



Residential Products

SnowMaster®/SnowMax®



Issued: May 2016

ABOUT THIS MANUAL

This service manual was written expressly for TORO® and LAWN-BOY® 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.

The SnowMaster® and SnowMax® Snowthrower is covered in this manual. The manual may also be specified for use on later model products.

Due to the compact design, parts were removed for photographic purposes when necessary.

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
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8111 Lyndale Avenue South
Bloomington, MN 55420

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SAFETY INFORMATION

General Information



This symbol means WARNING or PERSONAL SAFETY INSTRUCTION - read the instruction because it has to do with your safety. Failure to comply with the instruction may result in personal

injury or even death.

This manual is intended as a service and repair manual only. The safety instructions

provided herein are for troubleshooting, service, and repair of the Toro SnowMaster® and SnowMax® snowthrowers. The SnowMaster operator's manuals contain safety information and operating tips for safe operating practices. Operator's manuals are available through your Toro parts source or:

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Think Safety First

Avoid unexpected starting of engine...

Always turn off the engine 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 increase in temperature during operation, while the unit is running or shortly after it has been running.

Avoid fires and explosions...

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.

Avoid asphyxiation...

Never 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.

SPECIFICATIONS AND MAINTENANCE

Torque Specifications

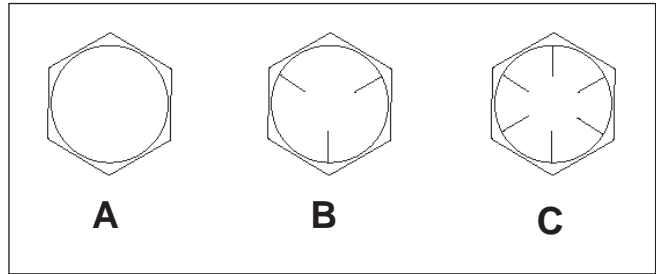
Recommended fastener torque values are listed in the following tables. For critical applications, as determined by Toro, either the recommended torque or a torque that is unique to the application is clearly identified and specified in the service manual.

These torque specifications for the installation and tightening of fasteners shall apply to 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 (e.g. 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.

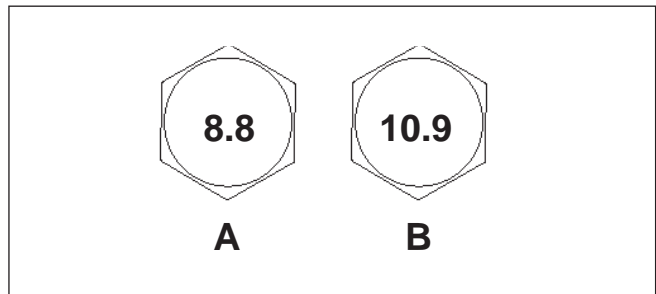
The standard method of verifying torque shall be performed by marking a line on the fastener (head or nut) and mating part, then back off fastener 1/4 of a turn. Measure the torque required to tighten the fastener until the lines match up.

Fastener Identification



Inch Series Bolts and Screws

- (A) Grade 1 & 2
- (B) Grade 5
- (C) Grade 8



Metric Bolts and Screws

- (A) Class 8.8
- (B) Class 10.9

SPECIFICATIONS AND MAINTENANCE

Standard Torque Values (Inch)

Thread Size	Grade 1, 5, & 8 with Thin Height Nuts	SAE Grade 1 Bolts		SAE Grade 5 Bolts		SAE Grade 8 Bolts	
		In-lb	N-cm	In-lb	N-cm	In-lb	N-cm
1/4-20 UNC		48 ± 7	53 ± 7	100 ± 10	1125 ± 100	140 ± 15	1580 ± 170
1/4-28 UNF		53 ± 7	65 ± 10	115 ± 10	1300 ± 100	160 ± 15	1800 ± 170
5/16-18 UNC		115 ± 15	105 ± 15	200 ± 25	2250 ± 280	300 ± 30	3390 ± 340
5/16-24 UNF		138 ± 17	128 ± 17	225 ± 25	2540 ± 280	325 ± 30	3670 ± 340
		ft-lb	N-m	ft-lb	N-m	ft-lb	N-m
3/8-16 UNC		16 ± 2	22 ± 3	30 ± 3	41 ± 4	43 ± 4	58 ± 5
3/8-24 UNF		17 ± 2	24 ± 3	35 ± 3	47 ± 4	50 ± 4	68 ± 5
7/16-14 UNC		27 ± 3	37 ± 4	50 ± 5	68 ± 7	70 ± 7	95 ± 9
7/16-20 UNF		29 ± 3	39 ± 4	55 ± 5	75 ± 7	77 ± 7	104 ± 9
1/2-13 UNC		30 ± 3	65 ± 9	75 ± 8	102 ± 11	105 ± 10	142 ± 14
1/2-20 UNF		32 ± 3	72 ± 9	85 ± 8	115 ± 11	120 ± 10	163 ± 14
5/8-11 UNC		65 ± 10	119 ± 16	150 ± 15	203 ± 20	210 ± 20	285 ± 27
5/8-18 UNF		75 ± 10	129 ± 20	170 ± 15	230 ± 20	240 ± 20	325 ± 27
3/4-10 UNC		93 ± 12	190 ± 27	265 ± 25	359 ± 34	374 ± 35	508 ± 47
3/4-16 UNF		115 ± 15	224 ± 34	300 ± 25	407 ± 34	420 ± 35	569 ± 47
7/8-9 UNC		140 ± 20	305 ± 34	430 ± 45	583 ± 61	600 ± 60	813 ± 81
7/8-14 UNF		155 ± 25	353 ± 41	475 ± 45	644 ± 61	660 ± 60	895 ± 81

Standard Torque Values (Metric Fasteners)

Thread Size	Class 8.8 Bolts		Class 10.9 Bolts	
	in-lb	N-m	in-lb	N-m
M5 X 0.8	57 ± 5 in-lb	644 ± 68 N-m	78 ± 8 in-lb	881 ± 90 N-m
M6 X 1.0	96 ± 10 in-lb	1085 ± 113 N-m	133 ± 14 in-lb	1503 ± 158 N-m
M8 X 1.25	19 ± 2 ft-lb	26 ± 3 N-m	28 ± 3 ft-lb	38 ± 4 N-m
M10 X 1.5	38 ± 4 ft-lb	52 ± 5 N-m	54 ± 6 ft-lb	73 ± 8 N-m
M12 X 1.75	66 ± 7 ft-lb	90 ± 10 N-m	93 ± 10 ft-lb	126 ± 14 N-m
M16 X 2.0	166 ± 15 ft-lb	225 ± 23 N-m	229 ± 23 ft-lb	310 ± 31 N-m
M20 X 2.5	325 ± 33 ft-lb	440 ± 45 N-m	450 ± 36 ft-lb	610 ± 62 N-m

INCH/METRIC 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®.

INCH/METRIC NOTE: 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.

INCH/METRIC NOTE: 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 height nuts include jam nuts.

METRIC NOTE: 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.

SPECIFICATIONS AND MAINTENANCE

Other Torque Specifications

SAE Grade 8 Steel Set Screws

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

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
3/8 - 16 UNC	35 ± 10 ft-lb	18 ± 3 ft-lb
1/2 - 13 UNC	75 ± 15 ft-lb	50 ± 10 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)

Thread 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 nonlubricated fasteners.

Conversion Factors

in-lb x 11.2985 = N-cm	N-cm x 0.08851 = in-lb 88 ± 14 N-m
ft-lb x 1.3558 = N-m	N-cm x 0.73776 = ft-lb 108 ± 14 N-m

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/Sq. In.	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 32° 2. Multiply by 5/9

SPECIFICATIONS AND MAINTENANCE

Equivalents & Conversions

Decimal & Millimeter Equivalents

Fractions	Decimals	mm
1/64	0.015625	0.397
1/32	0.03125	0.794
3/64	0.046875	1.191
1/16	0.0625	1.588
5/64	0.078125	1.984
3/32	0.9375	2.381
1/8	0.1250	3.175
9/64	0.140625	3.572
5/32	0.15625	3.969
11/64	0.171875	4.366
3/16	0.1875	4.762
13/64	0.203125	5.159
7/32	0.21875	5.556
15/64	0.234375	5.953
1/4	0.2500	6.350
17/64	0.265625	6.747
9/32	0.28125	7.144
19/64	0.296875	7.541
5/16	0.3125	7.938
21/64	0.328125	8.334
11/32	0.34375	8.731
23/64	0.359375	9.128
3/8	0.3750	9.525
25/64	0.390625	9.922
13/32	0.40625	10.319
27/64	0.421875	10.716
7/16	0.4375	11.112
29/64	0.453125	11.509
15/32	0.46875	11.906
31/64	0.484375	12.303
1/2	0.5000	12.700
1 mm = 0.03937 in.		

Fractions	Decimals	mm
33/64	0.515625	13.097
16/32	0.53125	13.484
35/64	0.546875	13.891
9/16	0.5625	14.288
37/64	0.578125	14.684
19/32	0.59375	15.081
5/8	0.6250	15.875
41/64	0.640625	16.272
21/32	0.65625	16.669
43/64	0.671875	17.066
11/16	0.6875	17.462
45/64	0.703125	17.859
23/32	0.71875	18.256
47/64	0.734375	18.653
3/4	0.7500	19.050
49/64	0.765625	19.447
25/32	0.78125	19.844
51/64	0.796875	20.241
13/16	0.8125	20.638
53/64	0.828125	21.034
27/32	0.84375	21.431
55/64	0.859375	21.828
7/8	0.8750	22.225
57/64	0.890625	22.622
29/32	0.90625	23.019
59/64	0.921875	23.416
15/16	0.9375	23.812
61/64	0.953125	24.209
31/32	0.96875	24.606
63/64	0.984375	25.003
1	1.000	25.400
0.001 in. = 0.0254mm		

SPECIFICATIONS AND MAINTENANCE

Maintenance

Note: Determine the left and right sides of the machine from the normal operating position.

