



# *The Articulator*

## Owner's Manual

---

**WZ400 series**

**G3873**

---

*Manual number: MWZ400G3873  
For WZ400G3873 owners beginning with serial number 67970420*



**WARNING! Read and understand this manual before using this machine.**

## California

### Proposition 65 Warning



**WARNING:** Breathing gas/diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and/or birth defects or other reproductive harm.

Always start and operate the engine in a well-ventilated area.

If in an enclosed area, vent the exhaust to the outside.

Do not modify or tamper with the exhaust system.

Do not idle the engine except as necessary.

For more information go to [www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).

© **Lastec, 2023**

Printed in the United States of America, all rights reserved. No part of this manual may be reproduced in any form by any photographic, electronic, mechanical or other means or used in any information storage and retrieval system without written permission from

**Lastec, LLC**

**8180 W. 10th Street**

**Indianapolis, IN 46214**

**Phone (317) 892-4444, (800) 515-6798**

**[www.lastec.com](http://www.lastec.com)**

# Table of Contents

# Section-Page

<b>SECTION 1</b>	<b>TO THE OWNER</b>	<b>1-1</b>
1.1	Read This Manual BEFORE Operating .....	1-1
1.2	Product Registration .....	1-1
1.3	Warranty Registration .....	1-1
1.4	If You Need To Order Parts .....	1-1
1.5	Servicing The Lastec Mower.....	1-2
1.6	2020 PRODUCT WARRANTY .....	1-2
1.7	Component Manufacturers' Warranties .....	1-3
<b>SECTION 2</b>	<b>SAFETY INFORMATION</b>	<b>2-1</b>
2.1	Safety Symbols.....	2-1
2.2	About This Section.....	2-1
2.3	Safety Guards And Covers .....	2-2
2.4	Pre-operational Safety Rules .....	2-2
2.5	Personal Protection Equipment .....	2-2
2.6	Operational Safety Rules.....	2-2
2.7	Maintenance Safety Rules .....	2-3
2.8	Storage Safety Rules.....	2-4
2.9	Use Caution When Working With Batteries .....	2-5
2.10	Safe Booster Cable Operation .....	2-5
2.11	Safety Decals and Symbols .....	2-6
2.12	Hazard Identified Chart.....	2-7
<b>SECTION 3</b>	<b>INITIAL SET-UP</b>	<b>3-1</b>
3.1	Assembly .....	3-1
3.2	Parking Brake .....	3-1
3.3	Fuel .....	3-1
3.4	Operator Seat Pan .....	3-1
3.5	Engine Oil.....	3-2
3.6	Air Cleaner .....	3-2
3.7	Hydraulic Fluid.....	3-3
3.8	Hydrostatic Pump Adjustment .....	3-3
3.9	Towing (Hydrostatic Pump Release).....	3-4
3.10	Hydrostatic Pump Belt .....	3-4
3.11	Mower Deck Drive Belt .....	3-5
3.12	Deck Belt.....	3-5
3.13	Weight Transfer Springs.....	3-6
3.14	Blades .....	3-6
3.15	Operator Seat .....	3-6
3.16	Steering Control Arms.....	3-6
3.17	Mower Deck Height .....	3-7
3.18	Mower Deck Height Calibration .....	3-7
3.19	Tires and Wheels .....	3-9
3.20	General Inspection.....	3-9
3.21	Engine.....	3-9
3.22	Hour Meter .....	3-10
3.23	Maintenance Checklists.....	3-10

# Table of Contents

# Section-Page

<b>SECTION 4</b>	<b>OPERATING PROCEDURES</b>	<b>4-1</b>
4.1	Starting The Engine.....	4-1
4.2	Stopping The Engine.....	4-1
4.3	Motion Control.....	4-1
4.4	Recommended Blades.....	4-2
4.5	Ground Speed.....	4-3
4.6	Mower Deck Operation.....	4-3
4.7	Mule Pulley Adjustment.....	4-4
4.8	Anti-Scalp Wheel Adjustment.....	4-4
<b>SECTION 5</b>	<b>MAINTENANCE</b>	<b>5-1</b>
5.1	Maintenance.....	5-1
5.2	Every 8 Operating Hours or Daily.....	5-1
5.3	First 25 Operating Hours.....	5-1
5.4	First 50 Operating Hours.....	5-1
5.5	Every 50 Operating Hours.....	5-2
5.6	Every 100 Operating Hours.....	5-2
5.7	Every 200 Operating Hours.....	5-2
5.8	Every 400 Operating Hours.....	5-2
5.9	Every 500 Hours.....	5-2
5.10	Annual.....	5-2
5.11	Bi-Annual.....	5-2
5.12	Maintenance Schedule.....	5-3
5.13	Lubrication Points and Deck Belt Routing.....	5-4
5.14	Urethane Bushings.....	5-4
5.15	Hydraulic System Diagram (3873C ).....	5-6
5.16	Electrical Information.....	5-7
6.1	Lastec 3873 Mower Specifications.....	6-1
<b>SECTION 7</b>	<b>ENGINE FAULT CODE</b>	<b>7-1</b>

## SECTION 1 TO THE OWNER

### 1.1 Read This Manual BEFORE Operating



Do not allow anyone to operate the Lastec Mower without first reading and understanding this operator's manual in its entirety. Do not allow non-essential personnel, especially children, to operate the Lastec Mower. Do not operate the Lastec Mower when non-essential personnel, especially children, are present.

This information prepares you to operate the Lastec Mower in a safe and knowledgeable manner, providing a safer working environment, and promoting higher quality, more efficient results.

This manual is to assist you in properly and safely operating and maintaining the mower. Read and understand this entire manual before attempting to set-up, operate, adjust, perform any maintenance on, or store the mower.

Keep this manual at hand at all times for ready reference.

### 1.2 Product Registration

Immediately record the model and serial numbers of your Lastec Mower in the spaces provided below.

**Model Number:** \_\_\_\_\_

**Serial Number:** \_\_\_\_\_

These numbers can be found on the serial number plate/decal which is permanently affixed to the mower.

You should now fill out the warranty registration form online at [www.lastec.com](http://www.lastec.com). This form must be completed and returned to the factory within fifteen (15) days of purchase in order to validate the warranty. Please do not hesitate.

### 1.3 Warranty Registration

Complete the following Lastec Warranty Registration Form and return to Lastec within 15 days of the purchase of the Lastec Mower. This will aid you, Lastec, and Lastec distributor in warranting and servicing of your Lastec Mower.

Warranty registration can be done online through the Lastec website at [www.lastec.com](http://www.lastec.com). (See Figure 1-1.) If you have difficulties accessing or filling out your registration form, your Lastec representative can assist you.

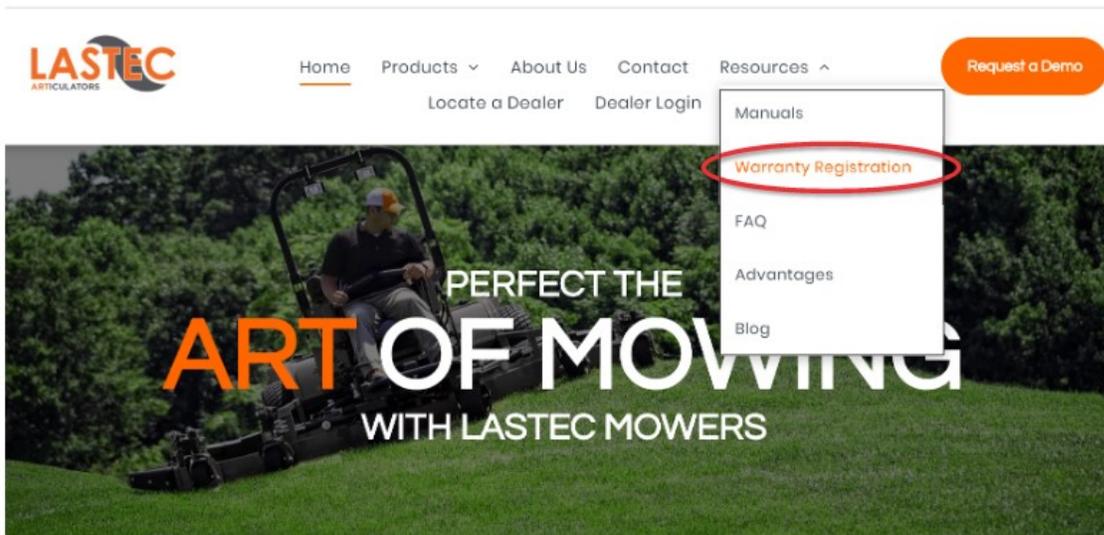


FIG. 1-1

### 1.4 If You Need To Order Parts

To order parts, contact your distributor. Be sure to have your model and serial number available as a reference. This will assist them in supplying you the correct and most current parts available for your Lastec Mower.

**NOTE:** Use only genuine Lastec parts when servicing your Lastec Mower. Use of substitute parts may cause unsafe operation, unsatisfactory performance, and void the warranty of your Lastec Mower.

## 1.5 Servicing The Lastec Mower

The Lastec Mower is carefully engineered and manufactured to provide safe, dependable, and satisfactory service. As with all other mechanical equipment, the Lastec Mower requires routine inspection, cleaning and maintenance.

When servicing the Lastec Mower, be sure to use only genuine Lastec parts. Utilization of substitute parts will not only void the warranty, but may also cause unsafe or unsatisfactory operation of the Lastec Mower due to their substandard quality or incorrect application.

In order to handle all of your service needs, your authorized Lastec dealer stocks genuine Lastec parts, and has trained mechanics on hand.

## 1.6 2020 PRODUCT WARRANTY

Wood-Mizer, LLC, DBA Lastec (Lastec), “Warrantor”, with its place of business at 8180 West 10th Street, Indianapolis, IN 46214 warrants as stated herein to the original purchaser (“purchaser”) for two (2) years or 2000 hours of equipment use, whichever comes first, on parts and one (1) year of labor for equipment use from the date of purchase from Lastec (“warrantor”), that the equipment manufactured by warrantor and any optional equipment or accessories purchased at the same time, subject to the exclusions herein, will be free from defects in material and workmanship attributable to warrantor so long as it is operated and maintained in accordance with the instructions provided by warrantor and purchaser has completed the registration form or warrantor may choose to not honor any warranty claims. Limited lifetime urethane bushing and bushing hardware warranty.

### 90 DAY LIMITED WARRANTY

Warrantor agrees to replace any defective wear components including but not limited to seals, bearings, idlers with bearings, wheels/tires, bushings and blades for ninety (90) days from date of purchase. After ninety (90) days, all wear components are no longer covered under further warranty from warrantor. (Component failure as a result of improper maintenance of wear items may not be covered under warranty at the warrantor’s discretion. I.E. improper cleaning/lubrication practices) After ninety (90) days, component failure as a result of loose hardware is no longer covered under further warranty from warrantor.

Warrantor agrees to warranty for a period of ninety (90) days from date of purchase to any original purchaser who is a rental yard, lease-based business or temporary use facility that the equipment manufactured by warrantor and any optional equipment or accessories purchased at the same time will be free from defects in material and workmanship attributable to warrantor so long as it is operated and maintained in accordance with instructions provided by warrantor. After ninety (90) days, no further warranty will exist for rental yard, lease-based or temporary use businesses or facilities.

### FREIGHT ALLOWANCE

Freight allowance for warranty – expedited freight covered by warrantor in “mower down” situations for first year of warranty not to include wear items as listed above in the (90) day limited warranty. After the first year freight for warranty items would be limited to regular ground shipment at the discretion of the warrantor.

### WARRANTOR’S OBLIGATIONS AS TO DEFECTS

Warrantor’s only responsibility shall be to replace any covered defects or repairs without cost to purchaser. Warrantor may request that such part or unit be returned to Warrantor’s place of business. Purchaser will be responsible for transportation or shipping of part or unit to the distributor and such part must be returned to distributor within fifteen (15) days after requested. Warrantor shall have a reasonable time within which to replace or repair defective part or unit. If warrantor determines that the part or unit is not defective under the terms of this warranty, then purchaser shall be responsible for expenses incurred by warrantor in returning part or unit to original purchaser. Warrantor gives no allowance for labor, travel time, mileage or incidental or consequential damages. Purchaser must submit warranty claims to a distributorship authorized by Warrantor. Warrantor’s authorized distributors are responsible for all repairs and the processing of all warranty claims.

### WARRANTY PARTS RETURN

Lastec reserves the right to have parts returned that have been submitted for warranty. The service department will issue an RMA number. The part must be returned within 30 days of the requested return date. Parts not returned within 30 days of the RMA issue date will result in rejection of claim.

### LIMITATIONS AND DISCLAIMERS OF OTHER WARRANTIES

EXCEPT FOR THE EXPRESS WARRANTY PROVISIONS STATED ABOVE, WARRANTOR DISCLAIMS ALL WARRANTIES, EXPRESS AND/OR IMPLIED, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

No representation or other affirmation of fact by representatives of warrantor, whether verbal or in writing, including photographs, brochures, samples, models, or other sales aids, shall constitute a warranty or other basis for any legal action against warrantor. THE ORIGINAL PURCHASER, ANY PERSONS TO WHOM THIS EQUIPMENT IS TRANSFERRED AND ANY INTENDED USER OR BENEFICIARY OF THIS EQUIPMENT SHALL NOT BE ENTITLED TO RE-COVER ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FROM WARRANTOR FOR ANY REASON WHATSOEVER, INCLUDING WARRANTY OR DEFECT IN THE PRODUCT. Warrantor does not warrant that its equipment meets or complies with the requirements of a particular safety code or governmental requirements.

## **DESIGN CHANGES**

Warrantor reserves the right to change the design of its products from time to time without notice and without obligation to make corresponding changes in its products previously manufactured.

## **RIGHTS OF PURCHASER**

The validity and effect of this limited warranty as well as its interpretation, operation and effect, shall be determined exclusively by the principles of law and equity of the State of Indiana. This limited warranty gives purchaser specific legal rights. Purchaser may also have other rights, which may vary from State to State. Some States may not allow limitations as to duration of warranties so the above may not apply.

This contract supersedes all prior written and oral agreements related to the purchase and is intended to be an integration of the entire agreement between the parties. All of the promises, warranties, guarantees and representations made by warrantor or its representatives that are not specifically contained herein are not included in this warranty.

## **1.7 Component Manufacturers' Warranties**

Some of the component parts of your Lastec Mower are warranted by their respective manufacturers. These parts include:

- Engine
- Clutch
- Hydraulic pumps
- Battery

The complete manufacturers' warranty information for these components is available upon request. Contact your Lastec dealer if you have questions concerning warranties on these component parts.

## SECTION 2 SAFETY INFORMATION

### 2.1 Safety Symbols

The following symbols and signal words call your attention to instructions concerning your personal safety. Be sure to observe and follow these instructions.



