Form No. 3432-730 Rev A

TORO

Count on it.

Service Manual

30 Inch TurfMaster® HDX WPM

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8111 Lyndale Avenue South
Bloomington, MN 55420

Original Instructions (EN)

CV

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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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

Model	22207	22215	22225
Engine	Kawasaki		Kohler
Engine Oil Capacity	22 oz (0.65 L) without filter, 29 oz (0.85 L) with filter		24 oz (0.70 L) with and without filter
Engine Oil	SAE 30 or SAE 10W-30/API SJ or higher		
Fuel Tank	1 gallon		
Cut Width	30 inch		
Transmission	Single Speed		
High Idle (No Load)	3500 RPM		
Front Wheel	9 inch		
Rear Wheel	10.5 inch		

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

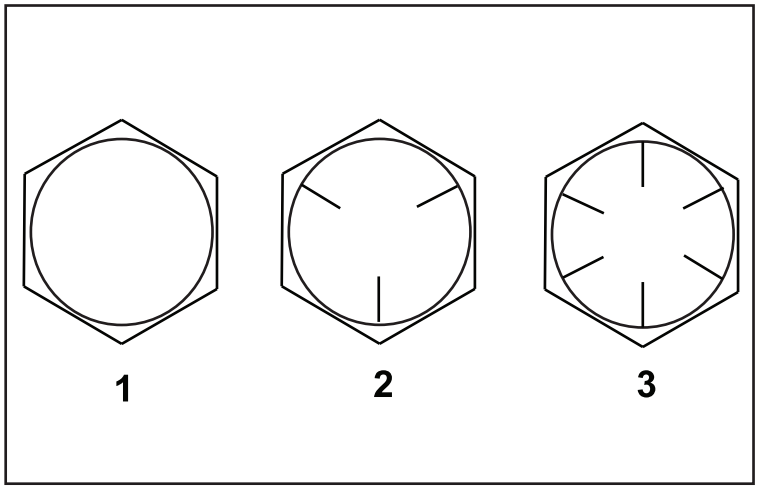

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Figure 1

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

Metric Bolts and Screws

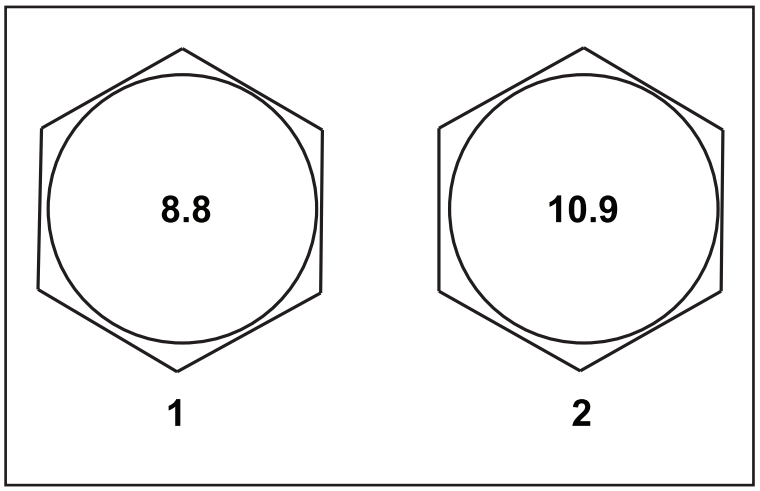

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Figure 2

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

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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

Problem	Possible Cause	Corrective Action
Bent, crooked handle frame	Shipping damage, improper securing while transporting	Replace damaged components.
Cracked or broken frame	Damage from improper securing while transporting the unit.	Replace the frame.
	Vibration from the bent crank, damaged or unbalanced blades.	Replace the frame.
	Loose engine mounting bolts.	Replace the frame. Inspect the engine for damage.
	Operation with the engine guard.	Unit needs to be operated with the engine guard in place or may cause cracked or broken frame.
Broken Bolts	Corrosion	Extract broken portion of bolt, and repair threads when needed.
	Improper assembly torque	Extract broken portion of bolt, and repair threads when needed.
Cracked blade spindle mounts on deck	Striking debris while mowing	Replace the deck, correct vibration.
Broken spindle mounting bolts	Striking debris while mowing	Replace damaged components and check for spindle bearing damage.
Engine has poor running, no start	Fuel contamination, no fuel	Consult the Operator's Manual for basic troubleshooting. Engine support through the engine manufacturer.
Weak drive	Worn belt or pulley	Replace the belt or pulley.
	Improper traction cable adjustment	Adjust the cable properly.
	Low engine RPM	Adjust engine RPM to proper engine speed.
No drive	Broken traction cable	Replace the cable.
	Broken drive belt	Replace the belt.
	Damaged pinion or wheel gears	Replace the pinion gear and wheel assembly.
	Internal failure of transmission	Replace the transmission.

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General Information

This unit comes with 2 different engines, model 22215 with Kawasaki FJ180V and model 22225 with Kohler CV200. These are lubricated engines with a spin on filter and use a fuel tank that is separate from the engine assembly.

Service and Repairs

Engine Assembly 1

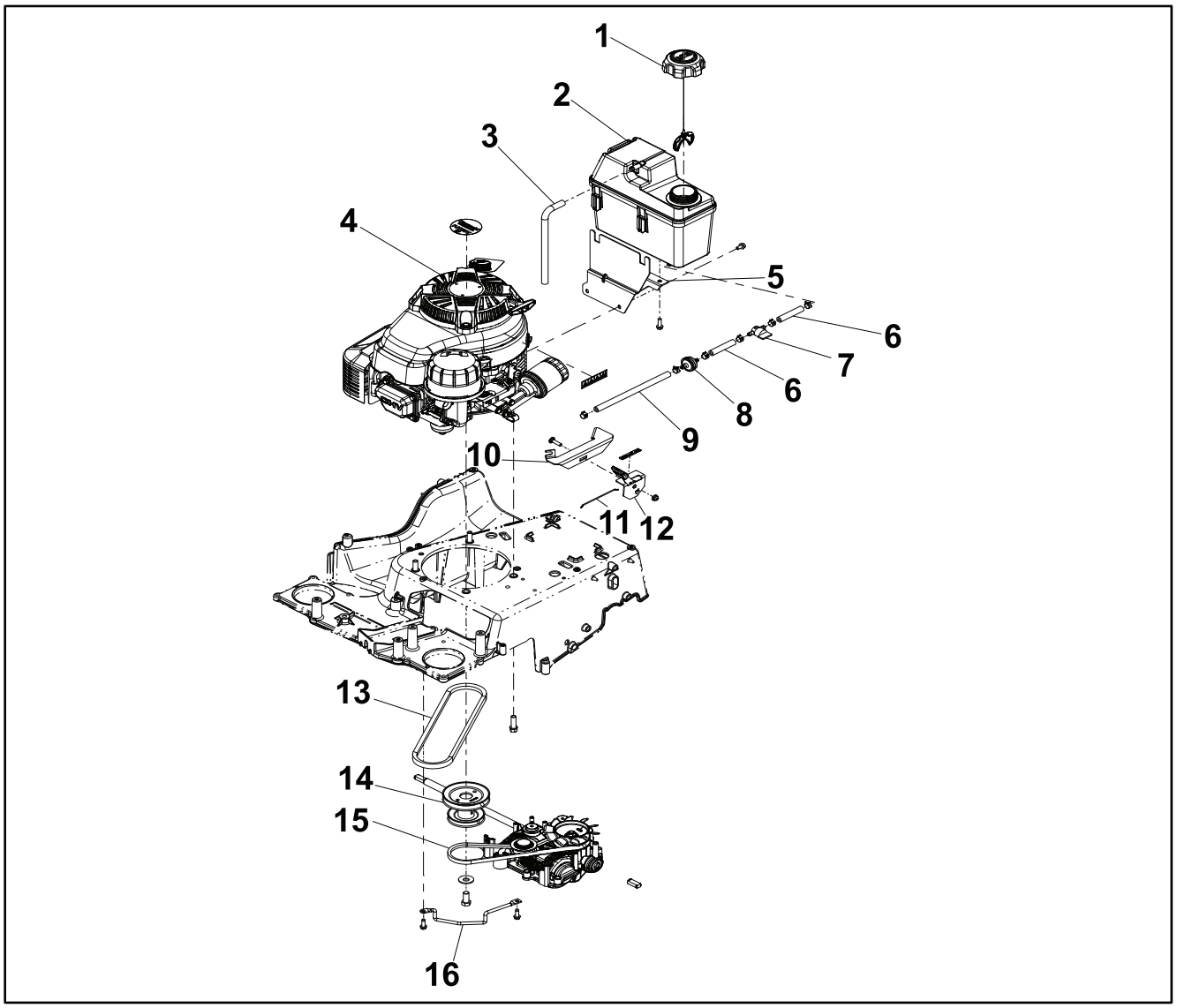

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Figure 3

1. Fuel Cap
2. Fuel Tank
3. Canister Vent Hose
4. Kawasaki Engine
5. Tank Mount
6. Fuel Hose
7. Fuel Valve
8. Fuel Filter
9. Fuel Hose
10. Throttle Mount Bracket
11. Control Wire
12. Throttle Control
13. BBC Belt
14. Engine Pulley
15. Transmission Belt
16. Belt Guide Rod

Engine Assembly 2

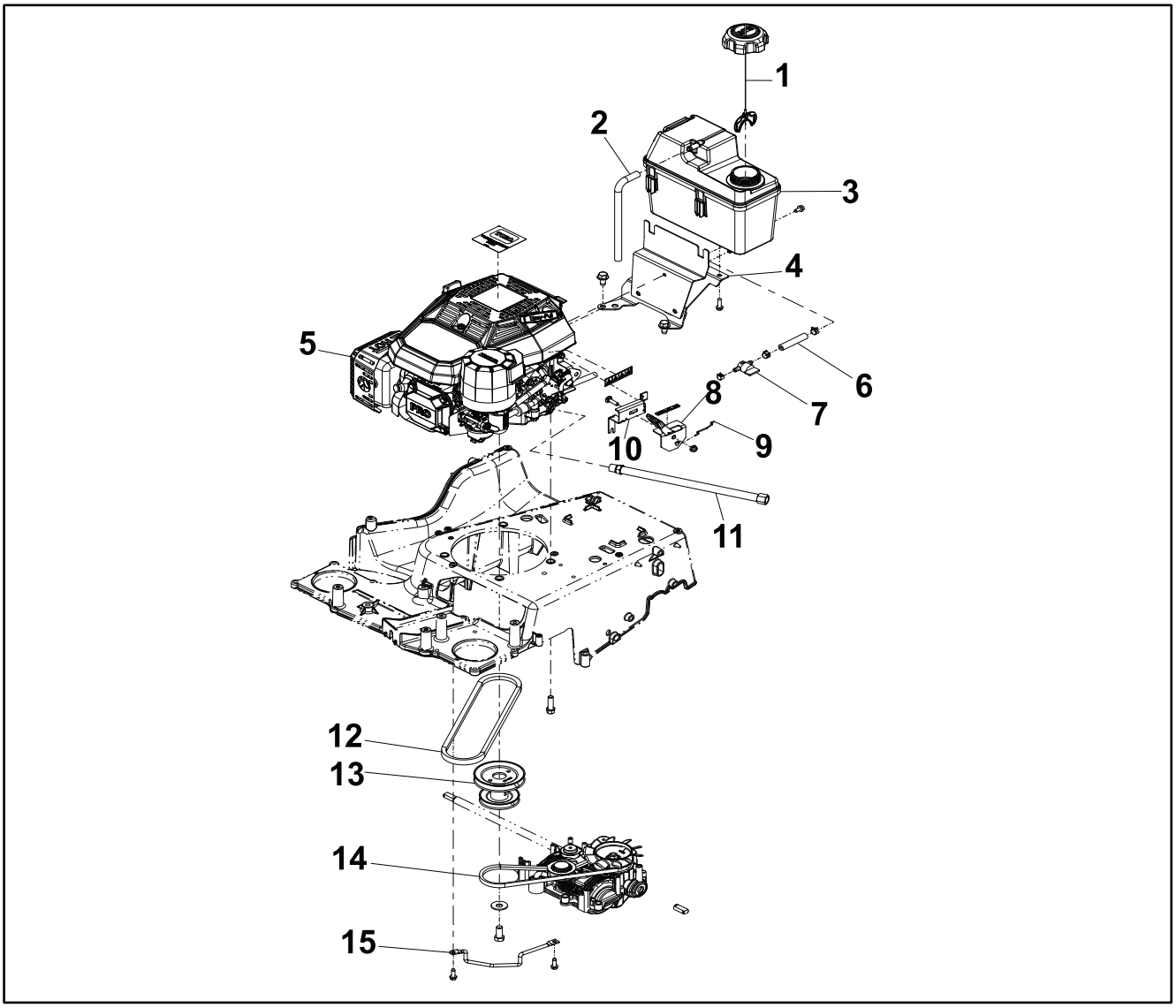

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Figure 4

1. Fuel Cap
2. Canister Vent Hose
3. Fuel Tank
4. Tank Mount Asm.
5. Kohler Engine
6. Fuel Hose
7. Fuel Valve
8. Throttle Control
9. Link Wire
10. Throttle Bracket
11. Oil Drain Hose
12. BBC Belt
13. Engine Pulley
14. Transmission Belt
15. Belt Guide Rod

Engine Replacement

Engine Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the frame cover to the frame.

g296174

Figure 5

6. Remove the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame.

g296175

Figure 6

7. Rotate the belt tensioner arm by turning the 7/16 inch nut on the bottom side of the transmission clockwise.

g302330

Figure 7

8. Remove the belt tension by aligning the idler pulley with the access hole on the bottom side of the transmission. Insert a quarter inch screw driver.

   Note: Screw driver needs to fit through access hole and the idler pulley slot securing the pulley into position.

g296176

Figure 8

9. Remove the transmission belt from the engine pulley.

   Note: Access belt from the front of the mower.

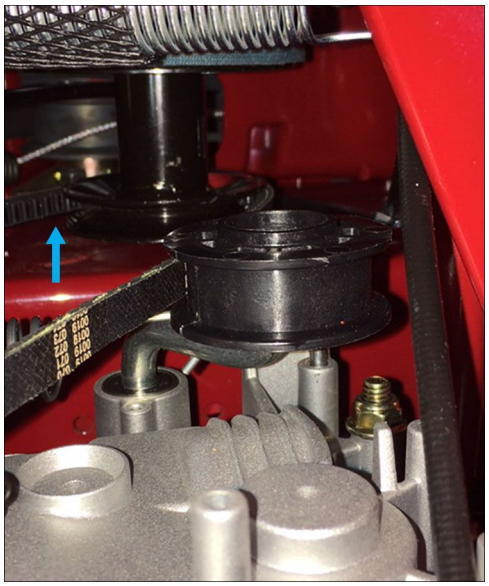

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Figure 9

10. Remove the belt from the rear of the mower.

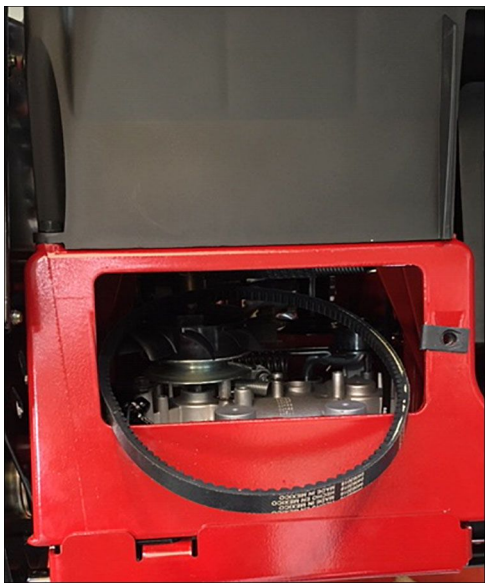

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Figure 10

11. Remove the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Remove the belt guide.

g296179

Figure 11

12. Loosen the ½ inch nylock nut from BBC idler arm pivot until flush with bottom bolt. Secure the topside of the bolt with a ½ inch wrench.

    Note: Access bottom bolt through the bottom of the deck, see image.

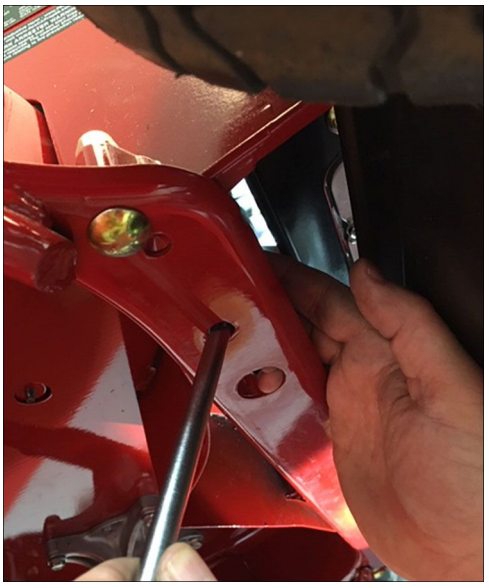

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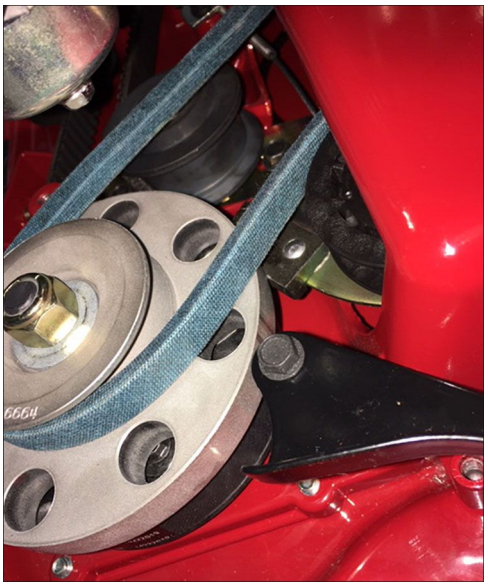
Figure 12

13. Move the brake arm downwards to release from pulley.

    Note: Releases pulley pressure from the belt.



g302385

Figure 13

14. Remove the BBC belt from the pulley.

g296181

Figure 14

15. Remove the BBC belt from rear of mower.
16. Remove the 3 (1/2 inch) bolts securing the engine to the frame.

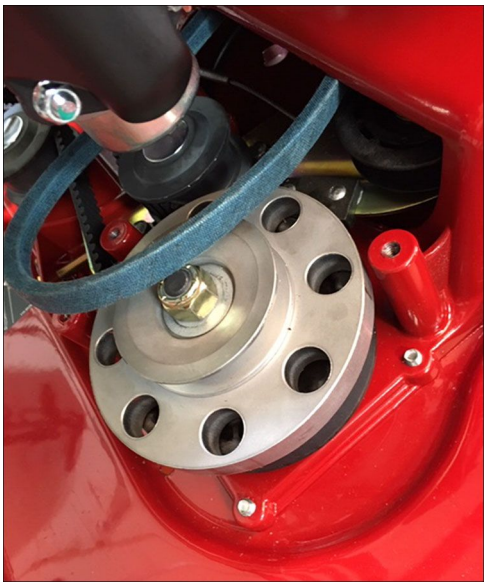
    Note: To remove the front bolt, go through the access hole in the deck with a 10 inch (3/8 inch) drive extension and a ½ inch socket with a universal joint.
17. Remove the engine.

Engine Installation

1. Install the engine onto the machine.
2. Install the 3 (1/2 inch) bolts securing the engine to the frame. Torque 500 ± 50 in-lbs. (56 ± 5 Nm).

Note: To install the front bolt, go through the access hole in the deck with a 10 inch (3/8 inch) drive extension and a ½ inch socket with a universal joint.

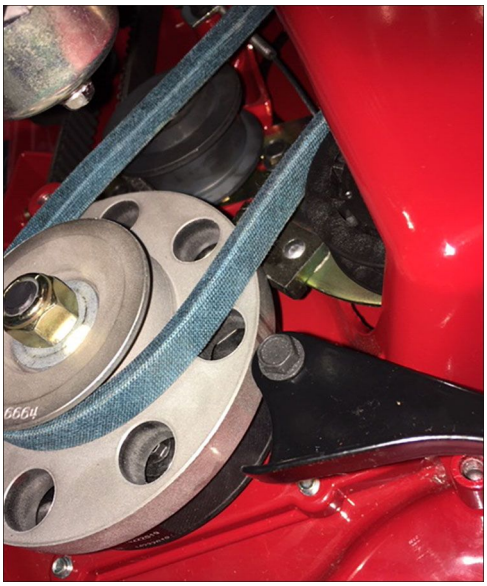
3. Install the BBC belt through the rear of the mower.
4. Install the BBC belt to the engine pulley.
5. Install the BBC belt to the brake pulley.



g296181

Figure 15

6. Move the brake arm upwards to align with the pulley.

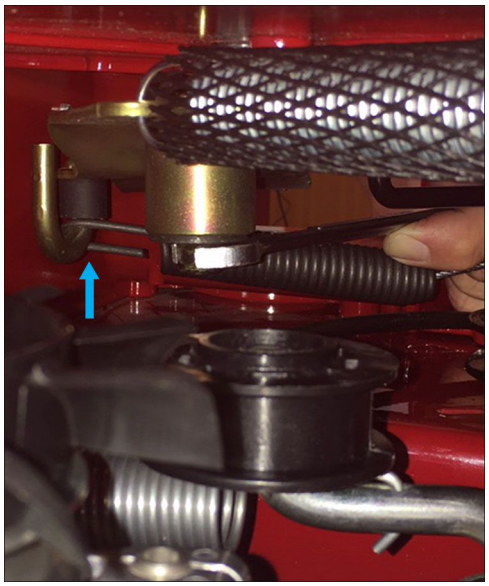


g302385

Figure 16

7. Tighten the 1/2 inch nylock nut from the BBC idler arm pivot until flush with the bottom bolt. Secure the topside of the bolt with a 1/2 inch wrench.

Note: Access through the front side of the frame.



g305213

Figure 17

8. Install the belt guide. Install the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Torque screws to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296179

Figure 18

9. Install the transmission belt through the rear of the mower.
10. Install the transmission belt to the engine pulley.

    Note: Access belt engine pulley from the front of the mower.

g302331

Figure 19

11. Install the transmission belt to the transmission pulley.
12. Using a 7/16 inch nut on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing idler arm to put tension on the belt.

13. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque screws to 55 ± 5 in-lbs. (6 ± 1 Nm).

g296175

Figure 20

14. Install the 1/4–20 inch taptite screw securing the frame cover to the frame. Torque screw to 110 ± 11 in -lbs. (12 ± 2 Nm).

g296174

Figure 21

15. Lower the rear cover.
16. Using an appropriate lifting device, lower the rear of the machine to the ground.

Fuel Tank Replacement

Fuel Tank Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Shut the fuel off.
4. Move the hose clamp away from the fuel shut-off valve.
5. Remove the fuel hose from the fuel shut-off valve.

   Note: Kawasaki engine shown.

g296195

Figure 22

6. Remove the 2 (1/4–10 inch) screws mounting the tank to the fuel tank bracket.
7. Lift fuel tank away from the machine.

g296196

Figure 23

8. Remove the 3 (M6x1) screws on the Kawasaki engine securing securing the fuel tank mounting bracket to the engine assembly. On Kohler engine, remove the 1 (M6x1) and 2 (3/8–16x3/4) screws.

   Note: Removing the bottom left bolt last allows bracket rotation for easier access on Kawasaki engine.

Fuel Tank Removal (continued)

g296197

Figure 24

9. Remove the fuel tank mounting from the engine.

Fuel Tank Inspection

Shake or tap the fuel tank to listen for audible rattle of the check ball in the tank vent.

Fuel Tank Installation

1. Install the fuel tank mounting to the engine.

2. Install the 3 (M6x1) screws on the Kawasaki engine securing the fuel tank mounting bracket to the engine assembly. Torque screws to 65 ± 5 in-lbs. (7 ± 1 Nm). For the Kohler engine install the 1 (M6x1) and 2 (3/8–16x3/4) screws. Torque M6x1 screw to 65 ± 5 in-lbs. (7 ± 1 Nm). Torque 3/8–16x3/4 screws to 200 ± 20 in-lbs. (22 ± 2 Nm).

g296197

Figure 25

3. Install the fuel tank onto the machine.

g296196

Figure 26

4. Install the 2 (1/4–20 inch) taptite screws mounting the tank to the fuel tank bracket. Torque screws to 33 ± 3 in-lbs. (4 ± 1 Nm).

5. Install the fuel hose to the fuel shut-off valve. Secure with a hose clamp.

   Note: Kawasaki engine shown.

g296195

Figure 27

Throttle Control Replacement

Throttle Control Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Loosen the 2 (1/4–20 inch) screws securing the throttle control to the engine shroud.

   Note: Mounting bolts are in different locations for Kawasaki and Kohler engines, same function applies.

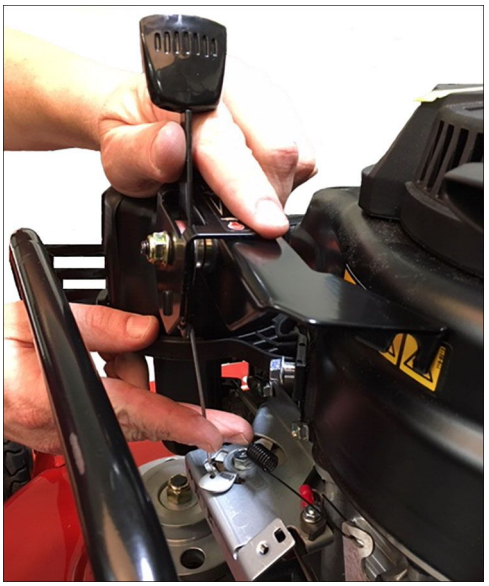
g296938

Figure 28

Throttle Control Removal (continued)

4. Tip the rear of the control upwards then out slightly to remove the throttle control from the engine.

   Note: Kawasaki engine shown.



g296939

Figure 29

Throttle Control Adjustment

Full forward should adjust the full throttle detent that does not apply choke. Move forward for choke to engage the choke linkage. Full backwards should engage the engine stop switch.

Note: Kawasaki engine shown.

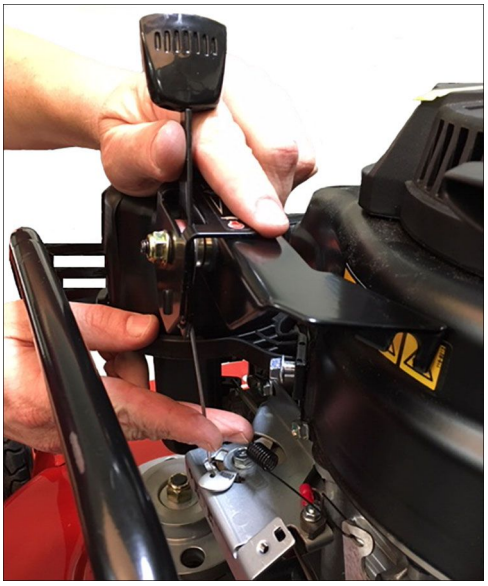
g296940

Figure 30

Throttle Control Installation

1. Install the throttle control to the engine.

Note: Kawasaki engine shown.



g296939

Figure 31

2. Tighten the 2 (1/4–20 inch) screws securing the throttle control to the engine shroud. Torque bolts to 55 ± 5 in-lbs. (6 ± 1 Nm).

