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TORO

Count on it.

Service Manual

POWER CLEAR® 721/821 Snowthrower Service Manual

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8111 Lyndale Avenue South
Bloomington, MN 55420

Original Instructions (EN)
Contact us at www.Toro.com.

Revision History

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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Chapter 1

Safety

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Safety Instructions

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…

Think Safety First (continued)

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…

Think Safety First (continued)

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

Chapter 2

Specifications and Maintenance

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Specifications

POWER CLEAR® 721/825					
Model Name	**Power Clear 721 R/E**	**Commercial Power Clear 721**	**Commercial Power Clear 821**	**Power Clear 721 QZE**	**Power Clear 821 QZE**
Model	**38752 / 38753**	**38754**	**38755**	**38756**	**38757**
Clearing Width	8.27 cm (21 inches)	8.27 cm (21 inches) with Extended Life Paddles		8.27 cm (21 inches)	
Snow Cut Depth	4.92 cm (12.5 inches)				
Engine	212cc Toro Premium OHV		252cc Toro Premium OHV	212cc Toro Premium OHV	252cc Toro Premium OHV
Engine Model	G210FS-4 / G210FDS-4	G210FS-4	G250FS-4	G210FDS-4	G250FS-4
Oil Type & Capacity	0.5 L (17 oz) 10W 30 / 5W 30 Synthetic	0.5 L (17 oz) 10W 30 / 5W 30 Synthetic	0.7 L (23.7 oz) 10W 30 / 5W 30 Synthetic	0.5 L (17 oz) 10W 30 / 5W 30 Synthetic	0.7 L (23.7 oz) 10W 30 / 5W 30 Synthetic
High Idle RPM	3700 ± 100				
Ignition Coil Air Gap	0.3 – 0.5 mm (0.011 - 0.019 inches)				
Spark Plug	NGK BPR6ES				
Spark Plug Gap	0.7 - 0.8 mm (0.028 - 0.032 inches)				
Fuel Capacity	2.16 L (2.3 quarts)		2.93 L (3.1 quarts)	2.16 L (2.3 quarts)	2.93 L (3.1 quarts)
Starting	Recoil/ Recoil-Electric	Recoil		Recoil-Electric	
Throwing Distance	Up to 10.7 m (35 ft)				
Capcity/Min.	Up to 816 kg (1800 lb)		Up to 861.8 kg (1900 lb)	Up to 816 kg (1800 lb)	Up to 861.8 kg (1900 lb)
Auger System	Power Curve				
Handle	Ergonomic	Ergonomic & Reinforced Handle		Ergonomic	
Deflector Control	Zip Deflector				
Chute Control	Chute Mounted			Quick Shoot	
Chute Rotation	210º				
Drive System	Power Propel Self-Propel				
Scraper	Pivoting				
Weight	36 kg / 38 kg (80 lb / 84 lb)	37 kg (82 lb)	41 kg (91 lb)	39 kg (87 lb)	44 kg (96 lb)
Overall Dimensions	48 inch L x 21 inch W x 42 inch H				
Storage Dimensions	33 inch L x 21 inch W x 34 inch H				

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

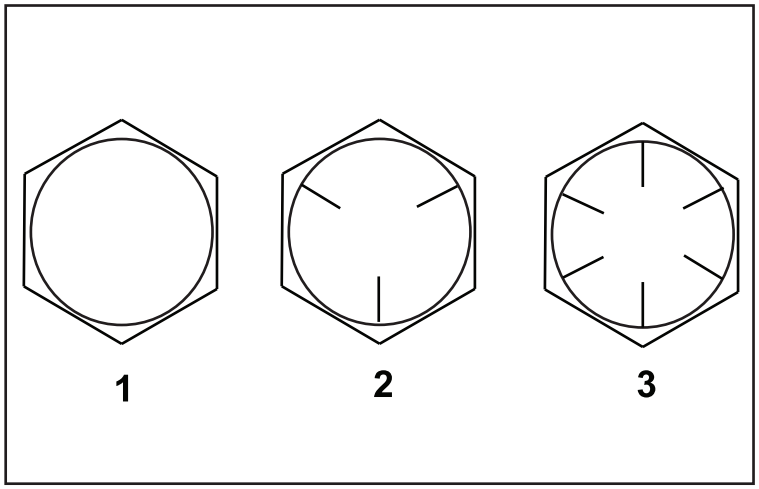

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Figure 1

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

Metric Bolts and Screws

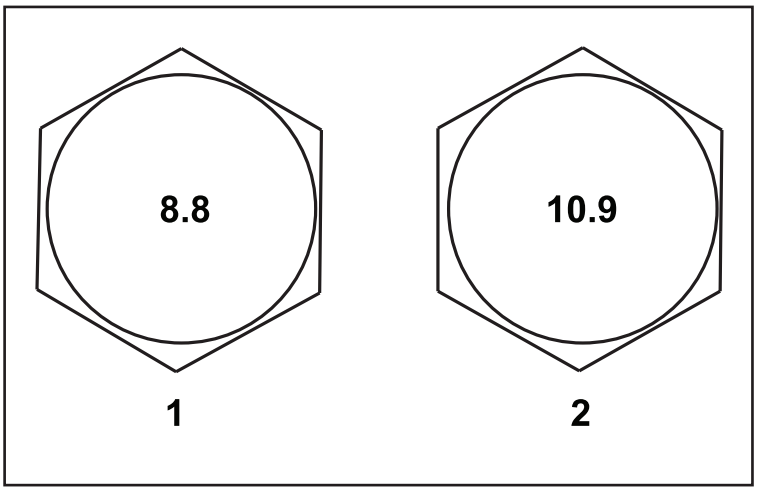

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Figure 2

1. Class 8.8
2. Class 10.9

Standard Torque for Dry, Zinc Plated, and Steel Fasteners (Inch Series)

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)	
	in-lb	in-lb	N • cm	in-lb	N • cm	in-lb	N • cm
#6-32 UNC	10 ± 2	13 ± 2	147 ± 23	15 ± 2	169 ± 23	23 ± 3	260 ± 34
#6-40 UNF				17 ± 2	192 ± 23	25 ± 3	282 ± 34
#8-32 UNC	13 ± 2	25 ± 5	282 ± 30	29 ± 3	328 ± 34	41 ± 5	463 ± 56
#8-36 UNF				31 ± 4	350 ± 45	43 ± 5	486 ± 56
#10-24 UNC	18 ± 2	30 ± 5	339 ± 56	42 ± 5	475 ± 56	60 ± 6	678 ± 68
#10-32 UNF				48 ± 5	542 ± 56	68 ± 7	768 ± 79
1/4-20 UNC	48 ± 7	53 ± 7	599 ± 79	100 ± 10	1130 ± 113	140 ± 15	1582 ± 169
1/4-28 UNF	53 ± 7	65 ± 10	734 ± 113	115 ± 12	1299 ± 136	160 ± 17	1808 ± 192
5/16-18 UNC	115 ± 15	105 ± 15	1186 ± 169	200 ± 25	2260 ± 282	300 ± 30	3390 ± 339
5/16-24 UNF	138 ± 17	128 ± 17	1446 ± 192	225 ± 25	2542 ± 282	325 ± 33	3672 ± 373
	ft-lb	ft-lb	N • m	ft-lb	N • m	ft-lb	N • m
3/8-16 UNC	16 ± 2	16 ± 2	22 ± 3	30 ± 3	41 ± 4	43 ± 5	58 ± 7
3/8-24 UNF	17 ± 2	18 ± 2	24 ± 3	35 ± 4	47 ± 5	50 ± 6	68 ± 8
7/16-14 UNC	27 ± 3	27 ± 3	37 ± 4	50 ± 5	68 ± 7	70 ± 7	95 ± 9
7/16-20 UNF	29 ± 3	29 ± 3	39 ± 4	55 ± 6	75 ± 8	77 ± 8	104 ± 11
1/2-13 UNC	30 ± 3	48 ± 7	65 ± 9	75 ± 8	102 ± 11	105 ± 11	142 ± 15
1/2-20 UNF	32 ± 4	53 ± 7	72 ± 9	85 ± 9	115 ± 12	120 ± 12	163 ± 16
5/8-11 UNC	65 ± 10	88 ± 12	119 ± 16	150 ± 15	203 ± 20	210 ± 21	285 ± 28
5/8-18 UNF	75 ± 10	95 ± 15	129 ± 20	170 ± 18	230 ± 24	240 ± 24	325 ± 33
3/4-10 UNC	93 ± 12	140 ± 20	190 ± 27	265 ± 27	359 ± 37	375 ± 38	508 ± 52
3/4-16 UNF	115 ± 15	165 ± 25	224 ± 34	300 ± 30	407 ± 41	420 ± 43	569 ± 58
7/8-9 UNC	140 ± 20	225 ± 25	305 ± 34	430 ± 45	583 ± 61	600 ± 60	813 ± 81
7/8-14 UNF	155 ± 25	260 ± 30	353 ± 41	475 ± 48	644 ± 65	667 ± 66	904 ± 89

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 my 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)

Thread Size	Class 8.8 Bolts, Screws, Studs with Regular Height Nuts (Class 8 or Stronger Nuts)		Class 10.9 Bolts, Screws, Studs with Regular Height Nuts (Class 10 or stronger Nuts)	
	in-lb	N • cm	in-lb	N • cm
M5 X 0.8	57 ± 6	644 ± 68	78 ± 8	881 ± 90
M6 X 1.0	96 ± 10	1085 ± 113	133 ± 14	1503 ± 158
	ft-lb	**N • m**	**ft-lb**	**N • m**
M8 X 1.25	19 ± 2	26 ± 3	28 ± 3	38 ± 4
M10 X 1.5	38 ± 4	52 ± 5	54 ± 6	73 ± 8
M12 X 1.75	66 ± 7	90 ± 10	93 ± 10	126 ± 14
M16 X 2.0	166 ± 17	255 ± 23	229 ± 23	310 ± 31
M20 X 2.5	325 ± 33	440 ± 45	450 ± 46	610 ± 62

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

Thread Size	Recommended Torque	
	Square Head	Hex Socket
1/4 - 20 UNC	140 ± 20 in-lb	73 ± 12 in-lb
5/16 - 18 UNC	215 ± 35 in-lb	145 ± 20 in-lb
1/2 - 13 UNC	75 ± 15 ft-lb	50 ± 10 ft-lb
3/8 - 16 UNC	35 ± 10 ft-lb	18 ± 3 ft-lb