**DANGER!** indicates an imminently hazardous situation which, if not avoided, will result in serious injury or death.



**WARNING!** suggests a potentially hazardous situation which, if not avoided, could result in serious injury or death.



**CAUTION!** refers to potentially hazardous situations which, if not avoided, may result in minor or moderate injury or damage to equipment.

**NOTICE** indicates vital information.

The above illustrated symbols are displayed throughout this manual in order to indicate important safety information. When one of these symbols appears in this manual, be aware of a potential hazard being discussed in the accompanying paragraphs. Hazards such as damage to equipment, serious personal injury, or even fatal injury are possible, perhaps even likely, if the accompanying instructions or procedures are not heeded.

#### OWNER'S RESPONSIBILITY

The procedures listed in this manual may not include all ANSI, OSHA, or locally required safety procedures. It is the **owner/operator's responsibility** and not Lastec to ensure all operators are properly trained and informed of all safety protocols. Owner/Operators are responsible for following all safety procedures when operating and performing maintenance to the Lastec Mower.

### 2.2 About This Section



**WARNING!** Read this manual and all manuals of any related equipment in their entirety.

**NOTICE** Right and left are determined facing in the direction of forward travel.

Blade rotation is clockwise as viewed from the top of the deck.



The purpose of this manual is to assist you in properly and safely operating and maintaining the mower. **Read and understand this entire manual** before attempting to set-up, operate, adjust, perform any maintenance on, or store the mower. This manual provides essential information and instructions which will help you enjoy years of dependable performance from the mower.

The safety of the mower is dependent upon operating within the parameters explained in this manual. Follow all safety rules for this mower and all related equipment.

Although these instructions have been compiled through field experience and engineering data, some information presented herein may be general in nature due to varying operating conditions. It is up to the operator to develop procedures suitable to your particular cutting application.

**NOTE:** The illustrations and data used in this manual were current at the time of printing, but the mower may vary slightly due to ongoing engineering changes. Lastec reserves the right to implement engineering and design changes to the mower as may be necessary without prior notification.

## 2.3 Safety Guards And Covers

 **WARNING!** Do not operate the mower with any safety covers removed.  
Follow all safety rules.

**NOTICE** Some illustrations in this manual show the mower with safety covers removed in order to provide improved viewing of the particular components being discussed. *This is for informational purposes only -- Do not operate the mower without all covers, shields, safety devices, and grass chute or mulching plate installed and secure.*

Safety is a primary concern in the design and manufacture of all Lastec products. Unfortunately, our extensive efforts to provide safe equipment can be negated by a single careless act of an operator. In addition to the design of the mower, accident prevention is dependent upon the awareness and proper training of all personnel involved in the operation, transportation, maintenance, and storage of the mower.

***The best safety device is an informed, careful operator.***

**We ask you to be that kind of operator.**

## 2.4 Pre-operational Safety Rules

 **WARNING!** Do not allow non-essential personnel, especially children, on or near the mower.  
Do not operate the mower when non-essential personnel, especially children, are present.  
Clear area of all personnel before operating the mower.  
Do not allow anyone to operate the mower without proper instruction.  
Know how to stop the mower quickly in an emergency.

## 2.5 Personal Protection Equipment

 **WARNING!** Wear eye and hearing protection.  
Wear close-fitting clothing to avoid entanglement in moving parts.  
Do not operate the mower or related equipment in bare feet, sandals, or sneakers: wear sturdy rough-soled work shoes.  
Clear the cut area of stones, branches, balls or other debris that may be thrown.  
Do not operate with ROPS in the folded position.



 **CAUTION!** Verify that all safety decals are properly installed, visible, and intelligible.  
Remove accumulated debris, fuel, or excess grease and oil from your Lastec Mower engine area to avoid a fire hazard.  
Perform the pre-operation equipment inspection and the appropriate maintenance schedule before operating your Lastec Mower.  
Do **not** change the engine governor settings or over-speed the engine.

## 2.6 Operational Safety Rules

 **DANGER!** Stay clear of blades during operation.  
Stay clear of all moving parts.



**DANGER!** Handle fuel with care to avoid fire or explosion:



use approved fuel containers;  
do not handle fuel near an open flame;  
do not use fuel as a solvent;  
do not fuel the drive unit while the engine is running  
do not fuel the drive unit while the engine is hot;  
do not fuel the mower indoors;  
do not fuel while sitting on drive unit;  
clean up any spilled fuel;  
do not smoke around fuel or while fueling;  
do not open fill cap on sloped ground  
refuel on level ground only; and  
do not fill beyond recommended levels indicated on mower.

Never leave running mower unattended on sloped ground.

Operate only in daylight or good artificial light.

Wear [\*Personal Protection Equipment\*](#) when operating the Lastec Mower.

Ensure that the parking brake is set and blades disengaged before attempting to start the engine.

Do not operate the mower without the grass chute or mulching plate installed and secure.

Do not operate the mower unless all covers, shields, and safety devices are installed and secure.

Do not permit any person other than the operator to ride or board the drive unit or mower at any time.

Do not allow anyone near the mower while operating.

Do not allow anyone near or in the path of discharge.

Do not discharge in the direction of bystanders, vehicles, or buildings.

Do not stop or start suddenly when going up or down a hill.

Avoid operating on steep (15 degrees or higher) slopes.

Disengage the blades, stop the engine, set the parking brake, and remove the key before dismounting the drive unit or making any adjustments to the mower.

Stop the mower immediately upon striking any obstruction. Disengage the blades, turn off the engine, set the parking brake, remove the key, and inspect the mower for any damage. Repair any damage before resuming operation of the mower.

Do not adjust the mower deck height or lift the deck into transport position while the blades are engaged.

Do not engage the blades with the mower decks raised into transport position.

Do not place your hands or feet under the deck while the engine is running.

Take all possible precautions when leaving the mower unattended:  
disengage the blades,  
turn off the engine,  
set the parking brake, and  
remove the key.

Activate headlights and/or hazard lights whenever crossing or accessing any roadways, driveways, or parking lots.

Watch for oncoming traffic.



## 2.7 Maintenance Safety Rules



**DANGER!** Disengage the blades, turn off the engine, set the parking brake, and remove the key before performing any maintenance or adjustments to your Lastec Mower.

Verify that all blades are sharp, free of nicks or cracks, and securely fastened. **Immediately replace blades that show any signs of cracks.**

Do not perform maintenance on your mower when non-essential personnel, especially children, are present.

---



**CAUTION!** Verify that all safety decals are properly installed, visible, and legible.

Remove accumulated debris, fuel, or excess grease and oil from the drive unit engine area to avoid a fire hazard.

Verify that the deck is properly mounted, set up, adjusted, and in good operating condition.

Perform the pre-operation equipment inspection and the appropriate maintenance schedule (*Section 5*) before operating the mower.

Disengage the blades, turn off the engine, set the parking brake, and remove the key before performing any service to, maintenance on, or adjustments to the mower.

Do not perform maintenance on the mower when non-essential personnel, especially children, are present.

Perform the appropriate maintenance schedule(s) in a timely fashion.

Do not allow anyone near any operator controls while performing adjustments, service or maintenance to the drive unit or deck.

Use [Personal Protection Equipment](#) such as eye, hand, head, and ear protection when performing any service or maintenance to the drive unit or deck.

Keep the drive unit engine area free of accumulated debris, fuel, or excess grease and oil to reduce fire hazard.

Keep the mower in good operating condition with all safety devices in place.

Verify that all fasteners are properly installed to ensure the drive unit and deck are in safe operating condition.

Upon completing any maintenance or service function, verify that all safety guards and devices are properly installed before operating the drive unit or deck.

Verify that all warning labels and decals are properly installed, visible, and legible.

Remove all tools and waste from the maintenance area.

---

## 2.8 Storage Safety Rules



**DANGER!** Do not run the engine in an enclosed space.

Do not store equipment with fuel in the tank inside a building where fumes could reach an open flame or spark.

---



**WARNING!** Do not store the mower in any area accessible by non-essential personnel, especially children.

Lock the safety pins on the raised decks.

Allow the engine to cool before storing it in an enclosed area.

---



**CAUTION!** Remove all accumulated debris from the top and bottom of the deck before storing.

Sand chipped or scratched areas and re-paint them to prevent rust during storage.

Lubricate all moving parts of the drive unit and deck to prevent rust during storage.

## 2.9 Use Caution When Working With Batteries

 **DANGER!** Keep sparks, flames, burning cigarettes, or other ignition sources away at all times. Failure to follow this will result in serious injury or death.

 **WARNING!** Wear safety goggles and a face shield when working near batteries. Failure to follow this could result in serious injury or death.

Wash hands after handling batteries to remove possible lead, acid, or other contaminants. Failure to follow this could result in serious injury or death.

Charge the battery in a well ventilated area. Failure to follow this could result in serious injury or death.

Do not attempt to charge a frozen battery. Failure to follow this could result in serious injury or death.

### EMERGENCY TREATMENT FOR CONTACT WITH BATTERY COMPONENTS (LEAD/SULFURIC ACID) per SDS (Safety Data Sheet):

<b>EYE CONTACT</b>	<b>Sulfuric Acid and Lead:</b> Flush eyes immediately with large amounts of water for at least 15 minutes while lifting lids. Seek immediate medical attention if eyes have been exposed directly to acid.
<b>SKIN CONTACT</b>	<b>Sulfuric Acid:</b> Flush affected area(s) with large amounts of water using deluge emergency shower, if available, shower for at least 15 minutes. Remove contaminated clothing, including shoes. If symptoms persist, seek medical attention. Wash contaminated clothing before reuse. Discard contaminated shoes. <b>Lead:</b> Wash immediately with soap and water.
<b>INGESTION</b>	<b>Sulfuric Acid:</b> Administer large amounts of water. Do NOT induce vomiting or aspiration into the lungs may occur and can cause permanent injury or death; consult physician.
<b>INHALATION</b>	<b>Sulfuric Acid:</b> Remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a physician. <b>Lead:</b> Remove from exposure, gargle, wash nose and lips; consult physician.

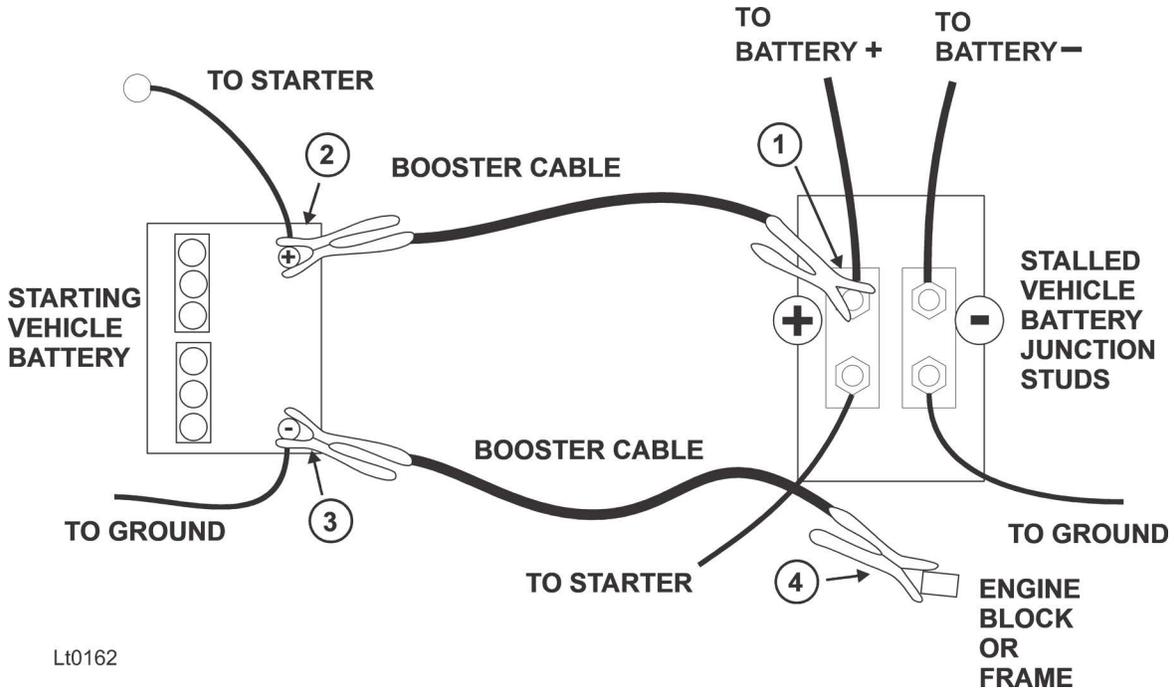
## 2.10 Safe Booster Cable Operation

 **WARNING!** Wear proper eye protection.  
Do not lean over the battery.

1. Inspect both batteries before connecting booster cables. **Do not jump start a damaged battery.**
2. Ensure vent caps are tight and level.
3. Ensure that the two vehicles are not touching and both ignition switches are turned to the OFF position.
4. Connect positive (+) booster cable to positive (+) junction studs on the inside front right side of the engine bay.
5. Connect other end of positive (+) cable to positive (+) terminal of assisting battery.
6. Connect negative (-) cable to negative (-) terminal of assisting battery.

 **WARNING!** Make final connection of negative (-) cable to engine block of stalled vehicle, away from battery.

7. Start engine and remove cables in **REVERSE** order of connections.

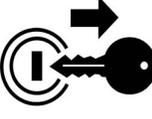
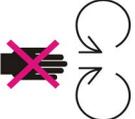


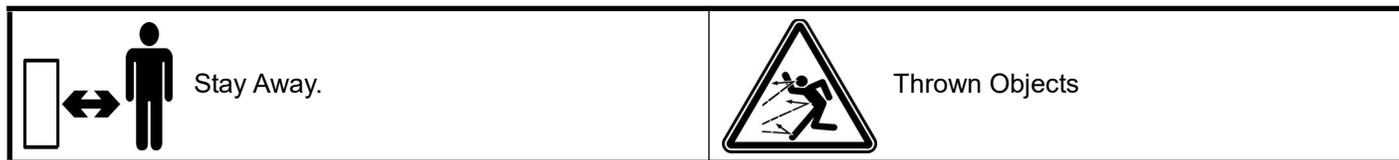
Lt0162

FIG. 2-1

## 2.11 Safety Decals and Symbols

The following safety symbols are used on your Lastec Mower. Operators should become familiar with these symbols and heed the warnings where they appear on your Lastec Mower.

	Attention.		Caution. Rotating Blades..
	Pinching/Crushing Danger.		Keep Hands and Feet Away from Blades.
	Keep Covers Locked Down		Pinch Point.
	Read the Manual.		Remove the Key.
	Rotating Parts.		Rotating Shaft.