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first hour	<ul style="list-style-type: none">• Check for loose fasteners and tighten them if necessary.
After the first 2 hours	<ul style="list-style-type: none">• Change the engine oil.• Inspect the auger cable and adjust it if necessary.• Inspect the transmission cable and adjust it if necessary.
Before each use or daily	<ul style="list-style-type: none">• Check the engine oil level and add oil if necessary.
Every 100 hours	<ul style="list-style-type: none">• Replace the spark plug.
Yearly	<ul style="list-style-type: none">• Check the skids and adjust them if necessary.• Inspect the throwing edges and have an Authorized Service Dealer replace the throwing edges and scraper if necessary.• Change the engine oil.• Inspect the auger cable and adjust it if necessary.• Inspect the transmission cable and adjust it if necessary.• Check the tire pressure.• Check for loose fasteners and tighten them if necessary.• Have an Authorized Service Dealer inspect the drive belt and replace it if necessary.
Yearly or before storage	<ul style="list-style-type: none">• Prepare the machine for storage.

Maintenance Safety

Read the following safety precautions before performing any maintenance on the machine:

- Before performing any maintenance, service, or adjustment, stop the engine and remove the key. If major repairs are ever needed, contact an Authorized Service Dealer.
- Check all fasteners at frequent intervals for proper tightness to be sure the machine is in safe working condition.
- Maintain or replace safety and instruction labels, as necessary.
- Do not change the governor settings on the engine.
- Purchase only genuine Toro replacement parts and accessories.

- If the oil level is below the full mark on the dipstick (Figure 1), add oil.
- If the oil level is above the Full mark, drain the excess oil until the oil level is at the Full mark.

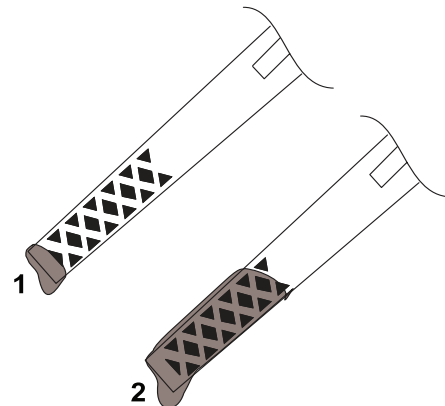


Figure 1

1. Low oil level—add oil 2. Correct oil level

Checking the Engine Oil Level

Service Interval: Before each use or daily

1. Remove the dipstick, wipe it clean, then fully insert the dipstick **without threading it in**.
2. Remove the dipstick and check the oil level.

SPECIFICATIONS AND MAINTENANCE

Checking and Adjusting the Skids

Service Interval: Yearly

Check the skids to ensure that the auger does not contact the paved surface. Adjust the skids as needed to compensate for wear (Figure 2).

1. Loosen the skid bolts.
2. Slide a 5 mm (3/16 inch) board underneath the scraper.

Note: Using a thinner board will result in a more aggressive scraper. A thicker board will result in a less aggressive scraper.

3. Lower the skids to the ground.

Note: Ensure the skids are flat on the ground.

4. Tighten the skid bolts.

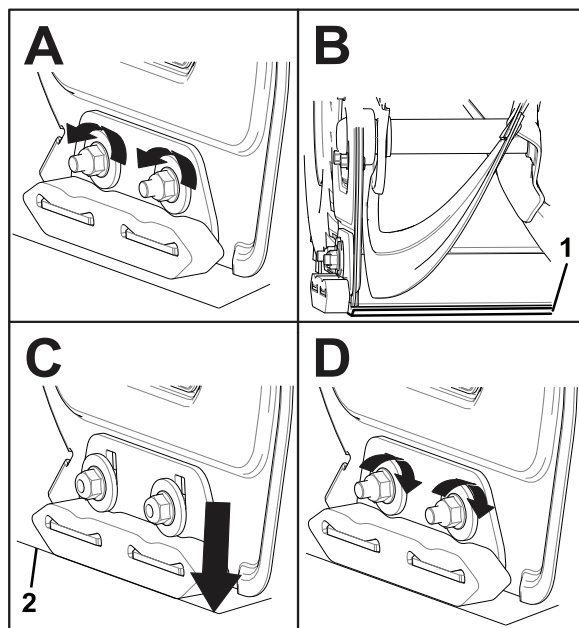
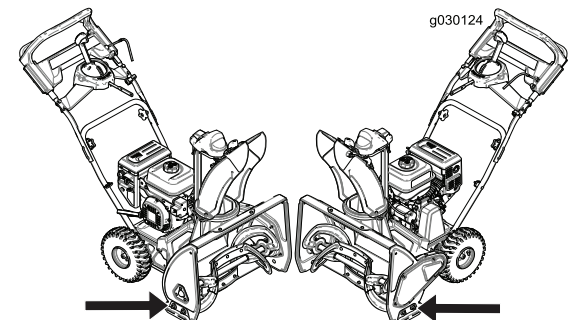


Figure 2

1. 5 mm (3/16 inch) board
2. Ground

Inspecting the Throwing Edges

Service Interval: Yearly—Inspect the throwing edges and have an Authorized Service Dealer replace the throwing edges and scraper if necessary.

Before each session, inspect the throwing edges for wear. When a throwing edge has worn down to the wear indicator hole, have an Authorized Service Dealer replace the throwing edges (Figure 3).

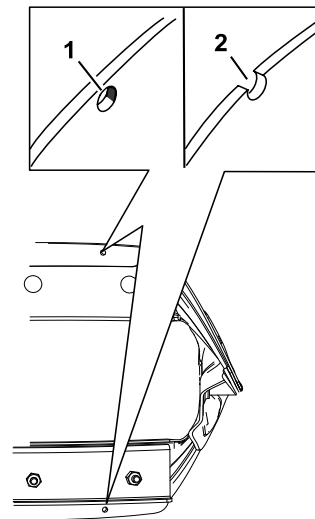


Figure 3

1. The wear indicator hole is intact; you do not need to replace the throwing edges.
2. The wear indicator hole is exposed; replace both throwing edges.

Changing the Engine Oil

Service Interval: After the first 2 hours

Yearly

Run the engine a few minutes before changing the oil to warm it. Warm oil flows better and carries more contaminants.

1. Move the machine to a level surface.
2. Place an oil drain pan under the oil-drain plug, remove the oil-drain plug, and tip the machine backward and drain the used oil in the oil-drain pan (Figure 4).

SPECIFICATIONS AND MAINTENANCE

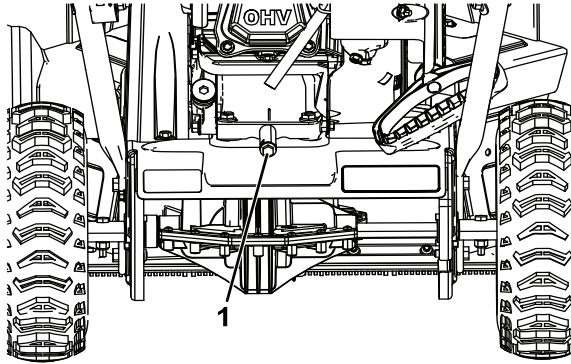


Figure 4

1. Oil-drain plug

3. After draining the used oil, return the machine to the operating position.
4. Install the oil drain plug and tighten it securely.
5. Clean around the oil fill cap.
6. Use Figure 5 below to select the best oil viscosity for the outdoor temperature range expected:

Model	Max fill
36001, 36002, 38710, 38711	0.5 L (16.9 oz)
36003, 38712	0.7 L (23.7 oz)

Oil type: automotive detergent oil with an API service classification of SJ, SL, or higher.

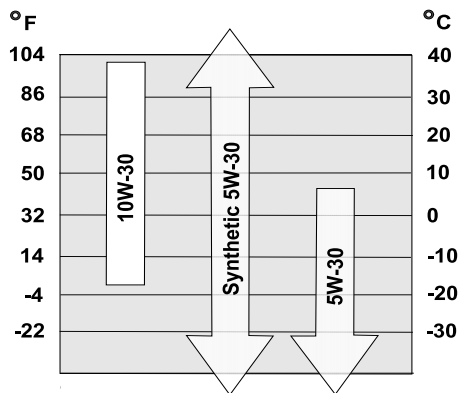


Figure 5

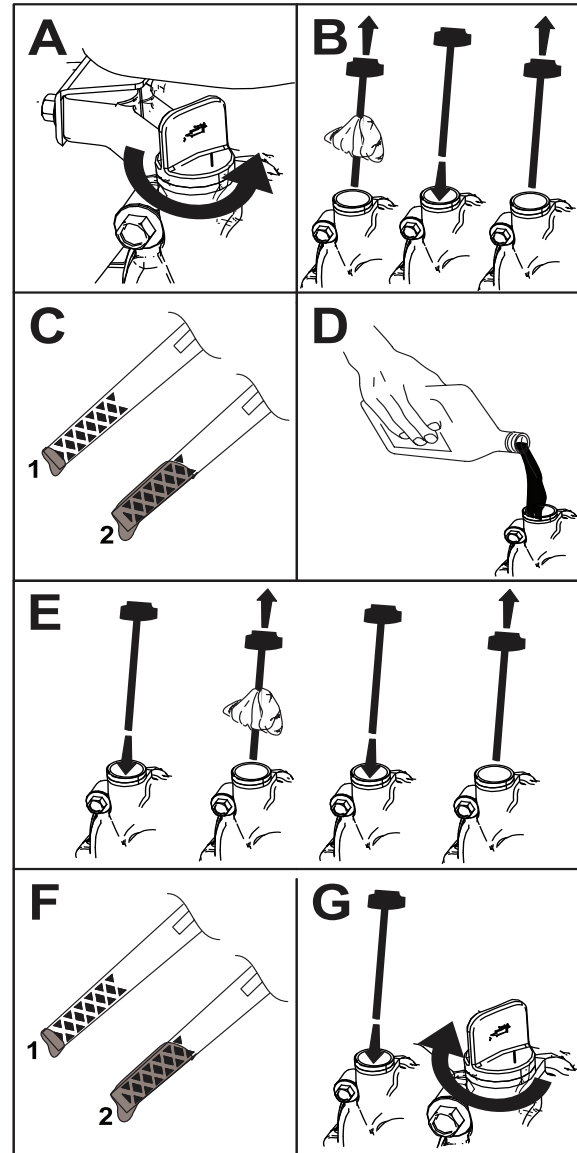
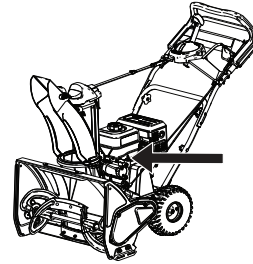


Figure 6

1. Low oil level—add oil
2. Correct oil level

SPECIFICATIONS AND MAINTENANCE

Replacing the Spark Plug

Service Interval: Every 100 hours—Replace the spark plug.