Note: Kawasaki engine shown. Kohler has different mounting locations.

g296938

Figure 32

Table of Contents

General Information

Controls for this unit are Blade Brake Clutch (BBC) bail, traction bail and park brake. All controls are operated by cables. All cables should be routed, not kinked or put in a bind. BBC cable is adjusted on the idler arm and the anchor point is on the frame. Traction and park brake are adjusted at the bail.

BBC bail and cable must be adjusted to fully disengage for proper function of the blade brake. When the bail is engaged for the clutching belt it must travel enough to fully tension the belt. The spring on the BBC cable will slightly extend.

Traction cable and bail should be adjusted for full engagement of the transmission arm when the bail touches the handle. Over tensioning the transmission cable will cause the unit to drive when the bail is released.

Brake is adjusted to prevent the unit from rolling once the brake lever it set. Do not over adjust the brake cable this well put excessive wear on the brake.

Service and Repairs

Controls Assembly 1

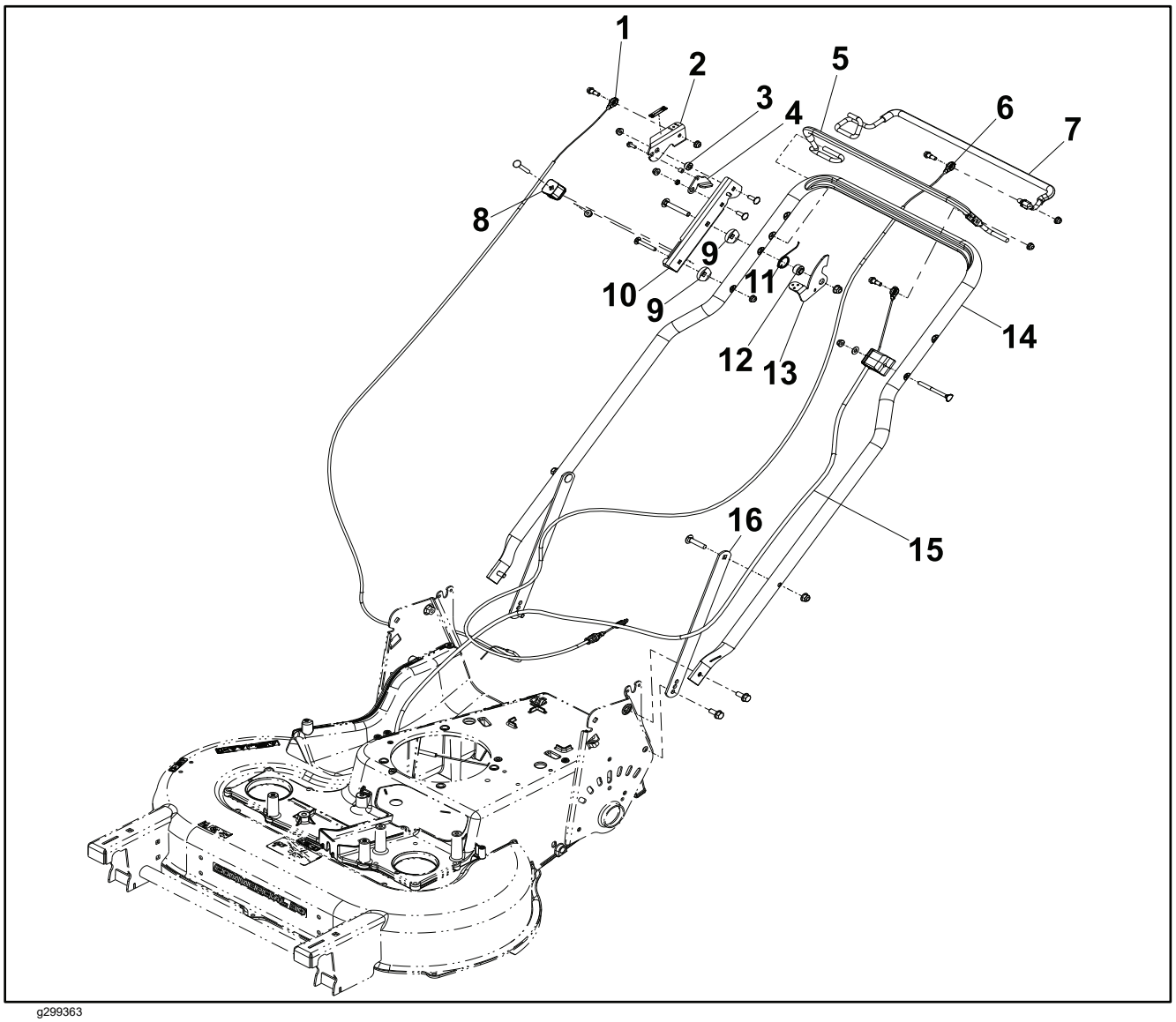


Figure 33

1. Parking Brake Cable
2. Brake Lever
3. Stepped Washer
4. Brake Actuation Link
5. Coated BBC Bail
6. Traction Cable
7. Coated Traction Bail
8. Cable Anchor
9. Curved Washer
10. Brake Lever Mount
11. BBC Lever Spring
12. Stepped Bushing
13. BBC Lever
14. Handle
15. BBC Cable
16. Handle Support

BBC Bail Replacement

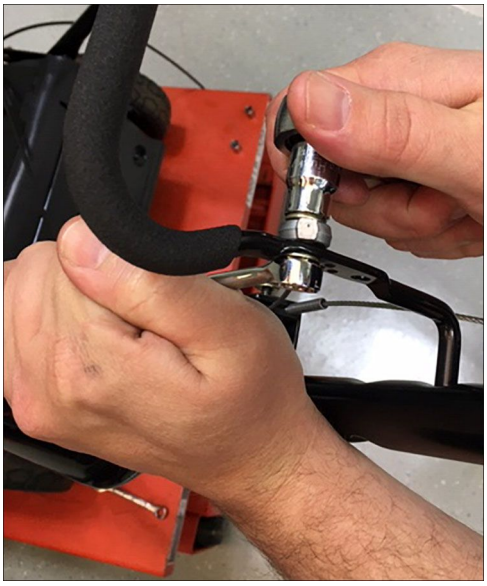
BBC Bail Removal

1. Park the machine on a level surface. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Loosen the 1/4–20 inch nylock nut to carriage bolt. Pull the cable housing towards the bail to release tension on the cable.

g296942

Figure 34

4. Remove the 1/4–20 inch shoulder bolt and nut securing the cable to the BBC bail. Remove the cable.



g302395

Figure 35

5. Remove BBC bail by pushing inward on one side and lifting away from the handle assembly.

BBC Bail Removal (continued)

g296943

Figure 36

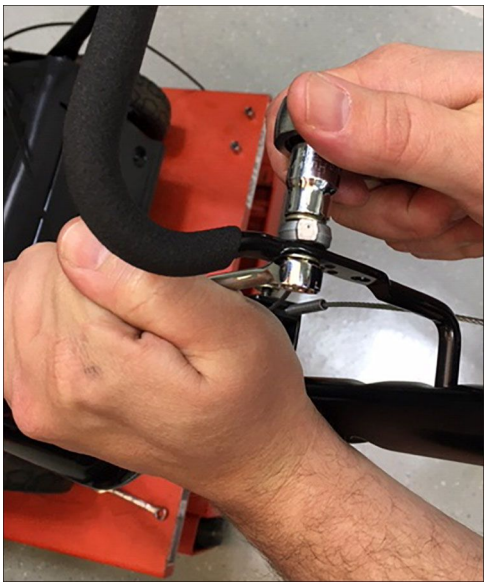
BBC Bail Installation

1. Install the BBC bail onto the handle assembly.

g296943

Figure 37

2. Install the cable. Install the 1/4–20 shoulder bolt and nut securing the cable to the BBC bail. Torque bolt and nut to 75 ± 5 in-lbs. (8 ± 1 Nm).



g302395

Figure 38

3. Tighten the 1/4–20 inch nylock nut to carriage bolt securing the cable guide clamp to the handle. Adjust the housing cable so that there is no slack in the cable. Torque nut to carriage bolt to 40 ± 7 in-lbs. (4 ± 1 Nm).

g296942

Figure 39

BBC Cable Replacement

BBC Cable Removal

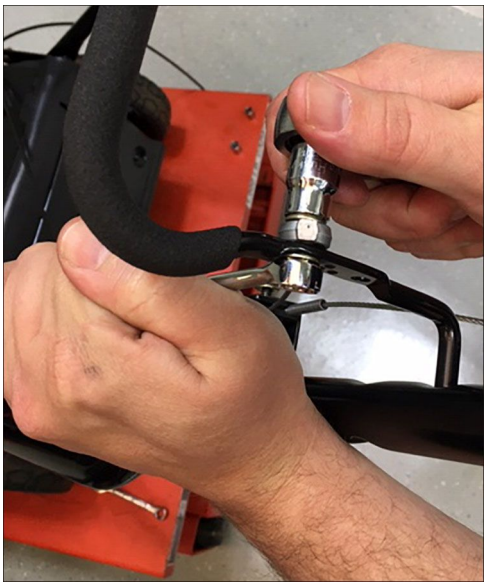
1. Park the machine on a level surface. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Cut both zip ties on the handle.

4. Loosen the 1/4–20 inch nylock nut to carriage bolt. Pull the cable housing towards the bail to release tension on the cable.

g296942

Figure 40

5. Remove the 1/4–20 inch bolt and nut securing the cable to the BBC bail. Remove the cable.

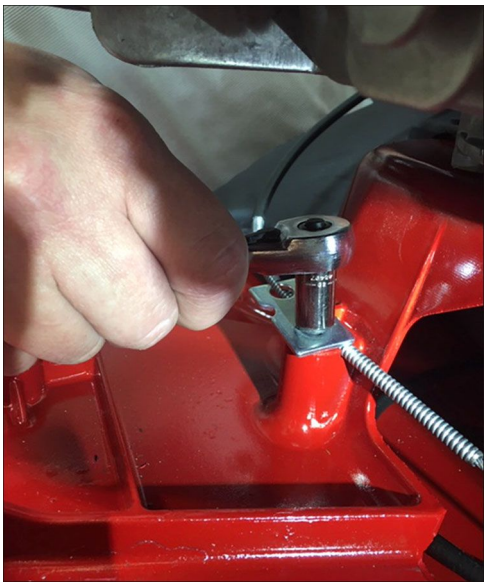


g302395

Figure 41

6. Remove the 4 (1/4–20 inch) taptite screws securing the front belt cover to the frame.
7. Remove the 1/4–20 inch taptite screw securing the cable clamp to the main frame.

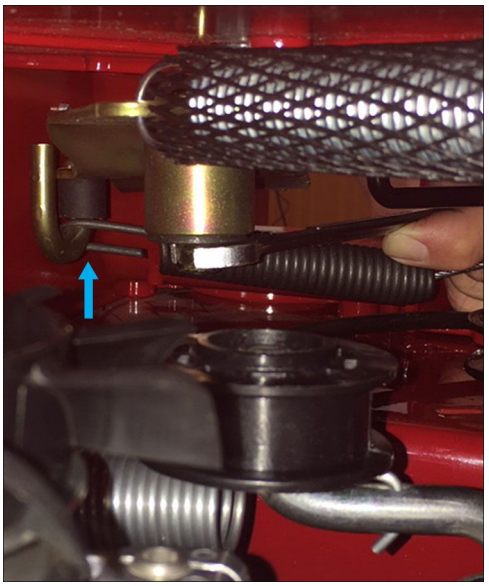
BBC Cable Removal (continued)



g302425

Figure 42

8. Remove the cable from the main frame.
9. Unhook the spring from the BBC brake arm.

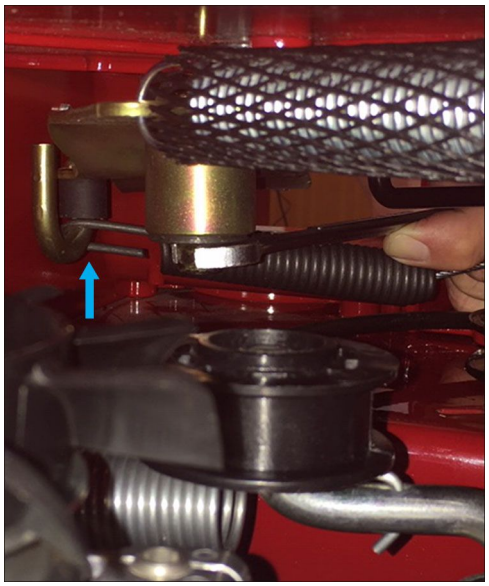


g305213

Figure 43

BBC Cable Installation

1. Install the cable spring to the BBC brake arm.

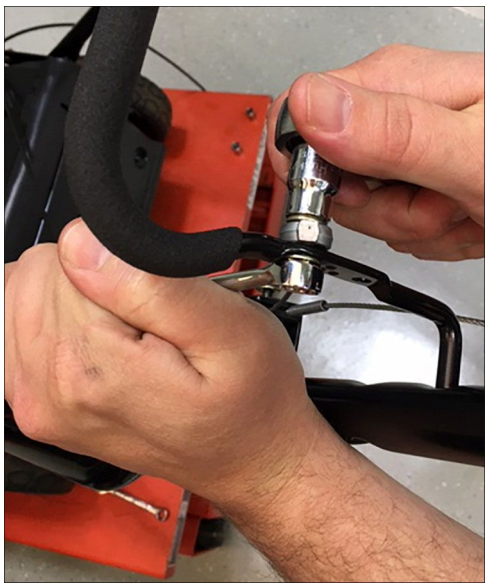


g305213

Figure 44

2. Loosely install the 1/4–20 inch screw securing the cable to the main frame.

3. Install the cable. Install the 1/4–20 inch shoulder bolt and nut securing the cable to the BBC bail. Torque bolt and nut to 75 ± 5 in-lbs. (8 ± 1 Nm).



g302395

Figure 45

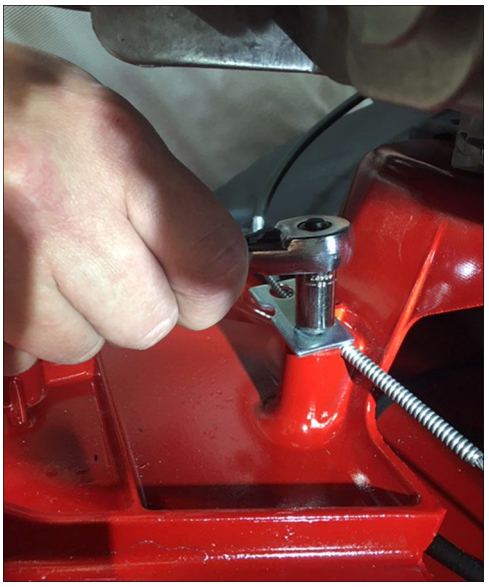
4. Tighten the 1/4–20 inch nylock nut to carriage bolt securing the cable guide clamp to the handle. Adjust the housing cable so there is no slack in the cable. Torque nut to carriage bolt to 40 ± 7 in-lbs. (4 ± 1 Nm).

g296942

Figure 46

5. Install zip ties securing the cable to the handle assembly.
6. Install the cable to the main frame.
7. Install the 1/4–20 inch taptite screw securing the cable clamp to the main frame. Torque screw to 110 ± 11 in-lbs. (12 ± 1 Nm).

   Note: Cable adjustment should be 1/4–3/8 spring stretch.



g302425

Figure 47

8. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque bolts to 110 ± 11 in-lbs. (12 ± 1 Nm).

Traction Bail Replacement

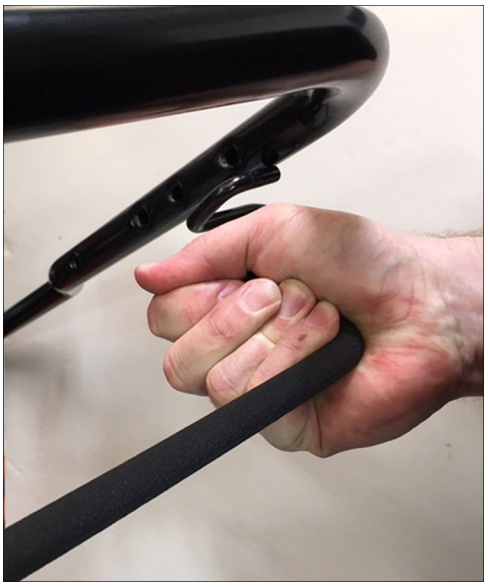
Traction Bail Removal

1. Park the machine on a level surface. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Remove the 1/4–20 shoulder bolt and nut securing the cable to the traction bail.

g302449

Figure 48

4. Remove traction bail by pushing inward on one side and lifting away from the handle assembly.



g302451

Figure 49

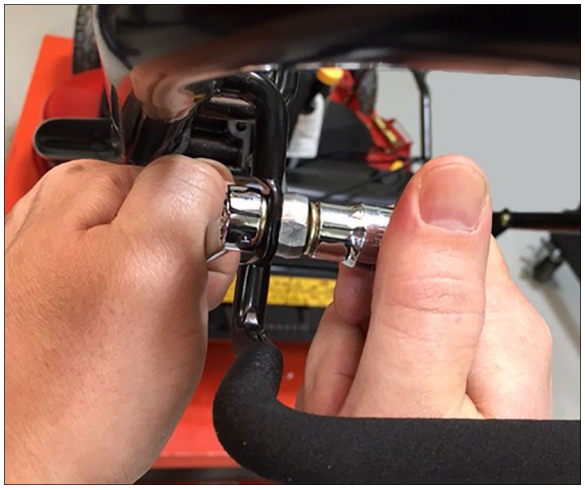
Traction Bail Installation

1. Install the traction bail to the top hole of the handle assembly.

g302451

Figure 50

2. Install the cable. Install the shoulder bolt and nut securing the cable to the traction bail. Torque shoulder bolt and nut to 75 ± 5 in-lbs. (8 ± 1 Nm).



g302449

Figure 51

Traction Cable Replacement

Traction Cable Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the cover to the frame.

g296174

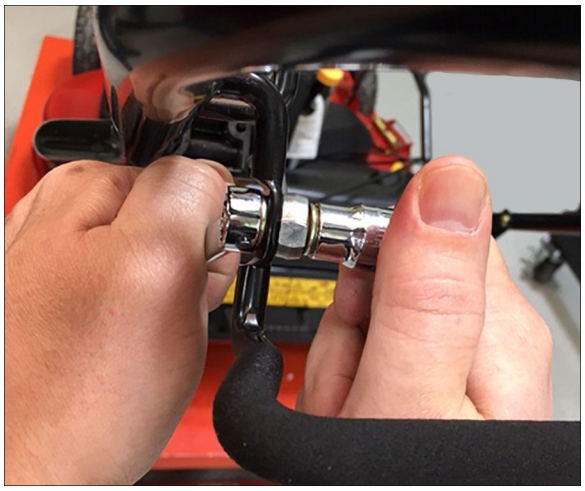
Figure 52

6. Remove the 4 (1/4–20 inch) taptite screws securing the front belt cover to the frame.

g296175

Figure 53

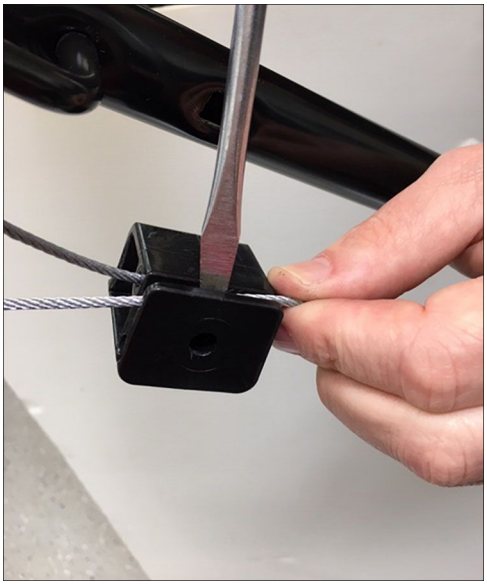
7. Remove the 1/4–20 inch shoulder bolt and nut securing the cable to the traction bail.



g302449

Figure 54

8. Open the clamp, remove the cable from the clamp lock.



g302450

Figure 55

9. Rotate the belt tensioner arm clockwise from the bottom side of the transmission.

g302330

Figure 56

10. To remove belt tension, align the idler pulley with the access hole on the bottom side of the transmission. Insert a quarter inch screw driver.

    Note: Screw driver needs to fit through access hole and the idler pulley slot securing the pulley into position.

g296176

Figure 57

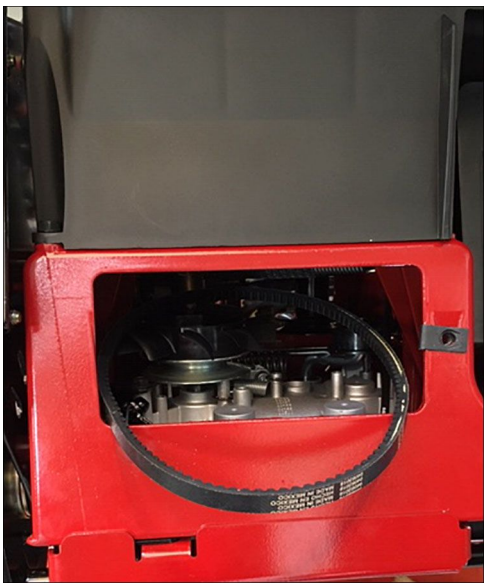
11. Remove the transmission belt from the engine pulley.

    Note: Access belt from the front of the mower.

g302331

Figure 58

12. Remove the belt from the rear of the mower.



g296178

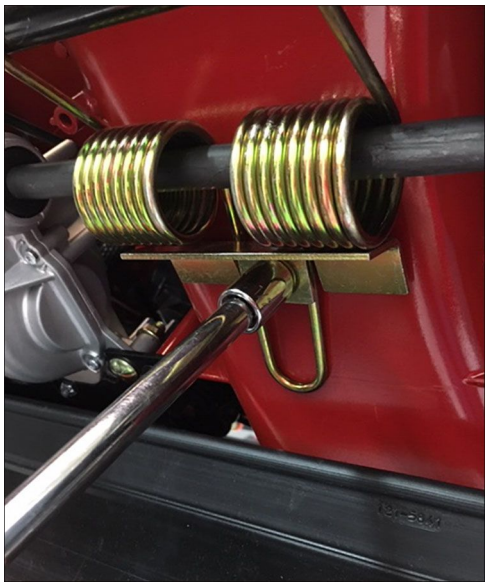
Figure 59

13. Using an appropriate lifting device, raise the rear of the machine off the ground.
14. Set the rear height-of-cut to 5 inch.
15. Using a 9/16 inch socket, remove the 2 nuts securing the wheels to the rear axles.
16. Remove the T-30 screw securing the dust cover to the axle assembly.

g297057

Figure 60

17. Remove the mulch plug from the rear discharge.
18. Remove the 5/16–18 inch nut on carriage bolt securing the spring bracket to the frame.



g297058

Figure 61

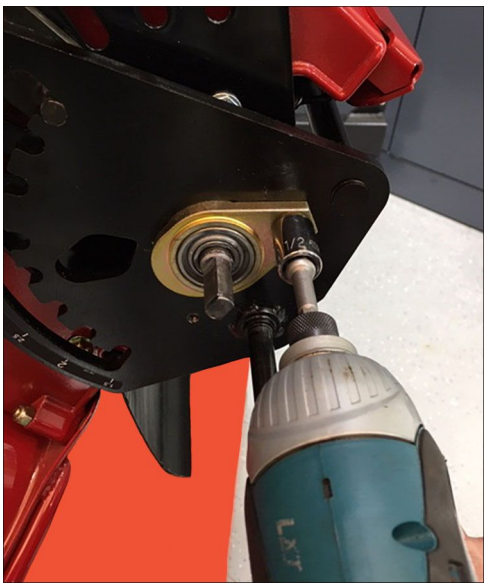
19. Using snap ring pillars, remove the snap ring retaining the pinion gear from axle shaft.