## 2.12 Hazard Identified Chart

Hazard Identified	Risk Source	Control Measure
Operator injury	Inexperience	Complete Owner's Manual supplied covering all aspects of operating the unit. Various warning decals strategically placed on the unit.
Unit overturning, crushing operator	Operating on steep or slippery slopes	ROPS framework on the unit. Seat belts for the operator. Warning decals. Clear warning in manual.
Risk of burns to hands and fingers	Hot surfaces from operations, such as exhaust system	Warning decals. Clear warning in manual.
Burns and scalds from radiator	Hot steam or water jets from opening radiator when engine is hot	Clear warning in manual.
Danger of entanglement	Moving parts. Guards are not in place.	Warning decals stating guards must be in place. Physical guards around belts and pulleys. Clear warning in manual.
Battery explosion	Improper battery handling or jumping	Instructions on battery handling from the Battery Council International included in manuals.
Danger of dismemberment	Cutting blades	Warning decals. Clear warning in manual. Physical guards around blades. Clear prohibitions outlined in manual.
Danger of projectile strike	Ejected debris from cutting blades	Warning decals. Clear warning in manual. Physical guards around blades.
Personal injury	Persons riding as passengers	Warning decals. Clear warning in manual.
Fuel fire/explosion	Improper refueling or fuel handling	Warning decals. Clear warning in manual.
Inhalation of exhaust fumes/carbon monoxide	Extended running of engine indoors or in a poorly ventilated area	Clear warning in manual.
Finger pinch points	Moving parts	Warning decals stating hazardous locations. Physical guards around such points. Clear warning in manual.
Electrical shock	Improper battery handling or jumping	Instructions on battery handling from the Battery Council International included in manuals.

## SECTION 3 INITIAL SET-UP

### 3.1 Assembly

The Articulator comes preset from the factory and ready to mow. Should adjustments be necessary due to shipment, follow the set-up procedures listed herein.

### 3.2 Parking Brake

 **WARNING!** Set the parking brake before performing any set-up, inspection, adjustments, or maintenance to your Articulator.

The parking brake is located to the left of the operator seat, just in front of the left steering control arm.

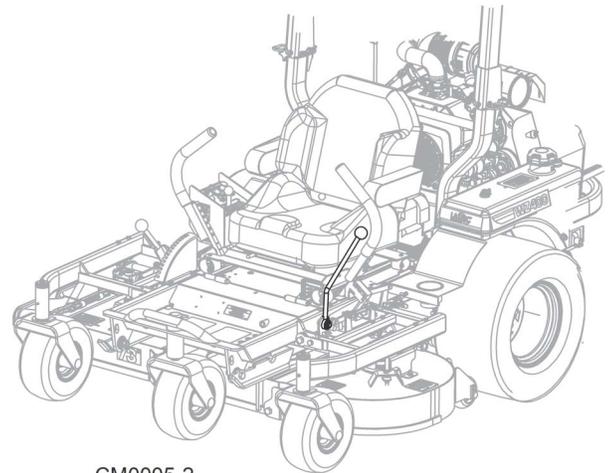
To set the parking brake, grasp the handle and pull upward, increasing the brake tension, until the handle hits a hard stop.

To release the parking brake, push forward on the handle away from the hard stop.

### 3.3 Fuel

 **WARNING!** Handle fuel with care to avoid fire or explosion:

- use approved fuel containers only;
- do not handle fuel near an open flame;
- do not use fuel as a solvent;
- do not fuel the drive unit while the engine is running
- do not fuel the drive unit while the engine is hot;
- do not fuel the mower indoors;
- do not fuel while sitting on drive unit;
- clean up any spilled fuel;
- do not smoke around fuel or while fueling.



CM0005-2

FIG. 3-1

Your Articulator is equipped with two fuel tanks, located over each rear wheel. Your Articulator is shipped dry (no fuel) from the factory, so you will need to fuel your Articulator before operating. The fuel tanks have a gauge that shows the approximate fuel level at all times. **Do not attempt to fuel your Articulator until you read and understand the entire INITIAL SET-UP section of this manual.**

**GAS ONLY:** Use only unleaded gasoline fuel. Contaminants in the fuel can adversely affect the fuel system.

**DIESEL ONLY:** Use only No. 2 fuel. Do not use any other alternative fuel. Kerosene and low quality fuel will adversely affect the engine. Contaminants in the fuel can adversely affect the fuel injection pump.

**DIESEL ONLY:** Do not allow either fuel tank to drain completely of fuel. This can allow air into the fuel system. If this happens, the fuel system will have to be bled before restarting the engine.

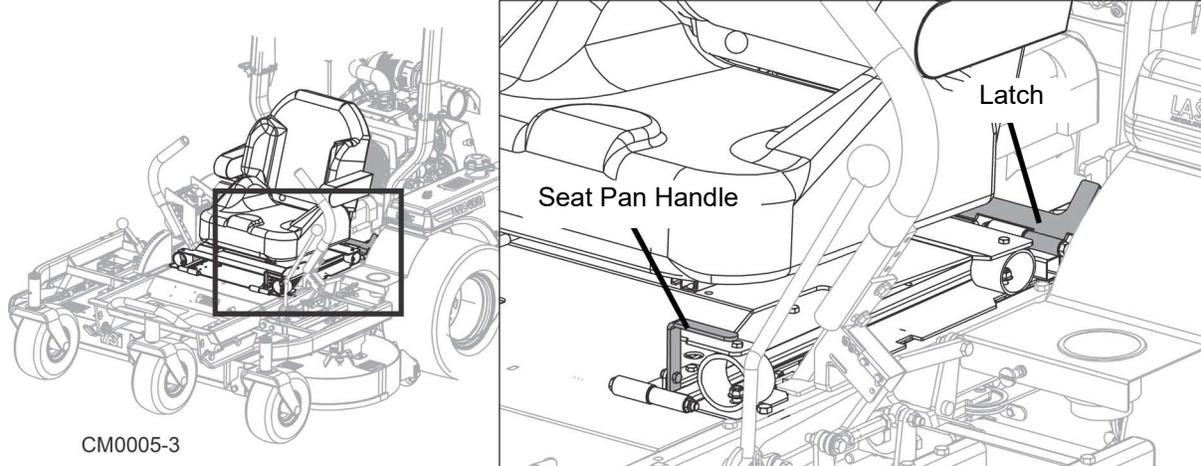
Refer to the *Engine Operator's Manual* for proper instructions.

### 3.4 Operator Seat Pan

 **WARNING!** Always clean the entire engine area and deck area of any excess grease, oil, fuel, or debris to prevent damage to the equipment, fire hazard, and projectile hazards.

1. Lift the operator seat pan all the way forward, to its maximum open position.

**NOTE:** The seat pan is heavy. If assistance is required when either lifting or lowering the operator seat pan, have someone help you.



2. Clean the entire engine area and mower deck area (under the operator seat pan) of all excess grease, oil, fuel, grass, or debris before operating your Articulator to prevent damage to the equipment, fire hazard, and projectile hazards.
3. Ensure the operator seat pan is properly closed before operating or engine will not start.

### 3.5 Engine Oil

**WARNING!** Turn off engine before checking the oil level, changing the oil, or changing the oil filter and allow ample time for oil to cool before changing or repairing leaks.

**CAUTION!** Ensure to use the correct oil in the engine crankcase.  
Ensure to check the engine oil level and quality daily.

Incorrect oil, inadequate oil level, or contaminated oil will cause engine damage.

Ensure your Articulator is parked on level ground before checking the oil level.

Check the oil level when engine is cool -- before starting the engine, or more than five minutes after turning the engine off.

To add or change the engine oil and/or oil filter, allow ample time for the engine and engine oil to cool. Consult the *Engine Operator's Manual* for the proper procedures.

Consult the *Engine Operator's Manual* for the proper SAE viscosity grade of oil that should be used depending on your operating conditions.

### 3.6 Air Cleaner

The air cleaner is located on top off the engine.

There are two filter elements within the air cleaner.

1. Open by unlatching the filter housing.
2. Check that both filter elements are clean and free of debris.
3. Clean or replace if necessary.
4. Consult the *Engine Operator's Manual* for the proper procedures and your Parts Manual for replacement filters.

### 3.7 Hydraulic Fluid

 **WARNING!** Keep away from any leaks or loose connections while system is pressurized.  
Allow ample time for hydraulic fluid to cool before changing or repairing leaks.

 **CAUTION!** Ensure to use the correct fluid in the hydraulic tank.  
Check fluid level and quality daily.  
Incorrect fluid, inadequate fluid level, or contaminated fluid will cause damage to the hydraulic system.

The hydraulic oil used in your Articulator is formulated to prolong the life of the hydrostatic pumps. Lastec offers the following oil kits (system capacity is approximately 5 quarts).

Kit size	Part number
5 gallon	049928
2.5 gallon	049929
1 quart	040642

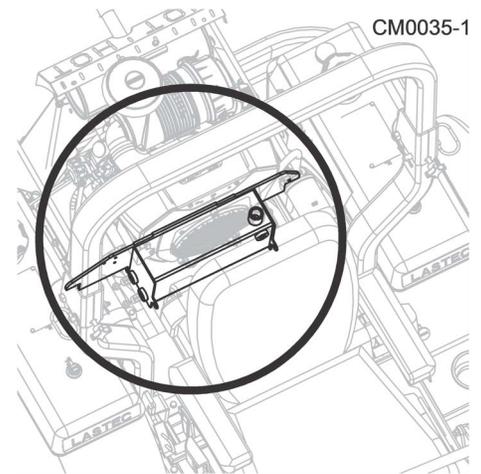


FIG. 3-2

1. Turn the engine off.
2. Check the hydraulic fluid level and condition.
3. Ensure the hydraulic oil level remains at the FULL mark at all times.

 **CAUTION!** Do not overfill.

4. Use the sight gauge on the side of the hydraulic tank to fill to the "Fill Line."
5. Inspect the motors and pumps, the filter, tank, all hoses, clamps, and fittings, and the entire area under the hydraulic system for leaks.
6. Allow time for the hydraulic fluid to cool, if necessary.
7. Repair or replace the defective parts and re-fill the hydraulic system before operating your Articulator.
8. Secure all clamps or fittings.

### 3.8 Hydrostatic Pump Adjustment

 **WARNING!** Use jack stands when adjusting the hydrostatic pumps.  
Keep personnel clear of all controls while adjusting the hydrostatic pumps.

If the drive wheels begin to creep, adjust the hydrostatic pumps as necessary.

1. Lift the rear of the drive unit until the drive tires clear the ground.

 **CAUTION!** Use jack stands for safety.

2. Ensure steering control arms are locked in neutral position.
3. Start the drive unit, and set the throttle arm to 3/4 full.

### 3 Initial Set-Up

Towing (Hydrostatic Pump Release)

4. If either drive tire rotates, adjust the hydrostatic pump link arm for that tire.  
See Figure 3-3.
  - a. Loosen the jam nut from the hydrostatic pump link arm. (*The jam nut is located between the rod end and the link arm.*) See Figure 3-3.
  - a. Slowly turn the link arm, watching the tire as it turns.
  - a. If the tire begins turning faster, turn the link arm in the opposite direction until it slows, and eventually stops.
  - a. Tighten the jam nut to lock the link arm into this position.
5. When finished, turn off the drive unit.
6. Ensure that both link arm jam nuts are tight.
7. Lift the drive unit, remove the jack stands, and lower the unit to the ground.

### 3.9 Towing (Hydrostatic Pump Release)

When towing your Articulator, it is necessary to allow the hydraulic fluid to bypass the hydrostatic pump.

1. Locate the bypass valve on the top of each pump.
2. Turn the valves no more than (2) two turns in a counterclockwise motion.

The drive tires should rotate freely.

3. Tow the unit to the desired destination at a slow speed.
4. When towing is completed, return the valves to the original position by turning them in a clockwise motion until they are tight (84-120 in-lbs).

### 3.10 Hydrostatic Pump Belt



**WARNING!** Do not inspect, adjust, or change the hydrostatic pump belt while the engine is running.

The hydrostatic pump drive belt is located at the rear of the engine, under the engine guard.

The hydraulic belt idler is mounted on the engine framework. See Figure 3-4

The idler should tension the belt properly so that additional adjustments are not necessary.

1. Check the belt for visible wear or damage.
2. Replace the belt if the belt appears excessively worn, damaged, cracked, weathered, or otherwise unsuitable or unsafe.
3. Check the belt for 45-50 lbs. tension on the Cricket gauge (part number 028498).

**NOTE:** If the idler tensioner rotates to its maximum stroke without adequately tightening the belt, you need to replace the belt.

If the belt you are checking is new, and the idler tensioner goes to its maximum or minimum stroke without adequately tightening the belt, it is likely you have installed the wrong size belt. See the Parts Manual or contact your Lastec dealer for the proper belt lengths for your Articulator.

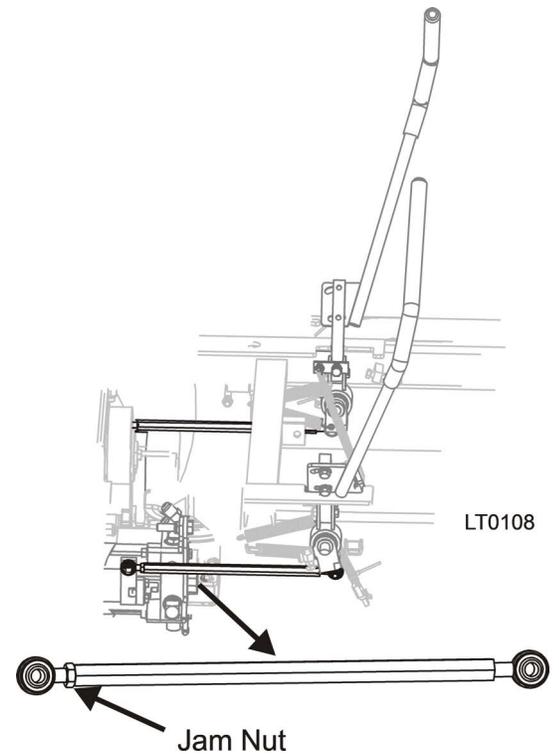
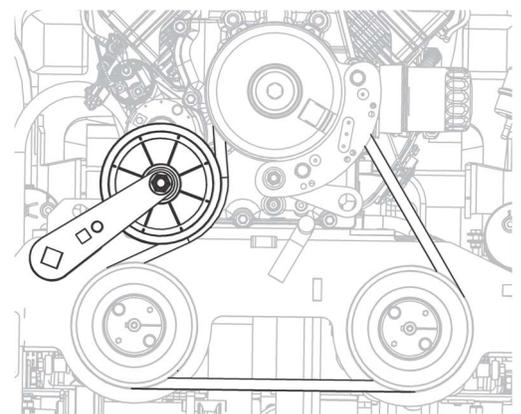


FIG. 3-3



CM0035-2  
FIG. 3-4

4. Check for belt wear and/or wear to the nylon tensioning rods (part number 049571) if slippage is occurring.
5. Ensure that the idler tensioning rods are properly installed and in good condition: if these rods are loose, worn, or fatigued, the idler will not properly tension the belt.

