# SERVICE MANUAL

for
SNAPPER PRO Hydro Power Units
Series 0 thru Series 4

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<td>8.1 - 8.4</td>
</tr>
</tbody>
</table>

## NOTE

When making repairs that require replacement parts or components, use only original SNAPPER replacement parts to keep the equipment in top operating condition. Refer to the appropriate parts manual for correct part numbers and proper quantities required.
## Section I
### GENERAL INFORMATION

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<th>PAGE No.</th>
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<tr>
<td>CAUTIONS &amp; WARNINGS</td>
<td>1.6</td>
</tr>
</tbody>
</table>


Section I - GENERAL INFORMATION

1.1 The following lists identify the SNAPPER Hydro Power Units covered in this manual. Please note there is no coverage given the Gear Drive Units - they are in a separate manual. The Mower Units are also in a separate manual, but they are listed below to aid in the identification of the Power Units.

### SERIES 4

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL7H1404KVE</td>
<td>PMHA7364</td>
</tr>
<tr>
<td>PP7H1404KWW</td>
<td>PMHA7484</td>
</tr>
<tr>
<td>PL7H1404KWW</td>
<td>PMHA7524</td>
</tr>
<tr>
<td>PL7H1604BV</td>
<td>PMHA7614</td>
</tr>
<tr>
<td>PL7H1404KV</td>
<td></td>
</tr>
<tr>
<td>PL7H1804BVE</td>
<td></td>
</tr>
</tbody>
</table>

### SERIES 0

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLH140KW</td>
<td>SPA360</td>
</tr>
<tr>
<td>SPLH140KH</td>
<td>SPA480</td>
</tr>
<tr>
<td>SPLH160BV</td>
<td>SPA520</td>
</tr>
<tr>
<td>SPLH180KHE</td>
<td>SPA610</td>
</tr>
</tbody>
</table>

### SERIES 1

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP7H1401KV</td>
<td>PMH7481</td>
</tr>
<tr>
<td>PP7H1401KWW</td>
<td>PMH7361</td>
</tr>
</tbody>
</table>

1.2 These lists begin with coverage of the PRO Series 4, which was produced in 1992, and conclude with the PRO Series 2. The "Master Profiles" which list the year of production for the Power Units and their compatible Mower Units are shown on Page 1.4.

---

**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

1.3 MODEL NUMBER EXPLANATIONS

**EXAMPLE 1**

<table>
<thead>
<tr>
<th>PREFIX</th>
<th>BODY</th>
<th>SUFFIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLH</td>
<td>180</td>
<td>KHE</td>
</tr>
</tbody>
</table>

- **MODEL DESIGNATION**: SPLH
- **ENGINE HP SERIES DESIGNATION**: 180
- **ENGINE AND OPTIONS**: KHE

**EXAMPLE 2**

<table>
<thead>
<tr>
<th>PREFIX</th>
<th>BODY</th>
<th>SUFFIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLH</td>
<td>160</td>
<td>BV</td>
</tr>
</tbody>
</table>

- **MODEL DESIGNATION**: SPLH
- **ENGINE HP SERIES DESIGNATION**: 160
- **ENGINE AND OPTIONS**: BV

### PREFIX EXPLANATION

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Snapper Commercial Walk Behind Mower</td>
</tr>
<tr>
<td>E</td>
<td>Express Model</td>
</tr>
<tr>
<td>7</td>
<td>PRO Series</td>
</tr>
<tr>
<td>H</td>
<td>Hydro</td>
</tr>
<tr>
<td>P</td>
<td>Pro- Mid-Size</td>
</tr>
<tr>
<td>P</td>
<td>Pistol Grip Handle</td>
</tr>
<tr>
<td>L</td>
<td>Loop Handle</td>
</tr>
</tbody>
</table>

### BODY EXPLANATION

<table>
<thead>
<tr>
<th>Body HP</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 - 9 HP</td>
<td>14 - 14 HP</td>
</tr>
<tr>
<td>125 - 12 1/2 HP</td>
<td>16 - 16 HP</td>
</tr>
<tr>
<td>18 - 18 HP</td>
<td></td>
</tr>
</tbody>
</table>

- **0 - Series**
- **1**
- **2**
- **4**

### SUFFIX EXPLANATION

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KW</td>
<td>Kawasaki</td>
</tr>
<tr>
<td>KH</td>
<td>Kohler</td>
</tr>
<tr>
<td>K</td>
<td>Kohler</td>
</tr>
<tr>
<td>B</td>
<td>Briggs &amp; Stratton</td>
</tr>
<tr>
<td>V</td>
<td>Overhead Valve</td>
</tr>
<tr>
<td>E</td>
<td>Electric Start</td>
</tr>
</tbody>
</table>

**NOTE**: The above information includes the prefix letter "H". This denotes the Hydro Power Units of the PRO Series. The Pro Gear Power Units are covered in SNAPPER Service Manual No. 07221 (I.R. 11/98).
### PRO HYDRO COMMERCIAL WALK BEHIND - '95

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLH140KW - 80898</td>
<td>SPA360 - 80908</td>
</tr>
<tr>
<td>SPLH140KH - 80899</td>
<td>SPA480 - 80909</td>
</tr>
<tr>
<td>SPLH160BV - 80914</td>
<td>SPA520 - 80910</td>
</tr>
<tr>
<td>SPLH180KHE - 80901</td>
<td>SPA610 - 80911</td>
</tr>
</tbody>
</table>

**Literature Pack**
- Operator Manual - 2-9049
- Dealer Set-Up - 2-9048
- Parts Manual - 06926

### PRO HYDRO COMMERCIAL WALK BEHIND - '96

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLH140KW - 80898</td>
<td>SPA360 - 80908</td>
</tr>
<tr>
<td>SPLH140KH - 80899</td>
<td>SPA480 - 80909</td>
</tr>
<tr>
<td>SPLH160BV - 80914</td>
<td>SPA520 - 80910</td>
</tr>
<tr>
<td>SPLH180KHE - 80901</td>
<td>SPA610 - 80911</td>
</tr>
</tbody>
</table>

1) Literature Pack - 5-3950
2) Literature Pack - 5-3959
3) Literature Pack - 2-9092
4) Literature Pack - 5-3961
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926

### PRO HYDRO COMMERCIAL WALK BEHIND - '97

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLH140KW - 80898</td>
<td>SPA360 - 80908</td>
</tr>
<tr>
<td>SPLH140KH - 80899</td>
<td>SPA480 - 80909</td>
</tr>
<tr>
<td>SPLH160BV - 80914</td>
<td>SPA520 - 80910</td>
</tr>
<tr>
<td>SPLH180KHE - 80901</td>
<td>SPA610 - 80911</td>
</tr>
</tbody>
</table>

1) Literature Pack - 5-3950
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926
2) Literature Pack - 5-3959
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926
3) Literature Pack - 2-9092
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926
4) Literature Pack - 5-3961
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926

### PRO HYDRO COMMERCIAL WALK BEHIND - '98

<table>
<thead>
<tr>
<th>POWER UNITS</th>
<th>MOWER UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLH140KW - 80898</td>
<td>SPA360 - 80908</td>
</tr>
<tr>
<td>SPLH140KWE - 84276</td>
<td>SPA480 - 80909</td>
</tr>
<tr>
<td>SPLH140KH - 80899</td>
<td>SPA520 - 80910</td>
</tr>
<tr>
<td>SPLH170KW - 84275</td>
<td>SPA610 - 80911</td>
</tr>
<tr>
<td>SPLH180KHE - 80901</td>
<td>SPA84282</td>
</tr>
</tbody>
</table>

1) Literature Pack - 5-3950
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926
2) Literature Pack - 5-3950
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926
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- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926
4) Literature Pack - 5-3961
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926
5) Literature Pack - 53961
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926
6) Literature Pack - 53961
- Operator Manual - 4-3799
- Dealer Set-Up - 2-9048
- Parts Manual - 06926
Section I - GENERAL INFORMATION

INTRODUCTION

1.5 HOW TO USE THIS MANUAL

This manual contains the Service and Maintenance information required to properly inspect, service and repair the PRO Hydro Power Units, Series 0 thru Series 4.

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 standing behind the handlebar controls.

1.6 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.

1.7 SERIAL NUMBER LOCATION

The unit serial number is located on the rear deck in different places; according to unit model.

1.8 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 PRO Hydro Power Units. 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, the word "unit" will be used (in most cases) in lieu of PRO Hydro Power Unit.

1.9 SPECIFICATIONS - GENERAL

A. ENGINE SPECIFICATIONS

Refer to the Engine Manufacturer’s Manuals.

B. HYDRAULIC DRIVE SYSTEM

The Power Units covered in this manual will have the following drive components:

1. Wheel Motor (2)*

2. Hydraulic Pump (2) - See Section V.

* Refer to the Wheel Motor Manufacturer’s Repair Manual.

C. TIRE SPECIFICATIONS

The Power Units covered in this manual are furnished with identical traction tires having the same parts number. Regardless of the unit model number, traction tire pressure is not to exceed 28 PSI.

1.10 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>MANUFACTURER’S MARKS MAY VARY. THREE-LINE MARKINGS ON HEADS SHOWN BELOW - FOR EXAMPLE, INDICATE SAE GRADE 5.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE 1 or 2</td>
<td>SAE 5</td>
</tr>
<tr>
<td>SAE 6 or 7</td>
<td>SAE 8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAPSCREW BODY SIZE</th>
<th>SAE 1 or 2 Torque Fl - Lb</th>
<th>SAE 5 Torque Fl - Lb</th>
<th>SAE 6 or 7 Torque Fl - Lb</th>
<th>SAE 8 Torque Fl - Lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches - Thread</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4 - 20</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>- 28</td>
<td>6</td>
<td>10</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>5/16 - 28</td>
<td>11</td>
<td>17</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>- 24</td>
<td>13</td>
<td>19</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>3/8 - 16</td>
<td>18</td>
<td>31</td>
<td>34</td>
<td>44</td>
</tr>
<tr>
<td>- 24</td>
<td>20</td>
<td>35</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>7/16 - 14</td>
<td>28</td>
<td>49</td>
<td>55</td>
<td>70</td>
</tr>
<tr>
<td>- 20</td>
<td>30</td>
<td>55</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>1/2 - 13</td>
<td>39</td>
<td>75</td>
<td>85</td>
<td>105</td>
</tr>
<tr>
<td>- 20</td>
<td>41</td>
<td>85</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>9/16 - 12</td>
<td>51</td>
<td>110</td>
<td>120</td>
<td>155</td>
</tr>
<tr>
<td>- 18</td>
<td>55</td>
<td>120</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>5/8 - 11</td>
<td>83</td>
<td>150</td>
<td>167</td>
<td>210</td>
</tr>
<tr>
<td>- 18</td>
<td>95</td>
<td>170</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>3/4 - 10</td>
<td>105</td>
<td>270</td>
<td>280</td>
<td>375</td>
</tr>
<tr>
<td>- 16</td>
<td>115</td>
<td>295</td>
<td>420</td>
<td></td>
</tr>
</tbody>
</table>

1.11 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 - it is extremely flammable.

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 wire and secure the end away from the plug BEFORE inspecting, servicing or repairing the unit or attachments. Precautions prevent accidents such as unintentional start-ups!