⚠ WARNING

Replacing the spark plug while the engine is hot can result in burns.

Wait until the engine is cool to replace the spark plug.

Use a Toro spark plug or equivalent (Champion® RN9YC or NGK BPR6ES).

1. Remove the boot (Figure 7).

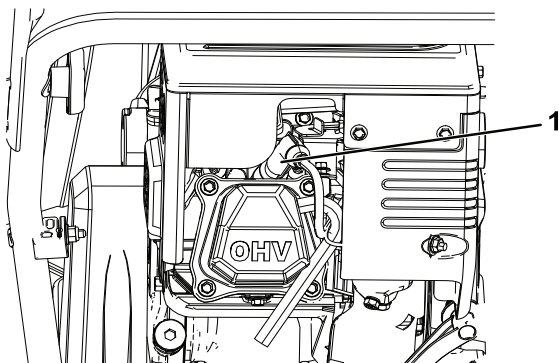


Figure 7

2. Clean around the base of the spark plug.
3. Remove and discard the old spark plug.
Note: You will need a ratchet wrench extension to remove the spark plug.
4. Set the gap between the electrodes on a new spark plug at 0.76 mm (0.030 inch) (Figure 8).

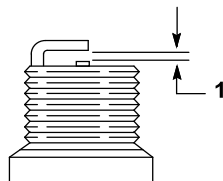


Figure 8

1. 0.76 mm (0.030 inch)

Adjusting the Auger Cable

Service Interval: After the first 2 hours

Yearly

If the drive belt slips or squeals under heavy load, adjust the auger cable.

1. Loosen the nut on the lower cable clamp, but do not remove it (Figure 9).

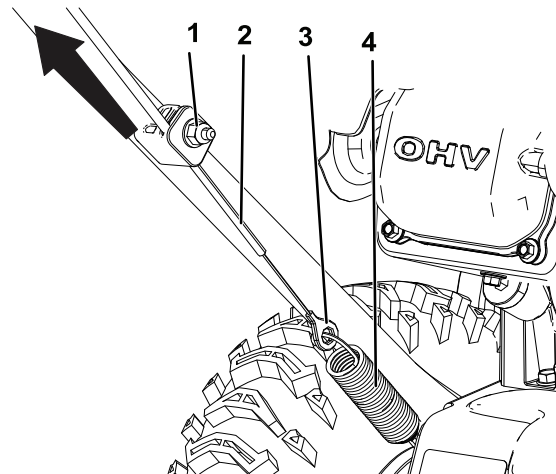


Figure 9

- | | |
|----------|--------------|
| 1. Nut | 3. Connector |
| 2. Cable | 4. Spring |

2. Pull the cable up to remove some slack (Figure 9).

Important: Do not remove all the slack from the cable. Removing all the slack from the cable will prevent the auger from stopping properly.

3. Hold the cable in place and tighten the nut (Figure 9).

Adjusting the Transmission Cable

Service Interval: After the first 2 hours

Yearly

If the wheels easily stall out, or if the wheels drive without engaging the self-propel handle, adjust the transmission cable.

1. Loosen the nut on the upper cable clamp, but do not remove it (Figure 10).

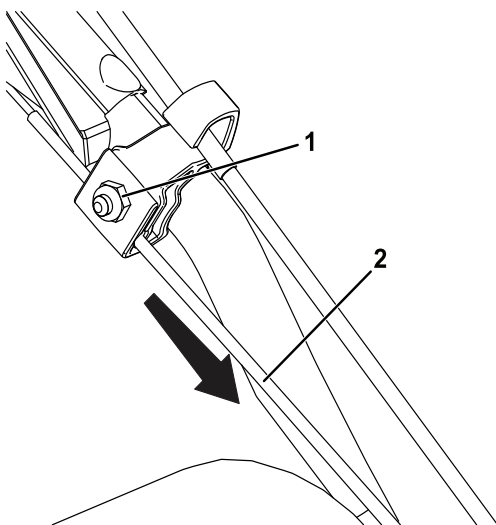


Figure 10

1. Nut 2. Cable

2. Pull the cable down to remove most of the slack in the cable (Figure 10).

Important: Do not remove all the slack from the cable. Removing all the slack from the cable may cause the wheels to engage without engaging the self-propel handle.

3. Tighten the nut (Figure 10).

Checking the Tire Pressure

Service Interval: Yearly

Set the tire pressure equally in both tires to between 103 and 137 kPa (15 and 20 psi).

SPECIFICATIONS AND MAINTENANCE

Storage

Storing the Snowthrower

⚠ WARNING

- Gasoline fumes are highly flammable, explosive, and dangerous if inhaled. If you store the machine in an area with an open flame, the gasoline fumes may ignite and cause an explosion.
 - Do not store the machine in a house (living area), basement, or any other area where ignition sources may be present, such as hot water and space heaters, clothes dryers, furnaces, and other like appliances.
 - Do not tip the machine backward with fuel in the fuel tank; otherwise, fuel may leak out of the machine.
1. On the last refueling of the season, add fuel stabilizer to fresh fuel as directed by the engine manufacturer.
 2. Run the engine for 10 minutes to distribute the conditioned fuel through the fuel system.
 3. Stop the engine, allow it to cool, and siphon the fuel tank or run the engine until it stops.
 4. Start the engine and run it until it stops.
 5. Choke or prime the engine, start it a third time, and run the engine until it will not start.
 6. Drain the fuel in the carburetor through the carburetor drain bolt into an approved gasoline container.
 7. Dispose of unused fuel properly. Recycle it according to local codes, or use it in your automobile.
 8. While the engine is still warm, change the engine oil.
 9. Remove the spark plug.
 10. Squirt 2 teaspoons of oil into the spark plug hole.
 11. Install the spark plug by hand and then torque it to 27–30 N-m (20–22 ft-lb).
 12. With the ignition key in the Off position, pull the recoil starter slowly to distribute the oil on the inside of the cylinder.
 13. Clean the machine.
 14. Touch up chipped surfaces with paint available from an Authorized Service Dealer. Sand affected areas before painting, and use a rust preventative to prevent the metal parts from rusting.
 15. Tighten any loose fasteners. Repair or replace any damaged parts.
 16. Cover the machine and store it in a clean, dry place out of the reach of children. Allow the engine to cool before storing it in any enclosure.

Handles and Controls

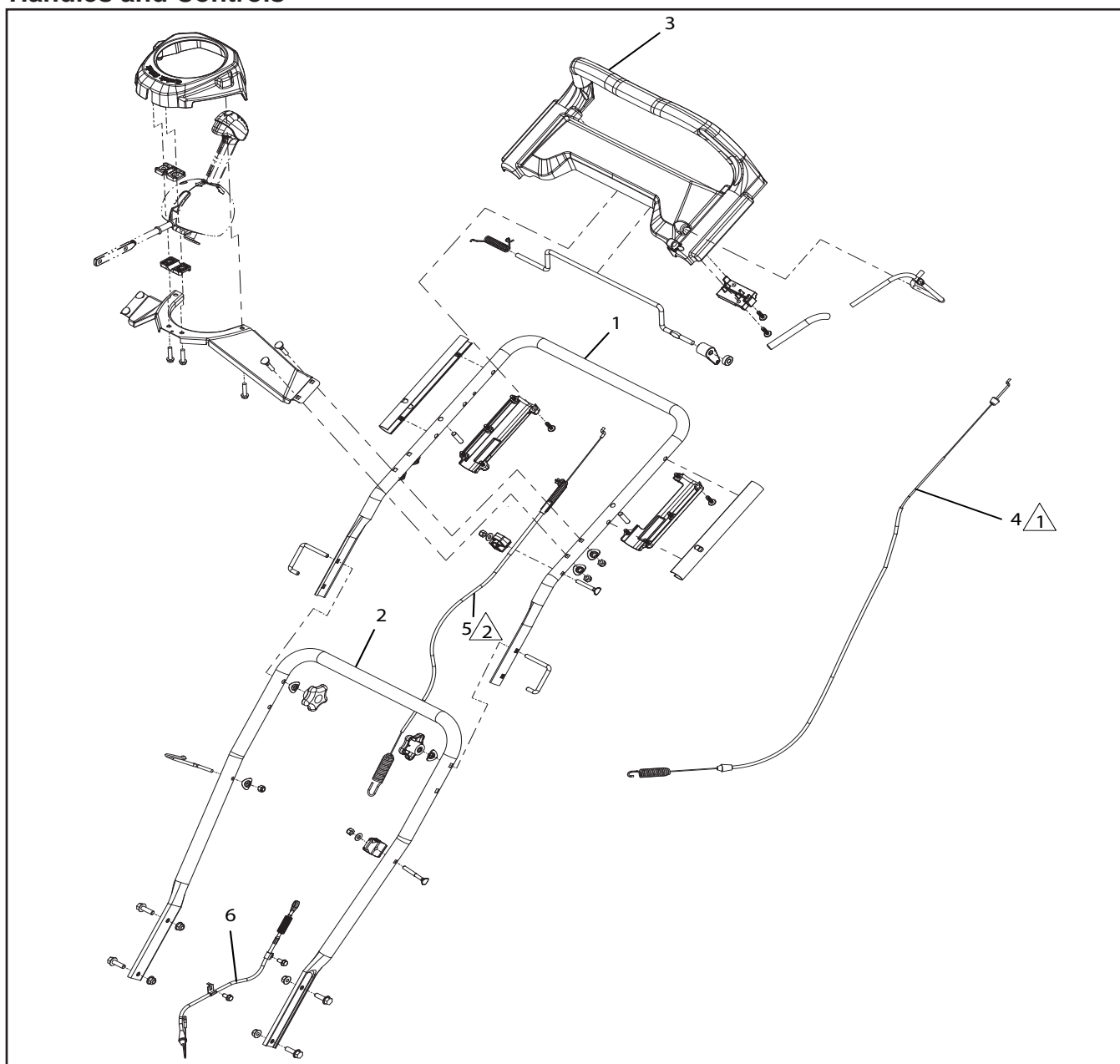


Figure 11

- 1. Upper Handle
- 2. Lower Handle
- 3. Personal Pace® Handle
- 4. Transmission Cable
- 5. Upper Rotor Cable
- 6. Lower Rotor Cable

1 All slack must be removed from the traction cable before cable is secured. Transmission cable to be adjusted so $2.50 \pm .05$ in. of conduit sticks out past cable anchor. Rear wheels should spin freely in both forward and reverse without Personal Pace® engagement and should lock with Personal Pace® engagement.

