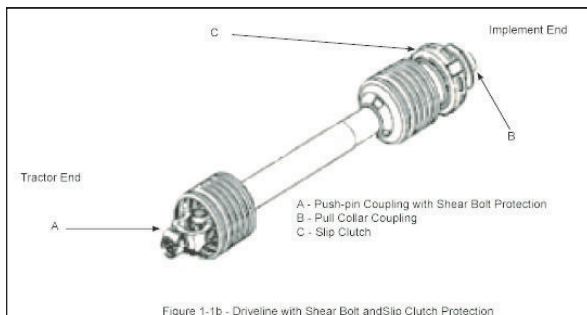


Figure 1-1b - Driveline with Shear Bolt and Slip Clutch Protection



DANGER

Do not attempt to operate your PTO driveline while it is unguarded as this may cause entanglement that may result in serious injury or death.

PTO Driveline:

Refer to Figures 1-2 to determine minimum and maximum operating lengths on page 12.

The PTO driveline minimum and maximum lengths must be checked prior to initial use or when using a different tractor or adding a quick connect hitch and to ensure that the driveline is compatible with all work conditions required by your ABI Innovations implement.

When fully extended the driveline must have a minimum overlap of the inner and outer shafts by not less than 1/3 the free length with both inner and outer shafts being of equal length or not less than a 6" (76mm) overlap.

Telescoping drivelines will have a variant in lengths due to changes in the vertical angle of $\pm 20^\circ$ due to uneven terrain or raising implement for transport. It is very important not to operate your driveline with less than the 1/3 free length or 6" (76mm) overlap as this may cause your driveline to detach while in operation and pose a safety hazard to the operator and possible damage to the tractor and implement.

1. Attach implement to your tractor. (See "Tractor Hook-up", pg. 10)
2. Adjust tractor top link until the implement gearbox input shaft is level with tractor input shaft.
3. Place tractor gear selector into park, turn engine off, set park brake and remove key.
4. Securely block implement in this position.
5. Attach the PTO driveline to the implement's shaft:
For Driveline with slip clutch—secure by sliding the Slip clutch end of driveline over the splined input shaft of the gearbox. Secure with driveline yoke locking device. For Driveline with Shear Bolt—secure by sliding the shear bolt end of the driveline to the implement's shaft of the gearbox. If the driveline comes with a snap ring ensure that this is locked into place and shear bolt is tight.
6. Slide the opposite driveline yoke end over the tractor's splined driveline shaft. Secure with driveline yoke locking device. The driveline will require shortening if it is too long to fit between the tractor and implement then continue with Driveline Adjustment. If the PTO driveline fits the tractor and implement continue with Slip Clutch Set-up Requirements.
7. If the PTO driveline does not fit between the tractor and the implement continue with "Determining your operating lengths".

Determine your operating lengths:

1. Pull drive halves apart until fully extended, just before coming apart. Record this measurement as A and subtract 6" (76mm) and record as C measurement in your operator's manual.
2. Push the driveline halves together. Record this measurement as B and add 1" (25.4 mm) and record as D measurement in your operator's manual.

Section 1: Set-Up Requirements

IMPORTANT: Never operate equipment with driveline extended beyond measurement C. Never operate equipment with driveline collapsed to less than measurement D. Before you begin the driveline adjustments; ABI Innovations strongly recommends that you request your dealer to fit your driveline to your equipment.

Driveline Adjustment

Refer to Figures 1-2 for Minimum and Maximum Lengths.

IMPORTANT: Adjusting the PTO Driveline requires that all cuts be made equally to the inner/outer guards and the inner/outer shafts.

1. Remove the PTO driveline from the tractor's splined output shaft and the implement's splined gearbox.
2. Pull the inner and outer shafts apart.
3. Remove the PTO shields (guarding).
4. Attach the implement's inner cylinder to the implement's gearbox shaft.
5. Pull on the implement's PTO driveline to ensure that it is securely attached.
6. Attach the tractor's output shaft to the tractor's PTO gearbox shaft.
7. Pull on the tractor's PTO driveline to ensure that it is securely attached.
8. Raise and lower implement to find the shortest operating distance between the gearbox input shaft and tractor's output shaft.
9. Hold both halves parallel to each other in the shortest operating distance and mark them.
10. Measure the marks made in Step 9 and record them to shorten the outer and inner guards equally.
11. Raise and lower implement to find the maximum operating distance between the gearbox input shaft and tractor's output shaft.
12. Hold both halves parallel to each other in the maximum operating distance and mark them.
13. Check that the driveline has a minimum of 6" (152.4mm) overlap or 1/3 the total length of the driveline.
14. Measure the marks made in Step 13 and record them.
15. Disconnect the implement inner cylinder from the implement's gearbox shaft.
16. Disconnect the tractor's output shaft from the tractor's PTO gearbox shaft.
17. Securely clamp the implement driveline guard shield section in a bench vise and cut off the guard at mark. File off any burrs. Repeat this step for the tractor driveline guard shield. Use one of these sections to create a cutting guide for the shaft and cylinder.
18. Use a padded bench vise to securely clamp the implement cylinder before cutting. Do not over tighten as this may damage the cylinders.
19. Using the guard as a guide, mark the cylinder and cut. File any burrs and clean off filings. Do not round the ends of the cylinder when filing.
20. Repeat steps 12 and 13 to shorten the tractor driveline shaft.
21. Apply grease to the inner shaft.
22. Reassemble the driveshaft, and securely attach the driveline guard.
23. Reattach the PTO driveline to the tractor and implement. Make sure that these are securely attached before attempting to engage the PTO driveline.
24. The driveline should now be moved back and forth to insure that both ends are secured to the tractor and implement. Reattach any end that is loose.
25. Hook driveline safety chain in the hole in the inner driveline guard. Attach the other end to the implement's main frame.
26. Hook driveline safety chain in the hole in the outer driveline guard and attach the other end to the tractor main frame.
27. Start tractor and raise implement just enough to remove blocks used to support the implement frame.
28. Slowly engage tractor's hydraulic 3-point to lower the implement. Check for sufficient drawbar clearance. Move drawbar ahead, aside or remove if required to eliminate binding.
29. Check to make certain that the driveline overall length does not extend beyond the maximum recorded length as in Step 14.

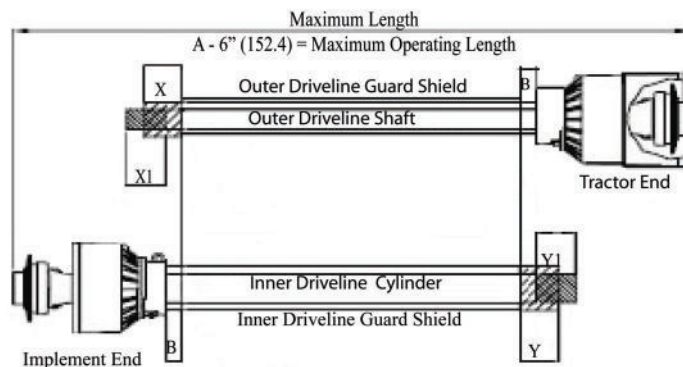
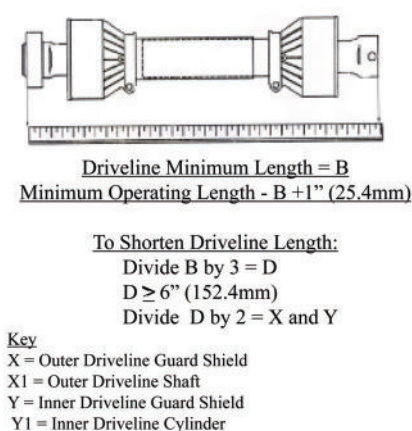


Figure 1-2 Checking Minimum and Maximum Lengths

Section 1: Set-Up Requirements



CAUTION

If the safety chains are not correctly fitted this will result in excessive tension causing the safety hook to open on the protection side. when this occurs it is necessary to replace the damaged hook with an original one.

This chain must be attached to the inner driveline shield and to the implement to restrict shield rotation.

Measurements:

Note: Do not use the driveline as a support or running board. Do not use the anti-rotation chain to support or transport the driveline when it is detached from the tractor. Use the storage bracket on the machine.

Slip Clutch Specifications

Slip (Friction) clutches have adjustable torque settings. The torque setting varies with the different compression of each spring. All springs should have an equal amount of compression (a sliding caliper or measuring tape will aid in setup and adjustments). Your slip clutch comes factory preset to the correct torque setting.



CAUTION

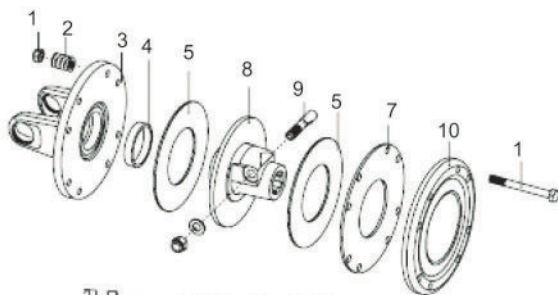
Slip clutches may become hot. Do Not Touch! Keep the slip clutch area clear of any material that may catch fire!

Important: Do not over-tighten the compression bolts as this may impair performance or cause premature wearing of the slip clutch!

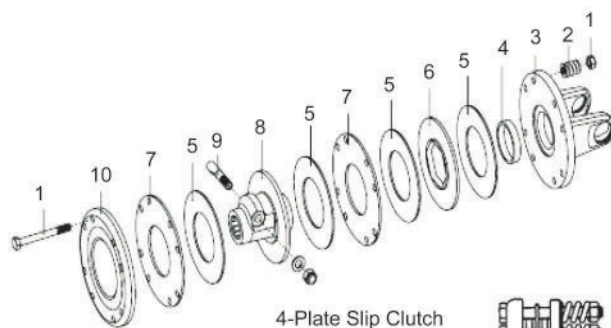
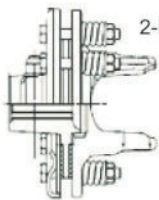
- Before first use or after a long storage, loosen set screw on pressure nut.
- Back off pressure nut to free clutch plates.
- Tighten pressure nut until the clutch plates are snug.
- Tighten pressure nut another 1/4 turn.
- Run the driveline at a low idle to slip the clutch until it starts to smoke. This will remove the dirt, corrosion and surface gloss from the clutch plate faces.
- Tighten the pressure nut another 1/2 turn to set the clutch plate pressure.
- Tighten the set screw in the pressure nut to lock it in place. Normally the clutch will slip at a 20% higher torque after the "run-in" than before.
- Check the temperature of the clutch after running for 20 minutes and after every 8 hours of operation.
- If the clutch is hot to the touch or smokes reset the pressure nut or the clutch plates will burn up and fail.
- Tighten the pressure nut in 1/4 turn increments and try during operation.
- The clutch should be set so it does not slip during normal operation. It should slip when the unit is overloaded from heavy cutting or when striking an obstruction. If it is set for too high torque to slip, components will fail.

