SERVICE MANUAL

for
SNAPPER OUT FRONT Z-RIDERS

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## Section I - GENERAL INFORMATION

### OUT FRONT Z-RIDER - '96

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER DECKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZF2200K - 82371</td>
<td>ZF6100M (61” Deck) - 82385</td>
</tr>
<tr>
<td>ZF2500K - 82517</td>
<td>ZF5200M (52” Deck) - 82459</td>
</tr>
</tbody>
</table>

**Literature Pack - 5-4286**
- Operator Manual - 3-5899
- Dealer Set-Up - 3-5892
- Parts Manual - 06106

### OUT FRONT Z-RIDER - '97

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER DECKS</th>
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</thead>
<tbody>
<tr>
<td>1) ZF2200K - 82371</td>
<td>ZF5200M (52” Deck) - 82459</td>
</tr>
<tr>
<td>1) ZF2500K - 82517</td>
<td>ZF6100M (61” Deck) - 82385</td>
</tr>
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**Literature Pack - 5-7724**
- Operator Manual - 4-6480
- Dealer Set-Up - 3-5892
- Parts Manual - 06106

### OUT FRONT Z-RIDER (Diesel) - '97

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER DECKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) ZF2100DKU - 82512</td>
<td>ZF5200M (52” Deck) - 82459</td>
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<tr>
<td></td>
<td>ZF6100M (61” Deck) - 82385</td>
</tr>
</tbody>
</table>

**Literature Pack - 5-4629**
- Operator Manual - 4-5182
- Dealer Set-Up - 3-5892
- Parts Manual - 06113

### OUT FRONT Z-RIDER - '98

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER DECKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) ZF2500KH - 84343</td>
<td>1) ZF5200M (52” Deck) - 84344</td>
</tr>
<tr>
<td></td>
<td>2) ZF6100M (61” Deck) - 84345</td>
</tr>
<tr>
<td></td>
<td>3) ZF7301M (73” Deck) - 84278</td>
</tr>
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</table>

**Literature Pack - 5-7724**
- Operator Manual - 4-6480
- Dealer Set-Up - 3-5892
- Parts Manual - 06106

### OUT FRONT Z-RIDER (Diesel) - '98

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER DECKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) ZF2500DKH - 84342</td>
<td>ZF5200M (52” Deck) - 82459</td>
</tr>
<tr>
<td>2) ZF2300GKU - 84271</td>
<td>ZF6100M (61” Deck) - 82385</td>
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**Literature Pack - 5-4629**
- Operator Manual - 5-5182
- Dealer Set-Up - 3-5892
- Parts Manual - 06113

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- Operator Manual - 4-5182
- Dealer Set-Up - 3-5892
- Parts Manual - 06106

**Literature Pack - 5-6429**
- Operator Manual - 5-5182
- Dealer Set-Up - 3-5892
- Parts Manual - 06113

### OUT FRONT Z-RIDER - '99

<table>
<thead>
<tr>
<th>POWER UNITS</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1) ZF5200M (52” Deck) - 84434</td>
<td></td>
</tr>
<tr>
<td>2) ZF6100M (61” Deck) - 84435</td>
<td></td>
</tr>
<tr>
<td>3) ZF7301M (73” Deck) - 84441</td>
<td></td>
</tr>
</tbody>
</table>

**Literature Pack - 5-7724**
- Operator Manual - 4-6480
- Dealer Set-Up - 3-5892
- Parts Manual - 06106

**Literature Pack - 5-6002**
- Operator/Dealer Set-Up - 4-7174
- Parts Manual - 06125

### OUT FRONT Z-RIDER (Diesel) - '99

<table>
<thead>
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<th>POWER UNITS</th>
<th>MOWER DECKS</th>
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</thead>
<tbody>
<tr>
<td>1) ZF2100DKU - 84410</td>
<td></td>
</tr>
<tr>
<td>1) ZF2300GKU - 84411</td>
<td></td>
</tr>
<tr>
<td>2) EZF2100DKU - 84350</td>
<td></td>
</tr>
</tbody>
</table>

**Literature Pack - 5-4629**
- Operator Manual - 4-5182
- Dealer Set-Up - 3-5892
- Parts Manual - 06106

**Literature Pack - 5-8677**
- Operator Manual - 7-3065
- Dealer Set-Up - 7-3067
- Parts Manual - 06113

### OUT FRONT Z-RIDER

**NOTE**

Model Number Explanations are graphically shown on Page 1.3. Please learn this identification system. It will help in many ways.
## Section I - GENERAL INFORMATION

### 1.2 MODEL NUMBER EXPLANATIONS

#### POWER UNITS

**EXAMPLE 1**

<table>
<thead>
<tr>
<th>PREFIX</th>
<th>BODY</th>
<th>SUFFIX</th>
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</thead>
<tbody>
<tr>
<td>ZF</td>
<td>2500</td>
<td>KH</td>
</tr>
</tbody>
</table>

**MODEL DESIGNATION**
- ZF - Zero Turning - Hydro
- **F** - Front Mounted Mower

**ENGINE HP SERIES**
- 21 - 21 HP
- 23 - 23 HP
- 25 - 25 HP

**ENGINE AND OPTIONS**
- 00 - Series Designation

**EXAMPLE 2**

<table>
<thead>
<tr>
<th>PREFIX</th>
<th>BODY</th>
<th>SUFFIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZF</td>
<td>2100</td>
<td>DKU</td>
</tr>
</tbody>
</table>

**MODEL DESIGNATION**
- EZF - European Market
- **F** - Front Mounted Mower

**ENGINE HP SERIES**
- 21 - 21 HP
- 23 - 23 HP
- 25 - 25 HP

**ENGINE AND OPTIONS**
- 00 - Series Designation

### EXPLANATION

<table>
<thead>
<tr>
<th>PREFIX</th>
<th>BODY</th>
<th>SUFFIX</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E</em> - European Market</td>
<td>21 - 21 HP</td>
<td>KH - Kohler Engine</td>
</tr>
<tr>
<td>Z - Zero Turning - Hydro</td>
<td>23 - 23 HP</td>
<td>DKU - Kubota Diesel Engine</td>
</tr>
<tr>
<td><strong>F</strong> - Front Mounted Mower</td>
<td>25 - 25 HP</td>
<td>GkU - Kubota Gas Engine</td>
</tr>
<tr>
<td></td>
<td>00 - Series Designation</td>
<td></td>
</tr>
</tbody>
</table>

#### MOWER UNITS

**EXAMPLE 1**

<table>
<thead>
<tr>
<th>PREFIX</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ZF</td>
<td>5200</td>
<td>M</td>
</tr>
</tbody>
</table>

**TYPE OF POWER UNIT**
- ZF - Zero Turning - Hydro
- **F** - Front Mounted Mower

**SIZE SERIES**
- 52 - 52" Mower Cutting Width
- 61 - 61" Mower Cutting Width
- 73 - 73" Mower Cutting Width

**MOWER DECK**
- 00 - Series Designation
- 01 - Series Designation

**EXAMPLE 2**

<table>
<thead>
<tr>
<th>PREFIX</th>
<th>BODY</th>
<th>SUFFIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZF</td>
<td>6100</td>
<td>M</td>
</tr>
</tbody>
</table>

**TYPE OF POWER UNIT**
- EZF - European Market
- **F** - Front Mounted Mower

**SIZE SERIES**
- 61 - 61" Mower Cutting Width
- 73 - 73" Mower Cutting Width

**MOWER DECK**
- 00 - Series Designation
- 01 - Series Designation

### EXPLANATION

<table>
<thead>
<tr>
<th>PREFIX</th>
<th>BODY</th>
<th>SUFFIX</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E</em> - European Market</td>
<td>52 - 52&quot; Mower Cutting Width</td>
<td>M - Mower Deck</td>
</tr>
<tr>
<td>Z - Zero Turning - Hydro</td>
<td>61 - 61&quot; Mower Cutting Width</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong> - Front Mounted Mower</td>
<td>73 - 73&quot; Mower Cutting Width</td>
<td></td>
</tr>
<tr>
<td></td>
<td>00 - Series Designation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>01 - Series Designation</td>
<td></td>
</tr>
</tbody>
</table>

*When Used, It Is Always First Letter of Model Number
**Appears After First or Second Letter Of Model Number*
Section I - GENERAL INFORMATION

INTRODUCTION

1.3 HOW TO USE THIS MANUAL
This manual contains the Service and Maintenance information required to properly inspect, service and repair the OUT FRONT Z-RIDER Power Units and their compatible Mower Units (ZF5200M, ZF6100M & ZF7301M).

The manual is divided into sections for quick, easy reference. Carefully read all procedures described for servicing a particular component BEFORE repairs are started, to avoid needless disassembly.

NOTE
References to the RIGHT and LEFT sides are determined by facing forward while sitting in the Operator’s Seat.

1.4 WARNINGS & CAUTIONS
Details of standard workshop safety procedures are not included in this manual. WARNINGS & CAUTIONS occur where procedures, if improperly performed, could cause personal injury, and/or damage to the unit or its components. These WARNINGS & CAUTIONS do not cover all conceivable ways hazardous consequences could be created by improperly following the instructions or by the incorrect use of service tools.

1.5 SERIAL NUMBER LOCATION
The Unit Serial Number is located on the inside of the rear of the right hand fender.

1.6 TOOL REQUIREMENTS
The normal complement of U.S. Standard tools found in most repair shops are all that will normally be needed to repair SNAPPER OUT FRONT Z-RIDERS. Special tools and meters are mentioned where needed in the manual. Refer to the specified Parts Manual for special tools available through SNAPPER Dealers.

NOTE
Throughout the following sections of this manual, you may find the abbreviations ZF or OFZ being used in lieu of OUT FRONT Z-RIDER. These are acronyms of common usage to describe various models of the machine.

1.7 SPECIFICATIONS - GENERAL

A. ENGINE SPECIFICATIONS
Refer to the Engine Manufacturer’s Manuals.

B. HYDRO TRANSAXLE SPECIFICATIONS
The Power Units covered in this manual will have the following Hydro Transaxle Combinations:
1. Eaton 771A (R.H.), 771B (L.H.)
2. Refer to the Hydro Transaxle Manufacturer’s Shop Manuals for repair procedures.

C. TIRE SPECIFICATIONS
The Power Units covered in this manual are furnished with tires having four (4) different parts numbers. Traction Tire Pressures are to be maintained at 12 PSI while Caster Tires are to be kept at 25 PSI.

1.8 SPECIFICATIONS - TORQUE VALUES
Standard Torque Specifications and Capscrew Markings Chart. The values given here are based on the use of clean and dry threads. Reduce torque by 10 percent when threads are lubricated with engine oil and by 20 percent if new plated capscrews are used.

<table>
<thead>
<tr>
<th>CAPSCREW HEAD MARKINGS</th>
<th>CAPSCREW BODY SIZE Inches - Thread</th>
<th>SAE 1 or 2</th>
<th>SAE 5</th>
<th>SAE 6 or 7</th>
<th>SAE 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SAE 1 or 2 Torque Ft. - Lb</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>SAE 5 Torque Ft. - Lb</td>
<td>6</td>
<td>10</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>SAE 6 or 7 Torque Ft. - Lb</td>
<td>13</td>
<td>19</td>
<td>34</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>SAE 8 Torque Ft. - Lb</td>
<td>20</td>
<td>35</td>
<td>49</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>1/4 - 20</td>
<td>28</td>
<td>49</td>
<td>55</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>- 28</td>
<td>30</td>
<td>55</td>
<td>78</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>5/16 - 18</td>
<td>1/2 - 13</td>
<td>39</td>
<td>75</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>- 20</td>
<td>41</td>
<td>85</td>
<td>105</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>9/16 - 12</td>
<td>51</td>
<td>110</td>
<td>120</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td>- 18</td>
<td>55</td>
<td>120</td>
<td>167</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td>5/8 - 11</td>
<td>83</td>
<td>150</td>
<td>157</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>- 18</td>
<td>95</td>
<td>170</td>
<td>280</td>
<td>375</td>
</tr>
<tr>
<td></td>
<td>3/4 - 10</td>
<td>- 16</td>
<td>105</td>
<td>295</td>
<td>420</td>
</tr>
</tbody>
</table>

1.9 WORKSHOP SAFETY HINTS

A. DO NOT run engine in an enclosed area - exhaust fumes are hazardous to your health.

B. DO NOT smoke, light a fire or create any sparks near gasoline or diesel fuel - both are flammable, gasoline in particular.

C. DO NOT use gasoline as a solvent. Fumes are dangerous. Always use non-flammable solvents.

D. DO NOT store gasoline in an area where sparks or flames are present such as near water heaters or furnaces - gasoline fumes are extremely explosive.