2 Rotor cable is to be adjusted so $1.00 \pm .05$ in. of conduit sticks out past cable anchor. Ensure there is slack in cable after adjustment to ensure brake still functions.

CHASSIS

Engine

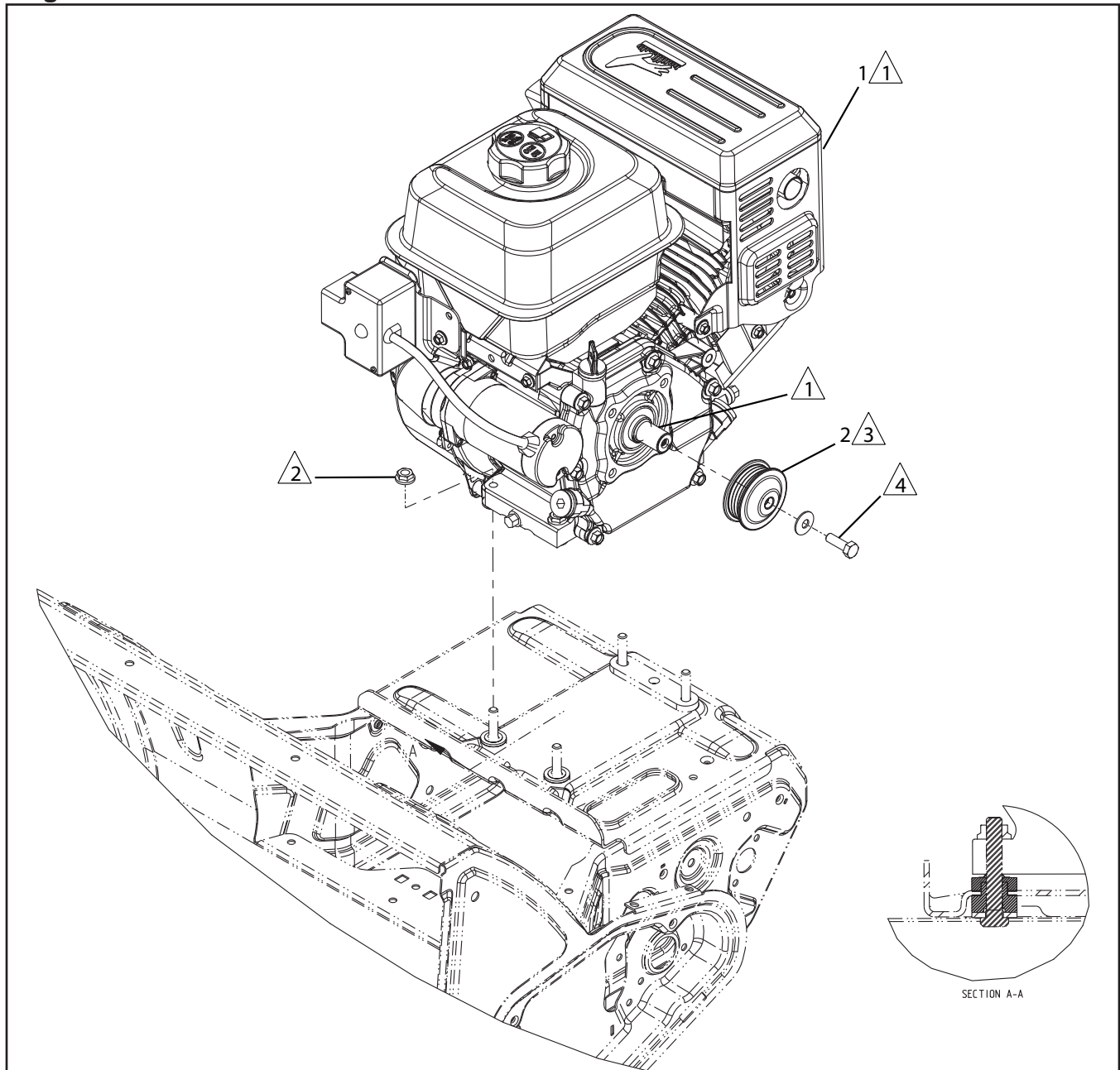


Figure 12

- 1. Engine
- 2. Engine Pulley

3 Pulley grooves, item 2, need to be dry and free of oil, anti-seize or other lubricants.

1 Apply a light coat of anti-seize to engine crankshaft, before installing engine pulley.

4 Torque engine pulley bolt to 170 ± 15 in-lbs. (19.5 ± 1.7 Nm) When inspecting the proper torque, torque must be checked immediately before Loctite® 243 sets up.

2 Apply Loctite® 243 to the threads of the engine mounting studs.

Chute Asm.

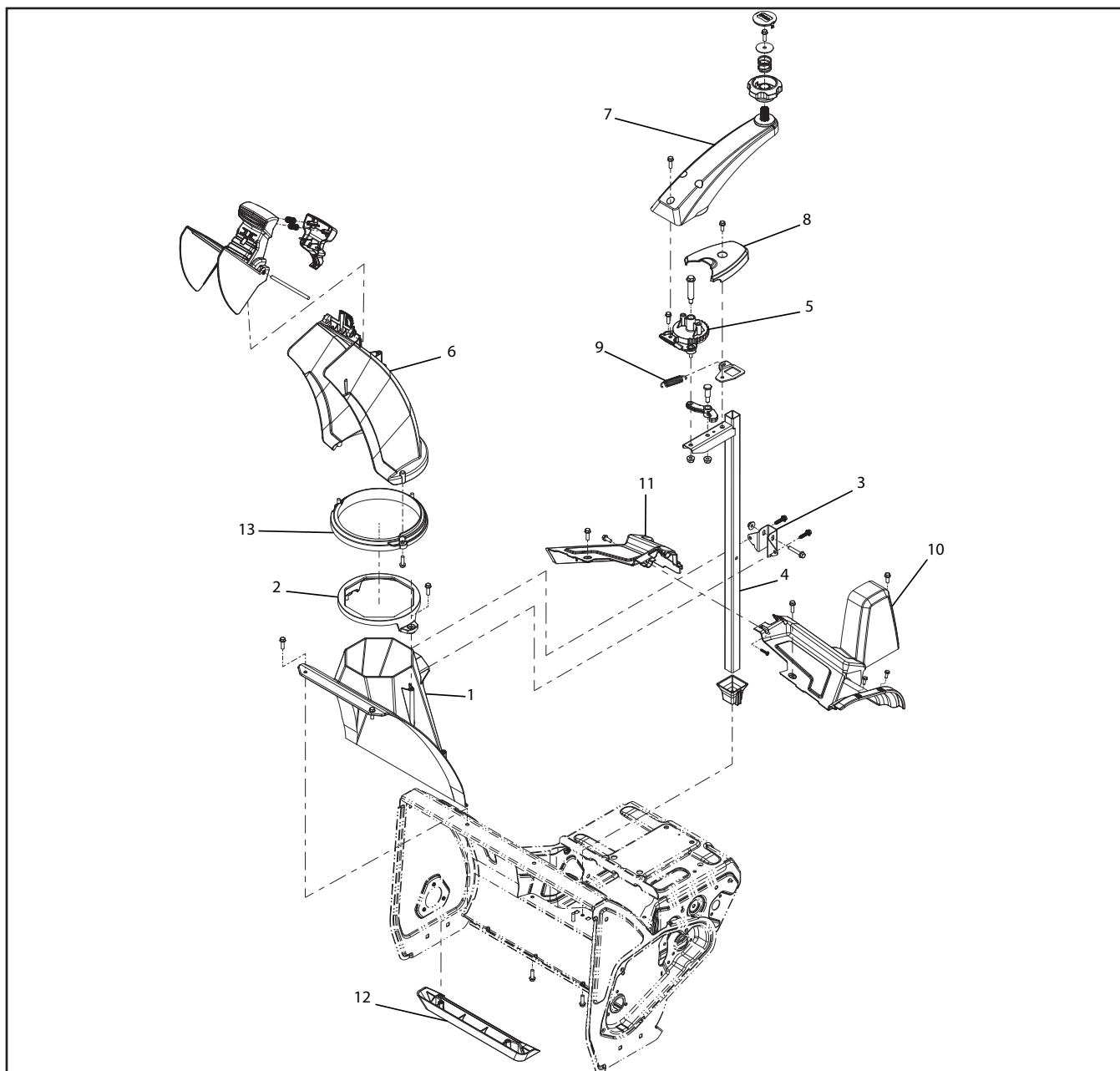


Figure 13

- 1. Lower Chute
- 2. Chute Guide
- 3. Chute Support Tube Bracket
- 4. Chute Post
- 5. Chute Gear
- 6. Chute

- 7. Chute Handle
- 8. Spring Cover
- 9. Extension Spring
- 10. LH Upper Shroud
- 11. RH Lower Shroud
- 12. Housing Kicker
- 13. Chute Ring

CHASSIS

Chute Asm.