Driveline Protection on RMS Model

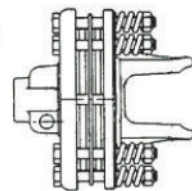
For RMS models with PTO drivelines that have shear bolt protection; ensure that you also secure the driveline using the snap ring that is included after securing the driveline to the gearbox. Failure to do so may result in serious injury or death. To remove or replace the snap ring use snap ring pliers. If the snap ring is bent or cracked do not attempt to operate the driveline. Immediately take the implement out of operation until the snap ring is replaced.



2-Plate Slip Clutch



4-Plate Slip Clutch



- 1 - Compression Bolt & Nut (Quantity 8)
- 2 - Spring (Quantity 8)
- 3 - Implement Flange Yoke
- 4 - Bushing
- 5 - Friction Disc (Linings) (2-Plate has 2 Friction Discs)
(4-Plate has 4 Friction Discs)
- 6 - Thrust (Driving) Plate (Not applicable to 2-Plate)
- 7 - Inner Pressure Plate
- 8 - Driveline Flange Yoke
- 9 - Bolt, Washer & Nut
- 10 - Outer Pressure Plate

Section 1: Set-Up Requirements

Gear Box Oil Requirements

Refer to Figure 1-4 and Figure 1-5

Before putting your implement into service:

IMPORTANT:

- Gearbox uses Multi-Purpose Gear Oil (ie: S.A.E. 80w/90 or S.A.E. 85w/140 Multi-purpose gear oil.)
- For all Grease Fittings use TYPE/Grade II tube grease.
- Place implement so that the deck is secure and level.
- Clean away any excess oil and dirt before removing 1/2" Pipe Plug (located at top of gearbox and 1/8" pipe plug (located at lower 1/3 of gearbox). Refer to figure 1-5 if your gearbox does not have a fluid level plug as shown in Figure 1-4.
- Fill gearbox until the oil level is even with the bottom opening of the 1/8" pipe plug hole. *Refer to Figure 1-5 to check oil level if your gearbox does not have the fluid level plug.
- Grease wheel axles (4), tail wheel (1), front roller axle (1), and PTO Shaft universal joints (2).
- Check all bolts, nuts and belt to insure they are tight and secure.



CAUTION:

DO NOT overfill gearbox!

This could cause damage to oil seals, and can cause permanent damage to the gearbox.

This issue will not be covered under warranty.

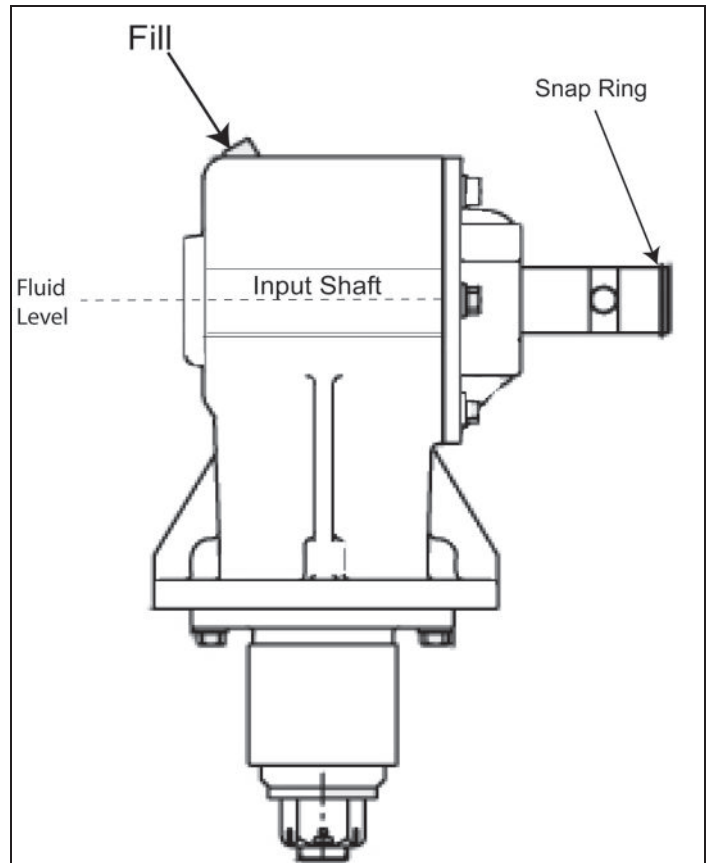
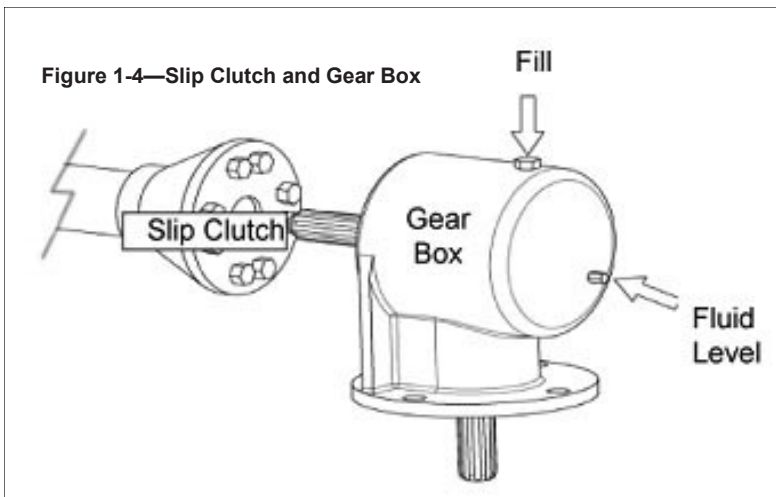


Figure 1-5—Gearbox without Fluid Level Plug

When filling you will need to visually check the oil level in the gearbox through the fill opening. Fluid level should come half-way up the input shaft as shown above; otherwise you may overfill the gearbox.



Section 2: Adjustments

Slip Clutch Adjustment

Figure 2-1a—Slip Clutch Adjustment and Figure 2-1b Spring Compression

The slip clutch is designed to slip while under excessive torque to protect the gearbox and drivelines, should the implement strike an obstruction. This slip clutch is factory preset to the correct torque for protecting the implement and the tractor PTO. A new slip clutch or one that has been stored over the winter may seize. Before operating, make sure it will slip by:

1. Make sure tractor engine is turned off and key is removed.
2. Loosen the eight nuts retaining the springs by a 1/3 to 1/4 turn or until you can turn the springs.
3. With tractor at idle speed, engage the tractor's PTO drive for 2 to 3 seconds. If the clutch slips without turning blades skip to step 4. If the clutch does not slip freely, disassemble and clean the clutch face plates, yoke and plate and clutch hub—reassemble the clutch and test again. If clutch continues to slip even though the springs are compressed to the proper length, then check the friction disc for excessive wear. Discs are 1/8" when new, if discs are less than 1/16" then replace with new discs. Contact your local authorized ABI Innovations dealer for further assistance.
4. Tighten each of the eight nuts until the springs are compressed to the necessary tightness. Ensure that all compression bolts are set to the same compression depth.
5. Check all spring lengths are the same (H); adjust nut on any spring that is unequal in length. Refer to Figure 2-1b—Spring Compression.

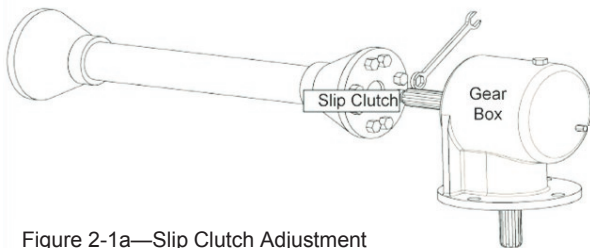


Figure 2-1a—Slip Clutch Adjustment

Important: Failure to retighten nuts may cause damage to implement and/or tractor due to improper slip clutch torque setting!

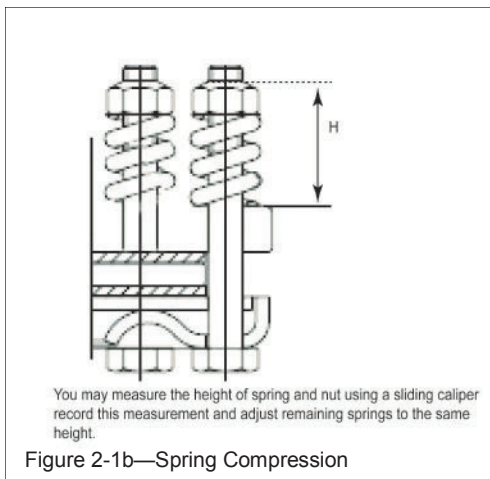


Figure 2-1b—Spring Compression

Note: Adjustment of the slip clutch is to provide only enough torque to prevent slippage under normal operating conditions. Occasional slippage is normal and provides protection to the driveline. If you are not satisfied with your results please contact your local authorized ABI Innovations dealer for further assistance.

Leveling Procedure

There are 4 primary adjustments that should be made prior to actual field operations:

1. Deck leveling from left to right.
2. Tractor top link length.
3. Tractor lower link height.
4. Tail-wheel height.

Proper adjustment of each of these items will provide for higher efficiency, improved cutting performance and longer blade life.

The following tools will be needed:

- Pliable tape measure.
- Spirit or carpenter's level.
- Open end or hex end wrench or socket set.
- Protective gloves.



DANGER

Engage parking brake, disengage PTO, shut off tractor and remove key before proceeding. Ensure that all moving parts have come to a complete stop before dismounting the tractor.

