POWER CLEAR® 721/821
Snowthrower Service Manual

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8111 Lyndale Avenue South
Bloomington, MN 55420

Original Instructions (EN)
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Preface

This service manual was written expressly for Toro service technicians. The Toro Company has made every effort to make the information in this manual complete and correct.

Basic shop safety knowledge and mechanical/electrical skills are assumed. The Table of Contents lists the systems and the related topics covered in this manual.

We are hopeful that you will find this manual a valuable addition to your service shop. If you have any questions or comments regarding this manual, please contact us at the following address:

   The Toro Company
   RLC/SWS Customer Care Department
   8111 Lyndale Avenue South
   Bloomington, MN 55420

The Toro Company reserves the right to change product specifications or make changes to this manual without notice.
Service Procedure Icons

The following icons appear throughout this Service Manual to bring attention to specific important details of a service procedure.

Critical Process
This icon is used to highlight:

• Installing safety equipment (shields, guards, seat belts, brakes, and R.O.P.S. components) that may have been removed
• Dimensions or settings that must be maintained for proper machine operation
• A specific fastener tightening sequence
• Component orientation that may not be obvious

Critical Torque
This icon is used to highlight an assembly torque requirement that is different than what is recommended in the Standard Torque Tables.

Fluid Specifications
This icon is used to highlight fluid specifications and capacities that are less common, and may not appear on the machine service decal or in the machine Operator’s Manual.

Note: Refer to the service decal on the machine and the machine Operator’s Manual for commonly used fluid specifications and capacities.
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Think Safety First ........................................................................................................................................ 1–2
DANGER

This safety symbol means danger. When you see this symbol, carefully read the instructions that follow. Failure to obey the instructions could cause serious permanent injury, disability, or death.

WARNING

This safety symbol means warning. When you see this symbol, carefully read the instructions that follow. Failure to obey the instructions can result in serious injury.

CAUTION

This safety symbol means caution. When you see this symbol, carefully read the instructions that follow. Failure to obey the instructions can result in minor to moderate injury and/or damage to property or equipment.

Think Safety First

Avoid unexpected starting of engine...

Always turn off the engine, remove the ignition key and disconnect the spark plug wire(s) before cleaning, adjusting, or repair.

Avoid lacerations and amputations...

Stay clear of all moving parts whenever the engine is running. Treat all normally moving parts as if they were moving whenever the engine is running or has the potential to start.

Avoid burns...

Do not touch the engine, muffler, or other components, which may be hot during operation, while the unit is running or shortly after it has been running.

Avoid fires and explosions...

Use extreme care in handling fuel. It is flammable and its vapors are explosive. Extinguish all cigarettes, cigars, pipes, and other sources of ignition. Avoid spilling fuel and never smoke while working with any type of fuel or lubricant. Wipe up any spilled fuel or oil immediately. Never remove the fuel cap or add fuel when the engine is running. Always use approved, labeled containers for storing or transporting fuel and lubricants. Do not add or drain fuel in an enclosed space. Do not store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or other appliance.

Avoid asphyxiation...

Do not operate an engine in a confined area without proper ventilation.

Avoid injury from batteries...
Battery acid is poisonous and can cause burns. Avoid contact with skin, eyes and clothing. Battery gases can explode. Keep cigarettes, sparks and flames away from the battery.

Avoid injury due to inferior parts…
Use only original equipment parts to ensure that important safety criteria are met.

Avoid injury to bystanders…
Always clear the area of bystanders before starting or testing powered equipment.

Avoid injury due to projectiles…
Always clear the area of sticks, rocks or any other debris that could be picked up and thrown by the powered equipment.

Avoid modifications…
Never alter or modify any part unless it is a factory approved procedure.

Avoid unsafe operation…
Always test the safety interlock system after making adjustments or repairs on the machine. Refer to the Electrical section in this manual for more information.

Avoid electrical shock…
Never touch electrical wires or components while the engine is running. They can be sources of shock. De-energize the system if you are having to do repairs. If testing electrical components ensure you are working in a dry environment.

Hydraulic System…
Release all pressure in the hydraulic system before performing any work on the system. Keep your body and hands away from pin-hole leaks or nozzles that eject hydraulic fluid under high pressure. Do not use your hands to search for leaks. Hydraulic fluid escaping under pressure can have sufficient force to penetrate under the skin and cause serious injury. Seek medical attention right away if hydraulic fluid gets in the skin.

Personal Protective Equipment…
Tie back long hair, and do not wear loose clothing or jewelry. Use appropriate personal protective equipment (PPE) for protecting yourself from potential hazards in the environment in which you will work. Each process outlined in this manual may need different PPE to protect the service person. Use the proper PPE for the task at hand.

Tools…
All tools should be in proper working order. Do not use tools that are broken or in disrepair. Use the proper tool for the proper application.

Lifts, Hoists, and Jacks…
All lifts, hoists, and jacks should be used in accordance with the manufacturer information. Inspect lifts, hoists, and jacks prior to use. Do not overload lifts, hoists, and jacks. Do not work under a suspended load. Ensure chock blocks are used on equipment that can move. Use lifts or jacks and jack stands that are rated to support the total weight of the machine and any attachments. Do not rely on jacks to support the machine. If you are unsure of the operation of any lifts, hoists, and jacks do not use.

Fire Extinguishers…
The proper class of fire extinguisher should be used in case of fire.