### 3.11 Mower Deck Drive Belt

-  **WARNING!** Do not inspect, adjust, or change the deck drive belt while the engine is running.
- Clean the entire deck area (under the operator seat pan) of all grease, oil, fuel, grass, or debris to prevent fire and projectile hazards.
- 

The mower deck drive belt is located under the operator seat pan and up to the rear of the engine.

1. Check the belt for visible wear or damage.
 

**NOTE:** If the belt appears excessively worn, damaged, cracked, weathered, or otherwise appears to pose an unsuitable or unsafe operating condition, replace the belt.
2. Check the belt for proper tension.
3. If the idler tensioner moves to its maximum stroke without adequately tightening the belt, you need to replace the belt.
 

**NOTE:** If the belt you are checking is new, and the idler tensioner goes to its maximum stroke without adequately tightening the belt, it is likely you have installed the wrong size belt.

If you are unable to install a new belt with the idler system at its minimum stroke, it is likely you are installing the wrong size belt.

Contact your Lastec dealer for proper belt lengths for your Articulator.
4. Ensure that the idler tensioning urethane spring is properly installed and in good condition.
 

**NOTE:** If for some reason this urethane spring becomes loose, detached, or fatigued, the idler will not properly tension the belt.
5. Clean entire mower deck area (under the operator seat pan) of all excess grease, oil, fuel, grass, or debris before operating your Articulator to prevent damage to the equipment, fire hazard, and projectile hazards.

### 3.12 Deck Belt

-  **WARNING!** Do not inspect, adjust, or change the deck belt while the engine is running.
- Clean the entire deck area (under the operator seat pan) of all grease, oil, fuel, grass, or debris to prevent fire and projectile hazards.
- 

The mower deck belt is located under the rocker arms on each side of deck.

1. Access the belt by loosening the cover nuts and lifting the cover out from under the rocker frame.
 

**NOTE:** The pulley idler belt tensioning system automatically tensions the belt on the mower decks, thus eliminating the need for manual belt tension adjustment.
2. Check the belt for visible wear or damage.
 

If the belt appears excessively worn, damaged, cracked, weathered, or otherwise appears to pose an unsuitable or unsafe operating condition, replace the belt.
3. Check the belt for proper tension.
 

If the idler tensioner reaches its maximum stroke without adequately tightening the belt, you need to replace the belt.

If the belt you are checking is new, and the idler tensioner slides to its maximum stroke without adequately tightening the belt, it is likely you have installed the wrong size belt. See section 5 of this manual or contact your Lastec dealer for the proper belt lengths for your Articulator.

### 3 Initial Set-Up

#### Weight Transfer Springs

If you are unable to install a new belt with the idler system at its minimum stroke, it is likely you are installing the wrong size belt. Contact your Lastec dealer for proper belt lengths for your Articulator.

4. Ensure that the idler pulley tensioning spring is properly installed and in good condition. If for some reason this spring becomes loose, detached, or fatigued, the idler will not properly tension the belt.

Clean each entire deck (including under the rocker arms) of all excess grease, oil, fuel, grass, or debris before operating your Articulator. This will help prevent damage to the equipment, fire hazard, and projectile hazards.

5. Replace all covers and hardware.

### 3.13 Weight Transfer Springs

The weight transfer springs help to lighten the mower deck by transferring excess weight to the drive unit, allowing more agile floating of the mower deck and a higher quality cut.

The weight transfer springs are located under the operator seat pan. See Figure 3-5.

Check that all weight transfer springs are properly mounted and secure. (The springs may come as close as one inch to the mounting bracket.)

Adjust the spring tension by tightening the bolt at the rear of the springs.

Proper operation of the weight transfer system will allow you to lift the mowing deck by the handle with little effort.

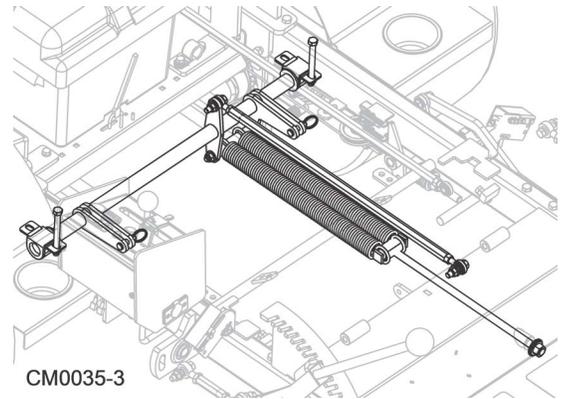


FIG. 3-5

### 3.14 Blades



**DANGER!** Do not inspect, adjust, change, or perform any other maintenance to the blades while the engine is running.



**WARNING!** Turn off the blades, turn off the engine, remove the key, and set the parking brake before attempting to inspect, adjust, change, or perform any other maintenance to the blades.

Do not expose yourself or others in any way to the blades while the engine is running.

Keep all personnel clear of all controls while inspecting, adjusting, changing, or performing maintenance to the blades.

1. Inspect all blades for proper installation, orientation, tightness, sharpness, and overall condition.
2. Tighten the bolts that hold the blade on to a recommended torque value of **75 ft-lbs** of pressure.
3. Ensure the lift fins are oriented to the top of the blades.
4. Verify that the mount bolts are secure, the blades are sharp, and free of any nicks, cracks, or bends.
5. Replace any damaged, dull, cracked, or missing blades before operating your Articulator.

Lastec also offers low-lift blades and mulching blades for certain mowing applications. Contact your Articulator dealer for further information about optional blades available.

### 3.15 Operator Seat

1. Check that the operator seat pan is properly seated.
2. Adjust the seat forward or back so that the operator can easily reach the control panel, steering control arms, throttle, and mower deck height adjustment handle.

### 3.16 Steering Control Arms

1. Check that both steering control arms are properly linked, free of debris, and operating freely.
2. Swing the arms toward the operator seat, removing them from the neutral lock position.

3. Slowly push both arms all the way forward, then all the way back.
  - a. Arms should both move smoothly and easily, with no sticking, obstruction, or uneven tension.
  - b. If the control arms are too high or low for operator comfort, reposition the control arm attachment bolts.
  - c. If the arms are too stiff moving in from neutral, loosen the bolt at the base of the arm. See Figure 3-6, A.
  - d. If the arms are too stiff moving forward and back, loosen the set screw in the collar. See Figure 3-6, B.

**NOTE:** Do not over loosen the arms. Arms should also “snap” back to neutral position, which is straight up and down and centered with the neutral position lock (notch in the frame).

4. Return both control arms into neutral position; you should feel them set into place.

### 3.17 Mower Deck Height

 **WARNING!** Do not attempt to change the cutting deck height while the engine is running.

Set the deck height before operating your Articulator.

Your Articulator has a mower deck height range of 1" to 4.5", in 1/4" increments. The mower deck height adjustment has a lever for adjusting the deck height. The lever fits into spaces marked off in 1/4" spaces, and are marked at the 2", 3", and 4" deck height positions for quick identification.

**NOTE:** If the control arms or difficult to move, back the connecting bolts out until a proper tension is achieved.

1. Pull the deck height control lever out from the height bracket and move it to the desired height.

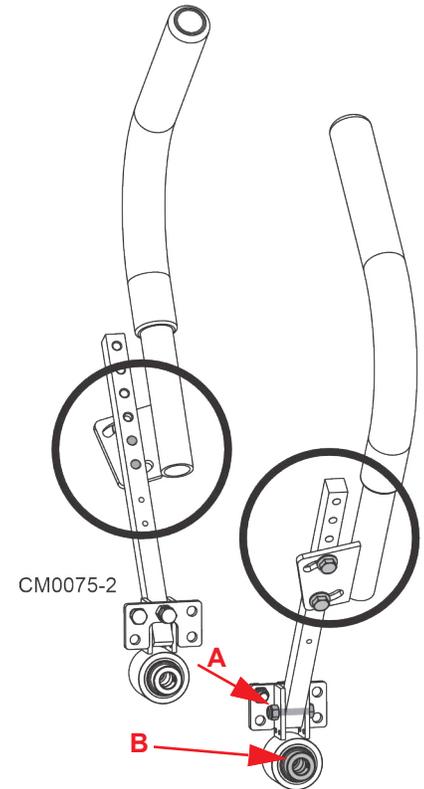


FIG. 3-6

2. Replace the lever into the bracket. See Figure 3-7.

This sets the entire cutting deck to the desired height.

### 3.18 Mower Deck Height Calibration

 **WARNING!** Do not make any adjustments to the deck height while the engine is running.

Ensure to set the parking brake before making any adjustments to your Articulator.

When you receive your Articulator, you will need to calibrate the mower deck height.

1. Park your Articulator on a flat, level surface.
2. Turn off the engine and set the parking brake before making any adjustments to your Articulator.

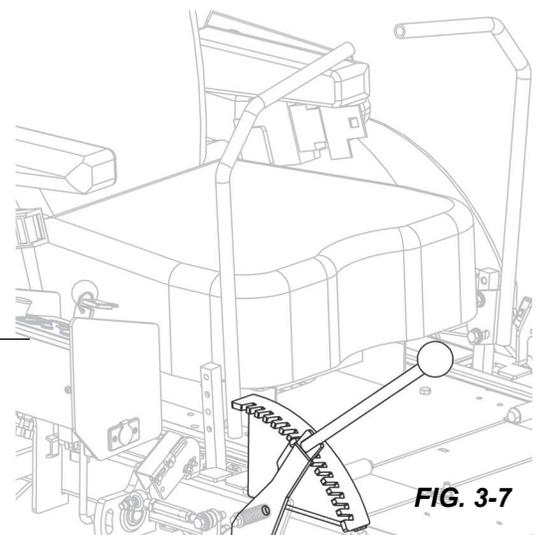
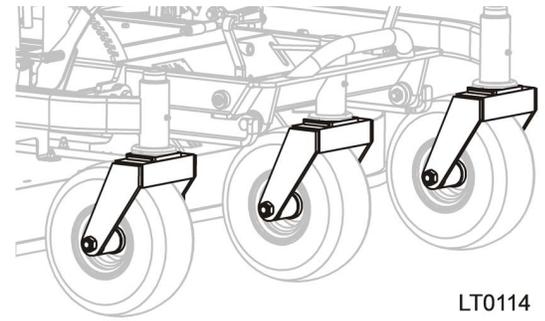


FIG. 3-7

### 3 Initial Set-Up

#### Mower Deck Height Calibration

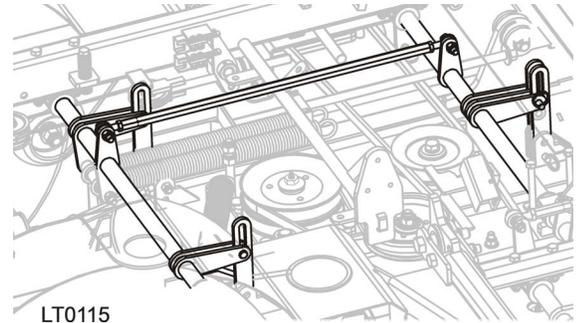
3. Ensure both rear drive tires are properly inflated to 18 PSI and front wheels are at 12 PSI.
4. Ensure all wheels are pointing forward in the direction of travel, as shown in Figure 3-8.



LT0114  
**FIG. 3-8**

5. Set the deck height adjustment arm to 3".

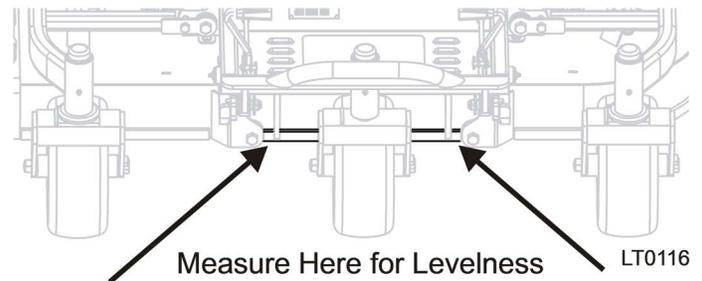
The flags on the lift arms should give a visual cue as to whether the deck needs major or minor adjustments. The deck hanger flags should be approximately parallel to the deck, while the tie rod flags should be approximately perpendicular. See Figure 3-9.



**FIG. 3-9**

6. Starting with the center deck, measure from the bottom of the pan to the floor across the front and rear of the deck at points near the hinge pins. See Figure 3-10.

A 3" block may be used. The measurements should be **level**, within  $\pm 1/8$ ". Actual cutting height should be measured from the **blades** (ensure the blades are not bent from damage when taking measurements).

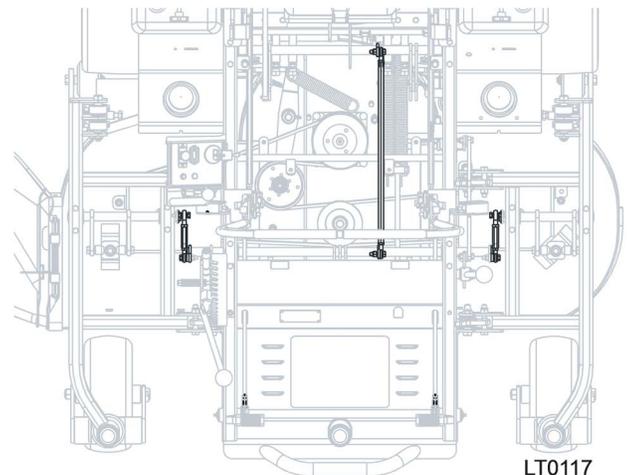


**FIG. 3-10**

7. Use the center turnbuckle on the deck lift assemblies to level the center deck front-to-back. See Figure 3-11.

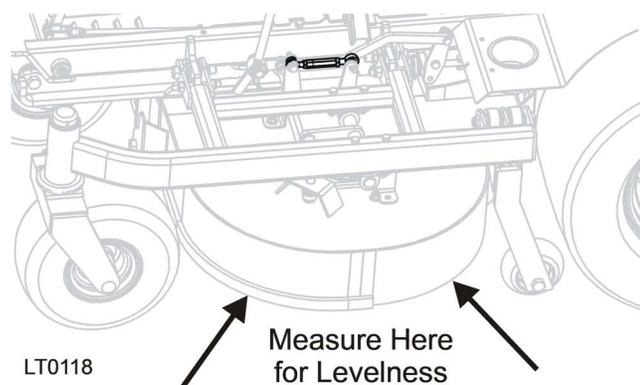
Tolerances for front-to-back is positive 1/8 inch in the rear -- the rear should never be lower than the front edge. Retighten the jam nuts on the turnbuckle after leveling the deck.