Wheel Bolts and Lug Nuts

Thread Size	Recommended Torque**	
7/16 - 20 UNF Grade 5	65 ± 10 ft-lb	88 ± 14 N • m
1/2 - 20 UNF Grade 5	80 ± 10 ft-lb	108 ± 14 N • m
M12 X 1.25 Class 8.8	80 ± 10 ft-lb	108 ± 14 N •m
M12 X 1.5 Class 8.8	80 ± 10 ft-lb	108 ± 14 N • m

**For steel wheels and non-lubricated fasteners.

Thread Cutting Screws (Zinc Plated Steel)

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

*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)

Threads Size	Threads per Inch		Baseline Torque*
	Type A	Type B	
No. 6	18	20	20 ± 5 in-lb
No. 8	15	18	30 ± 5 in-lb
No. 10	12	16	38 ± 7 in-lb
No. 12	11	14	85 ± 15 in-lb

*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

Fractions	Decimals	mm	Fractions	Decimals	mm
1/64	0.015625	0.397	**33/64**	0.515625	13.097
1/32	0.03125	0.794	**16/32**	0.53125	13.484
3/64	0.046875	1.191	**35/64**	0.546875	13.891
1/16	0.0625	1.588	**9/16**	0.5625	14.288
5/64	0.078125	1.984	**37/64**	0.578125	14.684
3/32	0.9375	2.381	**19/32**	0.59375	15.081
1/8	0.1250	3.175	**5/8**	0.6250	15.875
9/64	0.140625	3.572	**41/64**	0.640625	16.272
5/32	0.15625	3.969	**21/32**	0.65625	16.669
11/64	0.171875	4.366	**43/64**	0.671875	17.066
3/16	0.1875	4.762	**11/64**	0.6875	17.462
13/64	0.203125	5.159	**45/64**	0.703125	17.859
7/32	0.21875	5.556	**23/32**	0.71875	18.256
15/64	0.234375	5.953	**47/64**	0.734375	18.653
1/4	0.2500	6.350	**3/4**	0.7500	19.050
17/64	0.265625	6.747	**49/64**	0.765625	19.447
9/32	0.28125	7.144	**25/32**	0.78125	19.844
19/64	0.296875	7.541	**51/64**	0.796875	20.241
5/16	0.3125	7.541	**13/16**	0.8125	20.638
21/64	0.328125	8.334	**53/64**	0.828125	21.034
11/32	0.34375	8.731	**27/32**	0.84375	21.431
23/64	0.359375	9.128	**55/64**	0.859375	21.828
3/8	0.3750	9.525	**7/8**	0.8750	22.225
25/64	0.390625	9.922	**57/64**	0.890625	22.622
13/32	0.40625	10.319	**29/32**	0.90625	23.019
27/64	0.421875	10.716	**59/64**	0.921875	23.416
7/16	0.4375	11.112	**15/16**	0.9375	23.812
29/64	0.453125	11.509	**61/64**	0.953125	24.209
15/32	0.46875	11.906	**31/32**	0.96875	24.606
31/64	0.484375	12.303	**63/64**	0.984375	25.003
1/2	0.5000	12.700	**1**	1.000	25.400
1 mm = 0.03937 in.			**0.001 in. = 0.0254 mm**		

U.S. to Metric Conversions

	To Convert	Into	Multiply By
Linear Measurement	Miles	Kilometers	1.609
	Yards	Meters	0.9144
	Feet	Meters	0.3048
	Feet	Centimeters	30.48
	Inches	Meters	0.0254
	Inches	Centimeters	2.54
	Inches	Millimeters	25.4
Area	Square Miles	Square Kilometers	2.59
	Square Feet	Square Meters	0.0929
	Square Inches	Square Centimeters	6.452
	Acre	Hectare	0.4047
Volume	Cubic Yards	Cubic Meters	0.7646
	Cubic Feet	Cubic Meters	0.02832
	Cubic Inches	Cubic Centimeters	16.39
Weight	Tons (Short)	Metric Tons	0.9078
	Pounds	Kilograms	0.4536
	Ounces	Grams	28.3495
Pressure	Pounds/Square Inch	Kilopascal	6.895
Work	Foot-Pounds	Newton-Meters	1.356
	Foot-Pounds	Kilogram-Meters	0.1383
	Inch-Pounds	Kilogram-Centimeters	1.152144
Liquid Volume	Quarts	Liters	0.9463
	Gallons	Liters	3.785
Liquid Flows	Gallons/Minute	Liters/Minute	3.785
Temperature	Fahrenheit	Celsius	1. Subtract by 32°
			2. Multiply by 5/9

Chapter 3

Troubleshooting

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GEARS

The Systematic approach to defining, diagnosing and solving problems.

G

Gather Information

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

E

Evaluate Potential Causes

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

A

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

R

Repair

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

S

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.

Chapter 4

Engine

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General Information

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

Service and Repairs

Engine Assembly

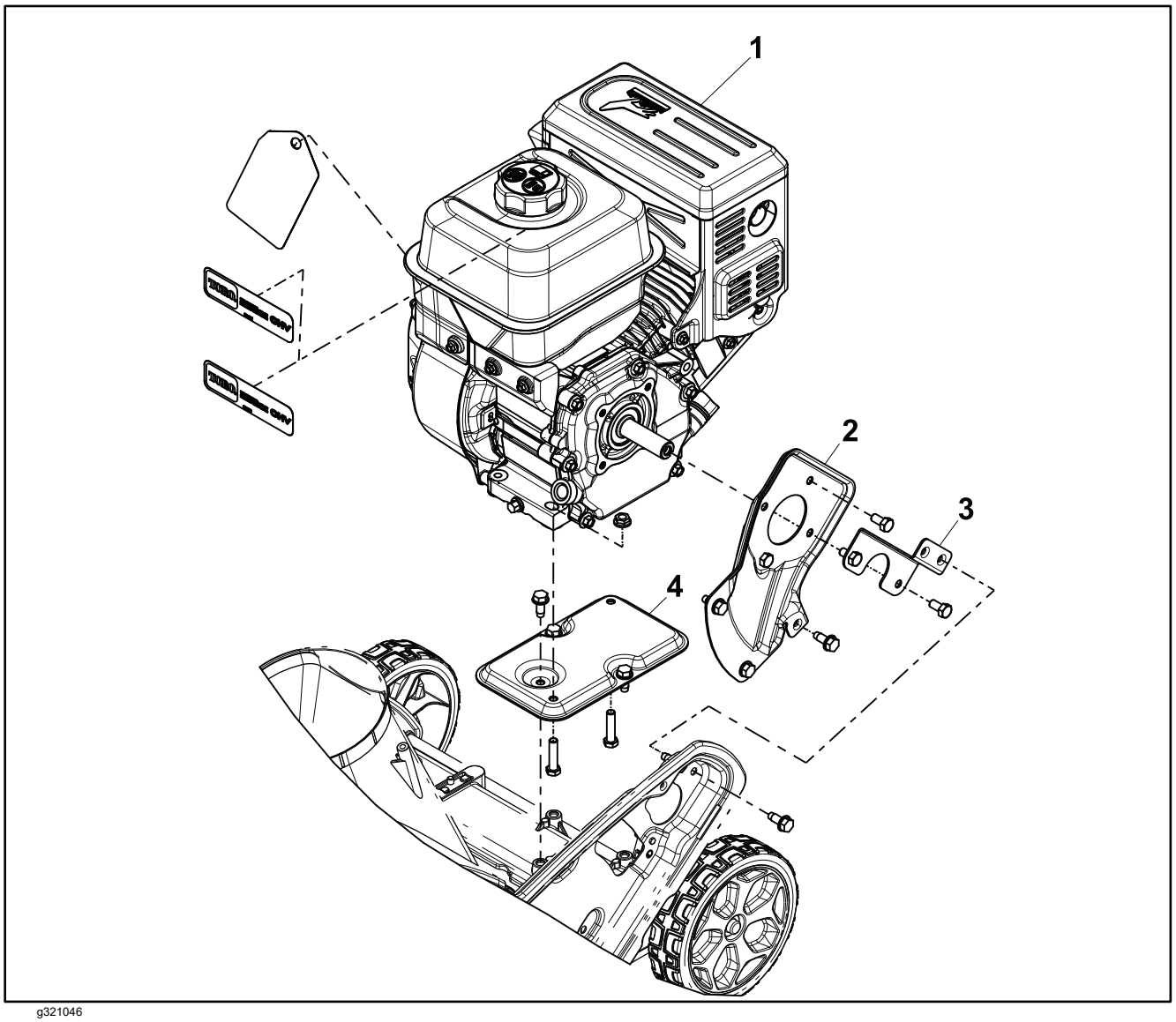

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Figure 3

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.

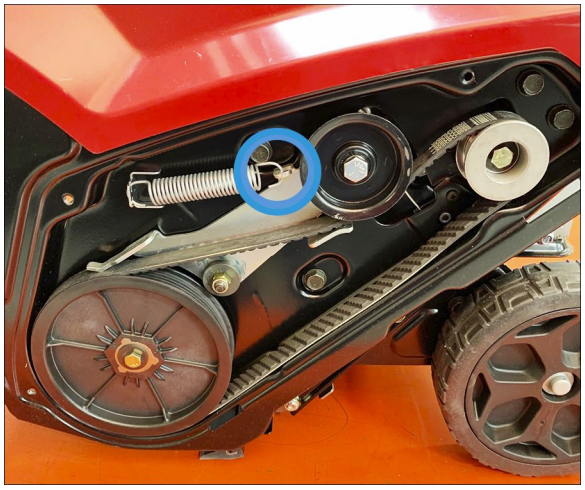

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Figure 4

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

g324731

Figure 5

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.

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Figure 6

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.

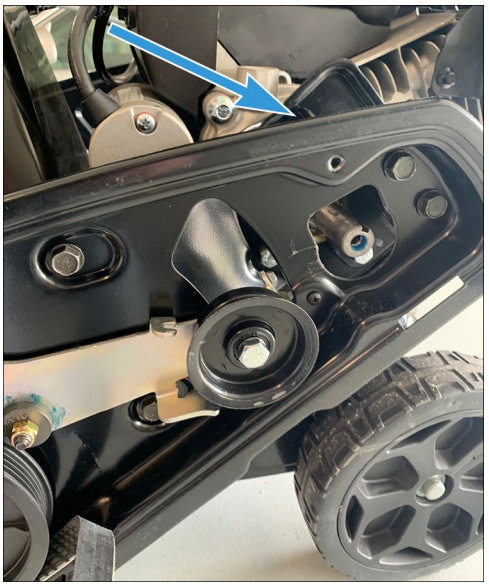

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Figure 7

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.