**Class A** extinguishers are for ordinary combustible materials such as paper, wood, cardboard, and most plastics. The numerical rating on these types of extinguishers indicates the amount of water it holds and the amount of fire it can extinguish. Geometric symbol (green triangle).

**Class B** fires involve flammable or combustible liquids such as gasoline, kerosene, grease and oil. The numerical rating for class B extinguishers indicates the approximate number of square feet of fire it can extinguish. Geometric symbol (red square).

**Class C** fires involve electrical equipment, such as appliances, wiring, circuit breakers and outlets. Never use water to extinguish class C fires - the risk of electrical shock is far too great! Class C extinguishers do not have a numerical rating. The C classification means the extinguishing agent is non-conductive. Geometric symbol (blue circle).

**ABC** fire extinguishers are a dry chemical type used for multiple purposes. See above information for description. Ensure fire extinguishers are serviceable and replace any that are discharged or out of inspection dates.
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<table>
<thead>
<tr>
<th>Specification</th>
<th>POWER CLEAR® 721/825</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing Width</td>
<td>8.27 cm (21 inches)</td>
</tr>
<tr>
<td>Snow Cut Depth</td>
<td>4.92 cm (12.5 inches)</td>
</tr>
<tr>
<td>Engine</td>
<td>Engine: 212cc Toro Premium OHV, Engine Model: G210FS-4 / G210FDS-4, Oil Type &amp; Capacity: 0.5 L (17 oz) 10W 30 / 5W 30 Synthetic</td>
</tr>
<tr>
<td>High Idle RPM</td>
<td>3700 ± 100</td>
</tr>
<tr>
<td>Ignition Coil Air Gap</td>
<td>0.3 – 0.5 mm (0.011 - 0.019 inches)</td>
</tr>
<tr>
<td>Spark Plug</td>
<td>NGK BPR6ES</td>
</tr>
<tr>
<td>Spark Plug Gap</td>
<td>0.7 - 0.8 mm (0.028 - 0.032 inches)</td>
</tr>
<tr>
<td>Fuel Capacity</td>
<td>2.16 L (2.3 quarts)</td>
</tr>
<tr>
<td>Starting</td>
<td>Recoil/Recoil-Electric, Recoil Electric</td>
</tr>
<tr>
<td>Throwing Distance</td>
<td>Up to 10.7 m (35 ft)</td>
</tr>
<tr>
<td>Capacity/Min.</td>
<td>Up to 816 kg (1800 lb)</td>
</tr>
<tr>
<td>Auger System</td>
<td>Power Curve</td>
</tr>
<tr>
<td>Handle</td>
<td>Ergonomic, Ergonomic &amp; Reinforced Handle, Ergonomic</td>
</tr>
<tr>
<td>Deflector Control</td>
<td>Zip Deflector</td>
</tr>
<tr>
<td>Chute Control</td>
<td>Chute Mounted, Quick Shoot</td>
</tr>
<tr>
<td>Chute Rotation</td>
<td>210º</td>
</tr>
<tr>
<td>Drive System</td>
<td>Power Propel Self-Propel</td>
</tr>
<tr>
<td>Scraper</td>
<td>Pivoting</td>
</tr>
<tr>
<td>Weight</td>
<td>36 kg / 38 kg (80 lb / 84 lb), 41 kg (91 lb), 39 kg (87 lb), 44 kg (96 lb)</td>
</tr>
<tr>
<td>Overall Dimensions</td>
<td>48 inch L x 21 inch W x 42 inch H</td>
</tr>
<tr>
<td>Storage Dimensions</td>
<td>33 inch L x 21 inch W x 34 inch H</td>
</tr>
</tbody>
</table>
Torque Specifications

The recommended fastener torque values are listed in the following tables. For critical applications, as determined by Toro, either the recommended torque or a torque that is unique to the application is clearly identified and specified in the service manual.

These torque specifications for the installation and tightening of fasteners shall apply for all fasteners which do not have a specific requirement identified in the service manual. The following factors shall be considered when applying torque: cleanliness of the fastener, use of a thread sealant (Loctite), degree of lubrication on the fastener, presence of a prevailing torque feature, hardness of the surface underneath of the fastener’s head, or similar condition which affects the installation.

As noted in the following tables, torque values should be reduced by 25% for lubricated fasteners to achieve the similar stress as a dry fastener. Torque values may also have to be reduced when the fastener is threaded into aluminum or brass. The specific torque value should be determined based on the aluminum or brass material strength, fastener size, length of thread engagement, etc.

The standard method of verifying torque shall be performed by marking a line on the fastener (head or nut) and mating part, then back off fastener 1/4 of a turn. Measure the torque required to tighten the fastener until the lines match up.