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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 unit 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. With the mower unit attached, the front caster wheels will pivot - therefore, both sides of the rear deck must be securely supported. Be sure to chock (block) the wheels that remain on the surface.

IMPORTANT!

J. To roll unit without engine running, turn both pressure relief valves counter-clockwise (to the left) 1/2 turn. See Figure 1.1.

![Figure 1.1](image)

NOTE
Orientation of pump relief valves will be different on some units when compared to those shown in Figure 1.1. The terms "Counter-Clockwise" and "Clockwise" still apply - regardless of orientation.

IMPORTANT!

K. For unit operation, turn both pressure relief valves clockwise (to the right) to tighten.

NOTE
Read the Operator's & Engine Owner's Manuals and instructions BEFORE operating equipment.

CAUTION
Any mechanic/repairman who operates the PRO Hydro for the first time, should be instructed in the operation of the unit and should practice ALL mower movements while operating the mower with the Speed Control Lever in the slowest travel speed position and Blade Clutch Lever in OFF position.

CAUTION
Reverse operation of the PRO Hydro Unit is attained by squeezing the traction controls against the handlebar. The tighter the Traction Controls are squeezed against the handlebar, the faster the mower will move in reverse. Use CAUTION when reversing mower!

WARNING
The SNAPPER PRO Hydro Mowers have a Transport Speed which allows the mower to travel forward at a speed of 6 MPH - it is NOT to be used while walking! Use the Transport Speed ONLY when the mower is equipped with a Riding Suly!

- NEVER make sharp turns at high speed!
- The mower has a "zero-turn" capability; NEVER use "zero-turn" at high speed.

WARNING
NEVER leave mower running on a slope, hill, or other incline without an Operator at the controls. The mower should be left running ONLY ON FLAT TERRAIN if it is to be temporarily left unattended by the Operator!

WARNING
Hydraulic fluid escaping under pressure can have sufficient force to penetrate skin and cause injury. If foreign fluid is injected into the skin, it must be surgically removed within a few hours by a physician familiar with this form of injury or gangrene may result. Keep body and hands away from hydraulic leaks or loose connections. Use paper or cardboard and not hands to search for leaks.

Safely relieve all pressure in the system before disconnecting any hose or performing any work on the hydraulic system. Remove pressure from the system by turning engine OFF and allowing machine to set idle for twenty minutes.
# Section II

## TROUBLESHOOTING

### CONTENTS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PAGE No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>2.2</td>
</tr>
<tr>
<td>Power Unit/Mower</td>
<td>2.3</td>
</tr>
<tr>
<td>Hydro</td>
<td>2.3</td>
</tr>
<tr>
<td>Service &amp; Lubrication</td>
<td>2.4</td>
</tr>
<tr>
<td>Service &amp; Lubrication Chart</td>
<td>2.5</td>
</tr>
<tr>
<td>Service Notes</td>
<td>2.6</td>
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</tbody>
</table>
## Section II - TROUBLESHOOTING

### ENGINE

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBLEM</th>
<th>SOLUTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine does not start.</td>
<td>Key OFF.</td>
<td>Turn Key to Run.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fuel Tank empty.</td>
<td>Fill Fuel Tank.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engine Throttle Control not at FAST (Rabbit) position.</td>
<td>Put Engine Throttle Control to FAST (Rabbit) position.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choke NOT closed.</td>
<td>Put Throttle Control in CHOKE IØI position.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Check adjustment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spark Plug Wire loose or disconnected.</td>
<td>Connect Spark Plug Wire.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Traction Controls NOT Latched in NEUTRAL position.</td>
<td>Move Traction Controls to NEUTRAL LATCH position.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operator Presence Control (OPC) Switch out of adjustment.</td>
<td>Adjust Switch.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Safety Interlock Switches out of Adjustment.</td>
<td>Adjust Switches.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blade Clutch Switch in ON position.</td>
<td>Pull Blade Clutch Lever to OFF position.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spark Plug bad.</td>
<td>Install new Spark Plug.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Dirty Air Filter.</td>
<td>Clean Air Filter.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Vent in Gas Cap plugged.</td>
<td>Clean Vent or install new Gas Cap.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Air Filter dirty.</td>
<td>Clean or install new Air Filter.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Spark Plug not gapped correctly.</td>
<td>Check and set Spark Plug gap.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Spark Plug bad.</td>
<td>Install new Spark Plug.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Spark Plug not gapped correctly.</td>
<td>Clean and set Spark Plug gap.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Fuel Filter plugged or dirty.</td>
<td>Replace Fuel Filter.</td>
<td></td>
</tr>
<tr>
<td>Engine Idles Poorly.</td>
<td>Dirty Air Filter.</td>
<td>Clean or replace Filter.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Fuel Filter plugged.</td>
<td>Replace Fuel Filter.</td>
<td></td>
</tr>
<tr>
<td>Engine Overheats.</td>
<td>Engine Oil low in Crankcase.</td>
<td>Add Oil.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Fins are clogged.</td>
<td>Clean.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mower Related:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1) Blade Mounting Bolts loose.</td>
<td>Tighten Blade Mounting Bolts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) Blade out of Balance.</td>
<td>Sharpen and balance Blade.</td>
<td></td>
</tr>
<tr>
<td>Engine Dies.</td>
<td>Mower Related:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1) Mowing grass too tall.</td>
<td>Adjust cutting height.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) Mowing too fast.</td>
<td>Reduce travel speed.</td>
<td></td>
</tr>
</tbody>
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2.2 SERVICE - PRO HYDRO POWER UNITS
### POWER UNIT/MOWER

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBLEM</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mower Does Not Move When Steering Controls Are Released.</td>
<td>Pressure Relief Valve open.</td>
<td>Close Pressure Relief Valves</td>
</tr>
<tr>
<td></td>
<td>Traction Control Rod out of Adjustment.</td>
<td>Adjust Rods.</td>
</tr>
<tr>
<td></td>
<td>Tire pressure in both Traction Wheels not the same.</td>
<td>Adjust Air Pressure.</td>
</tr>
<tr>
<td>Blades Do Not Engage - Mower Mows Unevenly.</td>
<td>Belt slipping or broken.</td>
<td>Replace or adjust Belt.</td>
</tr>
<tr>
<td></td>
<td>Travel speed too fast.</td>
<td>Reduce travel speed.</td>
</tr>
<tr>
<td></td>
<td>Operator making Mower turn corner too fast.</td>
<td>Reduce travel speed.</td>
</tr>
<tr>
<td></td>
<td>Rough terrain.</td>
<td>Change mowing pattern.</td>
</tr>
<tr>
<td></td>
<td>Unequal number of Blade Spacers on Cutter Shafts or Caster Wheels.</td>
<td>Install equal number of Spacers.</td>
</tr>
<tr>
<td></td>
<td>Clutch NOT activating.</td>
<td>Check electrical connections and Switch. Check Clutch air gap adjustment.</td>
</tr>
<tr>
<td>Mower Not Cutting Full Width.</td>
<td>Broken or slipping Blade Belt.</td>
<td>Replace or adjust Belt.</td>
</tr>
<tr>
<td>Discharge Chute Plugs.</td>
<td>Grass Wet.</td>
<td>Let Grass dry.</td>
</tr>
<tr>
<td></td>
<td>Mower too low.</td>
<td>Raise cutting height.</td>
</tr>
<tr>
<td></td>
<td>Engine overloaded.</td>
<td>Run Engine at full Throttle and reduce travel speed.</td>
</tr>
</tbody>
</table>

### HYDRO

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBLEM</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit is Noisy.</td>
<td>Gearing is overly noisy - chatters, etc.</td>
<td>Check Oil level, Check Belt idler.</td>
</tr>
<tr>
<td></td>
<td>Worn Gears in Pump or Motor.</td>
<td>Remove and repair/replace.</td>
</tr>
<tr>
<td></td>
<td>Worn Bearings.</td>
<td>Replace Pump or Motor.</td>
</tr>
<tr>
<td>Unit Runs Erratically.</td>
<td>Oil Level low.</td>
<td>Add oil.</td>
</tr>
<tr>
<td></td>
<td>Filter clogged.</td>
<td>Replace Filter.</td>
</tr>
<tr>
<td></td>
<td>Pump Lockouts loose.</td>
<td>Tighten Lockouts.</td>
</tr>
<tr>
<td>Oil Leaks.</td>
<td>Loose hydraulic connection. (Always use cardboard or paper to search for leaks).</td>
<td>Tighten connections. Replace defective components.</td>
</tr>
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**SERVICE & LUBRICATION (See Pages 2.4 & 2.5)**
# Section II - TROUBLESHOOTING

## SERVICE & LUBRICATION

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<th>PROCEDURE</th>
<th>COMMENTS</th>
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<td>BREAK-IN</td>
<td>Check all Grease Points and add if necessary.</td>
<td></td>
<td>(See Service &amp; Lubrication Chart, Page 2.5)</td>
</tr>
<tr>
<td></td>
<td>Check all Fasteners for proper tightness.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check Set Screws.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change Hydraulic Oil and Filter after first 25 hours of operation</td>
<td></td>
<td>(See Section V)</td>
</tr>
<tr>
<td></td>
<td>Change Engine Oil and Filter at 5 hours.</td>
<td></td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td>DAILY</td>
<td>Check Engine Oil.</td>
<td>Change Oil if extreme dusty conditions.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Clean Air Filter.</td>
<td>More often if needed.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Clean Air Intake Screen.</td>
<td>More often if needed.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Grease Transmission Couplings.</td>
<td>One Shot General Purpose Grease.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WEEKLY</td>
<td>Check Tire Air Pressure.</td>
<td>Adjust Air Pressure to 28 PSI.</td>
<td></td>
</tr>
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<td></td>
<td>Check Safety Interlock System.</td>
<td>Inspect OPC Switches for proper Operation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lube Traction (Drive) Levers/Loops.</td>
<td>One Shot General Purpose Grease.</td>
<td></td>
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<tr>
<td></td>
<td>Inspect Traction Lock for Wear.</td>
<td>Replace if Worn.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change Engine Oil and Filter.</td>
<td>More often if needed.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Replace Air Filter.</td>
<td>More often if needed.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fuel Filter.</td>
<td>Replace with correct SNAPPER Filter.</td>
<td></td>
</tr>
<tr>
<td>MONTHLY</td>
<td>Check Set Screws.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clean and Adjust Spark Plugs.</td>
<td>(See Engine Manual)</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Lube Controls and Linkages.</td>
<td>Use Medium Duty Oil.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change Hydraulic Oil and Filter.</td>
<td>(See Section V).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YEARLY</td>
<td>Test Engine for Compression &amp; Wear.</td>
<td>Repair/Replace Parts if needed.</td>
<td>(Refer to Engine Repair Manual)</td>
</tr>
<tr>
<td></td>
<td>Test Engine Electrical System.</td>
<td>Replace Components if needed.</td>
<td>(See Engine Manual)</td>
</tr>
<tr>
<td></td>
<td>Test OPC Electrical Components.</td>
<td>Replace Components if needed.</td>
<td>(See Electrical System)</td>
</tr>
<tr>
<td></td>
<td>Check all Bearings for Wear.</td>
<td>Replace if needed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check Performance of Wheel Motors and Hydro Pumps.</td>
<td>Rebuild/Replace if needed.</td>
<td>(See Section V)</td>
</tr>
<tr>
<td></td>
<td>Check Hydraulic Hoses and Fittings for Leaks, Cracks, Kinks and Other</td>
<td>Replace Components if needed.</td>
<td>(See Section V)</td>
</tr>
<tr>
<td></td>
<td>Signs of Wear.</td>
<td></td>
<td></td>
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NOTE:
The Power Unit illustrated below is representative of the PRO Hydro Units. It is shown with the Mower Unit Model SPE360 attached and is intended to give a general overview of the location of the various components. Use common sense when servicing - if a sliding surface shows sign of wear, it needs lubrication. If a component is equipped with a grease fitting, it requires grease, etc.
Section III
ELECTRICAL

ATTENTION
Because of ongoing improvements to the PRO line of commercial mowers, there have been many variations in the electrical systems and their components. For this reason, Snapper Product Technical Service Department is presently compiling a comprehensive "PRO Electrical Repair Manual" which hopefully, will solve any problem that may be encountered. Therefore, this Section covers only Components Testing and Battery Service for those Hydro Power Units covered in this manual.