**NOTE:** The rear deck hangers are also adjustable. Hangers should have the same tension on both sides before adjusting the main turnbuckle. Adjust the eyebolt until the tension is even on both hangers, then snug down the jam nut.



LT0117  
**FIG. 3-11**

8. When the center deck is level, check each side deck for levelness.
  9. Inspect the hanger rod to make sure the urethane bushings are snug, but not overly tight.
- NOTE:** Do not use these hangers for adjustment purposes.
10. Raise or lower the deck by means of the small turnbuckle. See Figures 3-11 and 3-12.
  11. Retighten the jam nuts on the turnbuckle after leveling the deck
  12. Set the anti-scalp wheel at your “typical” cutting height.

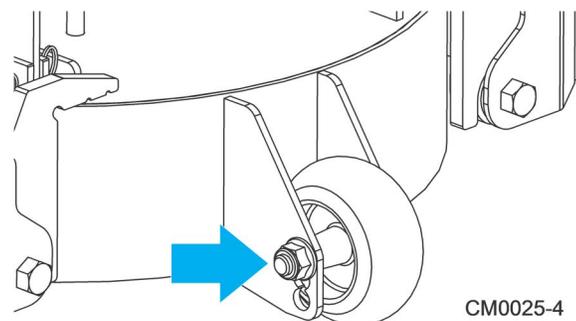


**FIG. 3-12**

The factory setting is approximately 1 inch, and should be readjusted to meet your needs. Do not allow the anti-scalp roller to be on the ground constantly or it will result in premature wear.

### 3.19 Tires and Wheels

1. Check the air pressure in the rear drive tires.
2. Maintain rear wheel air pressure at 18 psi, or as needed to maintain level deck cutting.
3. Check the air pressure in the front tires.
4. Maintain front tire air pressure at 12 psi, or as needed to maintain level deck cutting
5. Verify proper function of all mower deck wheels.



**FIG. 3-13**

The wheels should turn freely without excessive side-to-side motion, and be free of debris.

6. Clean, adjust, replace, and grease as necessary.
7. Check that each wheel swivels freely in the shaft pivot collar, and the bearings are in good condition.
8. Clean and grease the shaft collar assembly if a wheel does not swivel freely.
9. Replace the bearings if necessary.

### 3.20 General Inspection

1. Verify that all warning decals are in place, visible, and legible.
2. Verify that all covers and safety devices are properly installed and secure.
3. Check that the discharge chute is clear of debris, properly mounted, and in good condition.
4. Inspect entire Articulator for loose or entangled parts, debris, obstructions, misplaced tools, or any other possible safety hazards, equipment hazards, or projectile hazards.

### 3.21 Engine

1. Check the exhaust while the engine is running.

During proper operation, the exhaust should be colorless. If the engine runs continuously with dark exhaust, stop the engine and correct the problem before operating your Articulator.

2. Listen for any suddenly slows downs or accelerations, abnormal noises, rough running, or displays any other usual characteristics.
3. Stop the engine and correct the problem before operating your Articulator.

### **3.22 Hour Meter**

The hour meter is located on the control panel. This meter records the total hours on the engine, and cannot be reset. You may wish to record the hour meter reading prior to operation of your Articulator for tracking of maintenance schedules, job timing, billing, or other records.

### **3.23 Maintenance Checklists**

Complete the appropriate maintenance checklists in a timely manner. (*See Section 5*).

## SECTION 4 OPERATING PROCEDURES

### 4.1 Starting The Engine



**DANGER!** Do not allow extended running of any engine indoors.

---



**WARNING!** Do not attempt to operate your Articulator until you have read and understand this manual in its entirety.

Do not allow anyone to operate your Articulator without proper training and without first reading and understanding this manual in its entirety.

---



**CAUTION!** Perform the pre-operation equipment inspection before attempting to operate your Articulator.

Perform the appropriate maintenance schedule(s) before attempting to operate your Articulator.

---

The following safety conditions must be met before the engine will start:

- Operator's seat is occupied.
- Auxiliary switches (blades, etc.) on the control panel are in the OFF positions.
- Hand control levers are locked into NEUTRAL position.
- Parking brake must be set to the ON position.

1. Turn the key switch clockwise to the START position, and release when the engine starts.

Cranking engine for more than 10 seconds may cause starter motor failure or damage. If the engine does not start in 10 seconds, allow a 60 second cool down period between starts. If, after several attempts, the engine will still not start, discontinue the starting process until the cause of malfunction is determined.

2. Release the key (which will return to the running position) when engine starts.
3. Adjust the throttle lever (located to the lower right of the operator seat) forward (downward) until the engine is running at a steady idle.

**NOTE:** Do not overpower the engine.

### 4.2 Stopping The Engine

1. Stop the engine by throttling down to a slow idle, then turning the ignition key switch to the OFF position.
2. Wait for all motion to stop.
3. Be sure all auxiliary switches are in the OFF position.
4. Set the parking brake before dismounting your Articulator.

### 4.3 Motion Control



**WARNING!** Clear the entire area of all personnel before operating your Articulator.

Verify that all safety covers are in place and secure before operating your Articulator.

---

Your Articulator is equipped with two hydrostatic pumps, one operating each rear drive wheel. These pumps are controlled separately with each of the steering control arms (located to the left and right of the operator seat).

Start the engine in accordance with section 4.1 of this manual.

Pushing a steering control arm forward activates the hydrostatic pump on the corresponding side, turning the drive wheel in the corresponding direction. (i.e., pushing the right steering control arm forward activates the right drive wheel in the forward direction. Pulling the right steering control arm back activates the right drive wheel in the reverse direction.)

The steering control arms also govern the ground speed of your Articulator. The farther from the neutral position the arm is pushed or pulled, the faster the corresponding drive wheel turns. Always use the steering control arms to regulate ground speed - NOT the throttle control.

Release the parking brake.

In order to maneuver your Articulator, you must first remove both steering control arms from the neutral lock position. Grasp each steering control arm with each hand, and pull them both toward the center of the unit until they are free from the neutral lock.

- **To travel forward:** Push both control levers forward evenly. The farther they are pushed, the faster your Articulator travels.
- **To travel in reverse:** Pull both control levers backward evenly. The farther they are pulled, the faster your Articulator travels.
- **To turn to the right:** Push the left control lever forward slowly, and maintain the right control lever in neutral position.
- **To turn to the left:** Push the right control lever forward slowly, and maintain the left control lever in neutral position.
- **To obtain a zero turn radius to the right:** Push the left control lever forward slowly, while simultaneously pulling the right control lever backward slowly.
- **To obtain a zero turn radius to the left:** Push the right control lever forward slowly, while simultaneously pulling the left control lever backward slowly.
- **To stop:** Return both control levers to the neutral position.
- **To change directions:** Slowly return both control levers to the neutral position, and allow your Articulator to slow to a stop. Then slowly move the control levers into the appropriate positions to travel in the desired direction.

**NOTE:** When the control levers are released, they automatically return to the neutral position, stopping all motion of your Articulator.

## 4.4 Recommended Blades

### Ultra Low Blade

Use Ultra Low Lift Blade when the conditions are dry and in sandy soil areas. When conditions like this are evident, lift created by the cutter blades can be reduced, decreasing the abrasion wear to the cutter blades and deck caused by sand. The Low Lift Blade will also help reduce cutter deck blowout during the conditions stated above.

### Low-Lift Blade

Low-Lift Blade is recommended for 1"-2" cutting height. Use a Low Lift Blade when the conditions are dry, the region is experiencing a drought, in sandy soil areas or when performing seasonal scalping. When conditions like this are evident, lift created by the cutter blades can be reduced, decreasing the abrasion wear to the cutter blades and deck caused by sand. The Low Lift Blade will also help reduce cutter deck blowout during the conditions stated above.

### High-Lift Blade

High-Lift Blade is recommended for cool season grasses and cut heights of 2" and above, unless in sandy conditions. These blades are shipped standard on all mowers.

Use a High Lift Blade when the conditions are extremely wet or heavy. The High Lift Blades will create greater lift that may be needed in difficult cutting conditions. Additional deck cleaning may be required when using High Lift Blades.

### Gator Mulching Blade

Mulching blades are designed for use with a mulching (discharge block-off) plate or with a complete mulching system. These blades feature a high lift, “double-cut” edge for quick, thorough shredding of grass clippings, leaves and debris.

## 4.5 Ground Speed

Your Articulator is designed to cut cleanly and efficiently at relatively high ground speeds.

Reduced ground speed is required when operating on severe contours, when cutting excessively tall, wet, or thick grass, or when traveling up or down large or steep hills.

Attempting to change directions at high ground speed, whether cutting or transporting, can cause damage to the turf, especially in wet conditions. Direction changes should be made by slowing to a near or complete stop (returning the control levers to neutral position), and slowly changing the control lever positions to begin travel in the desired direction. This prevents turf damage, as well as prolonging equipment life and promoting safer operation of your Articulator.

Maximum ground speed is intended for transport to and from the work site only, and should not be attempted during any cutting operation.

## 4.6 Mower Deck Operation



**DANGER!** Stay well clear of blades during operation.



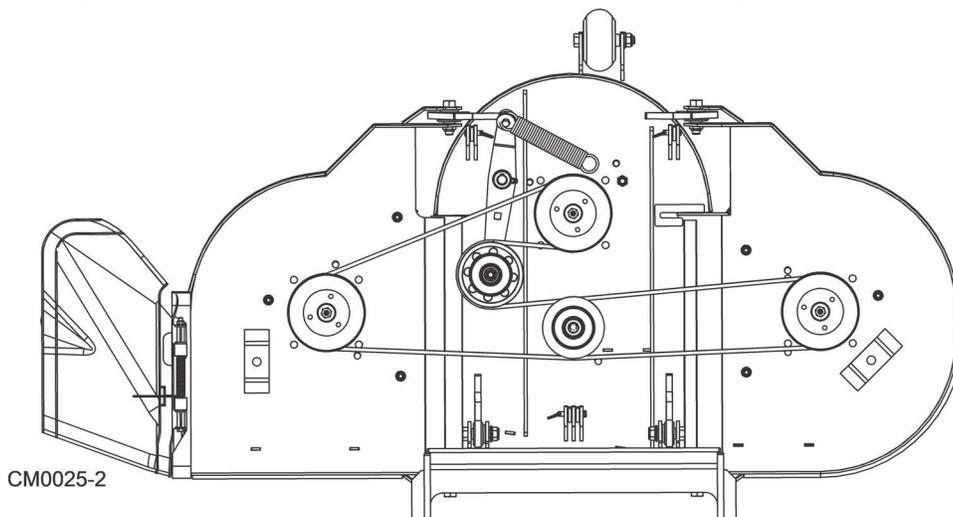
**WARNING!** Clear area of all personnel before engaging the blades.

Verify that all safety covers are in place before operating your Articulator.

Do not aim/point/etc. the discharge in the direction of bystanders, vehicles, or buildings.

Do not operate your Articulator when children are present.

Your Articulator is equipped with a mower deck comprised of three blades. All three blades are belt driven - the drive belt (located under the operator seat pan) drives the center blade, and the deck belt drives each blade. The idler belt tension system takes up excess belt length or releases additional belt length as necessary during the operation of the deck.



To engage the blades, the operator-presence switch (located within the operator seat) must be activated. The activation of the operator-presence switch is activated when the operator is properly seated in the operator seat.

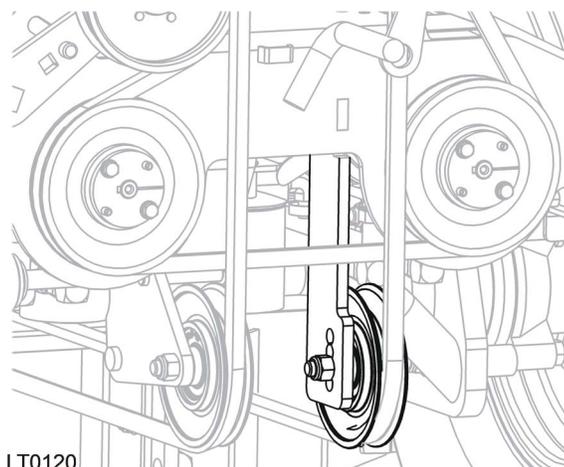
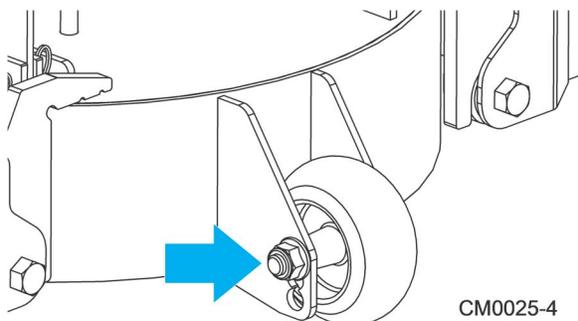
## 4.7 Mule Pulley Adjustment

The mule pulley is located under the engine. The drive belt passes through the pulley to the main deck drive pulley. Under normal operating situations, the pulley should not be changed from the factory set position. The factory set position is dictated by the model of the Articulator.

The mule pulley may be adjusted to keep the idler pulley keep properly tensioned (40-50 ft-lbs on the Cricket gauge [part number 028498]) on a drive belt that has stretched. Remove the center bolt and place the pulley at the level most appropriate to maintain the proper belt tension.

## 4.8 Anti-Scalp Wheel Adjustment

The rear anti-scalp wheel on the deck can be readjusted as needed.



**IMPORTANT.** Any time the mower deck height is adjusted on the Articulator, it is necessary to check all the anti-scalp wheels for proper positioning. The recommended anti-scalp wheel height settings are as follows:

- **Deck Height < 2"** = Set the anti-scalp wheels to the top hole,
- **Deck Height 2" to 3"** = Set the anti-scalp wheels to the center hole,
- **Deck Height > 3"** = Set the anti-scalp wheels to the bottom hole.

## SECTION 5 MAINTENANCE

### 5.1 Maintenance



**WARNING!** NEVER allow children to operate your Lastec Mower!

NEVER allow children on or near your Lastec Mower!

NEVER operate your Lastec Mower when children are present!

NEVER perform maintenance to your Lastec Mower when children are present!

---



**CAUTION!** Proper maintenance of your Lastec Mower is important!

ALWAYS perform the appropriate maintenance checklist at the proper time interval!

Failure to complete the appropriate maintenance checklists at the proper time intervals will cause damage to your Lastec Mower, unsafe operating conditions, substandard performance, and may void the warranty of your Lastec Mower!

Warranty issues are dependent upon proper maintenance!

---

Along with completing the Pre-Operation Equipment Inspection Checklist *each time* you operate your Lastec Mower, complete the following Maintenance Checklists at the indicated time intervals. ([See Section 5.12](#) for maintenance chart.)