Fastener Identification

Inch Series Bolts and Screws

1. Grade 1
2. Grade 5
3. Grade 8

![Figure 1](image)
Metric Bolts and Screws

Figure 2

1. Class 8.8
2. Class 10.9
**Thread Size** | **Grade 1, 5, & 8 Fasteners with Thin Height Nuts** | **SAE Grade 1 Bolts, Screws, Studes & Sems with Regular Height Nuts (SAE Grade 2 or Better Nut)** | **SAE Grade 5 Bolts, Screws, Studs & Sems with Regular Height Nuts (SAE Grade 5 or Better Nut)** | **SAE Grade 8 Bolts, Screws, Studs & Sems with Regular Height Nuts (SAE Grade 8 or Better Nut)** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>#6-32 UNC</td>
<td>10 ± 2</td>
<td>13 ± 2</td>
<td>147 ± 23</td>
<td>15 ± 2</td>
</tr>
<tr>
<td>#6-40 UNF</td>
<td>17 ± 2</td>
<td>192 ± 23</td>
<td>25 ± 3</td>
<td>282 ± 34</td>
</tr>
<tr>
<td>#8-32 UNC</td>
<td>13 ± 2</td>
<td>25 ± 5</td>
<td>282 ± 30</td>
<td>29 ± 3</td>
</tr>
<tr>
<td>#8-36 UNF</td>
<td>31 ± 4</td>
<td>350 ± 45</td>
<td>43 ± 5</td>
<td>486 ± 56</td>
</tr>
<tr>
<td>#10-24 UNC</td>
<td>18 ± 2</td>
<td>30 ± 5</td>
<td>339 ± 56</td>
<td>42 ± 5</td>
</tr>
<tr>
<td>#10-32 UNF</td>
<td>48 ± 5</td>
<td>542 ± 56</td>
<td>68 ± 7</td>
<td>768 ± 79</td>
</tr>
<tr>
<td>1/4-20 UNC</td>
<td>48 ± 7</td>
<td>53 ± 7</td>
<td>599 ± 79</td>
<td>100 ± 10</td>
</tr>
<tr>
<td>1/4-28 UNF</td>
<td>53 ± 7</td>
<td>65 ± 10</td>
<td>734 ± 113</td>
<td>115 ± 12</td>
</tr>
<tr>
<td>5/16-18 UNC</td>
<td>115 ± 15</td>
<td>105 ± 15</td>
<td>1186 ± 169</td>
<td>200 ± 25</td>
</tr>
<tr>
<td>5/16-24 UNF</td>
<td>138 ± 17</td>
<td>128 ± 17</td>
<td>1446 ± 192</td>
<td>225 ± 25</td>
</tr>
</tbody>
</table>

**Note:** Reduce torque values listed in the table above by 25% for lubricated fasteners. Lubricated fasteners are defined as threads coated with a lubricant such as oil, graphite, or thread sealant such as Loctite.

Torque values may have to be reduced when installing fasteners into threaded aluminum or brass. The specific torque value should be determined based on the fastener size, the aluminum or base material strength, length of thread engagement, etc.

The nominal torque values listed above for Grade 5 and 8 fasteners are based on 75% of the minimum proof load specified in SAE J429. The tolerance is approximately ± 10% of the nominal torque value. Thin nuts include jam nuts.
Standard Torque for Dry, Zinc Plated, and Steel Fasteners (Metric Series)

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Class 8.8 Bolts, Screws, Studs with Regular Height Nuts (Class 8 or Stronger Nuts)</th>
<th>Class 10.9 Bolts, Screws, Studs with Regular Height Nuts (Class 10 or stronger Nuts)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in-lb</td>
<td>N • cm</td>
</tr>
<tr>
<td>M5 X 0.8</td>
<td>57 ± 6</td>
<td>644 ± 68</td>
</tr>
<tr>
<td>M6 X 1.0</td>
<td>96 ± 10</td>
<td>1085 ± 113</td>
</tr>
<tr>
<td>M8 X 1.25</td>
<td>19 ± 2</td>
<td>26 ± 3</td>
</tr>
<tr>
<td>M10 X 1.5</td>
<td>38 ± 4</td>
<td>52 ± 5</td>
</tr>
<tr>
<td>M12 X 1.75</td>
<td>66 ± 7</td>
<td>90 ± 10</td>
</tr>
<tr>
<td>M16 X 2.0</td>
<td>166 ± 17</td>
<td>255 ± 23</td>
</tr>
<tr>
<td>M20 X 2.5</td>
<td>325 ± 33</td>
<td>440 ± 45</td>
</tr>
</tbody>
</table>

**Note:** Reduce torque values listed in the table above by 25% for lubricated fasteners. Lubricated fasteners are defined as threads coated with a lubricant such as oil, graphite, or thread sealant such as Loctite.

Torque values may have to be reduced when installing fasteners into threaded aluminum or brass. The specific torque value should be determined based on the fastener size, the aluminum or base material strength, length of thread engagement, etc.

The nominal torque values listed above are based on 75% of the minimum proof load specified in SAE J1199. The tolerance is approximately ± 10% of the nominal torque value. Thin height nuts include jam nuts.
SAE Grade 8 Steel Set Screws

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Square Head</th>
<th>Hex Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 - 20 UNC</td>
<td>140 ± 20 in-lb</td>
<td>73 ± 12 in-lb</td>
</tr>
<tr>
<td>5/16 - 18 UNC</td>
<td>215 ± 35 in-lb</td>
<td>145 ± 20 in-lb</td>
</tr>
<tr>
<td>1/2 - 13 UNC</td>
<td>75 ± 15 ft-lb</td>
<td>50 ± 10 ft-lb</td>
</tr>
<tr>
<td>3/8 - 16 UNC</td>
<td>35 ± 10 ft-lb</td>
<td>18 ± 3 ft-lb</td>
</tr>
</tbody>
</table>