Deck Leveling From Left to Right

Refer to Figure 2-2:

1. Locate tractor with implement on a flat, level surface.
2. Use tractor's hydraulic 3-point control lever to lower implement until the tail-wheel makes contact with the ground surface.
3. Place a level or another suitable leveling device on the front of the implement's deck as shown in Figure 2-1. Manually adjust either one or both of the tractor's lower 3-point arm height adjustments to level the deck from left to right. Some tractors have only a single adjusting crank.

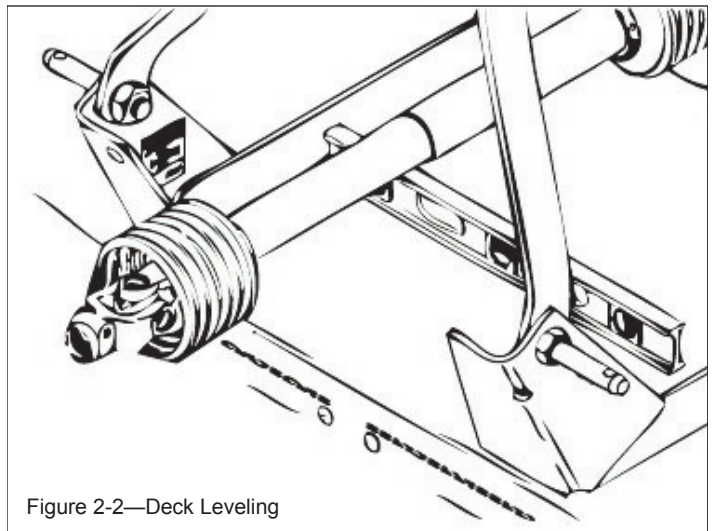


Figure 2-2—Deck Leveling

Section 2: Adjustments

Deck Mowing Height

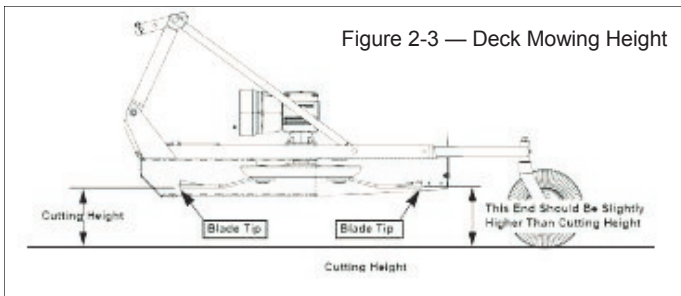
Refer to Figure 2-3 Deck Mowing Height (applicable to RMS, RMX and RMH)



CAUTION

Wear a pair of gloves when performing this operation and ensure the tractor is shut off and key is removed! Go to the back of the implement and carefully rotate each blade to the position shown in Figure 2-2. Avoid direct contact with the cutting edge of the blade.

IMPORTANT: The blades should be positioned to cut material only at the front of the implement. If deck is level or back of implement is lower than the front, then the blades are subject to continuous material flow resulting in additional blade wear, horsepower loss and frequent blade sharpening.



1. Using tractor's 3-point hydraulic control, raise or lower the 3-point arms until the front of the deck is slightly lower than the rear of the deck.
2. The top center link should be loose when deck rear is supported by the tail-wheel. If not, lengthen center link until loose. Final adjustment will be made later.
3. With gloves on, carefully rotate each blade tip to the position shown in Figure 2-3 on page 14.
4. Measure distance from cutting tip of blade to ground surface. This distance is the cutting height.
5. If desired cutting height cannot be obtained by adjusting the lower 3-point arms then readjust tail-wheel height refer to "Tail-wheel Height Adjustment" for RMS, RMX and RMH on this page. For FMX adjust the gauge wheel height. Refer to "Gauge Wheel Height Adjustment" on this page.
6. Repeat Steps 1-5 until desired cutting height is achieved.
7. Set tractor's 3-point hydraulic control stop at this height.

Center 3-Point Link Length on RMS, RMX and RMH Models

1. Lower implement deck to the normal cutting height.
2. Adjust length of center 3-point link so that the upper pivot hitch rests at a slight downhill position. This arrangement allows for optimum ground contour following performance.
3. Lock center link in this position once correct length is achieved.
4. The second set of holes on the upper pivot hitch should be used when tractor's center 3-point link is too short.

Adjusting Center Point Top Length on the FMX Model

This upper link needs to be adjusted to allow for the mower to "float", but still is able to lift the mower for transport or to avoid obstacles. This adjustment is subjective; however, we recommend that the upper link be adjusted out enough that when the mower is lifted above operating

level that the gauge wheels remain on the ground for a moment before the 3-Point eventually raises the mower into the transport position. The second set of adjustment holes on the upper pivot hitch should be used when tractor's center 3-point link is too short.

Gauge Wheel Height Adjustment (FMX models)

Refer to Figure 2-4.

To adjust the mowing height the spacers must be suitably placed above and/or below the axle bushings. Achieving the professional appearance is by combining the spacers above or below the axle bushings on all wheels.

The spacers allow for an adjustment range from 3/4" to a maximum of 3-1/4" in 1/2" increments on the FMX500 ABI Innovations Finishing Mower. The adjustment range for the ABI Innovations Finishing Mower - FMX 600 is 5-1/4" in 1/2" increments.

1. To set the minimum cutting height: place all the spacers above the axle bushings.
2. To set the maximum cutting height: Place all spacers below the axle bushings.
3. Using the tractor's 3-point lift; raise the mower and securely lock into position.
4. Holding gauge wheel and yoke assembly up, remove the lock pins from top of gauge wheel spindle.
5. Position full-length spacers and half-length spacers as needed to achieve the desired mowing height.
6. Lower mower to the ground.
7. Repeat steps 1-3 if needed. Make certain that all gauge wheels are adjusted to the same height.

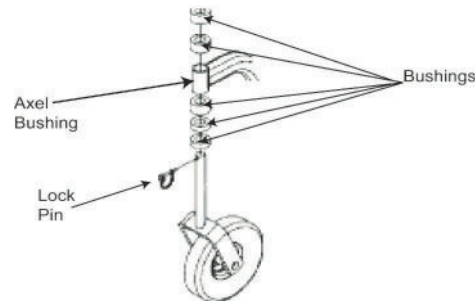


Figure 2-4—Gauge Wheel Height

Wheel Interference Check on FMX Model

Do not operate mower until this interference check has been performed. If you change tractors, you must perform the check for that mounting.

1. Raise mower with tractor hydraulics to maximum height of tractor lift.
2. Pivot both front gauge wheels forward and check that there is clearance between gauge wheels and tractor tires.
3. If there is interference, you must move hitch pin to extended position. Move tractor tires inward to obtain clearance or lower mower until clearance exists. Set 3-Point quadrant stop so mower cannot be raised beyond set point.

Section 2: Adjustments

Tail-Wheel Height Adjustment (RMS, RMX, RMH Models)

Refer to Figure 2-5:

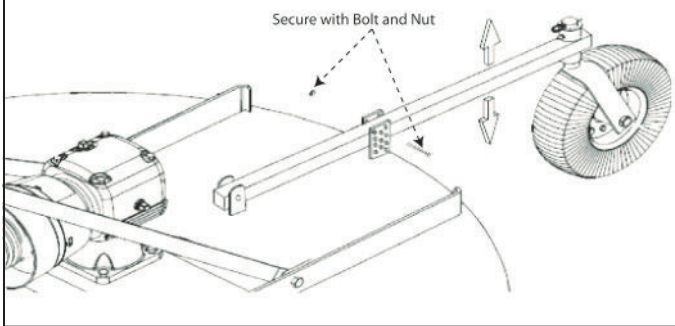
If deck slope is slightly lower at the front than at the back, and cutting height is not at the desired height, then the tail-wheel must be adjusted up or down as follows:

1. Use tractor's 3-point hydraulic control to lift cutter until the tail-wheel clears the ground. Remove carriage bolt and flange nut.
2. Adjust tail-wheel as follows:
3. To lower cutting height, adjust tail-wheel up.
4. To increase cutting height, adjust tail-wheel down.
5. With Tail wheel adjusted to the correct height, replace long carriage bolt and flange nut. Tighten flange nut to the correct torque.

Readjust tractor's lower 3-point arm height as needed.

See "Deck Mowing Height" on previous page.

Figure 2-5—Tail-Wheel Height



Belts and Sheaves (FMX Models)

Refer to Figure 2-6

Belts

Ideal tension is the lowest tension at which the belt will not slip under peak load conditions. Checking the tension during the first 24-48 hours of run-in operation will lengthen the life of the belts.

Check belts before each use to keep the belts free from foreign material which may cause slipping.

For maximum service, replace belts with a complete new set of belts to maintain even tension on both sides. Never install a used belt as a replacement unit of a set. Used belts are worn in cross-sections and are stretched this will cause the belt to ride lower in the sheave, reduce blade speed and may rupture the core centers causing the other belt to elongate leaving one side of the mower under-belted. Belts from other manufacturers should not be mixed for the same reasons.

Belt Tension (FMX Models)

1. To check tension, apply 7-10 lbs of pressure by pushing against the belts halfway between the pulleys. The belt deflection should be between $5/16"$ - $1/2"$.
2. To adjust belt tension, loosen the (4) nuts holding the gearbox support plate to the central plate (A). (Figure 2-6a)
3. Loosen the (2) locking nuts on the adjustment bolt (B).
4. Turn the adjustment bolt counter clockwise until the proper belt tension is reached. This will draw the gearbox support plate to the rear, thus tightening the belts.
5. Tighten the (2) locking nuts on the adjustment bolt (B).
6. Tighten the (4) nuts holding the gear box support to the central plate (A).

Sheaves (FMX Models)

Check the condition of the sheaves before installing new belts. Rusty or worn sheaves impairs the drive's efficiency and will abrade the belts prematurely. If the grooves are worn to where the belt bottoms, slippage may result and burn the belts. If the sidewalls are "dished out," the bottom shoulder wears off the bottom edge of the belt.

When replacing belts, ensure that the drive is shortened enough until the belts can be put on the sheaves without forcing. Forcing belts may cause internal damage to the belts and shorten belt life.