    Note: Inspect the pinion gear to wheel gear mesh for abnormal wear, broken teeth, and uneven wear. Replace pinion gear and wheel gear, if needed.

g297059

Figure 62

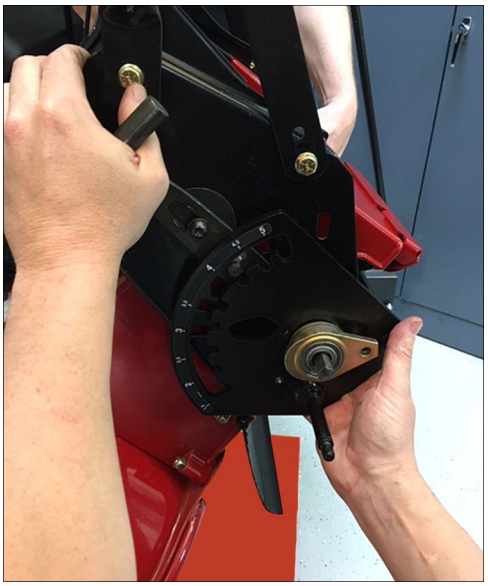
20. Remove the 5/16–18 inch bolt securing the axle bearing housing to the axle height-of-cut plate.



g297060

Figure 63

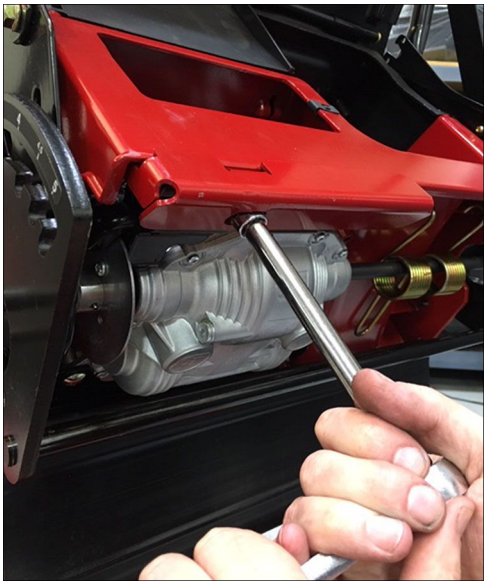
21. While holding up the spring loaded height-of-cut handle, apply pressure to the back of the axle bearing housing assembly, separating from axle weldment.



g297061

Figure 64

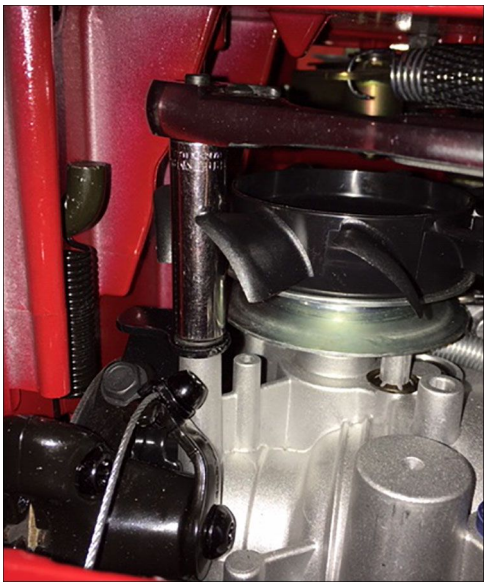
22. Remove the 1–4–20 taptite screw securing the transmission cable guide mounting bolt to the frame.



g297062

Figure 65

23. Remove the 1/4–20 inch bolt securing the parking brake to the transmission.



g297064

Figure 66

24. Move the parking brake caliper out of the way and secure.
25. Remove the 2 Phillip head screws from the trailing shield to the main frame.

g297065

Figure 67

26. Remove the 5/16–18 inch nut to carriage bolt on the LH side. Remove the RH 5/16–18 inch taptite screw to main frame securing the transmission assembly to the main housing.

g297066

Figure 68
Side

g297531

Figure 69
Vertical

27. Slide transmission to the right. Line up RH side height-of-cut notch with bolt.

g297894

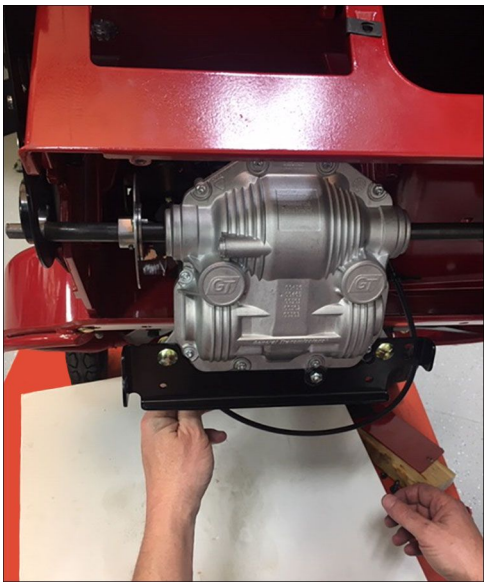
Figure 70

28. Remove the height-of-cut weldment from the chassis. Slide the LH side of the height-of-cut weldment first before the RH side.

g297895

Figure 71

29. Center the transmission. Pinch the traction cable towards the transmission and rotate the front transmission and cable downward.



g297896

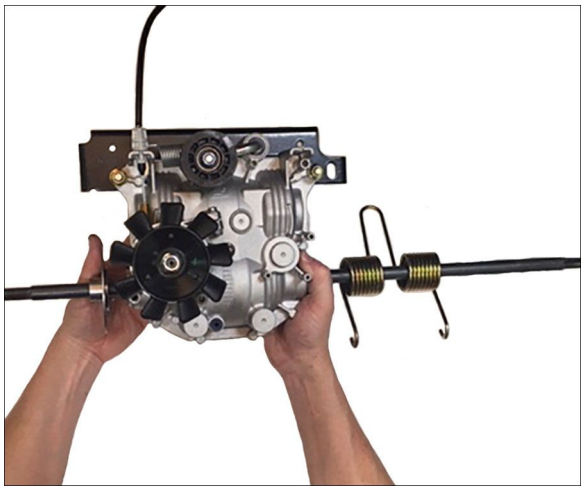
Figure 72

30. To remove the transmission from the frame, rotate the transmission upside down and slide the transmission to the right. Remove the transmission from the frame with the traction cable attached.

g298181

Figure 73

31. Remove the torsion spring from the RH side axle shaft.



g298182

Figure 74

32. Using needle a nose plier, squeeze the cable anchor and remove cable anchor from the cable mount.

g298183

Figure 75

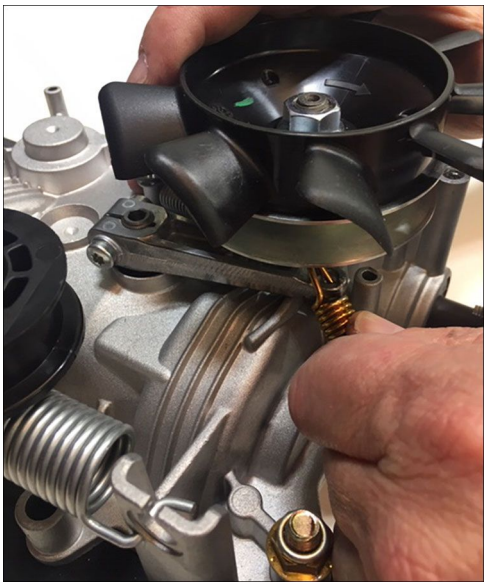
33. Pull the cable and remove from the cable anchor mount.

Traction Cable Removal (continued)

g298184

Figure 76

34. Remove the spring hook from the transmission clutch lever.



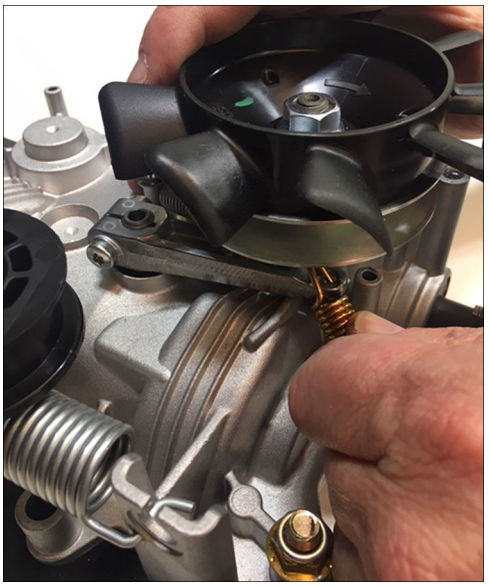
g298185

Figure 77

35. Cable should now be free from the chassis.

Traction Cable Installation

1. Install the spring hook to the transmission clutch lever.



g298185

Figure 78

2. Install the cable to the cable anchor mount.

g298184

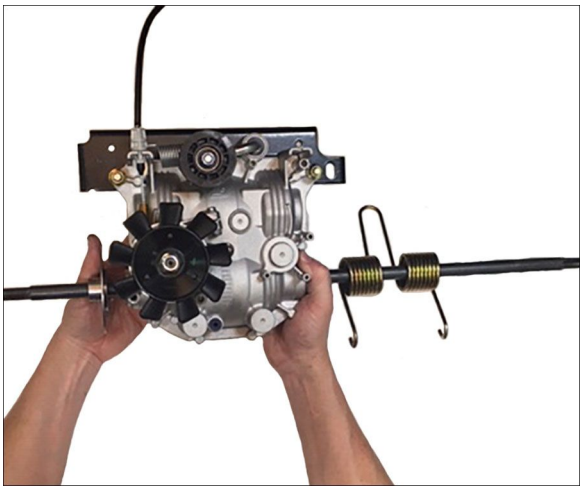
Figure 79

3. Install the cable anchor to the cable mount.

g298183

Figure 80

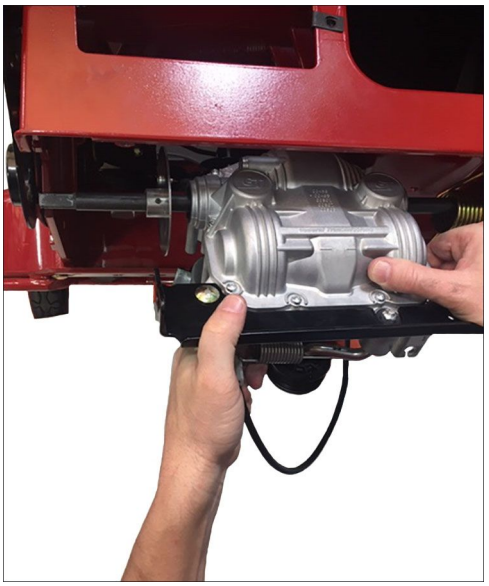
4. Install the height-of-cut spring to the RH side axle shaft.



g298182

Figure 81

5. Install the transmission to the frame with the traction cable attached.

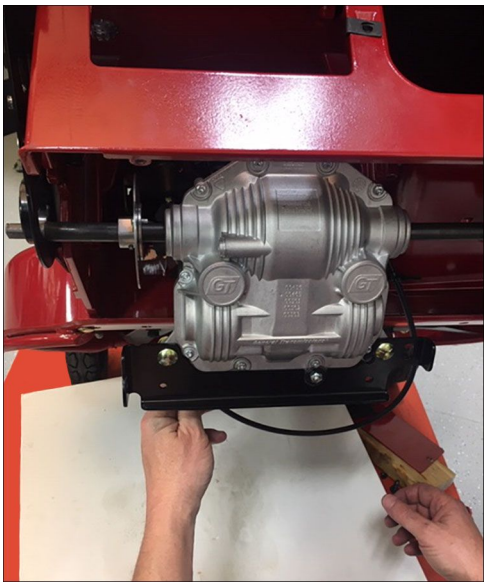


g298181

Figure 82

6. Rotate the front transmission and cable upward. Pinch the traction cable towards the transmission.

   Note: Cable should lay on top of the deck and not be pinched between the transmission and deck housing.



g297896

Figure 83

7. Slide the RH side of the height-of-cut weldment first before the LH side. Install the height-of-cut weldment to the chassis.

g297895

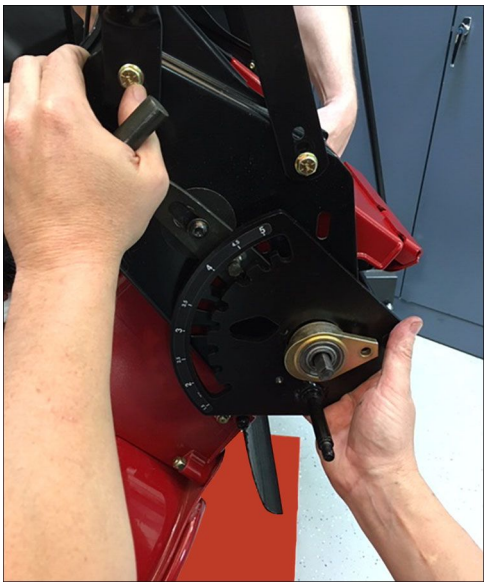
Figure 84

8. Line up the RH side height-of-cut notch with bolt. Slide the transmission to the left.

g297894

Figure 85

9. Put anti-seize inside the axle bearing before sliding over the shaft. Install the axle bearing housing assembly over the axle. Line up the mounting hole on the bearing housing assembly to the weldment hole. Install the bearing retainers in the rear axle weldment and rear height-of-cut plate for alignment purposes before securing the transmission to the frame. Install the 5/16–18 inch bolt to the axle weldment. Torque bolt to 160 ± 16 in-lbs. (18 ± 2 Nm).



g297061

Figure 86

10. Install the LH 5/16–18 inch nut to carriage bolt and the RH 1/2 inch taptite screw to the main frame securing the transmission assembly to the main housing. Torque nut to Hcarriage bolt to 140 ± 5 in-lbs. (16 ± 0.5 Nm).

g297531

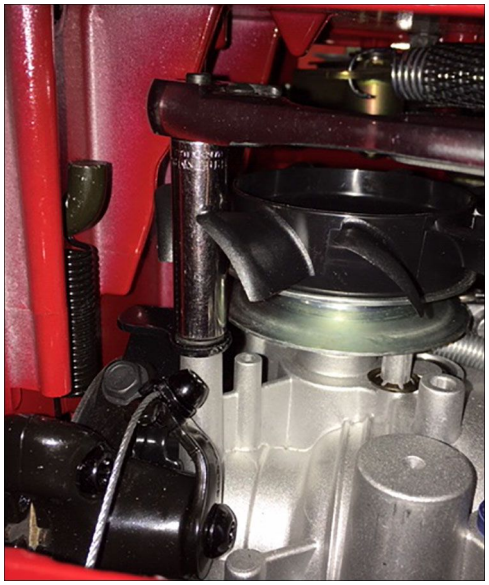
Figure 87

11. Install the 2 Phillip head screws securing the trailing shield to the main frame. Torque screws to 9 ± 1 in-lbs. (1 Nm).

g297065

Figure 88

12. Install the 3/8 inch bolt securing the parking brake to the transmission. Torque bolt to 85 ± 15 in-lbs. (9 ± 2 Nm).



g297064

Figure 89

13. Install the 1/4–20 taptite screw securing the transmission cable guard to the frame.

g297062

Figure 90

14. Install the 5/16–18 inch bolt securing the axle bearing housing to the axle height-of-cut plate. Torque bolt to 160 ± 16 in-lbs. (18 ± 2 Nm).

15. Using snap ring pillars, install the snap ring retaining the pinion gear to axle shaft.

g297059

Figure 91

16. Install the 5/16–18 inch nut on carriage bolt securing the spring bracket to the frame. Torque nut to 115 ± 15 in-lbs. (13 ± 2 Nm).

g297058

Figure 92

17. Install the mulch plug to the rear discharge.

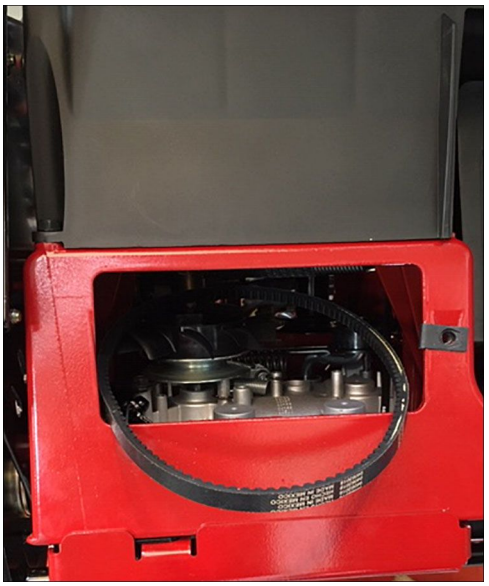
18. Install the T-30 screw securing the dust cover to the axle assembly. Torque screw to 55 ± 5 in-lbs. (6 ± 1 Nm).

g297057

Figure 93

19. Using a socket, install the 2 (3/8–16) nylock nuts securing the wheels to the rear axles. Torque nuts to 180 ± 20 in-lbs. (20 ± 2 Nm).

20. Install the belt trough the rear of the mower.



g296178

Figure 94

21. Install the transmission belt to the engine pulley.

    Note: Access belt from the front of the mower.

g302331

Figure 95

22. Install the transmission belt to the transmission pulley.
23. Using a 7/16 inch nut on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing idler arm to put tension on the belt.
24. Install the cable. Install the shoulder bolt and nut securing the cable to the traction bail. Torque shoulder bolt and nut to 75 ± 5 in-lbs. (8 ± 1 Nm).

g302449

Figure 96

25. Tighten the 1/4–20 inch nylock nut to carriage bolt securing the cable guide clamp to the handle. Adjust the housing cable so there is no slack in the cable. Torque nut to carriage bolt to 40 ± 7 in-lbs. (4 ± 1 Nm).

g296942

Figure 97

26. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque bolts to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296175

Figure 98

27. Install the 1/4–20 inch taptite screw securing the frame cover to the frame. Torque bolt to 110 ± 11 in-lbs. (12 ± 1 Nm).

g296174

Figure 99

28. Lower the rear cover.
29. Using an appropriate lifting device, lower the rear of the machine to the ground.
30. Turn the fuel on.

Brake Cable Replacement

Brake Cable Removal

1. Park the machine on a level surface. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Cut the zip tie.
4. Loosen the 1/4–20 inch nut to the carriage bolt securing the cable to the bracket.

g298346

Figure 100

5. Remove the carriage bolt and 1/4–20 inch nut securing the cable to the parking brake lever.

g298347

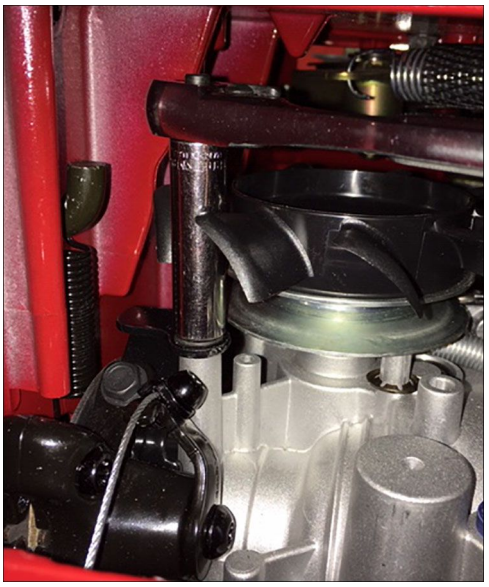
Figure 101

6. Remove the 1/4–20 taptite screw securing the transmission cable guide to the frame.

g297062

Figure 102

7. Remove the 3/8 inch bolt securing the parking brake to the transmission.



g297064

Figure 103

8. Remove the brake caliper from the frame.
9. Remove the 5 mm Allen head bolt securing the cable to the caliper.

Brake Cable Removal (continued)

g302936

Figure 104

10. Remove the brake cable up through the main frame access hole.

Brake Cable Installation

1. Thread brake cable through the main frame access hole.

2. Set cable length to 7–1/8 inch from cable clamp to end cable. Install the 5 mm Allen head bolt securing the cable to the caliper. Torque bolt to 43 in-lbs. (5 ± 1 Nm).

g302936

Figure 105

3. Install the brake caliper.

4. Install the 1/4–20 inch screw securing the parking brake to the transmission. Torque bolt to 85 ± 15 ft-lbs. (10 ± 2 Nm).

5. Install the 1/4–20 taptite screw securing the transmission cable guide to the frame.

g297062

Figure 106

6. Install the 1/4–20 inch shoulder bolt and 1/4–20 inch nylock nut securing the cable to the parking brake lever. Torque bolt and nut to 75 ± 5 in-lbs. (8 ± 1 Nm).

g298347

Figure 107

7. Tighten the 1/4–20 inch nut to the carriage bolt securing the cable to the bracket. Torque bolt to 40 ± 7 ft-lbs. (4 ± 1 Nm). Adjust housing cable so the machine rolls freely when parking brake is disengaged but stop machine from rolling when engaged.

g298346

Figure 108

8. Install zip ties securing the cable to the handle assembly.

Parking Brake Lever Assembly Replacement

Parking Brake Lever Assembly Removal

1. Park the machine on a level surface. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Remove the 1/4–20 inch nylock nut to 1/4–20 inch carriage bolt securing the parking brake assembly to the handle.

g298358

Figure 109

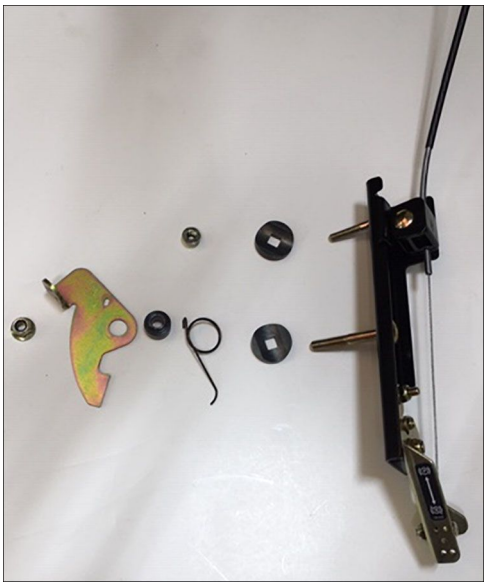
4. Remove the 5/16–18 inch nylock nut to 5/16–18 inch carriage bolt securing the parking brake assembly to the handle.

Parking Brake Lever Assembly Removal (continued)

g298359

Figure 110

5. Remove the parking brake assembly from the handle.



g298360

Figure 111

Parking Brake Lever Assembly Installation

1. Install the parking brake assembly to the handle.

2. Install the 5/16–18 inch bolt/nut to carriage bolt securing the parking brake assembly to the handle. Torque nut to 80 ± 10 in-lbs. (9 ± 1 Nm).

g298359

Figure 112

3. Install the 1/4–20 inch nylock nut to 1/4–20 carriage bolt securing the parking brake assembly to the handle. Torque nut to carriage bolt to 40 ± 7 in-lbs. (4 ± 1 Nm).

g298358

Figure 113

Handle Replacement

Handle Removal

1. Park the machine on a level surface. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Cut the zip tie.

4. Loosen the 1/4–20 inch nylock nut to 1/4–20 inch carriage bolt securing the brake cable to the bracket.

g298346

Figure 114

5. Remove the carriage bolt and 1/4–20 inch nut securing the cable to the parking brake lever.

g298347

Figure 115

6. Remove the 1/4–20 inch nylock nut to 1/4–20 carriage bolt securing the parking brake assembly to the handle.

g298358

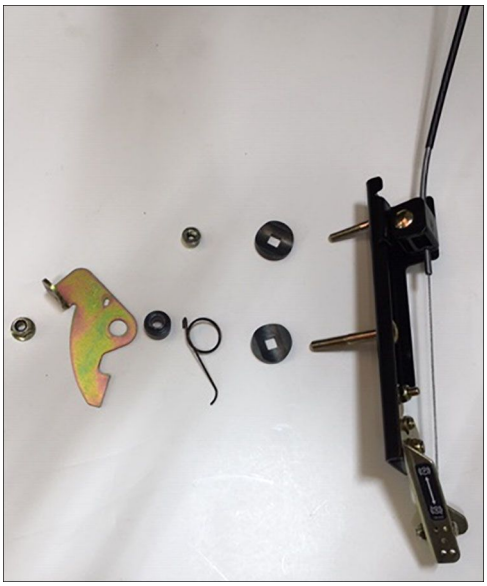
Figure 116

7. Remove the 5/16–18 inch nylock nut to 5/16–18 carriage bolt securing the parking brake assembly to the handle.

g298359

Figure 117

8. Remove the parking brake assembly from the handle.



g298360

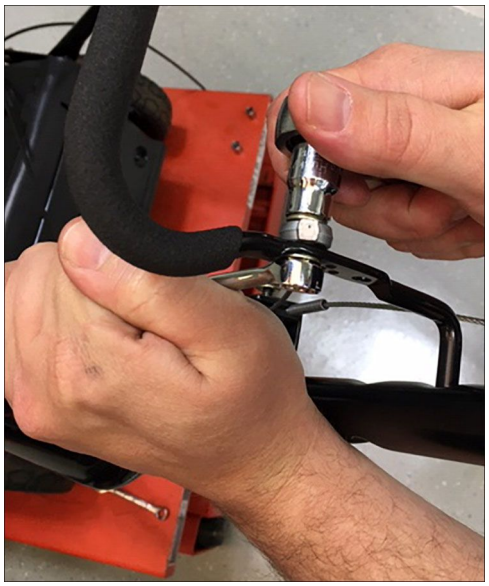
Figure 118

9. Remove the 1/4–20 inch nylock nut to carriage bolt. Pull cable housing towards bail to gain slack in cable to release cable tension. Remove the cable clamp assembly from the handle.

g298489

Figure 119

10. Remove the 1/4–20 inch shoulder bolt and nut securing the cable to the BBC bail. Remove the cable.



g302395

Figure 120

11. Remove BBC bail by pushing inward on one side and lifting away from the handle assembly.

g296943

Figure 121

12. Remove traction bail by pushing inward on one side and lifting away from the handle assembly.
13. Remove the 5/16–18 inch nuts to 5/16–18 inch carriage bolt and 4 (2 per side) bolts with captured nuts securing the handle to the main frame.

Handle Removal (continued)

g298491

Figure 122

14. Remove handle assembly from the machine.

g298492

Figure 123

Handle Installation

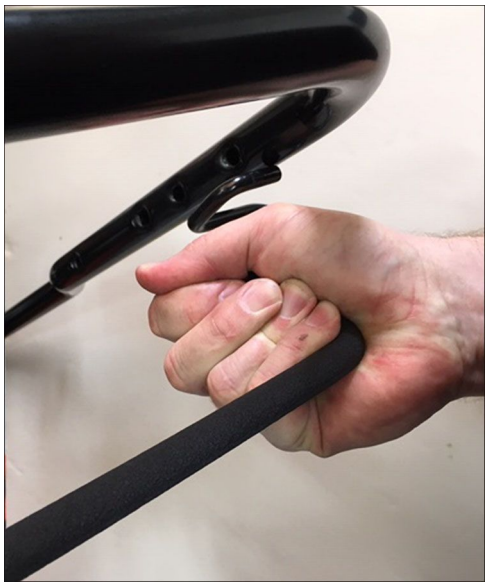
1. Install the handle assembly to the machine.