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Section III - ELECTRICAL SYSTEM

INTRODUCTION
The HYDRO version of the PRO Power Unit is offered as Manual Start or Electric Start. The electrical system of each version is as follows:

3.1 MANUAL START
This electrical system consists of two circuits which are the ignition and starting circuits. Only the starting circuit will be covered in this section. Refer to the Engine Manual for information concerning the ignition circuit which is an internal engine circuit. See Figure 3.1 for two configurations of the Manual Start Wiring Schematic for the main harness. Both configurations shown below feature an electric blade brake clutch. The wiring schematic for the Electric Start Units is shown on Page 3.3.

WIRING SCHEMATIC - Main Harness (Pistol Grip & Loop Handle)
PRO HYDRO MID-SIZE COMMERCIAL MOWERS SERIES 4 (I.R. 1/95)
NOTE: The Wiring Schematic shown below was introduced 1/95. For Schematic prior to this date, contact Snapper Product Technical Service Department.

WIRING SCHEMATIC - Main Harness (Loop Handle)
PRO HYDRO MID-SIZE WALK BEHIND MOWERS SERIES 0 (I.R. 2/96)

FIGURE 3.1

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SERVICE - PRO HYDRO POWER UNITS
Section III - ELECTRICAL SYSTEM

3.2 ELECTRIC START UNITS
Generally found on the higher horsepower versions of the Hydro Power Units, the Electric Start System consists of three circuits: ignition; charging; starting. This section will cover the Starting Circuit only. Refer to the Engine Manuals for information concerning the ignition and charging circuits - these are internal engine circuits. See Figure 3.2.

WIRING SCHEMATIC - Main Harness (Loop Handle)
PRO HYDRO MID-SIZE WALK BEHIND MOWERS SERIES 0 (I.R. 2/96)

FIGURE 3.2

3.3 ELECTRICAL SYSTEM COMPONENTS
(Manual Start/Electric Start)
The components of the PRO Hydro Power Unit's Electrical System are as follows:
A. Key Switch (Manual Start - Early Models)
B. Key Switch (Manual Start - Later Models)
C. Key Switch (Electric Start - ALL Models)
D. Solenoid (Electric Start - ALL Models)
E. Fuse (if applicable)
F. Blade Clutch Switch (Manual)
G. Blade Clutch Switch (Electric)
H. OPC Switch
J. Transmission (PTO) Switch
K. Electric Clutch
L. Rectifier/Regulator (Kawasaki Engines only)
M. Capacitor
N. Module (if applicable)

See Pages 3.4 thru 3.7 for components testing.
Section III - ELECTRICAL SYSTEM

3.4 PRINCIPLE OF OPERATION
Together the components listed under 3.3, A thru N., make up the Safety Interlock System. This is an electrical loop which contains four interlock switches; key, OPC, clutch (or mower blade) and transmission switch. These switches MUST be in their appropriate modes (normally open/normally closed) before the engine can be started. If any of the four switches are not in their appropriate mode (N/O) - N/C, the circuit will not be completed and the engine cannot be started.

Testing of the individual components is explained in the following "Interlock System Analysis".

3.5 INTERLOCK SYSTEM ANALYSIS
A. KEY SWITCH TEST (Manual Start-Early Models)
1. Disconnect wire from the Switch Terminal. See Figure 3.3.

![Figure 3.3](image)

2. Connect tester wires to terminal and dash panel. If light on tester glows, switch is good. If light does not glow, replace switch.

B. KEY SWITCH TEST (Manual Start-Later Models)
1. Disconnect wire connectors from terminals. See Figure 3.4.

![Figure 3.4](image)

2. Attach continuity light wires to the terminals.
3. Turn the switch key to RUN position (making the circuit). The light should come on.
4. If light does not come on, replace switch.

C. KEY SWITCH TEST (Electric Start - All Models)
1. Disconnect wires from the switch terminals. See Figure 3.5.

![Figure 3.5](image)

2. Place the switch in the OFF position. Connect continuity light to "M" and "G" terminals only - there should be contact.
3. Place the switch in ON position and connect the light to the "B" and "L" terminals only - there should be contact.
4. Hold the switch in the START position after connecting the light to terminals "B" and "S" - there should be contact.
5. Reconnect harness wires to switch terminals after completing test.

D. SOLENOID TEST (Electric Start - All Models)
1. Disconnect all wires from the solenoid. See Figure 3.6.

![Figure 3.6](image)

2. Connect the continuity light to both threaded terminals.
3. Now apply 12 Volts to the two plug terminals. The solenoid should click and the continuity light should come on.
4. Reconnect wires to proper terminals.
Section III - ELECTRICAL SYSTEM

E. FUSE CHECK
Some models of the PRO7 Power Unit have a fuse holder and a 15 or 20 Amp fuse contained in the main wiring harness. This fuse should be checked on a regular basis and, especially when the engine will not start, or, if it suddenly stops.

F. BLADE CLUTCH SWITCH TEST (MANUAL)
1. Disconnect wire connectors from terminals. See Figure 3.7.

2. Attach continuity light wires to the terminals. When the switch is depressed (making the circuit), the light should come on.
3. Reconnect wires to the proper terminals.

G. BLADE CLUTCH SWITCH TESTS (ELECTRIC)
1. Disconnect wire connectors from the switch terminals. See Figure 3.8.
2. Place switch in OFF position and connect tester wires to the #4 and #5 terminals only - the light should come on.
3. Place switch in ON position and connect tester wires to the #1 and #3 terminals only - the light should come on.
4. Reconnect wires to the proper terminals.

H. OPC SWITCH TEST (OPERATOR'S PRESENCE CONTROL)
1. Disconnect wire connectors from terminals. See Figure 3.9.

2. Attach continuity light wires to the terminals. When the switch is depressed, the light should go off. If not, replace switch.

J. TRANSMISSION (PTO) SWITCH TEST
1. Remove connector from terminals. See Figure 3.10.

NOTE
There are four (4) switches of this type on the PRO HYDRO MID-SIZE WBM, Series 0. They are located on the Switch Bracket above the Hydro Pumps. See Parts Manual No. 06926, Pg. 12, Items 8A & 8B.

2. Test switch with continuity leads to switch terminals. Depress and release the bottom ball. They should make and break continuity depending on which switch is being tested.

SERVICE - PRO HYDRO POWER UNITS
Section III - ELECTRICAL SYSTEM

K. ELECTRIC CLUTCH TESTS
(MEASURE CLUTCH FIELD COIL RESISTANCE)
1. Turn clutch switch and engine switch OFF.
2. Disconnect clutch wire connectors. See Figure 3.11.

3. Connect OHM meter leads to the two wires in the clutch connector. Refer to Figure 3.11.
4. If the meter reading is BELOW 2.40 OHMs or ABOVE 3.40 OHMs resistance, the clutch has failed and must be replaced.
5. If the meter reads between 2.40 and 3.40 OHMs resistance, proceed with the CLUTCH CURRENT DRAW test.

(MEASURE CLUTCH CURRENT DRAW)
1. With the engine switch and clutch switch OFF, disconnect the clutch wire connector. See Figure 3.12.

2. Use an AMP meter with a 10 AMP scale. Connect one meter lead to clutch connector wire “A” and connect the other metal lead to wire “C” in the harness connector.
3. Connect a short jumper wire to the wire “B” in the clutch connector and to wire “D” in the harness connector.
4. Turn clutch switch ON.
5. If the meter reads BELOW 3.5 AMPS, the electrical system has a problem (battery, relay, switches, etc.). Check the electrical system.
6. If the meter reads 3.5 AMPS to 4.5 AMPS, proceed to the AIR GAP SETTING instructions.

(CHECK AIR GAP SETTING)
1. With the engine switch and clutch switch OFF, locate the three air gap check “slots” as shown. See Figure 3.13.

(USING FEELER GAUGE)

2. Insert a .017 feeler gauge into each of the 3 slots.
3. If the gaps do not fall between .010 and .025, reset the spring-loaded adjustment nuts until the gaps are measured at .017 on the feeler gauge.

THEREFORE IF...
1. The resistance falls between 2.40 and 3.40 OHMS...
2. The amperage draw is 3.50 AMPS to 4.5 AMPS...
3. The air gaps are between .010" and .025" (or have been set to .017"), the electric clutch is within factory specifications and is not the source of a problem - check the remainder of the electrical system.

NOTE
Items “L” & “M” are applicable to Kawasaki engines only.

L. RECTIFIER/REGULATOR TEST
If this item becomes suspect of causing a problem, check with the manufacturer’s instructions for methods of testing. See Figure 3.14.

M. CAPACITOR TEST
Test according to manufacturer’s instructions. Replace as needed. Refer to Figure 3.14.
Section III - ELECTRICAL SYSTEM

B. TESTING WITH VOLTMETER
Test battery voltage with a Voltmeter (VOM). Set meter on DC Volts. Place the red probe on the Positive (+) terminal and the blade probe on the Negative (-) terminal. Refer to the chart for test indications. See Figure 3.16.

![Volmeter Test Diagram]

<table>
<thead>
<tr>
<th>12 V Recorded</th>
<th>Less Than 12 V Recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery OK for Cranking System Tests</td>
<td>Battery Discharged or Defective</td>
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<tr>
<td>Test Battery Cables</td>
<td>Perform Battery Maintenance</td>
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</table>

![Figure 3.16]

C. TESTING WITH HYDROMETER
Test the specific gravity of the battery's electrolyte with a hydrometer. If the reading is less than 1.225, the battery should be recharged before further testing can be done. If the battery fails to accept a charge, it is not serviceable and should be replaced. Cease testing if this is the case. See Figure 3.17, "READING THE HYDROMETER".

NOTE
Hydrometers are generally calibrated to give a correct reading only at 80° F. When taking a reading at other temperatures, a correction factor must be used. This factor is approximately 0.004 (4 points) specific gravity. For each 10 degrees above 80° F, ADD 4 point. For each 10 degrees below 80° F, SUBTRACT 4 points. Always correct the readings for temperature variations. Test specific gravity of each cell.