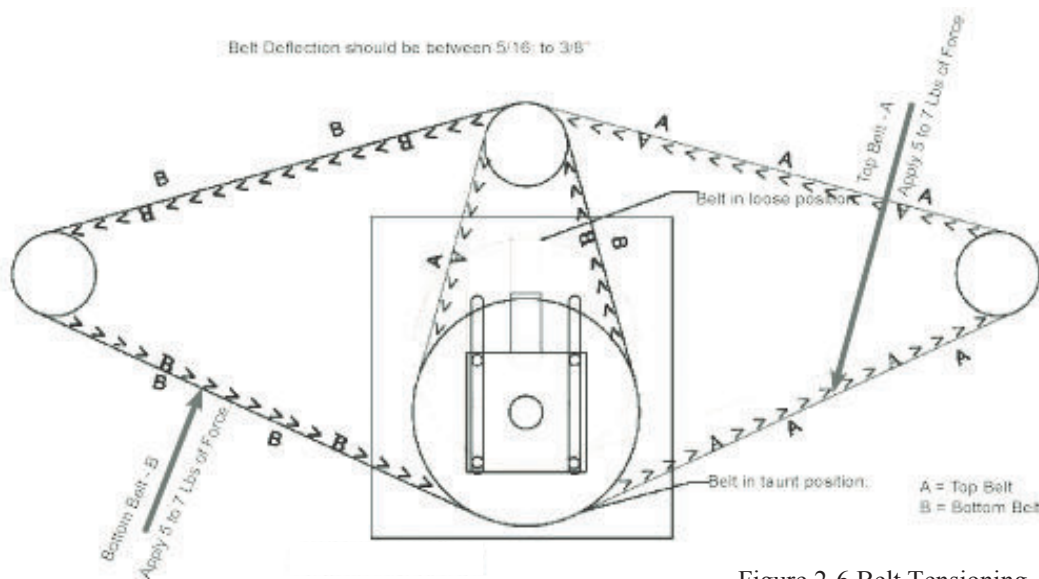
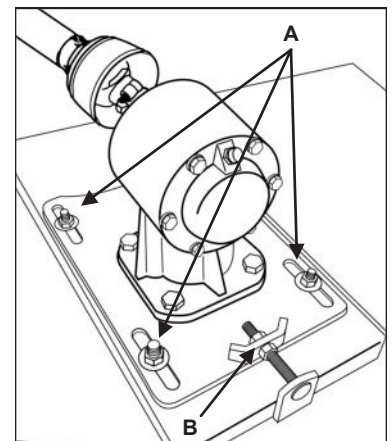


Figure 2-6 Belt Tensioning

Figure 2-6a Adjustment Nuts



Section 3: Operating Instructions

Operating Check List

Hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training involved in the operation, transport, maintenance and storage of the implement. Therefore, it is absolutely essential that no one operates the implement without first having read, fully understood and become totally familiar with the Operator's manual. Make sure the operator has paid particular attention to:

- **Safety, pages 6 - 9**
- **Section 1: Set-Up Requirements, pages 10 - 14**
- **Section 2: Adjustments, page 15 - 17**
- **Section 3: Operating instructions, pages 18 - 21**

Also make sure the operator has completed the Operating Checklist below before using your implement:

- ☐ Read and follow the "Safety" section starting on page 6 carefully.
- ☐ Read all of the "Operating Instructions" section on pages 18 - 21.
- ☐ Review your tractor's operating instructions.
- ☐ Check the implement initially and periodically for loose bolts & pins and tighten if needed.
- ☐ Make sure all guards and shields are in place.
- ☐ Check initially and periodically for loose bolts, pins and chains.
- ☐ Know your controls and how to stop tractor, engine and PTO quickly in an emergency.

IMPORTANT: ABI Innovations strongly recommends that no children are allowed to operate the rotary implement.

Inspection Procedures

Make the following inspections with implement attached to a tractor and PTO disengaged and completely stopped.



DANGER

For RMS models with PTO drivelines that have shear bolt protection; ensure that you also secure the driveline using the snap ring that is included; failure to do so may result in serious injury or death. To remove or replace the snap ring use snap ring pliers.

1. Inspect tractor safety equipment to make sure it is in good working condition.
2. Carefully raise and lower implement to ensure that the drawbar, tires, and other equipment on the tractor do not contact implement's frame or PTO driveline.
3. Check that all hardware is properly installed.
4. With implement deck resting on solid supports, PTO disengaged and completely stopped, check that the blades are sharp and secure and properly positioned.
5. Check PTO guards to make certain they are in good working condition and in place.
6. Remove solid supports from under the deck and verify implement's front to rear and top link alignments.

7. Check that implement is level side-to-side and verify implement's deck is set to the correct height. See "Leveling Procedure" on page 15.
8. Lubricate all grease fitting locations. Make sure PTO shaft slip joint is lubricated.
9. Check to be sure gear lube runs out the small check plug on the gearbox.
10. Make sure that the driveline operates freely and is seated firmly in the tractor PTO shaft spline groove.
11. Set tractor PTO and transmission into neutral before starting engine.
12. Set tractor PTO select lever to 540 RPM.
13. The remaining inspections are made by engaging the PTO to check for vibrations.

IMPORTANT: Stop PTO immediately if vibration continues after a few revolutions during start-up and anytime it occurs thereafter. Wait for PTO to come to a complete stop before dismounting from tractor. Make necessary repairs and adjustments before continuing on.

- Start tractor, set throttle to idle or slightly above idle and slowly engage PTO. Initial start-up vibration is normal and should stop after a few revolutions. Stop PTO rotation immediately if vibration continues.
- Once the implement is running smoothly, increase tractor throttle to operating RPM. Stop PTO immediately if vibration occurs.

IMPORTANT: Do not exceed RPM rating. Excessive engine speed will cause damage to the power train components.

Transporting Procedures



CAUTION

When travelling on public roads at night or during the day, use accessory lights and devices for adequate warning to operators or other vehicles. Comply with federal, state, and local laws

IMPORTANT: Always disengage the tractor's PTO before raising the implement to transport position.

1. Make sure driveline does not contact tractor or implement when raising implement to transport position. If it is necessary to lift implement above 14"; always disconnect the tractor PTO driveline first.
2. Reduce tractor ground speed when turning, and allow enough clearance so implement does not contact obstacles such as buildings, trees or fences.
3. Limit transport speed to 20 mph. Transport only with a farm tractor of sufficient size and horse power.
4. When traveling on roadways, transport in such a way that faster moving vehicles may pass you safely.
5. Sudden braking can cause a towed load to swerve and upset. Reduce speed if towed load is not equipped with brakes.
6. Shift tractor to a lower gear and use extra care when traveling over rough terrain.

Section 3: Operating Instructions

Un-hooking the Implement

Unhook the implement from the tractor as follows:

1. Disengage power to the driveline.
2. Park the implement on a level solid hard surface.
3. Lower implement to level ground or onto stable support blocks.
4. Engage tractor park brake, shut tractor engine off and remove key before dismounting from tractor.
5. Disconnect driveline from tractor PTO shaft.
6. Un-hook 3-point hitch from tractor.
7. Reinstall hitch pins, lynch pins and hairpin cotters in implement hitch for storage.
8. Connect driveline safety chains together.
9. Rotate driveline and place driveline into the grooved storage bracket.

Mowing Safety



DANGER

Do not engage tractor PTO while hooking-up and unhooking the driveline or while someone is standing near the driveline. A person's body and/or clothing can become entangled in the driveline resulting in serious injury or death.



Tractor PTO shield, gearbox shield, and driveline shield must be secured in place while operating the implement to avoid injury or death from entanglement in rotating drivelines.

Damaged drivelines can break apart while rotating at high speeds causing serious injury or death. Always remove the implement from service until damaged drivelines are repaired or replaced.

Implements have the ability to discharge objects at high speeds. Therefore, the use of front & rear deck safety shields is strongly recommended while mowing along highways or in an area where people may be present!



Do not cut on steep inclines. The tractor and implement could flip over causing damage to the equipment, bodily injury or death.



Never carry a passenger on the implement. A rider can fall and be run over by the implement or tractor causing serious injury or death.



Do not use implement to lift or carry objects. Lifting and/or carrying objects can result in damage to the implement, serious bodily injury or death.

Never operate the implement while in the raised position. The implement can discharge objects at high speeds resulting in serious injury or death.

Do not use the deck as a working platform. The deck is not properly designed or guarded for this use. Using the deck as a working platform can cause serious injury or death.

Do not use deck as a fan. Cutting blades are not properly designed or guarded for this use. Using the deck as a fan can result in injury or death.

Do not use the driveline as a support or step.

Do not use the anti-rotation chain to support the driveline while it is detached from the tractor. Use the grooved storage bracket on the implement.

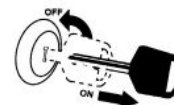
Do not allow anyone to stand between the tractor and the implement during hookup. The Operator's foot may slip off the clutch and back over the assistant.



Do not operate machinery if you have consumed drugs or alcohol. These will impair your judgment, alertness or coordination while operating equipment. Seek medical advice if you are taking prescription drugs before operating equipment.

Stay alert for hidden hazards, people, children entering into your work area or traffic.

Do not leave the operator's seat for ANY reason while the PTO driveline is engaged and the tractor is running. Always disengage PTO, engage parking brake, shut tractor engine off, remove switch key and wait for blades to come to a complete stop before dismounting from tractor.



Section 3: Operating Instructions

IMPORTANT: It is important to maintain correct PTO speed. Loss of PTO speed will allow blades to hinge back and result in ragged, uneven cutting.



DANGER

Keep hands and feet out! Do not step on or climb over the unit while machine is in operation, or engine is running.

WARNING

Always disengage PTO, set parking brake, shut tractor off, remove switch key and wait for blades to come to a complete stop before dismounting from tractor.

CAUTION

Do not exceed rated mowing capacity of your implement! See Specifications & Capacities for your model on pages 24-27 for specified mowing Capacity. Using this implement for any other work can damage the drive components, cutter blades, and deck components!

Do not over speed PTO or machine damage may result. This implement is designed to be used only with a tractor having a 540 RPM rear PTO.

To reduce blade impact while striking obstacles; your rotary implement is rigged with free swinging blades that will pivot or fold to absorb the shock. However, it is best to ensure that the cutting height is adjusted for the terrain in which you are mowing. This will extend the life of your implement and will reduce premature blade wear or breakage.

Mowing should be avoided in extremely dry conditions as debris may accumulate on your implement and may result in a fire due to heat build-up caused by the friction of moving parts. In wet conditions build-up of material on the underside of the implement will create a loss of horsepower, increased wear and poor discharge and may cause additional stress on the PTO driveline.