2. Install the 5/16–18 inch bolt/nuts to carriage bolt and 4 (2 per side) bolts with captured nuts. Torque nuts to 80 ± 10 in-lbs. (9 ± 1 Nm). Torque bolt to frame to 300 ± 30 in-lbs. (34 ± 3 Nm).

g298491

Figure 124

3. Install the traction bail to the handle assembly.



g302451

Figure 125

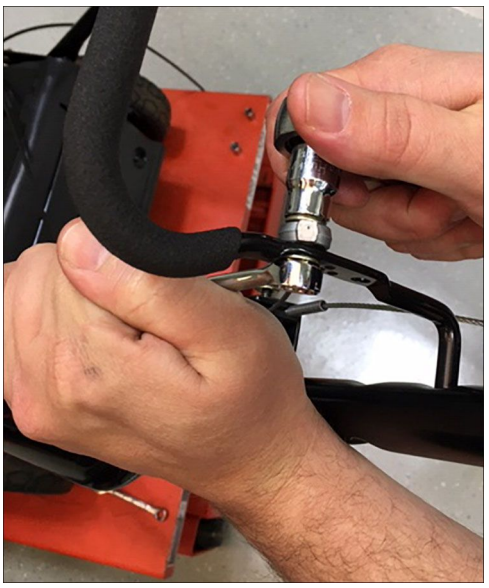
4. Install the cable. Install the bolt and nut securing the cable to the traction bail. Torque shoulder bolt and nut to 75 ± 5 in-lbs. (9 ± 1 Nm).

g298490

Figure 126

5. Install the BBC bail onto the handle assembly.

6. Install the cable. Install the 1/4–20 inch shoulder bolt and nut securing the cable to the BBC bail. Torque bolt and nut to 75 ± 5 in-lbs. (9 ± 1 Nm).



g302395

Figure 127

7. Install the 1/4–20 inch nylock nut to carriage bolt securing the cable guide clamp to the handle. Torque nut to carriage bolt to 40 ± 7 in-lbs. (4 ± 1 Nm). adjust housing cable.

g298489

Figure 128

8. Install zip ties securing the cable to the handle assembly.
9. Install the parking brake assembly to the handle.

10. Install the 5/16–18 inch bolt/nut to carriage bolt securing the parking brake assembly to the handle. Torque bolt/nut to 80 ± 10 in-lbs. (9 ± 1 Nm).

g298359

Figure 129

11. Install the 1/4–20 inch nylock nut to 1/4–20 inch carriage bolt securing the parking brake assembly to the handle. Torque nut to carriage bolt to 40 ± 7 in-lbs. (4 ± 1 Nm).

g298358

Figure 130

12. Install the 1/4–20 inch shoulder bolt and 1/4–20 inch nylock nut securing the cable to the parking brake lever. Torque bolt and nut to 75 ± 5 in-lbs. (8 ± 1 Nm).

g298347

Figure 131

13. Tighten the 1/4–20 inch nut to the carriage bolt securing the cable to the bracket. Torque bolt to 40 ± 7 in-lbs. (4 ± 1 Nm). Adjust housing cable so the machine rolls freely when the parking brake is disengaged but stop machine from rolling when engaged.

g298346

Figure 132

14. Install zip ties securing the cable to the handle assembly.

Table of Contents

General Information

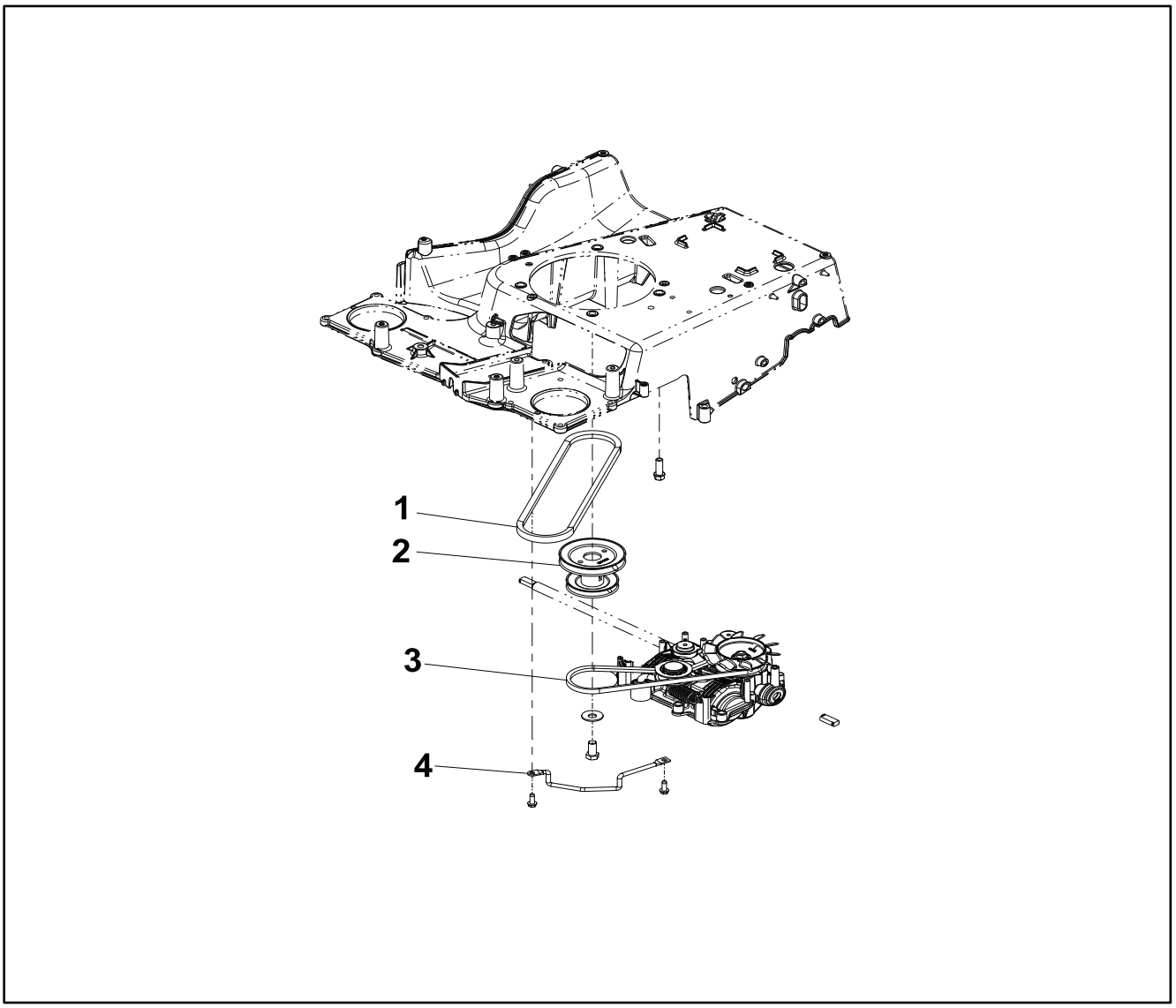
There are 3 belts on this unit that will need minimal maintenance for proper function, 2 belts are for the blade drive and 1 is the transmission drive belt. Blade drive has a timing belt on the cutting deck and clutching belt from the engine to the deck. None of the belts on the machine require greasing.

The timing belt is installed so the blades are 90 degrees to each other. Maintenance consist of cleaning under the belt shield and tension adjustment of the idler pulley. Not maintaining tension (over tension and under tension), will cause the loss of material of the flat areas of belt and pulleys.

The BBC belt is tensioned by the bail and cable. See the Controls section.

The transmission belt is self-tensioning and has minimal maintenance.

Belts Assembly 1



g299420

Figure 133

1. BBC Belt
2. Engine Pulley
3. Transmission Belt
4. Belt Guide Rod

BBC Belt Replacement

BBC Belt Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the frame cover to the frame.

g296174

Figure 134

6. Remove the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame.

g296175

Figure 135

7. Rotate the belt tensioner arm by turning the 7/16 inch nut on the bottom side of the transmission clockwise.

g302330

Figure 136

8. Align the idler pulley with the access hole on the bottom side of the transmission to remove the belt tension. Insert a quarter inch screw driver.

   Note: Screw driver needs to fit through access hole and the idler pulley slot securing the arm/pulley into position.

g296176

Figure 137

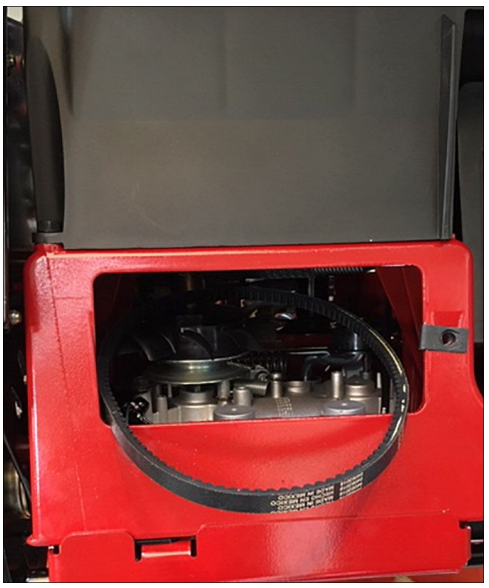
9. Remove the transmission belt from the engine pulley.

   Note: Access belt from the front of the mower.

g302331

Figure 138

10. Remove the belt from the rear of the mower.



g296178

Figure 139

11. Remove the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Remove the belt guide.

g296179

Figure 140

12. Loosen the ½ inch nylock nut from the BBC idler arm pivot until flush with bottom bolt. Secure the topside of the bolt with a ½ inch wrench.

    Note: Gain access through the front of the main frame, top side of the deck.

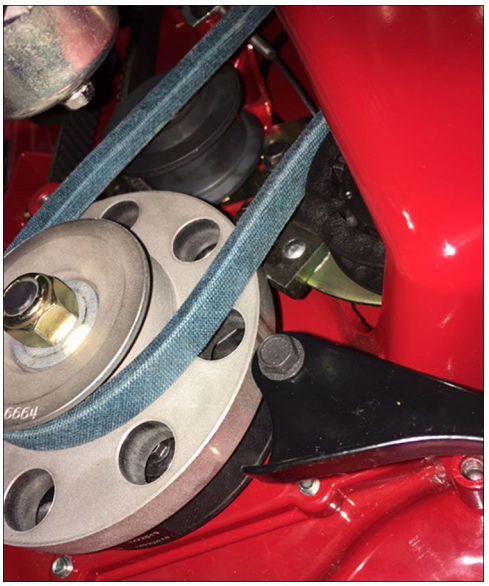
g296180

Figure 141

13. Move the brake arm downwards to release from the pulley.

    Note: Releases pulley pressure from belt.

BBC Belt Removal (continued)



g302385

Figure 142

14. Remove the BBC belt from the pulley.

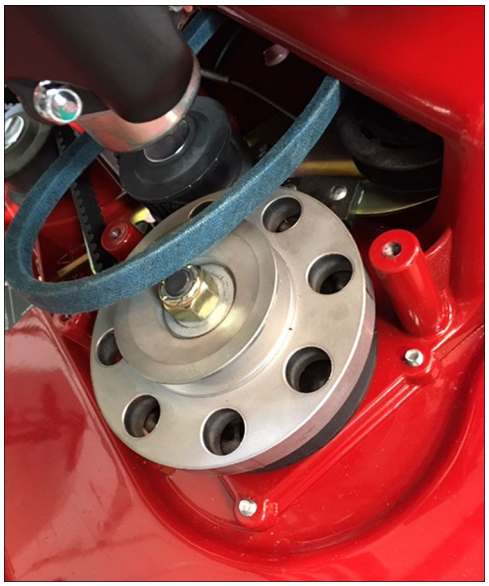
g296181

Figure 143

15. Remove the BBC belt from rear of the mower.

BBC Belt Installation

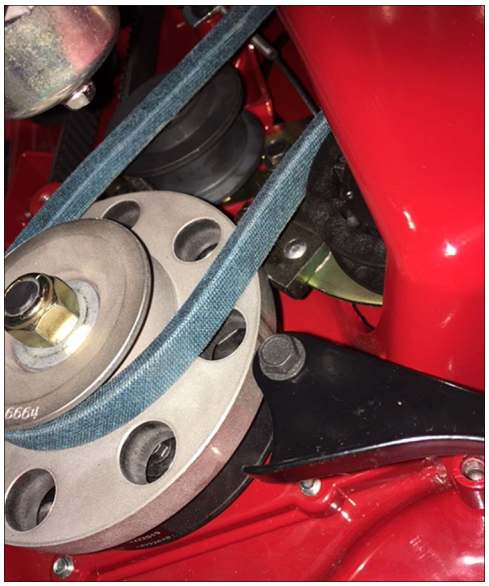
1. Install the BBC belt through the rear of the mower.
2. Install the BBC belt to the engine pulley.
3. Install the BBC belt to the brake pulley.



g296181

Figure 144

4. Move the brake upwards to align with the pulley.

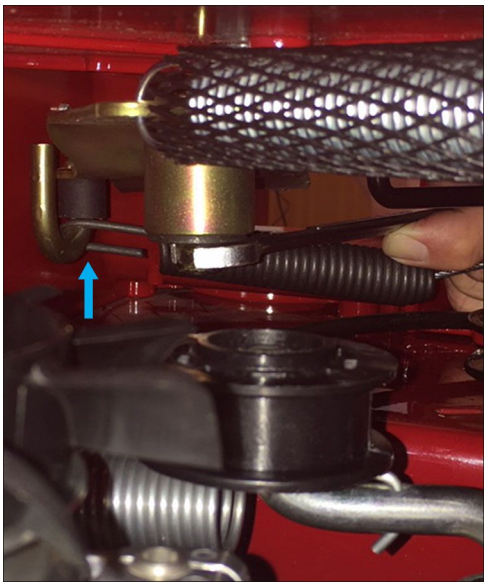


g302385

Figure 145

5. Tighten the 1/2 inch nylock nut to the BBC idler arm pivot. Secure the topside of the bolt with a 1/2 inch wrench. Torque nut and bolt to 200 ± 20 in-lbs. (22 ± 2 Nm).

   Note: Access through the front side of the frame.



g305213

Figure 146

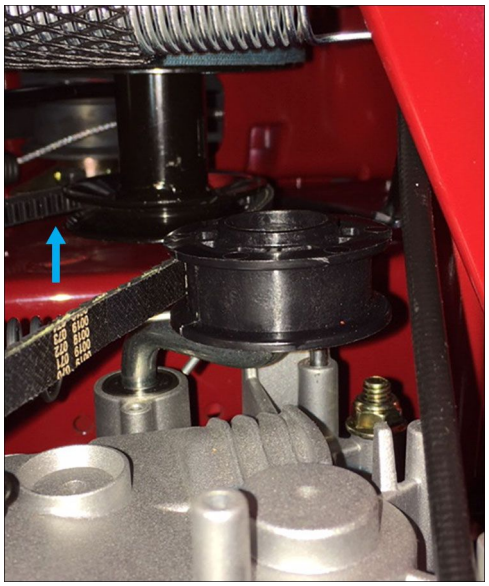
6. Install the belt guide. Install the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Torque screws to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296179

Figure 147

7. Install the transmission belt through the rear of the mower.
8. Install the transmission belt to the engine pulley.

   Note: Access belt/engine pulley from the front of the mower.



g302331

Figure 148

9. Install the transmission belt to the transmission pulley.
10. Using a 7/16 inch nut on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing idler arm to put tension on the belt.
11. Reinstall the cable guide.
12. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque bolts to 55 ± 5 in-lbs. (6 ± 1 Nm).

g296175

Figure 149

13. Install the 1/4–20 inch taptite screw securing the frame access cover to the frame. Torque bolt to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296174

Figure 150

14. Lower the rear cover.
15. Using an appropriate lifting device, lower the rear of the machine to the ground.

Transmission Belt Replacement

Transmission Belt Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the access cover to the frame.

g296174

Figure 151

6. Remove the 4 (1/4–20 inch) taptite screws securing the front cover to the frame.

g296175

Figure 152

7. Rotate the belt tensioner arm clockwise from the bottom side of the transmission.

g302330

Figure 153

8. To remove belt tension, align the idler pulley with the access hole on the bottom side of the transmission. Insert a quarter inch screw driver.

   Note: Screw driver needs to fit through access hole and the idler pulley slot securing the pulley/idler arm into position.

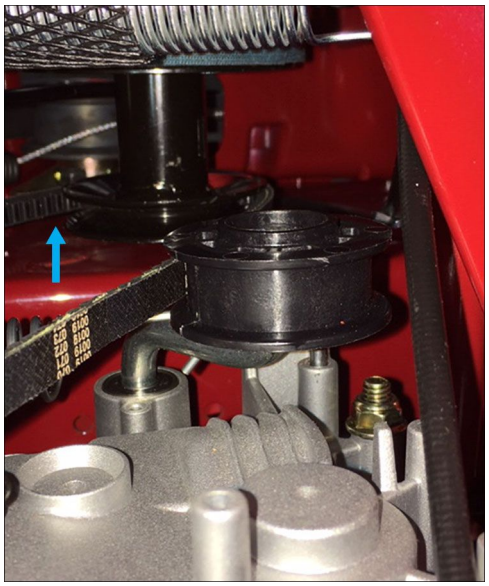
g296176

Figure 154

9. Remove the transmission belt from the engine pulley.

   Note: Access belt from the front of the mower.

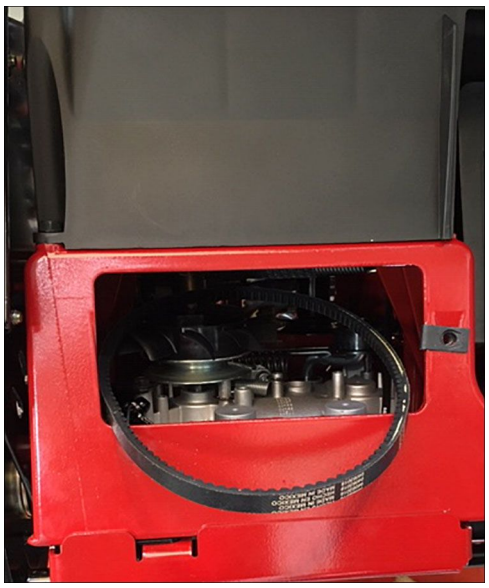
Transmission Belt Removal (continued)



g302331

Figure 155

10. Remove the belt from the rear of the mower.



g296178

Figure 156

Transmission Belt Installation

1. Install the belt through the rear of the mower.
2. Install the transmission belt to the engine pulley.

   Note: Access belt/engine pulley from the front of the mower.

g302331

Figure 157

3. Install the belt on the transmission pulley.
4. Using a 7/16 inch nut on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing idler arm to put tension on the belt.

5. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque bolts to 55 ± 5 in-lbs. (6 ± 1 Nm).

g296175

Figure 158

6. Install the 1/4–20 inch taptite screw securing the frame access cover to the frame. Torque bolt to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296174

Figure 159

7. Lower the rear cover.
8. Using an appropriate lifting device, lower the rear of the machine to the ground.

Engine Pulley Belt Guide Replacement

Engine Pulley Belt Guide Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the frame access cover to the frame.

g296174

Figure 160

6. Remove the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame.

g296175

Figure 161

7. Rotate the belt tensioner arm by turning the 7/16 inch nut on the bottom side of the transmission clockwise.

g302330

Figure 162

8. To remove belt tension, align the idler pulley with the access hole on the bottom side of the transmission. Insert a quarter inch screw driver.

   Note: Screw driver needs to fit through access hole and the idler pulley slot securing the pulley/idler arm into position.

g296176

Figure 163

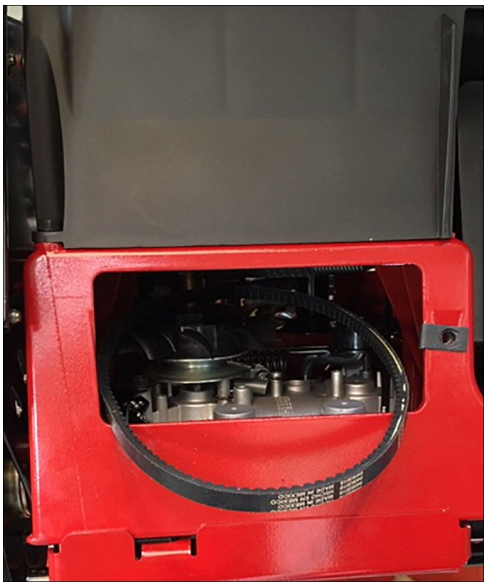
9. Remove the transmission belt from the engine pulley.

   Note: Access belt from the front of the mower.

g302331

Figure 164

10. Remove the belt through the rear of the mower.



g296178

Figure 165

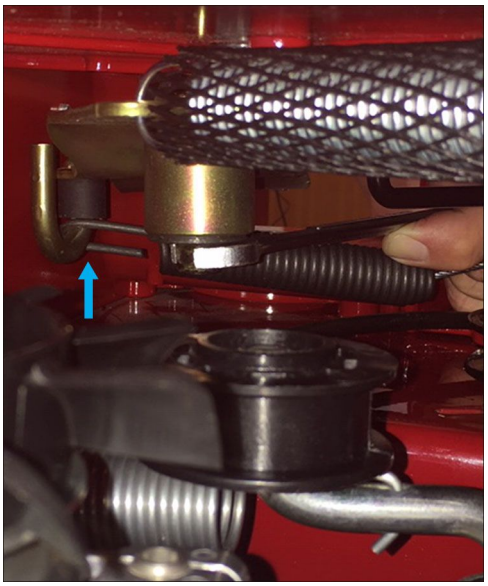
11. Remove the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Remove the belt guide.

g296179

Figure 166

12. Loosen the ½ inch nylock nut from the BBC idler arm pivot until flush with bottom bolt. Secure the topside of the bolt with a ½ inch wrench.

    Note: Access through the front side of the frame.

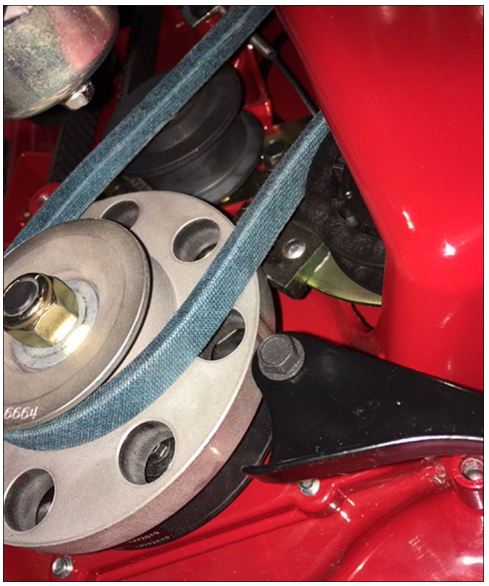


g305213

Figure 167

13. Move the brake arm downwards to release from pulley.

    Note: Releasing pulley pressure from the belt.



g302385

Figure 168

14. Remove the BBC belt from the pulley.

g296181

Figure 169

15. Remove the BBC belt from rear of the mower.
16. Remove the 2 (1/4–20 inch) taptite screws securing the guide to the frame.

    Note: To remove front bolt, go through the access hole in the deck with a 10 (3/8 inch) drive extension and a 3/8 inch socket with a universal joint.

Engine Pulley Belt Guide Removal (continued)

g296180

Figure 170

17. Remove the belt guide.
18. Replace engine pulley belt guide.

Engine Pulley Belt Guide Installation

1. Using a 6 inch long, quarter inch drive extension and a 1/2 inch deep well socket, put the extension in the access hole with socket off. Then from the back side reinstall the socket to extension (hole is only large enough for extension). Place the socket on top of the extension on the top of the deck

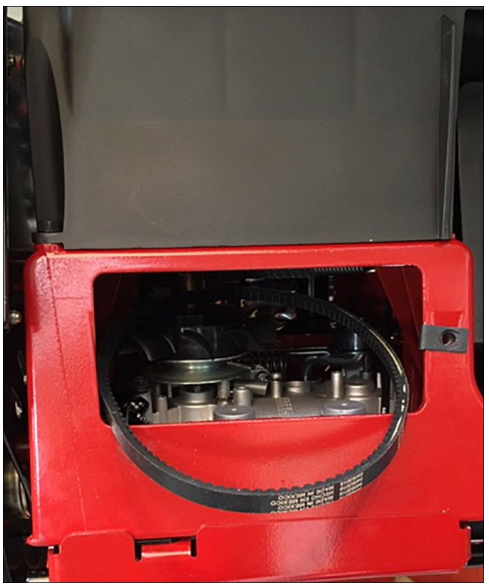
g296180

Figure 171

2. Install the 2 (1/4–20 inch) taptite screws securing the belt guide and guide to the machine. Torque 80 ± 10 in-lbs. (9 ± 1 Nm).

Note: To install the front bolt, go through the access hole in the deck with a 10 (3/8 inch) drive extension and a 3/8 inch socket with a universal joint.

3. Install the BBC belt through the rear of the mower.



g296178

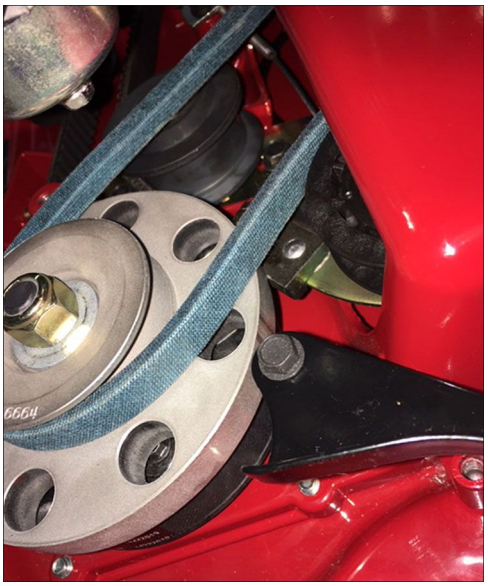
Figure 172

4. Install the BBC belt to the engine pulley.
5. Install the BBC belt to the BBC brake pulley.

g296181

Figure 173

6. Move the brake arm upwards to engage the belt with the idler pulley.



g302385

Figure 174

7. Tighten the ½ inch nylock nut to the BBC idler arm pivot. Secure the topside of the bolt with a ½ inch wrench. Torque nut and bolt to 200 ± 20 in-lbs. (22 ± 2 Nm).

8. Install the belt guide. Install the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Torque bolts to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296179

Figure 175

9. Install the transmission belt to through rear of the mower.
10. Install the transmission belt to the engine pulley.

    Note: Access belt/engine pulley from the front of the mower.

g302331

Figure 176

11. Install the transmission belt to the transmission pulley.
12. Using a 7/16 inch nut on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing idler arm to put tension on the belt.

13. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque bolts to 55 ± 5 in-lbs. (6 ± 1 Nm).

g296175

Figure 177

14. Install the 1/4–20 inch taptite screw securing the frame cover to the frame. Torque bolt to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296174

Figure 178

15. Lower the rear cover.
16. Using an appropriate lifting device, lower the rear of the machine to the ground.

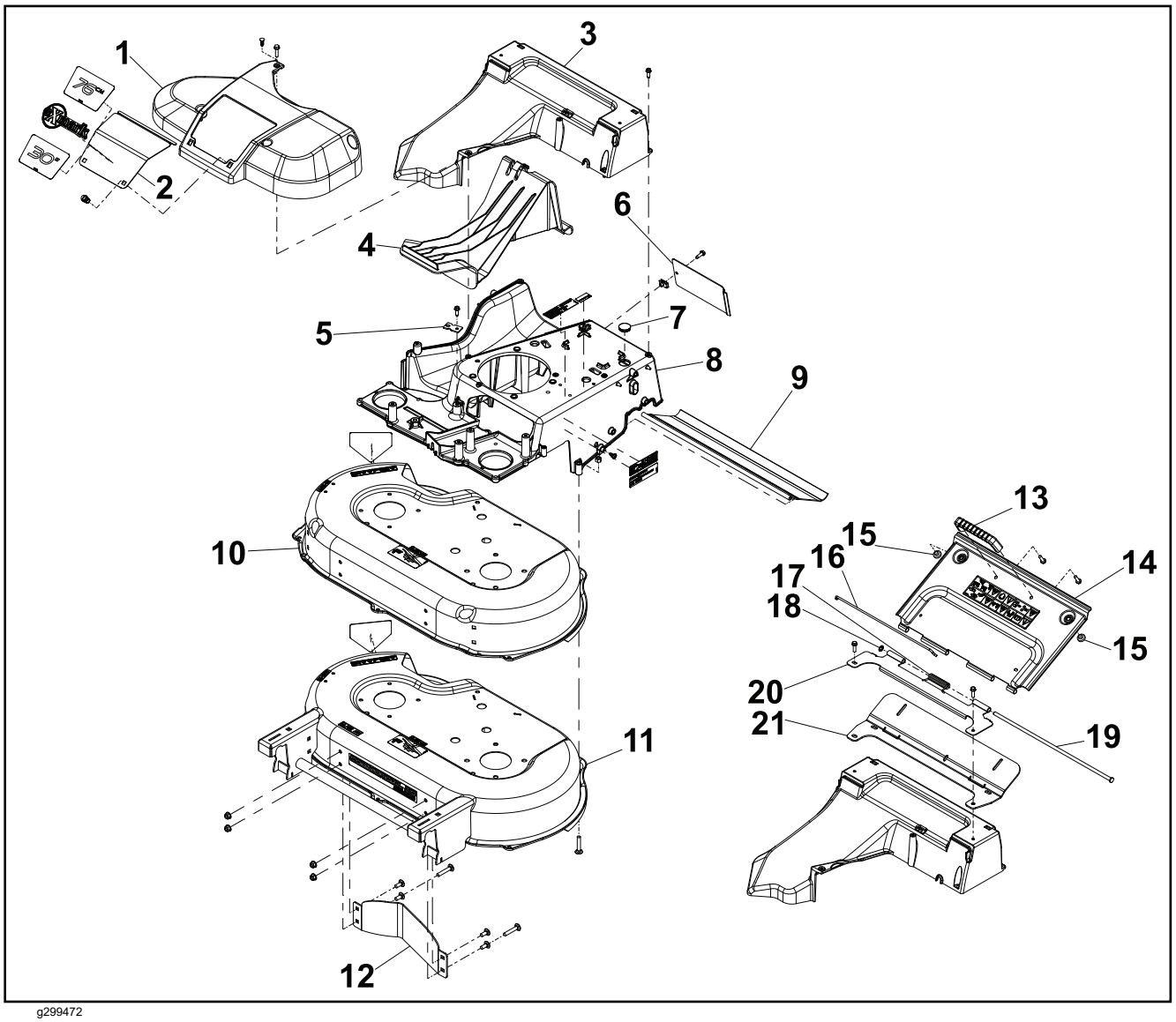
Table of Contents

General Information

Deck is constructed to side discharge, mulch and bag. Unit has 2 blades that utilize a sheer pin driver to protect the deck from damage in the event of the blade impacting an object. Only maintenance needed is occasional cleaning of the underside of the deck.