3.6 BATTERY SERVICE
A. BATTERY TESTING
A battery which does not perform properly is not necessarily worn out or defective. It may only need to be removed from the unit and brought up to full charge with a battery charger. If battery trouble is still suspected after being fully charged, tests should be performed.

If the battery is producing 12 volts and the cables have continuity, the remainder of the system can be systematically tested. A complete check includes cleaning and testing the charge with a hydrometer. The battery must be properly serviced as described earlier before testing.
D. READING THE HYDROMETER

To read the hydrometer correctly, position the top surface of the electrolyte in the hydrometer at eye level. Disregard the curvature of the liquid where the surface rises against the float.

EXAMPLE

Hydrometer reading is...........1.240
Temperature is..........................0°

Degrees different than 80°...........30
Number of 10° intervals............3

Times Correction
Factor..................................3 x 0.004
Correction..................................0.012

(Correction is subtracted when temperature is lower than 80°)

...........................................-0.012

Corrected Hydrometer Reading
...........................................1.228

A fully charged battery should have a specific gravity reading above 1.225 in all cells before performing full high rate discharge test.

FIGURE 3.17

E. USING THE HYDROMETER

Perform the hydrometer specific gravity test as follows:
Carefully insert tip of the hydrometer into the cell to avoid damaging the separators. Broken separators could result in premature failure of the battery. Squeeze bulb and draw in only enough electrolyte to keep the float from touching the bottom of the hydrometer barrel when the bulb is released. Keep hydrometer in a vertical position while drawing in liquid and while taking the reading. Test each cell. Refer to the BATTERY TESTING CHART on Page 3.9 for analysis of test readings.
### Section III - ELECTRICAL SYSTEM

#### F. BATTERY TESTING CHART

<table>
<thead>
<tr>
<th>HYDROMETER TEST @ 80°F (27.2°C)</th>
<th>STATE OF CHARGE OR BATTERY CONDITION</th>
<th>CORRECTION OR REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1.215 Specific Gravity</td>
<td>1. Probably Good</td>
<td>1. No correction required if variation among cells not over .050 Specific Gravity. Give High Rate Discharge Capacity Test. If Test O.K., check operation and setting of Voltage Regulator. Make a thorough check of the electrical system for short circuits, loose connections, corroded terminals, etc.</td>
</tr>
<tr>
<td>3. Cells Showing More Than 50 Points (.050) Specific Gravity variation.</td>
<td>3. (A) Short circuit in low cell. (B) Loss of electrolyte by leak or excessive overcharge. (C) Improper addition of electrolyte or contaminants. (D) Natural or premature battery failure. (E) Cracked box partition.</td>
<td>3. Recharge battery. If .050 Specific Gravity variation persists, replace battery. If battery accepts charge and variation does not persist, repeat Step #1.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPEN CIRCUIT VOLTAGE TEST</th>
<th>STATE OF CHARGE OR BATTERY CONDITION</th>
<th>CORRECTION OR REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Battery or cells showing more than half charge.</td>
<td>4. Probably good.</td>
<td>4. Apply remedy given for #1.</td>
</tr>
<tr>
<td>5. Battery or cells showing less than half charge, but not more than .06 variation.</td>
<td>5. Questionable.</td>
<td>5. Apply remedy given for #2.</td>
</tr>
<tr>
<td>6. If cell connectors are accessible, cells showing more than .05 variation.</td>
<td>6. See #3.</td>
<td>6. Apply remedy given for #3.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HIGH RATE DISCHARGE TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Use High Rate Discharge Tester in accordance with manufacturer's recommendations.</td>
</tr>
</tbody>
</table>

### 3.7 ACTIVATING NEW BATTERIES

Most dry charge type battery problems result from improper activation practices and/or the lack of proper battery maintenance. Activate as follows:

**A.** Before activating the battery, remove it from the Power Unit. Never attempt to pour electrolyte into a new battery when it is mounted on the unit.

**B.** After removing battery from unit, place the battery on a level surface and make sure the cap vent holes are open to permit gas to escape during battery charging.

**C.** Remove the caps and fill each cell with 1.265 (± .05) specific gravity battery grade electrolyte to a level that is no more than 3/16" above the top of the plates. See Figure 3.18.

#### NOTES:

The battery and electrolyte should be at least 70 degrees Fahrenheit prior to filling. Allow 30 minutes to set, then add electrolyte as needed to bring the level back up to 3/16" above plate level. Reinstall caps.

Never overfill the battery cells. Maintain the level at NO MORE than 3/16" above the plates. Use distilled water to restore correct level. If overfilled, the liquid can overflow and reach the battery terminals creating a path for electrical discharge and, also cause corrosion and deterioration of metal parts. Should corrosion occur, clean terminals with a wire brush, then coat with petroleum jelly.

#### WARNING!

**HYDROGEN IS EXPLOSIVE!** Do not charge batteries around open flames or sparks! Battery acid (electrolyte) is corrosive! Use care when handling!

---

**FIGURE 3.18**

MANUAL No. 07222 (I.R. 10/99) 3.9 SERVICE - PRO HYDRO POWER UNITS
Section IV
ENGINE

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Fuel Filter Service .................................... 4.3
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Engine Removal & Installation ...................... 4.5 - 4.8
1. Kohler 14, 15, 18 & 22 HP. ......................... 4.5 - 4.6
2. Kawasaki 14 & 17 HP. ............................ 4.6 - 4.7
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REFERENCE LITERATURE

PARTS MANUAL No. PAGE No.
#06922 (I.R. 7/93) ................................. 4 thru 7 & 12
#06923 (I.R. 1/95) ................................. 4 thru 7 & 12
#06926 (I.R. 2/96) ................................. 4, 6, 7, 8 & 9
Section IV - ENGINE

INTRODUCTION
This section covers procedures for the maintenance and disassembly of those engine components which power the different units.

These components include the filters, muffler, spark plug and fuel system.

Also covered in this section is the Removal and Installation of various engines.

4.1 ENGINE MAINTENANCE
(The following information is applicable to most engines; regardless of make, model or horsepower).

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>
<thead>
<tr>
<th>RECOMMENDED SAE VISCOSITY GRADES</th>
</tr>
</thead>
<tbody>
<tr>
<td>0W-20, 5W-30</td>
</tr>
<tr>
<td>10W-30</td>
</tr>
<tr>
<td>20W-50</td>
</tr>
<tr>
<td>30</td>
</tr>
</tbody>
</table>

Temperature Range Anticipated Before Next Oil Change

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

B. OIL FILTER
1. Change the engine oil filter each time the oil is changed. Use only the type and brand of filter as designated in the Engine Owner's Manual.

2. Some power units have engines which come equipped with oil filters. For those engines that do not, consult the proper Parts Manual for the availability of an oil filter kit.

C. CHANGING ENGINE OIL
1. Start engine and allow to operate until oil has warmed.

2. Remove oil drain plug and loosen oil fill/dipstick cap.

NOTE
Engines will have different methods for draining engine oil.

3. Allow oil to drain completely.

4. Remove oil filter (if applicable).

5. Using a clean cloth, wipe away any dirt or other debris that may have collected in the oil filter base.

6. Install new o-ring into filter base.

7. Install new filter (hand-tighten only).

8. Install oil drain plug.

NOTE
Some power units are equipped with engines which allow the engine oil to be drained through the oil filter base. See Figure 4.1.


10. Start engine and allow to operate while checking for leaks.

11. If there are no leaks, stop engine (allow unit to remain undisturbed for 5 minutes) and check oil level. If required, add oil to bring to proper level on dipstick.

D. AIR FILTER
(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 4.2.
2. Clean the sponge filter element according to instruction label found on filter cover. If label is missing, consult engine manual.

3. Clean paper filter by tapping it gently to remove debris and dust particles. If extremely dirty, replace filter.

4. Always clean cover inside and out, and clean base before reassembly.

E. FUEL FILTER

![WARNING!](image)

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.

Shown in Figures 4.3 & 4.4 are the two types of fuel filters found on most units.

1. FILTER, ENGINE MANUFACTURER’S
   - The type fuel filter shown in Figure 4.3 is supplied by the engine manufacturer. Refer to the Engine Manual for Part Number and Order Information. Make sure the replacement is correctly installed with the arrow on filter pointing toward the engine. See Figure 4.3.
   - Check the In-Line Fuel Filter at frequent intervals and replace before the screen becomes clogged with sediment.

3. FILTER #1-4359
   - Make sure the replacement filter is correctly installed with “IN” marking toward the fuel tank and “OUT” toward the engine. See Figure 4.4.
Section IV - ENGINE

F. MUFFLER
1. When servicing engine, inspect muffler for signs of damage or deterioration. Replace as required.

2. Make sure that muffler guard or heat shield 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!

G. SPARK PLUGS
1. Spark plugs should be cleaned or replaced (if necessary), and gap reset to .030 or .035 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.

H. FUEL SYSTEM
The Fuel System consists of the fuel tank and cap, (2) fuel tank straps, (3) lengths of fuel hose, an “ON/OFF” fuel valve and a fuel line filter. See Figure 4.5.

1. Check the Fuel System components frequently. Replace any parts showing worn spots or cracks.

2. Keep the fuel tank fill-cap area clean at all times. Wipe away any debris before filling tank.

---

MANUAL No. 07222 (10/99)  FIGURE 4.5  SERVICE - PRO HYDRO POWER UNITS
4.2 ENGINE REMOVAL & INSTALLATION
The following procedures are for the removal and re-installation of the units engine. Refer to the Engine Manufacturer's Service/Repair Manual for information concerning engine repairs.

A. ENGINE REMOVAL (KOHLER 14,15,18 & 22 HP)
1. Turn fuel shut-off valve to OFF position.
2. If removing engine from a unit featuring electric-start, disconnect the battery as follows:
   a. Disconnect the battery's negative (black wire) terminal.
   b. Disconnect the positive (red wire) terminal.
3. Disconnect the positive (red) cable from the base of the starter.
4. Disconnect alternator wire from starter. See Figure 4.6.

5. Disconnect the engine's electrical harness from the main harness.
   a. Disconnect engine ground wire.
   b. Disconnect electric clutch harness (if applicable to unit).
6. Remove the fuel line from the engine.
7. Disconnect the choke and throttle cables from the engine.
8. Remove hood from mower unit in order to gain access to deck belts.
9. Tilt unit back on its handles to gain access to underside of rear deck.
10. Roll the deck drive belt off the deck pulleys, then pull the belt slack up to the engine clutch pulley and remove the belt. See Figure 4.7.
11. Remove the electric clutch bracket. See Figure 4.7.

12. Roll the Engine/Hydro belt off the pump pulleys and remove the belt.
13. On units so equipped, it will be necessary to remove the electric clutch if the rear deck is not notched out to allow lifting engine out with clutch attached. Check for notches. See Figure 4.8.

14. In order to remove the electric clutch, you must first remove the engine nuts and bolts and then slide the engine forward until the electric clutch has cleared the axle. The electric clutch may now be removed.
15. Remove the electric clutch by first removing the Hex Hd Cap Bolt, split lockwasher and spacer. Remove the clutch from the engine driveshaft. Refer to Figures 4.9 & 4.10.
16. Lift engine out from topside of deck.
17. Remove Engine pulley and key.
18. If replacing engine, transfer all drive components to new engine.
19. Reverse above procedure to install and connect a new or repaired engine.
B. ENGINE REMOVAL (KAWASAKI) 14 & 17 HP

1. Turn fuel shut-off valve to OFF position.

2. If removing engine from a unit featuring electric-start, disconnect the battery as follows:
   a. Disconnect the battery's negative (black wire) terminal.
   b. Disconnect the positive (red) cable from the base of the starter.