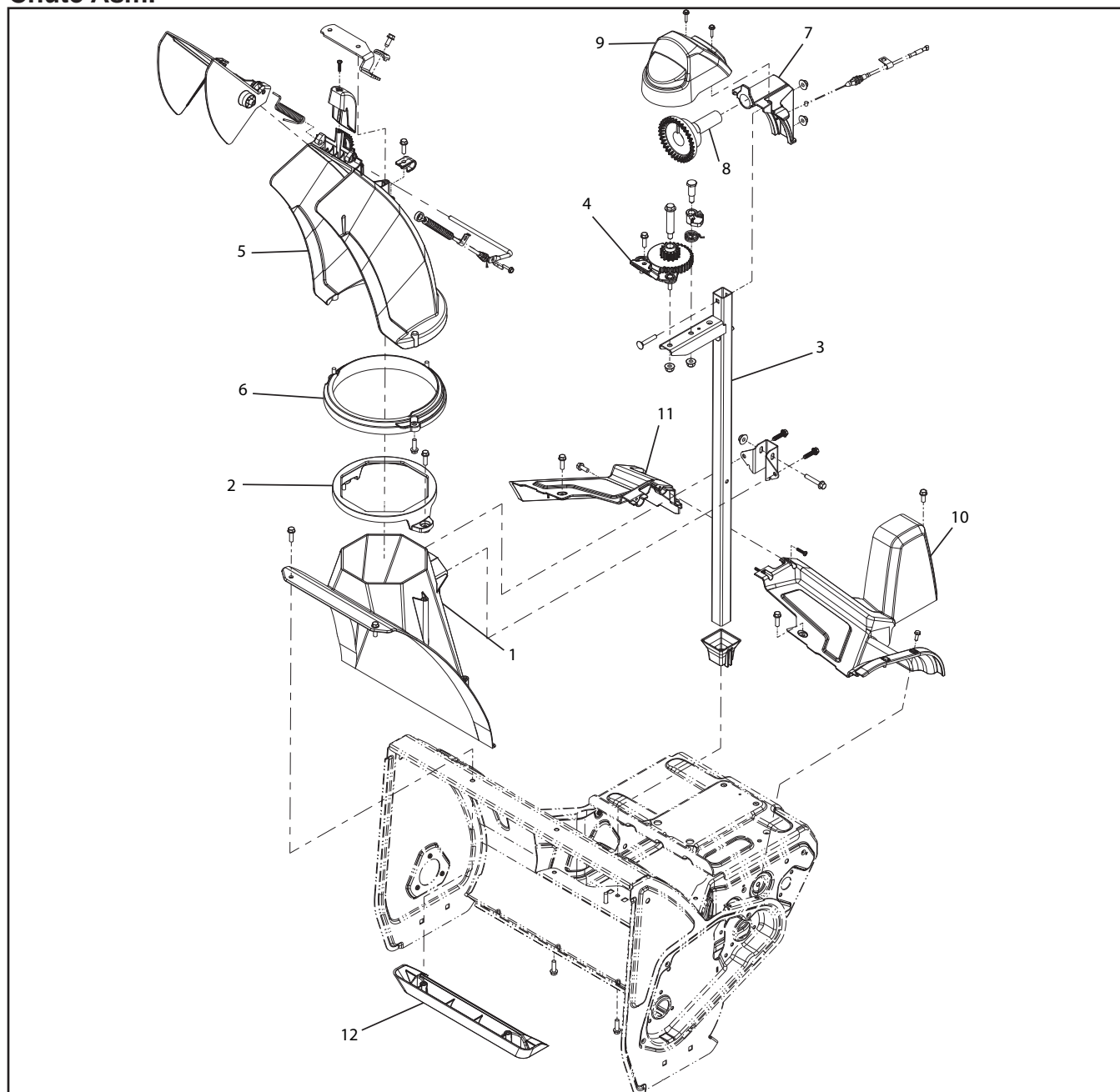


Figure 14

- 1. Lower Chute
- 2. Chute Guide
- 3. Chute Post
- 4. Chute Gear
- 5. Chute
- 6. Chute Ring

- 7. Gear Chute Mount
- 8. Face Gear
- 9. Gear Chute Cover
- 10. LH Upper Shroud
- 11. RH Lower Shroud
- 12. Housing Kicker

Chute and Shroud Removal & Replacement (Figure 13 and 14)

Removal

1. Remove RH (item 11) and LH (item 10) upper shrouds..
2. Remove the bolt and nut attaching the chute post (Figure 13) (item 4). Remove the post and chute assembly.

NOTE: Must remove the quick stick rod and deflector cable clamp on the side of the frame on QS models prior to removing the chute assembly.

3. Remove the screws that hold the lower chute (item 1) to the housing kicker. (item 12)
4. Tip the unit forward. Remove the lower chute (item 1) bottom screws (Figure 15).



Figure 15

5. Remove the lower chute (item 1) from the unit.

Replacement

1. Install the lower chute (item 1). Install the lower chute bottom screws and the screws that hold the lower chute to the housing kicker (item 12). Torque screws to 25-35 in-lbs. (2.8-4 Nm) (Figure 16).



Figure 16

2. Install the chute post (item 3) and chute assembly. Torque to 60 in-lbs. (7 Nm) (Figure 17).

NOTE: Must insert the quick stick rod and deflector cable clamp on the side of the frame on the QS models prior to installing the chute assembly.



Figure 17

3. Install the RH (item 11) and LH (item 10) upper shrouds. Torque screws to 25-35 in-lbs. (2.8-4 Nm).

CHASSIS

Belt Removal & Replacement

Removal

1. Remove the bolts securing the belt cover and remove the cover (Figure 18).



Figure 18

2. Unhook the brake spring clip and remove the clip and spring.
3. Remove the Rotor Pulley bolt and pull the Rotor Pulley out (Figure 19).



Figure 19

4. Work the belt off the jackshaft pulley, remove rotor pulley and belt.

Replacement

1. Start the belt over the jackshaft pulley. Route the belt under the idler pulley and between the tabs on the rotor clutch arm. Route the belt over the rotor pulley (Figure 20).



Figure 20

2. Slide the rotor pulley onto the rotor shaft. Apply loctite® 243 to the bolt, install the washer and bolt. Torque to 96 in-lbs. (11 Nm) (Figure 21).



Figure 21

3. Install the belt cover. Torque bolt to 60-80 in-lbs. (7-9 Nm).

NOTE: Match the orientation of rotor pulley with the above image to prevent putting rotor pulley on backwards.

Rotor and Rotor Drive

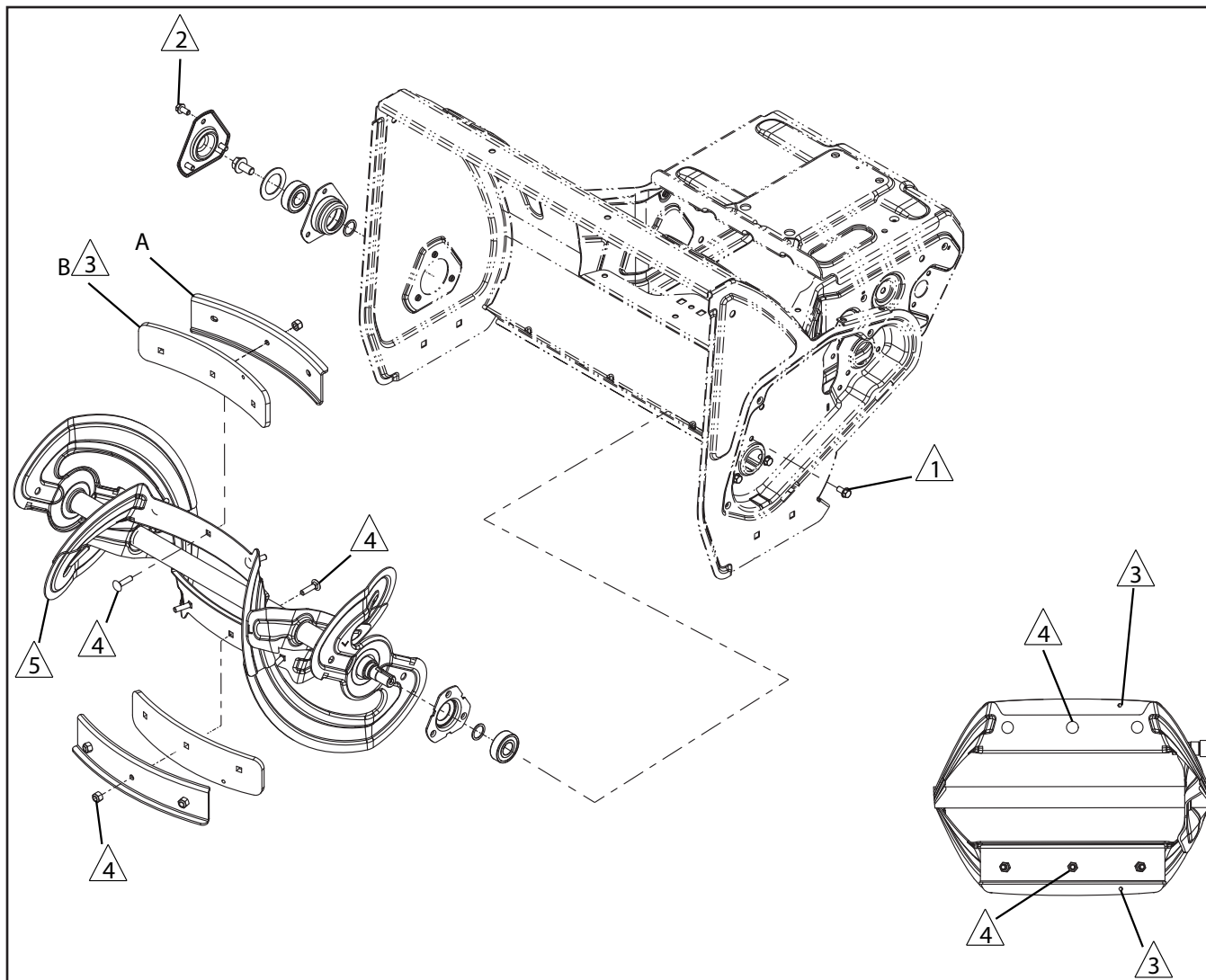


Figure 22

A. Rotor Center Support
B. Paddle

1 Torque to 60-80 in-lbs. (7-9 Nm)

2 Torque to 40-60 in-lbs. (4-7 Nm)

3 Paddles, item B, should be assembled with wear indicator holes in positions shown, when viewed from front.

4 Tighten center screw first when assembling rotor paddles. Torque to 45-55 in-lbs.

5 Insure rotor assembly, rotates freely after completely installed in frame. Rotor cannot make contact with frame or ground surface.