E. ALWAYS disconnect the spark plug wires and secure the ends away from the plug BEFORE inspecting, servicing or repairing the unit or attachments. Precautions prevent accidents such as unintentional start-ups!
Section I - GENERAL INFORMATION

F. ALWAYS make adjustments and do repairs in a well-lit and well-ventilated area.

G. ALWAYS wear protective safety goggles when using pressurized air to clean the machine or parts.

H. DO NOT use a jack to support the OUT FRONT Z-RIDER in a raised position. Use a chain hoist, "jack stands" or other stable supports that will hold up BOTH sides of the frame at the same time. This approach is especially important when raising and supporting the rear end of the unit. When lifting the rear of the unit (with deck attached), the mower deck caster wheels may pivot - therefore, both sides of the rear frame MUST be securely supported. Be sure to chock (block) the front caster wheels.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
</table>
| If welding repairs are to be made on the OUT FRONT Z-RIDER, observe the following precautionary steps before welding:
A. ALWAYS disconnect or remove the battery.
B. ALWAYS attach grounding lead a minimum of 2 FEET (24") from area to be welded. (Make certain welder ground is not located at a seal or bearing).
C. ALWAYS shut-off fuel supply valves.
D. ALWAYS make sure that fuel tank caps are tightened securely.
E. ALWAYS drape fuel tanks with wet towels.
F. ALWAYS keep a fire extinguisher and other fire fighting apparatus close by.
G. ALWAYS practice SAFETY when welding! |

NOTE
Read the Operator's and Engine Owner's Manuals and instructions BEFORE operating equipment.
## Section II
TROUBLESHOOTING

### CONTENTS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PAGE No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>2.2 - 2.3</td>
</tr>
<tr>
<td>Hydro Transaxle (Traction Drive)</td>
<td>2.3</td>
</tr>
<tr>
<td>Mower Unit</td>
<td>2.3 - 2.4</td>
</tr>
<tr>
<td>Battery</td>
<td>2.4</td>
</tr>
<tr>
<td>Maintenance Parts Chart</td>
<td>2.4</td>
</tr>
<tr>
<td>Service &amp; Lubrication Chart</td>
<td>2.5</td>
</tr>
<tr>
<td>Service Schedule</td>
<td>2.6</td>
</tr>
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</table>
## Section II - TROUBLESHOOTING ENGINE

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>PROBABLE CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Backfires When Throttle Control set to “FAST” position. Turned to “STOP”.</td>
<td></td>
<td>Set Throttle Control to “SLOW” and allow Engine to idle. Then, turn Key to “OFF”.</td>
</tr>
<tr>
<td>Excessive Vibration.</td>
<td>Damaged or bent Mower Blade(s). Loose Blade components. Loose or missing Air Lift (if equipped). Frayed or damaged Belts. Loose or damaged Pulleys.</td>
<td>Service Mower Blade(s). Service and tighten loose parts. Replace Air Lifts. Tighten to proper torque. Replace Belts. Inspect and tighten/replace.</td>
</tr>
</tbody>
</table>

(Troubleshooting Continued on Next Page)
### Section II - TROUBLESHOOTING ENGINE

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>PROBABLE CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
</table>

### HYDRO TRANSAXLE (Traction Drive)

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>PROBABLE CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of Traction.</td>
<td>Traction Drive Belt requires replacement.</td>
<td>Replace Traction Drive Belt. (See MAINTENANCE PARTS, Pg. 2.4).</td>
</tr>
</tbody>
</table>

### MOWER UNIT

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>PROBABLE CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blade(s) Not Cutting</td>
<td>Blade Engagement Switch in the &quot;OFF&quot; position. Clutch Belt slipping.</td>
<td>Move Blade Switch to the &quot;ON&quot; position. Replace Clutch Belt. (See MAINTENANCE PARTS, Pg. 2.4).</td>
</tr>
<tr>
<td>NOTE</td>
<td>See Section VIII for Detailed &quot;Corrective Action&quot; in Solving Cutting Problems.</td>
<td></td>
</tr>
<tr>
<td>Poor Grass Discharge. (See Section VIII).</td>
<td>Engine speed too slow. Forward speed too fast. Grass is wet. Excessively worn or damaged Blade(s). Buildup of grass clippings and debris under Deck. Improper Blade(s) installed on Deck. Blade(s) installed improperly on Deck.</td>
<td>Move Throttle Control to &quot;FAST&quot; position. Move Motion Control Levers to a slower speed. Mow when grass is dry. Service Mower Blade(s). Clean Deck. Install proper SNAPPER Blade(s). Install Blade(s) properly.</td>
</tr>
</tbody>
</table>
Section II - TROUBLESHOOTING
MOWER UNIT (Continued from Page 2.3)

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>PROBABLE CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deck Will Not Lift Properly.</td>
<td>Loose or disconnected Electrical Harness.</td>
<td>Connect Electrical Harness</td>
</tr>
<tr>
<td></td>
<td>Key Switch is in &quot;OFF&quot; position.</td>
<td>Turn Key Switch to &quot;ON&quot; position.</td>
</tr>
<tr>
<td>Oil Leaking.</td>
<td>Loose or missing Hydraulic Reservoir Cap.</td>
<td>Check oil level and replace Reservoir Cap.</td>
</tr>
<tr>
<td></td>
<td>Leaking Hose Fittings, Clamps or Reservoir.</td>
<td>Verify Fittings and Hose Clamps are tight.</td>
</tr>
</tbody>
</table>

**BATTERY**

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>PROBABLE CAUSE</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Will Not Charge.</td>
<td>Poor Cable connections.</td>
<td>Clean Cables and Battery Terminals.</td>
</tr>
<tr>
<td></td>
<td>Bad Battery Cell(s).</td>
<td>Replace with new Battery.</td>
</tr>
<tr>
<td></td>
<td>Faulty Alternator.</td>
<td>Repair or replace Alternator.</td>
</tr>
<tr>
<td></td>
<td>Blown Fuse.</td>
<td>Replace Fuse.</td>
</tr>
</tbody>
</table>

**MAINTENANCE PARTS**

<table>
<thead>
<tr>
<th>REreplacement PARTS</th>
<th>POWER UNITS</th>
<th>MOWER UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
<td>ZF2200K</td>
<td>ZF2500K</td>
</tr>
<tr>
<td>Battery</td>
<td>3-5610</td>
<td>•</td>
</tr>
<tr>
<td>Oil Filter, Hydro</td>
<td>4-5184</td>
<td>•</td>
</tr>
<tr>
<td>Fuel Filter</td>
<td>4-4777</td>
<td>(Order from KOHLER)</td>
</tr>
<tr>
<td>Mower Blades</td>
<td>2-9246</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1-7081</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-9251</td>
<td></td>
</tr>
<tr>
<td>Belt, Mower Deck</td>
<td>4-2776</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-5542</td>
<td></td>
</tr>
<tr>
<td>Belt, Upper Drive</td>
<td>3-5544</td>
<td>• (2)</td>
</tr>
<tr>
<td>Shaft to Hydro Pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belt, Deck Drive</td>
<td>3-5543</td>
<td>• (2)</td>
</tr>
<tr>
<td>Shaft to Electric</td>
<td>4-1830</td>
<td>• (2)</td>
</tr>
<tr>
<td>Clutch</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** For those parts not listed above, consult SNAPPER Parts Manual No. 06106 (REV 2, 11/97).
Section II - TROUBLESHOOTING
SERVICE & LUBRICATION CHART

NOTE:
The Power Unit illustrated below is indicative of all models of the SNAPPER OUT FRONT Z-RIDER. It is shown with a representative 52" or 61" Mower Unit attached and is intended to give a general overview of the various components. Use common sense when servicing - if a sliding surface shows signs of wear, it needs lubrication. If a component is equipped with a grease fitting, it requires grease, etc.

NOTE
Use Kendall NLG1 No.2 Lithium Grease (or equivalent) for all grease requirements unless otherwise specified.

ENGINE
SEE SERVICE SCHEDULE. CHECK OIL DAILY.

FUEL FILTER
REPLACE EVERY 100 HOURS.

INTERLOCK SWITCHES
INSPECT DAILY. DO NOT LUBRicate.

DRIVE BELTS
INSPECT WEEKLY.

UPPER DRIVE SHAFT
& DECK DRIVE SHAFT
GREASE WEEKLY.

TIRE PRESSURE
12 PSI (CHECK DAILY).

CUTTER DECK
IDLER ARM PIVOT
GREASE WEEKLY.

TRANSAxLES
• CHECK OIL LEVEL EVERY 50 HOURS.
• CHANGE FILTER EVERY 500 HOURS.

TIRE PRESSURE
25 PSI (CHECK DAILY).

CUTTER BLADES
SHARPEN DAILY. TORQUE TO 60-75 LBS.

NOTE
LUBRIFICATE ALL LINKAGE CONNECTION POINTS WEEKLY WITH A LIGHT COAT OF 30W MOTOR OIL.

AXLE PIVOT
GREASE WEEKLY.

MUFLER
INSPECT OFTEN FOR SIGNS OF DETERIORATION OR "BURN-OUT".

CASTER SWIVEL
GREASE WEEKLY.

TIRE PRESSURE
25 PSI (CHECK DAILY).

CASTER WHEEL BEARINGS
GREASE EVERY 100 HOURS.

CASTER WHEEL BEARINGS
GREASE EVERY 100 HOURS.

CASTER WHEEL BEARINGS
GREASE EVERY 100 HOURS.

CASTER SWIVEL
GREASE WEEKLY.

REMOVE DEBRIS FROM UNDER BELT COVER & DECK BLOW CLEAN DAILY. WASH WEEKLY.

CUTTER BLADE SPINDLES
GREASE EVERY 25 HOURS.

MANUAL No. 07225 (I.R. 4/00) 2.5 SERVICE - OUT FRONT Z-RIDER
## Section II - TROUBLESHOOTING
### SERVICE SCHEDULE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SERVICE PERFORMED</th>
<th>EACH USE</th>
<th>5 HRS</th>
<th>25 HRS</th>
<th>50 HRS</th>
<th>75 HRS</th>
<th>100 HRS</th>
<th>EACH SEASON</th>
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<tbody>
<tr>
<td>Engine Oil</td>
<td><strong>Check Oil Level</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td><strong>Initial Oil Change</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Gas Eng.</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Periodic Oil Change</strong></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X*</td>
<td></td>
<td>Diesel</td>
</tr>
<tr>
<td></td>
<td><em>Gas Eng.</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Change Oil Filter</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>Diesel</td>
</tr>
<tr>
<td></td>
<td><em>Gas Eng.</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Pre-Cleaner</td>
<td><strong>Clean Sponge Element</strong></td>
<td></td>
<td>X**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Gas Eng.</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Cleaner</td>
<td><strong>Clean or Replace</strong></td>
<td>X**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X Diesel</td>
</tr>
<tr>
<td></td>
<td><em>Gas Eng.</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Filter</td>
<td><strong>Replace</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X Diesel</td>
</tr>
<tr>
<td>Engine Cooling System</td>
<td><strong>Clean Shroud &amp; Fins</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X** Kohler</td>
</tr>
<tr>
<td>Engine Cooling System</td>
<td><strong>Clean Radiator Screen &amp; Fins</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X**</td>
<td></td>
<td>Kubota</td>
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<tr>
<td>Engine Cooling System</td>
<td><strong>Check Coolant Level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>See Engine Manual</td>
</tr>
<tr>
<td>Battery</td>
<td><strong>Check Electrolyte</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X X</td>
</tr>
<tr>
<td></td>
<td><strong>Charge Battery</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X***</td>
</tr>
<tr>
<td></td>
<td><strong>Testing Battery</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tires</td>
<td><strong>Check Air Pressure</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X X</td>
</tr>
<tr>
<td>Drive Belts</td>
<td><strong>Check For Wear, Damage &amp; Replacement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Mower Deck</td>
<td><strong>Clean Outside &amp; Underside of Debris Accumulation</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication Points</td>
<td><strong>Grease or Oil</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Hydrostatic Trans.Oil</td>
<td><strong>Check Oil Level</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Hydrostatic Trans. Filter</td>
<td><strong>Replace Filter</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>First Change at 200 Hours. Thereafter every 500 Hours.</td>
</tr>
</tbody>
</table>

- Change oil every 25 hours when operating under heavy load or high temperatures.
- **Clean more often under dusty conditions or when air debris is present.**
- ***Charge battery every one or two months as specified by Engine Owner's Manual.***
## Section III
### ELECTRICAL

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<td>3.2</td>
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<td>3.7</td>
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<td>3.7</td>
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<tr>
<td>• Battery Installation</td>
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</tr>
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<td>• Battery Service</td>
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<tr>
<td>• Battery Testing</td>
<td>3.7 - 3.8</td>
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<td>3.8</td>
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<td>3.10</td>
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<tr>
<td>• Park Brake Switch Test</td>
<td>3.10</td>
</tr>
<tr>
<td>• Seat Switch Test</td>
<td>3.10</td>
</tr>
<tr>
<td>Deck Lift Switch Test</td>
<td>3.11</td>
</tr>
<tr>
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<td>3.11</td>
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<td>Notes</td>
<td>3.12</td>
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Section III - ELECTRICAL SYSTEM
INTRODUCTION
The Electrical Systems of the OUT FRONT Z-RIDERS consist of three circuits which are the Ignition, Charging and Starting Circuits. This section covers the Starting Circuit only. Refer to the Engine Manuals for information concerning the Ignition and Charging Circuits - these are Internal Engine Circuits.

3.1 STARTING CIRCUIT (Principle of Operation)
The Safety Interlock System is an electrical loop containing three Interlock Switches; Seat, Park Brake and PTO Control Switch. Activation of the Park Brake will manually lock the Steering Control. The three Interlock Switches MUST be closed at the same time before the Engine can be started. If any of the three are open, the Circuit will not be grounded and the Starting Solenoid cannot be activated. After the Engine has been started, the PTO Switch can be closed and the Park Brake released to free the Steering Control. The Key Switch must remain open (in RUN position) and the operator must remain in the seat to keep the Seat Switch closed. The Interlock System will "kill" the Engine if the operator vacates the seat UNLESS the PTO Switch (Mower Blade) has been turned OFF, the Steering Control placed in NEUTRAL and the Parking Brake set.