Service and Repairs

Deck Assembly 1

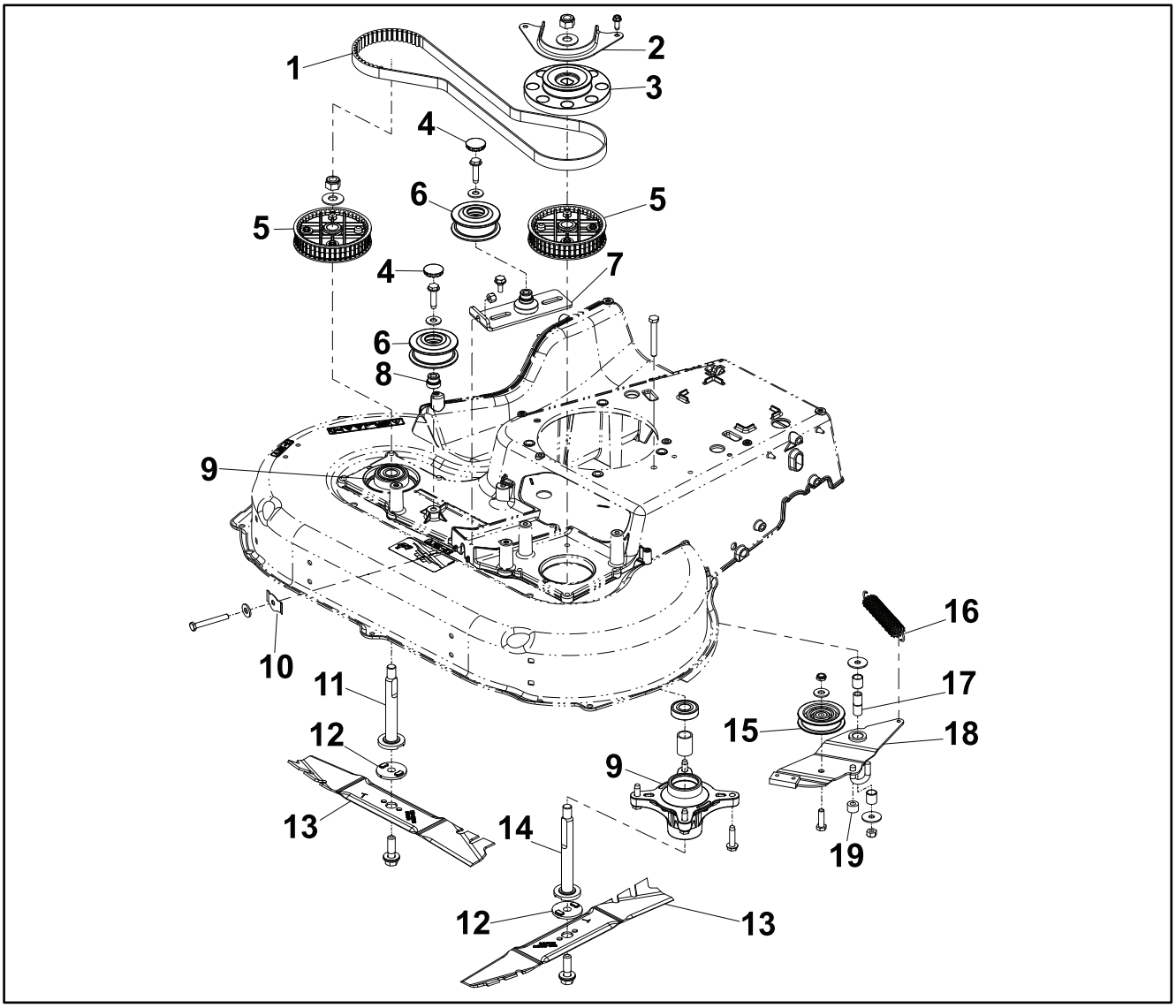


g299472

Figure 179

1. Belt Cover
2. Access Door
3. Chute
4. Mulch Plug
5. Traction Cable Bracket
6. Frame Cover
7. Button Plug
8. 30 Inch Frame
9. Trailing Shield
10. 30 Inch Deck
11. ExMark 30 Inch Deck
12. Control Baffle
13. Door Handle
14. Rear Door Asm.
15. Bumper
16. Seal Clip
17. Torsion Spring
18. Retaining Ring
19. Hinge Pin
20. Hinge Bracket
21. Door Seal

Deck Assembly 2

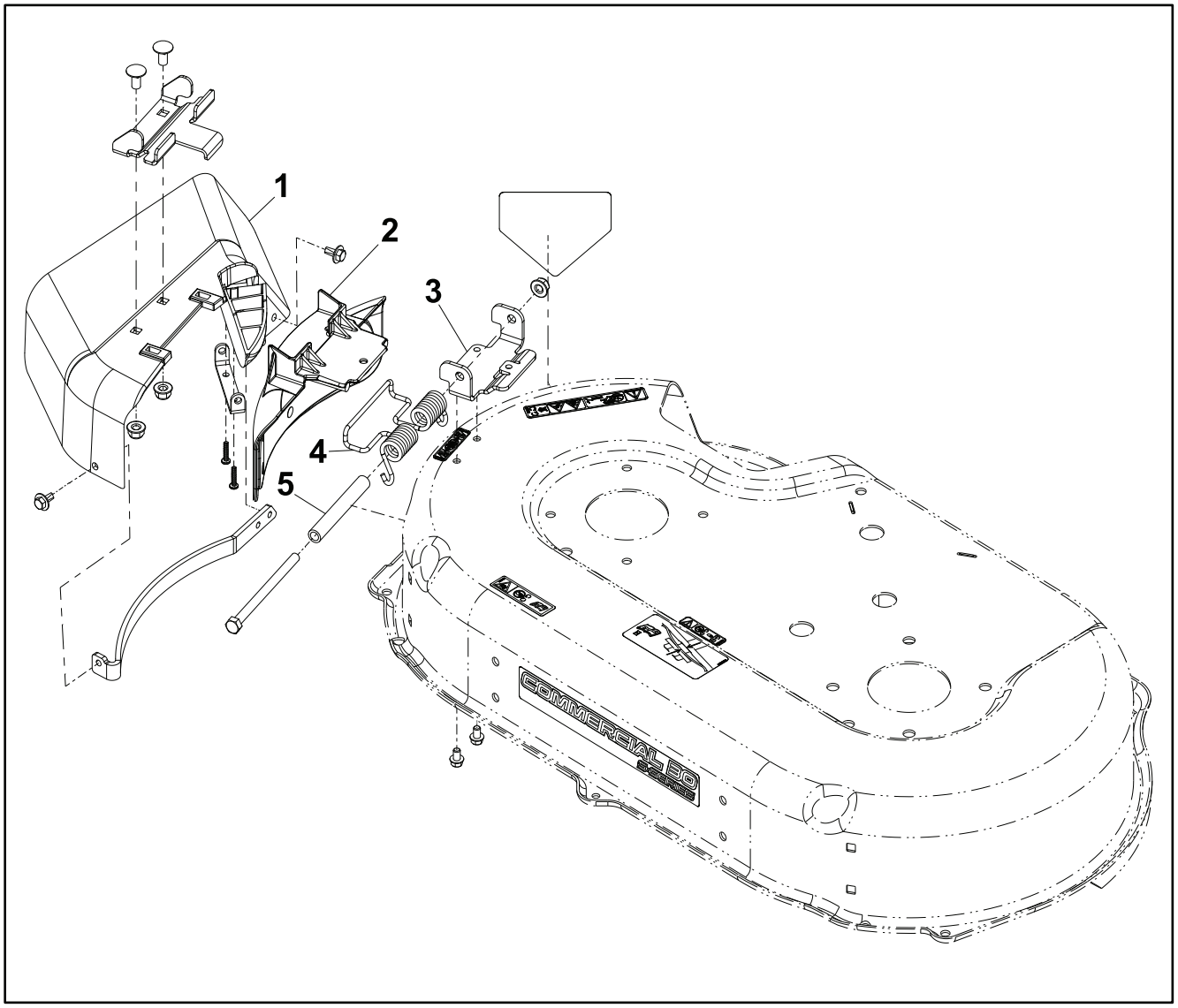


g299485

Figure 180

1. Synchronous Belt
2. Spindle Belt Guide
3. Spindle Brake Pulley
4. Button Plug
5. Sprocket Asm.
6. Flat Idler Pulley
7. Idler Bracket
8. Bore Adapter
9. Spindle Asm.
10. Flat Spring
11. RH Spindle Shaft
12. Blade Adapter
13. Rotary Blade
14. LH Spindle Shaft
15. Idler Pulley
16. Brake Extension Spring
17. Brake Spacer
18. Brake Arm Asm.
19. Coolant Hose

Deck Assembly 3



g299487

Figure 181

1. Side Discharge Chute Asm.
2. Discharge Cover
3. Hinge
4. Torsion Spring
5. Spacer

Deck Replacement

Deck Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the cover to the frame.

g296174

Figure 182

6. For Kawasaki engines, remove the 4 (1/4–20 inch) taptite screws securing the front cover to the frame. For Kohler engines, remove the 3 (1/4–20 inch) taptite screws and christmas tree clip securing the front cover to the frame.

g296175

Figure 183

7. Rotate the belt tensioner arm by using a 7/16 inch socket on the nut at the bottom side of the transmission, turning clockwise.

g302330

Figure 184

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8. To remove belt tension, align the idler pulley with the access hole on the bottom side of the transmission. Insert a quarter inch screw driver.

   Note: Screw driver needs to fit through access hole and the idler pulley slot securing the pulley into position.

g296176

Figure 185

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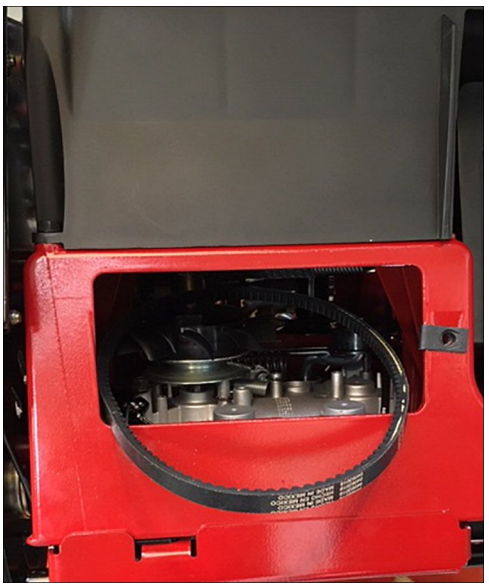
9. Remove the transmission belt from the engine pulley.

   Note: Access belt from the front of the mower.

g302331

Figure 186

10. Remove the belt from the rear of the mower.



g296178

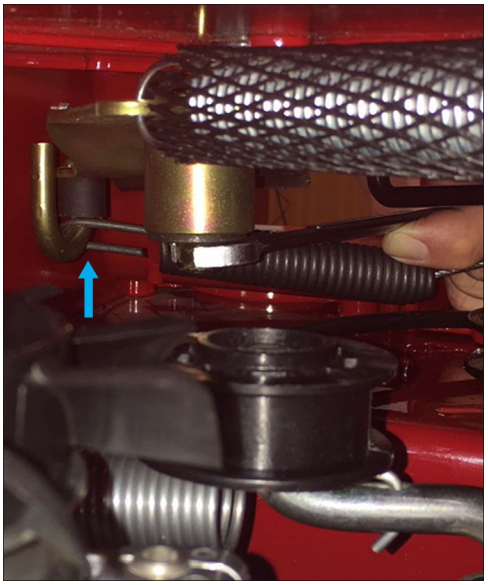
Figure 187

11. Remove the 2 (1/4–20) taptite screws securing the front BBC belt guide to the bosses on the frame. Remove the belt guide.

g296179

Figure 188

12. From the front, loosen the 5/16–18 inch nylock nut from the BBC idler arm pivot until flush with bottom bolt. Secure the topside of the bolt with a ½ inch wrench.

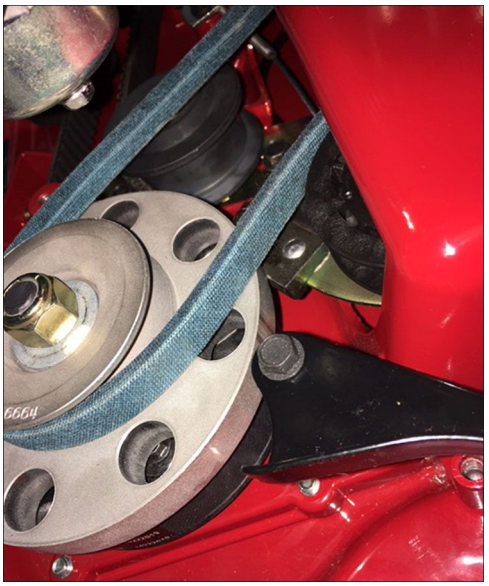


g305213

Figure 189

13. Move the brake arm downwards to release from pulley.

    Note: Releasing pulley pressure from the belt.



g302385

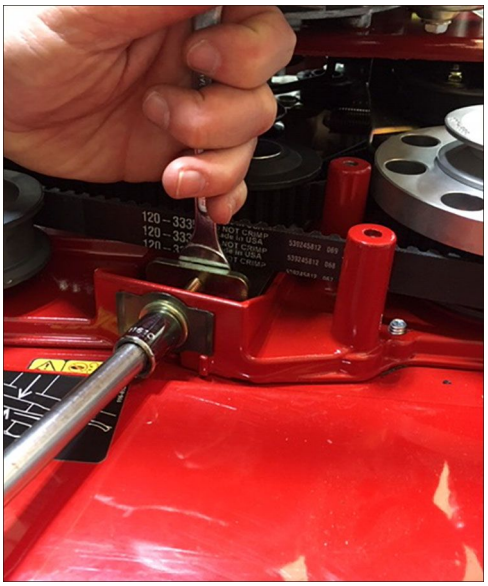
Figure 190

14. Remove the BBC belt from the pulley.

g296181

Figure 191

15. Remove the BBC belt from rear of the mower.
16. Remove the belt tension (5/16–18 inch) bolt and nut to relieve tension from the blade timing belt.

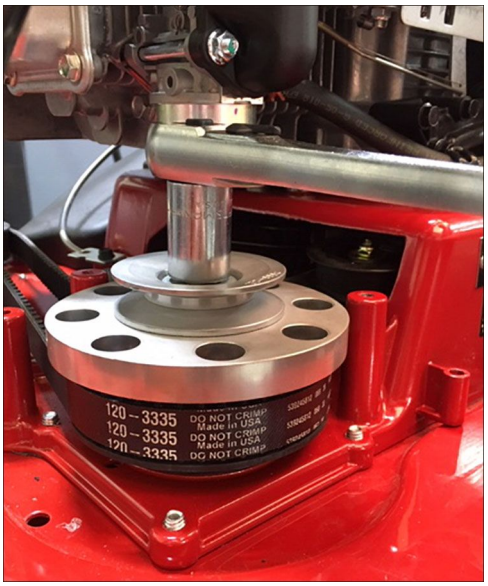


g298542

Figure 192

17. Remove the 2 (1/2–20) inch nut from the BBC pulley. Pull the BBC brake pulley off the left side spindle.

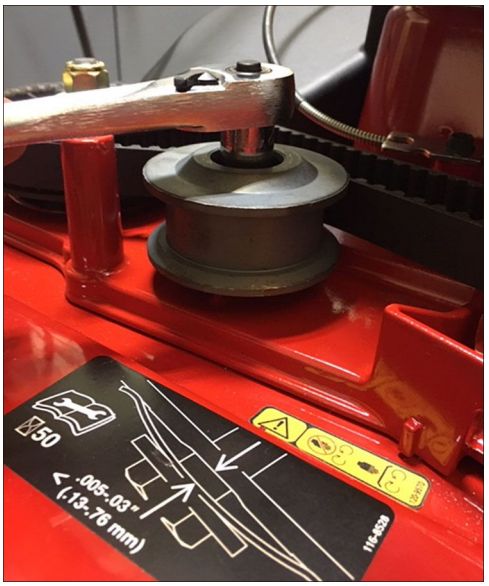
    Note: Secure blade with a wood block.



g298543

Figure 193

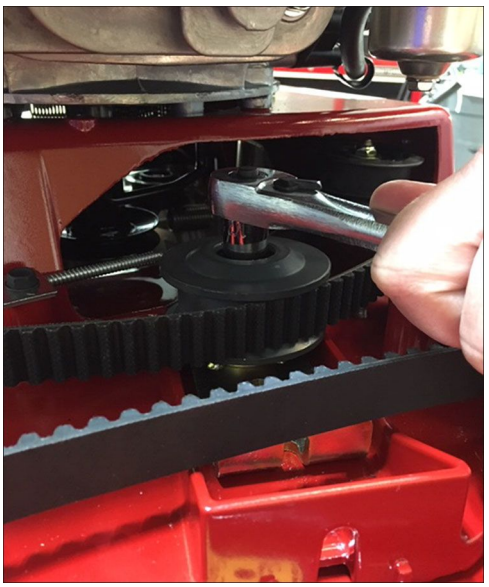
18. Remove both dust covers and idler pulleys from the main frame.
19. Remove the 5/16–18 inch bolt securing the fixed idler pulley to the frame.



g298544

Figure 194

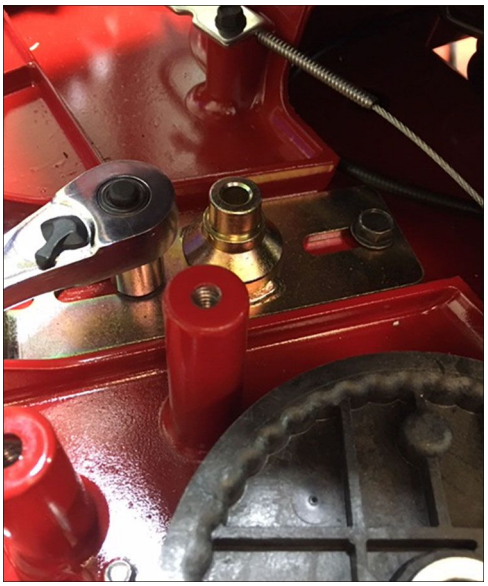
20. Remove the 5/16–18 inch bolt securing the idler pulley to the belt tension assembly.



g304130

Figure 195

21. Remove the blade timing belt from the spindle pulleys.
22. Remove the 2 (1/4–20 inch) shoulder bolts securing the tension idler bracket from the frame.



g298545

Figure 196

23. Remove the 2 sprocket pulleys and BBC pulley from the spindle assembly.
24. Remove blade and spindle shaft from spindle hub.

    Note: Spindle shaft and blade will drop out of the bottom side of the machine.

g298546

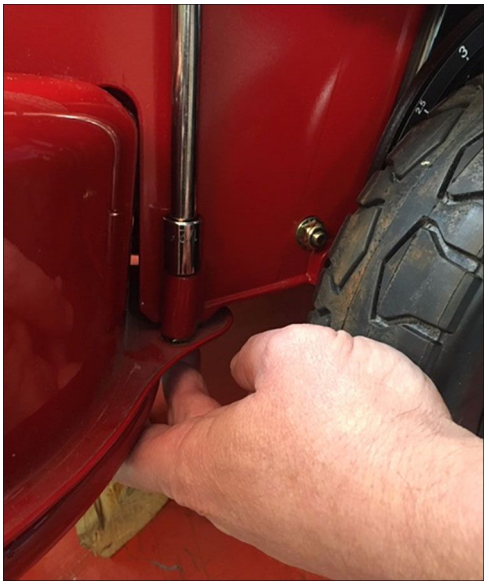
Figure 197

25. Remove the 8 (5/16–18 inch) taptite screws securing spindle hub assembly to the main frame.

g298547

Figure 198

26. Remove the 2 (1/2 inch) nuts to carriage bolts securing the deck shell to the main frame.



g304131

Figure 199

27. Remove the deck shell from the main frame.

    Note: Image shows the front bumper removed.

Deck Removal (continued)

g298548

Figure 200

Deck Disassembly

1. Pull up on the spring latch and remove the discharge cover.

g298549

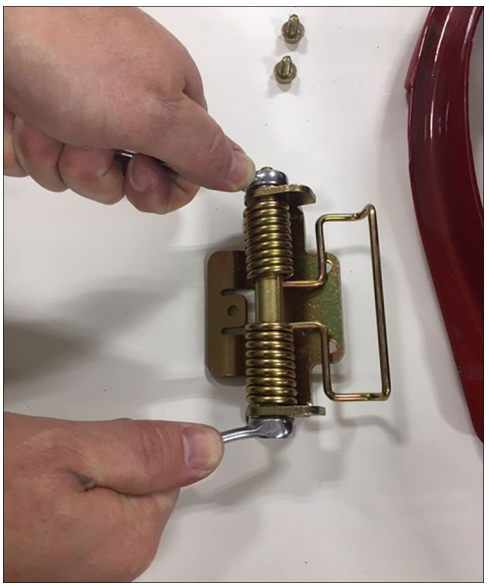
Figure 201

2. Remove the 2 (5/16–18 inch) carriage bolts securing the spring latch to the deck shell.

g298613

Figure 202

3. Remove the 5/16–18 inch nut and bolt securing the spring bushing to the spring bracket.

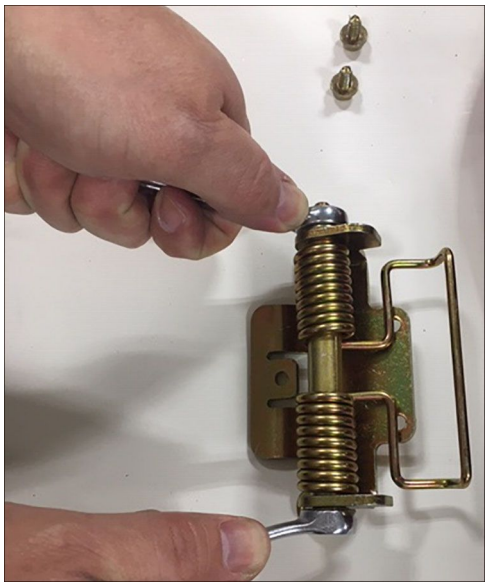


g304132

Figure 203

Deck Assembly

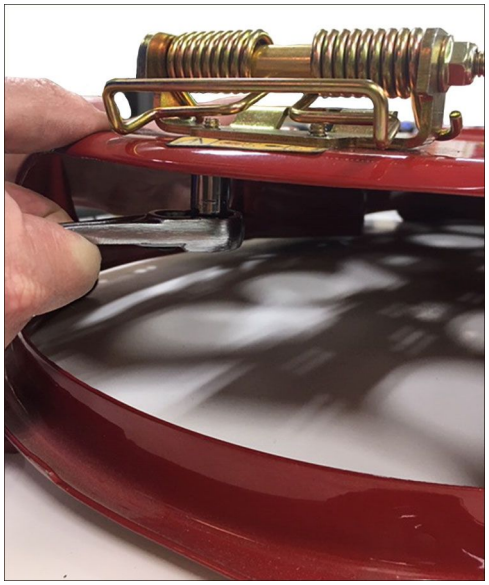
1. Install the 5/16–18 inch bolt and flange nut securing the spring bushing to the spring bracket. Torque nut and bolt to 200 ± 20 in-lbs. (22 ± 2 Nm).



g298614

Figure 204

2. Install the 2 (5/16–18 inch) bolt and nut securing the spring latch to the deck shell. Torque screw to 25 ± 3 in-lbs. (2.8 ± 0.4 Nm).



g298613

Figure 205

3. Install the discharge cover.

g298549

Figure 206

Deck Installation

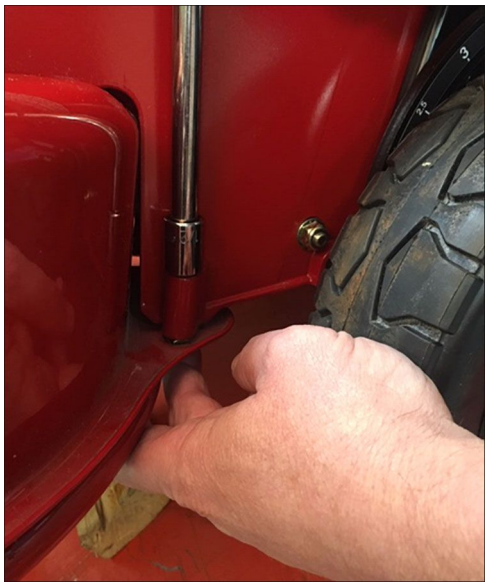
1. Install the deck shell to the main frame.

g298548

Figure 207

2. Install the 2 (5/16–18 inch) nuts to carriage bolts securing the deck shell to the main frame. Torque bolts to 200 in-lbs. (22.6 Nm).