Wheel Bolts and Lug Nuts

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Square Head</th>
<th>Hex Socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/16 - 20 UNF Grade 5</td>
<td>65 ± 10 ft-lb</td>
<td>88 ± 14 N • m</td>
</tr>
<tr>
<td>1/2 - 20 UNF Grade 5</td>
<td>80 ± 10 ft-lb</td>
<td>108 ± 14 N • m</td>
</tr>
<tr>
<td>M12 X 1.25 Class 8.8</td>
<td>80 ± 10 ft-lb</td>
<td>108 ± 14 N • m</td>
</tr>
<tr>
<td>M12 X 1.5 Class 8.8</td>
<td>80 ± 10 ft-lb</td>
<td>108 ± 14 N • m</td>
</tr>
</tbody>
</table>

**For steel wheels and non-lubricated fasteners.

Thread Cutting Screws (Zinc Plated Steel)

<table>
<thead>
<tr>
<th>Type 1, Type 23, or Type F</th>
<th>Baseline Torque*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thread Size</td>
<td></td>
</tr>
<tr>
<td>No. 6 - 32 UNC</td>
<td>20 ± 5 in-lb</td>
</tr>
<tr>
<td>No. 8 - 32 UNC</td>
<td>30 ± 5 in-lb</td>
</tr>
<tr>
<td>No. 10 - 24 UNC</td>
<td>38 ± 7 in-lb</td>
</tr>
<tr>
<td>1/4 - 20 UNC</td>
<td>85 ± 15 in-lb</td>
</tr>
<tr>
<td>5/16 - 18 UNC</td>
<td>110 ± 20 in-lb</td>
</tr>
<tr>
<td>3/8 - 16 UNC</td>
<td>200 ± 100 in-lb</td>
</tr>
</tbody>
</table>

*Hole size, material strength, material thickness and finish must be considered when determining specific torque values. All torque values are based on non-lubricated fasteners.

Conversion Factors

- in-lb X 11.2985 = N • cm
- ft-lb X 1.3558 = N • m
- N • cm X 0.08851 = in-lb
- N • cm X 0.73776 = ft-lb

Thread Cutting Screws (Zinc Plated Steel)

<table>
<thead>
<tr>
<th>Threads Size</th>
<th>Threads per Inch</th>
<th>Baseline Torque*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type A</td>
<td>Type B</td>
</tr>
<tr>
<td>No. 6</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>No. 8</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>No. 10</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>No. 12</td>
<td>11</td>
<td>14</td>
</tr>
</tbody>
</table>

*Hole size, material strength, material thickness and finish must be considered when determining specific torque values. All torque values are based on non-lubricated fasteners.
## Equivalents and Conversions

### Decimal and Millimeter Equivalents

<table>
<thead>
<tr>
<th>Fractions</th>
<th>Decimals</th>
<th>mm</th>
<th>Fractions</th>
<th>Decimals</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/64</td>
<td>0.015625</td>
<td>0.397</td>
<td>33/64</td>
<td>0.515625</td>
<td>13.097</td>
</tr>
<tr>
<td>1/32</td>
<td>0.03125</td>
<td>0.794</td>
<td>16/32</td>
<td>0.53125</td>
<td>13.484</td>
</tr>
<tr>
<td>3/64</td>
<td>0.046875</td>
<td>1.191</td>
<td>35/64</td>
<td>0.546875</td>
<td>13.891</td>
</tr>
<tr>
<td>1/16</td>
<td>0.0625</td>
<td>1.588</td>
<td>9/16</td>
<td>0.5625</td>
<td>14.288</td>
</tr>
<tr>
<td>5/64</td>
<td>0.078125</td>
<td>1.984</td>
<td>37/64</td>
<td>0.578125</td>
<td>14.684</td>
</tr>
<tr>
<td>3/32</td>
<td>0.09375</td>
<td>2.381</td>
<td>19/32</td>
<td>0.59375</td>
<td>15.081</td>
</tr>
<tr>
<td>1/8</td>
<td>0.1250</td>
<td>3.175</td>
<td>5/8</td>
<td>0.6250</td>
<td>15.875</td>
</tr>
<tr>
<td>9/64</td>
<td>0.140625</td>
<td>3.572</td>
<td>41/64</td>
<td>0.640625</td>
<td>16.272</td>
</tr>
<tr>
<td>5/32</td>
<td>0.15625</td>
<td>3.969</td>
<td>21/32</td>
<td>0.65625</td>
<td>16.669</td>
</tr>
<tr>
<td>11/64</td>
<td>0.171875</td>
<td>4.366</td>
<td>43/64</td>
<td>0.671875</td>
<td>17.066</td>
</tr>
<tr>
<td>3/16</td>
<td>0.1875</td>
<td>4.762</td>
<td>11/64</td>
<td>0.6875</td>
<td>17.462</td>
</tr>
<tr>
<td>13/64</td>
<td>0.203125</td>
<td>5.159</td>
<td>45/64</td>
<td>0.703125</td>
<td>17.859</td>
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<tr>
<td>7/32</td>
<td>0.21875</td>
<td>5.556</td>
<td>23/32</td>
<td>0.71875</td>
<td>18.256</td>
</tr>
<tr>
<td>15/64</td>
<td>0.234375</td>
<td>5.953</td>
<td>47/64</td>
<td>0.734375</td>
<td>18.653</td>
</tr>
<tr>
<td>1/4</td>
<td>0.2500</td>
<td>6.350</td>
<td>3/4</td>
<td>0.7500</td>
<td>19.050</td>
</tr>
<tr>
<td>17/64</td>
<td>0.265625</td>
<td>6.747</td>
<td>49/64</td>
<td>0.765625</td>
<td>19.447</td>
</tr>
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| | | 2. Multiply by 5/9 |
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GEARS
The Systematic approach to defining, diagnosing and solving problems.