3. Disconnect alternator wire from starter.

4. Disconnect the engine's electrical harness from the main harness.
   a. Disconnect engine ground wire.
   b. Disconnect electric clutch harness (if applicable to unit).

5. Remove the fuel line from the engine.

6. Disconnect the choke and throttle cables from the engine.

7. Remove hood from mower unit in order to gain access to deck belts.

NOTE: MOWER DECK NOT SHOWN FOR CLARITY

9. Tilt unit back on its handles to gain access to underside of rear deck.

10. Roll the deck drive belt off the deck pulleys, then pull the belt slack up to the engine clutch pulley and remove the belt. See Figure 4.11.

11. Remove the electric clutch bracket.

12. Roll the Engine/Hydro belt off the pump pulleys and remove the belt.
Section IV - ENGINE

13. Remove the four (4) engine bolts and washers.
14. Attach an appropriate lifting mechanism to the "Lifting-Eyes" provided on the engine.
15. Lift engine from top side of deck. See Figure 4.12.
16. Remove the electric clutch. Refer to Figures 4.9 (or) 4.10.
17. Remove engine pulley and key.
18. If replacing engine, transfer all drive components to new engine.
19. Reverse above procedure to install and connect a new or repaired engine.

NOTE
The electric clutch should be tested for proper adjustment and operation before it is installed on the rebuilt/replaced engine. Refer to Section III - ELECTRICAL.

4.3 BELT CHART, ENGINE/HYDRO

PRO736 & PRO748 MID-SIZE COMMERCIAL MOWERS - SERIES 1 (I.R. 7/93)

<table>
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<tr>
<th>MODEL</th>
<th>PARTS MAN.</th>
<th>PART No.</th>
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<tr>
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PRO HYDRO MID-SIZE COMMERCIAL MOWERS - SERIES 4 (I.R. 1/95)

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<tr>
<td>PL7H1604BV</td>
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<tr>
<td>PL7H140KV</td>
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<td>PL7H1804BVE</td>
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PRO HYDRO MID-SIZE WALK BEHIND MOWERS - SERIES 0 (I.R. 2/96)

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<th>PARTS MAN.</th>
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<td>SPLH160BV</td>
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<td>SPLH180KHE</td>
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PRO HYDRO WALK BEHIND MOWERS - SERIES 0

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PRO HYDRO WALK BEHIND MOWERS - SERIES 1

<table>
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<th>MODEL</th>
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<th>PART No.</th>
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<tbody>
<tr>
<td>PP7H1401KV</td>
<td>06921</td>
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<tr>
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<td>(REV. 2, 7/93)</td>
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</tr>
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<td></td>
</tr>
</tbody>
</table>
Section V
HYDRO PUMP
SERVICE & REPAIR

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  • Charge Pumps | 5.4
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<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBLEM</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control Linkage damaged or binding.</td>
<td>Repair control linkage.</td>
</tr>
<tr>
<td></td>
<td>Bypass valve stuck partially open.</td>
<td>Repair bypass valve.</td>
</tr>
<tr>
<td></td>
<td>Charge check valve held open. (Problem in one direction only).</td>
<td>Remove foreign material from valve.</td>
</tr>
<tr>
<td>Mower Will Not Move When Steering Controls are Released.</td>
<td>Control linkage damaged or not connected.</td>
<td>Repair or reconnect control linkage.</td>
</tr>
<tr>
<td></td>
<td>Drive between engine and transmission damaged.</td>
<td>Repair drive (replace broken belt, repair sheared key, repair splined coupling, etc.).</td>
</tr>
<tr>
<td>Mower Jerky or Operating Erratically.</td>
<td>Plugged filter. Inlet air leak.</td>
<td>Inspect inlet condition and filter.</td>
</tr>
<tr>
<td>Mower is “Sluggish” Under Load. (Operates OK on Level Surface).</td>
<td>Loose drive belt between engine and hydro pumps.</td>
<td>Tension drive belt (replace if necessary).</td>
</tr>
<tr>
<td></td>
<td>Hydro system low on fluid.</td>
<td>Refill reservoir. Purge air from system if necessary.</td>
</tr>
<tr>
<td></td>
<td>Large amount of water in hydro system fluid (evaporates when hot, resulting in low fluid level).</td>
<td>Drain fluid from reservoir and unit, replace filter element and refill with new fluid.</td>
</tr>
<tr>
<td>Mower Does Not Pull on One Side.</td>
<td>Pump or wheel motor is faulty.</td>
<td>Test pump first. If pump is O.K., change-out wheel motor.</td>
</tr>
</tbody>
</table>
Section V - HYDRO PUMP SERVICE & REPAIR

5.1 INTRODUCTION

The purpose of this section is to provide information useful in servicing the Hydrostatic Pumps, used to propel the SNAPPER PRO HYDRO POWER UNITS. This section includes unit and component description, troubleshooting and minor repair procedures.

A pump normally will not require servicing during the life of the mower in which it is installed. Should servicing be required, some repairs can be accomplished without removing the unit from its installed location, provided that the unit is accessible and can be thoroughly cleaned before beginning any procedures. Since dirt or contamination is the greatest enemy of any hydraulic equipment, the greatest possible cleanliness is necessary.

5.2 GENERAL DESCRIPTION

A. The Hydrostatic pumps used on the SNAPPER PRO HYDRO POWER UNITS are for vehicle applications where up to six horsepower is required for the propel function, or for auxiliary functions where the system pressure requirements and design life can be met within the pump rating. These variable displacement pumps each have a maximum displacement of 0.61 in³/rev (10 cc/rev).

B. Pumps are of the axial piston design, utilizing spherical nosed pistons. A compression spring, located inside each piston, holds the nose of the piston against a thrust bearing race.

C. The variable displacement pump features a cradle swashplate with a direct-proportional displacement control. Reversing the direction of tilt of the swashplate reverses the flow of oil from the pump and thus reverses the direction of the motor output rotation.

D. A fixed displacement gerotor charge pump is provided in the pump units. Oil from an external reservoir and filter is pumped into the closed loop by a charge pump. Fluid not required to replenish the closed loop flows either into the pump housing through a cooling orifice, or back to the charge pump inlet through the charge pressure relief valve.

E. Charge check valves are included in the pump end cap to control the makeup oil flow for the system.

F. A screw type bypass valve is utilized in the pumps to permit movement of the machine for short distances at low speeds without starting the engine. Refer to Figures 5.2 & 5.7.

5.3 HYDRO SUPPORT SYSTEM

A. The charge pump incorporated into the pump units supplies fluid to keep the closed loop charged, preventing cavitation and providing cooling oil flow for the system. An inlet filter is required to insure that only clean fluid enters the system. The charge relief valve is designed to maintain the charge pressure at 25 to 70 PSI at 3600 RPM input speed. See Figure 5.1.

![Charge Circuit Diagram]

FIGURE 5.1 - CHARGE CIRCUIT

B. Since either of the main hydraulic passages can be at high pressure, two (2) charge check valves are used to direct make-up fluid into the low pressure side of the closed loop. These check valves are located in the pump end cap.

5.4 SAFETY PRECAUTIONS

A. The loss of hydrostatic drive line power in any mode of operation may cause a loss of hydrostatic braking capacity. A braking system, redundant to the hydrostatic transmission must, therefore, be provided which is adequate to stop and/or hold the system should the condition develop.

B. Certain service procedures may require the vehicle/machine to be disabled (wheels raised off the ground, work function disconnected, etc.) while performing them in order to prevent injury to the technician and bystanders.

C. Use caution when dealing with hydraulic fluid under pressure. Escaping hydraulic fluid under pressure can have sufficient force to penetrate your skin, causing serious injury. This fluid may also be hot enough to burn. Serious infection or reactions can develop if proper medical treatment is not administered immediately.

D. Some cleaning solvents are flammable. To avoid possible fire, do not use cleaning solvents in an area where a source of ignition may be present.

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Section V - HYDRO PUMP SERVICE & REPAIR

5.5 CONTROLS & FEATURES

A. DIRECT DISPLACEMENT CONTROL
1. The Direct-Proportional Displacement Control (DDC) provides a simple method of control. Movement of the swashplate control shaft produces a proportional swashplate movement and change in pump flow and/or direction.
2. If difficulties are encountered with the control, inspect the connection of the control linkage to the swashplate control shaft to insure that the linkage is properly attached. The vehicle/machine control system determines the neutral position of the linkage.

B. CHARGE PUMPS
A fixed displacement gerotor type charge pump is provided as part of the Hydrostatic Pump.

C. BYPASS VALVE
1. In some applications, it is desirable to move the machine for short distances at low speeds, without operating the engine. A bypass valve allows oil to be routed from one side of the pump/motor circuit to the other, thus allowing the motor to turn with little resistance.
2. The variable pumps utilize a screw-type bypass valve which is fully open when unscrewed two (2) turns maximum. The bypass valve must be fully closed during normal vehicle operation. See Figure 5.2.

5.6 INITIAL SET-UP (New & Serviced Power Units)

! CAUTION
Before starting a new or serviced PRO Hydro Unit, check the hydraulic reservoir to MAKE SURE it is filled to the proper level with oil.

A. HYDRAULIC OIL RESERVOIR
Use SAE 10W-30 oil. Fill reservoir with oil until the level comes within 3 to 4 inches from the top of the filler neck. See Figure 5.3.

![HYDRAULIC OIL RESERVOIR](image)

**FIGURE 5.3**

B. ENGINE OIL
Add oil as needed to bring up to, but not over, the FULL mark. Refer to the Engine Owner's Manual for oil specifications.

C. AIR BLEED PROCEDURE

! CAUTION
The following procedure MUST be performed before initial start-up of a new or serviced Pro Hydro Unit, or when changing hydraulic oil or changing hydraulic hoses and other components.

1. With the keyswitch in the STOP position and the Hydraulic Oil Reservoir filled to the proper level with 10W-30 oil, disconnect the hose line from each pump to the oil filter block (middle front port) at the pumps. See Figure 5.4.

![MIDDLE FRONT PORT](image)

**FIGURE 5.4**

1. Seal off disconnected hose lines with plugs or other means.
2. When oil drips at a steady rate from the open ports on the pumps, reconnect the hose lines.

SERVICE - PRO HYDRO POWER UNITS
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4. Move the front of the machine against a wall or post, jack up the rear of the machine so the rear tires are at least 1" off the ground and secure with jack stands (Ensure that machine is stable).  
5. Make sure that the Blade Control Switch is in the OFF position! See Figure 5.5.