### 5.2 Every 8 Operating Hours or Daily

- Complete the Pre-Operation Equipment Inspection Checklist.
- Grease all grease zerks.
- Inspect the spindle bearing grease seals (under each deck) for grease leakage or improper seating.
- Lubricate all joints and moving parts which are not equipped with grease fittings. (*Use anti-seize for these areas*).
- Verify that all brake cables and hardware are functional, securely fastened and in good condition.
- Verify proper installation, operation, and unobstructed flow of grass chute.
- Inspect entire Lastec Mower for loose or entangled parts, debris, obstructions, misplaced tools, or any other possible safety hazards, equipment hazards or projectile hazards. Clean off decks of any dirt, grease, or oil.
- Depending on current cutting conditions, brush out and clean the radiators and hood grills periodically during the day to ensure proper flow of cooling air.

### 5.3 First 25 Operating Hours

- Change the hydraulic oil and filter.

### 5.4 First 50 Operating Hours

- Change engine oil and filter.<sup>1</sup>

---

<sup>1</sup>. Refer to the Engine Operator's Manual accompanying this manual.

### 5.5 Every 50 Operating Hours

- Grease all blade spindle bearing housings. Fill until grease purges from weep hole in bearing housing.
- Inspect all bushings for wear. Replace as needed.
- Check and clean if necessary any debris that may have accumulated during operation.

### 5.6 Every 100 Operating Hours

- Inspect engine fuel lines and clamps. Replace as needed.<sup>1</sup>
- Inspect air cleaner and filter elements. Replace as needed.<sup>1</sup>
- Inspect engine fan and alternator belt. Replace as needed.

### 5.7 Every 200 Operating Hours

- Change engine oil and filter.<sup>1</sup>

### 5.8 Every 400 Operating Hours

- Replace fuel filter cartridge.<sup>1</sup>
- Change the hydraulic oil and filter.

### 5.9 Every 500 Hours

- Inspect and re-pack all wheel bearings.
- Flush fuel tanks.<sup>1</sup>
- Check engine valve clearance<sup>1</sup>
- Check head mounting bolt torque (while doing valve check)<sup>1</sup>

### 5.10 Annual

- Inspect air cleaner filter elements and replace if necessary.<sup>1</sup>
- Change the hydraulic oil and filter.
- Rotate tires.

### 5.11 Bi-Annual

- Replace fuel lines and clamps.<sup>1</sup>
- Replace radiator hoses and clamps.<sup>1</sup>
- Replace battery.

---

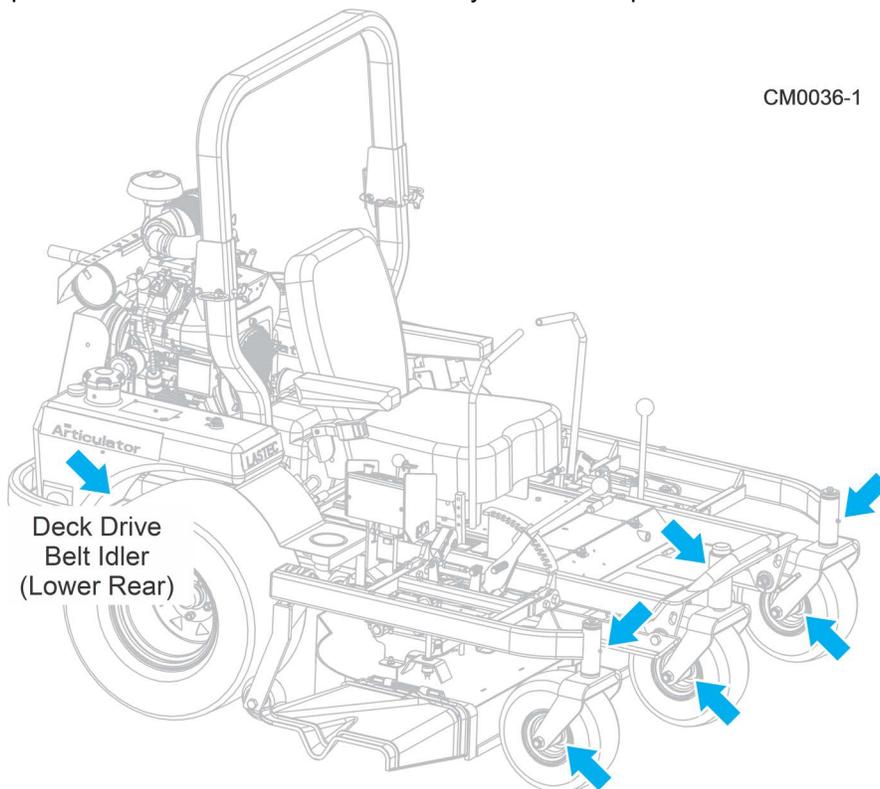
1. Refer to the Engine Operator's Manual accompanying this manual.

5.12 Maintenance Schedule

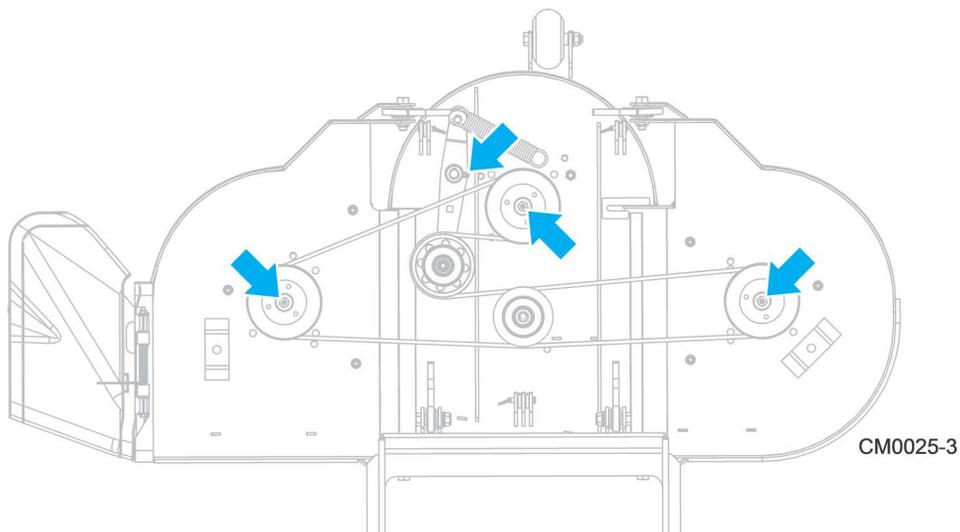
	8 hrs	First 25 hrs	First 50 hrs	100 hrs	200 hrs	400 hrs	500 hrs	Annually	Biannually
Complete the <i>Pre-operation Equipment Checklist</i>	X	X	X	X	X	X	X	X	X
Inspect filter elements	X	X	X	X	X	X	X	X	X
Grease all zerks	X	X	X	X	X	X	X	X	X
Inspect all spindle grease seals under each deck	X	X	X	X	X	X	X	X	X
Lubricate all joints and moving parts that are not equipped with grease zerks	X	X	X	X	X	X	X	X	X
Verify that hardware is functional, securely fastened, and in good condition	X	X	X	X	X	X	X	X	X
Verify proper installation, operation, and flow of grass chute	X	X	X	X	X	X	X	X	X
Inspect entire Lastec Mower for loose or entangled parts, debris, obstructions, neglected tools, or other hazards	X	X	X	X	X	X	X	X	X
Change Hydraulic oil and filter		X				X		X	
Change engine oil and filter			X			X	X	X	X
Inspect engine fuel lines and clamps			X	X	X	X	X	X	X
Grease a blade spindle bearing housings			X	X	X	X	X	X	X
Inspect all bushings			X	X	X	X	X	X	X
Inspect alternator and fan belts					X	X	X	X	X
Replace fuel filter cartridge						X	X	X	X
Inspect and repack wheel bearings							X	X	X
Flush fuel tank of debris							X	X	X
Check engine valve clearance							X	X	X
Check head mounting bolt torque (while performing valve check)							X	X	X
Rotate tires								X	X
Replace air cleaner filter elements								X	X
Replace engine fuel lines and clamps									X
Replace radiator hoses and clamps									X
Replace battery									X

## 5.13 Lubrication Points and Deck Belt Routing

The drive unit lubrications points are shown below. Lubricate every 8 hours of operation.



The deck lubrications points and deck belt routing are shown below. Lubricate every 8 hours of operation. [See Section 5.13](#) for the deck belt part number.

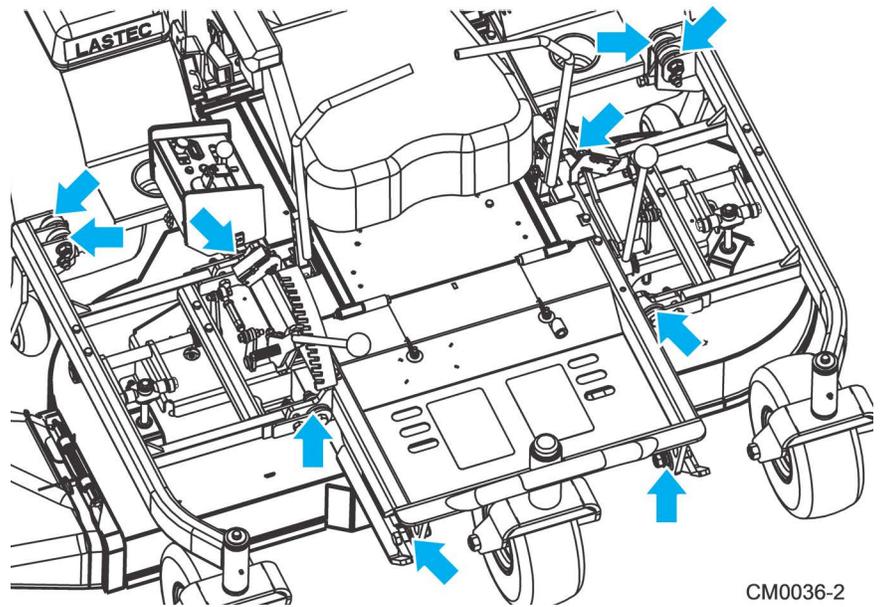


## 5.14 Urethane Bushings



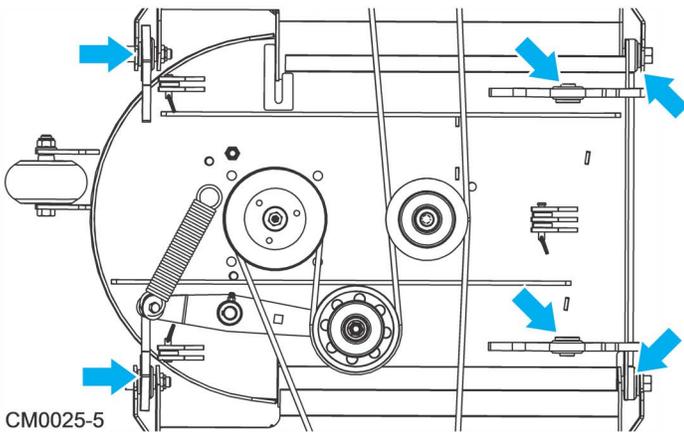
**CAUTION!** Bolts holding urethane bushings must remain tight.

Urethane bushings are used throughout all Lastec mowers in various applications, including (but not limited to) articulating deck hinges and rocker arms. In all cases, the bushings ride on spacers that fit between the rotating pieces of framework, held tightly in place with bolts. **It is important that the spacers remain tight between the framework at all times.** Failure to keep these spacers tight will result in premature wear on the bolts, and equipment damage.

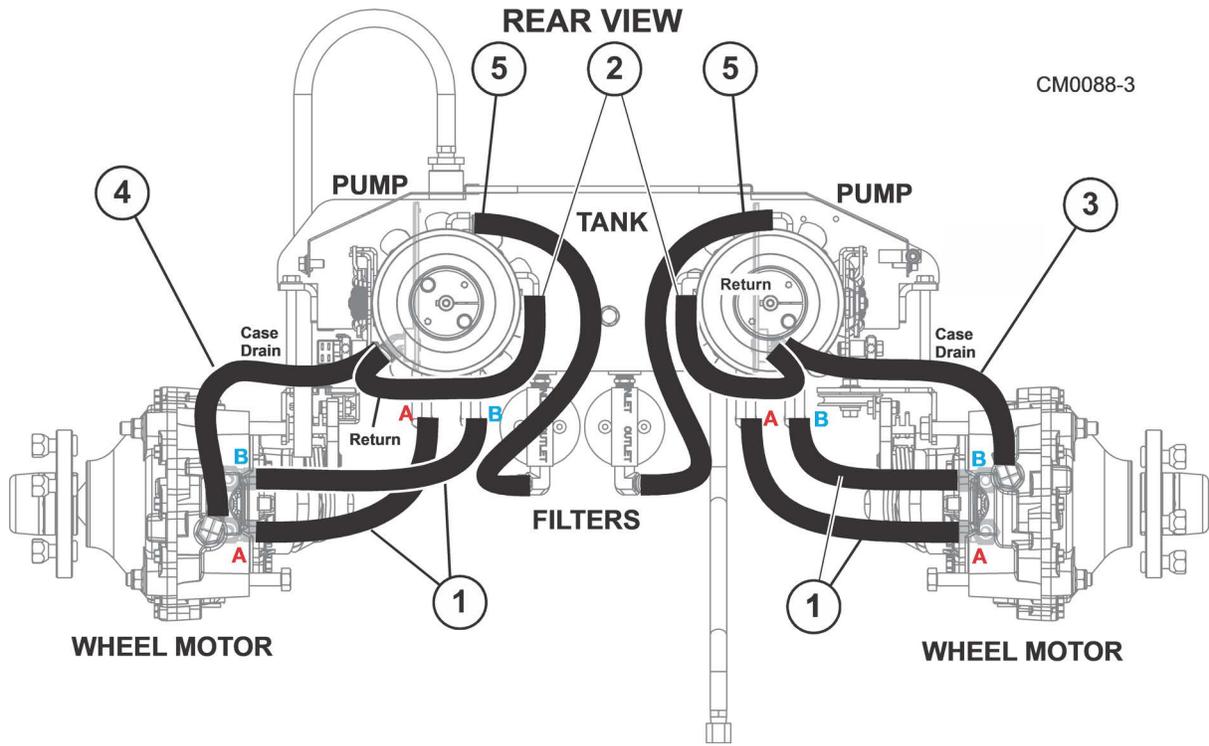


Ensure that ALL bolts associated with urethane bushings are tight at all times.

In some cases, urethane bushing applications are associated with grease points. The grease, in these cases, is used to protect the moving parts from corrosion due to water or other contaminants, and is not used for friction reduction. Ensure grease fills the cavity to prevent infiltration.