   Note: Bolt is installed from the bottom and the nut from on top.



g304131

Figure 208

3. Install the 8 (5/16–18 inch) bolts securing spindle hub assembly to the main frame. Torque bolts to 160 ± 16 in-lbs. (18 ± 2 Nm).

g298547

Figure 209

4. Install the blade and spindle shaft to the spindle hub.

g298546

Figure 210

5. Install the 2 sprocket pulleys and BBC pulley to the spindle assembly.
6. Loosely install the 1/2–20 nut to spindle shaft.

7. Install the 2 (1/4–20 inch) shoulder bolts securing the tension idler bracket to the frame. Torque bolts to 110 ± 11 in-lbs. (12 ± 2 Nm).

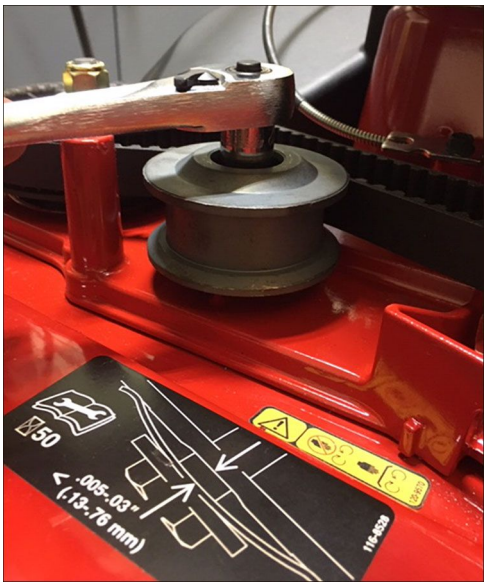
g298545

Figure 211

8. Install the blade timing belt to the spindle pulleys.

   Note: Blades need to be timed 90 degrees apart.

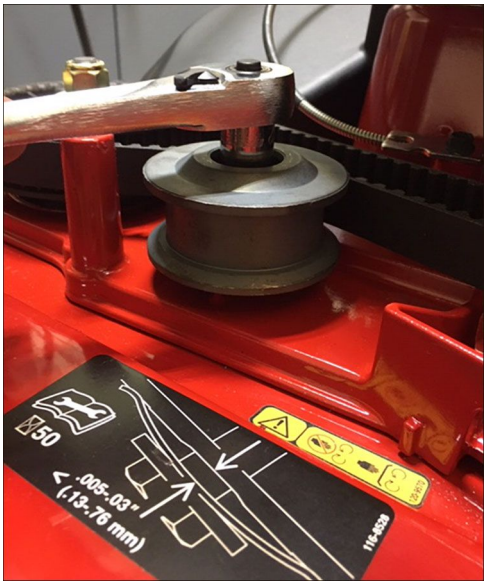
9. Install the 5/16–18 bolt securing the idler pulley to the belt tension assembly. Torque bolt to 160 ± 16 ft-lbs. (18 ± 2 Nm).



g298544

Figure 212

10. Install the 5/16–18 inch bolt securing the fixed idler pulley to the frame. Torque bolt to 160 ± 16 in-lbs. (18 ± 2 Nm).



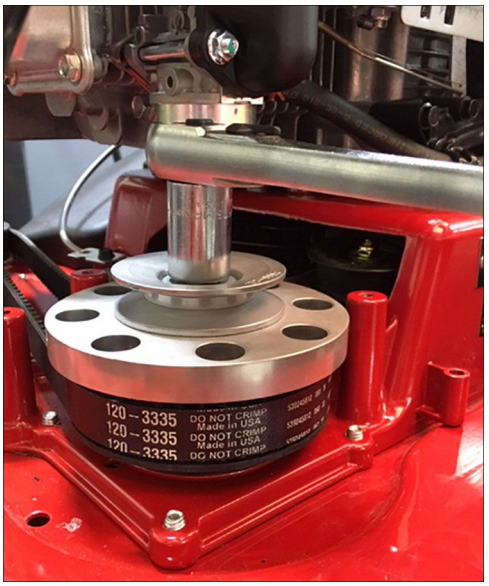
g298544

Figure 213

11. Install both dust covers and idler pulleys to the main frame.

12. Tighten the 2 (1/2–20 inch) nuts to the spindle pulleys. Torque nut to 60 ± 5 ft-lbs. (81.3 ± 6.7 Nm).

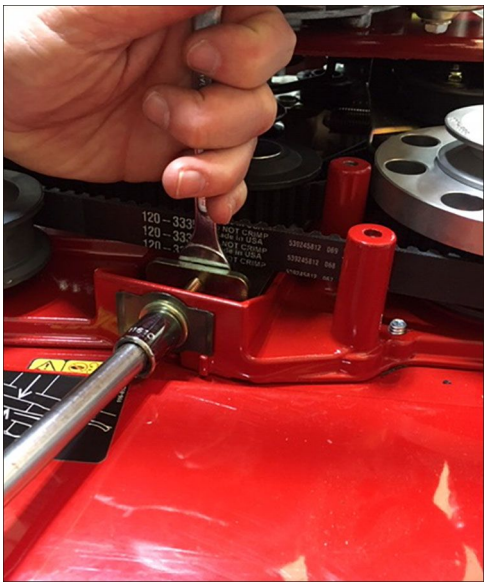
    Note: Secure blade with a wood block.



g298543

Figure 214

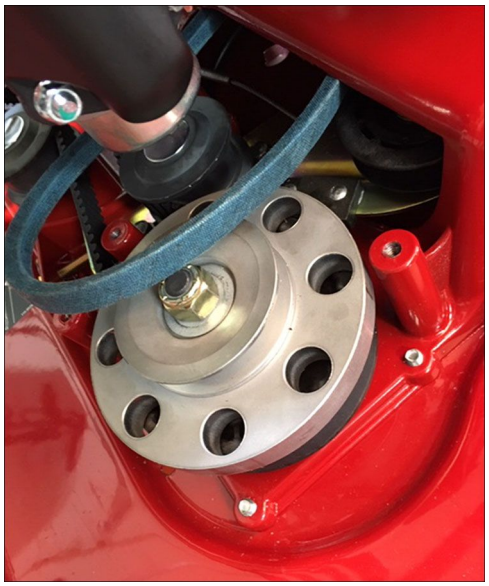
13. Install the belt tension 5/16–18 inch bolt and nut to tension the blade timing belt. Tighten bolt until there is 0.010–0.030 gap between the spring washer and frame for proper belt tension.



g298542

Figure 215

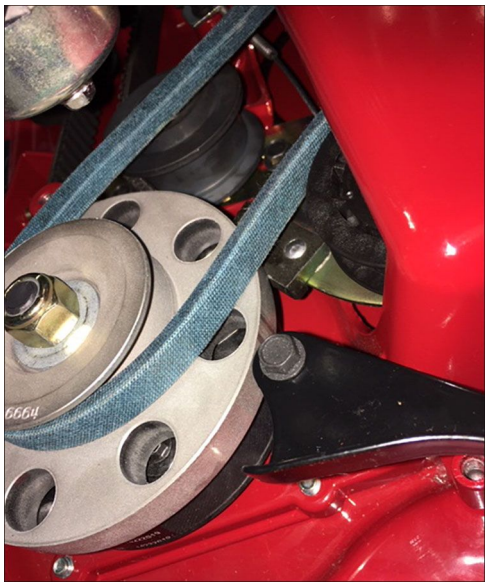
14. Install the BBC belt through the rear of the mower.
15. Install the BBC belt around the engine pulley.
16. Install the BBC belt around the brake pulley.



g296181

Figure 216

17. Move the brake arm upwards to secure the pulley.

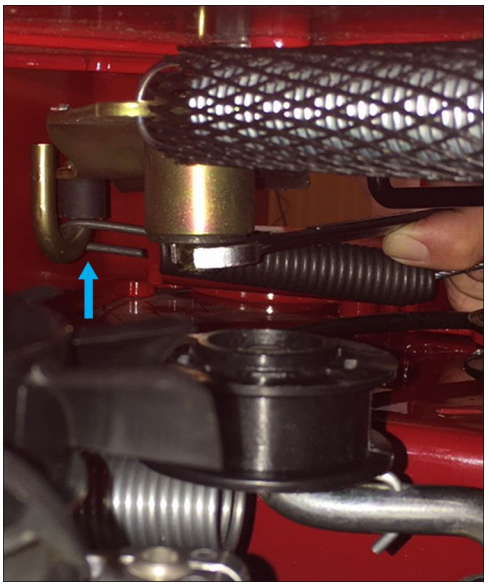


g302385

Figure 217

18. Secure the topside of the bolt with a ½ inch wrench. Torque nut and bolt to 200 ± 20 in-lbs. (22 ± 2 Nm).

    Note: Access the bottom nut from the front of the machine.



g305213

Figure 218

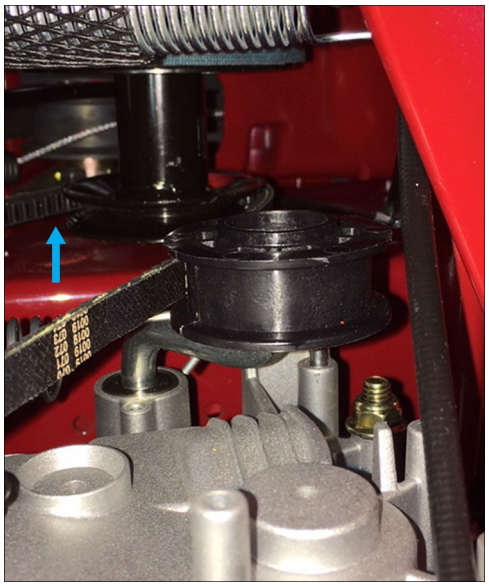
19. Install the belt guide. Install the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Torque bolts to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296179

Figure 219

20. Install the belt to the rear of the mower.
21. Install the transmission belt to the engine pulley.

    Note: Access belt/engine pulley from the front of the mower.



g302331

Figure 220

22. Install the transmission belt to the transmission pulley.
23. Using a 7/16 inch socket on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing the idler arm to put tension on the belt.

24. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque screws to 55 ± 5 in-lbs. (6 ± 1 Nm).

g296175

Figure 221

25. Install the 1/4–20 inch taptite screw securing the frame cover to the frame. Torque bolt to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296174

Figure 222

26. Lower the rear cover.
27. Using an appropriate lifting device, lower the rear of the machine to the ground.

Height-of-Cut Replacement

Height-of-Cut Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the cover to the frame.

g296174

Figure 223

6. Remove the 4 (1/4–20 inch) taptite screws securing the front cover to the frame.

g296175

Figure 224

7. Rotate the belt tensioner arm by using a 7/16 inch socket on the nut at the bottom side of the transmission, turning clockwise.

g302330

Figure 225

8. To remove belt tension, align the idler pulley with the access hole on the bottom side of the transmission. Insert a quarter inch screw driver.

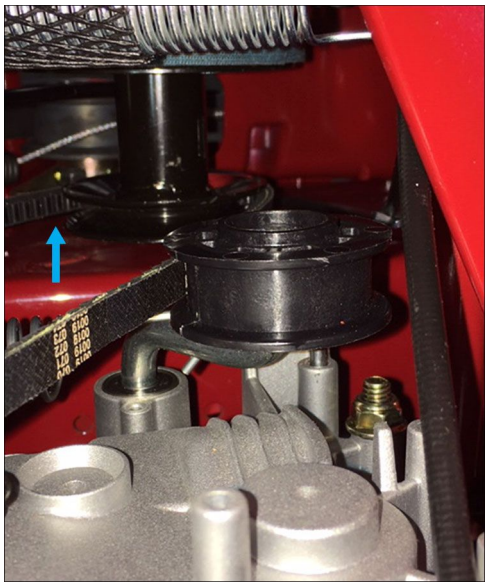
   Note: Screw driver needs to fit through access hole and the idler pulley slot securing the pulley into position.

g296176

Figure 226

9. Remove the transmission belt from the engine pulley.

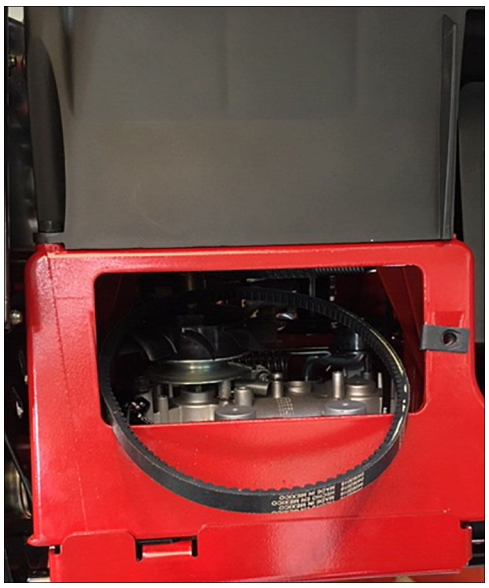
   Note: Access belt from the front of the mower.



g302331

Figure 227

10. Remove the belt from the rear of the mower.



g296178

Figure 228

11. Using an appropriate lifting device, lower the rear of the machine onto the ground.
12. Set the rear height-of-cut to 5 inch.
13. Using a 9/16 inch socket, remove the 2 nuts securing the wheels to the rear axles.
14. Remove the T-30 screw securing the dust cover to the axle assembly.

g297057

Figure 229

15. Remove the 5/16–18 inch nut on carriage bolt securing the spring bracket to the frame.

g297058

Figure 230

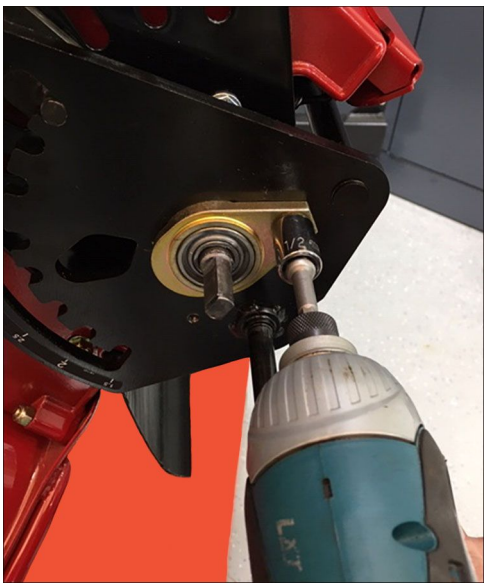
16. Using snap ring pillars, remove the snap ring retaining the pinion gear from axle shaft.

    Note: Inspect the pinion gear to wheel gear mesh for abnormal wear, broken teeth, and uneven wear. Replace pinion gear to wheel gear mesh if needed.

g297059

Figure 231

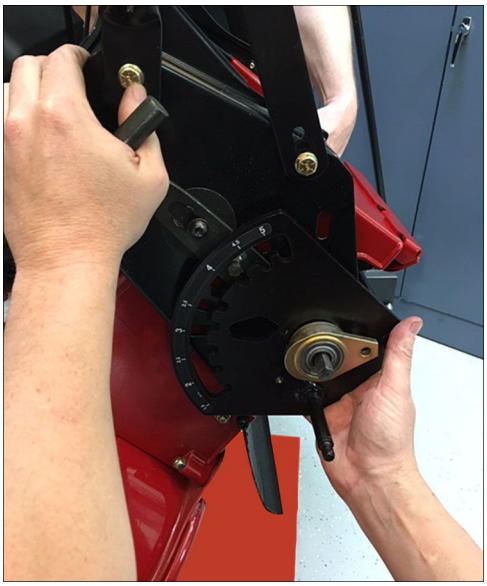
17. Remove the 5/16–18 inch bolt securing the axle bearing housing to the axle height-of-cut plate.



g297060

Figure 232

18. While holding up the spring loaded height-of-cut handle, apply pressure to the back of the axle bearing housing assembly, separating from axle weldment.



g297061

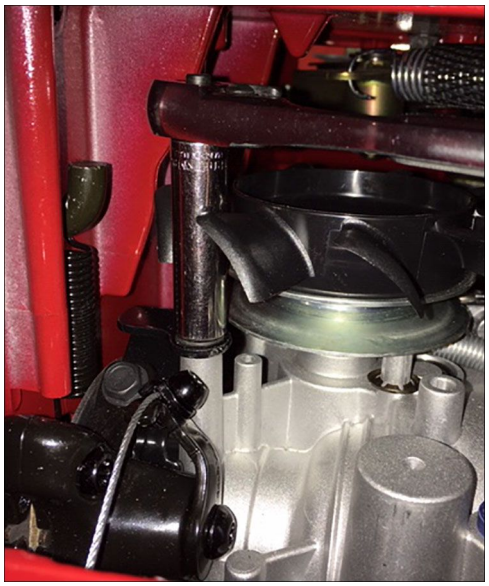
Figure 233

19. Using a 3/8 inch socket, remove the bolt securing the transmission cable guard and parking brake mount bolt to the frame.

g297062

Figure 234

20. Remove the 1/4–20 inch bolt securing the parking brake to the transmission.



g297064

Figure 235

21. Remove the 2 Phillip head screws from the trailing shield to the main frame.

g297065

Figure 236

22. Remove the 5/16–18 inch nut to carriage bolt on LH side. Remove the RH 5/16–18 inch taptite screw to main frame securing the transmission assembly to the main housing.

g297066

Figure 237

g297531

Figure 238

23. Slide transmission to the right. Line up RH side height-of-cut notch with bolt.

g297894

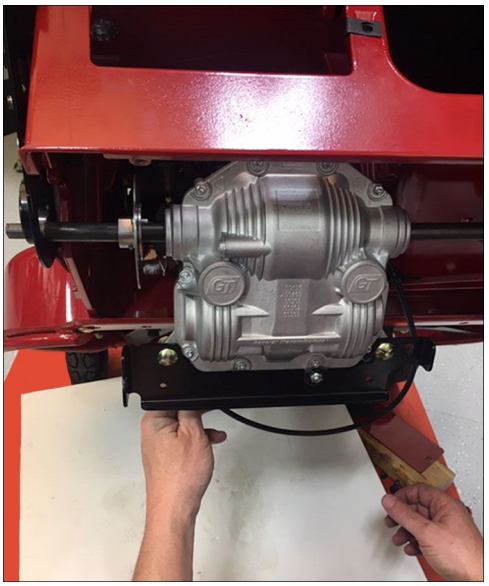
Figure 239

24. Remove the height-of-cut weldment from the chassis. Slide the LH side of the height-of-cut weldment first before the RH side.

g297895

Figure 240

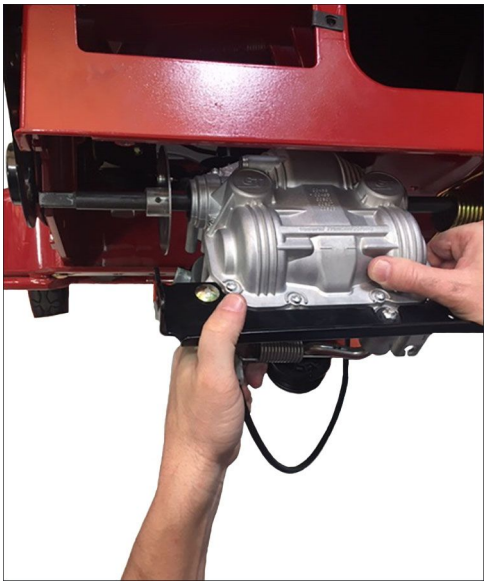
25. Center the transmission. Pinch the traction cable towards the transmission and rotate the front transmission and cable downward.



g297896

Figure 241

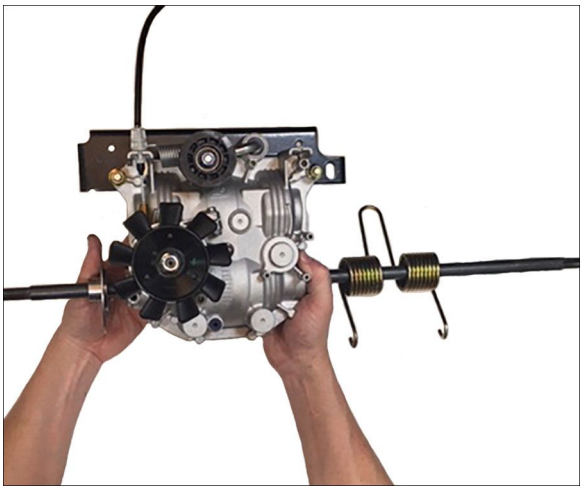
26. To remove the transmission from the frame, rotate the transmission upside down and slide the transmission to the right. Remove the transmission from the frame with the traction cable attached.



g298181

Figure 242

27. Remove the torsion spring from the RH side axle shaft.



g298182

Figure 243

28. Using needle a nose plier, squeeze the cable anchor and remove cable anchor from the cable mount.

g298183

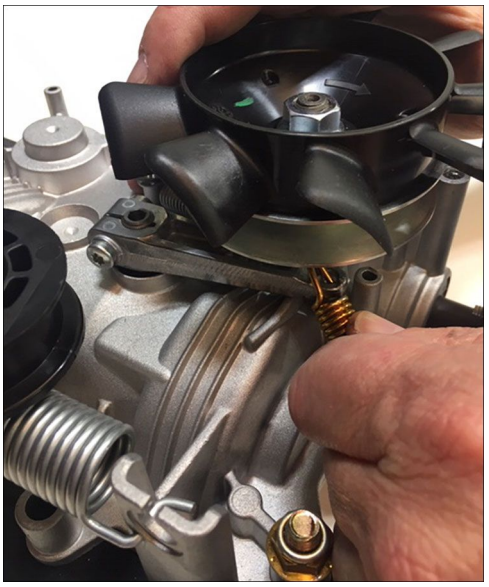
Figure 244

29. Pull the cable and remove from the cable anchor mount.

g298184

Figure 245

30. Remove the spring hook from the transmission clutch lever.



g298185

Figure 246

31. Remove the 6 (5/16–18 inch) nuts to carriage bolts securing the engine cage to chassis.

g298693

Figure 247

32. Remove the handle from the machine.
33. Remove the 2 (5/16–18 inch) bolts on the RH side of the height-of-cut plate.

g298694

Figure 248

34. Remove the height-of-cut plate from the main frame.
35. Remove the height-of-cut adjustment spring.

    Note: Spring is inside the frame.

g298697

Figure 249

36. Remove the upper T-30 torx screw from the LH height adjuster handle.

g298695

Figure 250

37. Remove the washer between lever and plate.
38. Remove the 2 (5/16–18 inch) bolts securing LH height-of-cut plate to the main frame.

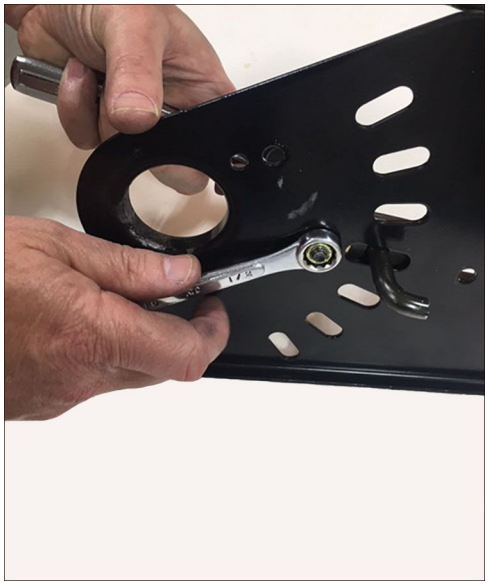
Height-of-Cut Removal (continued)

g298696

Figure 251

Height-of-Cut Disassembly

Remove the T-30 bolt from 5/16–18 inch nylock height lock adjustment.



g298698

Figure 252

Height-of-Cut Assembly

Install the T-30 bolt to the 5/16–18 inch nylock height lock adjustment. Torque bolt to 160 ± 16 in-lbs. (18 ± 2 Nm).

Height-of-Cut Installation

1. Install the 2 (5/16–18 inch) bolts securing LH height-of-cut plate to the main frame. Torque bolts to 160 ± 16 in-lbs. (18 ± 2 Nm).

g298696

Figure 253

2. Install the washer between the lever and plate.

3. Install the upper T-30 torx screw to the LH height adjuster handle. Torque screw to 160 ± 16 in-lbs. (18 ± 2 Nm).

g298695

Figure 254

4. Install the height-of-cut adjustment spring.

g298697

Figure 255

5. Install the height-of-cut plate to the main frame.

   Note: The spring is inside the frame.

6. Install the 2 (5/16–18 inch) bolts on the RH side of the height-of-cut plate. Torque bolts to 160 ± 16 in-lbs. (18 ± 2 Nm).

g298694

Figure 256

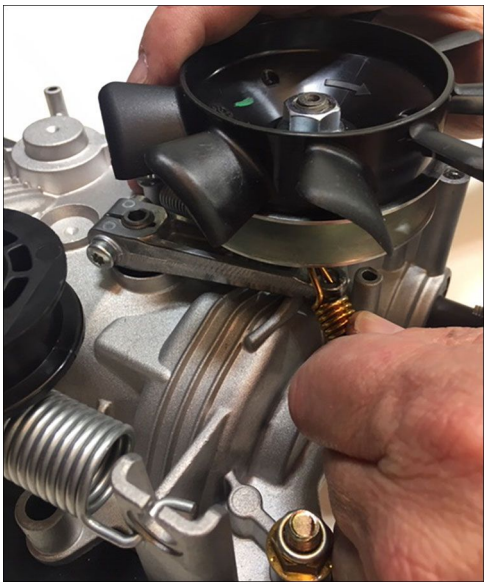
7. Install the engine cage to the chassis.