Know before you mow:

1. Check and mark potential hazards such as ditches, stumps, holes or other obstacles that may cause the tractor to rollover or damage the implement.
2. Inspect and clear the area for debris, and unseen foreign objects such as branches, rocks, etc.
3. Develop a safe plan to avoid or minimize any safety hazards found in steps 1 and 2.
4. Never assume the area is clear. Mow only in areas that you are familiar with and are free of debris and unseen objects.
5. Extremely tall grass should be cut twice: first cut at the highest possible cutting height to detect potential hazards, before cutting at the desired cutting height.

IMPORTANT: ABI Innovations strongly recommends that children should not be allowed to operate this implement.

IMPORTANT: The PTO driveline while operating at 540 RPM is actually rotating 9 times per second and at this speed the driveline can pull clothing (for example) much faster than a human being can take evasive action.

Note: Determining the correct ground speed depends upon two things: The density of the material being cut and the size of the tractor powering

the implement.

Generally the quality of cut is better at lower ground speeds. Dense ground cover will create the need to slow down even more. In certain conditions the tractor tires will roll grass down resulting in uneven cut when the grass fails to rebound. Should this happen you may try reversing the direction of the cut and/or double cut to achieve the desired finish.

General Operating Instructions

It is important that you familiarize yourself with the Operator's manual, 1) completed the Operator's Checklist, 2) properly attached implement to your tractor, 3) made leveling adjustments, and 4) preset your mowing height.

You will need to maintain 540 RPM speed and 2 to 4 mph ground speed to produce a clean cut. Make a tractor gear and range selection that will enable you to maintain these speed combinations. If you need to go slower, reduce your tractor speed by down shifting gears while maintaining the 540 RPM - do not reduce speed of the PTO while operating as this will impact the quality of the cut.

Note: Do not allow the implement to drop violently on the ground. Violent impacts would strongly stress all machine components and could cause damage to your implement.

General Operating Procedures

Perform an operational safety check by starting the implement. It is important that at any time during this safety check you detect a malfunction in either the implement or tractor that you immediately disengage the PTO, shut the tractor off, remove it's key, and make necessary repairs and/or adjustments before continuing on.

1. Start the tractor and set the engine throttle speed at low idle. Raise the implement with the tractor's rear hydraulic lift control lever to transport position making sure that the PTO shaft does not bind and does not contact the implement's frame.
2. Lower the implement to the ground and at a low engine speed engage the PTO. If everything is running smoothly at a low idle, slowly raise the implement to transport height checking for bind or chatter in the driveline.
3. Lower the implement to the ground and increase the tractor's engine RPM until it reaches 540 RPM.
4. If everything is still running smoothly, once more raise the implement to transport height to check for driveline bind or chatter.
5. Lower the implement to the ground, return the engine to a low idle, and disengage the PTO.
6. Position the adjustable stop on the tractor's hydraulic lift lever so the implement can be consistently returned to the same cutting and transport height.

Avoid very low cutting heights especially on extremely uneven terrain. Always cut downward on slopes and avoid crossing the face of the steep slopes. Avoid sharp drops and cross diagonally through dips to prevent hanging up the tractor and implement. Slow down in turns. Remember to look back often.

Section 3: Operating Instructions



WARNING

A heavy load can cause instability in driving a tractor. Make sure the front of the tractor is properly counter-balanced with weights. An unstable tractor could steer badly and possibly tip over, causing injury or death.

Transporting Instructions

On roadways transport in such a manner that faster moving vehicles can easily see you and pass you safely. Reduce your speed when traveling over rough and hilly terrain. Avoid quick or sharp steering corrections. Take extra care to insure that the implement doesn't come into contact with obstacles such as trees, buildings or fences.

Use accessory lights and appropriate reflective devices to provide adequate warning to pedestrians and other vehicle operators when traveling on public roads and in the dark of night. Comply with all local, state and federal laws.

It is important that you inspect the area where you will be mowing and clear it of safety hazards and foreign objects either before or after you arrive at the mowing site. Never assume the area is clear. Mow only in areas that you are familiar with and are free of debris and unseen objects.

Use your 3-point hitch or Quick-Hitch to lift your implement into transport position while making tight turns and to reverse direction.

Now that you are prepared and well briefed you may begin mowing.

Note: When crossing ditches with steep inclines or going up sharp inclines, it is probable that the main driveline inner profile will penetrate into the outer housing to its maximum depth until the assembly becomes solid. This type of abusive operation can result in serious damage to the tractor and implement by driving the PTO into the tractor and through the support bearings or downward onto the PTO shaft causing it to break apart.



Warning

Many varied objects, such as wire, cable, rope or chains, may become entangled in the operating parts of the implement. These could then swing at greater velocities than the blades thus creating a hazard that could result in serious injury or death. Never allow the cutting blades to contact such items.

Mowing Instructions

1. Ensure the tractor's park brake is engaged, the PTO is disengaged, and the implement is resting on the ground.
2. Start your implement slowly; do not use full throttle. Allow 10 to 15 seconds for implement blades to become aligned properly before going to 540 RPM.

3. Maintain 540 RPM PTO speed while mowing. Loss of PTO speed will allow the blades to pivot or fold back and result in ragged, uneven cutting.
4. Travel only as fast as the tractor is capable of making smooth even cuts without overloading the tractor.
5. Mow 45 to 50 feet, stop and check to see that the implement is adjusted properly.
6. Do not engage PTO while implement is in the fully raised position.
7. Periodically disengage the PTO, turn off the tractor, remove the ignition key and check for foreign objects wrapped around the rotor shaft. Block implement's deck up before removing objects.
8. Frequently inspect the implement for loose bolts and nuts. Tighten all loose bolts and nuts.
9. Always work at a safe distance from roads, populated areas or places.
10. Be alert for people, children, pets or livestock entering your work area while operating your implement.

In the event you do strike an object; immediately disengage the PTO driveline, stop the tractor, set the brake, remove the key and inspect the tractor and implement. Make necessary repairs to the implement or tractor before resuming operation.

Taking a Break:

Do not operate any machinery if you are exhausted. Whether you are done mowing, need to take a break, or just need to make a few adjustments to the implement, remember to perform the following shut down procedures:

To shut down the implement:

1. Reduce the tractor's engine RPM.
2. Disengage the PTO.
3. Stop on level ground.
4. Lower the implement to the ground.
5. Set the park brake.
6. Turn off the engine and remove the key.
7. Stay on the tractor until the blades come to a complete stop.
8. Bring tractor to a complete stop.

IMPORTANT: The RMS is designed to CUT GRASS AND OBJECTS UP TO 1/2" IN DIAMETER and is for non-commercial use. Use of your implement to cut any material larger than the 1/2" may damage the implement and void your warranty.

The RMX is designed to CUT PRAIRIE GRASS AND OBJECTS UP TO 1" IN DIAMETER. Use of your RMX to cut any material larger than 1" in diameter may damage the implement and void your warranty.

Section 4: Maintenance

Servicing

Proper servicing and adjustment is the key to the long life of any implement. With careful inspection and routine maintenance, you can avoid costly down time and repair. Do not get under the machine to make measurements or adjustments without securely blocking implement first.

General Maintenance

1. Check all bolts after each use.
2. Replace any worn, damaged or illegible safety labels by obtaining new labels from your ABI Innovations Dealer. If you are operating your implement in a heavy duty capacity then maintenance operations may need to be performed more frequently.
3. Before you add oil to the gearbox, it is important that the fill plug area be wiped clean before removing plugs. Debris mixed into the lubricants will rapidly wear the parts and destroy bearings and gears. Oil levels must be checked when implement is on a level surface.



DANGER

Always disconnect main driveline from tractor PTO before servicing the underside of the implement's deck. Implement can be engaged if tractor is started resulting in damage to the implement, bodily injury and/or death.



WARNING

Always secure implement's deck in the up position with solid supports before servicing the underside of the implement. Never work under equipment supported by hydraulics. Hydraulics can drop equipment if controls are actuated or if hydraulic lines burst. Either situations can drop the implement instantly even when power to the hydraulics is shut off.



CAUTION

Use heavy leather gloves when sharpening or replacing blades.

Maintenance Schedule

Every 8 Hours of Service:

- Grease the support of the rotor.
- Grease the "U" joints of the PTO driveline.
- Check the bolts that connect the blades to the rotor.

Every 50 Hours of Service:

- Change the first oil fill in the gearbox after the initial 50 hours of service. After this point, oil should be changed after every 250 hours of service.
- Check blades for wear or damage. Replace if necessary. Never try to straighten a bent blade.
- Disconnect and clean the PTO driveline. Cover the sliding parts with grease before reassembling.

Every 250 Hours of Service:

- Change oil in the gearbox.

Blade Maintenance

Always inspect implement blades before each use. Make certain these are properly installed and are in good working condition. Use only original blades on the implement as they are made of a special heat-treated alloy steel. Substituting blades from other manufacturers may not meet our specifications and may create a hazardous situation if these fail.

Replace any blade that is damaged, worn, bent or excessively nicked. Never try to straighten a bent blade! Small nicks can be ground out when sharpening.

Blade Sharpening

Blades should be sharpened at both cutting edges at the same angle as the original cutting edge. Do not sharpen blade to a razor edge, but leave a 1/32" blunt edge. Balance each blade after sharpening

Note: *Care should be taken in order not to remove any more material than necessary to sharpen blade.*

Blade Replacement

Blade bolts are right-handed bolts.

1. Always install blade cutting edge facing direction of rotation.
2. Remove the bolt counter-clockwise and blade washer from the bottom of the blade to be replaced. Remove blade.
3. Inspect bolts and nuts threads to ensure that these are not worn or damaged. Replace worn or damaged bolts and nuts.
4. Install the blade washer into the center hole on blade.
5. Replace the bolt and tighten clockwise.

IMPORTANT: Not replacing both blades will result in an out-of-balance condition that will contribute to premature bearing wear.

Shear Bolt Replacement



WARNING

Failure to reinstall the retaining clip on the input shaft can result in injury or death.

1. Slide the shield yoke back.
2. Remove damaged shear bolt and nut with a hammer and punch.
3. Replace damaged or lost shear bolt by realigning the holes in yoke and shaft.
4. Install new shear bolt and secure with nut.
5. Secure yoke shield by locking back into place.