![Diagram of hydro pump controls](image)

**FIGURE 5.5**

6. Move Throttle Control to “half” throttle.  
7. Turn Keyswitch to RUN position.  
8. Pull Starter Rope until engine starts. After engine starts, pull Throttle Control back to lowest speed possible and move Speed Control Lever in a slow forward position.  
9. Pull back slightly on both Traction Controls until the Neutral Latch releases and allows the Controls to go forward.  
10. On the top of each Wheel Motor, there are two hydraulic lines. Follow the line that is toward the rear of the Wheel Motor and follow it to the pump. See Figure 5.6.  
11. Loosen the hose fitting 1 1/2 turns counter-clockwise (DO NOT COMPLETELY DISCONNECT THE HOSE) at the pump end. Watch for oil to come out without air bubbles showing. When this happens, retighten the hose securely. Refer to Figure 5.6.

![Diagram of bypass valve](image)

**FIGURE 5.6**

12. With the machine still on jack stands, open the Bypass Valves on the pumps (turning them counterclockwise) 2 complete turns and let the engine run approximately 20 to 30 minutes. See Figure 5.7.

![Diagram of bypass valves](image)

**FIGURE 5.7**

13. Close the Bypass Valves (turning them clockwise) and run the wheels full speed forward for approximately 30 seconds and also in full reverse for 30 seconds.  
14. Using the Neutral Latch, lock the Traction Controls back into the Neutral (Park) position. Turn the Keyswitch to STOP and lower the machine to the ground.
Section V - HYDRO PUMP SERVICE & REPAIR

5.7 MINOR REPAIRS

NOTE
Only those minor repairs as described in this section are authorized under the pump warranty. Any repairs beyond the scope of the following instructions will void the warranty.

A. GENERAL
1. Cleanliness is a primary means of assuring satisfactory life on either new or repaired units. Cleaning parts by using a clean solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign materials and chemicals.
2. Protect all exposed sealing surfaces and open cavities from damage and foreign material.
3. It is recommended that all O-rings be replaced. Lightly lubricate all O-rings with clean petroleum jelly prior to assembly.

B. PLUG/FITTING TORQUE VALUES
If any plugs are removed from the housing or end cap during servicing, they should be torqued as indicated in chart shown as Figure 5.8.

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<tr>
<td>Case Drain Fitting (9/16 - 18 O-ring)</td>
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<td>System Ports (3/4 - 16 O-ring)</td>
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<tr>
<td>Inlet Fitting/Plug (7/16 - 20 O-ring)</td>
<td>8-10 ft. lbs.</td>
</tr>
<tr>
<td>Check Valve Plugs (9/16 - 18 O-ring)</td>
<td>15-20 ft. lbs.</td>
</tr>
<tr>
<td>Bypass Valve</td>
<td>7-10 ft. lbs.</td>
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FIGURE 5.8

C. SHAFT SEALS
Lip type seals are used on the input shaft and displacement control shaft of the variable pumps. These seals can be replaced without major disassembly of the unit. However, replacement of these seals generally requires removal of the pump from the machine.

D. HYDRO PUMP/MOTOR REPLACEMENT
1. Should it become necessary to replace a pump or motor, it is recommended that the affected pump or motor be replaced as a set (both pump and motor). Generally, when a pump or motor is bad, it will affect the associated pump or motor.
2. Relieve all pressure in the system and disconnect Spark Plug(s). See Figure 5.9.

FIGURE 5.9

3. Replace the affected component(s).

E. HYDRO PUMP REMOVAL
1. STOP ENGINE! Loosen and remove nut from under the spring tensioner for hydraulic belt idler tensioner. Remove spring from bolt. See Figure 5.10.

FIGURE 5.10

2. Loosen nut on belt guide at rear of engine pulley and remove cutter deck belt from engine pulley.
3. Remove hydraulic pump belt.
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4. Remove the pump drive pulley by loosening the 5/16 - 18 x 3/8" Set Screw and removing the pulley and key from the pump shaft.

5. Disconnect wiring harness plugs from transmission switches. See Figure 5.11.

8. Working through the slot, located on the L.H. side of the bracket, use a socket and extension to remove the L.H. eccentric from the pump arm. See Figure 5.13.

**NOTE**
Leave the pump arms attached if the pumps are to be serviced or repaired. If replacing a pump, remove the pump arm and install it on the new pump.

1/4 - 20 x 1 1/4" HEX HD SCREW
5/16 - 18 x 1/2 HEX HD SCREW
5/16 LOCK WASHER
5/16 x 1 x 3/32 FLAT WASHER
ECCENTRIC
L.H. SIDE OF TANK BRACKET
PUMP ARM

9. Remove the 5/16 - 18 x 1/2 Hex Hd Screw, 5/16 lockwasher and 5/16 x 1 x 3/32 flatwasher. Refer to Figure 5.13.

10. Remove the 5/16 - 18 hex nuts, 5/16 washers and 5/16 - 18 x 1 1/2" hex cap screws which secure the pump to the rear deck. Remove pump.

11. Removal of R.H. pump is similar.

F. SHAFT SEAL REPLACEMENT

1. To replace the pump input shaft seal, first remove the retaining ring from the housing. See Figure 5.14.

---

**FIGURE 5.11**

6. Remove the switch bracket (with switches attached) by removing the 5/16 - 18 hex nuts, 5/16 x 7/8 x 3/32" flat washers and 5/16 - 18 x 1 1/4" hex hd screws. See Figure 5.12.

**FIGURE 5.12**

7. Disconnect the hydraulic hoses from the pump(s). Plug or otherwise seal-off each hydraulic hose.

**FIGURE 5.14**

---

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5.7

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2. Carefully pull the seal out of the housing bore. A "hook" type tool may be used to grasp the seal and pull it out, or a slide hammer type puller may be used to remove the seal. Care must be taken so as not to damage the housing bore, shaft sealing surface, or bearing. Once removed, the seal is not reusable. See Figure 5.15.

NOTE
Once the pump input shaft seal is removed, the pump block spring may push the shaft partially out of the housing. Do not attempt to pull the shaft out of the housing. Internal parts could move out of alignment or fall into the transmission, requiring major disassembly of the unit.

3. Inspect the sealing area on the shaft for rust, wear or contamination. Polish the sealing area on the shaft, if necessary.
4. Lubricate the new seal with petroleum jelly.
5. Wrap the spline or key end of the shaft with thin plastic to prevent damage to the seal lip during installation.
6. Slide the seal over the shaft and press it into the housing bore. Be careful not to damage the seal. See Figure 5.16.

CAUTION
Do not allow the check balls to fall into the closed loop passages in the end cap.

7. Install the seal retaining ring in the housing. Refer to Figure 5.16 above.

G. CHECK/CHARGE VALVES
1. Remove the check valve plug with a 1/4" internal hex wrench. See Figure 5.17.

2. Remove the valve spring and check ball (or poppets) from the pump end cap. See Figure 5.18.

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3. Inspect the check balls (or poppets) and mating seals in the end cap for damage or foreign material.
4. Lay the pump on its side and reinstall the check ball (or poppets), spring, and plug (with O-ring) into the end cap. Be certain the check ball does not fall into the closed loop passage. Torque the plug to 15-20 ft. lbs. Turn the unit over and repeat for the other check valve. Refer to Figure 5.18.

H. BYPASS VALVE (Also referred to as "RELIEF VALVE")
1. Unscrew the bypass valve from the end cap.
2. Inspect the valve and mating seat in the end cap for damage or foreign material. It is recommended that the O-ring and backup ring be replaced. See Figure 5.19.

3. Reinstall the bypass valve into the end cap. Torque to 7-10 ft. lbs.

J. CHARGE PUMP
1. The charge pump rotation is determined by the orientation of the charge pump cover on the end cap. The cap boss on the charge pump cover indicates the orientation.

4. Remove the charge pump cover and O-ring.
5. Remove the charge pump gerotor assembly.
6. Remove the charge relief valve spring and ball.
7. Inspect the gerotor assembly, charge pump cover, and end cap for abnormal wear, damage or foreign material. Inspect the charge relief valve ball and spring. Inspect the charge relief valve seat in the end cap for damage or foreign material.
8. Prior to installing the charge pump, apply a small quantity of petroleum jelly to the I.D., O.D., and side faces of the gerotor assembly.
9. Install the charge relief valve ball and spring. See Figure 5.22.

(Continued on following page)
10. Install the charge pump gerotor assembly.
11. Install the charge pump cover and O-ring. The charge relief valve spring must enter the recess in the cover.
12. Install the charge pump cover screws. Torque each screw to 7-10 ft. lbs.
# Section VI

## HANDLE

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6.1 FAMILIARIZATION (Pages 6.2 & 6.3)
Figure 6.1 shows the components which make up the Handle Assembly. Components of the Tracking Control Assembly are shown by Figure 6.2 on Page 6.3.

FIGURE 6.1
Section VI - HANDLE
(LOOP HANDLE, CONTROL & TRACKING CONTROL ASSEMBLIES)
(6.1 FAMILIARIZATION - Continued from Page 6.2)

TRACKING CONTROL ASSEMBLY

HANDLE, Shift Lever

LEVER

PIN, 3/16 x 1” Roll

PIN, Shoulder

PLATE, Speed, Accutrack

SCREW, 5/16 - 18 x 1”, Gr 5

NUT, 3/8 - 16 Hex Nyloc

WASHER, Slipper

WELDMENT, Control

SCREW, 5/16 - 18 x 1”, Gr 5

WASHER, Slipper

CAM, Track

SPRING

WASHER, 5/8 Spring

BUSHING

NUT, 5/16 - 18 Hex Top Lock, Gr B

GRIP, Vinyl

HANDLE (Weldment)

FIGURE 6.2

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Section VI - HANDLE
(LOOP HANDLE, CONTROL & TRACKING CONTROL ASSEMBLIES)

6.2 HANDLE REMOVAL (Complete Ass'y)
A. Disconnect wiring harness from the ignition switch, cutter blade switch and OPC switch.
B. Disconnect throttle control from engine. Cut and remove plastic tie which secures cable to tank bracket. See Figure 6.3.
C. Cut and remove the three (3) plastic ties which secure the wiring harness.
D. Remove wiring harness from control panel and handle. Store out of the way.
E. Wrap a piece of masking tape above and below each traction rod swivel. This will preserve the traction adjustment. See Figure 6.4.
F. Remove self-locking cotter pin from each traction rod swivel.
G. Remove swivels and traction rods from traction levers. Lower traction rods out of the way.
H. While supporting the handle assembly, remove the four (4) 3/8 - 16 x 1" lg. bolts and 3/8 - 16 Nyloc nuts which secure the handle assembly to the tank bracket. See Figure 6.5.

NOTE
Before removal, mark handle adjustment hole. Reinstall in same location.
Section VI - HANDLE
(LOOP HANDLE, CONTROL & TRACKING CONTROL ASSEMBLIES)

6.3 LOOP HANDLE REPLACEMENT (Weldment)

A. Remove the 1/2" E-Ring and 1/2" machine bushing from one end of the pivot rod. See Figure 6.6.

B. Remove the L.H. and R.H. control panels by removing the eight (8) 1/4 - 20 hex washer self-tapping screws. See Figure 6.7.

NOTE
The L.H. control panel contains the throttle control and the cutter blade switch; the ignition switch is located on the R.H. control panel.

D. Remove the L.H. and R.H. traction levers.

E. Remove the traction control assembly as a unit.

F. Remove the OPC bail from the handle by removing two (2) 1/4 - 20 hex jam nuts, two (2) 1/4 - 20 x 1 3/4" hex hd cap bolts and four (4) bearings. See Figure 6.8.