Gather Information
- Information reported by the customer
- Information observed by you
- Establish the what, where and when of the issue

Evaluate Potential Causes
- Consider possible causes of the problem to develop a hypothesis
- Narrow down the focus of the problem

Assess Performance
- Ensure you have all the necessary tools for testing
- Test all potential causes of the failure
- Reevaluate and create new hypotheses if necessary

Repair
- Return the unit to service by repairing, rebuilding or replacing

Solution Confirmation
- Did the issue go away
- Was the root cause of the issue correctly repaired
- Are there any other new symptoms
General Troubleshooting

See Operator’s Manual for troubleshooting information.
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  Fuel Tank Replacement ........................................................................................................................... 4–17
General Information

The POWER CLEAR® 721 models utilize the Toro G210 engine, while the POWER CLEAR® 821 utilizes the Toro G250 engine.
Figure 3

1. Engine
2. Engine Plate
3. Engine Side Support
4. Engine Support
Engine Replacement

Engine Removal

1. Park the machine on a level surface. Stop the engine, wait for all moving parts to stop and remove the key.

![DANGER]

Fuel is very flammable and explosive under some conditions. Do not smoke or let flames or sparks in your work area.

2. Drain the engine oil and fuel into a suitable container.
3. Remove the shroud from the machine. Shroud Removal (page 5–8)
4. Remove the recoil handle from the rope guide.
5. Remove the 3 (1/4-20 x 5/8 inch) screws securing the belt cover to the auger housing. Remove the belt cover from the auger housing.
6. Unhook the extension spring from the idler arm.

![Figure 4]

7. Remove the (1/4-20 x 7/8 inch) screw and Belleville washer securing the rotor pulley to the rotor shaft.
Engine Removal (continued)

8. Remove the rotor pulley assembly from the rotor shaft.

9. Remove the belt from the engine pulley and rotor pulley.

10. Remove the (5/16–24 x 1 1/4 inch) screw and Belleville washer securing the engine pulley to the engine shaft. Remove the engine pulley from the engine shaft.

11. Remove the 4 (M8 x 1.25 mm x 5/8 inch) bolts securing the engine to the engine plate.

    **Note:** Bolts are located inside the belt housing.
12. Remove the 2 (5/16-18 x 1 3/8 inch) screws and 2 nuts securing the engine support to the engine.

**Note:** Do not flip the machine to replace the screws and nuts.

13. Using an appropriate lifting device, remove the engine from the machine.
Engine Removal (continued)

![Figure 9](image1.jpg)

**Engine Installation**

1. Using an appropriate lifting device, install the engine onto the machine.
2. Install the 2 (5/16-18 x 1 3/8 inch) screws and 2 nuts securing the engine support to the engine.

   **Note:** Do not flip the machine to remove the screws and nuts.

![Figure 10](image2.jpg)
Engine Installation (continued)

3. Install the 4 (M8 x 1.25 mm x 5/8 inch) bolts securing the engine to the engine plate. Torque the screws to 21.5–27 N • m (190–240 in-lb).

4. Apply blue threadlocker to threads of the (5/16–24 x 1 1/4 inch) screw. Install the screw and Belleville washer securing the engine pulley to the engine shaft. Torque the screw 25.4 ± 2.8 N • m (225 ± 25 in-lb).

5. Route the belt first around the engine pulley, under the flat idler pulley, and finally around the loose rotor pulley positioned above the rotor shaft.
6. Install the rotor pulley onto the rotor shaft. Apply blue threadlocker to threads of the new (1/4-20 x 7/8 inch) screw. Install the Belleville washer and screw securing the rotor pulley assembly to the rotor shaft. Torque the screw to 11.3 ± 1 N • m (100 ± 10 in-lb).

![Figure 13](image1)

7. Hook the extension spring to the idler arm.

![Figure 14](image2)

8. Install the belt cover to the auger housing. Install the 3 (1/4–20 x 5/8 inch) screws securing the belt cover to the auger housing. Torque the screws to 4.5–6.8 N • m (40–60 in-lb).

9. Install the recoil handle to the rope guide.
10. Install the shroud onto the machine. Shroud Installation (page 5–10)
11. Refill the fuel and oil.

**Electric Starter Replacement**

**Electric Starter Removal**

1. Remove the engine from the machine. Engine Removal (page 4–4)
Electric Starter Removal (continued)

2. Remove the 2 (#6 x 2.5 in) screws securing the electric starter switch box to the shroud.

3. Unwind the harness retainer clip and remove the electric starter wire from the harness retainer clip.

4. Remove the 2 (M6 x 35 mm) bolts securing the electric starter to the engine.

   **Note:** If the dowel pins were inadvertently removed, retain for installation.

5. Remove the electric starter from the engine.

Electric Starter Installation

1. If the dowels were inadvertently removed, install the dowel pins.
Electric Starter Installation (continued)

2. Install the electric starter by inserting the nose of the starter into the blower shroud and slide the mounting holes over the dowel pins. Install the 2 (M6 x 35) bolts securing the electric starter to the engine. Torque the bolts to 10 N • m (89 in-lb).