Blade Spindle Maintenance (FMX models only)

Blade spindles should be lubricated after every 8 hours of operation. Our mowers provide easy access to the spindles via holes on outer shield. When lubricating the spindle allow for a small amount of excess grease to vent through top seal.

Note: *Do not over lubricate the spindles as excess grease may damage belt drive.*

Section 4: Maintenance

Driveline Maintenance

Refer to Figure 4-1

Lubricate the driveline parts before each use. This may need to be done during use depending upon the number of operating hours and conditions of use, i.e. extremely dusty conditions may require a higher frequency of lubrication. Also, clean and lubricate the driveline before storing at the end of each seasonal use.

Recommended hourly usage is approximately 8 in normal conditions. Constant angle applications or use in extremely dusty conditions may require a lube interval of 4 hours.

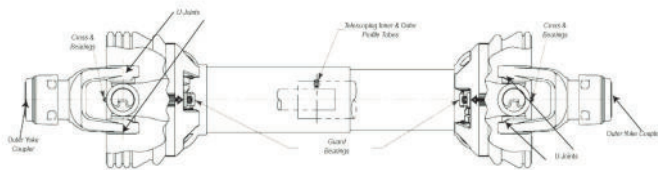


Figure 4-1 - Lubricating Driveline
(Not shown with slip clutch)




WARNING

Failure to reinstall the retaining clip on the input shaft will allow driveline to swing if shear bolt is broken that may result in injury or death.

Lubricating

Lubricate all fittings with a good quality lithium soap compatible with E.P. Grease meeting the N.L.G.I. #2 Specifications and containing no more than 1% Molybdenum Disulfide.

Components		Hourly Usage
U-Joints	Multi-purpose grease - 4 to 6 lever pumps	8 Hours
Cross (aka Spider)		8 Hours
Guard Bearings/ Bushings		8 Hours
Telescoping Profile Tubes	Multi-purpose grease - 8 to 10 lever pumps	20 Hours
Outer Tube Couplers	Multi-purpose grease	Before each use

Refer to Gear Box Requirements on page 14 for lubricating instructions.

While greasing driveline shaft with the internal greasing system, use the special nipple that can be reached through the guard's hole. Grease slowly, giving time for the grease to flow along the tubes. Internal rotating guard bushings should be lubricated upon replacement.

Gearbox

If the gearbox performs abnormally, shut down immediately and take the unit off-line. Do not operate until the unit is serviced. Our gearboxes are shipped with 85-140W EP oil. Please refer to our website for additional information regarding service to the gearbox that is installed on your implement.

The RMS400 is equipped with a gearbox that does not have a fluid level plug and must be visually checked for proper fluid level before each use. The FMX, RMS500, RMS600, RMX and RMH models are equipped with fluid level plugs, do not overfill beyond this point.

To replace oil in the gearbox

1. Tools needed: Wrench or socket wrench, bucket or catch pan for used oil.
2. Remove bolts and nuts attaching the gearbox to the implement.
3. Remove the fill plug and invert over the catch pan. If the gearbox has a fluid level plug, you may remove this to speed up the process.
4. Once the oil has been drained, replace plug(s).
5. Realign mounting holes to the gearbox bracket holes and secure with nuts and bolts.
6. Fill with the appropriate oil for your region.
7. Dispose of used oil in accordance with your local, state and federal regulations.



Handling Waste Product and Chemicals

- Waste products, such as used gearbox oil, fuel, coolants, etc. can harm the environment or people.
- Do not use beverage containers for waste fluids – someone may drink from them!
- Contact your local Recycling Center to learn how to recycle or dispose of waste products. Material Safety Data Sheet (MSDS) provides specific details on the chemicals, physical and health hazards, safety procedures for using the chemical and emergency response techniques.
- The retailer of the chemical products used with your machine is responsible for providing the MSDS for that product.

Parking Implement

- Park the implement on a level solid surface.
- Shut off the tractor's engine and engage parking brake.
- Disconnect from tractor.
- Store driveline in the driveline groove.

Storage

The following steps should be completed when preparing to store the mower for the season:

1. Good practice is to clean off any dirt or grease that may have accumulated on any moving parts.
2. Check blades for wear and replace if necessary.
3. Inspect for loose, damaged or missing parts and replace if needed.
4. Lubricate as noted in this manual, as well as, any other manuals that were supplied with your ABI Innovations implement.
5. Sand areas where paint is chipped and apply touch-up paint to prevent rust.



CAUTION

Always store or park your Rotary Mower in a safe place away from children or livestock.

Section 5: Specifications



FMX MODEL SPECIFICATIONS

	FMX500	FMX600
Working Width	60"	72"
Overall Width	61"	73"
Overall Length <i>(Including Gauge Wheels)</i>	58"	62"
Weight (with Front Guard)	504 lbs	542 lbs
Floating Top Link	Permits deck to float over terrain for a professional finish.	
High Blade Speed Tip FPM (Feet Per Minute)	Ensures a clean cut.	
	17,288 FPM	17,319 FPM
Blades (1/2" Bolt and Nut)	3 —1/4" x 2.5 x 20-1/2"	3 —1/4" x 2.5 x 24-1/2"
	*All blades measurements are from tip to tip.	
Deck Height <i>(bottom of deck to bottom of skid)</i>	5"	
Deck Material Thickness	Fully welded deck for additional strength. 10 Gauge	
5/8" Belts	B-73 are 76" Long	B-78 are 81" Long
Minimum Horsepower Rating	Minimum 20 HPMaximum 45 HP	Minimum 25 HPMaximum 60 HP
Gearbox	540 RPM PTO Driven Gearbox 1:1:93 Cast Iron Housing	
Gearbox Oil	SAE 85W-140 EP Oil Capacity 23 Oz (.68 liters)	
Cutting Height	1 1/4 to 4" Provides perfect cutting height for a professional finished landscape	
Cutting Capacity	Grass and weeds	
Safety Guards	Protects against flying object hazards. Rubber belting rear discharge.	
Driveline Safety Protection	1/4" square shear key. Series 4 PTO Driveline 32" Cross to Cross	
Gauge Wheel	<i>Allows the operator to raise or lower the wheels by adjusting the gauges in increments of 1/2" to 1".</i>	<i>Allows the operator to raise or lower the wheels by adjusting the gauges in increments of 1/2" to 1".</i>
Gauge Wheel		
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE!		

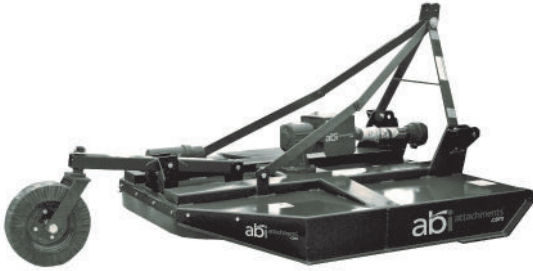
Section 5: Specifications



RMS MODEL SPECIFICATIONS

	RMS 400		RMS 500		RMS 600	
Working Width	48"		60"		72"	
Overall Width	54"		67"		79"	
Overall Length <i>(Including Tail-Wheel)</i>	82"		98"		108"	
Weight (with Front Guard)	490 lbs		545 lbs		738 lbs	
High Blade Speed Tip FPM (Feet Per Minute)	Ensures a clean cut.					
	13,096 FPM		12,469 FPM		14,963 FPM	
Blades Heat Treated Alloy Steel - Free Swing Blades 1-1/2" Bolt and Nut	3/8" x 3" x 16"		1/2" x 3-1/2" x 22"		1/2" x 4" x 28"	
	*All Blades Measurements are from hole center line to blade tip.					
Deck Height <i>(underside of deck to bottom of skid)</i>	8 3/8"					
Deck Material Thickness	12 Gauge					
Deck Design	Fully welded for additional strength. Shaped to discharge grass more effectively than other models.					
Minimum Horsepower Rating	Minimum 20HP	Maximum 45HP	Minimum 25HP	Maximum 60HP	Minimum 25HP	Maximum 60HP
Gearbox	Vertical mount 90° with Smooth Input with 1/2" shear bolt (Grade 2); tapered spline output with hub. 540 rpm PTO Driven Gearbox ratio: 1:1:93 Cast Iron Housing		Vertical mount 90° with Smooth Input with 1/2" shear bolt (Grade 2); tapered spline output with hub. 540 rpm PTO Driven Gearbox ratio: 1:1:47 Cast Iron Housing		Vertical mount 90° with Smooth Input with 1/2" shear bolt (Grade 2); tapered spline output with hub. 540 rpm PTO Driven Gearbox ratio: 1:1:47 Cast Iron Housing	
Gearbox Oil	SAE 85W-140EP Oil Capacity 23 Oz (.68 Liters)		SAE 85W-140EP Oil Capacity 23 Oz (.68 Liters)		SAE 85W-140EP Oil Capacity 23 Oz (.68 Liters)	
Cutting Height	1-3/4" - 12"					
Cutting Capacity	Grass, weeds and light brush not exceeding 1" dia.					
Safety Guards	Protects against flying object hazards. Rubber (Front and Rear) or Optional Chain Guard (Front and Rear).					
Skids	Provides sidewall reinforcement and full protection to bottom sidewall. 1/4" x 2" weld on.					
Stump Jumper	Allows mower to slide over obstructions while protecting the gearbox output shaft. Oval Pan 1/4" thickness					
Driveline Safety Protection	Shielded Series 4 PTO Shaft 28" with 1/2" Shear Pin Grade 2 with Snap Ring (uses #2 Grade Bolt)		Shielded Series 4 PTO Shaft 32" with 1/2" Shear Pin Grade 2 with Snap Ring (uses #2 Grade Bolt).		Shielded Series 4 PTO Shaft 36" with 1/2" Shear Pin Grade 2 with Snap Ring (uses #2 Grade Bolt).	
Tail-Wheel	4" x 8" x 15" Laminated Tire					
Heavy Duty Spindle on Tail-Wheel	1-1/2" Spindle gives the strength to protect tail-wheel assembly.					
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE!						