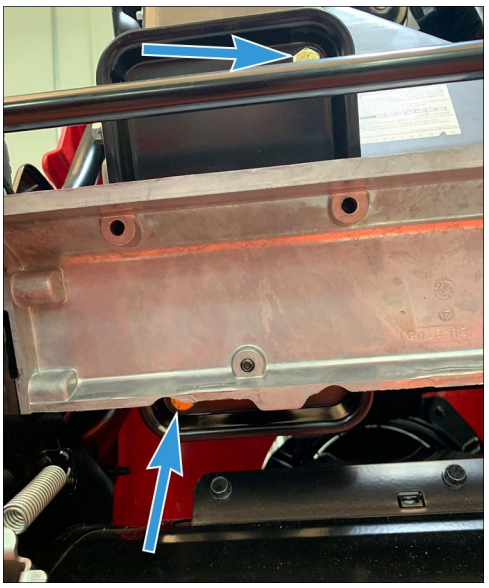

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Figure 8

13. Using an appropriate lifting device, remove the engine from the machine.

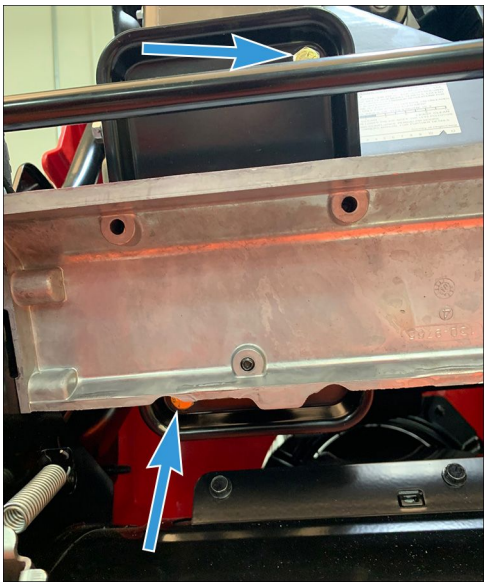
g323977

Figure 9

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.

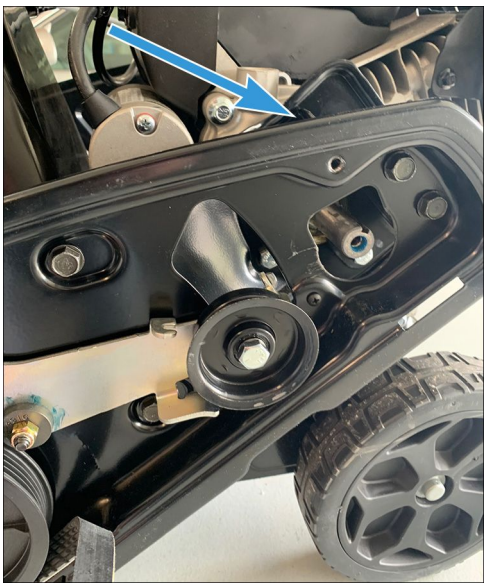
   Note: Do not flip the machine to remove the screws and nuts.



g321401

Figure 10

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).



g323976

Figure 11

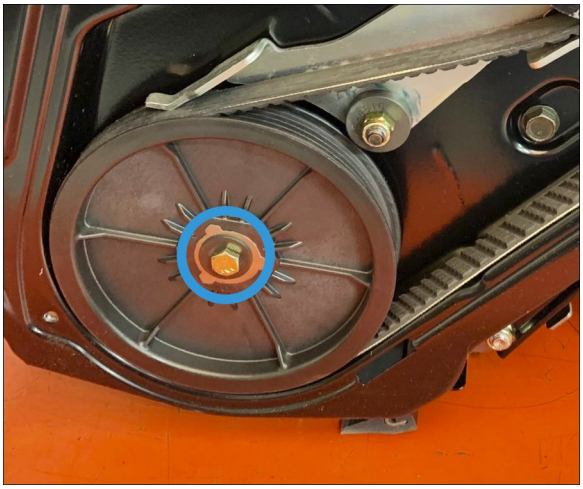
4. Apply blue threadlocker to threads of the (5/16–24 x 1 1/4 inch) screw. Install the screw and Belleville washer securing the engine pulley to the engine shaft. Torque the screw 25.4 ± 2.8 N • m (225 ± 25 in-lb).

g321398

Figure 12

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.

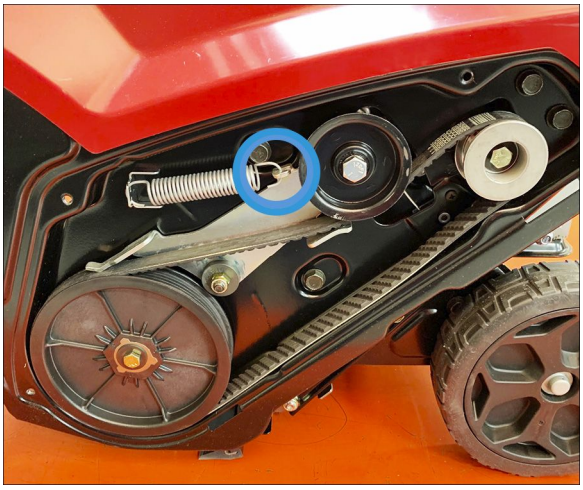
6. Install the rotor pulley onto the rotor shaft. Apply blue threadlocker to threads of the new (1/4-20 x 7/8 inch) screw. Install the Belleville washer and screw securing the rotor pulley assembly to the rotor shaft. Torque the screw to 11.3 ± 1 N • m (100 ± 10 in-lb).



g324731

Figure 13

7. Hook the extension spring to the idler arm.



g324732

Figure 14

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.

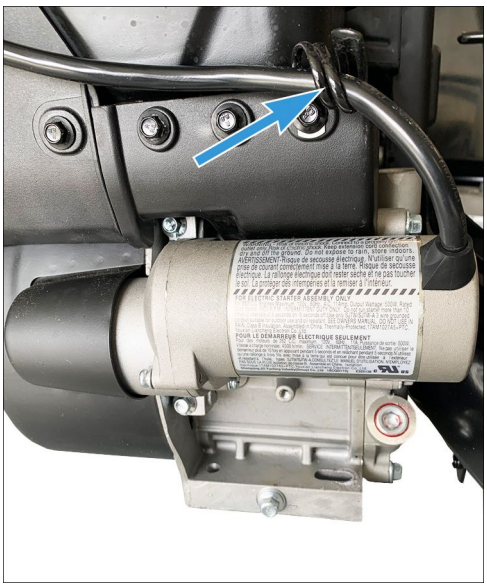
Electric Starter Replacement

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.

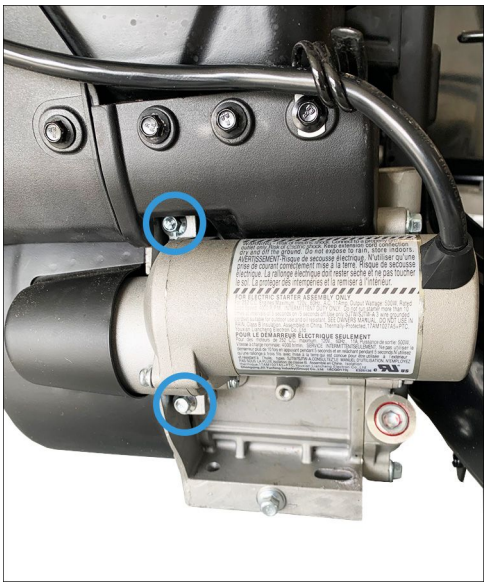


g323979

Figure 15

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.



g323978

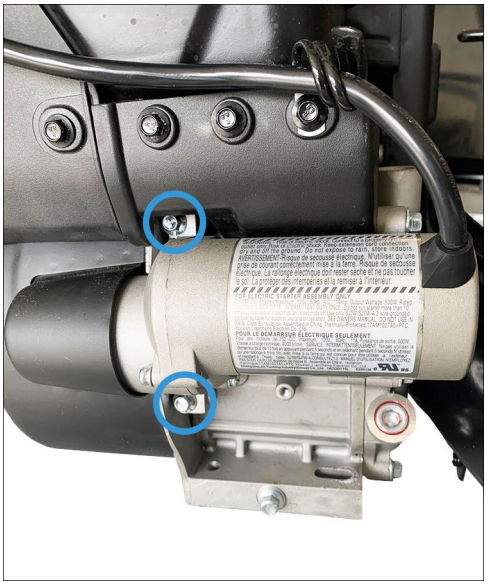
Figure 16

5. Remove the electric starter from the engine.

Electric Starter Installation

1. If the dowels were inadvertently removed, install the dowel pins.

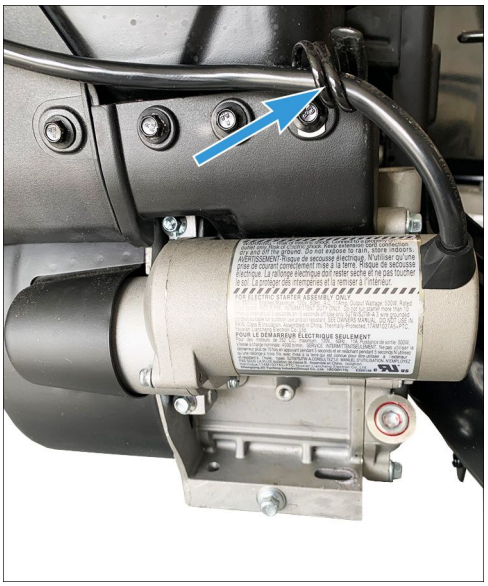
2. Install the electric starter by inserting the nose of the starter into the blower shroud and slide the mounting holes over the dowel pins. Install the 2 (M6 x 35) bolts securing the electric starter to the engine. Torque the bolts to 10 N • m (89 in-lb).



g323978

Figure 17

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



g323979

Figure 18

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.