3.2 WIRING HARNESS
Shown in Figures 3.1 & 3.2 are the Battery Cables and Wiring Harnesses for the OUT FRONT Z-RIDER. These apply to all models. See "Cable & Plug Connection Chart" on Pages 3.3 & 3.4 for connection locations. Wiring Schematics are shown on Pages 3.4, 3.5 and 3.6.
### CABLE & PLUG CONNECTION CHART (Kubota Engines)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4-5312</td>
<td>CABLE, Battery - Positive</td>
</tr>
<tr>
<td>2</td>
<td>4-5311</td>
<td>CABLE, Battery - Negative</td>
</tr>
<tr>
<td>19</td>
<td>4-5200</td>
<td>HARNESS, Control Panel (Model ZF2100DKU)</td>
</tr>
<tr>
<td>20</td>
<td>4-7240</td>
<td>HARNESS, Control Panel (Model ZF2300GKU)</td>
</tr>
<tr>
<td>20</td>
<td>4-5201</td>
<td>HARNESS, D722B-I/D 722EB-1 Kubota Engine</td>
</tr>
<tr>
<td>30</td>
<td>4-5334</td>
<td>HARNESS, WG750ELP-1 Kubota Engine</td>
</tr>
<tr>
<td>36</td>
<td>4-8348</td>
<td>HARNESS, Deck Lift</td>
</tr>
<tr>
<td>37</td>
<td>4-5310</td>
<td>CABLE, Ground-Chassis (Model ZF2100DKU)</td>
</tr>
<tr>
<td>37</td>
<td>5-8364</td>
<td>CABLE, Ground-Chassis (Model ZF2300GKU)</td>
</tr>
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</table>

#### PLUG CONNECTIONS

<table>
<thead>
<tr>
<th>PLUG</th>
<th>CONNECTS TO:</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>Engine Harness</td>
</tr>
<tr>
<td>B</td>
<td>Battery</td>
</tr>
<tr>
<td>C</td>
<td>Terminal &quot;30&quot; (5A)</td>
</tr>
<tr>
<td>D</td>
<td>Terminal &quot;17&quot; (2A)</td>
</tr>
<tr>
<td>E</td>
<td>Battery Terminal (Neg.)</td>
</tr>
<tr>
<td>F</td>
<td>Control Panel Harness</td>
</tr>
<tr>
<td>G</td>
<td>Starter Solenoid</td>
</tr>
<tr>
<td>H</td>
<td>Control Panel Harness</td>
</tr>
<tr>
<td>I</td>
<td>Battery Terminal (Pos.)</td>
</tr>
<tr>
<td>J</td>
<td>PTO</td>
</tr>
<tr>
<td>K</td>
<td>Regulator</td>
</tr>
<tr>
<td>L</td>
<td>Ground (Engine Base)</td>
</tr>
<tr>
<td>M</td>
<td>Main Harness</td>
</tr>
<tr>
<td>N</td>
<td>Ground (Chassis)</td>
</tr>
<tr>
<td>O</td>
<td>Starter Solenoid</td>
</tr>
</tbody>
</table>

#### BATTERY CABLES & WIRING HARNESS

Models ZF2200K & ZF2500K (Kohler Engines)

See Page 3.4 for “CABLE & PLUG CONNECTION CHART” (Kohler Engines)
Section III - ELECTRICAL SYSTEM

CABLE & PLUG CONNECTION CHART (Kohler Engines)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-5607</td>
<td>CABLE, Battery - Positive</td>
</tr>
<tr>
<td>2</td>
<td>3-5609</td>
<td>CABLE, Battery - Negative</td>
</tr>
<tr>
<td>19</td>
<td>3-5606</td>
<td>HARNESS, Control Panel</td>
</tr>
<tr>
<td>20</td>
<td>3-5614</td>
<td>HARNESS, Front</td>
</tr>
<tr>
<td>30</td>
<td>4-2834</td>
<td>HARNESS, Deck Lift</td>
</tr>
</tbody>
</table>

**PLUG**
- A. Electric Clutch
- B. Starter Solenoid
- C. Engine
- D. Battery
- E. Deck Lift Switch
- F. Fuse Box (Mounted Under Console Panel)
- G. PTO Switch
- H. Light Switch
- I. Amp Meter
- J. Hour Meter
- K. Buzzer
- L. Front Harness
- M. Ignition Switch
- N. Electric Screwjack

**CONNECTS TO:**
- O. Front Harness
- P. Battery Terminal (Neg.)
- Q. Control Panel Harness (Green Wire)
- R. Ground (Engine Base)
- S. Control Panel Harness
- T. Right Head Light
- U. Park Brake Switch
- V. Seat Switch
- W. Deck Lift Harness
- X. Left Head Light
- Y. Starter Solenoid
- Z. Control Panel Harness (Black Wire)
- AA. Battery Terminal (Pos.)

**WIRING SCHEMATIC**

MODELS ZF2200K & ZF2500K (Kohler Engines)

![Wiring Diagram](image)

**FIGURE 3.3**

MANUAL No. 07225 (I.R. 4/00)
Section III - ELECTRICAL SYSTEM

3.3 BATTERY

A. BATTERY REMOVAL
1. Remove Battery Spring & Bracket.
2. Slide Terminal Cover away from Positive Terminal.
3. Observe and note Cable positions on Battery. See Figure 3.6.
4. Disconnect Cables from Battery Terminals, disconnecting BLACK (Negative) Cable first, then disconnect RED (Positive) Cable last. Retain Mounting Bolts and Nuts.

B. BATTERY INSTALLATION
1. Position Battery into Battery Compartment.
3. Reinstall Battery Bracket, Spring and Terminal Cover. Refer to Figure 3.6.

WARNING
Shield the Positive Terminal with Terminal Cover located on Battery Harness. This prevents metal from touching the Positive Terminal which could cause sparks. Cables must be connected to Battery Terminals in the proper position. RED (Positive) Cable must go to the (+) Terminal. Black (Negative) Cable must go to the (-) Terminal.

C. BATTERY SERVICE
1. Remove Battery.
2. Place Battery in a well-ventilated area on a level surface.
3. Using distilled water, refill Cells as required to cover Cell Plates.
4. With Cell Caps removed, connect Battery Charger to Battery Terminals. RED to Positive (+) Terminals and BLACK to Negative (-) Terminal. See Figure 3.7.

WARNING
The electrolyte (acid) produces a highly explosive gas. Keep all sparks, flame and fire away from area when charging Battery or when handling electrolyte or Battery. Electrolyte (acid) is a highly corrosive liquid. Wear eye protection. Wash affected areas immediately after having eye or skin contact with electrolyte (acid). Battery acid is corrosive. Rinse empty acid containers with water and mutilate before discarding. If acid is spilled on Battery, bench or clothing, etc., flush with clear water and neutralize with baking soda.

D. BATTERY TESTING
There are two types of Battery Tests - Unloaded and Loaded. The Unloaded Test is the procedure that will be discussed. An Unloaded Test is made on a Battery without discharging current. To perform Unloaded Testing, check charge condition using either a hydrometer or voltmeter.
1. Using a voltmeter, voltage readings appear instantly to show the state of charge. Remember to hook the Positive Lead to the Battery's Positive Terminal, and the Negative Lead to the Negative Terminal.

(Continued on Following Page)
2. A Hydrometer measures the specific gravity of each cell. The specific gravity tells the degree of charge, generally a specific gravity of about 1.265 to 1.280 indicates full charge. A reading of 1.230 to 1.260 indicates the Battery should be charged before testing. The charge above shows the charge level as measured by Syringe Float Hydrometer, Digital Voltmeter and Five Ball Hydrometer.

E. NEW BATTERY PREPARATION
1. Removed Battery from carton.
2. Place Battery in a well-ventilated area on a level non-concrete surface.
3. Remove Battery Cell Caps. Fill Cells as required with Electrolyte to proper level. Fill to 3/16" above Cell Plates. Filling Battery with Electrolyte will bring the Battery to 80% charged state.

**IMPORTANT!**
3/16" above Cell Plates is the recommended level. However, do not try to measure this dimension. Never place anything in Battery other than specified Electrolyte.

**WARNING**
DO NOT OVERFILL!

4. With Cell Caps removed, connect Battery Charger to Battery Terminals; RED to Positive (+) and BLACK to Negative (-) Terminal.

**WARNING**
Never attempt to service or charge the Battery while it is installed in the machine. Never use “BOOST” chargers on the Battery.

5. Slow charge the Battery at 1 amp for 2 hours to bring the Battery to full charge.

6. After charging, check level of Electrolyte and add as needed to bring level to 3/16" above Cell Plates.
7. Reinstall Cell Caps.
8. Install Battery into Power Unit.
9. Connect Positive (+) Cable (RED) first, then Wiring Harness to the Positive Terminal (+) on Battery using bolt and nut provided. Connect Negative (-) Cable (BLACK) last, to Negative Terminal (-) on Battery using bolt and nut. Apply a small amount of grease over Terminals to prevent corrosion.

**WARNING**
Shield the Positive Terminal with Terminal Cover located on Battery Harness. This prevents metal from touching the Positive Terminal which could cause sparks. Cables must be connected to Battery Terminals in the proper position. RED (Positive) Cable must go to the (+) Terminal. BLACK (Negative) Cable must go to the (-) Terminal.
Section III - ELECTRICAL SYSTEM

3.4 INTERLOCK SYSTEM ANALYSIS

A. KEY SWITCH TEST (DIESEL ENGINES)
   1. Slide the Protective Rubber Boot away from the Switch Terminals.
   2. Disconnect wires from the Switch Terminals. See Figure 3.8.
   3. Hold the Switch in the PREHEAT Position and, using an Ohmmeter, connect Terminals AC and 19 - it should show continuity. Now, connect Terminals AC and 30 - there should be continuity.
   4. Place the Switch in the OFF Position. There should be no continuity.
   5. Hold the Switch in the START Position after connecting the Ohmmeter to Terminals AC and 17 - there should be continuity. Now, connect Terminals AC and 30 - there should be continuity. Terminals AC and 50 should show continuity, also.
   6. Turn Key to RUN Position. Connect Ohmmeter to Terminals AC and 30. There should be continuity.
   7. Reconnect Harness Wires to Switch Terminals after completing test. Replace Rubber Boot.

<table>
<thead>
<tr>
<th>POSITION</th>
<th>CIRCUIT &quot;MAKE&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PREHEAT</td>
<td>AC - 19 - 30</td>
</tr>
<tr>
<td>2. OFF</td>
<td>NONE</td>
</tr>
<tr>
<td>3. RUN</td>
<td>AC - 30</td>
</tr>
<tr>
<td>4. START</td>
<td>AC - 17 - 30 - 50</td>
</tr>
</tbody>
</table>

FIGURE 3.8

B. KEY SWITCH TEST (GAS ENGINES)
   1. Slide the Protective Rubber Boot away from the Switch Terminals.
   2. Disconnect Wires from the Switch Terminals. See Figure 3.9.
   3. Place the Switch in the OFF Position. There should be no continuity.
   4. Hold the Switch in the START Position after connecting the Ohmmeter to Terminals AC and 17 - there should be continuity. Now, connect Terminals AC and 30 - there should be continuity. Terminals AC and 50 should show continuity, also.
   5. Reconnect Harness Wires to Switch Terminals after completing test. Replace Rubber Boot.

<table>
<thead>
<tr>
<th>POSITION</th>
<th>CIRCUIT &quot;MAKE&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. OFF</td>
<td>NONE</td>
</tr>
<tr>
<td>2. RUN</td>
<td>AC - 30</td>
</tr>
<tr>
<td>3. START</td>
<td>AC - 17 - 30 - 50</td>
</tr>
</tbody>
</table>

FIGURE 3.9
Section III - ELECTRICAL SYSTEM

C. PTO SWITCH TEST
1. Disconnect Wire Connectors from the Switch Terminals. See Figure 3.10.
2. Push Knob down to OFF position and connect Tester Leads to the Switch Terminals as follows:
   a) #3 and #7
   b) #6 and #7 - the Light should NOT come on.
   c) #1 and #4
3. Pull Knob up to ON position and connect Tester Leads to the Switch Terminals as follows:
   a) #1 and #4
   b) #2 and #5 - the Light SHOULD come on.
   c) #3 and #6

D. PARK BRAKE SWITCH TEST
1. Disconnect the Wires from the four Switch Terminals. See Figure 3.11.
2. Attach a Continuity Light to the two Terminals marked NC. Turn the Light Switch on - the bulb should light. Depress the Switch Button and the bulb should go out.
3. Next, attach the Light to the two UNMARKED Terminals. Turn the Light Switch ON and depress the Switch Button - the bulb should light ONLY when the Button is depressed.

E. SEAT SWITCH TEST
1. Disconnect Seat Switch Plug from Seat Switch. See Figure 3.12.
2. Attach Continuity Light Wires to the Terminals.
3. Have a helper to depress the Seat Switch by pushing in on the Seat area directly above the Switch. When the Switch is depressed (making the circuit), the Light should come on.
4. Reconnect wires to the proper Terminals.

IMPORTANT!
The Seat Switch Plug is equipped with a Grounding Plunger which will ground the Magneto unless fully depressed. Make certain you have a firm connection when attaching Plug to Seat Switch.

FIGURE 3.10

FIGURE 3.11

FIGURE 3.12
Section III - ELECTRICAL SYSTEM

3.5 DECK LIFT SWITCH TEST

A. The self-centering Deck Lift Switch has three positions:
   Position 1 - UP
   Position 2 - NEUTRAL (Self-Centering)
   Position 3 - DOWN

B. Test the Switch using an Ohmmeter as follows:
   1. Disconnect wires from the Switch Terminals.
      See Figure 3.13.
   2. Push Switch to UP Position and, while holding in place, connect Terminals A and D - it should show continuity. Connect Terminals B and C - they also should show continuity.
   3. Release Switch, allowing it to assume the NEUTRAL Position. Test. There should be no continuity.
   4. Move Switch to DOWN Position and hold in place. Connect Terminals C and D - there should be continuity. Connect Terminals A and B - there should be continuity.

---

IMPORTANT

CAUTION

(Kubota Engines Only)

If the Chassis Ground Cable (Item No. 37, Figure 3.1) has been removed or loosened for any reason, make certain that it is properly attached and securely grounded to the lower chassis (frame) before starting Engine!

If this Cable is not properly grounded, the circuit will seek ground through the Engine. This circumstance can result in the burn-out of the Main Bearings in less than 40 hours of operation.
OEM ENGINE SERVICE MANUAL
KOHLER
COMMAND ENGINES - 18, 20, 22 & 25 HP Horizontal Crankshaft
Form No: TP - 2428A
Issue Date: 4/92
Revised: 4/94
Contact: Kohler Sales & Service 1-800-544-2444

Section IV
ENGINE & FUEL SYSTEM
(Kohler 22 & 25 HP ENGINES)

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Section IV - ENGINE & FUEL SYSTEM

INTRODUCTION
This Section covers only those SNAPPER OUT FRONT Z-RIDERS powered by Kohler Twin Cylinder, Air-Cooled, 22 and 25 HP Gasoline Engines. See Section V for information covering service of Kubota gasoline and diesel engines.

The following information covers the maintenance, removal and installation of these engines. Refer to the Manufacturer's Service/Repair Manuals for information covering Engine Repair.

4.1 ENGINE MAINTENANCE (KOHLER)

A. ENGINE OIL
1. Change Engine Oil on a regular schedule. Use only those oils classified for Service SF, SE, SD or SC. These oils will keep the engine cleaner and will help retard the formation of gum and varnish deposits. DO NOT use oil additives!
2. Refer to the following chart for recommended grades to use with temperature range anticipated before next oil change.

![RECOMMENDED SAE VISCOSITY GRADERS](chart.png)

* If not available, a synthetic oil may be used having 5W-20 or 5W-30 viscosity.