G. Remove the OPC switch by removing two (2) #12-14 x 1/2" hex washer self-tapping screws. See Figure 6.9.

H. Reverse steps A thru G to reinstall parts on new handle weldment.

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6.4 TRACTION LEVER REPLACEMENT (R.H. Shown)
A. Pull both traction controls slightly backwards to release neutral latch (if engaged).

B. Remove the 1/2" self-locking cotter pin from each traction rod swivel. See Figure 6.10.

NOTE
Wrap a piece of masking tape above and below each traction rod swivel before removal. This will preserve the traction adjustment.

C. Remove the traction rods from the traction levers. Lower rods out of the way. Refer to Figure 6.10.

D. Remove the E-ring and 1/2" machine bushing from the R.H. end of the pivot rod. See Figure 6.11.

E. Remove the control panel(s) by removing the 1/4 - 20 x 1/2" hex washer self-tapping screws (4 - per panel).

F. Remove pivot rod by pulling it out from the L.H. side. Be careful not to lose the left-side machine bushing.

NOTE
If ONLY the R.H. traction lever is to be removed/replaced, then pull the pivot rod out just enough to allow its removal. Leave the tracking control assembly and L.H. traction lever held in place by the pivot rod.

G. Remove the traction lever(s) to be replaced.

H. Reverse steps A thru G to reinstall new/repaired traction lever.
Section VI - HANDLE  
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6.5 OPC BAIL REPLACEMENT  
A. Remove the two (2) 1/4 - 20 hex jam nuts and 1/4 - 20 x 1 3/4" hex hd cap screws which secure the ball to the handle weldment. See Figure 6.12.

![Figure 6.12](image)

B. Tilt bail forward to disengage it from the handle weldment while moving it to the right to free the OPC rod. Refer to Figure 6.12.

C. Remove the four (4) bearings from the bail. Inspect them for excessive wear or damage. If required, install new bearings in replacement bail.

D. Install new OPC bail in reverse order.

6.6 OPC SWITCH TEST (Operator's Presence Control)  
A. Disconnect wire connector from terminals. See Figure 6.13.

![Figure 6.13](image)

B. Attach continuity light wires to the terminals. When the switch is depressed, the light should go off. If not, replace switch.

6.7 OPC SWITCH REPLACEMENT/ADJUSTMENT  
A. Disconnect wire connectors from OPC switch.

B. Remove the two (2) #12 - 14 x 1/2" hex washer hd, self-tapping screws to remove switch.

C. Install new switch, but do not overtighten screws - leave some slack for adjustment.

D. Depress OPC bail against handle.

E. Slide OPC switch towards the OPC rod until the switch button is pushed in.

F. Tighten screws. Test installation by starting engine then releasing bail. Readjust OPC switch as required until engine stops when OPC ball is released.
Section VI - HANDLE
(LOOP HANDLE, CONTROL & TRACKING CONTROL ASSEMBLIES)

6.8 TRACKING CONTROL ASSEMBLY - REMOVAL/REPLACEMENT

A. Remove traction rods.

B. Remove the control panels by removing the 1/4 - 20 x 1/2" hex washer self-tapping screws (4 - per panel).

C. Remove the E-ring and 1/2" machine bushing from the R.H. end of the pivot rod. See Figure 6.14.

D. Remove pivot rod by pulling it out from the L.H. side.

E. Remove the tracking control assembly. See Figure 6.15.

F. After making any repairs or parts replacement, reinstall tracking control assembly in reverse order of removal.

6.9 TRACKING CONTROL ASSEMBLY PARTS REPLACEMENT

A. SHIFT LEVER

1. Remove 5/16 - 18 hex top lock nut and 5/16 - 18 x 1" screw. Refer to Figure 6.2, Page 6.3.

NOTE
The 5/8 spring washer, bushing shift lever and .33 x .88 x .09 flatwasher will fall free of the assembly as the screw is taken out. Be careful not to lose any parts. Refer to Figure 6.2, Page 6.3.

2. Insert the replacement shift lever (with handle attached) thru the slot in the cam track.

3. Place the 5/16 - 18 x 1" screw thru the hole in front of the control weldment.

4. Place the 5/8 spring washer and bushing on the screw from the inside. Refer to Figure 6.2, Page 6.3 for correct position of spring washer.

5. With shift lever facing forward, place it over screw.

6. Now, add the flatwasher and nut behind the shift lever. Tighten securely.

NOTE
The shift lever assembly should be tightened enough to maintain position, but still loose enough to be moved.

B. SLIPPER WASHERS (Speed Control)

NOTE
The slipper washers (4) may need replacement when the speed control lever will not maintain position during mower operation.

1. Remove 3/8 - 16 Nyloc nut and 3/8 - 16 x 5" hex hd cap screw. Refer to Figure 6.2, Page 6.3.

2. As step 1 (above) is performed, the flatwashers, spring and side plates will be disassembled. Take care not to lose any parts.

3. Inspect the four (4) slipper washers for wear. Replace as required.

4. Reassemble items in reverse order. Tighten securely and test for ease of adjustment.
Section VI - HANDLE
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C. TRACK CAM & SPRING WASHER
1. Remove the SHIFT LEVER. See 6.9, A.
2. Remove the 5/16 - 18 hex top lock nut and 5/16 - 18 x 1" screw which secure the track cam. Refer to Figure 6.2, Page, 6.3.
3. Inspect the track cam and spring washer for damage or wear.
4. Reassemble components in reverse order.

D. NEUTRAL LATCH, SPEED PLATES & CONTROL WELDMENT
1. Inspect these parts during routine maintenance or when replacing other parts as described in A thru C.
2. Replace any worn or damaged parts.

6.10 HANDLE HEIGHT/TRACTION CONTROL ROD ADJUSTMENT
For Operator comfort, the Mower Handlebar is adjustable to five different positions. The Handlebar is assembled in a high position at the factory. If Handlebar is not comfortable to the Operator, Handlebar adjustment and also Traction Control Rod adjustment can be accomplished by following the steps as follows:
A. Move Traction Control Levers to neutral position and engage Neutral Latch Lever. The Mower SHOULD NOT creep forward or backwards with the Engine running. If it does, neutral position MUST be adjusted. STOP the Engine and remove Ignition Key from Keyswitch.

B. Slide a 12" long by 5/16" diameter rod through the hole on left side of the Fuel Tank/Handlebar Support Bracket, through the Traction Control Shift Lever Arm and Switch Bracket as shown in Figure 6.16. This locks the Arms and Pumps in neutral so they can be synchronized. Release the Neutral Latch Lever.

C. Disconnect the swivels from the Traction Control Arms on left and right side of the Handlebar. Maintain the hairpins for re-assembly. See Figure 6.17.

D. Loosen the upper bolt and nut on right and left side of Mower which holds Handlebar to Support Bracket. Remove the lower bolt and nut on each side. Maintain this hardware also. See Figure 6.18.

E. Pivot the Handlebar up or down and reinsert bolt and nut into desired hole position on each side. Tighten both upper and lower bolts and nuts on each side to 35 ft. lbs.

F. Adjust the swivels on the Traction Control Rods on right and left side to synchronize the neutral position. The pins on the swivel should just allow the Latch to slip by with the rod still inserted as mentioned in Step B. Adjust the swivel up or down the Traction Control Rod as required.

G. Reconnect swivels to Traction Control Levers on each side. Reinstall hairpins as mentioned in Step C.
Section VI - HANDLE
(HANDLE HEIGHT/TRACTION CONTROL ROD ADJUSTMENT)
(Continued from Page 6.9)

H. Remove rod from Fuel Tank.Handlebar Bracket as mentioned in Step B.

J. Start the Engine! The Mower SHOULD NOT creep forwards or backwards.
# Section VII - ADJUSTMENTS

(Neutral, OPC Components & Speed Controls)

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Section VII - ADJUSTMENTS (Neutral, OPC Components & Speed Controls)

INTRODUCTION
The following information gives step-by-step instructions for the proper adjustment of the Neutral Position Steering Controls, OPC, Manual/Electric Clutch, Reverse Speed & Forward Speed of the various PRO7 Power Units.

This information will cover both the Pistol Grip and Loop Handle Models of the PRO7 Hydro from 1992 thru 1999.

7.1 NEUTRAL ADJUSTMENTS - 1992/95 Models
A. SPEED CONTROL/PARK LOCK LEVER
1. Stop Engine, pull Speed Control/Park Lock Lever fully backwards (towards the handle).
2. Check that the Neutral Locks (located on each of the hydraulic pumps) fully engage the Roller Bearings on each pump arm. If they both do not fully engage the Roller Bearings, remove the hairpin from the Speed Control Rod and adjust the rod so that it forces the Neutral Locks onto the Roller Bearings. See Figures 7.1 & 7.2.

FIGURE 7.1

3. If only one of the Neutral Locks does not engage a Roller Bearing, or if there is play in the neutral position, the adjustments that attach the neutral locks to the Speed Control Cam need to be adjusted. Loosen the hardware on the affected side(s) and loosen or tighten the bolts and lock nut accordingly. Tighten the hardware after adjustment is complete. See Figure 7.2.
4. Test the Neutral Locks by moving the Speed Control/Park Lock Lever back and forth several times and observe the action of Neutral Lock when the Speed Control Lever is fully backwards (towards the handle). If this is actuating properly, proceed to Step 5. If not, repeat appropriate steps in Step 2.

FIGURE 7.2

5. The Speed Control/Park Lock Lever should force the Steering Controls into neutral when the Speed Control/Park Lock Lever is pulled backward fully (towards the handles). If the Steering Controls are going into neutral and the Traction Lock is moving forward, the Speed Control Park Lock Lever is properly adjusted.

B. STEERING CONTROLS/NEUTRAL POSITION
1. If the Steering Controls are not going into neutral (Traction Lock not actuating), the Speed Control/Park Lock Lever will need to be adjusted.
2. Loosen the six (6) mounting bolts that hold the side of the Speed Control Park/Lock Lever in place.
3. Disconnect the Speed Control Rod.
4. Move the Speed Lever until the Steering Controls actuate the Traction Lock forward and lock the Steering Controls in neutral.
5. Tighten the six (6) mounting bolts.
6. Adjust the Speed Control Rod as required. See Figure 7.3.

FIGURE 7.3
Section VII - ADJUSTMENTS (Neutral, OPC Components & Speed Controls)

C. PUMP NEUTRAL POSITION ADJUSTMENT

1. Stop Engine, pull the Speed Control Park Lock Lever fully backwards (towards the handle). Carefully raise and secure the rear of the machine so that the Drive Wheels are 1" to 2" off the ground.

   CAUTION
   Unit must be stable and secure prior to proceeding.

2. Remove the hairpins from each Traction Rod on the front of the control panel and remove the Swivels from the connecting arms so that the Traction Rods are no longer attached to the Drive Levers.

3. Make sure the Blade Clutch is in the OFF position.

4. Loosen the Set Screws located on the Control Arms on each hydraulic pump. This is the Set Screw pointed towards the back of the machine. See Figure 7.4.

   FIGURE 7.4

   CONNECTING ARM
   REMOVE SWIVEL FROM ARM
   REMOVE HAIRPIN AND WASHER
   HYDRAULIC PUMP
   CONTROL ARM
   LOOSEN SET SCREW

5. Start the engine.

   CAUTION
   Unit must be secure to prevent it from vibrating off the stands.