g320930

Figure 19

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

g323692

Figure 20

Muffler Guard Removal (continued)

g322776

Figure 21

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.

g323980

Figure 22

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).

g323692

Figure 23

g322776

Figure 24

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

g320930

Figure 25

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.

g322787

Figure 26

3. Remove the muffler assembly and gasket from the engine.

Muffler Removal (continued)

g322788

Figure 27

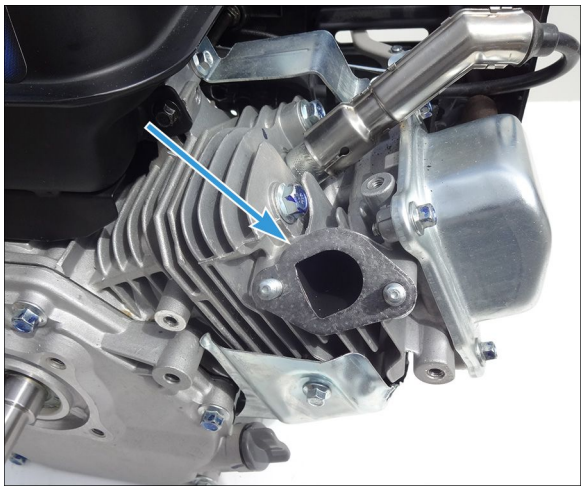
Muffler Inspection

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.



g322786

Figure 28

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).

g322787

Figure 29

Fuel Tank Replacement

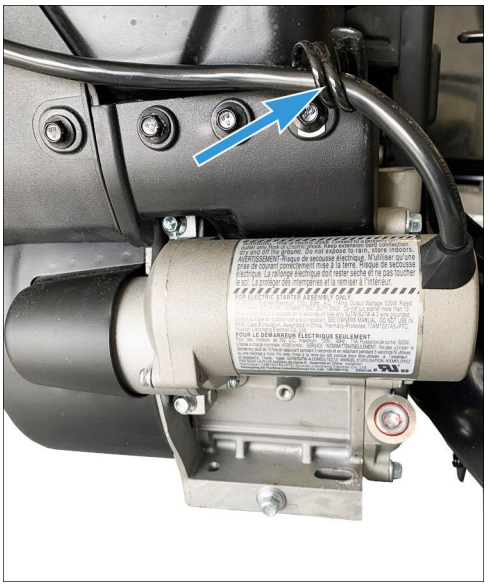
Fuel Tank Removal

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.



g323979

Figure 30

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)

g323982

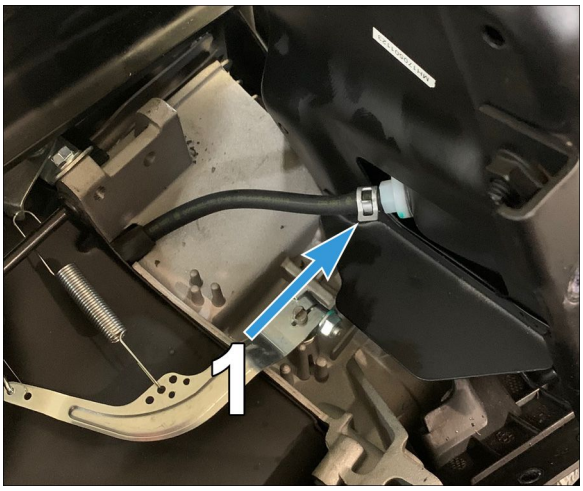
Figure 31

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

g322779

Figure 32

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.



g323984

Figure 33

1. Clamp

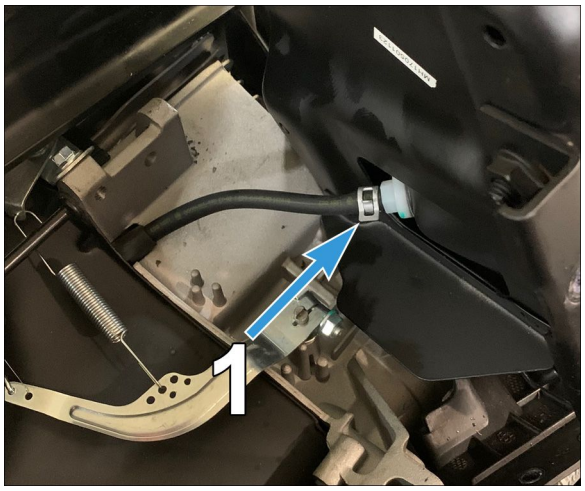
8. Remove the fuel tank from the engine.
9. If needed, unscrew and remove the fuel filter from the fuel tank.

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.



g323984

Figure 34

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).

g322779

Figure 35

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.

g323982

Figure 36

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)

DANGER

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

DANGER

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.