![Figure 17](image1)

3. Wrap the harness clip around the electric starter wire.

![Figure 18](image2)

4. Install the 2 (#6 x 2.5 in) screws securing the electric starter switch box to the shroud. Torque the screws to 6.78 N • m (60 in-lb).

5. Install the engine onto the machine. Engine Installation (page 4–7)
Muffler Guard Replacement

Muffler Guard Removal

1. Park the machine on a level surface. Stop the engine, wait for all moving parts to stop and remove the key.

2. Remove the 2 (1/4–10 x 13/16 inch) screws securing the LH shroud retainer to the LH shroud. Remove the LH shroud retainer from the LH shroud.

3. Remove the 6 (M6 x 12 mm) bolts securing the muffler guard to the engine.
Muffler Guard Removal (continued)

4. Tip the muffler guard up towards the fuel tank to dislodge it from the fuel tank lip.

5. Remove the muffler guard from the engine.

Muffler Guard Installation

1. Slide the lip of the muffler guard under the lip of the fuel tank.

2. Install the 6 (M6 x 12 mm) bolts securing the muffler guard to the engine. Torque the bolts to 8.47 N • m (75 in-lb).
3. Install the 2 (1/4–10 x 13/16 inch) screws securing the LH shroud retainer to the LH shroud.
Muffler Replacement

Muffler Removal

1. Remove the muffler guard from the engine. Muffler Guard Removal (page 4–12)
2. Remove the 2 nuts securing muffler assembly to cylinder head.
3. Remove the muffler assembly and gasket from the engine.
Muffler Removal (continued)

Muffler Inspection

1. Inspect the muffler assembly for cracks, rust, or damage. Shake the muffler to check if the internal baffle is loose. Replace muffler if damaged.

Muffler Installation

1. Install the new gasket onto the exhaust studs.

   **Note:** Refer to figure for correct gasket orientation.
Muffler Installation (continued)

2. Install the muffler onto the exhaust studs. Install the 2 nuts securing the muffler to the exhaust studs. Torque the nuts to 29 N • m (21 ft-lb).

Fuel Tank Replacement

Fuel Tank Removal

1. Park the machine on a level surface. Stop the engine, wait for all moving parts to stop and remove the key.
2. Drain the fuel from the fuel tank into a suitable container.

DANGER

Fuel is very flammable and explosive under some conditions. Do not smoke or let flames or sparks in your work area.

3. Remove the shroud from the machine. Shroud Removal (page 5–8)
4. Engines equipped with an electric starter only, unwind the harness retainer clip and remove the electric start wire from the harness retainer clip.
Fuel Tank Removal (continued)

5. Remove the (M6 x 20 mm) bolts securing the front of the fuel tank to the engine. The G210 engine has 3 (M6 x 20 mm) bolts and the G250 engine has 4 (M6 x 20 mm) bolts. Refer to the Specifications chapter to find the engine model. Specifications (page 2–2)

6. Remove the (M6 x 20 mm) fuel tank bolt securing the fuel tank to the engine.
Fuel Tank Removal (continued)

7. Pivot the fuel tank to gain access to the fuel line. Slide the clamp away from the fuel filter and remove the fuel line from fuel filter fitting.

8. Remove the fuel tank from the engine.
9. If needed, unscrew and remove the fuel filter from the fuel tank.

Fuel Tank Inspection

1. Inspect the fuel tank for rust, corrosion, or leaking on the inside and outside of the fuel tank. Replace the fuel tank if damaged.
2. Inspect the fuel filter for contamination, blockage, or if compromised. Replace the fuel filter if damaged.

Fuel Tank Installation

1. Ensure the inside of the fuel tank, tank outlet fitting, and fuel filter fittings are all clean. Install the fuel filter to the tank outlet.
2. Connect the fuel hose to the fuel filter fitting and secure with the clamp.
Fuel Tank Installation (continued)

1. Clamp

3. Install the fuel tank onto the engine. Apply blue threadlocker to the fuel tank bolt threads. Install the (M6 x 20 mm) fuel tank bolt securing the fuel tank to the engine. Torque the bolt to 8.47 N • m (75 in-lb).

4. Install the (M6 x 20 mm) bolts securing the front of the fuel tank to the engine. The G210 engine has 3 (M6 x 20 mm) bolts and the G250 engine has 4 (M6 x 20 mm) bolts. Refer to the Specifications chapter to find the engine model.
5. Engines equipped with an electric starter only, wrap the harness retainer clip around the electric start wire.

6. Install the shroud onto the machine. Shroud Installation (page 5–10)

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Fuel is very flammable and explosive under some conditions. Do not smoke or let flames or sparks in your work area.

7. Refill the fuel.

Fuel Tank Test

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Fuel is very flammable and explosive under some conditions. Do not smoke or let flames or sparks in your work area.