CHASSIS

Rotor Removal & Replacement (Figure 22)

Removal

1. Remove the belt cover and remove belt and rotor pulley as outlined in “Belt Removal & Replacement.”
2. Remove the three bolts from behind the rotor pulley.



Figure 23

3. On the opposite side, remove the three bolts on the bearing cap.
4. Remove the bearing bolt. Remove the bearing and bearing retainer, rubber washer, and thrust washer.



Figure 24

5. Slide the rotor one way and remove.

Replacement

1. Make sure the thrust washer, bearing, and bearing retainer are on the rotor shaft on the drive belt side. Insert into the rotor hole. Insert the rotor through the other side of the rotor hole.



Figure 25

2. Insert the thrust washer, bearing retainer and bearing. Install the bolt. Torque bolt to 30 ft-lbs. (40 Nm).



Figure 26

Rotor Removal & Replacement (Figure 22)(Cont.)

Replacement (Cont.)

3. Install the rubber washer and bearing cap. Ensure the rubber washer is properly positioned before installing the bearing cap. Torque bolts to 40-60 in-lbs. (4.6-7 Nm).
4. Install the bolts that go behind the rotor pulley. Torque to 60-80 in-lbs. (7-9 Nm).
5. Install the rotor belt and belt cover as outlined in "Belt Removal & Replacement."

CHASSIS

Transmission, Drive and Tire

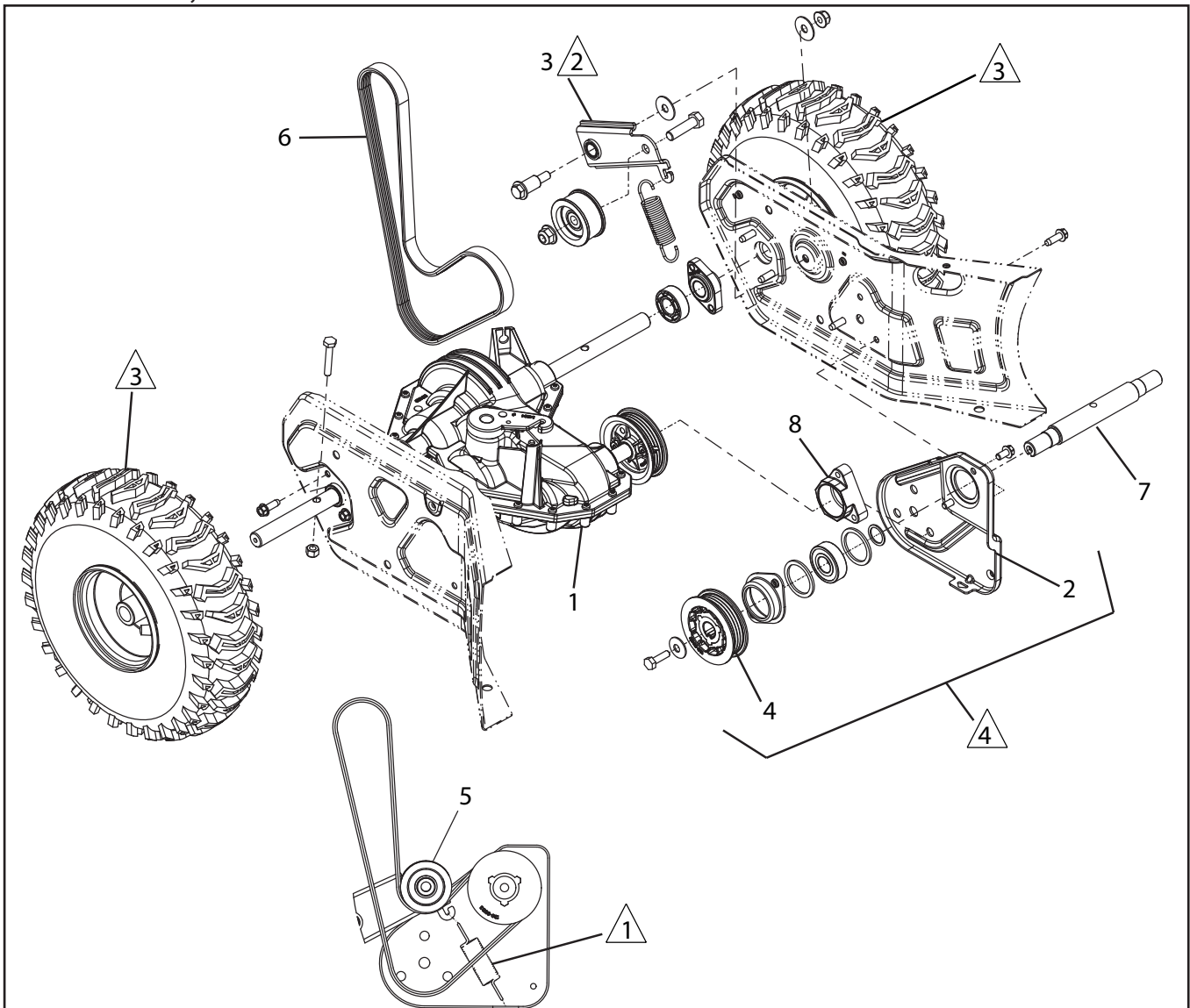


Figure 27

1. Transmission
2. Jackshaft Support Plate
3. Traction Idler
4. Jackshaft Pulley
5. Idler Pulley
6. Belt
7. Jackshaft
8. Transmission Bearing Support

1 Spring must be assembled into the slot of the traction idler arm and hole in jackshaft support plate.

2 Ensure idler arm, pivots freely after assembly.

3 Tire and wheel assemblies, should be assembled so the tire tread is going in the correct direction.

4 Assemble items to jackshaft support plate. Then pass jackshaft assembly through bearing in the left side of the frame then assemble rotor jackshaft pulley to jackshaft. Install transmission bearing support after jackshaft assembly is tightened to left hand side plate. Insure pulley and shaft rotate freely after assembled.

Transmission Cable Removal and Replacement Figure 27)

Removal

1. Remove the LH upper shroud. Remove the belt cover.
2. Remove the cable end from its retainer (Figure 28).



Figure 28

3. Remove the bolt from inside the belt cover (Figure 29).



Figure 29

4. Remove the two bolts holding the cable to the chassis (Figure 30).



Figure 30

5. Remove cable from the spring.

CHASSIS

Transmission Cable Replacement (Cont.)

Replacement

1. Place the looped end of the cable on the spring (Figure 31)..



Figure 31

2. Install the two bolts holding the cable to the chassis. Torque bolts to 60-80 in.-lbs. (7-9 Nm) (Figure 32).



Figure 32

3. Insert the bolt through the bolt holes from inside the belt cover into the bracket. Tighten bolts to 60-80 in.-lbs. (7-9 Nm) (Figure 33).



Figure 33

4. Insert the cable end into its retainer (Figure 34).



Figure 34

5. Install the LH upper shroud and belt cover. Torque shroud bolts to 25-35 in.-lbs. (2.8-4 Nm). Torque cover bolts to 60-80 in.-lbs. (7-9 Nm).

Transmission Removal

Removal

1. Remove the upper shroud. Remove the bolt holding the upper belt cover (Figure 35).



Figure 35

2. Tip blower forward resting the auger housing on a protective mat. Remove the fasteners holding the lower belt cover in place. Remove the cover (Figure 36).



Figure 36

3. Remove the tensioner spring.
4. Remove the wheels from the axles.
5. Slide the transmission to the right. Work the belt over the pulley (Figure 37).



Figure 37

6. Remove the belt from the crankshaft pulley (Figure 38).



Figure 38

7. Slide the belt out.

CHASSIS

Transmission Removal (Cont.)

Removal (Cont.)

8. Remove the bolts that secure the drive shaft bearings and retainers to the housing (Figure 39).



Figure 39

9. Slide the transmission to the right until the left hand axle clears the housing. Lift the transmission up and out. Disconnect the traction cable (Figure 40).

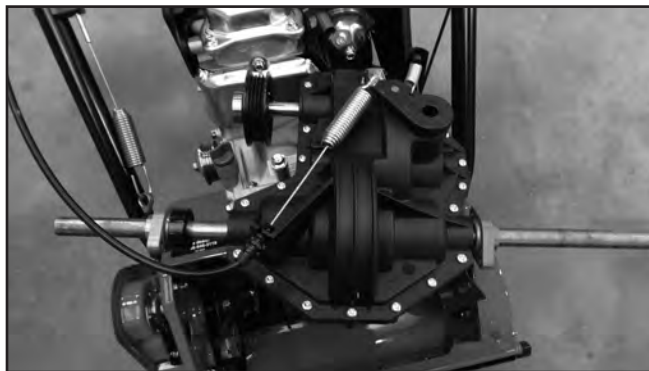


Figure 40

Pulley Removal

Removal

1. Remove the transmission from the unit. Remove the two pulley screws.



Figure 41

2. Using a punch, tap the pin out of the pulley.



Figure 42

3. Slide the pulley back on the shaft.



Figure 43

4. Using a puller, pull the bearing off the shaft. Remove the pulley.



Figure 44

CHASSIS

Pulley Removal (Cont.)