Chapter 5

Chassis

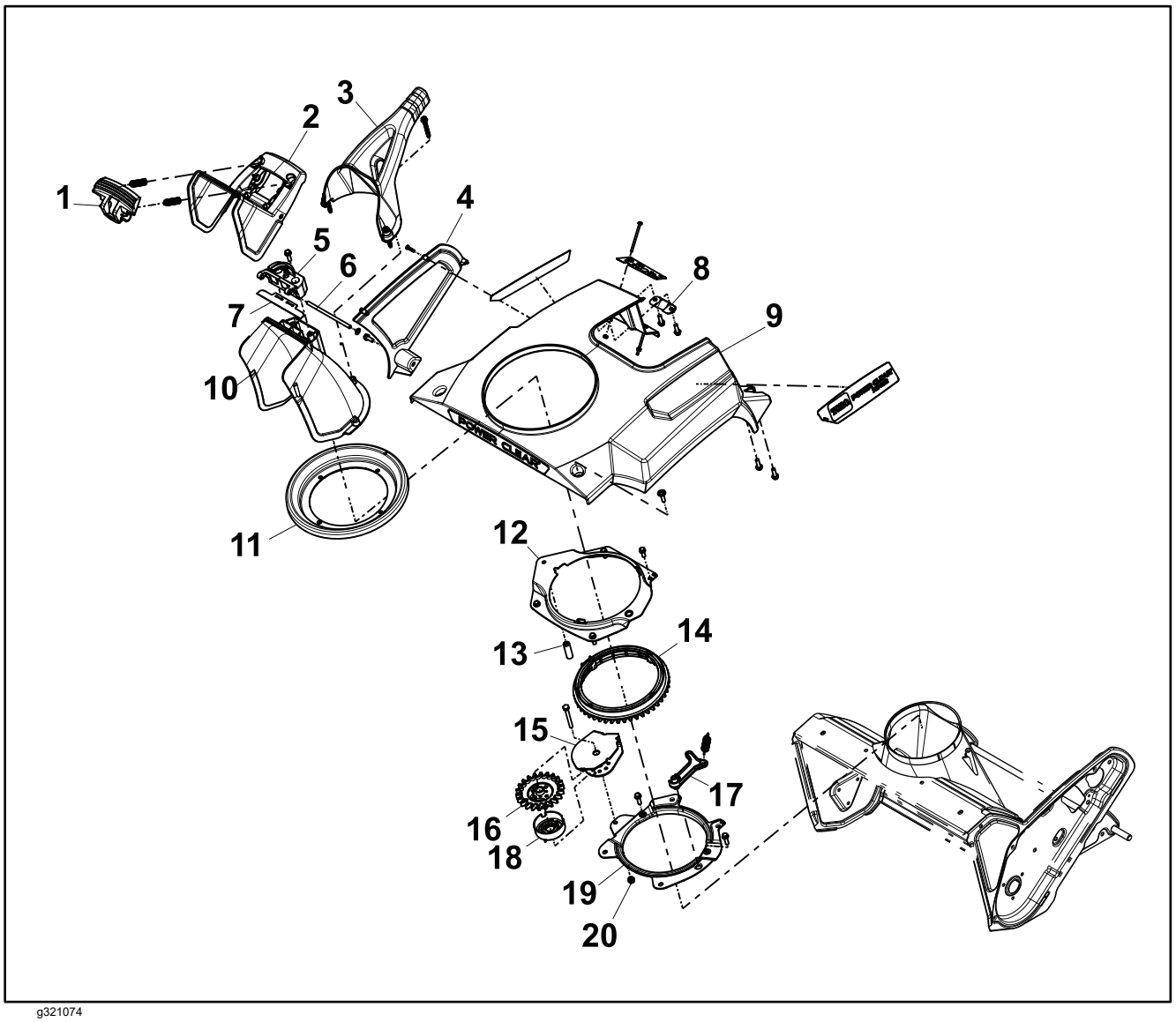
Table of Contents

General Information

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

Service and Repairs

Shroud and Quick Shoot Control Assemblies

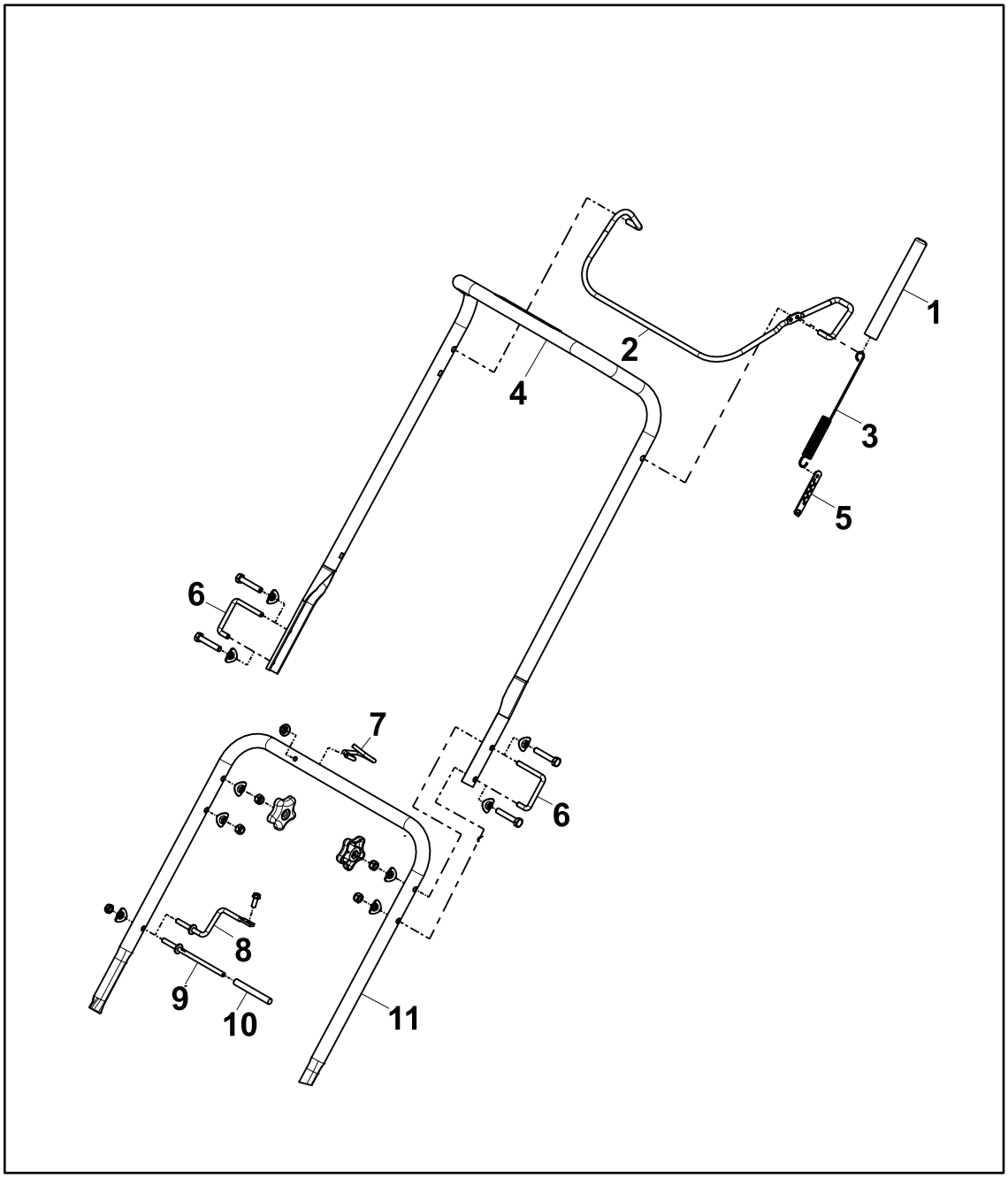


g321074

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

Handle Assembly

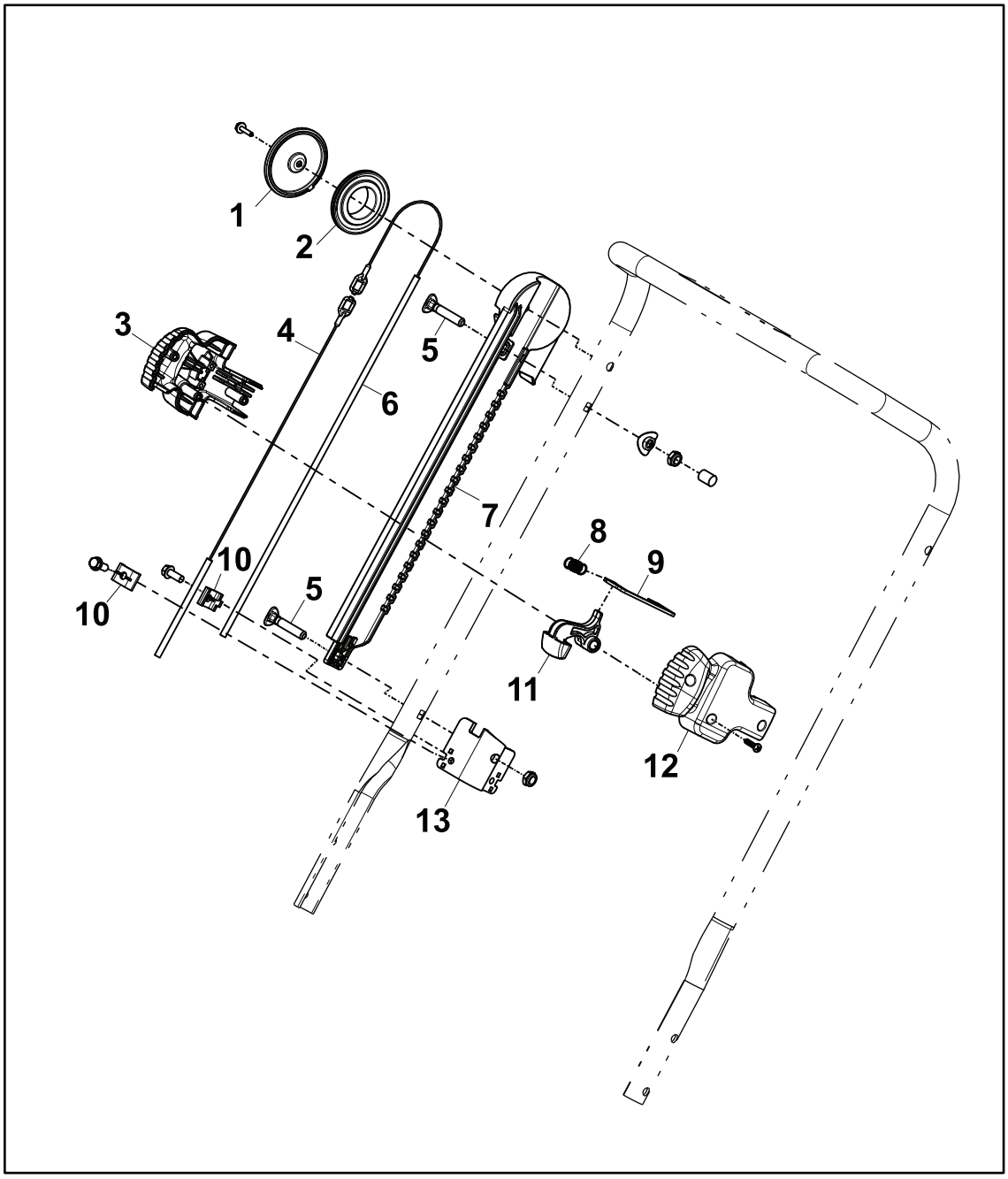


g324729

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

Power Shoot Assembly

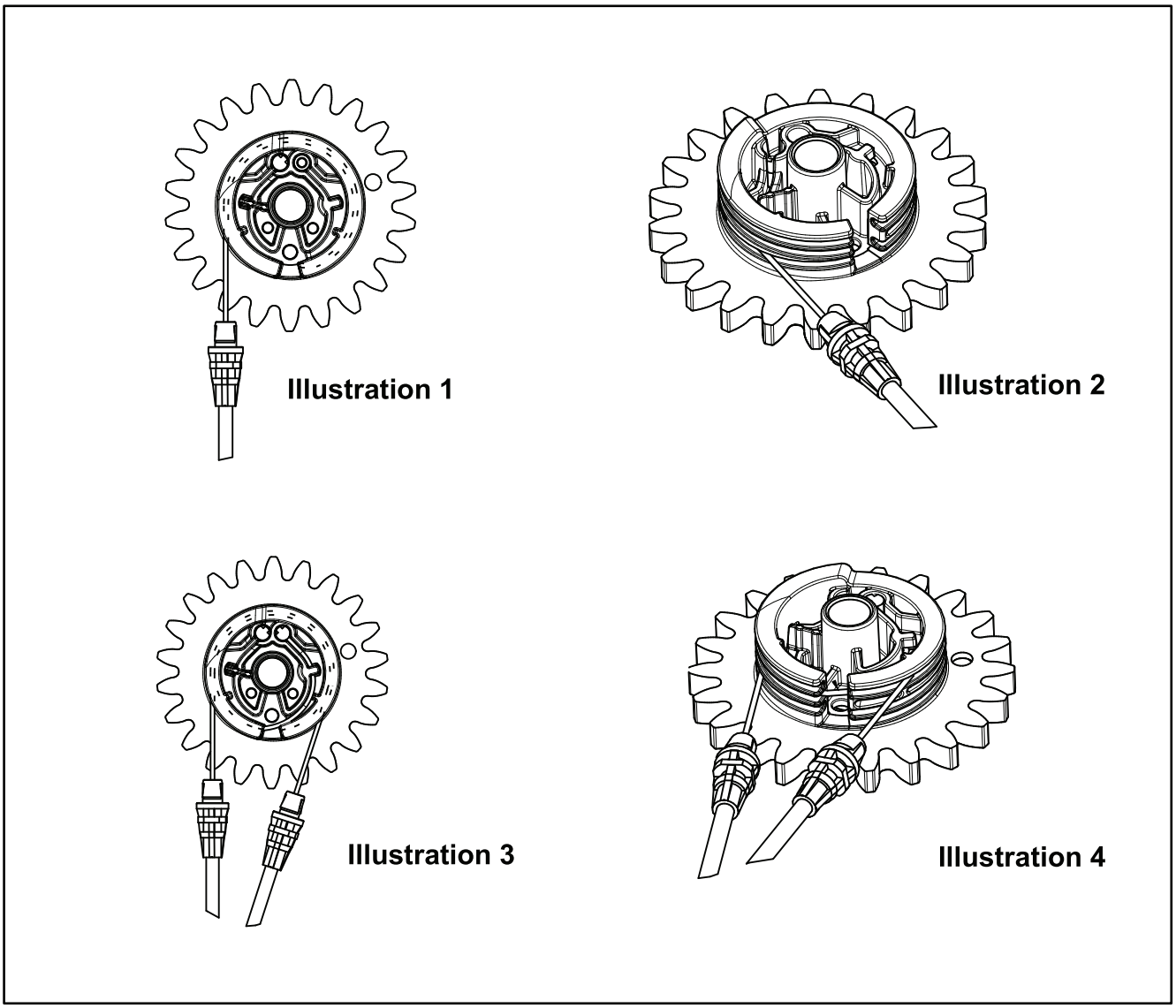


g324730

Figure 39

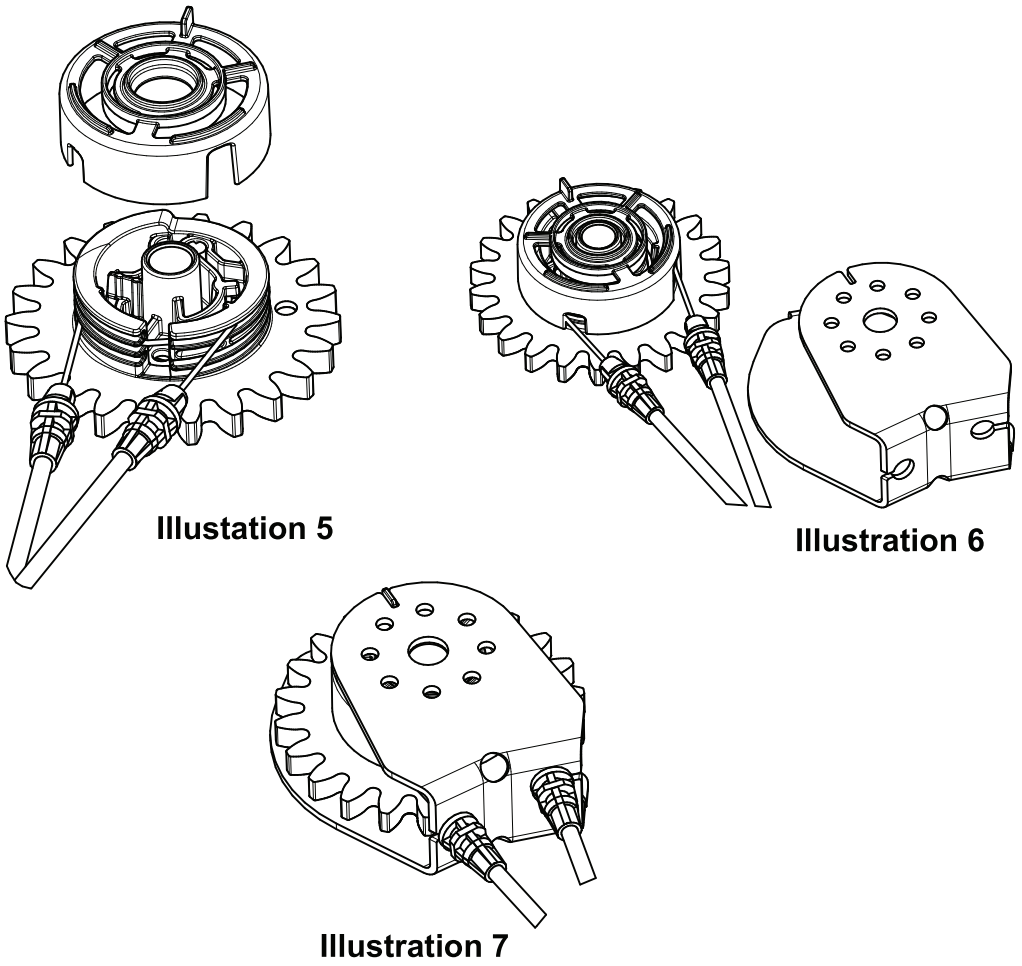
1. Pulley Cover
2. Slider Pulley
3. Slider Handle RH
4. Short Chute Cable
5. Handle Screw
6. Long Chute Cable
7. Slider Track
8. Trigger Spring
9. Plate Chute Lock
10. Cable Clamp
11. Trigger
12. Slider Handle LH
13. Cable Bracket

Quick Shoot Controls 1



g321048

Figure 40



g321049

Figure 41

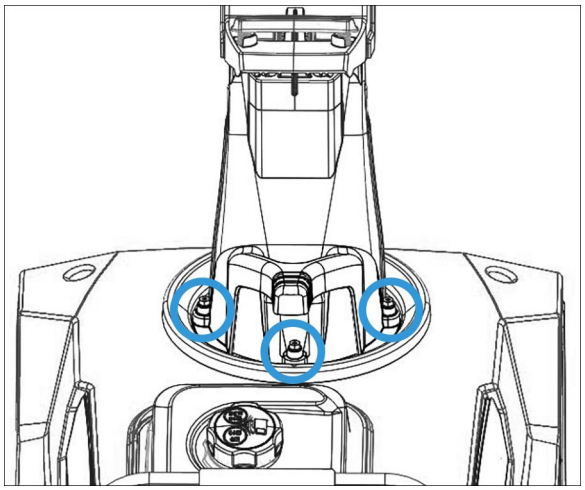
Shroud Replacement

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.



g321389

Figure 42

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.

g320929

Figure 43

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.

g320930

Figure 44

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.

g320931

Figure 45

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 Removal (continued)

g320932

Figure 46

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.

g320932

Figure 47

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

g320931

Figure 48