6. Using a 5/8" socket through the side of the Tank Mount, adjust each eccentric on each Pump Arm until Wheel does not rotate. Tighten the Set Screw after adjusting each side.

7. Stop the Engine by turning Key Switch OFF.

8. Lower the machine to the ground.

9. With Speed Control still in neutral, reattach the Traction Rods so that the Swivels fit the holes with light tension. Refer to Figure 7.4.

7.4 OPC INTERLOCK SWITCH ADJUSTMENTS - 1992/95 Models

A. SPEED CONTROL LEVER SWITCH

The Speed Control Lever Switch is an integral part of the OPC system. When the Speed Control Lever is pulled backwards to the NEUTRAL position, the Interlock Switch is fully engaged. When the Speed Control Lever is pushed forward, the Interlock Switch is released. Adjust Switch as follows:

1. With Engine OFF, pull Speed Control Lever fully back (towards handle).

2. Check to see if Switch Button is depressed. See Figure 7.5.

   FIGURE 7.5

   INTERLOCK SWITCH PUSHED DOWN (ENGAGED)
   SPEED CONTROL ROD
   ADJUSTING SCREWS
   L.H. HYDRAULIC MOTOR

3. If Switch is not depressed, adjust Switch.

4. Test Switch with a test light. Connect test light to Switch Terminals, move Speed Control Lever forward. Test light should be ON when Speed Control Lever is back fully (towards handle) and OFF when Speed Control Lever is moved forward.

B. OPERATORS PRESENCE CONTROL (OPC) SWITCH (LOOP HANDLE)

When properly adjusted, the OPC Switch should act to stop the Engine when the Operator’s Presence Control Bail is released. To adjust, proceed as follows:

1. Start Engine.

2. Hold OPC Bail against handlebar.

3. Move Blade Clutch Lever to the “ON” position.

4. Loosen OPC Switch Screw located on R.H. side of console. See Figure 7.6.
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5. Slide Switch toward Operator until the Engine stops when the OPC Bail is released. Tighten screw.

C. OPERATORS PRESENCE CONTROL (OPC) SWITCH (PISTOL GRIP HANDLE)
When properly adjusted, the OPC Switch should act to stop the Engine when both Operator's Presence Controls are released. To adjust, proceed as follows:
1. Start Engine.
2. Hold both OPC Levers against handles.
3. Move Blade Clutch Switch to "ON" position.
4. Loosen OPC Switch screws on L.H. OPC Switch (located on top of console). See Figure 7.7.

5. Slide switch towards operator until the Engine stops when both OPC levers are released. Tighten screws.
6. Repeat above steps for R.H. side.

D. MANUAL CLUTCH SWITCH
The Blade Clutch Lever Switch is an integral part of the OPC System. When the Blade Control Lever is pulled back to the "OFF" position, the Switch is fully engaged - when the Lever is pushed for-ward to the "ON" position, the Switch Button is fully released. Adjust Switch as follows:
1. With Engine "OFF", push the Blade Control Lever forward to the "ON" position.
2. Check to see that the Switch Button is NOT ENGAGED by the bellcrank.
3. If Switch Button IS ENGAGED by the bellcrank, loosen the Switch Mounting Screws (on top of deck) and adjust Switch until it is NOT ENGAGED. See Figure 7.8.

4. A secondary adjustment for the Blade Clutch Lever Switch is located at the top of the Blade Clutch Rod. For major movement changes of the bellcrank, adjust Rod as follows:
a. Remove Retainer Pin from Swivel.
b. Adjust Swivel "UP" or "DOWN" as required.
   See Figure 7.9.
c. Reassemble after adjustment.

NOTE
For visual identification of those Electrical Components which control the MANUAL BLADE ENGAGEMENT circuitry of the Series 1 PRO Mower Units, see Page 18 of SNAPPER Parts Manual No. 06922 (L.R. 7/93)
E. ELECTRIC CLUTCH ADJUSTMENT
For those PRO Mowers equipped with an Electric Blade Control, the Cutter Blades should stop within 7 seconds after the BLADE SWITCH is moved to “OFF”. If blade stopping time exceeds 7 seconds, check the clutch air gap setting as follows:
1. With the Engine Switch and Blade Switch “OFF”, locate the three air gap check “SLOTS” as shown in Figure 7.10.
2. Insert a feeler gauge into each of the three slots.
3. The clearance in each slot should be NO MORE than .010 to .012.
4. If adjustment is required, keep feeler gauge in slot and turn the adjusting nut until the gap is correct.
5. Adjust all three slots.

![Figure 7.10]

**IMPORTANT!!**
Technically speaking, the Electric Clutch is not an OPC component - since it is not affected by the operator’s absence or presence - and therefore, great care should be exercised in adjusting it correctly. After adjustment, please check the stopping time of the Cutter Blades before releasing the machine to the customer. BLADE STOPPING TIME SHOULD BE SEVEN (7) SECONDS OR LESS. Refer to Page 3.6, Section III - ELECTRICAL SYSTEM for more information on Clutch Adjustments.

7.3 REVERSE SPEED ADJUSTMENT - 1992/95 Models
A. LOOP HANDLE
1. Stop Engine! Maximum Reverse Speed can be increased or decreased.
2. Reverse Speed is increased by turning the Reverse Action Limiters, located on the side of the Steering Controls, clockwise. It is decreased by turning the Reverse Action Limiters counterclockwise. See Figure 7.11.

![Figure 7.11]

**IMPORTANT!!**
Increasing reverse speed will cause the unit to reverse more rapidly and zero turn faster. Do this ONLY after informing the owner/operator of the increased performance characteristics which are the result of this adjustment and after the operator has been trained in the operation of the machine and attachments.

![Figure 7.12]
Section VII - ADJUSTMENTS

7.4 NEUTRAL ADJUSTMENTS - 1996/99 Models
(PRO Hydro Power Units SPLH140KW, SPLH140KH, SPLH160BV & SPLH180KHE)

The above models of the PRO Hydro Power Units were introduced in late 1996 and are more simplified in their adjustments than were the earlier models of the PRO7.

A. TRACTION CONTROL LEVERS/NEUTRAL POSITION
1. Move Traction Control Levers to neutral position and engage Neutral Latch Lever. The mower SHOULD NOT creep forward or backwards with the Engine running. If it does, neutral position MUST be adjusted. STOP the Engine and remove Ignition Key from Keyswitch.
2. Slide a 12" long by 5/16" diameter rod through the hole on left side of the Fuel Tank/Handlebar Support Bracket, through the Traction Control Shift Lever Arm and Switch Bracket as shown in Figure 7.13. This locks the Arms and Pumps in neutral so they can be synchronized. Release the Neutral Latch Lever.

NOTE
If Handlebar adjustment is required, it should be adjusted before proceeding with Step 4. Refer to Pages 6.9 & 6.10, Section VI - HANDLE.

4. Adjust the swivels on the Traction Control Rods on right and left side to synchronize the neutral position. The pins on the swivel should just allow the Latch to slip by with the rod still inserted as mentioned Step 2. Adjust the swivel up or down the Traction Control Rod as required.
5. Reconnect swivels to Traction Control Levers on each side. Reinstall hairpins as mentioned in Step 3.
6. Remove rod from Fuel Tank/Handlebar Bracket as mentioned in Step 2.
7. Start the Engine! The Mower SHOULD NOT creep forwards or backwards.

NOTE
The Steering Controls are automatically adjusted to the correct "Neutral Position" when the "Traction Control Levers" have been adjusted.

7.5 OPC INTERLOCK SWITCH ADJUSTMENT - 1996/99 Models
A. OPERATORS PRESENCE (OPC) SWITCH
When properly adjusted, the OPC Switch should act to stop the Engine when the Operator's Presence Control Bail is released. To adjust, proceed as follows:
1. Start Engine.
2. Hold OPC Bail against handlebar.
3. Move Blade Control Switch to the "ON" position.
4. Loosen OPC Switch Screw located on R.H. side of console. See Figure 7.15.

FIGURE 7.13

3. Disconnect the swivels from the Traction Control Arms on left and right side of the Handlebar. Maintain the hairpins for reassembly. See Figure 7.14.

FIGURE 7.14

FIGURE 7.15
Section VII - ADJUSTMENTS (Neutral, OPC Components & Speed Controls)

5. Slide Switch toward Operator until the Engine stops when the OPC Bail is released. Tighten screws.

B. ELECTRIC CLUTCH ADJUSTMENT

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7.6 CHANGING MOWER SPEED RANGES
(PRO Hydro Models 1996/1999)

A. Move Traction Control Levers and Neutral Latch Lever into neutral.

B. Turn Key to STOP position and remove Key from Ignition Switch.

C. Remove Hairpins from Swivels on Traction Control Arms on Right and Left Hand side. See Figure 7.16.

![Diagram of high speed, medium speed, low speed settings with hairpin and swivel labels](image)

**FIGURE 7.16**

D. Push Swivel out from each Traction Control Arm and insert Swivel into newly selected speed range. (No adjustment should be necessary to maintain neutral setting after changing speed range).

E. Start the Engine and test using the Mower at the newly selected speed range.

**WARNING**
The SNAPPER PRO Hydro Mowers have a Transport Speed which allows the mower to travel forward at a speed of 6 MPH - it is NOT to be used while walking! Use the Transport Speed ONLY when the mower is equipped with a Riding Sulkay!

- NEVER make sharp turns at high speed!
- The mower has “zero-turn” capability. NEVER use “zero-turn” at high speed.

MANUAL No. 07222 (I.R. 10/99) 7.7 SERVICE - PRO HYDRO POWER UNITS
Section VIII
TRACTION WHEEL & TIRE REPLACEMENT

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Section VIII - TRACTION WHEEL SERVICE

INTRODUCTION
The PRO7 Hydro Power Units are furnished with 16/6.50 x 8, 4 Ply Tubeless Tires for traction. Tire pressure should be maintained at 28 psi. Routine Wheel & Tire maintenance is as follows:

8.1 REAR WHEEL REMOVAL (Without Removing Hub)
A. Raise rear end of unit and support with jackstands.
B. To remove wheel and tire assembly only, loosen then remove the four (4) 1/2" lug nuts. See Figure 8.1.

NOTE
It may become necessary to use a gear-puller to separate the wheel hub from the drive motor shaft. If so, remove the wheel and tire assembly first.

D. Deflate tire and separate tire from rim.
E. Install new 16/6.50 x 8 tire on rim (if reusing). Inflate tire to 28 psi.
F. Reattach rim to hub with four (4) lug nuts. Apply anti-seize compound to hub.
G. Install tire/rim assembly to Hydro Wheel Drive Motor and secure with castle nut.

NOTE
Torque the castle nut to 100 ft. lbs. Make certain that the castle nut aligns with the cotter pinhole while tightening.

H. Secure assembly with cotter pin.

7.2 REAR WHEEL & HUB REMOVAL
A. Raise rear end of unit and support with jackstands.
B. Remove cotter pin and castle nut from end of drive motor shaft. See Figure 8.2.
C. Pull tire, rim and hub as an assembly.

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8.2 SERVICE - PRO HYDRO POWER UNITS