B. SPARK PLUGS
1. Spark Plugs should be cleaned or replaced (if necessary) and gap reset to .040 (1.02mm) every 100 hours of operation or every 6 months, whichever comes first.
2. To clean, remove Spark Plug from Engine, scrape or wire brush and wash with a commercial solvent. DO NOT blast clean.

NOTE
Sparking can occur if Wire Terminal does not fit firmly on Spark Plug. Compress Terminals if necessary.

C. MUFFLER
1. When servicing Engine, inspect Muffler for signs of damage or deterioration. Replace as required.
2. Make sure that Muffler Guard (if applicable) is always in place and secure before allowing mower to leave shop.

D. AIR CLEANER
(Consult Engine Manual for Part Number of Filter Element).
1. Inspect Filter during every Engine Service or every 25 operating hours (more often if mower is used under extremely dirty or dusty conditions). See Figure 4.1.

![AER CLEANER COVER](diagram.png)

FIGURE 4.1
1. Clean Sponge Filter per Manufacturer's instructions.
2. Replace Filter Element as required.
3. Always clean Cover inside and out, and clean Base before reassembly.

E. FUEL FILTER

WARNING
Gasoline is flammable and must be handled with care. DO NOT allow open flame, matches or smoking in area. Wipe up any spills. Use approved (RED) fuel container.
1. Both the 22 and 25 HP Kohler Engines use a 15 Micron Inline Fuel Filter which is initially furnished as an OEM Item. Replacement filters are SNAPPER Part No. 4-4777.
2. Check the Inline Fuel Filter at frequent intervals and replace before it becomes clogged with sediment.
3. Make certain that the replacement filter is correctly installed with the gas flow going to the Engine.
4. Check other Fuel System Components frequently and replace any parts that are worn or cracked.
Section IV - ENGINE & FUEL SYSTEM

4.2 ENGINE REMOVAL (KOHLER)
A. Disconnect the Battery. Remove NEGATIVE (-) BLACK Cable first and POSITIVE (+) RED Cable last. Secure Cables away from the Battery. See Figure 4.2.

FIGURE 4.2

B. Disconnect Engine Pigtails from Wiring Harness. See Figure 4.3.

FIGURE 4.3

C. Remove Wires from Coil. Refer to Figure 4.3.
D. Disconnect Electric Clutch Pigtails from Wiring Harness and remove Fasteners from Cable Clamps. See Figure 4.4.

DECK DRIVESHAFT IDLER (DEPRESS TO REMOVE DRIVE BELTS)

FIGURE 4.4

E. Depress Deck Driveshaft Idler and remove Drive Belts. Refer to Figure 4.4.
F. Squeeze Fuel Line Clamp and remove Fuel Line from Engine. Plug open end of Line. See Figure 4.5.

FIGURE 4.5

CLAMP

FUEL LINE
(PLUG END OF LINE - REFER TO FIGURE 4.6)

MANUAL No. 07225 (I.R.4/00)

4.3

SERVICE - OUT FRONT Z-RIDER
Section IV - ENGINE & FUEL SYSTEM

G. Separate Left Main Fuel Line from front of Engine by bending Hose Clamps away from Line. See Figure 4.6.

3. Slide Adapter Hub/Flexible Disc Assembly away from Engine. Place Coupling Spacers and Washers aside for reassembly. Refer to Figure 4.7.

NOTE
At this point of disassembly, check Flexible Disc for damage. If replacement is required, see Step 4.5 "FLEXIBLE DISC REMOVAL".

K. Remove the four (4) Engine Mounting Nuts and Hex Hd. Capscrews. Store Ground Wire out of the way. See Figure 4.8.

L. Attach suitable lifting device to lift Ears on Engine. Remove Engine from Frame.

NOTE
In order to accommodate certain lifting devices, it may be necessary to remove Air Filter before attaching lift to Engine.

4.3 ENGINE PART NUMBERS
A. Engine, 22 HP (Kohler No. CH22S PS-66536)
B. Engine, 25 HP (Kohler No. CH25S PS-68577) (Refer to SNAPPER Parts Manual No. 06106 (REV. 2, 11/97) for Parts Numbers of Engine Components).

4.4 ENGINE INSTALLATION
A. If installing a new or replacement Engine, the Engine should be fitted with all usable components taken from the one removed.
B. Install a new Fuel Filter (KOHLER Part No. 4-4777) and inspect Fuel Lines for damage. Replace as required.

(Continued on Following Page)
Section IV - ENGINE & FUEL SYSTEM

C. Install a new Filter Element in the Air Cleaner.
D. Install new Oil Filter.
E. Reinstall Engine to Frame in reverse order of removal.

4.5 FLEXIBLE DISC REMOVAL
A. Loosen both Set Screws on the Adapter Hub. See Figure 4.9.

B. Remove the two (2) Hex Hd. Cap Screws, Lock Washers and Flat Washers which secure the Flexible Disc to the Engine Driveshaft.
C. Slide Adapter Hub/Flexible Disc Assembly away from Engine. Place Coupling Spacers and Washers aside for reassembly. Refer to Figure 4.10.

NOTE
At this point of disassembly, check Flexible Disc for damage. If replacement is required, see Step 4.6 "FLEXIBLE DISC REPLACEMENT".

4.6 FLEXIBLE DISC REPLACEMENT
A. Loosely attach NEW Flexible Disc to Engine Drive Shaft with two (2) Coupling Spacers, 5/16 x 1-1/2" Hex Hd. Cap Screws, Lock Washers and Flat Washers. Refer to Figures 4.9 and 4.10.
B. Remove Adapter Hub from the old Flexible Disc and loosely attach it to the NEW Disc as shown in Figure 4.11.

NOTE
At this point - for Drive Alignment Purposes - perform the following steps.
1. Loosen Set Screws on Flange Bearing Lock Collar. See Figure 4.12, Pg. 4.6.
2. Loosen the three (3) 5/16 - 18 Hex Nyloc Flange Bearing Mounting Nuts until Bearing will move freely.

C. Slide Upper Drive Shaft into Adapter Hub. Secure loosely with the two (2) Sq. Hd. Set Screws found on the Hub.
D. Align Dual V-Drive Pulley with both Transaxle Fan (Input) Pulleys.
E. Install both V-Belts. Make any necessary alignment adjustments at this time.
F. Tighten Flexible Disc to Engine Drive Shaft.
G. Tighten Adapter Hub to Flexible Disc.

(Continued on Following Page)
Section IV - ENGINE & FUEL SYSTEM

H. Tighten the two (2) Sq. Hd. Set Screws on the Adapter Hub. (This will secure the Upper Drive Shaft to its Drive Axis).

J. Tighten the Flange Bearing Mounting Nuts.

K. Tighten the two (2) Skt. Hd. Set Screws on the Dual V-Drive Pulley.

NOTE
Check Belt Alignment again. If necessary, make required adjustments until both Belts run true in the Pulleys.

IMPORTANT!
Early production units of the OFZ used Socket Head Set Screws to secure the Driven and Drive Pulleys. These should be replaced with Square Head Set Screws (consult Parts Man. No. 06106 (REV. 2, 11/97).

Also, the one-piece Flange Bearing shown below, Part No. 5-4655, should be replaced with the 4-piece Flange Bearing. See “Detail” below.

UPPER DRIVESHAFT ASSEMBLY

DETAIL - 4-Piece Flange Bearing

FLANGE (2 REQ.)
Part No. 4-7225

BEARING
Part No. 1-5971

LOCKING COLLAR
Part No. 1-4625

(REPLACES PART NO. 5-4655)

FLANGE BEARING
(Part No. 5-4655. SEE "IMPORTANT" NOTE & "DETAIL" ABOVE)

HUB KEY

KEY, DUAL V-PULLEY

SKT. HD. SET SCREW
(SEE "IMPORTANT" NOTE ABOVE)

NYLOC NUT

DUAL V-PULLEY

TRACTION DRIVE BELT

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4.7 FUEL SYSTEM
The Fuel System of the SNAPPER OUT FRONT Z-RIDERS consist of a Fuel Tank, Fuel Filter, Hoses, Clamps and Fuel Tank Support Bracket - all of which mount to the Upper Chassis. Components of the Fuel System are shown in Figure 4.13.

**IMPORTANT!**
The Fuel System should be inspected at each service period. Check for cracks or leaks in the Tank(s); Valve leakage and Fuel Hose integrity. Replace any item that appears worn or is damaged. Replace Fuel Filter on a regular basis.

4.8 FUEL TANK REPLACEMENT
A. Remove L.H. Fender as an assembly (refer to Section VII, "L.H. FENDER REMOVAL").
B. Remove the Hose Clamp and Fuel Hose from the Tank Fuel Outlet.
C. Lift and remove Tank from the Tank Support Bracket.
D. Install new Tank in reverse order of removal.

---

**FIGURE 4.13**

---

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4.7 SERVICE - OUT FRONT Z-RIDER
Section V

ENGINE & FUEL SYSTEM

(Kubota 22 HP Diesel & 23 HP Gasoline Engines)

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Section V - ENGINE & FUEL SYSTEM

5.1 ENGINE MAINTENANCE (KUBOTA 22 HP DIESEL ENGINE)

A. ENGINE OIL
1. Change Engine Oil on a regular schedule.

NOTE
Use only those oils classified for API Service CC or CD which are suitable for the temperature range anticipated before next oil change.

Above 77° F (25° C)..........SAE 30 or 10W-30
32° F to 77° (0° to 25° C)...SAE 20 or 10W-30
Below 32° F (0° C)..........SAE 10W or 10W-30

Oil Capacity of the Kubota 22 HP Diesel Engine is 4 U.S. qts. (3.2 Liters/2.81 Imp. qts.).

2. Change Oil Filter after first 50 hours of operation and at each oil change thereafter. See Figure 5.1.

4. Remove Filter element, large and small O-rings and Spring.
5. Submerge Filter Element in kerosene and move it about vigorously to rinse away debris. Remove Filter from kerosene and stand it on a clean cloth.
6. Reassemble Fuel Filter in reverse order.

NOTE
Replace Fuel Filter if it cannot be properly cleaned.


---

**FIGURE 5.1**

B. CLEANING/REPLACING FUEL FILTER

Engine must be cold before removing Fuel Filter. Proceed as follows:
1. Close Fuel Filter Cock. See Figure 5.2.
2. Remove Fuel Bowl Retaining Ring.
Section V - ENGINE & FUEL SYSTEM

C. BLEEDING FUEL SYSTEM
1. Make sure that Fuel Filter Cock is closed.
3. Open Fuel Filter Cock. See Figure 5.3.
4. Loosen the Air Vent Plug a few turns. Allow air bubbles to be released. Close Air Vent Plug when a steady flow of fuel appears.

NOTE
Keep Air Vent Plug on Fuel Injection Pump tight except when bleeding Fuel System. Otherwise, Engine may not operate.

D. CHECK FUEL LINES/CONNECTIONS
1. Check all Fuel Lines for any cuts, breaks or other damage. Replace as required.
2. Check Clamped connections for air or fuel leaks. Replace Clamps or Fuel Hose as required.
3. Check Fuel Tank and Fuel Cap for leaks. Replace items as required.

E. AIR CLEANER SERVICE
The Air Cleaner should be disassembled, thoroughly cleaned and fitted with a new (or cleaned) Air Filter Element at least once a year - more often under extremely dry or dusty conditions. The Air Filter Element is cleaned as follows:
1. Remove Filter Cannister Cover. See Figure 5.5. (Continued on Page 5.4).

FIGURE 5.3
5. Loosen the Air Vent Plug on top of the Fuel Injection Pump. See Figure 5.4.

FIGURE 5.4
6. Allow air bubbles to be released. Retighten Plug when bubbles stop. Refer to Figure 5.4.

FIGURE 5.5
SERVICE - OUT FRONT Z-RIDER
Section V - ENGINE & FUEL SYSTEM

(Continued from Page 5.3)

2. Remove Wing Screw and Filter Element (refer to Figure 5.5).
3. Place Filter Element on flat surface, finned-end down, and direct compressed air into the inside of the Element. Do not let the Air Nozzle get against the Filter.

**NOTE**

Nozzle Air Pressure must not exceed 100 PSI.

4. After cleaning or replacing Filter Element, reassemble the Air Cleaner Assembly.

**F. CHECKING FAN BELT TENSION**

1. Apply a force of 22 lbs. (30.4 N) to the center of the Fan Belt between the Fan Pulley and the Alternator Pulley.
2. Belt deflection at this point should be 0.78 inches (10mm).
3. To adjust Fan Belt tension, loosen Tensioning Screw at top of Alternator. See Figure 5.6. Move Alternator “IN” or “OUT” until Belt tension is correct. Retighten Tensioning Screws.

**G. MUFFLER**

1. When servicing Engine, inspect Muffler for signs of damage or deterioration. Replace as required.
2. Make sure that Muffler Guard (if applicable) is always in place and secure before allowing mower to leave shop.

**CAUTION**

Worn out Mufflers are more than just a noise nuisance, and should be replaced immediately. Continued use could result in fire or explosion!

**H. CHECKING COOLING SYSTEM**

Since a correctly-operating Fan is an integral part of the Engine Cooling System, make certain that the Fan Belt is in good condition and properly adjusted before proceeding with Cooling System Checks.

1. **COLD ENGINE ONLY** - Check Engine Coolant (antifreeze/water) and add Coolant in the Reserve Tank as needed to bring level up to the FULL mark. See Figure 5.7.

**FIGURE 5.7**

2. When adding Coolant, first mix the antifreeze and water, then pour the mixture into the Radiator. (Refer to STANDARD SAE J814c & SAE J1034 for mixing antifreeze and water). See Chart below.

<table>
<thead>
<tr>
<th>COOLANT RATIO</th>
<th>Vol % Antifreeze</th>
<th>Freezing Point</th>
<th>Boiling Point</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>°C</td>
<td>°F</td>
</tr>
<tr>
<td>40</td>
<td>-24</td>
<td>-12</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>-37</td>
<td>-34</td>
<td></td>
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<tr>
<td>60</td>
<td>-52</td>
<td>-62</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>-64</td>
<td>-84</td>
<td></td>
</tr>
</tbody>
</table>
Section V - ENGINE & FUEL SYSTEM

WARNING
DO NOT remove cap from radiator when Engine and Coolant are hot. Coolant is pressurized. Severe burns could result.