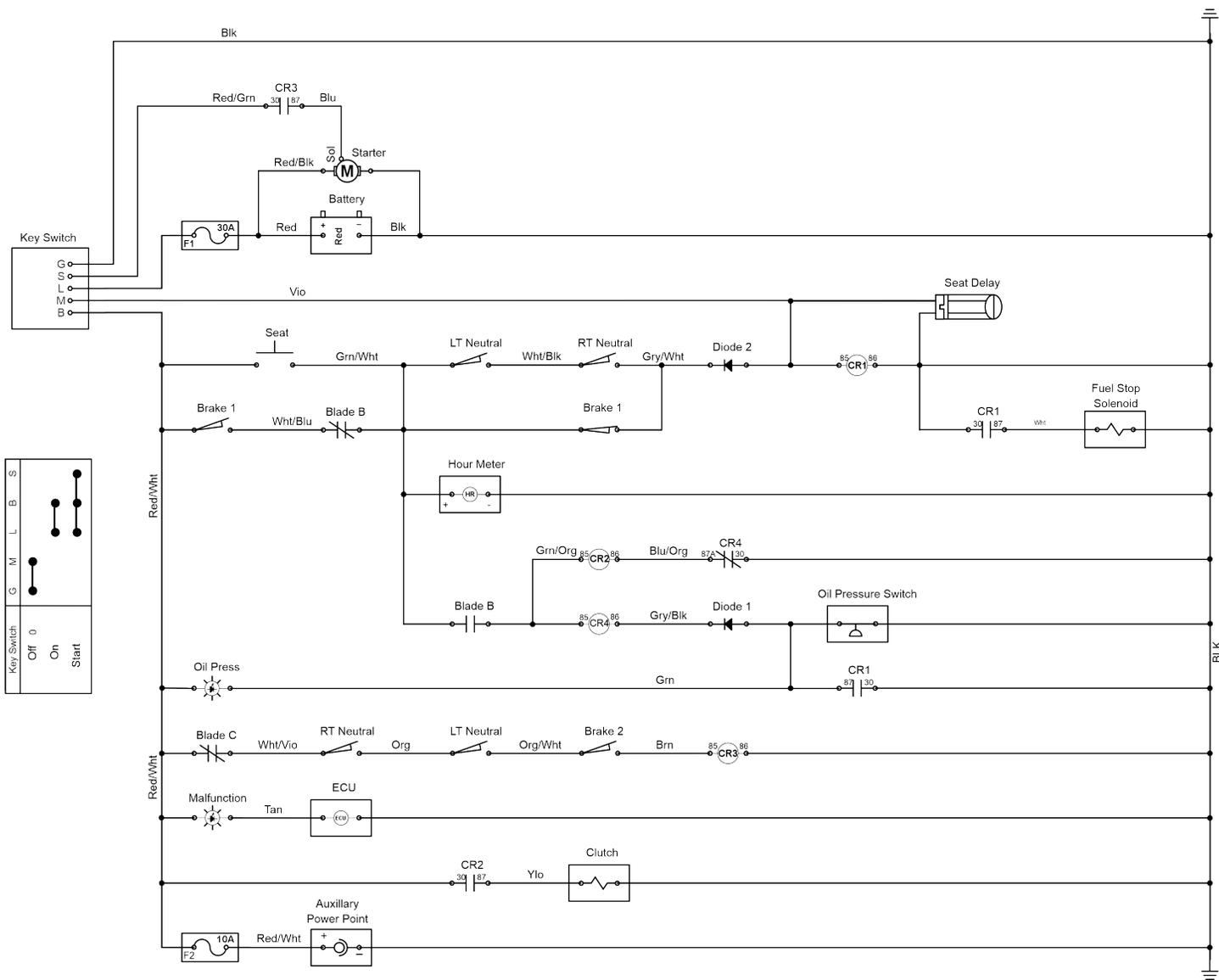
**5.15 Hydraulic System Diagram (3873C )**



REF	PART #	DESCRIPTION	COMMENTS	QTY.
1	073327	Hose Assembly, 1/2HPx26In ORFS 8 S90		4
2	072599	Hose Assembly, 3/8LPx16.5In ORFS 6 45		2
3	073096	Hose Assembly, 3/8LPx11.5In ORFS 6 45		1
4	073094	Hose Assembly, 3/8LPx10.5In ORFS 6 45		1
5	073419	Hose Assembly, 3/8LPx22.25In ORFS 6 90		1
6	073419	Hose Assembly, 3/8LPx22.25In ORFS 6 90		1

## 5.16 Electrical Information

### Electrical Schematic



See Section 4 Engine & Electrical in Parts Manual for complete information on wiring schematics and harnesses.

## 6.1 Lastec 3873 Mower Specifications

### Mower Deck Specifications

	73" Mower Deck	
Mower Deck Configuration	(3) 25" Articulating Decks	---
Cutting Width	73"	---
Blades	(3) 25" Low Lift	P849
	(3) 25" High-Lift (Optional)	P701
	(3) 25" Gator Mulching (Optional)	P848
	(3) 25" Low-Lift Ultra (Optional)	063266
Blade Tip Speed	Normal Operating Range Of 15,000 to 18,000 FPM	
Mower Deck Height Range	1-1/2" to 5"	
Paint	Red, 12 oz. spray	P229
	Black, 12 oz. spray	L07467
Gross Weight	---	
Front Wheel Assembly	(3) 13 x 6.5 x 6 Semi Solid Tires	073098
Drive Tire and Rim Assembly	(2) 24" x 12" x 12" OTR Wheel	073099
Deck Belt	Belt, B148 Wrapped	048272
Drive Belt (Deck Drive)	Belt, B133 Custom	105194

### Transmission Specifications

Hydraulic Pump, Left	12 cc Hydrostatic	048285
Hydraulic Pump, Right	12 cc Hydrostatic	048284
Hydraulic Motor, Left	Hydro-Gear	045959
Hydraulic Motor, Right	Hydro-Gear	026417
Hydraulic Fluid <sup>1</sup>	Lastec Hydro Oil, qt	040642
Hydraulic Fluid Filter	25 Micron, 7 GPM Full-Flow, 3/8" NPT	P620
Hydraulic Fluid Capacity	5 quarts	
Hydraulic Pump Drive Belt	Goodyear BX54	026470

<sup>1</sup> Lastec hydraulic fluid is equivalent to Mobile One Synthetic 15W50

### Engine Specifications

	38HP Engine (3873C)	
Model <sup>1</sup>	Kohler ECH980 air cooled	
Bore & Stroke	90 x 78.5mm / 3.5 x 3.1 in	
Total Displacement	999cc /61.0 cu in	
Power	38 HP	
High / Low Idle Speed	3600 RPM	
Compression Ratio	8.8:1	
Dry Weight	132 lbs	
Oil	API Service Class SJ, Visc SAE 20W-50	
Oil Capacity	2.1 US qt.	
Oil Filter	Kohler	046939
Fuel	Gasoline (unleaded)	

<b>Fuel Capacity</b>	12 Gallons	
<b>Air Filter</b>	Air Filter, Primary Element	046553
<b>Air Filter</b>	Air Filter, Inner Element	046554
<b>Battery</b>	Group U1 12V 340CCA, Ratings: CA@32°F=425; CCA@0°F=340	073079

<sup>1</sup> Refer to the *Engine Operator's Manual*.

## SECTION 7 ENGINE FAULT CODE

### SECTION 7 ENGINE FAULT CODES

0230	Fuel Pump Module Circuit Low Voltage or Open
0232	Fuel Pump Module Circuit High Voltage
0336	Crankshaft Position Sensor Noisy Signal
0337	Crankshaft Position Sensor No Signal
0351	Cylinder 1 Ignition Coil Malfunction
0352	Cylinder 2 Ignition Coil Malfunction
0562	System Voltage Low
0563	System Voltage High
61	End of Code Transmission

ECU continuously monitors engine operation against preset performance limits. If operation is outside limits, ECU activates MIL, if equipped, and stores a diagnostic code in its fault memory. If component or system returns to proper function, ECU will turn off MIL. If MIL stays illuminated, it warns customer a fault is currently happening, and dealer service is required. Upon receipt, dealer technician can access fault code(s) to help determine what portion of system is malfunctioning.

Codes are accessed through key switch and displayed as blinks or flashes of MIL. Access codes as follows:

1. Check that battery voltage is above 11 volts.
2. Start with key switch OFF.
3. Turn key switch to ON and OFF, then ON and OFF, then ON, leaving it on in third sequence. Do not start engine. Time between sequences must be less than 2.5 seconds.
4. MIL will blink a series of times. Number of times MIL blinks represents a number in blink code.
5. A sequence of four digits make up a fault code. There is a one (1) second pause between blinks of a fault code. There is a three (3) second pause between separate fault codes. After fault code(s) are blinked a two digit 61 is blinked to indicate program has completed.
  - a. It's a good idea to write down codes as they appear, as they may not be in numerical sequence.
  - b. Code 61 will always be last code displayed, indicating end of code transmission. If code 61 appears immediately, no other fault codes are present.

After problem has been corrected, fault codes may be cleared by following ECU Reset and TPS Learn Procedures.

Diagnostic Fault Code Summary lists fault codes, and what they correspond to. Diagnostic Code Summary is a list of individual codes with an explanation of what triggers them, what symptoms might be expected, and probable causes.

A MIL may not be provided with engine. If equipment manufacturer has not added a MIL to equipment, one can be added easily for quick diagnostics. Main engine to vehicle connection will have a tan wire which is ground for MIL. Either incandescent or LED type bulbs can be used for MIL as long as they do not draw more than 0.1 amps. Bulb needs to be rated at 1.4 Watts or less, or needs to have a total resistance of 140 Ω or more. LEDs typically draw less than 0.03 amps. Attach +12 volts to positive terminal of bulb and attach ground terminal of bulb to tan wire.

### Diagnostic Code Summary

#### Code 0031

Component:	Oxygen Sensor Heater
Fault:	O2S Heater Circuit High Voltage
Condition:	System voltage too high, shorted connection or faulty sensor.
Conclusion:	<p>Oxygen Sensor Related</p> <ul style="list-style-type: none"> <li>● Sensor connector or wiring problem.</li> <li>● Sensor damaged.</li> <li>● Pin circuit wiring or connectors at Black 7.</li> </ul> <p>ECU Related</p> <ul style="list-style-type: none"> <li>● ECU-to-harness connection problem.</li> </ul>

#### Code 0032

Component:	Oxygen Sensor Heater
Fault:	O2S Heater Circuit Low Voltage
Condition:	System voltage too low, open connection or faulty sensor.
Conclusion:	<p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>● Pin circuit wiring or connectors. ECU black pin 7 or broken wire.</li> </ul> <p>Oxygen Sensor Related</p> <ul style="list-style-type: none"> <li>● Sensor connector or wiring problem.</li> </ul> <p>Poor system ground from ECU to engine or battery to engine.</p>

#### Code 0107

Component:	Manifold Absolute Pressure Sensor
Fault:	MAP Circuit Low Voltage or Open
Condition:	Intake manifold leak, open connection or faulty sensor.
Conclusion:	<p>MAP Sensor Related</p> <ul style="list-style-type: none"> <li>● Sensor malfunction.</li> <li>● Vacuum leaks from loose manifold or sensor.</li> </ul> <p>Wire Harness Related</p> <ul style="list-style-type: none"> <li>● Poor grounding or open circuit.</li> <li>● Wire harness and connectors loose, damaged or corroded.</li> <li>● Pin circuit wiring or connectors at Black 10, 11 and 16.</li> </ul> <p>Bad TPS Learn.</p>

# 7 Engine Fault Code

## EFI SYSTEM-ECV

### Code 0108

Component:	Manifold Absolute Pressure Sensor
Fault:	MAP Circuit High Voltage
Condition:	Intake manifold leak, shorted connection or faulty sensor.
Conclusion:	<p>MAP Sensor Related</p> <ul style="list-style-type: none"> <li>• Sensor malfunction.</li> <li>• Vacuum leaks from loose manifold or sensor.</li> </ul> <p>Wire Harness Related</p> <ul style="list-style-type: none"> <li>• Poor grounding.</li> <li>• Pin circuit wiring or connectors at Black 11.</li> </ul> <p>Bad TPS Learn.</p>

### Code 0112

Component:	Intake Air Temperature Sensor
Fault:	Intake Air Temperature Sensor Circuit Low Voltage
Condition:	Shorted connection, faulty sensor or shorted wire.
Conclusion:	<p>Temperature Sensor Related</p> <ul style="list-style-type: none"> <li>• Sensor wiring or connection.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>• Pin circuits Black 10 and Black 8 may be damaged or routed near noisy signal (coils, alternator, etc.).</li> <li>• ECU-to-harness connection problem.</li> </ul>

### Code 0113

Component:	Intake Air Temperature Sensor
Fault:	Intake Air Temperature Sensor Circuit High Voltage or Open
Condition:	Shorted connection, faulty sensor, broken wire or connection.
Conclusion:	<p>Temperature Sensor Related</p> <ul style="list-style-type: none"> <li>• Sensor wiring or connection.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>• Pin circuits ECU Black pin 10 and 8 may be damaged.</li> <li>• ECU-to-harness connection problem or broken wire.</li> </ul>

### Code 0117

Component:	Coolant/Oil Sensor
Fault:	Coolant/Oil Temperature Sensor Circuit Low Voltage
Condition:	Shorted connection, faulty sensor or shorted wire.
Conclusion:	<p>Temperature Sensor Related</p> <ul style="list-style-type: none"> <li>• Sensor wiring or connection.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>• Pin circuits Black 10 and Black 14 maybe damaged or routed near noisy signal (coils, stator, etc.).</li> <li>• ECU-to-harness connection problem.</li> </ul>

### Code 0118

Component:	Coolant/Oil Sensor
Fault:	Coolant/Oil Temperature Sensor Circuit High Voltage or Open
Condition:	Shorted connection, faulty sensor, open connection or broken wire.
Conclusion:	<p>Temperature Sensor Related</p> <ul style="list-style-type: none"> <li>• Sensor wiring or connection.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>• Pin circuits ECU Black pin 10 and 14 may be damaged.</li> <li>• ECU-to-harness connection problem or broken wire.</li> </ul> <p>System Related</p> <ul style="list-style-type: none"> <li>• Engine is operating above 176°C (350°F) temperature sensor limit.</li> </ul>