8. Install the 6 (5/16–18 inch) nuts to carriage bolt securing the engine cage to chassis. Torque nuts to 140 ± 15 in-lbs. (15.8 ± 1.7 Nm).

g298693

Figure 257

9. Install the spring hook to the transmission lever.



g298185

Figure 258

10. Install the cable to the cable anchor mount.

g298184

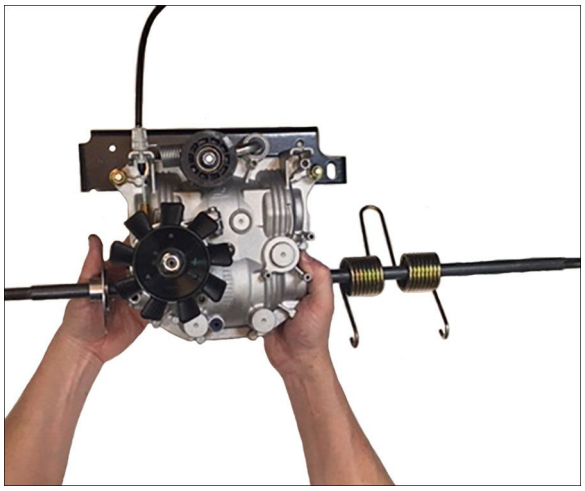
Figure 259

11. Using needle a nose plier, install the cable anchor to the cable mount.

g298183

Figure 260

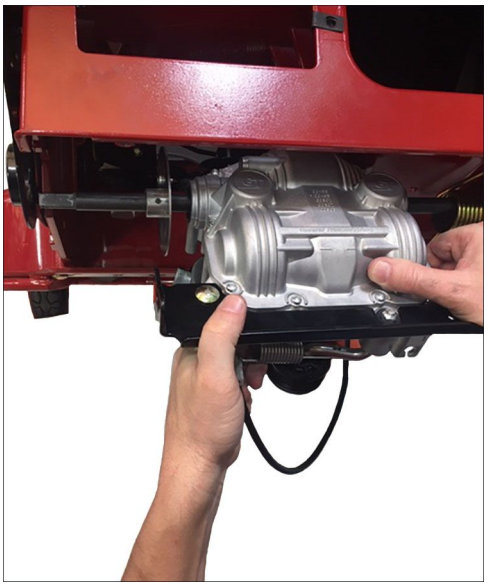
12. Install the height-of-cut spring to the RH side axle shaft.



g298182

Figure 261

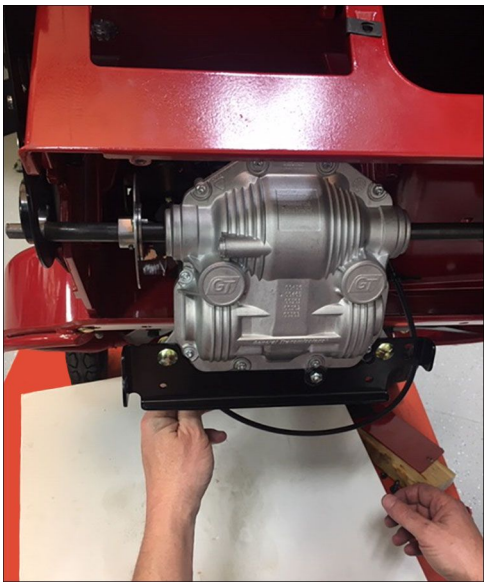
13. Install the transmission to the frame with the traction cable attached.



g298181

Figure 262

14. Rotate the front transmission and cable upward. Pinch the traction cable towards the transmission.



g297896

Figure 263

15. Slide the RH side of the height-of-cut weldment first before the LH side. Install the height-of-cut weldment to the chassis.

g297895

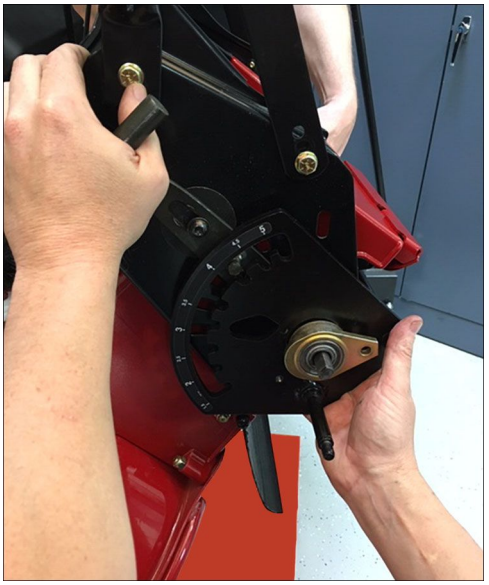
Figure 264

16. Line up the RH side height-of-cut notch with bolt. Slide the transmission to the left.

g297894

Figure 265

17. Put anti-seize inside the axle bearing before sliding over the shaft. Install the axle bearing housing assembly over the axle. Line up the mounting hole on the bearing housing assembly to the weldment hole. Install the bearing retainers into the rear axle weldment and rear height-of-cut plate for alignment purposes before securing the transmission to the frame. Install the 5/16–18 inch bolt to the axle weldment. Torque bolt to 160 ± 16 in-lbs. (18 ± 2 Nm).



g297061

Figure 266

18. Install LH 5/16–18 inch nut to carriage bolt and the RH 5/16–18 inch taptite screw to the main frame securing the transmission assembly to the main housing. Torque nut to carriage bolt to 140 ± 5 in-lbs. (16 ± 0.5 Nm). Torque taptite screw to 160 ± 16 in-lbs. (18 ± 2 Nm).

g297531

Figure 267

g297066

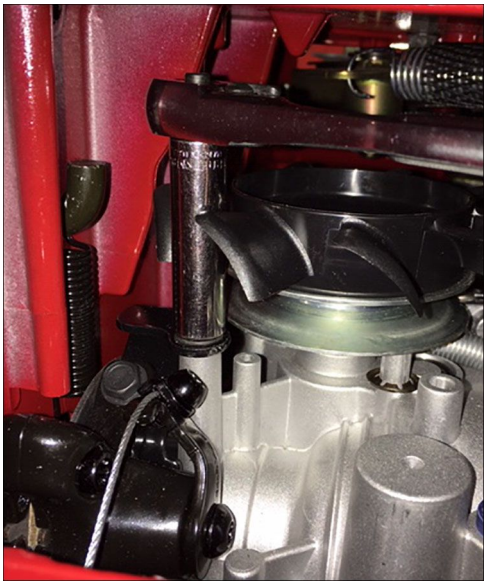
Figure 268

19. Install the 2 Phillip head screws securing the trailing shield to the main frame. Torque screws to 9 ± 1 in-lbs. (1 Nm).

g297065

Figure 269

20. Install the 1/4–20 inch bolt securing the parking brake to the transmission. Torque bolt to 85 ± 15 in-lbs. (9 ± 2 Nm).



g297064

Figure 270

21. Install the 1/4–20 taptite screw securing the transmission cable guide to the frame.

g297062

Figure 271

22. Using snap ring pillars, Install the snap ring retaining the pinion gear to axle shaft.

g297059

Figure 272

23. Install the 5/16–18 inch nut on carriage bolt securing the spring bracket to the frame. Torque nut to 115 ± 15 in-lbs. (13 ± 2 Nm).

g297058

Figure 273

24. Install the mulch plug to the rear discharge.

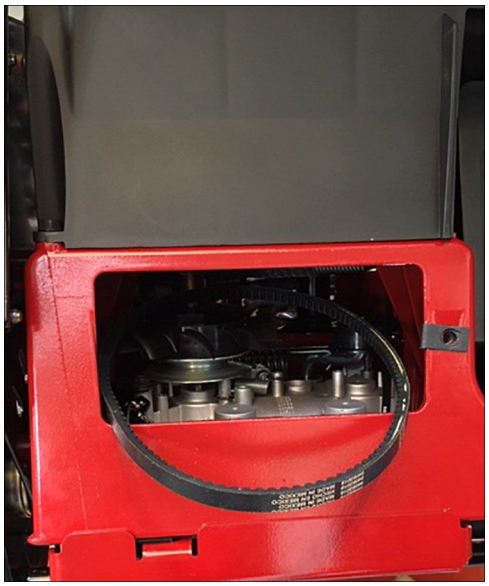
25. Install the T-30 screw securing the dust cover to the axle assembly. Torque screw to 55 ± 5 in-lbs. (6 ± 1 Nm).

g297057

Figure 274

26. Using a socket, install the 2 (3/8–16 inch) nuts securing the wheels to the rear axles. Torque nuts to 180 ± 20 in-lbs. (20 ± 2 Nm).

27. Install the belt through the rear of the mower.



g296178

Figure 275

28. Install the transmission belt to the engine pulley.

    Note: Access belt from the front of the mower.

g296177

Figure 276

29. Install the transmission belt to the transmission pulley.
30. Using a 7/16 inch socket on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing idler arm to put tension on the belt.
31. Install the belt to the input pulley on the transmission.
32. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque bolts to 55 ± 5 in-lbs. (6 ± 1 Nm).

g296175

Figure 277

33. Install the 1/4–20 inch taptite screw securing the frame cover to the frame. Torque bolt to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296174

Figure 278

34. Lower the rear cover.
35. Using an appropriate lifting device, lower the rear of the machine to the ground.
36. Reinstall the cable guide.

Front Bumper Replacement

Front Bumper Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Move the front axle height-of-cut to 5 inches.
4. Place wood blocks under the deck assembly to support the deck.
5. Remove the 4 (5/16–18 inch) (2 per side) nuts to carriage bolts securing engine guard to front bumper assembly.

g298855

Figure 279

6. Remove the 4 (5/16–18 inch) center nuts to carriage bolts securing the front bumper assembly to the deck assembly.

g298856

Figure 280

7. Remove the front axle assembly from the deck.

Front Bumper Removal (continued)

g298858

Figure 281

Front Bumper Disassembly

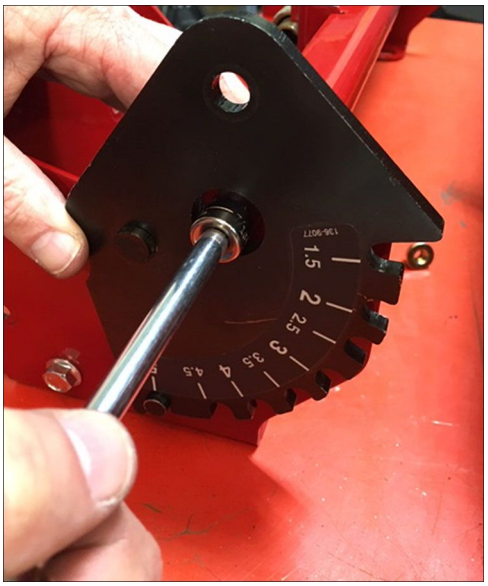
1. Roll the front bumper assembly over.
2. Using a 9/16 inch socket and wrench, remove 3/8–16 inch nut from 3/8–16 inch bolt securing the front wheels to the axle.

g298895

Figure 282

3. Remove the 4 (1/4–20 inch) bolts to captured nuts on the two piece axle bushings.

   Note: Remove the 2 furthest forward bolts first.



g298896

Figure 283

g298897

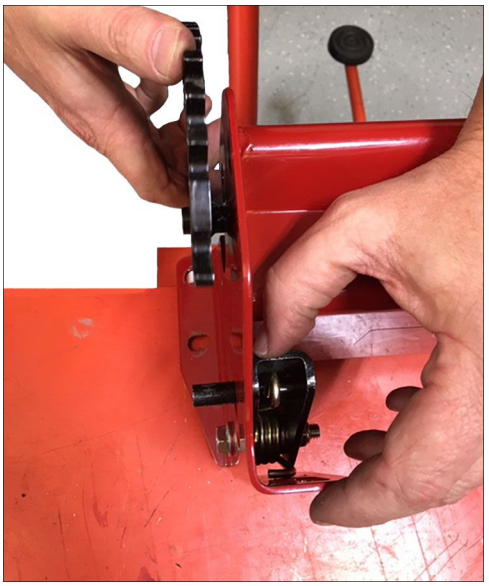
Figure 284

4. Remove the 4 bushings from the axle.
5. Roll the front bumper assembly over.

⚠ CAUTION ⚠

The spring is loaded.

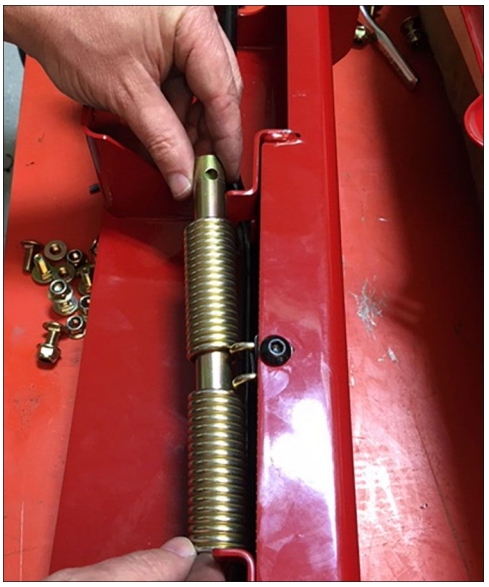
6. Depress the height-of-cut lockout lever and rotate axle forward releasing spring tension.



g298898

Figure 285

7. Depress the height-of-cut lockout lever and rotate axle forward releasing spring tension.
8. Apply downward pressure on the spring mandrell to remove the mandrell from the spring.



g298899

Figure 286

9. Remove the 3/16 inch allen head screw securing the spring to the front bumper assembly.
10. Remove the 5/16–18 inch bolt and nut securing the height-of-cut/lockout lever to the front bumper.

Front Bumper Disassembly (continued)

g298900

Figure 287

11. Squeeze the height-of-cut/lockout lever and remove the 5/16–18 inch bolt from the front bumper assembly.

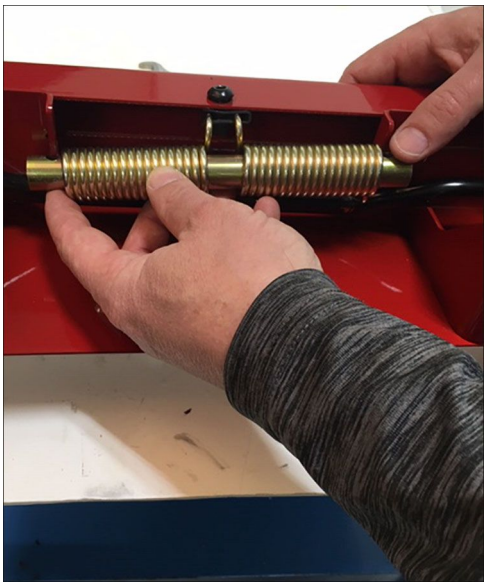
Front Bumper Assembly

1. Place the spring onto the front bumper assembly. Loosely install the 3/16 inch allen head screw.

g298901

Figure 288

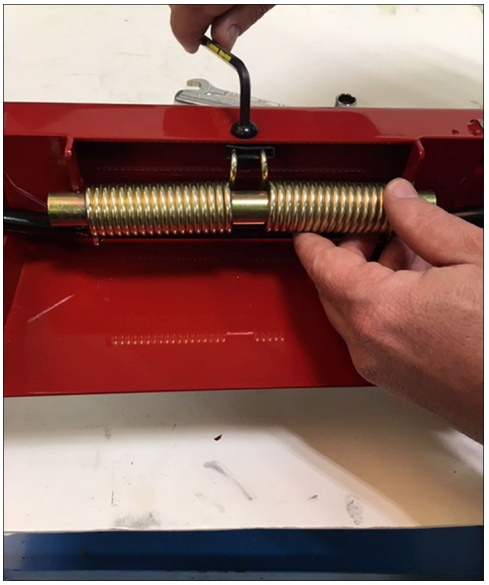
2. Install the axle weldment onto the front bumper assembly.
3. Place one end of the spring onto the axle weldment, install the mandrell, and then place the opposite end of the spring onto the axle weldment.



g298929

Figure 289

4. Tighten the 3/16 inch Allen head screw. Torque to 140 ± 15 in-lbs. (15.8 ± 1.7 Nm).



g298930

Figure 290

5. Roll the front bumper assembly over.
6. Squeeze the lever and rotate the front axle height-of-cut until aligned with the 5 inch mark.

g298931

Figure 291

7. Slightly raise the axle weldment and install bushing on the bottom for the non-height-of-cut side of the axle weldment. Install the other bushing for the top of the non-height-of-cut side of the axle weldment. Install the (7/16 inch) bolt and nut securing the bushing to the axle weldment until finger tight, do not fully tighten fastener. Repeat for opposite side.

   Note: Install the 5/16–18 inch bolts in the following order:
   Non-height-of-cut lower 5/16–18 inch bolt and nut
   Height-of-cut lower 5/16–18 inch bolt and nut
   Height-of-cut upper 5/16–18 inch bolt and nut
   Non-height-of-cut upper 5/16–18 inch bolt and nut

g298928

Figure 292

8. Install the 5/16–18 inch bolt and nut to both ends of the front bumper assembly. Torque all bolts to 140 ± 5 in-lbs. (15.8 ± 0.5 Nm).

Front Bumper Installation

1. Install the front axle assembly to the deck.

g298858

Figure 293

2. Install the 4 (5/16–18 inch) center nuts to carriage bolts securing the front bumper assembly to the deck assembly. Torque center nuts to carriage bolts to 140 ± 5 in-lbs. (15.8 ± 0.5 Nm).

g298856

Figure 294

3. Install the 4 (5/16–18 inch) (2 per side) nuts to carriage bolts securing engine guard to front bumper assembly. Torque nuts to carriage bolts to 140 ± 5 in-lbs. (15.8–0.5 Nm).

g298854

Figure 295

Blade Drive Assembly Replacement

Blade Drive Assembly Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the cover to the frame.

g296174

Figure 296

6. Remove the 4 (1/4–20 inch) taptite screws securing the front cover to the frame.

g296175

Figure 297

7. Rotate the belt tensioner arm by using a 7/16 inch socket on the nut at the bottom side of the transmission, turning clockwise.

g302330

Figure 298

8. To remove belt tension, align the idler pulley with the access hole on the bottom side of the transmission. Insert a quarter inch screw driver.

   Note: Screw driver needs to fit through access hole and the idler pulley slot securing the pulley into position.

g296176

Figure 299

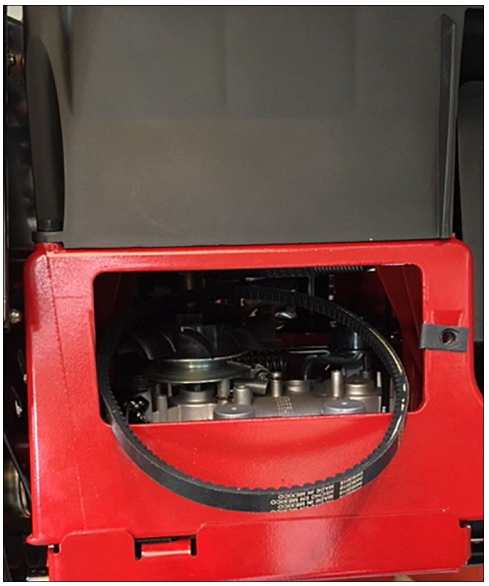
9. Remove the transmission belt from the engine pulley.

   Note: Access belt from the front of the mower.

g302331

Figure 300

10. Remove the belt from the rear of the mower.



g296178

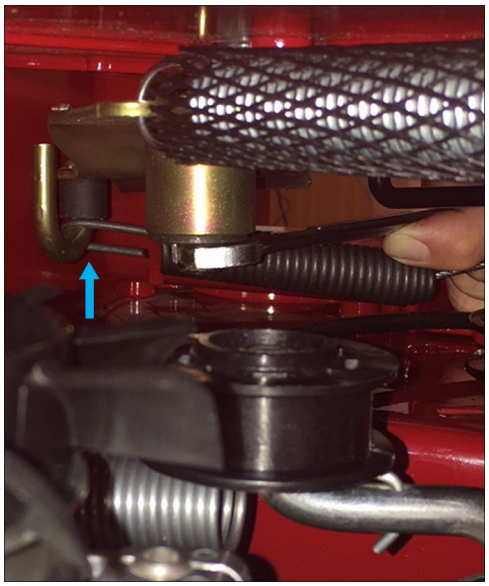
Figure 301

11. Remove the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Remove the belt guide.

g296179

Figure 302

12. From the front, loosen the 5/16–18 inch nylock nut from the BBC idler arm pivot until flush with bottom bolt. Secure the topside of the bolt with a 1/2 inch wrench.

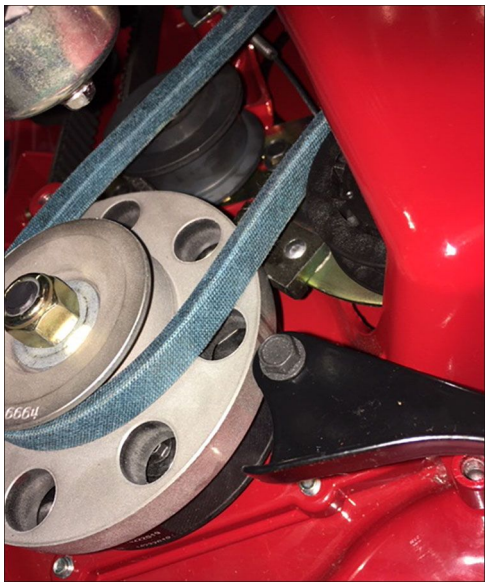


g305213

Figure 303

13. Move the brake arm downwards to release from pulley.

    Note: Releasing pulley pressure from the belt.



g302385

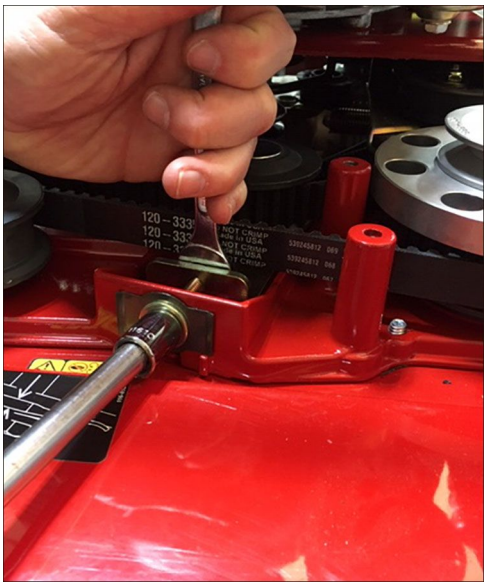
Figure 304

14. Remove the BBC belt from the pulley.

g296181

Figure 305

15. Remove the BBC belt from rear of the mower.
16. Remove the belt tension (5/16–18 inch) bolt and nut to relieve tension from the blade timing belt.

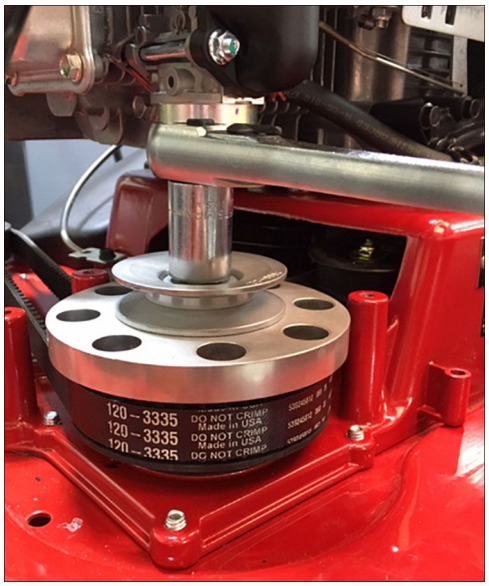


g298542

Figure 306

17. Remove the 2 (1/2–20 inch) nut from the BBC pulley. Pull the BBC brake pulley off the left side spindle.

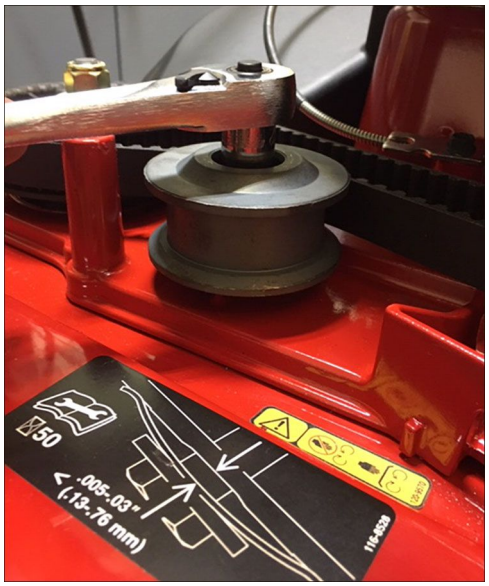
    Note: Secure blade with a wood block.



g298543

Figure 307

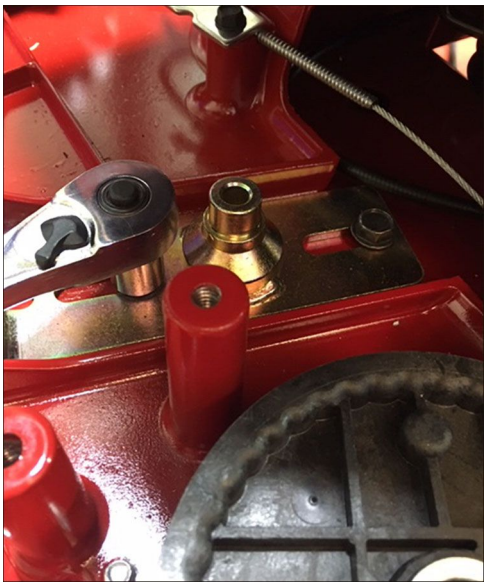
18. Remove both dust covers and idler pulleys from the main frame.
19. Remove the 5/16–18 inch idler bolt securing the fixed idler pulley to the frame.



g298544

Figure 308

20. Remove the blade timing belt from spindle pulleys.
21. Remove the 2 (1/4–20 inch) shoulder bolts securing the tension idler bracket from the frame.



g298545

Figure 309

22. Remove the 2 sprocket pulleys and BBC pulley from the spindle assembly.
23. Remove blade and spindle shaft from spindle hub.

    Note: Spindle shaft and blade will drop out of the bottom side of the machine.

g298546

Figure 310

24. Remove the 8 (5/16–18 inch) taptite screws securing spindle hub assembly to the main frame.

Blade Drive Assembly Removal (continued)

g298547

Figure 311

Blade Drive Assembly Installation

1. Install the 8 (5/16–18 inch) taptite screws securing spindle hub assembly to the main frame. Torque bolts to 160 ± 16 in-lbs. (18 ± 2 Nm).

g298547

Figure 312

2. Install the blade and spindle shaft to the spindle hub.

g298546

Figure 313

3. Install the 2 sprocket pulleys and BBC pulley to the spindle assembly.
4. Loosely install the 1/2–20 inch nuts to spindle shaft.

5. Install the 2 (1/4–20 inch) shoulder bolts securing the tension idler bracket to the frame. Torque bolts to 110 ± 11 in-lbs. (12 ± 2 Nm).

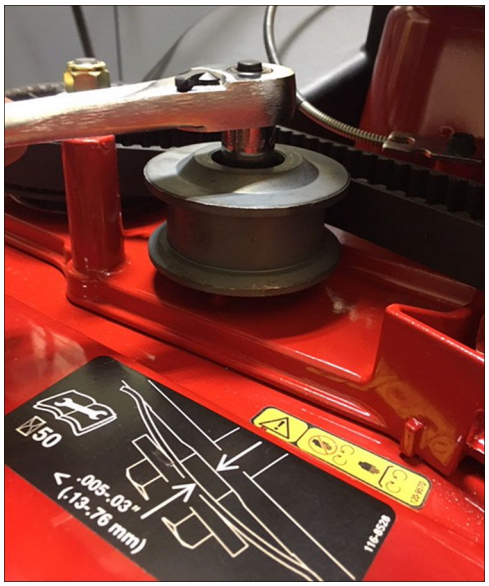
g298545

Figure 314

6. Install the blade timing belt to the spindle pulleys.

   Note: Blades need to be timed 90 degrees apart.

7. Install the 5/16–18 inch bolt securing the fixed idler pulley to the frame. Torque bolt to 160 ± 16 in-lbs. (18 ± 2 Nm).