3. The Cooling System should be cleaned each 500 hrs. of service or, as follows:
   a. Winter Service (before adding antifreeze).
   b. Summer Service (switching from antifreeze mixture to water only).

NOTE
When cleaning the Cooling System, the use of Kubota Detergent No. 20 (or equivalent) is recommended for effectively washing away any rust buildup.

4. Check all Hoses for condition and leaks. Tighten or replace items as required.

5.2 ENGINE REMOVAL (KUBOTA 22 HP DIESEL ENGINE)
A. DISCONNECT ELECTRICAL COMPONENTS
   (See 1 thru 10 as follows)
   1. Battery (Black Neg. (-) Wire first, Red Pos. (+) Wire last).
   2. Remove Drive Belts from Electric Clutch, then disconnect Electric Clutch Pigtail from Main Harness. Remove Wire Clamps. See Figure 5.8.
   3. Disconnect the three (34) Wires from the Starter Solenoid (L.H. Side).
   5. Separate the Wire Loom (close to the Alternator) and find the two (2) Spade Connections to the Alternator. Disconnect.

   6. Separate the Plastic Loom attached to the Radiator Support and disconnect the three (3) Spade Connections to the Solenoid mounted on the R.H. Side of Engine.
   7. Remove Red/Black Wire from GLO-PLUG STRIP. See Figure 5.9.

   10. Check to see if any other wiring would hamper Engine removal. If so, disconnect wiring and store out of way.

B. DISCONNECT MECHANICAL COMPONENTS
   (See 1 thru 10 as follows)
   1. Disconnect Throttle Control from Engine.
   Loosen or remove Cable Retaining Clamps and store Throttle Cable out of way.
   2. Tilt Seat forward and remove V-Belts from Upper Drive Shaft Pulley.
   3. Loosen Nuts on Upper Drive Shaft Bearing.
   4. Working from left side of unit, separate the Upper Drive Shaft from the Engine. Push Drive Shaft forward to clear Engine.
   5. Remove the four (4) 3/8 - 16 x 2-1/2" Hex Cap Screws, 3/8 - 16 Nyloc Nuts, 3/8" Flat Washers and Snubbing Washers which secure the Engine to the Isolator Mounts.
Section V - ENGINE & FUEL SYSTEM

9. Check Engine and Radiator to make sure that all Wires, Hoses, etc. which would interfere with Engine removal have been disconnected.
10. Attach Chain Hooks to Lift Eyes on Engine/Radiator Assembly and slowly lift up and away from Frame.

5.3 ENGINE INSTALLATION (KUBOTA 22 HP DIESEL ENGINE)
A. Repair or replace Engine and install in reverse order of removal.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SIZE &amp; PITCH</th>
<th>FT. - LBS.</th>
<th>N•M</th>
<th>KGF•M</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Head Cover Cap Nuts</td>
<td>M6 x 1.0</td>
<td>2.9 to 4.3</td>
<td>3.9 to 5.9</td>
<td>0.4 to 0.6</td>
</tr>
<tr>
<td>* (***) Head Bolts</td>
<td>M8 x 1.25</td>
<td>28.9 to 32.5</td>
<td>39.2 to 44.1</td>
<td>4.0 to 4.5</td>
</tr>
<tr>
<td>* Bearing Case Bolts 1</td>
<td>M6 x 1.0</td>
<td>9.4 to 11.6</td>
<td>12.7 to 15.7</td>
<td>1.3 to 1.6</td>
</tr>
<tr>
<td>* Bearing Case Bolts 2</td>
<td>M7 x 1.0</td>
<td>19.5 to 22.4</td>
<td>26.5 to 30.4</td>
<td>2.7 to 3.1</td>
</tr>
<tr>
<td>* Flywheel Bolts</td>
<td>M10 x 1.25</td>
<td>39.8 to 43.4</td>
<td>53.9 to 58.8</td>
<td>5.5 to 6.0</td>
</tr>
<tr>
<td>* Connecting Rod Bolts</td>
<td>M7 x 0.75</td>
<td>19.5 to 22.4</td>
<td>26.5 to 30.4</td>
<td>2.7 to 3.1</td>
</tr>
<tr>
<td>* Idle Gear Shaft Bolts</td>
<td>M6 x 1.0</td>
<td>7.23 to 8.32</td>
<td>9.81 to 11.28</td>
<td>1.00 to 1.15</td>
</tr>
<tr>
<td>* Fan Drive Pulley Bolt</td>
<td>M12 x 1.5</td>
<td>72.3 to 79.6</td>
<td>98.1 to 107.9</td>
<td>10.0 to 11.0</td>
</tr>
<tr>
<td>* Glow Plugs</td>
<td>M8 x 1.0</td>
<td>5.8 to 10.8</td>
<td>7.8 to 14.7</td>
<td>0.8 to 1.5</td>
</tr>
<tr>
<td>* Nozzle Holder Assembly</td>
<td>M20 x 1.5</td>
<td>36.2 to 50.6</td>
<td>49.0 to 68.6</td>
<td>5.0 to 7.0</td>
</tr>
<tr>
<td>* Oil Switch Taper Screw</td>
<td>PT 1/8</td>
<td>10.8 to 14.5</td>
<td>14.7 to 19.6</td>
<td>1.5 to 2.0</td>
</tr>
<tr>
<td>* Injection Pipe Retaining Nuts</td>
<td>M12 x 1.5</td>
<td>18.1 to 25.3</td>
<td>24.5 to 34.3</td>
<td>2.5 to 3.5</td>
</tr>
<tr>
<td>* Oil Drain Plug</td>
<td>M12 x 1.25</td>
<td>23.9 to 27.5</td>
<td>32.4 to 37.3</td>
<td>3.3 to 3.8</td>
</tr>
</tbody>
</table>

* Before installation, apply oil to threads.
* (***) Consult Kubota WORKSHOP MANUAL for tightening sequence of Head Bolts.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SIZE &amp; PITCH</th>
<th>FT. - LBS.</th>
<th>N•M</th>
<th>KGF•M</th>
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<td>3.9 to 5.9</td>
<td>0.4 to 0.6</td>
</tr>
<tr>
<td>Head Bolts</td>
<td>M8 x 1.25</td>
<td>28.9 to 32.5</td>
<td>39.2 to 44.1</td>
<td>4.0 to 4.5</td>
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<tr>
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<td>M7 x 1.0</td>
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<td>5.0 to 7.0</td>
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<td>10.8 to 14.5</td>
<td>14.7 to 19.6</td>
<td>1.5 to 2.0</td>
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<td>32.4 to 37.3</td>
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TORQUE VALUES CHART - GENERAL PURPOSE NUTS, BOLTS & SCREWS

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<td>77.5 to 90.2</td>
<td>7.9 to 9.2</td>
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No Grade or Grade 4
Standard Screw and Bolt SS41, S20C
Special Screw and Bolt S43C, S48C (Refined)

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Section V - ENGINE & FUEL SYSTEM

5.4 ENGINE MAINTENANCE (KUBOTA 23 HP GASOLINE ENGINE)

NOTE
Maintenance of the Kubota 23 HP Gasoline Engine is primarily the same as that of the Diesel Engine (Refer to 5.1 thru 5.3 for procedures). Listed below are those items found on the Gasoline Engine which require different service than the Diesel.

A. ENGINE OIL
1. Change Engine Oil on a regular schedule. Use only those oils classified for Service SF, SE, SD or SC. These oils will keep the Engine cleaner and will help retard the formation of gum and varnish deposits. DO NOT use oil additives!
2. Refer to the following Chart for recommended Grades to use with temperature range anticipated before next oil change.

<table>
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<tr>
<td>°F</td>
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<td>°C</td>
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RECOMMENDED SAE VISCOSITY GRADES

* If not available, a synthetic oil may be used having 5W-20 or 5W-30 viscosity.

B. OIL FILTER
1. Change Oil Filter after first 50 hours of operation and at each oil change thereafter.

C. SPARK PLUGS
1. Spark Plugs should be cleaned or replaced (if necessary) and Gap reset to .039 to .043 (1.0 to 1.1 mm) every 100 hours of operation or every 6 months, whichever comes first.
2. To clean, remove Spark Plug from Engine, scrape or wire brush and wash with a commercial solvent. DO NOT blast clean.

NOTE
Sparking can occur if Wire Terminal does not fit firmly on Spark Plug. Compress Terminals if necessary.

D. MUFFLER
1. When servicing Engine, inspect Muffler for signs of damage or deterioration. Replace as required.
2. Make sure that Muffler Guard (if applicable) is always in place and secure before allowing mower to leave the shop.

CAUTION
Worn out Mufflers are more than just a noise nuisance, and should be replaced immediately. Continued use could result in fire or explosion!

E. AIR CLEANER
(Consult Engine Manual for Part Number of Filter Element).

Inspect Filter during every Engine service or every 25 operating hours (or more often if mower is used under extremely dirty or dusty conditions). See Figure 5.10.

1. Remove Filter Element from Cannister.
2. To clean the Element, direct a flow of compressed air to the inside of the Element until all debris has been removed (do not exceed 100 psi).
3. Replace Filter Element as required.
4. Always clean Cover inside and out, and clean Cannister before reassembly.

WARNING
Gasoline is flammable and must be handled with care. DO NOT allow open flame, matches or smoking in area. Wipe up any spills. Use approved (RED) fuel container.

1. Check the Inline Fuel Filter at frequent intervals and replace before it becomes clogged with sediment. Replacement Filters are SNAPPER Part No. 4-6364.
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2. Make certain that the replacement Filter is correctly installed with the gas flow going to the Engine.
3. Check other Fuel System Components frequently and replace any parts that are leaking or showing worn spots or cracks.

G. CHECKING FAN BELT TENSION
(See Page 5.4, refer to Figure 5.6).

H. CHECKING COOLING SYSTEM
(See Pages 5.4 & 5.5, refer to Figure 5.7).

5.2 ENGINE REMOVAL (KUBOTA 23 HP GASOLINE ENGINE)
(See Pages 5.5 & 5.6, refer to Figure 5.8).

NOTE
Although the Gasoline and Diesel Engines are different, the instructions for their removal are practically the same. Use standard procedures to remove and disconnect those items required for Engine removal.

5.3 ENGINE (FAN) BELT REMOVAL: GASOLINE & DIESEL ENGINES
1. Remove Radiator Screen.
2. Remove Nut and Bolt that secure the top portion of Alternator Cover. Rotate Cover to the side. See Figure 5.11.

FIGURE 5.11

3. Remove the Nuts and Bolts that secure the Metal Couplings to the Rubber Flex Coupling. Remove Rubber Flex Coupling to allow space to remove and install Belt. See Figure 5.12.

FIGURE 5.12

IMPORTANT!
For those OFZ's equipped with Kubota Diesel Engines, the existing Drive Shaft Coupling should be replaced with SNAPPER #6-3164 UNIVERSAL JOINT/COUPLING KIT. Refer to SNAPPER Instruction No. 7-3582 (I.R. 3/31/00) for installation procedures. See Figure 5.13 below.

FIGURE 5.13

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5.4 FUEL SYSTEM
The Fuel System of the SNAPPER OUT FRONT Z-RIDERS consist of a Fuel Tank, Fuel Filter, Hoses, Clamps and Fuel Tank Support Bracket - all of which mount to the Upper Chassis. Components of the Fuel System are shown in Figure 5.14.

IMPORTANT
The Fuel System should be inspected at each service period. Check for cracks or leaks in the Tank; Valve leakage and Fuel Hose integrity. Replace any item that appears worn or is damaged. Replace Fuel Filter on a regular basis.

5.5 FUEL TANK REPLACEMENT
A. Replace L.H. Fender as an assembly (refer to Section VII, "L.H. FENDER REMOVAL").
B. Remove the Hose Clamps, Harness Clips and Hoses from the Tank Fuel Outlets.
C. Lift and remove Tank from the Tank Support Bracket.
D. Install new Tank in reverse order of removal.

FIGURE 5.14
**Section VI**

**TANDEM HYDRO DRIVE SYSTEM**

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</tr>
<tr>
<td>Notes</td>
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**IMPORTANT CHANGE NOTICE!**

Some OUT FRONT Z-RIDERS are equipped with Kubota DIESEL ENGINES. These Models should have their existing flexible disc drive shaft couplings replaced with the #6-3164 UNIVERSAL JOINT/COUPLING KIT. Refer to SNAPPER INSTRUCTION No. 7-3582 (I.R. 3/31/00).
Section VI - TANDEM HYDRO DRIVE SYSTEM

INTRODUCTION

The 700 Series Hydro Transaxle Assemblies used on the SNAPPER OUT FRONT Z-RIDERs are normally designed for rugged use and maximum endurance. If properly maintained, cleaned and cared for, these units should normally last for the working life of the Power Unit. However, due to accidents and sometimes operator's negligence, the repair shop will have to replace one or both Transaxle Units.

The following information covers basic troubleshooting, removal and replacement of the Hydro Transaxle Assemblies.

6.1 TROUBLESHOOTING - HYDRO TRANSAXLE

If either of the Hydro Transaxles are operating erratically or not at all, SNAPPER recommends that the following Troubleshooting checks be made before replacing the Unit(s).

A. CONTROLS - JOYSTICK

1. Check position of Roll-Release Levers. Make certain they are in "Operating Position". See Figure 6.1.

2. Check the Neutral Position as follows:
   a) Start Engine and release Parking Brake.
   b) Move Joystick forward to begin movement of Unit.
   c) Move Joystick to center or neutral position to stop machine. If machine does not come to a complete stop, or has any movement when Joystick has been moved to neutral position, adjustments are required.

3. NEUTRAL POSITION ADJUSTMENTS
   a) Stop Engine.
   b) Raise Rear Wheels off ground high enough to rotate freely.
   c) Disconnect Brake Rod from Parking Brake. See Figure 6.2.
   d) Pull Parking Brake Lever up to "ON" position.

   IMPORTANT
   Engaging Parking Brake while Brake Rod is disconnected, locks Joystick in Neutral position.

FIGURE 6.1

FIGURE 6.2

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e) Start Engine. Neither wheel should rotate or have any movement.
f) If wheel(s) are rotating, disconnect Transmission Control Rods from Cross Shaft and turn Adjusting Bolts, located on Pump(s), clockwise, or counterclockwise, until rotation stops. See Figure 6.3.