Replacement

1. Clean the shaft of any debris or rust. Slide the new pulley into the shaft.



Figure 45

2. Tap the pulley into position



Figure 46

3. Align the pulley holes with the hole in the shaft.



Figure 47

4. Insert a pin punch into the pulley.



Figure 48

5. Insert the transmission into a vice or clamp to create a solid surface for the pulley to rest on.



Figure 49

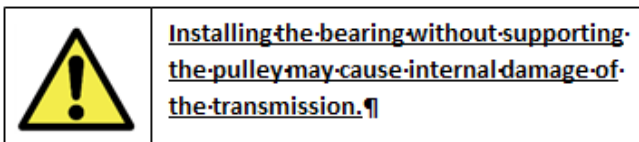
Pulley Removal (Cont.)

Replacement (Cont.)

6. Place bearing on shaft. Using a spacer, tap the bearing in place until the inner race of the bearing is flush with the shaft.



Figure 50



7. Remove the pinch punch. Insert the new pin.



Figure 51

8. Install screws into the pulley to secure the pin into position.



Figure 52

9. Pulley and bearing installation is complete.



Figure 53

CHASSIS

Rotor and Rotor Drive

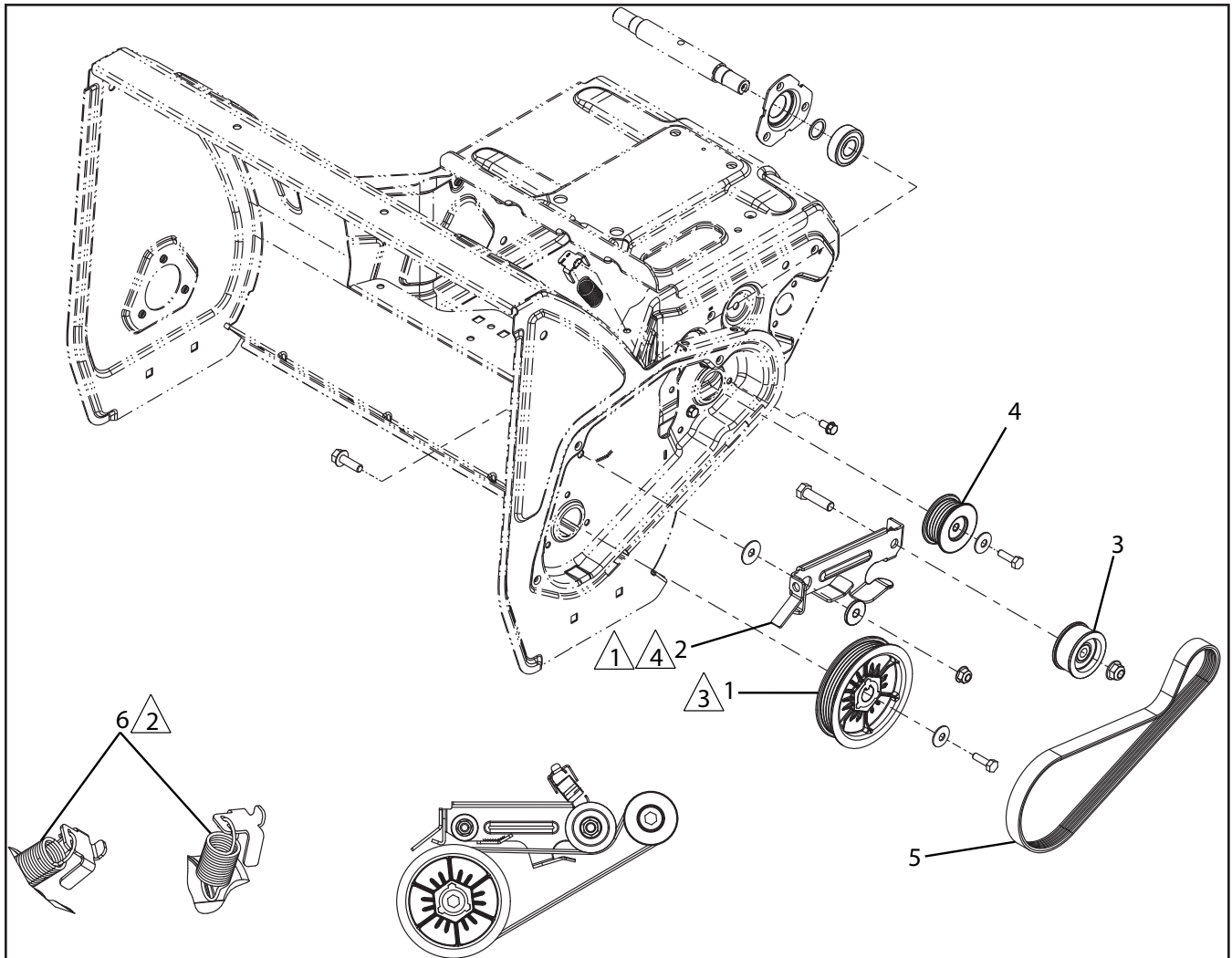


Figure 54

- 1. Rotor-Pulley Asm.
- 2. Rotor Clutch Asm.
- 3. Flat Idler-Pulley
- 4. Rotor Jack shaft-Pulley
- 5. V Poly-Belt
- 6. Extension Spring

⚠ 3 Extended pulley hub must be assembled towards the rotor.

⚠ 4 Ensure idler arm, pivots freely after assembly.

⚠ 1 Lubricate idler arm, on both sides around pivot hole with grease.

⚠ 2 Spring must be assembled as shown, it must pass through both the slot and hole in spring clip.

Jackshaft Removal and Replacement (Figure 54)

Removal

1. Remove the belt covers, belt, and transmission from the unit.
2. Place a screw driver or similar tool through the hole in the jackshaft (Figure 55).



Figure 55

3. Remove the bolt securing the jackshaft/rotor pulley (item 4). Remove the pulley (Figure 56).



Figure 56

4. Inside the housing, remove the bolts securing the other jackshaft pulley (item 4). Remove the pulley (Figure 57).



Figure 57

5. Remove the three bearing retainer bolts from inside the belt housing (Figure 58).



Figure 58

6. Remove the three bearing retainer bolts from the side of the housing. Remove the bearing retainer (Figure 59).



Figure 59

CHASSIS

Jackshaft Replacement (Cont.)

Removal (Cont.)

7. Loosen the tensioner arm bolt. Move the tensioner out of the way (Figure 60).



Figure 60

8. Slide the jackshaft support plate to the right and remove (Figure 61).



Figure 61

Replacement

1. Slide the jackshaft, thrust washer, bearing, and bearing retainer into the chassis, through the hole in the belt cover (Figure 62).



Figure 62

2. Slide the jackshaft support plate, thrust washer, bearing, and bearing retainer onto the jackshaft inside the housing (Figure 63).



Figure 63

Jackshaft Replacement (Cont.)

Replacement (Cont.)

5. Insert a screw drive or similar tool into the hole in the jackshaft. Install the jackshaft/rotor pulley. Apply Loctite® 243 to bolt. Torque to 96 in-lbs. (11 Nm) (Figure 64).



Figure 64

6. Install the other jackshaft pulley. Torque to 96 in-lbs. (11 Nm). Install the lower bearing retainer. Torque to 96 in-lbs. (11 Nm) (Figure 65).



Figure 65

3. Install the mounting bolts. Torque to 96 in-lbs. (11 Nm).

4. Slide the tensioner arm back into position. Torque to 30 ft-lbs. (40 Nm) (Figure 66).



Figure 66

CHASSIS

Transmission Replacement (Cont.)

Replacement

1. Install the traction cable (Figure 67).



Figure 67

2. Slide the bearings and bearing retainers on the drive shafts. Insert the left side axle through the hole in the housing and set the right side axle in the axle slot (Figure 68).

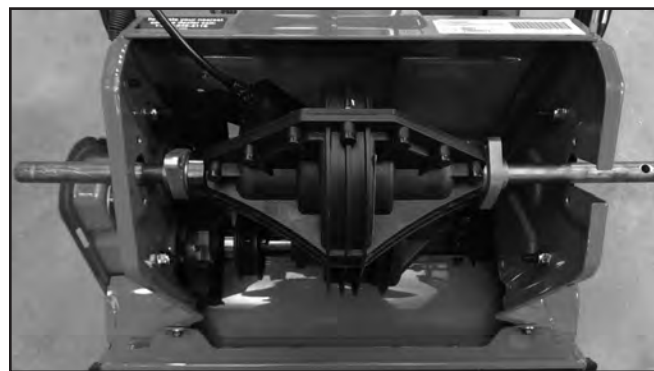


Figure 68

3. Slide the bearing carriers to the housing and install the mounting bolts. Torque bolt to 96 in-lbs. (11 Nm) (Figure 69).



Figure 69

4. Slide the drive belt up through the housing and around the lower pulley (Figure 70).

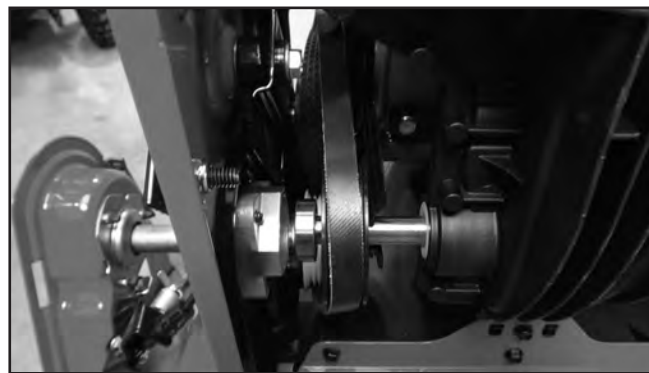


Figure 70

5. Route the belt the correct way and install belt on crankshaft pulley (Figure 71).



Figure 71

Transmission Replacement (Cont.)

Replacement (Cont.)

6. Install the tensioner spring. Check for proper belt routing and tension (Figure 72).



Figure 72

7. Install the belt covers and install all mounting bolts.
8. Install the wheels. Add anti-seize to lock wheels.
9. Replace all shrouds, the drive belt and cover.