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

g320930

Figure 49

5. Install the chute seal ring to the shroud, secure with a screw (M4.2–2.25 mm x 3/4 inch).

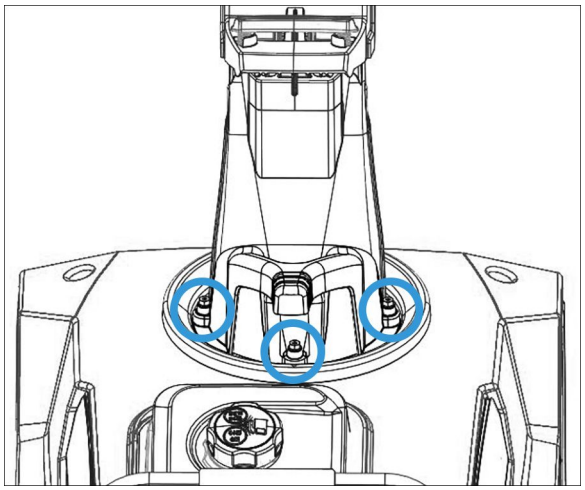
g320929

Figure 50

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.



g321389

Figure 51

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.

g320933

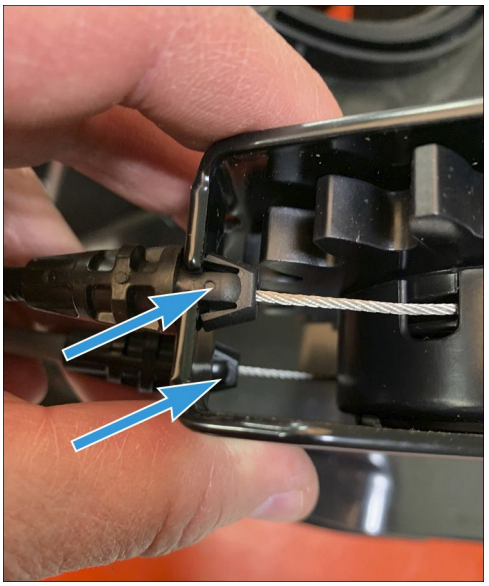
Figure 52

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

g320934

Figure 53

5. Using pliers, compress the cable locks and remove the black and gray cables from the pinion bracket.

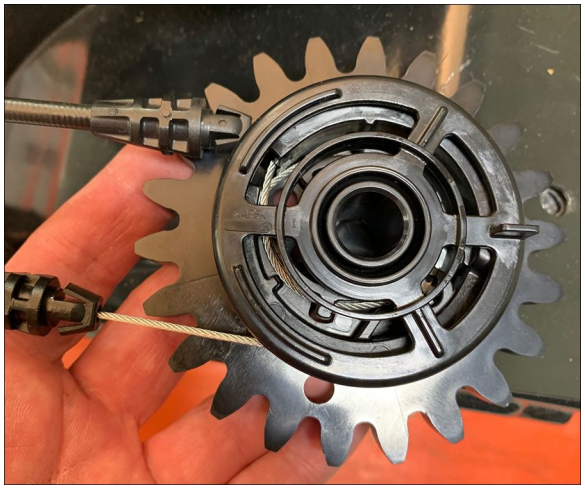


g320935

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.



g320936

Figure 55

Quick Shoot Controls Removal (continued)

g320937

Figure 56

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.

g320938

Figure 57

2. Wrap the black cable around the bottom of the spool.

g320939

Figure 58

g320940

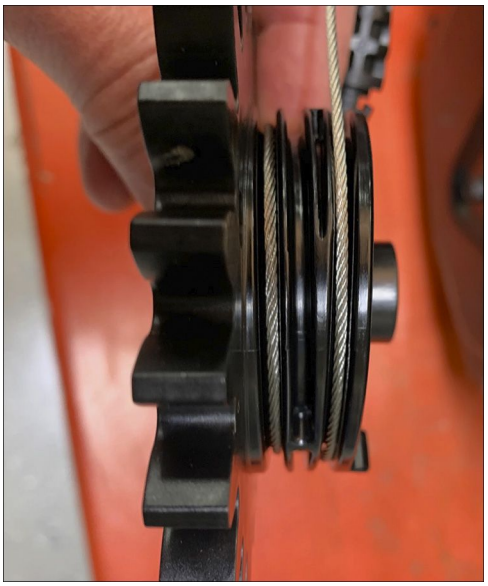
Figure 59

3. Insert the barrel end of the gray cable into the slot in the gear and secure the cable under the gear tab.

g320941

Figure 60

4. Wrap the gray cable around the top of the spool.



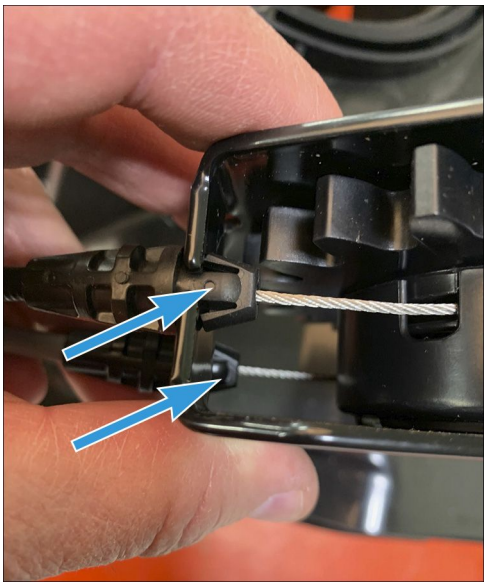
g320942

Figure 61

g320943

Figure 62

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



g320935

Figure 63

6. Insert the pinion spacer sleeve into the quick chute gear assembly.

g320934

Figure 64

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.