FIGURE 6.3

NOTE
DO NOT OVERTIGHTEN BRAKE ROD! Damage to Parking Brake components could result.

6. TESTING PARKING BRAKE ADJUSTMENT
   a) Engage Parking Brake.
   b) Try to roll each Drive Wheel to insure there is no movement (Parking Brake should hold both Drive Wheels in place).
   c) If one Wheel can be moved, then adjustment can be performed on the individual Drive Wheels. See 7., INDIVIDUAL DRIVE WHEEL/BRAKE ADJUSTMENT.

7. INDIVIDUAL DRIVE WHEEL/BRAKE ADJUSTMENT
   a) Rotate nut 1/2 turn clockwise to tighten Brake. (See "Inset", Figure 6.4, Page 6.4).
   b) Recheck Drive Wheel for adjustment. If Wheel does not move, adjustment is complete.

NOTE
DO NOT OVERTIGHTEN HYDROSTATIC BRAKE RODS! Damage to Parking Brake components could result.

B. HYDRAULIC RESERVOIR(S) & HOSES
   1. Check for leaks at connections.
   2. Check Hoses for kinks, cracks or deterioration.

C. HYDRAULIC FLUID
   1. Check for proper fluid level (1-1/2" to 2") below top of filler neck.
   2. Check fluid type (SAE 20W-20, SAE 30 or SAE 40 Motor Oil).
   3. Check Oil Filter (Part No. 4-2715 Oil Filter).

5. PARKING BRAKE ADJUSTMENT
   (Both Drive Wheels/Brakes Jointly)
   a) Disconnect Parking Brake Rod from Park Brake Lever. See Figure 6.4, Page 6.4.
   b) Rotate Rod clockwise one (1) turn to tighten Brake or counterclockwise to loosen Brake tension.

NOTE
Other than the Ball Joint Link Assemblies, the Joystick Control has no adjustments.

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6.3
6.2 CONCLUSION (TROUBLESHOOTING - HYDRO TRANSAXLE)
Having made the checks, tests and adjustments found on the previous two (2) pages, and finding no remedy for a malfunctioning unit, replace the Hydro Transaxle as follows:

6.3 REMOVAL - HYDRO TRANSAXLE ASSEMBLY
A. Disconnect the Battery. Remove NEGATIVE (-) BLACK Cable first and POSITIVE (+) RED Cable last. Secure Cables away from the Battery. See Figure 6.5.
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B. Remove the 1/4 - 28 Nyloc Nut from the Control Rod on the Neutral Return Cam. Disconnect Rod from Cam. See Figure 6.6.

C. Remove the 5/16 - 18 x 2-1/2" Neutral Return Adjusting Bolt and Spring. Refer to Figure 6.6.

D. Depress Idler Pulley and remove Traction Belt from Input Pulley. See Figure 6.7.

E. Place rear of Unit up on jackstands. Chock front Wheels.

F. Remove Rear Wheel from Transaxle to be removed.

G. Disconnect the Hydrostatic Brake Rod be removing the 3/32 x 3/4 Cotter Pin from the Brake Arm. Refer to Figure 6.4 on Page 6.4.

NOTE

For additional working space, disconnect the Deck Driveshaft and move it out of the way. See Figure 6.8.

H. Place a five (5) gallon container beneath Hydraulic Hose connection of Transaxle being removed. Using cutters or a sharp utility knife, cut Hose located at bottom of Transaxle.

1. Allow oil to drain from system.
2. Cut Upper Hose.
3. Remove the 13/16" Hose Clamps from the Hose Stubs.
4. Split the Hose Stubs with a sharp knife and remove.
5. Remove the sections of cut Hose from the Hydraulic Reservoir in a like manner. Save Clamps to install new Hoses.

J. Remove the eight (8) 1/4 - 20 x 5/8 Hex Flange Lock Screws from inside the Bearing Mount Weldment. See Figure 6.9 on following page.
Section VI - TANDEM HYDRO DRIVE SYSTEM

K. While supporting the Transaxle Assembly in a safe manner, separate it from the Unit by removing the 3/16 - 16 Hex Locknuts, Flat Washers and 3/8 - 16 x 4-3/4" Bolts and Transaxle Spacers. See Figure 6.10. Transaxle Assembly is now ready for repair or replacement.

R.H. TRANSAXLE ASSEMBLY SHOWN

3/8 - 16 x 4-3/4" BOLT

FLAT WASHER

3/8 - 16 HEX LOCKNUT

5.4 REPLACEMENT-HYDRO TRANSAXLE ASSEMBLY

A. Remove the following parts from the Hydro Transaxle Assembly which is to be replaced. See Figure 6.11 on following page.

1. Transmission Pulley
   a) Loosen the two (2) 5/16 - 18 x 5/16 Sq. Hd. Set Screws.
   b) Remove the Transmission Pulley and Cooling Fan as an assembly.
   c) Remove the #605 Woodruff Key.

2. Neutral Return Cam & Neutral Adjustment Plate
   a) Remove the 1/4 - 20 x 1-1/4 Hex Hd Cap Screw, 1/4 Lock Washer & 1/4 I.D. x 1" O.D. Flat Washer.
   b) Remove the Neutral Return Cam and #404 Woodruff Key.
   c) Remove the Neutral Adjustment Plate and the 1" External Retaining Ring.

3. Roll Release Rod
   a) Remove 1/16 x 1/2 Cotter Pin.
   b) Remove Roll Release Rod.

4. Hydraulic Fittings (Removal)
   a) Loosen Inner Nut of Upper Fitting (45°).
   b) Remove Fitting from Pump.

5.4 REPLACEMENT-HYDRO TRANSAXLE ASSEMBLY

NOTE

Upper Fitting (45°) - Note Angle of installed position BEFORE REMOVING! Fitting must be installed at SAME ANGLE in new Transaxle.

B. Install new and removed parts to replacement Hydro Transaxle Assembly before installation.

1. New Oil Filter (SNAPPER Part No. 4-2715, Eaton Part No. 103144).

2. Upper & Lower Hydraulic Fittings.
   a) Lubricate NEW O-Ring with Petroleum Jelly. Place O-Ring on Lower (Straight) Fitting and install. Do not overtighten.
   b) Place a NEW lubricated O-Ring on Upper Fitting and install at same angle of position as it was when removed. Tighten until snug.
   c) Tighten Inner Nut to seal O-Ring.

3. Insert Roll Release Rod into Shaft and secure with Cotter Pin.

4. Install Neutral Adjustment Plate and secure with 1" External Retaining Ring.

5. Install Neutral Return Cam and #404 Woodruff Key. Secure with Flat Washer, Lockwasher and Screw.

6. Install Transmission Pulley/Cooling Fan Assembly and loosely tighten the two (2) Set Screws (Pulley will have its final tightening when Traction Belt(s) are aligned).
C. While supporting the new Hydro Transaxle Assembly, align Mounting Holes with their mating holes in the Power Unit Frame.
1. Place the Spacer between the Hydro Transaxle and mounting surface of Frame. Insert the two (2) 3/8 - 16 x 4-3/4" Bolts thru the holes in top of the Frame, Spacer and Transaxle. Secure Bolts with Flat Washers and Locknuts. Torque to 31 Ft. Lbs. (42.16 N•m).
2. Secure the Hydro Transaxle to the Bearing Mount Weldment with the eight (8) 1/4 - 20 x 5/8 Hex Flange Lock Screws. Torque to 8 Ft. Lbs. (10.88 N•m).

D. Attach new Hydraulic Hoses to Transaxle.
E. Reattach Power Transfer Shaft to PTO.

F. Depress Idler Pulley and place Traction Belt(s) over Input Pulley. Move the Input Pulley on its Shaft until the Belt is aligned with Traction Pulley. Tighten the two (2) 5/16 - 18 x 5/16 Sq. Hd. Set Screws.
G. Install the 5/16 - 18 x 2-1/2 Neutral Return Adjusting Bolt and Spring into the Neutral Adjusting Plate and Driveshaft Bracket.
H. Reconnect the Hydrostatic Brake Rod to the Brake Arm.
J. Reconnect Control Rod to Neutral Cam.
K. Reinstall Rear Wheel.
L. Fill Hydraulic Reservoir(s).
M. Reconnect Battery (Refer to Figure 6.5.).
## Section VII

CASTER WHEEL/REAR AXLE, CHASSIS & BODY COMPONENTS

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Section VII - CASTER WHEEL/REAR AXLE, CHASSIS & BODY COMPONENTS

INTRODUCTION
Besides those instructions which detail the removal of parts, this section also gives information about partial disassembly in order to more easily access the Z-RIDER’s internal mechanisms. Take a moment to review this section. It will save you time when making adjustments or repairs.

7.1 CASTER WHEEL ASSEMBLY (All Models)
Components of the Caster Wheel Assembly are shown in Figure 7.1.

4. While supporting Wheel Assembly from underneath, remove the 1-3/16” External Retaining Ring from top of Caster Yoke.
5. Remove 1-1/4” Flat Washer.
6. Lower the assembled Caster Yoke and Wheel out of the Caster Support.
7. Drive old Bearings out with a Drift Pin.
8. Inspect Bearings surfaces in Caster Support. Remove any burrs or nicks with emery cloth. Clean insides thoroughly with an approved solvent, then wipe dry. Lubricate lightly with GP grease.
9. Lightly grease new Bearings, then press into Caster Support until they bottom-out.
10. Reinstall Caster Wheel in reverse order of removal.

B. REPLACEMENT OF CASTER WHEEL BEARINGS
1. Remove 1/2 - 13 x 7-1/4” Screw and 1/2 - 13 Nyloc Nut from Caster Wheel. Refer to Figure 7.1.
2. Remove Caster Wheel.
3. Remove Axle Sleeve and Wheel Bearings.
4. Clean, inspect and perform any required maintenance on Bearing surfaces of Wheel.
5. Lightly grease, then install new Bearings.
6. Reinstall Axle Sleeve.
7. Reinstall Caster Wheel to Yoke.
8. Lubricate Caster Wheel with Kendall NLGI No. 2 Lithium Grease or equivalent.
9. Check Tire pressure - it should be 12 psi.

C. REPLACEMENT OF OTHER COMPONENTS
Items such as the Tire & Rim Assembly, Caster Yoke, Spacer Tubes and Retaining Hardware may be replaced with new parts during any reassembly sequence. Consult Parts Manual No. 06106 (Rev.2, 11/97), & No. 06113 (Rev. 3, 1/14/00) for replacement numbers. Refer to Figure 7.1.

7.2 CASTER WHEEL/REAR AXLE ASSEMBLY
(Models EZF2100DKU, ZF2100DKU & ZF2300GKU)
Components of the Caster Wheel/Rear Axle Assembly are shown in Figure 7.2 on Page 7.3.

A. REMOVAL: CASTER WHEEL/AXLE ASSEMBLY
1. Raise and support rear of Power Unit.
2. Remove 5/16 - 18 x 5/8” Hex Flg. Screw from end of Caster Shaft Cap on Pivot.
3. Remove Caster Shaft Cap.
4. Remove 1-3/16 External Retaining Ring.

(Continued on Following Page)
Section VII - CASTER WHEEL/REAR AXLE, CHASSIS & BODY COMPONENTS

5. Remove two (2) 1-1/4" I.D. x 1-7/8" O.D. Flat Washers.
6. Using an assistant, remove the Assembly by pulling it to the rear and off the Rear Axle Pivot.

CAUTION
When the Caster Wheel/Axle Assembly is free of the Pivot, it will tend to roll over. Be careful when removing!

7. Reverse above steps to install Caster Wheel/Axle Assembly.

B. REPLACEMENT OF AXLE PIVOT BEARINGS

Before attempting to remove/replace Axle Pivot Bearings, either remove both Caster Wheel Assemblies (or) secure the Rear Axle Weldment - with Casters attached - in a vise to prevent movement while servicing.

1. Remove existing Bearings by driving them to the outside with a Drift Pin. (The Bearing Bosses have a machined seating surface. Bearings cannot be removed by driving them inward). See Figure 7.2.

2. Inspect insides of both Bearing Boss surfaces for any dirt or damage. Use emery cloth to eliminate any burrs. Clean insides thoroughly with an approved solvent, wipe dry, then lubricate with GP grease.
3. Press new Bearings (Part No. 3-5602) into Bosses until they bottom-out.
4. Lubricate Pivot Shaft and reinstall Axle Assembly.

C. REPLACEMENT OF AXLE PIVOT

1. Remove Caster Wheel/Axle Assembly (refer to A., Steps 1 thru 6).
2. Remove the four (4) 3/8 - 16 Hex Nuts, 3/8" Flat Washers and 3/8 - 16 x 1-1/2 Carriage Bolts from the Axle Pivot and Power Unit Frame. Refer to Figure 7.2.
3. Install new/repaired Axle Pivot to Lower Chassis by inserting the four (4) 3/8 - 16 x 1-1/2 Carriage Bolts from the inside, attaching the Axle Stop Bracket, Axle Pivot, Washers and Nuts. Tighten securely.
4. Reinstall Caster Wheel/Axle Assemblies.

---

**Figure 7.2**

---

**Important**
Install Caster Wheel Assemblies on the **Front** Side of the Axle Weldment as shown.
Section VII - CASTER WHEEL/REAR AXLE, CHASSIS & BODY COMPONENTS

7.3 SEAT & SEAT SUPPORT ASSEMBLIES

Shown below in Figure 7.3 are the Seat Assembly Components for all models of the OUT FRONT Z-RIDER.

A. REMOVING SEAT & SEAT SUPPORT ASSEMBLIES

1. Tilt Seat Assembly forward, then disconnect Wiring Harness from Switch. See Figure 7.4.
3. Remove Hairpin from Seat Pivot Rod, then remove Rod.
4. Remove the assembled Seat and Seat Support from Unit (refer to Figures 7.4 & 7.5).

B. SEPARATING SEAT & SEAT SUPPORT

(Assemblies do not have to be removed from Unit in order to separate them.
1. Disconnect Wiring Harness from Switch. Refer to Figure 7.4.
2. Remove Flanged Lock Nut and Wiring Harness Clamp.