CHASSIS

Main Frame

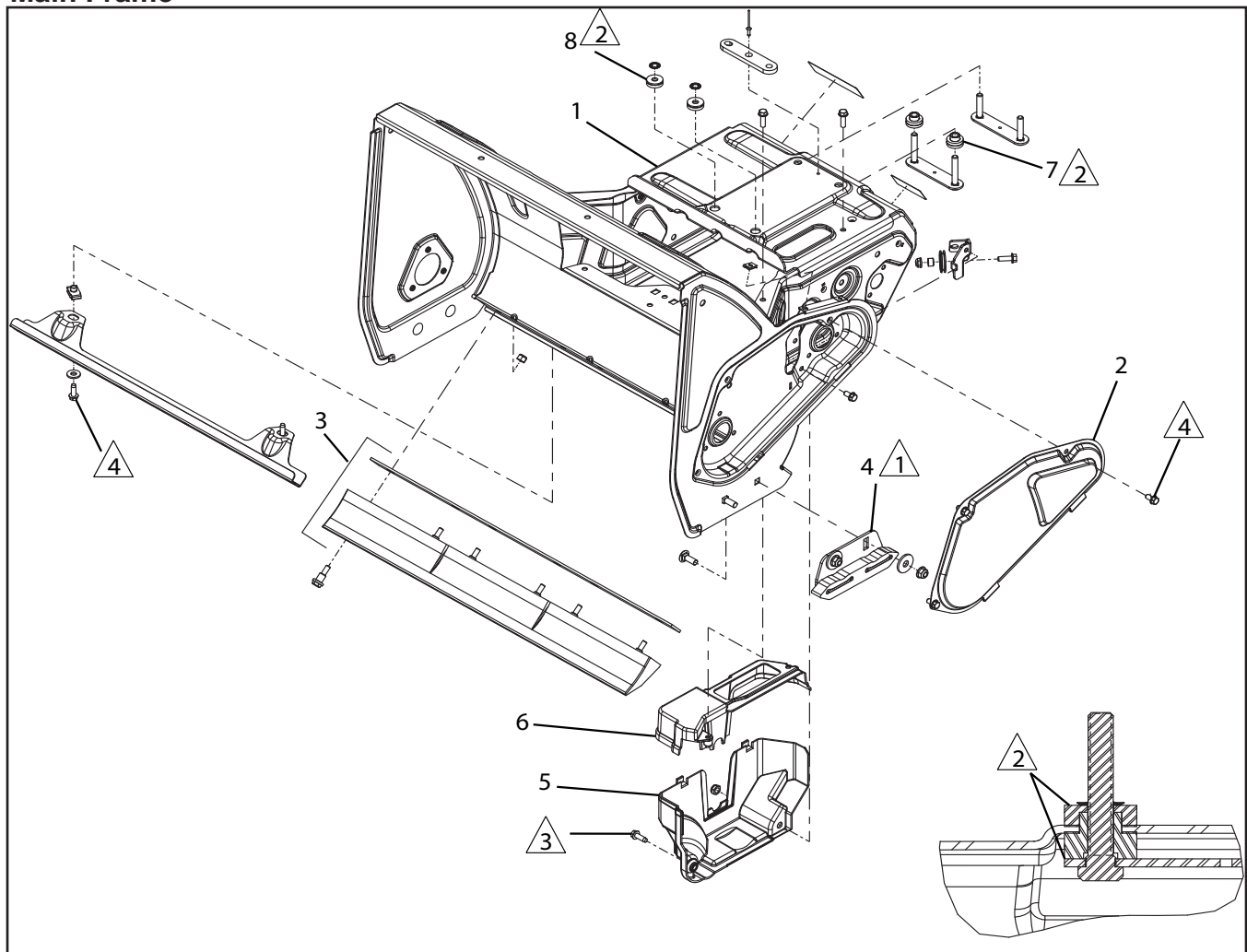


Figure 73

- 1. Frame
- 2. Belt Cover
- 3. Scraper Asm.
- 4. Skid Asm.
- 5. Lower Belt Cover
- 6. Upper Belt Cover
- 7. Bottom Ferrule (2x)
- 8. Top Ferrule (2x)

2 Bottom ferrule must be assembled such that body extends through frame. Top ferrule must be assembled around bottom ferrule. Neither ferrule can be pinched during assembly.

3 Torque to 25-35 in-lbs. (2.9-4 Nm)

4 Torque to 60-80 in. lbs. (7-9 Nm)

1 To assemble skids, item D, to correct height with tires and scraper installed and product on level surface. Place a 0.2 in. thick spacer under scraper. Position the skid so it is resting on the ground, tighten fasteners while holding skid to prevent from rotating.

Scraper Removal and Replacement (Figure 73)

Removal

1. Remove the six bolts that attach the scraper (Figure 73, item 3) to the housing (Figure 74).



Figure 74

Replacement

1. Install the new scraper and torque bolts to 96 in-lbs. (11 Nm)

Paddle Removal and Replacement

Removal

1. Remove the three bolts that attach the paddle to the rotor (Figure 75).



Figure 75

Replacement

1. Insert the new paddle behind the center support. Install the new paddles, tighten the center bolt first. Torque bolts to 45-55 in-lbs. (5.2-6.3 Nm) (Figure 76). Refer to page 2-6, Figure 3.



Figure 76

CHASSIS

Quickstick

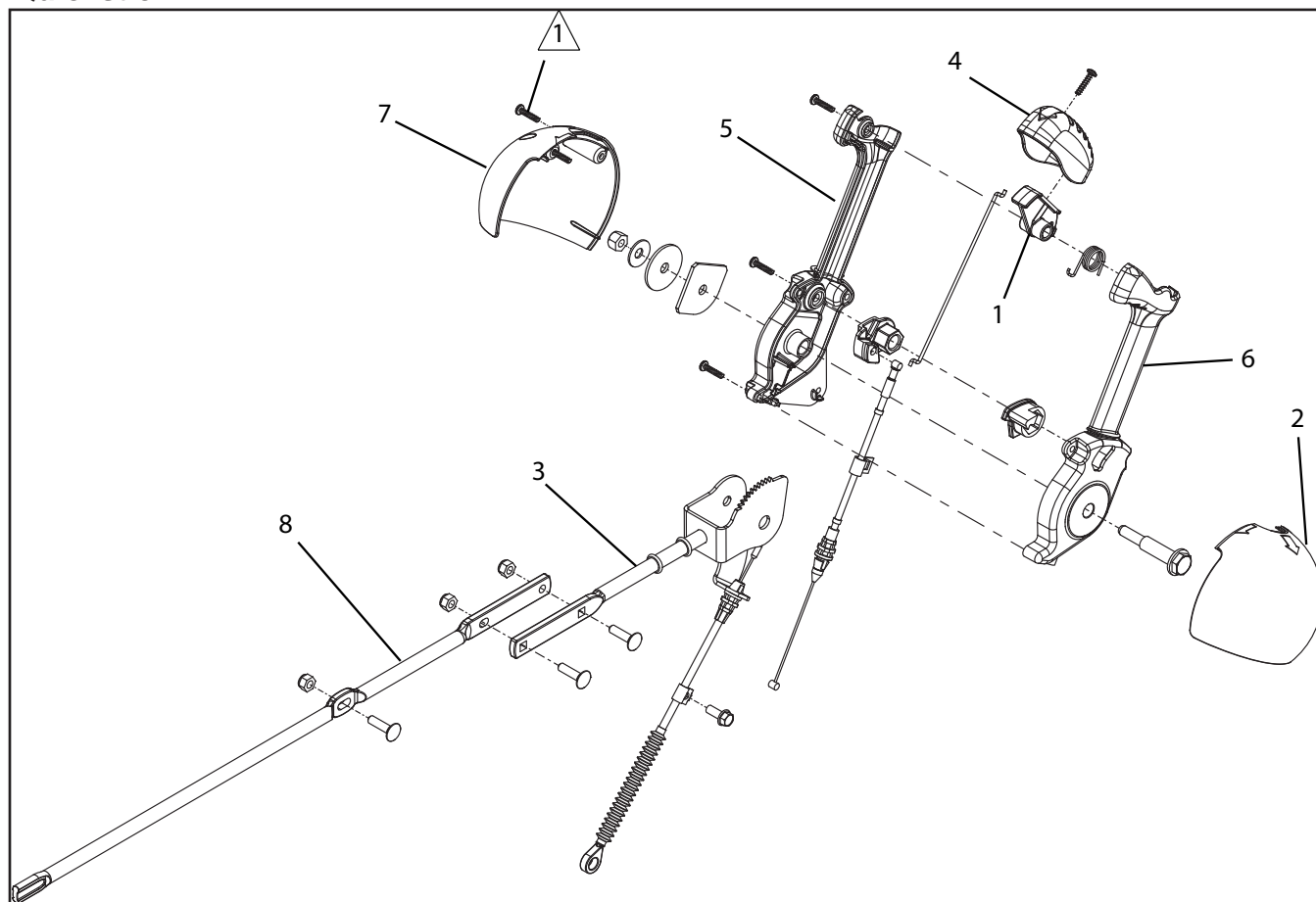



Figure 77

 Torque to 5-10 in-lbs. (0.5-1.1 Nm)

1. Latch Trigger
2. LH Chute Lever Cover
3. Chute Control Rod
4. Lever Cap
5. RH Chute Control Lever
6. LH Chute Control Lever
7. RH Chute Lever Cover
8. Chute Rod

Clocking the Quick Stick

1. Make sure the Quick Stick handle is in the center position.
2. Remove the two screws holding the front cover on (Figure 78).



Figure 78

3. Loosen the two screws holding the chute gear mount to the Quick Stick chute post (Figure 79).



Figure 79

4. Disengage the pawl and pull back on the face gear/chute gear mount. Rotate the chute until it faces straight ahead. (Figure 80).



Figure 80

5. Once clocking is set, tighten the two screws holding the gear chute mount to the quick stick chute mount to 50-60 in-lbs. (5.7-6.9 Nm).
6. Using the quick stick, ensure the chute rotates fully to the left and right.
7. Install the top cover. Torque bolts to 6-10 in-lbs. (7-1.1 Nm).



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