Section 5: Specifications



RMX MODEL SPECIFICATIONS

	RMX500	RMX600
Working Width	60"	72"
Overall Width	67"	79"
Overall Length <i>(Including Tail-Wheel)</i>	94"	107"
Weight (with Front Guard)	570 lbs	729 lbs
High Blade Speed Tip FPM (Feet Per Minute)	Ensures a clean cut.	
	12,469 FPM	14,963 FPM
Blades Heat Treated Alloy Steel - Free Swing Blades 1-1/2" Bolt and Nut	1/2" x 3 1/2" x 22" Heat Treated Alloy Steel - Free swing blades	
Deck Height <i>(underside of deck to bottom of skid)</i>	8 3/8"	
Deck Material Thickness	10 Gauge	
Deck Design	Fully welded for additional strength. Shaped to discharge grass more effectively than other models.	
Minimum Horsepower Rating	Minimum 25 HP	Maximum 40 HP
	Minimum 40 HP	Maximum 65 HP
Gearbox	Vertical mount 90° with Spline Input and tapered Spline Output with hub. 540 rpm PTO Driven Gearbox 1:1:47 Cast Iron Housing	Vertical mount 90° with Spline Input and tapered Spline output with hub. 540 rpm PTO Driven Gearbox 1:1:46 Cast Iron Housing
Gearbox Oil	SAE 85W-140EP Oil Capacity 23 Oz (.68 Liters)	SAE 85W-140EP Oil Capacity 33 Oz (.90 Liters)
Cutting Height	1-3/4" - 12"	
Cutting Capacity	Grass, weeds and brush not to exceed 1" dia.	
Safety Guards	Protects against flying object hazards. Rubber (Front and Rear) or Optional Chain Guard (Front and Rear).	
Skids	Provides sidewall reinforcement and full protection to bottom sidewall. 3/8" x 2" weld on.	
Stump Jumper	Allows mower to slide over obstructions while protecting the gearbox output shaft. Oval Pan 1/4" thickness.	
Driveline	Slip clutch driveline offers convenience for continual work.	
Driveline Safety Protection	Shielded Series 4 PTO Driveline Shaft 29" with 1-3/8" 6-Spline and 2– Disk Slip Clutch	Shielded Series 5 PTO Driveline Shaft 34" with 1-3/8" 6-Spline and 2– Disk Slip Clutch
Tail-Wheel	4" x 8" x 15" Laminated Tire.	
Heavy Duty Spindle on Tail-Wheel	1-1/2" Spindle gives the strength to protect tail-wheel assembly.	
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE!		

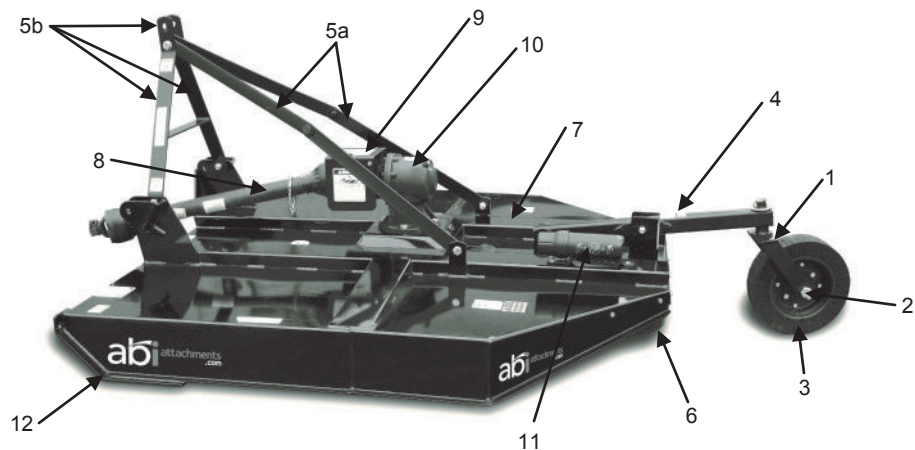
Section 5: Specifications



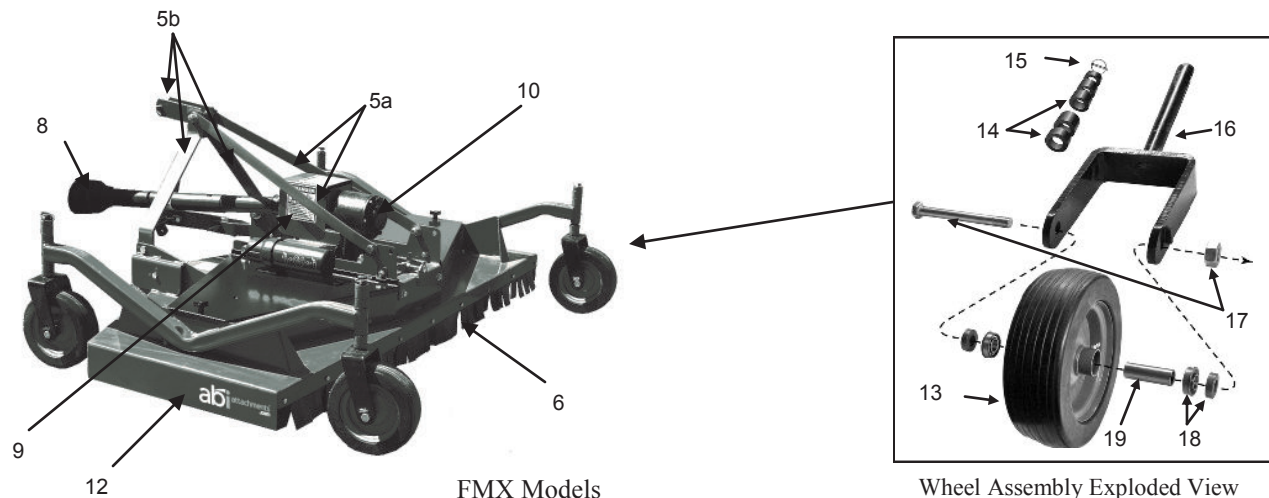
RMH MODEL SPECIFICATIONS

	RMH 700	RMH 700D
Working Width	84"	84"
Overall Width	92"	92"
Overall Length (Including Tail-Wheel)	128"	129"
Weight (with Front Guard)	1565 lbs	1605 lbs
High Blade Speed Tip FPM (Feet Per Minute)	Ensures a clean cut	
	14,369 FPM	
Blades	1/2"x4" Heat Treated Alloy Steel - Free swing blades 1-1/2" Bolt and Nut	
Deck Height (bottom of deck to bottom of skid)	8 1/2"	8 1/2"
Deck Material Thickness	3/16"	3/16"
Deck Design	Fully welded for additional strength. Shaped to discharge grass more effectively than other models.	
Minimum Horsepower Rating	Minimum 60 HP	Maximum 120 HP
Gearbox	Vertical mount 90° with 1-3/8" Spline Input and tapered spline output with hub. 540 rpm PTO Driven Gearbox 1:1.21:Cast Iron Housing	
Gearbox Oil	SAE 85W-140EP Oil Capacity 62 Oz (1.8 Liters)	
Cutting Height	1-3/4" to 12"	1-3/4" to 12"
Cutting Capacity	Commercial—Heavy Brush and grass, cuts up to 3" in thickness.	Commercial—Heavy Brush and grass, cuts up to 3" in thickness.
Safety Guards	Protects against flying object hazards. Chain Guard (Front and Back)	
Skids	Replaceable side wear skid plates. Provides sidewall reinforcement and full protection to bottom sidewall with a bolt on Abrasion Resisting "AR" Wear Form 400 Skid.	
Stump Jumper	Allows mower to slide over obstructions while protecting the gearbox output shaft. Oval Pan 1/4" thickness.	
Driveline	Shielded Series 6 PTO Shaft 40" with 4 – Disk Slip Clutch	Shielded Series 6 PTO Shaft 40" with 4 – Disk Slip Clutch
Tail-Wheel	4" x 8" x 15" Laminated Tire, Cast Iron Hub.	2 — 4" x 8" x 15" Laminated Tire, Cast Iron Hub.
Heavy Duty Spindle on Tail-Wheel	2" Spindle gives the strength to protect tail-wheel assembly.	2" Spindle for each wheel gives the strength to protect tail-wheel assemblies.
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE!		

Section 6: Components



RMS, RMX and RMH Models



FMX Models

Wheel Assembly Exploded View

Ref No.	Description	Ref No.	Description
1	Wheel Fork Assembly	10	Gearbox
2	Wheel Hub Assembly	11	Document Canister
3	Tire with Rim	12	Skids
4	Tail A-Frame Assembly	13	Solid Rubber Tires with Rim
5	3-Point A-Frame Assembly 5a—3-Point Front Stabilizer Arms 5b—3-Point Center Yoke, Yoke Pins & center Point Arms	14	Wheel Assembly Adjustment Gauges 2 - 1 in. gauges 3 - 1/2 in. gauges
6a	2-Ply Rubber Guarding (standard on FMX, RMS and RMX)	15	Clevis Pin
7	Deck	16	Wheel Assembly Yoke
8	PTO Drivelines with Outer Shielding: FMX —Driveline with Shear Bolt & Push-Pin Coupling RMS —Driveline with Shear Bolt and Snap Ring RMX —Driveline with 2-Plate Slip Clutch RMH —Driveline with 4-Plate Slip Clutch	17	1/2" Bolt & Nut
9	Gearbox Shield	18	2 - Wheel Bearings 2 - Spacers
10		19	Axle sleeve
RMS, RMX & RMH —Mower Blades with bolt and Stump Jumpers are not shown			
FMX mower blades with spindles, belt and bolts are not shown.			