(Continued on Page 7.5)
(Continued from Page 7.4, B. SEPARATING SEAT & SEAT SUPPORT)

3. Remove the two (2) front 5/16 - 18 Hex Nyloc Nuts first (refer to Figure 7.4).
4. Next, while holding Seat Assembly, remove the two (2) 5/16 - 18 Hex Nyloc Nuts from the rear of the Support Plate.
5. Remove Seat Assembly from Seat Support. If Seat Pan requires replacement, it must be ordered as Part No. 5-4117, SEAT ASSEMBLY. See SNAPPER PARTS MANUALS No. 06106 & No. 06113.

C. SEAT SWITCH REPLACEMENT
(Seat Assembly must be separated from Seat Support before Switch can be replaced. See "B. SEPARATING SEAT & SEAT SUPPORT").
1. Remove Vinyl Caps from ends of Screws.
2. Remove the two (2) 5/16 - 18 Hex Nyloc Nuts.
3. Remove the two (2) 5/16 - 11/16" O.D. Flat Washers.
4. Remove Seat Switch Holder from Studs. Refer to Figures 7.4 & 7.5.

NOTE
Make sure not to misplace the Spacers, Springs or Molded Seat Bushings when removing/installing the Seat Switch Holder.

5. Remove Seat Switch.
6. Install new Seat Switch (Part No. 1-7590).
7. Reinstall components in reverse order.

D. REPLACING COMPONENTS OF THE SEAT & SEAT SUPPORT ASSEMBLIES
Figures 7.3, 7.4 & 7.5 show all components of the Seat & Seat Support Assemblies. Replacement of any parts is a straightforward Removal/Installation operation. Consult the Parts Manual for required Part Numbers.
Section VII - CASTER WHEEL/REAR AXLE, CHASSIS & BODY COMPONENTS

(Continued from previous page - CHASSIS & BODY COMPONENTS)

7.4 CHASSIS & BODY COMPONENTS
A. FOOTREST ASSEMBLY
All models of the OUT FRONT Z-RIDER are equipped with identical Footrest Assemblies (refer to SNAPPER Parts Manuals No. 06106 & No. 06113). If damaged, the Footrest should be replaced with a new part. Removal and replacement are straightforward.

B. UPPER CHASSIS & SEAT LATCH ASSEMBLY
The same Chassis & Seat Latch Assembly (Part No.'s) are used on all models of the OUT FRONT Z-RIDER. However, the Kubota-powered (Diesel & Gasoline) have additional Cover Guards not found on the Kohler-powered Units. They are as follows:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Model</th>
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<tbody>
<tr>
<td>4-5292</td>
<td>GUARD, Driveshaft</td>
<td>ZF2100DKU</td>
</tr>
<tr>
<td>7-1986</td>
<td>GUARD, Driveshaft</td>
<td>ZF2300GKU</td>
</tr>
<tr>
<td>7-1992</td>
<td>COVER, Cable</td>
<td>(All Kubota)</td>
</tr>
<tr>
<td>7-2276</td>
<td>SHIELD, Drive</td>
<td>(European)</td>
</tr>
</tbody>
</table>

C. LOWER CHASSIS (FRAME)
The different models of the OUT FRONT Z-RIDER are equipped with the following Frames:

<table>
<thead>
<tr>
<th>POWER MODEL No.</th>
<th>FRAME PART No.</th>
<th>PARTS MANUAL REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZF2200K</td>
<td>4-2589</td>
<td>No. 06106 Pages 12 &amp; 13</td>
</tr>
<tr>
<td>ZF2500K</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>EZF2100DKU</td>
<td>4-4840</td>
<td>No. 06113 Pages 14 &amp; 15</td>
</tr>
<tr>
<td>ZF2100DKU</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>ZF2300GKU</td>
<td>&quot;</td>
<td></td>
</tr>
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D. R.H. FENDER REMOVAL
(Fender Remains Assembled)
This removal is for access to the following items:

1. Park Brake Lock
2. Joystick Control Assembly
3. Ball Joint Link Assemblies

1. Disconnect the Battery. Remove NEGATIVE (-) BLACK Cable first and POSITIVE (+) RED Cable last. Secure Cables away from the Battery. See Figure 7.6.

FIGURE 7.6
2. Remove the two (2) Screws from the Control Panel.
3. Lift up on outer side of Panel and disengage the Fender Panel.
4. Lower Panel into opening. See Figure 7.7.

FIGURE 7.7
CAUTION
If Battery has not been disconnected, Control Panel Wires will be "HOT". AVOID GROUNDING!
Section VII - CASTER WHEEL/REAR AXLE, CHASSIS & BODY COMPONENTS

5. Remove Screws from Fender at locations shown in Figure 7.8.

(REMOVE SCREWS AS SHOWN)

NOTE
JOYSTICK HEADLIGHT, ETC. NOT SHOWN FOR CLARITY

FIGURE 7.8

6. Gently tap inward on Headlight Lens to free Assembly from Bezel.
8. Remove assembled Fender by lifting it up and slightly forward.

E. L.H. FENDER REMOVAL
(Fender Remains Assembled)
This removal is for access to the following items:

1. Fuel Tank.
2. Throttle Control Assembly (Diesel & Gasoline).
3. Choke Control Assembly (Gasoline Only).

1. Remove Handle. See Figure 7.9.
2. Remove Screws from Fender at locations shown.
3. Gently tap inward on Headlight to Free Assembly from Bezel.
5. Disconnect Choke and Throttle Cables from Engine, OR remove Choke and Throttle Control Assemblies per Steps 6 thru 8.
6. Remove the Handles from the Choke and Throttle Controls.
7. Remove the four (4) Screws which secure the Choke and Throttle Controls to the Fender.

8. Lower Control Assemblies into Fender Well.

WARNING
Place a clean piece of cloth over Filler Spout of Fuel Tank until Fender has been removed, then replace Fuel Cap.

10. Remove assembled Fender by lifting it up and slightly forward.

(REMOVE SCREWS FROM HANDLE AND FENDER AS SHOWN)

FIGURE 7.9

CONTROL CABLE

CONTROL Handles (Only One Shown)

HANDLE

L.H. FENDER
# Section VIII

## 52" & 61" MOWER DECK ASSEMBLIES

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Section VIII - 52” & 61” MOWER DECK ASSEMBLIES

INTRODUCTION
This Section will begin by repeating that portion of TROUBLESHOOTING (Sect. II, Pg. 2.3) which deals with mowing problems. In doing so, it will elaborate on the “corrective action” measures taken to solve those problems by giving step-by-step instructions for the adjustment, disassembly, repair or replacement of those components causing the problems.

8.1 PROBLEM - BLADE(S) NOT CUTTING
Move unit to a level, well-ventilated area.
Check the obvious first!
Check Blades. Visually inspect the Deck Drive Belts and Mower Drive Belt for any sign of wear or other damage. Also, check the Power Transfer Shaft for damage and proper connection.

With Engine “OFF” and Spark Plug Wires disconnected, have an assistant to disengage the spring-loaded Deck Idler Pulley while you turn each Spindle Pulley by hand. Blades should turn freely as you turn the individual Pulleys. If not, there is a problem within the Cutter Housing Assembly. (Refer to Sect. IX, CUTTER HOUSING/BLADE ASSEMBLY).

After having made the visual check and finding no apparent problems, release the Deck Idler Pulley. Attach the Spark Plug Wires, set the Park Brake and start the Engine.

After Engine has warmed-up, pull the Blade Switch Knob out into the “ON” position to engage Mower Blades. If Mower Blades DO ENGAGE, proceed to Step 8.2 PROBLEM - CUTTING GRASS IMPROPERLY.

If Mower Blades DO NOT ENGAGE, continue as follows, one step-at-a-time, until problem is solved.

A. FUSE CHECK
1. Turn Engine “OFF”.
2. Remove Screws from Control Panel, located on top of R.H. Fender.
3. Lift Control Panel upward to expose Fuse Panel underneath.

CAUTION
Avoid accidental grounding of wires!
Without the Battery being disconnected, the Wiring System will be “HOT”!

4. Check the 7.5 Amp PTO Fuse. Replace as required. See Figure 8.1.

B. PTO SWITCH TEST
(See Section III - Electrical)

C. DECK DRIVE BELTS (ADJUSTMENT)
If the Deck Drive Belts are slipping, adjust Belt tension as follows:
1. Using a suitable pry bar, disengage the Torsion Spring from the Idler Arm Weldment. See Figure 8.2.

FIGURE 8.1

FIGURE 8.2

MANUAL No. 07225 (L.R. 4/00) 8.2 SERVICE - MID MOUNT Z-RIDER
Section VIII - 52” & 61” MOWER DECK ASSEMBLIES

2. Remove lower end of Torsion Spring from its slot location and place in a higher slot to increase Belt tension (a lower slot will decrease Belt tension).
3. Reattach Torsion Spring to Idler Arm Weldment. Refer to Figure 8.2.

D. DECK DRIVE BELTS (REPLACEMENT)
If the Deck Drive Belts which drive the Power Transfer Shaft require replacement, proceed as follows:
1. Depress Clutch Idler and remove both Deck Drive Belts. See Figure 8.3.
2. Install new Belts (Refer to “E. PART No.s - DECK DRIVE BELTS” below).

4. Remove Cover for access to Deck Belt.

3. DEPRESS CLUTCH IDLER TO REMOVE BELTS

FIGURE 8.3

E. PART No.s - DECK DRIVE BELTS
1. Models ZF2200K, ZF2500K & ZF2500KH
   3-5543 Belt, Deck Drive (HA 36.5 Effective Lgth.)
2. Models EZF2100DKU, ZF2100DKU & ZF2300GKU
   4-1830 Belt, Deck Drive (HA37.25 Effective Lgth. - Sold as a Pair)

F. MOWER DRIVE BELT
Replace Mower Drive Belt as follows:
1. Lower Deck to lowest setting.
2. Lift up on Footrest until it locks in the “UP” position.
3. Remove four (4) Knobs that secure the Deck Cover. See Figure 8.4.

5. Remove old Belt.
6. Route new Belt around Blade Pulleys and Idler Pulley in the same position as old Belt was removed. It may be necessary to use a pry bar to pull Idler Pulley back to install Belt. See Figure 8.5.
7. Reinstall Deck Cover and Knobs.

FIGURE 8.4

FIGURE 8.5

G. PART No.s - MOWER DRIVE BELT
4-2776 BELT, 52” HB (122”)
3-5542 BELT, 61” HB (134-1/2”)

MANUAL No. 07225 (I.R. 4/00)
H. ELECTRIC CLUTCH TEST
(See Section III, ELECTRICAL).

J. GEARBOX
Check Right Angle Gearbox for damage as follows:
1. Check for any severe oil leaks around PTO Input Shaft and Deck Belt Drive Shaft (See “IMPORTANT NOTE” below).
2. If leaks are found, they are probably due to a ruptured Oil Seal.
3. Replace ruptured Seal(s) per Step K., “GEAR BOX SEAL REPLACEMENT”.

K. GEARBOX SEAL REPLACEMENT
Earlier Models of the ZF5200M & ZF6100M Mower Units used a different casting for the Right Angle Gearbox Housing than the later models which were introduced in 1999. Both Housings are interchangeable.

IMPORTANT NOTE!
Customers and Operators should be advised that when cutting long grasses (fescue, etc.), they should frequently stop the Unit and clean any debris away from the Power Transfer Shaft and the Right Angle Gearbox Input Shaft. Failure to do so could result in excessive oil leakage due to the Oil Seal being knocked loose from the Gearbox.

1. PART No.s RIGHT ANGLE GEARBOXES
   5-8342    Right Angle Gearbox (’99)
2. Remove Gearbox from Mower Deck.
3. Remove Deck Drive Pulley and Spacer.
4. Remove damaged Seal(s) and replace as illustrated in Figure 8.6.

FIGURE 8.6

5. If Gearbox requires additional oil, see “L. GEAR-BOX LUBRICATION”.

L. GEARBOX LUBRICATION
(Gearbox must be removed from Mower Deck for lubrication).
1. Place Gearbox upside-down from its normally-installed position with the Flanges resting on blocks.
2. Remove the four (4) #10 - 24 x 1/2" Screws and the Cover. See Figure 8.7.

NOTE
At this point, the Gearbox may be thoroughly inspected for internal wear or damage. To do so, turn Gearbox back over (onto a container) and allow any oil to drain completely. Inspect and make any repairs. Place Gearbox back onto the blocks.

3. Inspect Gasket. Replace as required.
4. Use 80W90 GEAR OIL (6 oz.) to bring a drained Gearbox to proper “FULL” level.

MANUAL No. 07225 (I.R. 4/00) 8.4 SERVICE - OUT FRONT Z-RIDER
5. Attach Cover, turn Gearbox over to its operating position and check for any leakage.

8.2 PROBLEM - CUTTING GRASS IMPROPERLY

As previously stated in this section, you should "Check the obvious first!" In this case, visually inspect the tires for obvious pressure differences. Check the number of Spacers above and below each Cutter Spindle to see if each corresponds with the selected cutting height.

Start Engine and allow it to warm. Move Throttle Control to "FAST" position and ascertain if there are any Engine problems (Engine skip; misfire; choking down' etc.) which could cause improper cutting. Measure side-to-side level of Deck, and also, front-to-rear pitch.

A. MOWER DECK ADJUSTMENT (LEVELNESS)
SIIDE-TO-SIDE and FRONT-TO-REAR

Before making Deck leveling adjustments, check tires and add or release air as needed to bring pressure to 12 PSI in drive tires (Turf Type Tires), 5 PSI (All Terrain Type Tires) and 25 PSI in rear Caster Tires. Pressure in Front Deck Caster Wheels should be 25 PSI.

If tires are properly inflated and mowing is still uneven, adjust Deck levelness as follows:
Section VIII - 52" & 61" MOWER DECK ASSEMBLIES

7. Turn Ball Joint in or out until Ball Joint Anchor Hole aligns with Mounting Hole. Reinstall Bolt and tighten securely. Use same procedure on other Caster Wheel. (Refer to Figure 8.9).

8. Remove blocks from under front of Deck.

B. SIDE-TO-SIDE LEVEL
Check Blade Tips by rotating Blades until Tips are pointing to the side of the Deck. Check the measurement of outside Blade Tips to the ground on both Blades. The measurement of each outside Blade Tip should be within 1/8" of each other.