1. Add fuel to the fuel tank and verify no leaks exist. Replace the fuel tank if leaking exists.
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General Information

The chassis of both the 721 and 821 are the same size and use many of the same parts and fasteners.
Figure 37

1. Deflector Trigger
2. Chute Deflector
3. Chute Handle
4. Side Cover
5. Deflector Ratchet Hinge
6. Deflector Hinge Pin
7. Deflector Seal
8. Shroud Retainer
9. Shroud
10. Chute
11. Chute Ring Seal
12. Chute Ring Retainer
13. Pinion Sleeve Spacer
14. Gear Chute Ring
15. Pinion Bracket
16. Gear Pinion
17. Detent Pawl
18. Cable Retainer
19. Chute Support Ring
20. Lock Nut
Figure 38

1. Spring Cover
2. Control Bail
3. Clutch Extension Spring
4. Upper Handle
5. Clutch Cable Adjuster
6. Handle Lock
7. Rope Guide
8. Switch Box Support
9. Box Support
10. Support Cap
11. Lower Handle
Figure 39

1. Pulley Cover
2. Slider Pulley
3. Slider Handle RH
4. Short Chute Cable
5. Handle Screw
6. Long Chute Cable
7. Slider Track
8. Trigger Spring
9. Plate Chute Lock
10. Cable Clamp
11. Trigger
12. Slider Handle LH
13. Cable Bracket
Quick Shoot Controls 1

Illustration 1

Illustration 2

Illustration 3

Illustration 4

Figure 40
Quick Shoot Controls 2

Illustration 5

Illustration 6

Illustration 7

Figure 41
Shroud Replacement

Shroud Removal

1. Park the machine on a level surface. Stop the engine, wait for all moving parts to stop and remove the key.

2. Remove the 3 (1/4-10 x 2 inch) plastite screws securing the chute to chute seal ring. Remove the chute from the chute ring.

   **Note:** QZE models have a 1/4–10 x 1.5 inch plastite screw.

   **Note:** Some models will have a chute handle attached to the chute.

3. Remove the (M4.2–2.25 mm x 3/4 inch) screw securing the chute seal ring to the shroud. Remove the chute seal ring from the shroud.

4. Remove the 2 (1/4-10 x 13/16 inch) screws securing the LH shroud retainer to the LH shroud. Repeat the procedure on the RH side of the machine.
Shroud Removal (continued)

5. Remove the 2 (1/4-20 x 1 inch) screws securing the front of the shroud to the auger housing.

6. Remove the 3 (M4.2 x 2.25mm x 3/4 inch) screws securing the RH shroud to the side cover.

7. Remove the 2 (#6 x 2.5 inch) screws and 2 hex nuts securing the shroud to the switch box. Remove the shroud from the machine.

**Note:** Remove the starter plug from the shroud, if equipped with electric start.
Shroud Installation

1. Install the shroud onto the machine. Install the 2 (\#6 x 2.5 inch) screws and 2 hex nuts securing the shroud to the switch box.

   **Note:** Install the starter plug to the shroud, if equipped with electric start.

2. Install the 3 (M4.2 x 2.25mm x 3/4 inch) screws securing the RH shroud to the side cover.
3. Install the 2 (1/4-20 x 1 inch) screws securing the front of the shroud to the auger housing.

4. Install the 2 (1/4-10 x 13/16 inch) screws securing the LH shroud retainer to the LH shroud. Remove the LH shroud retainer. Repeat the procedure on the RH side of the machine.

5. Install the chute seal ring to the shroud, secure with a screw (M4.2–2.25 mm x 3/4 inch).
6. Install the chute and chute handle to the chute seal ring. Install the 3 (1/4-10 x 2 inch) plastite screws securing the chute handle and chute to chute seal ring. Torque the screws to 2.8–4 N • m (25–35 in-lb).

**Note:** QZE models have a 1/4–10 x 1.5 inch plastite screw.

**Note:** Some models will have a chute handle attached to the chute.

**Quick Shoot Controls Replacement**

**Quick Shoot Controls Removal**

1. Park the machine on a level surface. Stop the engine, wait for all moving parts to stop and remove the key.
2. Remove the shroud from the machine. **Shroud Removal (page 5–8)**
3. Remove the (1/4-20 x 2.25 inch) screw and lock nut securing the chute ring retainer and quick chute gear assembly to the chute support ring. Remove the quick chute gear assembly from the machine.
Quick Shoot Controls Removal (continued)

4. Remove the pinion spacer sleeve from the quick chute gear assembly.

5. Using pliers, compress the cable locks and remove the black and gray cables from the pinion bracket.
Quick Shoot Controls Removal (continued)

Figure 54

6. Turn the quick chute gear assembly over so that the cable retainer is facing upwards. Remove the cable retainer from the pinion gear.

**Note:** With the cable retainer removed, note the orientation of the cable.

Figure 55
Quick Shoot Controls Removal (continued)

7. Unwrap and remove the cables from the pinion gear.

Quick Shoot Controls Installation

1. With the pinion gear facing upwards, route the black cable into the bottommost gear slot. Insert the barrel end of the black cable into the slot and secure the cable under the gear tab.

2. Wrap the black cable around the bottom of the spool.
Quick Shoot Controls Installation (continued)

3. Insert the barrel end of the gray cable into the slot in the gear and secure the cable under the gear tab.
4. Wrap the gray cable around the top of the spool.
Quick Shoot Controls Installation (continued)

5. Slide the pinion gear into the pinion bracket and secure the cable locks.

6. Insert the pinion spacer sleeve into the quick chute gear assembly.
7. Align the quick chute gear assembly between the chute gear retainer and chute support ring. Install the (1/4-20 x 2.25 inch) screw and lock nut securing the chute ring retainer and quick chute gear assembly to the chute support ring.