g320944

Figure 65

g320933

Figure 66

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

Chapter 6

Drive System

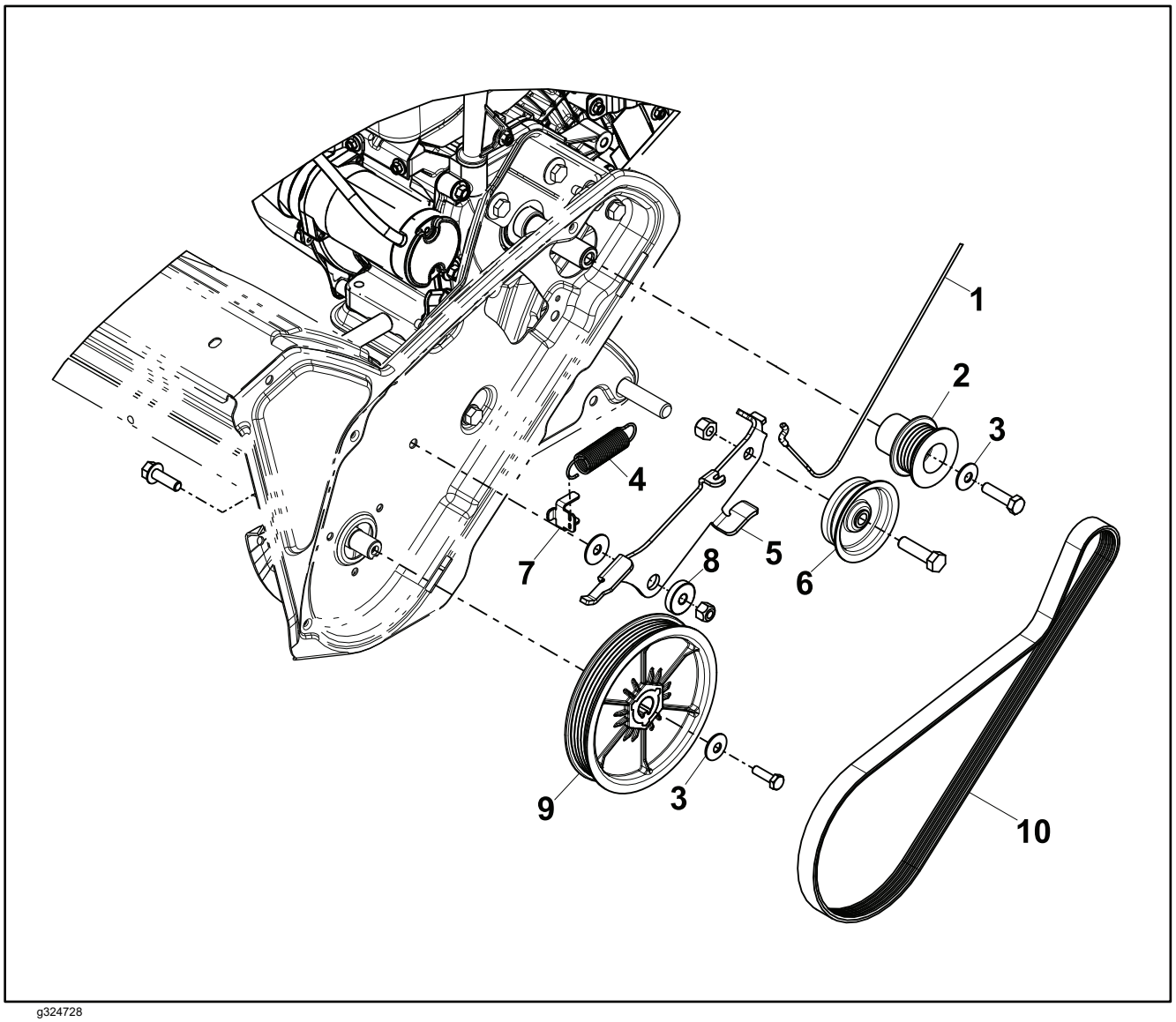
Table of Contents

General Information

All POWER CLEAR® 721 and 821 models utilize Toro's Power Propel self-propel system.