C. FRONT-TO-REAR LEVEL
Check Blade Tips by rotating Blades until Tips are pointing to the front and rear of Deck. Check the Blade Tip measurements of each Blade. Front-to-rear measurement should be 1/4" to 3/8" higher in the rear. See Figure 8.10.

8.3 CUTTING HEIGHT ADJUSTMENT
A. The cutting height can be adjusted with the Switch located on the Right Side Console. Move Switch "UP" to raise Deck or move Switch "DOWN" to lower the Deck. See Figure 8.11.

B. When Deck is at desired cutting height, release Switch and observe Height of Cut Decal located on the upper right top side of the Deck. See Figure 8.12.

FIGURE 8.10

FIGURE 8.12

NOTE
The Engine does not have to be running to adjust cutting height, but Key Switch must be in the "ON" position.

C. Check to make certain that Blade-to-Ground distance is the same as indicated on Height-of-Cut Decal. If not, loosen the Screwjack Pivot Bolt and adjust Pointer to correct reading on Decal. Refer to Figure 8.12.

8.4 DECK REMOVAL

WARNING
Before attempting any adjustments, maintenance, service, or repairs, stop Engine and Blade. Always remove Key from Ignition Switch, remove Spark Plug Wire(s) and secure Wire(s) away from Spark Plug(s).

Move Power Unit/Mower Deck to an area where the Mower Deck is to be disconnected. Turn Engine "OFF", but leave Keyswitch in the "ON" position. Engage Parking Brake.

A. The rear of Deck must be raised up or both Jack Stands moved down to the lowest position and both Locking Pins inserted. See Figure 8.13 on following page.

NOTE
Jack Stands are located on the left and right rear sides of the Mower Deck.
B. Using the Deck Lift Switch, lower the Deck until it rests on the Jack Stands.

C. The Hitch Latch Pins are shown in the latched position. The latched position locks the Deck Lift Arm into position. See Figure 8.14.

D. Rotate spring-loaded Hitch Latch Pins (located on both Hitch Plates) to the unlatched position. See Figure 8.15.

E. Move Deck Lift Switch as if to lower Deck and the Lift Arm will move up in the Hitch Plates. The Lift Arm needs to be high enough to clear the Hitch Plates when Power Unit is driven backward away from Mower Deck. Refer to Figure 8.15.

F. Turn Switch Key to “OFF” position.

G. Pull Lock Collar back and slide Power Transfer Shaft away from Power Take Off (PTO) Shaft. See Figure 8.16.

H. Disconnect Wiring Harness from Mower Deck.

J. Start Power Unit. Disengage Parking Brake. Carefully move Power Unit backward away from Mower Deck.
Section VIII - 52" & 61" MOWER DECK ASSEMBLIES

8.5 DECK COMPONENTS REPAIR (52" & 61" DECKS)
The 52" & 61" Decks found on the SNAPPER OUT FRONT Z-RIDERS have interchangeable components with the following exceptions (see chart below):

<table>
<thead>
<tr>
<th>PART No.s</th>
<th>DECK MODEL DESCRIPTION</th>
<th>DECK</th>
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NOTE
The geometry of the Belting arrangement found on the 52" & 61" Decks is such that the Mower Belt maintains 80 lbs. detent pressure at all times. Improper lubrication, neglect of apparent problems and constant abuse of the Mower Deck will result in its being sent to your repair shop with one or more of the following problems:

A. PROBLEM - EXCESSIVE BELT WEAR
1. Remove Mower Belt.
2. Check Idler Pulley for correct operation:
   a) Does it spin freely when turned by hand?
   b) Does it "wobble" when turned?
   c) Is it difficult to turn?
3. If the Idler Pulley spins freely, it is O.K. If it wobbles, or is difficult to turn, it must be replaced. See Figure 8.17.

IMPORTANT!
USE ONLY GENUINE SNAPPER PARTS WHEN REPLACING ITEMS ON THE ZF5200M & ZF6100M MOWER DECKS. DO NOT SUBSTITUTE AN AFTERMARKET PART FOR ANY ITEM FOUND ON EITHER DECK!

FIGURE 8.17

4. Check Idler Arm to make certain that it pivots easily.
5. If it does not, lubricate Pivot area through Grease Fitting, located at rear of Idler Arm. See Figure 8.18.

FIGURE 8.18

6. If the Idler Arm is still difficult to pivot, remove it from the Pivot and check the Bushings and Pivot Shaft for damage. See Figure 8.19. Replace parts as required.

NOTE
The Idler Arm may "Freeze-Up" on the Pivot Shaft due to lack of lubrication.
Section VIII - 52” & 61” MOWER DECK ASSEMBLIES

8. Check the Cutter Housing Assemblies. If they turn freely when spun by hand, they are O.K. If not, see Section IX, CUTTER HOUSING ASSEMBLIES, for repair information.

B. FRONT BAFFLE (52” & 61” Decks)
The Front Baffle may be used as a LIP BAFFLE or DUST BAFFLE by simply reversing its position on the Deck.

1. LIP BAFFLE (Lip Turned Outward)
   Best position of Baffle for use in lush grass during summer or fall. See Figure 8.21.

2. DUST BAFFLE (Lip Turned Inward)
   When in this position, the Baffle helps prevent dusting conditions during arid times of year. Also, it helps pull dust into Mower Deck and out Discharge Chute.

---

8.6 DECK WELDMENT REPAIR (52” & 61” DECKS)
If a Deck develops a broken weld or is punctured due to an accident while mowing or during transport, repair Deck as follows:

A. WELDING DECKS
When making welding repairs, the use of an Electric Stick Welder is recommended. Although the welding job is easier when using either 6010 or 0613 welding rods, the job can be completed faster by using the larger 7018 rods. In either case, always set the welder “Heat” at the appropriate number for each rod.

1. Thoroughly clean area to be welded. Use a grinder to dress parts to be joined.
2. Making sure that the parts are properly aligned, clamp or otherwise secure them in position.
3. Tack-weld the area as required to prevent warping. Check alignment frequently.
4. Weld area closed.
5. Grind and sand welded area.
6. Prime and paint.

(Continued on following page)
B. STRAIGHTENING BENT DECKS

If a Deck becomes bent during operation or transport, it can usually be restored to near-original condition by a mechanic who is familiar with metalworking. Observe the following when straightening Decks.

1. Avoid using a torch to "relieve" the damaged area for straightening. This will cause the heated area to lose temper.

2. If straightening a bent Blade Baffle, it is best to remove all Deck components and lay the Deck Weldment upside-down on a firm, level surface.
   a) Using shop hammers of varying weights with appropriately-sized dollys, "work-out" the bent areas of the Blade Baffle until its inner circumference matches that of an undamaged Baffle.
   b) The circumference may be checked with a cardboard pattern taken from an undamaged Baffle.
   c) Any welding of the Blade Baffles or Discharge Chute should be done with the Wire Welder.
   d) After work has been completed on the Deck, turn it back over - right-side-up - and check to make sure that all of the Deck Skirt is in contact with the level work surface.

3. If the Deck Skirt is not level with a proven level surface, straighten the Deck Weldment until the Skirt is in full contact with surface.

NOTE
To avoid repainting after straightening a Deck, the paint can sometimes be preserved by coating the affected area with GP grease before beginning the straightening process. Wipe of excess grease after completing job.
# Section IX
## CUTTER ASSEMBLIES

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<td>Parts Sheet (Cutter Housing Assembly - 52&quot; &amp; 61&quot; Decks)</td>
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Section IX - CUTTER HOUSING ASSEMBLIES

INTRODUCTION
Whenever a unit is brought in for service, the Mower Blade and Cutter Housing Assemblies should be checked for wear or damage. If the Blades require attention, they must be removed from the Spindle for repair/replacement. On the other hand, it is not necessary to remove the Cutter Housing from the Mower Deck in order to overhaul the Deck Spindle Assembly.

9.1 CUTTING BLADE SERVICE
A. When performing Service on a Mower Unit, be sure to check the Cutting Blades for damage or signs of excessive wear. See Figure 9.1 for Blade wear limits.

B. PART No.'s - CUTTING BLADES
   2-9245    BLADE, 18" (52" DECK)
   1-7081    BLADE, 21" (61" DECK) (Low Lift)
   2-9251    BLADE, 21" (61" DECK) (High Lift)

WARNING
Never allow a customer to take a mower out of your repair shop with a Cutting Blade worn to the extent shown in Illustration "C" of Figure 9.1, without warning that customer of the danger that a tip could fly off and cause either personal injury or property damage.

9.2 BLADE REMOVAL AND SHARPENING
A. With Engine OFF, remove Key and disconnect Spark Plug Wires from Spark Plugs. Secure wires away from plugs.
   1. Remove Floor Pan (if Deck is left attached) when removing Center Blade.
   2. Either remove Mower Deck or elevate front of Unit high enough to allow for Blade Removal underneath Deck.

3. Remove Spindle Covers (if required).
4. Remove Mower Drive Belt.

CAUTION
Avoid cutting yourself on a sharp Blade! Wear gloves to protect your hands while handling the Blade.

B. Remove Blade.
C. Clean and inspect each Blade for excessive wear and damage. Refer to Figure 9.1.
D. Should Blades be in acceptable condition, sharpen at 25 to 30 degrees. DO NOT sharpen beyond existing cutting edge. See Figure 9.2.

E. Balance each Blade after sharpening by grinding metal from the heavy end of the Blade.

WARNING
The use of aftermarket or "Universal" Blades may adversely affect mower performance and/or safety.

9.3 BLADE INSTALLATION
A. Insert Blade Mounting Bolt through Bevel Washer and into Blade. Place Blade Spacers over Bolt. Make certain each Blade is installed with the same amount of Spacers as removed. See Figure 9.3.
B. Install Blade Mounting Bolt with Spacers and Blade into Spindle.
C. Install an equal amount of Blade Spacers on top of each Blade Mounting Bolt.

(Continued on Following Page)
D. Install Spindle Washer and Nut on Blade Mounting Bolt.
E. Torque each Blade Mounting Bolt and Nut to 70 to 80 ft. lbs. of torque (95 to 109 N•m).

9.4 CUTTER HOUSING ASSEMBLY - 52” & 61” DECKS
The Cutter Housing Assembly can be replaced as an assembly or rebuilt using individual replacement parts. The following procedures are outlined separately and can be performed with the Mower Unit attached to the Power Unit.

9.5 CUTTER HOUSING ASSEMBLY REPLACEMENT
A. Either remove Mower Deck or elevate front of Unit high enough to allow for Blade removal from underneath Deck.
B. Remove Mower Drive Belt.
C. Remove Spindle Nut, any Spacers and Spindle Washer from top of Spindle. See Figure 9.4.
D. Remove Blade Bolt, Beveled Washer, Blade and any Blade Spacers. Refer to Figure 9.3.
E. Remove the six (6) 3/8 - 16 Hex Flange Lock Nuts securing the Cutter Housing to the Deck and remove Cutter Assembly.
F. Reverse above steps to install replacement Cutter Assembly.

9.6 CUTTER HOUSING ASSEMBLY REBUILD/OVERHAUL
A. Remove Cutter Housing Assembly as described in “Cutter Housing Assembly Replacement”.

NOTE
Cutter Housing Assembly may be overhauled without removal from Mower Deck. Remove Blade (see 9.2 BLADE REMOVAL, etc.), then proceed with Item B as follows:
B. Remove Spindle Washer. See Fig. 9.5 on Pg. 9.4.
C. Remove Pulley and Snap Ring.
D. Using a soft-faced mallet, tap the top of the Spindle downward until the Spindle, Lower Bearing and Spacer are free of the Cutter Housing.
E. Remove Upper Bearing.
F. Clean and inspect all components for damage or wear. Replace components as required.
G. Install components in reverse order.
H. Torque Blade Bolt and Spindle Nut to 70 to 80 ft. lbs. of torque (95 to 109 N•m).
J. Fill Cutter Housing Assembly with grease.
9.7 SPECIAL RECYCLING BLADE (NINJA) WEAR LIMIT

A. The special Recycling Blade (NINJA) is used on those mowers set up for mulching. This blade MUST be inspected for wear and damage each time one of these mowers is brought in for repair.

B. Consult the Blade Drawings shown in Figure 9.6 to determine if a blade can be sharpened and safely reused, or if it must be replaced with a new part. Consult the SNAPPER "ACCESSORIES" Manual for Part No.

C. Refer to 9.8, BLADE REMOVAL AND SHARPENING (NINJA).

9.8 BLADE REMOVAL AND SHARPENING (NINJA)

A. Remove Blade(s).

B. Clean and inspect Blades for excessive wear or damage. Refer to Figure 9.6.

C. Sharpen both cutting edges on each end of the Blade at an angle of 22 to 28 degrees. The cutting surface should extend inward about 4-1/2" from the tip of the lower cutting edge and as far as practical from the tip of the upper cutting edge. See Figure 9.7 on Page 9.5.

NOTE

Regardless of the location of the Blade Spacers, when the blade is removed, all Spacers should be placed at the bottom of the Spindle when replacing the Blade. This arrangement will provide a "low-as-possible" cut.
9.9 BLADE INSTALLATION (NINJA)
A. Place the Blade Mounting Bolt through Bevel Washer and Blade.
B. Install all Spacers on top of Blade. See Figure 9.8.
C. Install Blade Mounting Bolt with Blade and Spacers into Spindle.
D. Install the Blade Mounting Nut on each Blade Mounting Bolt.
E. Torque each Blade Mounting Bolt and Nut to 60 to 75 ft. lbs. of torque (81 to 102 Nm).

9.10 MOWER DRIVE BELT REPLACEMENT
Inspect Mower Drive Belt. Replace Belt if it shows signs of excessive wear, damage and/or is broken.

A. BELT REMOVAL
1. Remove Power Unit Foot Rest.
2. Remove old Belt.

B. PART No.'s - MOWER DRIVE BELT
4-2776 BELT, 52" HB DRIVE (122")
3-5542 BELT, 61" HB DRIVE (134 1/2")

C. BELT REPLACEMENT
1. Route Belt around Blade Pulleys and Idler Pulley in same direction as old Belt was removed. It may be necessary to use a pry bar to pull Idler Pulley back to install Belt. See Figure 9.9.
### CUTTER HOUSING ASSEMBLIES

**PARTS SHEET**

**(CUTTER HOUSING ASSEMBLY - 52” & 61” DECKS)**

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