Section 6: Components

DECALS

Part No.	Description	Quantity	FMX500	FMX600	RMS400	RMS500	RMS600	RMX500	RMX600	RMH700
D125	Notice of Alteration/Modification Decal	1	*	*	*	*	*	*	*	*
D201	Warning Pinch Point Decals (Pkg 4)	4	*	*	*	*	*	*	*	*
D225	Warning No Riders Decals	2	*	*	*	*	*	*	*	*
D232	Decal Sheet containing D133 - Rotating Driveline Hazard Decal (1) D400 - Lubricate Gearbox Decal (1) D402 - Skull & Cross Bones Decal (1) M100 - To Prevent Serious Injury or Death Decal (1) M400 - Rotating Blades-Keep Away Decals (2) M600 - Thrown Object Hazard Decals (2)	1	*	*	*	*	*	*	*	*
D401	Danger - Thrown Object Hazard Decals (2)	2	*	*	*	*	*	*	*	*
D402	Skull and Crossbones	1	*	*	*	*	*	*	*	*
DSMALLabi	abi Logo Decal (Not Shown)	2	*	*	*	*	*	*	*	*
DTINYabi	abi Logo Decal (Not Shown)	1	*	*	*	*	*	*	*	*



D125



D201



D225



D133



D400



M100



D401



M400



D402



M600

Mower Troubleshooting

<u>Problem</u>	<u>Probable Cause</u>	<u>Remedy</u>
Mower Vibration	<ul style="list-style-type: none"> *Mower not being operated at rated 540 RPM speed. *Possible build up of material on blade spool. *Bent or Broken Blade. *Blades unequal weight 	<ul style="list-style-type: none"> *Set tractor throttle for proper PTO speed. *Clean blade spool. *Replace blades, refer to page 22. *Replace blades, refer to page 22.
Noisy Mower	<ul style="list-style-type: none"> *Loose components. *Low oil in gearbox. 	<ul style="list-style-type: none"> *Check all bolts for tightness. *Check PTO clearances with Tractor drawbar, etc.
Mower Will Not Cut	<ul style="list-style-type: none"> *Slip Clutch Slipping. 	Adjust slip clutch according to instructions on page 15.
Clippings Discharges From Mower Along Sides or Unevenly	<ul style="list-style-type: none"> *Grass Too High or Dense. *Wet Grass. *Rear of mower too low, trapping clippings under mower. 	<ul style="list-style-type: none"> *Reduce ground speed but maintain 540 RPM at tractor PTO, OR *Make two passes- raise mower cutting height for first pass and lower to desired cutting height for second pass. *Allow grass to dry before mowing. Slow ground speed but maintain tractor RPM 540. Cutting lower will help. *Refer to page 15 for leveling & adjusting cutting height.
Uneven Cut	<ul style="list-style-type: none"> *Mower not level side to side or incorrect deck tilt. *Possible build-up of clippings under mower. *Worn or bent blades. *Excessive ground speed. 	<ul style="list-style-type: none"> *Refer to page 13 for leveling deck. *Clean mower. *Replace blades, refer to page 22. *Reduce ground speed.
Rapid Blade Wear (Cutting Edge)	<ul style="list-style-type: none"> *Blade contacting ground. 	<ul style="list-style-type: none"> *Adjust mower to operate at height that will eliminate ground contact.
Rapid Blade Wear (Bolt Hole)	<ul style="list-style-type: none"> *Mower not operating at rated 540 RPM Speed. *Too much ground speed. 	<ul style="list-style-type: none"> *Reduce ground speed. Set tractor throttle for proper PTO Speed. *Use lower gear.

Gearbox Troubleshooting

Gearbox Overheating	<ul style="list-style-type: none"> *Low on lubricant. *Improper type of lubricant. *Excessive trash build-up around gearbox. 	<ul style="list-style-type: none"> *Fill to proper level. *Replace with proper lubricant. *Remove Trash.
Gearbox Noisy	<ul style="list-style-type: none"> *Rough Gears. *Worn Bearings. *Low oil in gearbox. *May be normal when new. 	<ul style="list-style-type: none"> *Run-in or change gears. *Replace bearing. *Check level and add oil. *Allow for initial break-in.
Gearbox Leaking	<ul style="list-style-type: none"> *Damaged oil seal. *Bent shaft. *Shaft rough in oil seal area. *Oil seal installed wrong. *Oil seal not sealing in housing. *Oil level too high. *Gasket damaged. *Bolts loose. *Improper type of lubricant. 	<ul style="list-style-type: none"> *Replace seal. *Replace oil seal and shaft. *Replace or repair shaft. *Replace seal. *Replace seal or use a sealant on outside diameter of seal. *Drain oil to proper level. *Replace gasket. *Tighten bolts. *Replace with proper lubricant.

Drivelines Troubleshooting

<u>Problem</u>	<u>Probable Cause</u>	<u>Remedy</u>
Wear of Yoke Ears	*Clean Excessive Working Angle.	*Reduce working angle. *Make wide turns when possible. *Tight turns - disengage PTO and raise mower into transport position.
Bent/Twisted Yoke Ears	*Excessive Torque Peak or Shock Load.	*Avoid overloading and engaging drive under load *Check PTO clearances with Tractor drawbar, etc.
Cross Arms Broken	*Excessive Torque Peak or Shock Load.	*Avoid overloading and engaging drive under load.
Accelerated Wear of Cross Arms	*Excessive Load.	*Do not exceed the speed or power limits indicated in this manual. *Insufficient Lubrication.
Separated Telescoping Tubes	*Excessive Extension of Driveline.	*Avoid excessive extension of driveline. *Check extension of drawbar hitch according to this manual.
Deformation of Telescoping Tubes	*Excessive Torque Peak or Shock Load.	*Avoid overloading and engaging drive under load. *Check function of torque limiter. *Check that driveline does not come into contact with tractor or implement components during movements.
Accelerated Wear of Telescoping Tubes	*Insufficient Lubrication.	*Follow maintenance instructions on page 22. *Insufficient Tube Overlap - Refer to Driveline Installation, pages 11-13.
Accelerated Wear of Shield Bearing	*Insufficient Lubrication.	*Follow maintenance instructions on page 22.

Product weights may vary by approximately 5%.

Maintenance Record:

Date	Part	Usage Hours	Action Taken

Limited Warranties:

Absolute Innovations, Inc. (ABI) 1320 Third Street, Osceola, IN 46561, warrants for one (1) year from the purchase date to the original non-commercial, governmental, or municipal purchaser ("Purchaser") and warrants for six (6) months to the original commercial or industrial purchaser ("Purchaser") that the product purchased are free from defects in material or workmanship. ABI will replace or repair, free of charge to the original purchaser any part(s) found, upon examination at our factory, to be defective under normal use and service due to defects in material or workmanship, provided that the original purchaser:

- a. Notifies ABI in writing of any defect in material or workmanship within the above specified warranty period.
- b. Returns must be routed through an authorized ABI dealer or distributor from whom the purchase was made.
- c. Purchaser is responsible for cost of shipping.

In no event will ABI be held liable under this warranty unless written notice is received and failure must have occurred within the warranty period. Genuine ABI replacement parts and components will be warranted for 90 days from date of purchase, or the remainder of the original equipment warranty period, whichever is longer.

This limited warranty does not apply to any part of the product which has been subjected to improper or unintended use, negligence, alteration, modification, or accident, damaged due to lack of maintenance or use of wrong oil or lubricants, or repairs that have been made with parts other than those obtainable through ABI Innovations, or which has served its usual life. This limited warranty does not apply to any expendable item such as blades, shields, guards, or pneumatic tires, or other trade accessories since these items are warranted separately by their respective manufacturers, except as specifically noted in your Operator's Manual.

Except as provided herein, no employee, agent, Dealer, or other person is authorized to give any warranties of any nature on behalf of ABI. Only ABI Innovations is authorized to make any representation to the purchaser concerning "normal" use and service for its product as described in the Operator's Manual, or in authorized printed materials or stickers affixed to the product.

If after examination of the product and/or part(s) in question; ABI finds them to be defective under standard use and service due to defects in material or workmanship,

ABI will:

1. Repair or replace the defective product or part(s); if ABI has made several reasonable number of attempts in repairing the product and/or part(s) to conform to the warranty; then
2. ABI will replace part(s) or product.
3. Purchaser is responsible for any labor charges exceeding a reasonable amount as determined by ABI and for returning product and/or part(s) to the Dealer, whether or not the claim is approved. Purchaser is responsible for the transportation cost for the product or part(s) from the Dealer to the factory.

The choice of remedy shall belong to ABI Innovations. Repair or replacement are the only remedies against ABI under this limited warranty.

Limitation of Liability:

1. ABI disclaims any express (except as set forth herein) and implied warranties with respect to the product including, but not limited to, merchantability and fitness for a particular purpose.
2. ABI makes no warranty as to the design, capability, capacity, or suitability for use of the product.
3. This warranty shall not be interpreted to render us liable for injury or damages of any kind or nature to person or property. ABI will not be liable for any special, incidental or consequential damages based upon breach of warranty, breach of contract, negligence, strict tort liability, or any other legal theory. Such damages include but are not limited to loss of crops, loss of savings or revenue, cost of capital, loss of use of equipment, facilities or services, down time, expense or loss incurred for labor, supplies, substitute machinery, rental, and claims of third parties including customers, and injury to property.

Supplementary:

1. Proper venue for any lawsuits arising from or related to this limited warranty shall be only in St. Joseph County, Indiana.
2. ABI may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.
3. If any provision of this limited warranty violates any applicable law and is held unenforceable, then the invalidity of such provision shall not invalidate any other provisions.
4. Applicable law may provide rights and benefits to purchaser in addition to those herein.

References

- ¹Sentry Insurance, FEMA, *Owner's and Operators Manuals for Farm Equipment*, Sentry Insurance, Stevens Point, WI, revised Management Bulletin No. 112, 90-42; March 2007, pp S-2.
- ² Sentry Insurance, FEMA, *Safety Signs for Farm Equipment*, Sentry Insurance, Stevens Point, WI, 90-34, October 2006, pgs 1-20.
- ³American Society of Agricultural and Biological Engineers, ASABE, *Three-Point Free-Link Attachment for Hitching Implements*, ASAE S217.12 DEC2001 (ISO 730-1:1994) (R2007), Printed ASABE, St. Joseph, MO. pgs 1-10.
- ⁴International Standardization Organization (ISO), ISO 11684, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Safety Signs and hazard pictorials - General purpose*, Printed in Switzerland, ISO 11684:1995(E),
- ⁵ International Standardization Organization (ISO), ISO 17101, *Agricultural machinery - Rotary and Flail mowers - Thrown-object test and acceptance*, Printed in Switzerland, ISO 17101:2004(E),
- ⁶ Occupational Safety and Health Administration (OSHA), *Safety for Agricultural Equipment*, 29 CFR 1928.57, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10958.
- ⁷Tractor and Machinery Association of Australia (TMA), *OHS Guidelines For Agricultural Machinery*, Maddock Lonie & Chisholm, Melbourne Victoria, Australia, Fourth Edition, 2003, pgs 1-57.

Suggested References

abi assumes no liability for the use or misuse of information provided in the following references:

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<http://www.nasdonline.org/document/905/d000745/power-take-off-pto-safety.html>

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<http://www.admausa.com/ptoGuardDamage6.asp>

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<http://www.farmsafety.ca/pages/pages/manuals-dwnld.html>