**Note:** Do not over tighten.
Quick Shoot Controls Installation (continued)

8. Install the shroud onto the machine. Shroud Installation (page 5–10)
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All POWER CLEAR® 721 and 821 models utilize Toro's Power Propel self-propel system.
Figure 67

1. Cable Clutch
2. Engine Pulley
3. Belleville Washer
4. Extension Spring
5. Idler Arm
6. Flat Idler Pulley
7. Spring Clip
8. Pivot Pushing
9. Rotor Pulley
10. Belt
Figure 68

1. Rotor Blade
2. Lock Nut
3. Rotor Half
4. Rotor Blade Spacer
5. Rotor
Figure 69

1. Frame Brace
2. Auger Housing
3. Belt Cover
4. Bearing Flange
5. Thrust Washer
6. Ball Bearing
7. Bearing Spacer
8. Rubber Washer
9. Shoulder Bolt
10. Lower Chute
11. Scraper Blade
Belt Replacement

Belt Removal

1. Remove the 3 (1/4-20 x 5/8 inch) screws securing the belt cover to the auger housing. Remove the belt cover from the auger housing.
2. Unhook the extension spring from the idler arm.

![Figure 70](image)

3. Remove the screw (1/4-20 x 7/8 inch) and Belleville washer securing the rotor pulley to the rotor shaft.

![Figure 71](image)

4. Remove the rotor pulley assembly from the rotor shaft.
5. Remove the belt from the engine pulley and rotor pulley.

Belt Installation

1. Route the belt first around the engine pulley, under the flat idler pulley, and finally around the loose rotor pulley positioned above the rotor shaft.

2. Install the rotor pulley onto the rotor shaft. Apply blue threadlocker to threads of the new (1/4-20 x 7/8 inch) screw. Install the Belleville washer and screw securing the rotor pulley assembly to the rotor shaft. Torque the screw to 11.3 ± 1 N • m (100±10 in-lb).
Belt Installation (continued)

3. Hook the extension spring to the idler arm.

4. Install the belt cover to the auger housing. Install the 3 (1/4-20 x 5/8 inch) screws securing the belt cover to the auger housing. Torque the screws to 4.5–6.8 N • m (40–60 in-lb)

Rotor Replacement

Rotor Removal

1. Park the machine on a level surface. Stop the engine, wait for all moving parts to stop and remove the key.
2. Remove the belt. Belt Removal (page 6–6)
3. Remove the 3 (1/4-20 x 1/2 inch) rotor bearing screws securing the LH sideplate to the rotor assembly.
4. Remove the 3 (1/4-20 x 1 inch) rotor bearing screws securing the RH sideplate to the rotor assembly.

5. Remove the rotor assembly from the auger housing.
6. Remove the (3/8-16 x 3/4 inch) screw securing the RH bearing spacer to the RH end cap. Remove the rubber washer, ball bearing, thrust washer, and bearing flange from the rotor assembly. Replace rotor parts as necessary.

![Figure 77](image)

**Figure 77**

1. Screw
2. RH Bearing Spacer
3. Rubber Washer
4. Ball Bearing
5. Thrust Washer
6. Bearing Flange

**Rotor Installation**

1. Install the bearing flange, thrust washer, ball bearing, and rubber washer onto the rotor assembly. Install the (3/8-16 x 3/4 inch) screw securing the RH bearing spacer to the RH end cap.
2. Install the rotor assembly into the auger housing. Install the 3 (1/4-20 x 1 inch) rotor bearing screws securing the RH sideplate to the rotor assembly.

3. Install the 3 (1/4-20 x 1/2 inch) rotor bearing screws securing LH sideplate to the rotor assembly.
Rotor Installation (continued)

4. Install the belt. Belt Installation (page 6–6)

Paddle Replacement

Paddle Replacement

1. Park the machine on a level surface. Stop the engine, wait for all moving parts to stop and remove the key.
2. Remove the 4 (1/4-20 x 3/4 inch) Torx head screws securing the paddles together.
3. Remove the 4 (1/4-20 x 1 1/2 inch) screws, 4 spacers, and 4 lock nuts securing the paddles to the 2 paddle spacers. Remove the paddles from the rotor assembly.
Paddle Removal (continued)

Figure 82

Paddle Installation

1. Install the paddles to the rotor assembly so that the thicker rubber layer is assembled to the forward facing side of the rotor assembly. Install the 4 (1/4-20 x 1 1/2 inch) screws, 4 spacers, and 4 washers securing the paddles to the 2 paddle spacers.

Figure 83
Paddle Installation (continued)

2. Install the 4 (1/4-20 x 3/4 inch) Torx head screws securing the paddles together.

Scraper Replacement

Scraper Removal

1. Park the machine on a level surface. Stop the engine, wait for all moving parts to stop and remove the key.

2. Flip the machine over so the auger housing is facing the floor. Remove the springs from the LH and RH sides of the scraper.
Scraper Removal (continued)

3. Remove the 2 (3/8-16 x 2 1/2 inch) shoulder bolts securing the scraper to the auger housing. Remove the scraper from the auger housing.

Scraper Installation

1. Flip the machine over so the auger housing is facing the floor. Install the scraper onto handle auger housing. Install the 2 (3/8-16 x 2 1/2 inch) shoulder bolts securing the scraper to the auger housing.
2. Install the springs onto the LH and RH sides of the scraper. Install the lower hooks of the spring, so that the open end of the hooks are installed through the front holes of the scraper blade.