Service and Repairs

Auger Drive Assembly

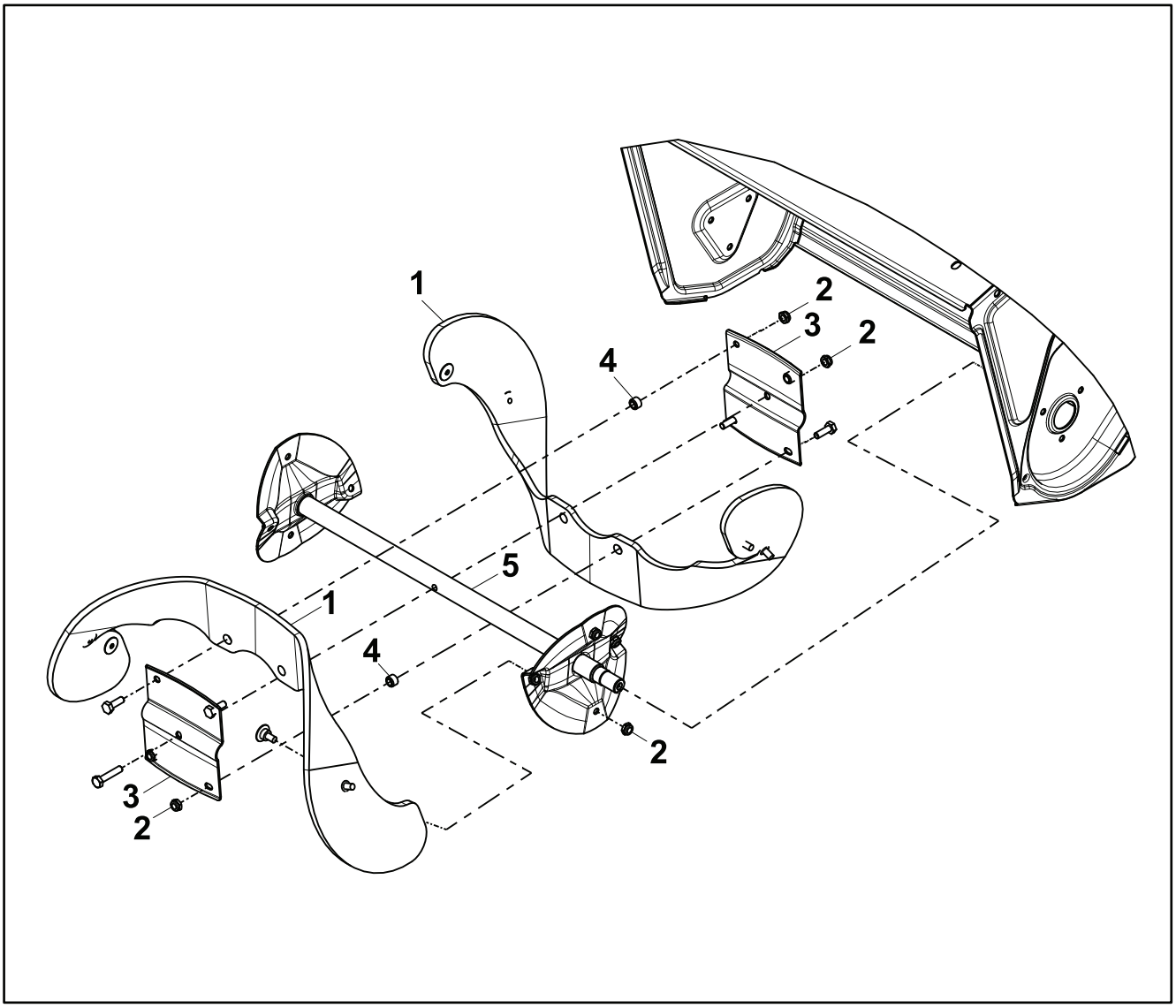


g324728

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

Rotor Assembly

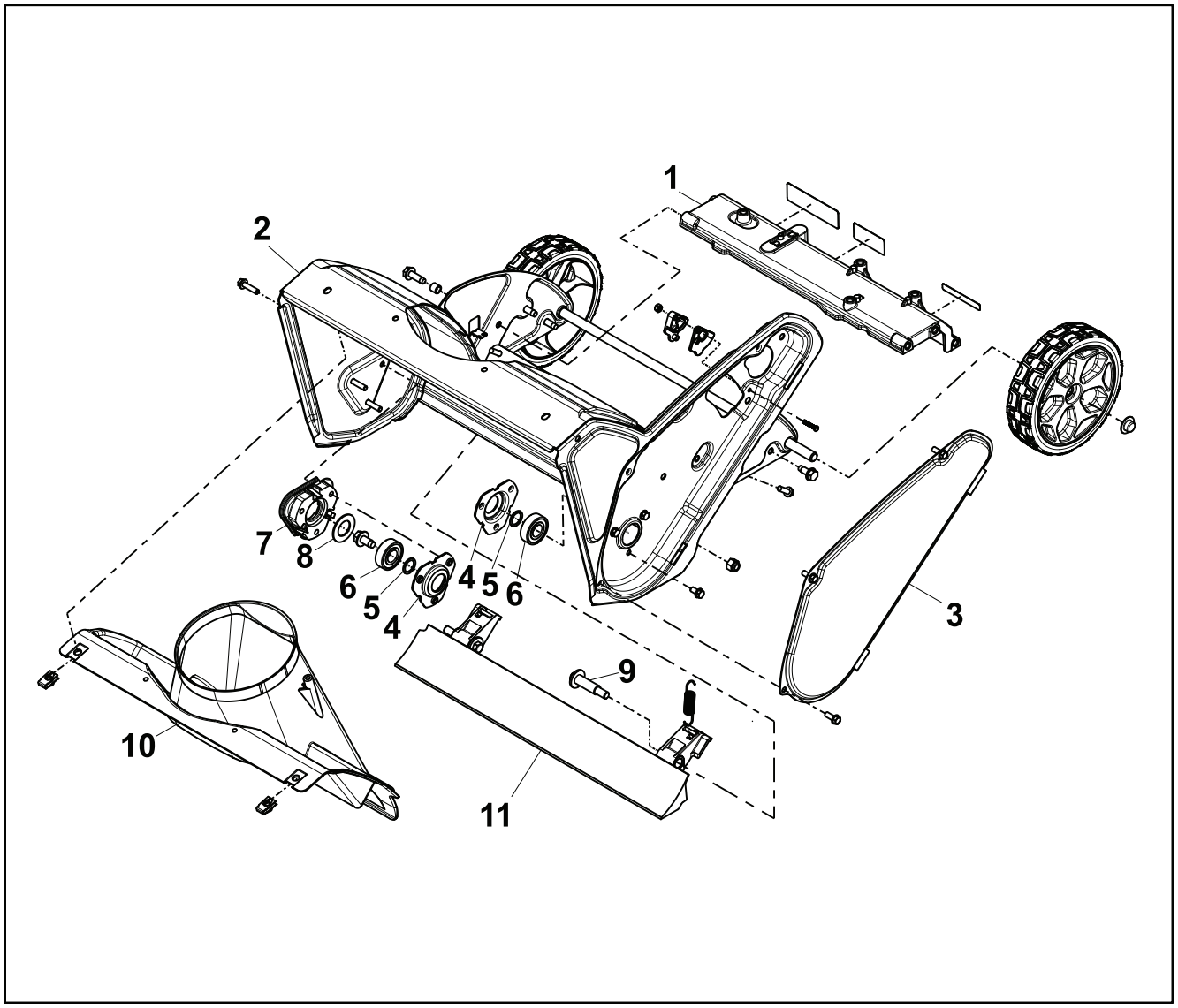


g320854

Figure 68

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

Scraper Assembly



g320957

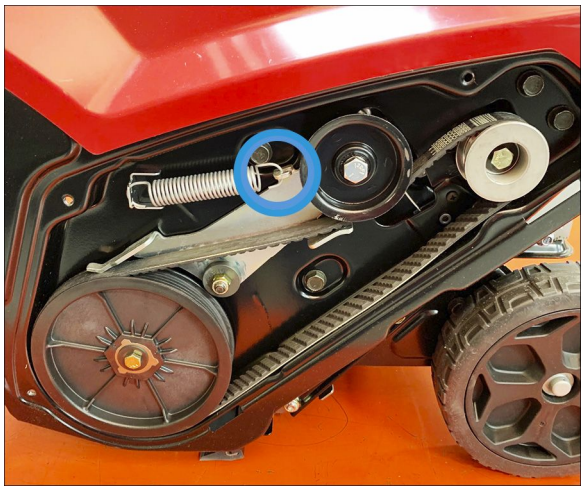
Figure 69

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.



g324732

Figure 70

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

g324731

Figure 71

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

Belt Installation

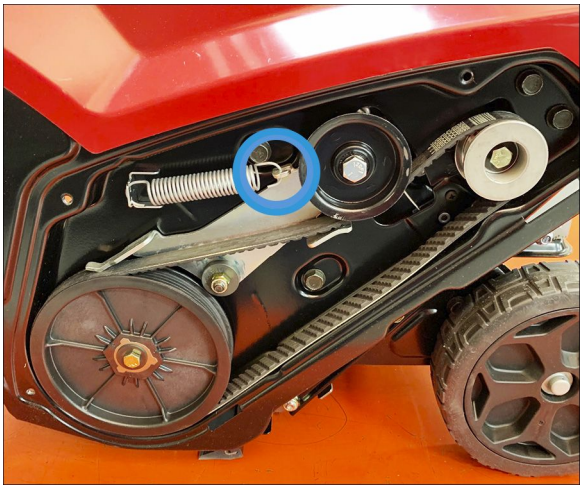
1. Route the belt first around the engine pulley, under the flat idler pulley, and finally around the loose rotor pulley positioned above the rotor shaft.

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).

g324731

Figure 72

3. Hook the extension spring to the idler arm.



g324732

Figure 73

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

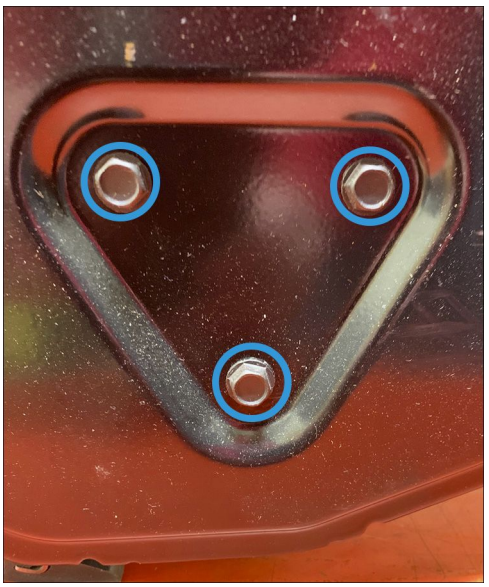
Rotor Removal

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.

g320945

Figure 74

4. Remove the 3 (1/4-20 x 1 inch) rotor bearing screws securing the RH sideplate to the rotor assembly.

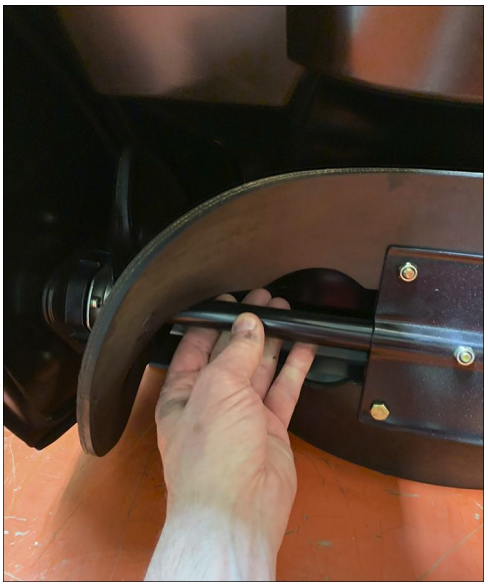


g320946

Figure 75

5. Remove the rotor assembly from the auger housing.

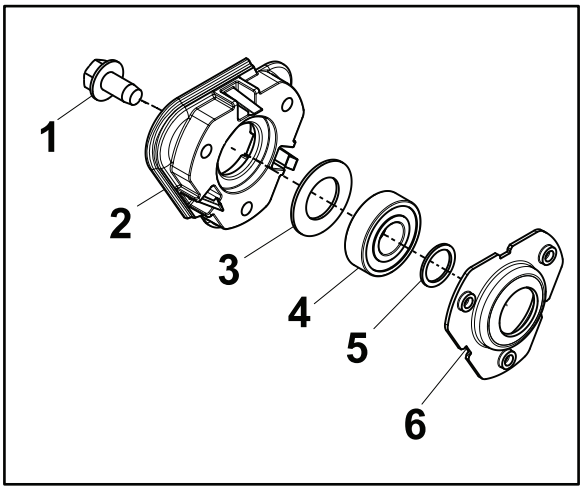
Rotor Removal (continued)



g321390

Figure 76

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.



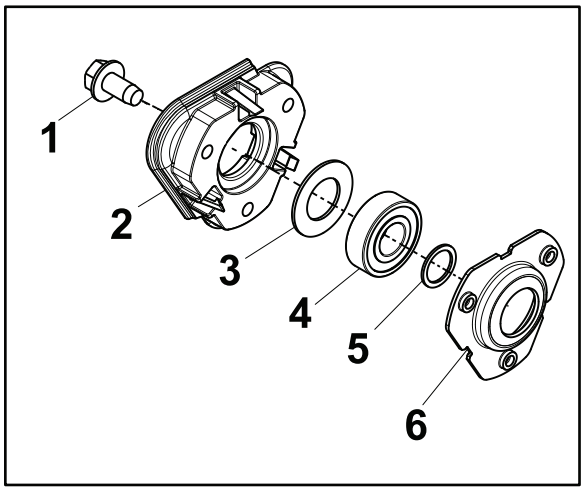
g321788

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.

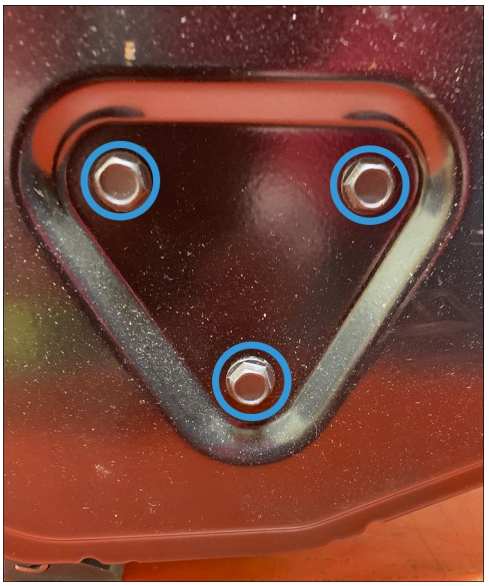


g321788

Figure 78

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

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.



g320946

Figure 79

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

g320945

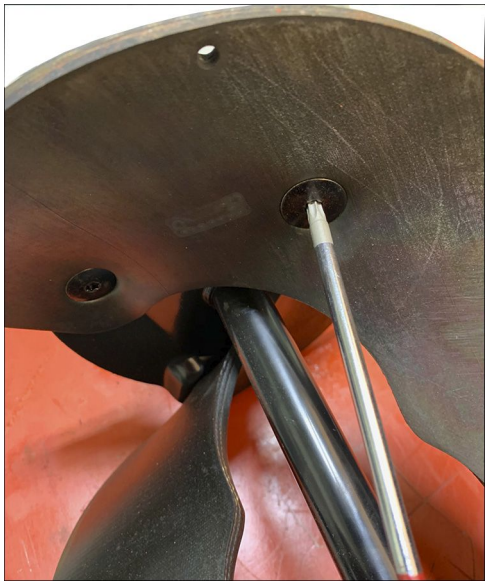
Figure 80

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

Paddle Replacement

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



g321393

Figure 81

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)

g321394

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.

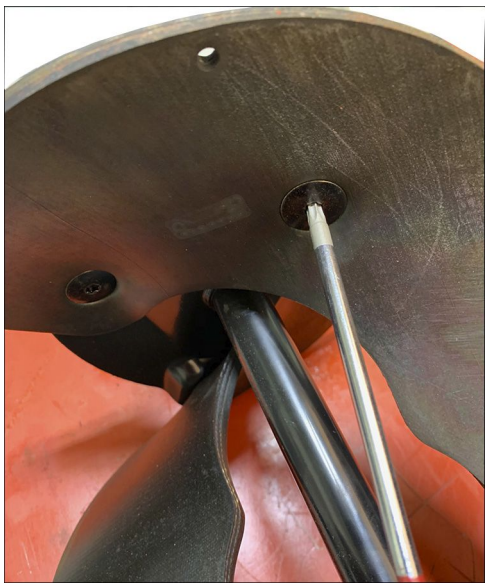
g327312

Figure 83

g321394

Figure 84

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



g321393

Figure 85

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.

g321395

Figure 86

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.

g321396

Figure 87

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.

g321396

Figure 88

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.

g321395

Figure 89