### Code 0122

Component:	Throttle Position Sensor (TPS)
Fault:	TPS Circuit Low Voltage or Open
Condition:	Open connection, broken wire or faulty sensor.
Conclusion:	<p>TPS Related</p> <ul style="list-style-type: none"> <li>• TPS bad or worn internally.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>• Broken or shorted wire in harness. <ul style="list-style-type: none"> <li>ECU Black pin 10 to TPS pin 1.</li> <li>ECU Black pin 12 to TPS pin 3.</li> <li>ECU Black pin 16 to TPS pin 2.</li> </ul> </li> </ul> <p>Throttle Body Related</p> <ul style="list-style-type: none"> <li>• Throttle shaft inside TPS worn, broken, or damaged.</li> <li>• Throttle plate loose or misaligned.</li> <li>• Throttle plate bent or damaged allowing extra airflow past, or restricting movement.</li> </ul> <p>ECU Related</p> <ul style="list-style-type: none"> <li>• Circuit providing voltage or ground to TPS damaged.</li> <li>• TPS signal input circuit damaged.</li> </ul>

**EFI SYSTEM-ECV**

**Code 0123**

Component:	Throttle Position Sensor (TPS)
Fault:	TPS Circuit High Voltage
Condition:	Shorted connection or faulty sensor.
Conclusion:	<p>TPS Sensor Related</p> <ul style="list-style-type: none"> <li>● Sensor connector or wiring.</li> <li>● Sensor output affected or disrupted by dirt, grease, oil, wear.</li> <li>● Sensor loose on throttle body manifold.</li> </ul> <p>Throttle Body Related</p> <ul style="list-style-type: none"> <li>● Throttle shaft or bearings worn/damaged.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>● ECU pins Black 10, 12 and 16 damaged (wiring, connectors).</li> <li>● ECU pins Black 10, 12 and 16 routed near noisy electrical signal (coils, alternator).</li> <li>● Intermittent 5 volt source from ECU (pin Black 16).</li> <li>● ECU-to-harness connection problem.</li> </ul>

**Code 0131**

Component:	Oxygen Sensor
Fault:	O2S 1 Circuit Low Voltage
Condition:	Open connection, broken wire or faulty sensor.
Conclusion:	<p>Oxygen Sensor Related</p> <ul style="list-style-type: none"> <li>● Sensor connector or wiring problem.</li> <li>● Sensor contaminated, corroded or damaged.</li> <li>● Poor ground path.</li> <li>● Pin circuit wiring or connectors. ECU Black pin 10 or 17.</li> </ul> <p>TPS Learn Procedure Incorrect</p> <ul style="list-style-type: none"> <li>● Lean condition (check oxygen sensor signal with VOA and see Oxygen Sensor section).</li> </ul> <p>Engine wiring harness related such as a cut wire, broken or pinched.</p>

**Code 0132**

Component:	Oxygen Sensor
Fault:	O2S 1 Circuit High Voltage
Condition:	Shorted connection or faulty sensor.
Conclusion:	<p>Oxygen Sensor Related</p> <ul style="list-style-type: none"> <li>● Sensor connector or wiring problem.</li> <li>● Sensor contaminated or damaged.</li> <li>● Poor ground path.</li> <li>● Pin circuit wiring or connectors. ECU Black pin 10 or Black pin 17.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>● Difference in voltage between sensed voltage and actual sensor voltage.</li> <li>● Short in wire harness.</li> </ul>

**Code 0171**

Component:	Fuel System
Fault:	Maximum adaptation limit exceeded
Condition:	Fuel inlet screen/filter plugged, low pressure at high pressure fuel line, TPS malfunction, shorted connection, faulty sensor, low fuel or wrong fuel type.
Conclusion:	<p>Oxygen Sensor Related</p> <ul style="list-style-type: none"> <li>● Corrosion or poor connection.</li> <li>● Sensor contaminated or damaged.</li> <li>● Air leak into exhaust.</li> <li>● Poor ground path.</li> <li>● Pin circuit wiring or connectors. ECU Black pin 10 or Black pin 17.</li> </ul> <p>TPS Sensor Related</p> <ul style="list-style-type: none"> <li>● Throttle plate position incorrect during Learn procedure.</li> <li>● TPS problem or malfunction.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>● Difference in voltage between sensed voltage and actual sensor voltage.</li> <li>● Problem in wiring harness.</li> <li>● ECU-to-harness connection problem.</li> </ul> <p>Systems Related</p> <ul style="list-style-type: none"> <li>● Ignition (spark plug, plug wire, ignition coil).</li> <li>● Fuel (fuel type/quality, injector, fuel pressure too low, fuel pump module or lift pump).</li> <li>● Combustion air (air cleaner dirty/restricted, intake leak, throttle bores).</li> <li>● Base engine problem (rings, valves).</li> <li>● Exhaust system leak (muffler, flange, oxygen sensor mounting boss, etc.).</li> <li>● Fuel in crankcase oil.</li> </ul>

# 7 Engine Fault Code

## EFI SYSTEM-ECV

### Code 0172

Component:	Fuel System
Fault:	Minimum adaptation limit exceeded
Condition:	Too high pressure at high pressure fuel line, TPS malfunction, shorted connection, faulty sensor or fuel pump module failure.
Conclusion:	<p>Oxygen Sensor Related</p> <ul style="list-style-type: none"> <li>● Sensor connector or wiring.</li> <li>● Sensor contaminated or damaged.</li> <li>● Poor ground path.</li> <li>● Pin circuit wiring or connectors. ECU Black pin 10 or 17.</li> </ul> <p>TPS Sensor Related</p> <ul style="list-style-type: none"> <li>● Throttle plate position incorrect during Learn procedure.</li> <li>● TPS problem or malfunction.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>● Difference in voltage between sensed voltage and actual sensor voltage.</li> <li>● Problem in wiring harness.</li> <li>● ECU-to-harness connection problem.</li> </ul> <p>Systems Related</p> <ul style="list-style-type: none"> <li>● Ignition (spark plug, plug wire, ignition coil).</li> <li>● Fuel (fuel type/quality, injector, fuel pressure too high, fuel pump module or lift pump).</li> <li>● Combustion air (air cleaner dirty/restricted).</li> <li>● Base engine problem (rings, valves).</li> <li>● Fuel in crankcase oil.</li> <li>● Fuel pump module is over filled.</li> <li>● Lift pump diaphragm is ruptured.</li> </ul>

### Code 0174

Component:	Fuel System
Fault:	Lean fuel condition
Condition:	Fuel inlet screen/filter plugged, low pressure at high pressure fuel line, TPS malfunction, shorted connection or faulty sensor.
Conclusion:	<p>TPS Learn Incorrect</p> <ul style="list-style-type: none"> <li>● Lean condition (check oxygen sensor signal with VOA and see Oxygen Sensor).</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>● Pin circuit wiring or connectors. ECU pin Black 10, 12, 16 and 17.</li> </ul> <p>Low Fuel Pressure</p> <ul style="list-style-type: none"> <li>● Plugged filters.</li> <li>● Bad lift pump.</li> </ul> <p>Oxygen Sensor Related</p> <ul style="list-style-type: none"> <li>● Sensor connector or wiring problem.</li> <li>● Exhaust leak.</li> <li>● Poor ground.</li> </ul> <p>Poor system ground from ECU to engine, causing rich running while indicating lean.</p> <p>Fuel pump module connection. See Fuel Components.</p>

### Code 0201

Component:	Fuel Injector
Fault:	Injector 1 Circuit Malfunction
Condition:	Injector damaged or faulty, shorted or open connection.
Conclusion:	<p>Injector Related</p> <ul style="list-style-type: none"> <li>● Injector coil shorted or opened.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>● Broken or shorted wire in harness. ECU pin Black 5.</li> <li>● Wiring from Ignition.</li> </ul> <p>ECU Related</p> <ul style="list-style-type: none"> <li>● Circuit controlling injector #1 damaged.</li> </ul>

**EFI SYSTEM-ECV**

**Code 0202**

Component:	Fuel Injector
Fault:	Injector 2 Circuit Malfunction
Condition:	Injector damaged or faulty, shorted or open connection.
Conclusion:	<p>Injector Related</p> <ul style="list-style-type: none"> <li>• Injector coil shorted or opened.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>• Broken or shorted wire in harness. ECU pin Black 6.</li> <li>• Wiring from Ignition.</li> </ul> <p>ECU Related</p> <ul style="list-style-type: none"> <li>• Circuit controlling injector #2 damaged.</li> </ul>

**Code 0230**

Component:	Fuel Pump
Fault:	Circuit Low Voltage or Open
Condition:	Shorted or open connection.
Conclusion:	<p>Fuel Pump Related</p> <ul style="list-style-type: none"> <li>• Fuel pump module open or shorted internally.</li> </ul> <p>Engine Wiring Harness related</p> <ul style="list-style-type: none"> <li>• Broken or shorted wire in harness. ECU pin Black 9 or Grey 17.</li> </ul> <p>ECU Related</p> <ul style="list-style-type: none"> <li>• ECU is damaged.</li> </ul>

**Code 0232**

Component:	Fuel Pump
Fault:	Circuit High Voltage
Condition:	Shorted connection.
Conclusion:	<p>Fuel Pump Related</p> <ul style="list-style-type: none"> <li>• Fuel pump module damaged internally.</li> </ul> <p>Charging Output System Too High.</p>

**Code 0336**

Component:	Crankshaft Position Sensor
Fault:	Crankshaft Position Sensor Noisy Signal
Condition:	Air gap incorrect, loose sensor, faulty/bad battery, shorted or faulty connection, faulty sensor or faulty sensor grounding.
Conclusion:	<p>Crankshaft Position Sensor Related</p> <ul style="list-style-type: none"> <li>• Sensor connector or wiring.</li> <li>• Sensor loose or air gap incorrect.</li> </ul> <p>Crankshaft Position Sensor Wheel Related</p> <ul style="list-style-type: none"> <li>• Damaged teeth.</li> <li>• Gap section not registering.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>• Pin circuit wiring or connectors. ECU pin Black 4 and Black 13.</li> <li>• ECU-to-harness connection problem.</li> </ul> <p>Ignition System Related</p> <ul style="list-style-type: none"> <li>• Non-resistor spark plug(s) used.</li> <li>• Faulty or disconnected ignition coil or secondary lead.</li> </ul>

**Code 0337**

Component:	Crankshaft Position Sensor
Fault:	Crankshaft Position Sensor No Signal
Condition:	Air gap incorrect, loose sensor, open or shorted connection or faulty sensor.
Conclusion:	<p>Crankshaft Position Sensor Related</p> <ul style="list-style-type: none"> <li>• Sensor connector or wiring.</li> <li>• Sensor loose or air gap incorrect.</li> </ul> <p>Crankshaft Position Sensor Wheel Related</p> <ul style="list-style-type: none"> <li>• Damaged teeth.</li> </ul> <p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>• Pin circuit wiring or connectors. ECU pin Black 4 or Black 13.</li> <li>• ECU-to-harness connection problem.</li> </ul> <p>If code is stored in fault history and starts normally. Clear code, no other service required.</p>

# 7 Engine Fault Code

## EFI SYSTEM-ECV

### Code 0351

Component:	Ignition Coil
Fault:	Cylinder 1 Ignition Coil Malfunction
Condition:	Broken wire in harness (may not be visible), shorted connection or faulty sensor.
Conclusion:	<p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>● Connection to ignition or fuse.</li> <li>● Pin circuit wiring or connectors.</li> <li>● ECU pin Black 1.</li> <li>● ECU-to-harness connection problem.</li> </ul> <p>Ignition System Related</p> <ul style="list-style-type: none"> <li>● Incorrect spark plug(s) used.</li> <li>● Poor connection to spark plug.</li> </ul>

### Code 0352

Component:	Ignition Coil
Fault:	Cylinder 2 Ignition Coil Malfunction
Condition:	Broken wire in harness (may not be visible), shorted connection or faulty sensor.
Conclusion:	<p>Engine Wiring Harness Related</p> <ul style="list-style-type: none"> <li>● Connection to ignition or fuse.</li> <li>● Pin circuit wiring or connectors.</li> <li>● ECU pin Grey 10.</li> <li>● ECU-to-harness connection problem.</li> </ul> <p>Ignition System Related</p> <ul style="list-style-type: none"> <li>● Incorrect spark plug(s) used.</li> <li>● Poor connection to spark plug.</li> </ul>

### Code 0562

Component:	System Voltage
Fault:	System Voltage Low
Condition:	Faulty voltage regulator, bad fuse or shorted connection.
Conclusion:	<p>Corroded Connections</p> <p>Bad Stator</p> <p>Bad Battery</p> <ul style="list-style-type: none"> <li>● Low output charging system.</li> <li>● Poor magnet in flywheel.</li> <li>● Bad or missing fuse.</li> </ul>

### Code 0563

Component:	System Voltage
Fault:	System Voltage High
Condition:	Faulty voltage regulator or shorted connection.
Conclusion:	<p>Faulty Rectifier-Regulator</p> <p>Bad Stator.</p> <p>Bad Battery.</p>

### Code 61

Component:	End of Code Transmission
------------	--------------------------

### Troubleshooting Flow Chart

Following flow chart provides an alternative method of troubleshooting EFI system. Chart will enable you to review entire system in about 10-15 minutes. Using chart, accompanying diagnostic aids (listed chart), and any signaled fault codes, you should be able to quickly locate any problems within system.

### Flow Chart Diagnostic Aids

#### Diagnostic Aid #1 SYSTEM POWER

(MIL does not illuminate when key is turned ON)

NOTE: MIL is installed by vehicle OEM. Twelve volt supply to bulb will be part of vehicle wire harness. Kohler key switch model will have MIL on engine with 12V supply to bulb.

#### Conclusion

- Battery
- Main system fuse
- MIL light bulb burned out
- MIL electrical circuit problem
  - Pin circuits Grey 3.
- Ignition switch
- Permanent ECU power circuit problem
  - Pin circuit Black 18.
- Switched ECU power circuit problem
  - Pin circuit Black 15.
- ECU grounds
- ECU

#### Diagnostic Aid #2 FAULT CODES

Refer to Diagnostic Fault Code Summary.

#### Diagnostic Aid #3 RUN/ON

(MIL remains ON while engine is running)\*

#### Condition

NOTE: Either incandescent or LED type bulbs can be used for MIL as long as they do not draw more than 0.1 amps. Bulb needs to be rated at 1.4 Watts or less, or needs to have a total resistance of 140  $\Omega$  or more. LEDs typically draw less than 0.03 amps.

All current fault codes will turn on MIL when engine is running.

#### Diagnostic Aid #4 CRANKSHAFT POSITION SENSOR

(MIL does not turn off during cranking)

#### Condition

- Crankshaft position sensor
- Crankshaft position sensor circuit problem, pin circuits Black 4 and Black 13.
- Crankshaft position sensor/toothed wheel air gap
- Toothed wheel
- Flywheel key sheared
- ECU

#### Diagnostic Aid #5 FUEL PUMP

(fuel pump not turning on)

#### Condition

- Main fuse
- Fuel pump circuit problem, pin circuits Black 9 and Grey 17.
- Fuel pump module