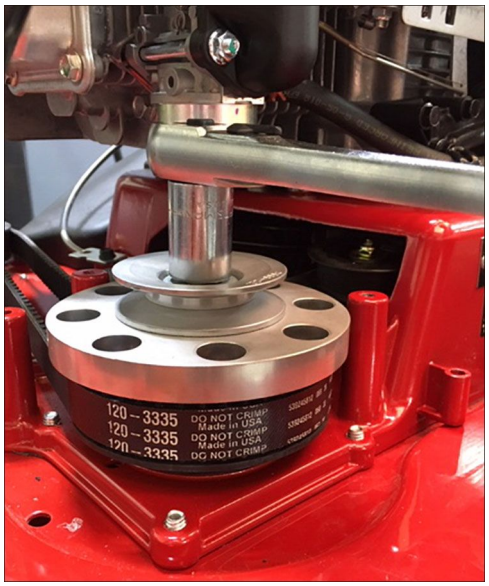
g298544

Figure 315

8. Install both dust covers and idler pulleys to the main frame.

9. Install the 2 (1/2–20 inch) nut to the BBC pulley. Pull the BBC pulley on the left side spindle. Torque nut to 60 ± 5 ft-lbs. (81.3 ± 6.7 Nm).

   Note: Secure the blade with a wood block.



g298543

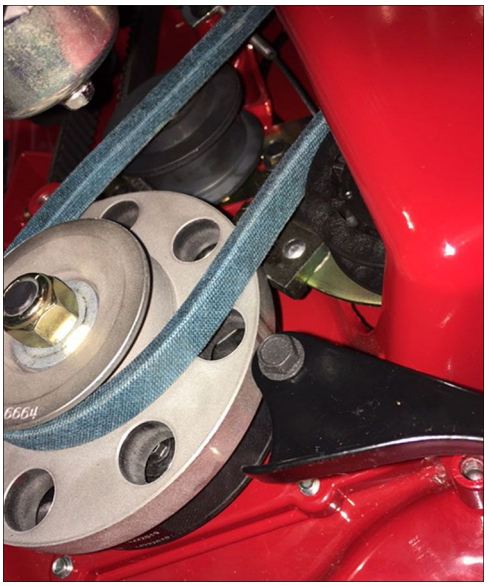
Figure 316

10. Install the belt tension 5/16–18 inch bolt and nut to tension the blade timing belt. Tighten bolt until there is 0.010–0.030 gap between the spring washer and frame for proper belt tension.
11. Install the BBC belt through the rear of the mower.
12. Install the BBC belt to the engine pulley.
13. Install the BBC belt to the brake pulley.

g296181

Figure 317

14. Move the brake arm upwards to secure the pulley.

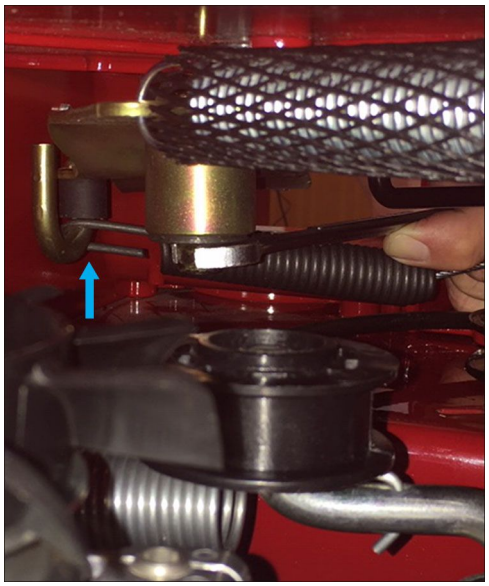


g302385

Figure 318

15. Secure the topside of the bolt with a 1/2 inch wrench. Torque nut and bolt to 100 ± 15 in-lbs. (11.3 ± 1.7 Nm).

    Note: Access bottom nut from the front of the machine.



g305213

Figure 319

16. Install the belt guide. Install the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Torque bolts to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296179

Figure 320

17. Install the belt to the rear of the mower.
18. Install the transmission belt to the engine pulley.

    Note: Access belt/engine pulley from the front of the mower.

g302331

Figure 321

19. Install the transmission belt to the transmission pulley.
20. Using a 7/16 inch socket on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing idler arm to put tension on the belt.

21. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque screws to 55 ± 5 in-lbs. (6 ± 1 Nm).

g296175

Figure 322

22. Install the 1/4–20 inch taptite screw securing the frame cover to the frame. Torque bolt to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296174

Figure 323

23. Lower the rear cover.
24. Using an appropriate lifting device, lower the rear of the machine to the ground.

Door and Chute Assembly Replacement

Door and Chute Assembly Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Remove the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame.

g296175

Figure 324

Door and Chute Assembly Removal (continued)

4. Remove the 4 (1/4–20 inch) taptite screws securing the chute and door assembly to the chassis.

g299115

Figure 325

5. Slide the door and chute assembly rearward and remove from the machine.
6. Remove the 2 (1/4–10 inch) taptite screws securing the door to the chute.

g299116

Figure 326

7. Separate the door and chute assembly.

Door Disassembly

1. Remove the 2 (1/4–10 inch) taptite screws securing the handle to the rear door.

g299117

Figure 327

2. Remove the seal clip from the door assembly.

g299118

Figure 328

3. Remove the push nut, rod, and spring from the hinge bracket to the rear door.

Door Disassembly (continued)

g299119

Figure 329

Door Assembly

1. Install the push nut, rod, and spring to the hinge bracket to the rear door.

g299119

Figure 330

2. Install the seal clip to the door assembly.

g299118

Figure 331

3. Install the 2 (1/4–10 inch) taptite screws securing the handle to the rear door. Torque bolts to 17 ± 2 in-lbs. (1.9 ± 0.3 Nm).

g299117

Figure 332

Door and Chute Assembly Installation

1. Attach the door and chute assembly.

2. Install the 2 (1/4–10 inch) taptite screws securing the door to the chute. Torque bolts to 30 ± 4 in-lbs. (3.4 ± 0.5 Nm).

g299116

Figure 333

3. Slide the door and chute assembly onto the machine.

4. Install the 4 (1/4–20 inch) bolts securing the chute and door assembly to the chassis. Torque bolts to 55 ± 5 in-lbs. (6 ± 1 Nm).

g299115

Figure 334

5. Install the belt cover onto the machine. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque bolts to 55 ± 5 in-lbs. (6.2 ± 0.5 Nm).

g296175

Figure 335

Blade Break Arm Replacement

Blade Break Arm Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the frame cover to the frame.

g296174

Figure 336

6. Remove the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame.

g296175

Figure 337

7. Rotate the belt tensioner arm by using a 7/16 inch socket on the nut at the bottom side of the transmission, turning clockwise.

g302330

Figure 338

8. To remove belt tension, align the idler pulley with the access hole on the bottom side of the transmission. Insert a quarter inch screw driver.

   Note: Screw driver needs to fit through access hole and the idler pulley slot securing the pulley into position.

g296176

Figure 339

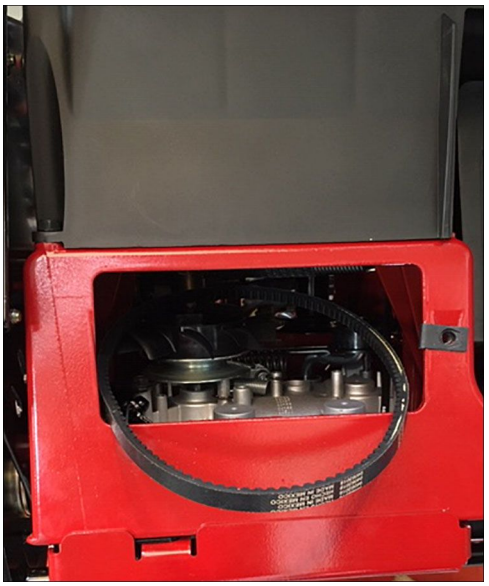
9. Remove the transmission belt from the engine pulley.

   Note: Access belt from the front of the mower.

g302331

Figure 340

10. Remove the belt from the rear of the mower.



g296178

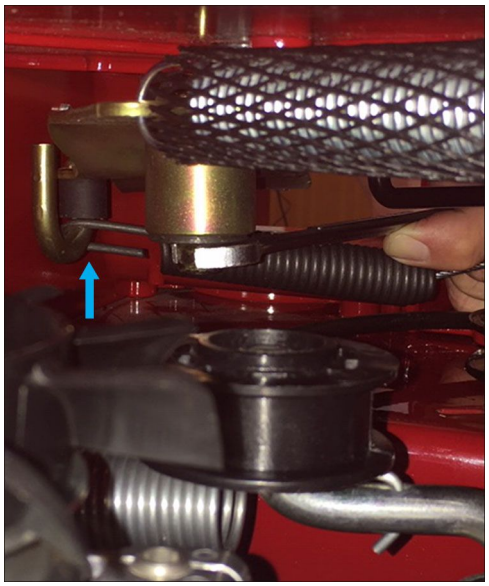
Figure 341

11. Remove the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Remove the belt guide.

g296179

Figure 342

12. From the front, loosen the 5/16–18 inch nylock nut from the BBC idler arm pivot until flush with bottom bolt. Secure the topside of the bolt with a 1/2 inch wrench.

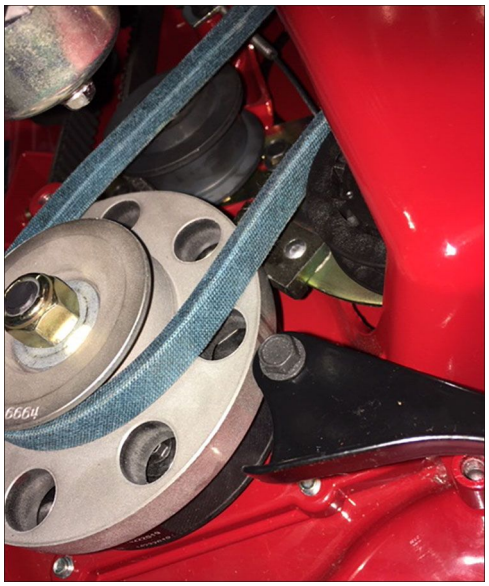


g305213

Figure 343

13. Move the brake arm downwards to release from the pulley.

    Note: Releasing pulley pressure from the belt.



g302385

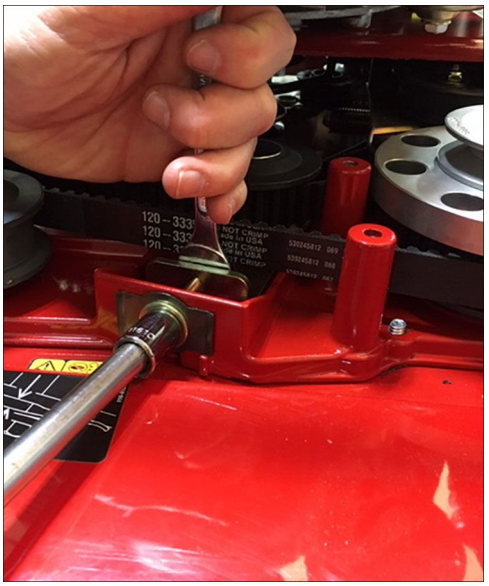
Figure 344

14. Remove the BBC belt from the pulley.

g296181

Figure 345

15. Remove the BBC belt from rear of the mower.
16. Remove the belt tension (5/16–18 inch) bolt and nut to relieve tension from the blade timing belt.

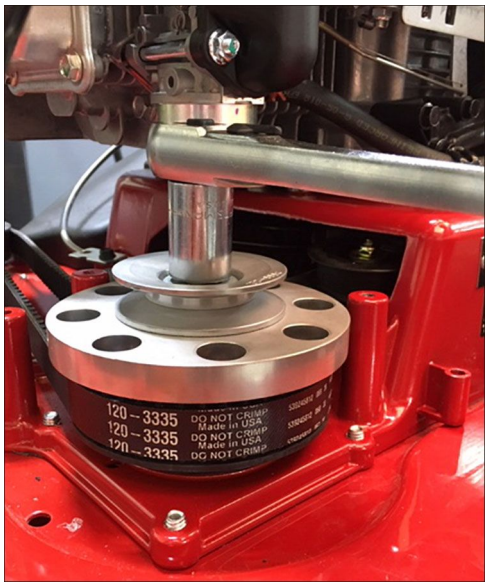


g298542

Figure 346

17. Remove both dust covers and idler pulleys from the main frame.
18. Remove the 1/2–20 inch nut from the BBC pulley. Pull the BBC brake pulley off the left side spindle.

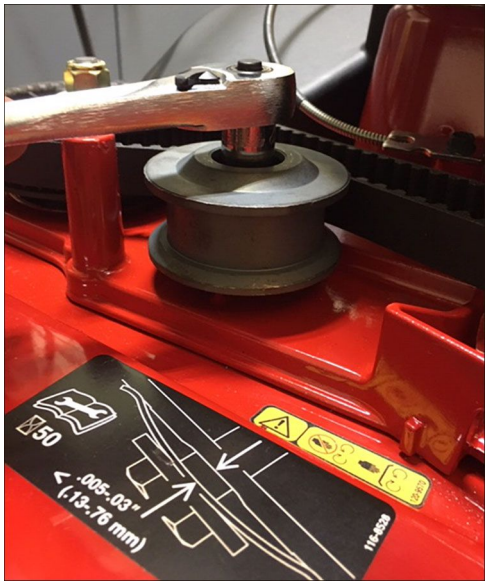
    Note: Secure blade with a wood block.



g298543

Figure 347

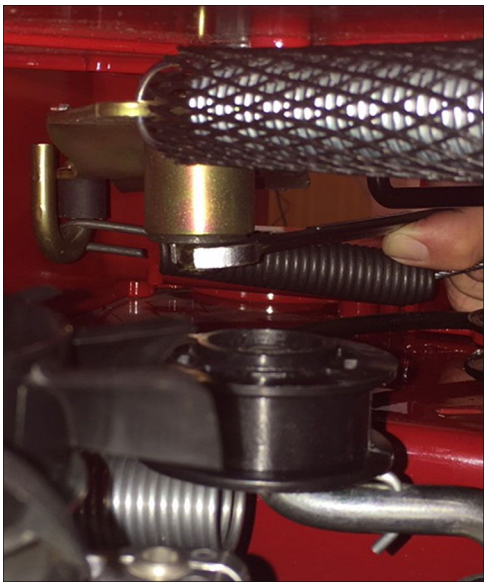
19. Remove the 5/16–18 inch bolt securing the fixed idler pulley to the main frame.



g298544

Figure 348

20. Remove fixed idler pulley from the main frame.
21. Remove the blade timing belt from the spindle pulleys.
22. Unhook the brake spring extension from the frame.
23. Remove the BBC cable spring from the brake idler arm.



g302428

Figure 349

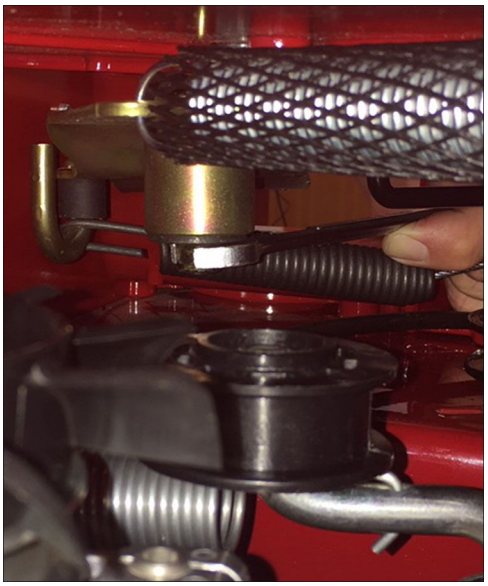
24. Remove the 5/16–18 inch nut securing the brake idler arm to the main frame. Pull the 5/16–18 inch bolt upwards and pull brake idler arm downwards to separate.

g304647

Figure 350

25. Remove the blade brake spring from the brake idler arm.

Blade Break Arm Removal (continued)



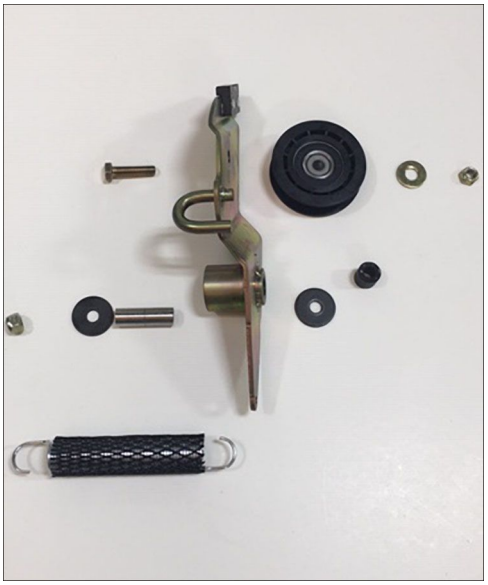
g302428

Figure 351

26. Remove the brake extension spring from the engine deck mount.
27. Remove the BBC cable spring from the brake idler arm.
28. Remove the brake extension spring from the brake idler arm.

Blade Break Arm Disassembly

Remove the 7/16 inch nut and bolt securing the idler pulley from brake idler arm.



g299121

Figure 352

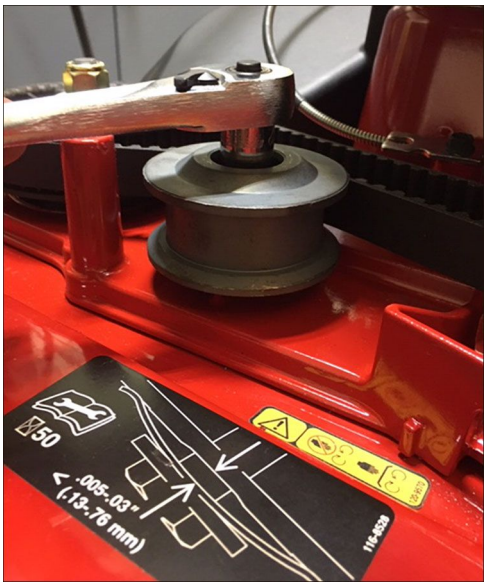
Blade Break Arm Assembly

Install the 7/16 inch nut and bolt securing the idler pulley to the brake idler arm. Torque nut and bolt to 100 ± 15 in-lbs. (11.3 ± 1.7 Nm).

Blade Break Arm Installation

1. Install the brake extension spring to the brake idler arm.
2. Install the BBC cable spring to the brake idler arm.
3. Install the blade brake idler arm to the 5/16 inch pivot bolt and install the 5/16–18 inch nylock nut flush with the bottom of the bolt.
4. Hook the brake spring to the frame.
5. Install the blade timing belt to the spindle pulleys. Blades need to be timed 90 degrees difference.

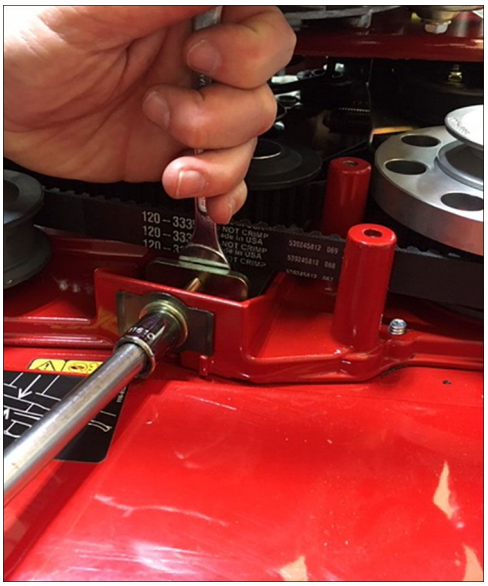
6. Install the 5/16–18 inch bolt securing the fixed idler pulley to the main frame. Torque bolt to 160 ± 16 in-lbs. (18 ± 2 Nm).



g298544

Figure 353

7. Install the dust cover to the fixed idler pulley.
8. Install the belt tension 5/16–18 inch bolt and nut to tension the blade timing belt. Tighten bolt until there is 0.010–0.030 gap between the spring washer and frame for proper belt tension.



g298542

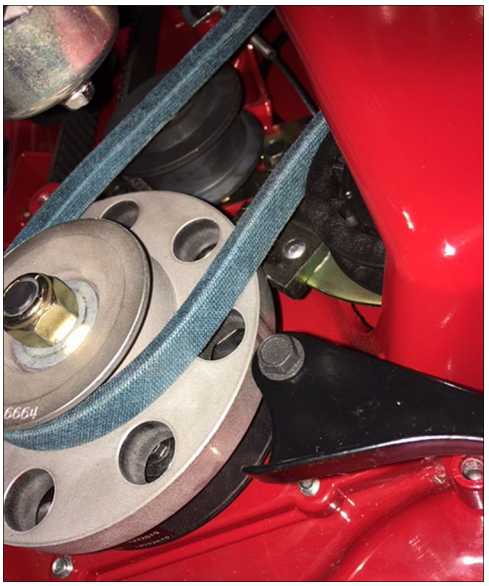
Figure 354

9. Install the BBC belt to the rear of the mower.
10. Install the BBC belt to the pulley.

g296181

Figure 355

11. Move the brake arm upwards to secure the pulley.



g302385

Figure 356

12. Secure the topside of the bolt with a 1/2 inch wrench. Torque nut and bolt to 200 ± 20 in-lbs. (22 ± 2 Nm).

    Note: Access bottom nut from front of the machine.

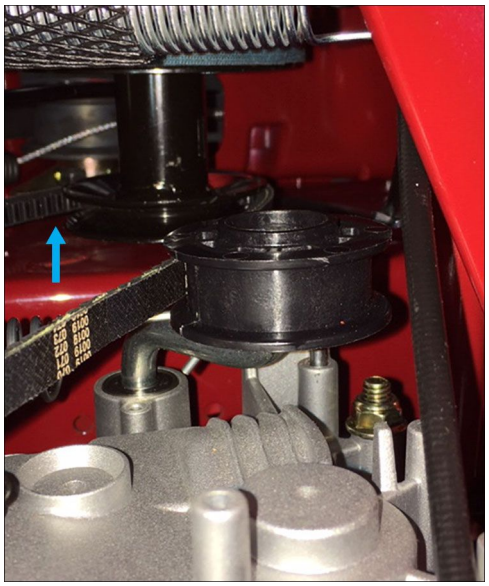
13. Install the belt guide. Install the 2 (1/4–20 inch) taptite screws securing the front BBC belt guide to the bosses on the frame. Torque screws to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296179

Figure 357

14. Install the belt to the rear of the mower.
15. Install the transmission belt to the engine pulley.

    Note: Access belt/engine pulley from the front of the mower.



g302331

Figure 358

16. Install the transmission belt to the transmission pulley.
17. Using a 7/16 inch socket on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing idler arm to put tension on the belt.

18. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque screws to 55 ± 5 in-lbs. (6 ± 1 Nm).

g296175

Figure 359

19. Install the 1/4–20 inch taptite screw securing the frame cover to the frame. Torque screw to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296174

Figure 360

20. Lower the rear cover.
21. Using an appropriate lifting device, lower the rear of the machine to the ground.

Chapter 8

Drive System

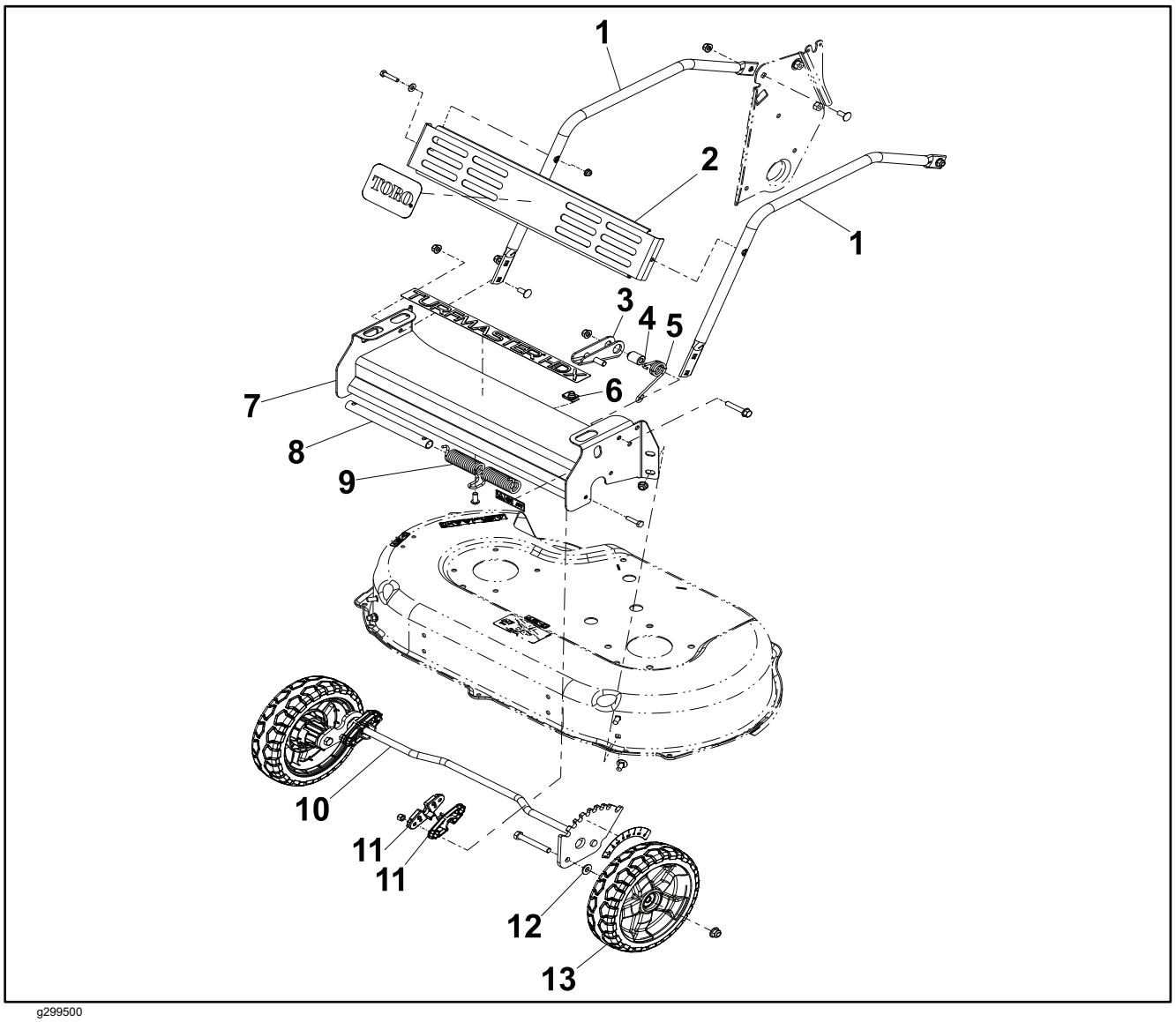
Table of Contents

General Information

This machine uses a MV702 transmission from General Transmission and is equipped with a parking brake caliper and rotor. Transmission is a two piece axle system with a fixed mount and idler arm for increased belt life.

Service and Repairs

Drive System Assembly 1

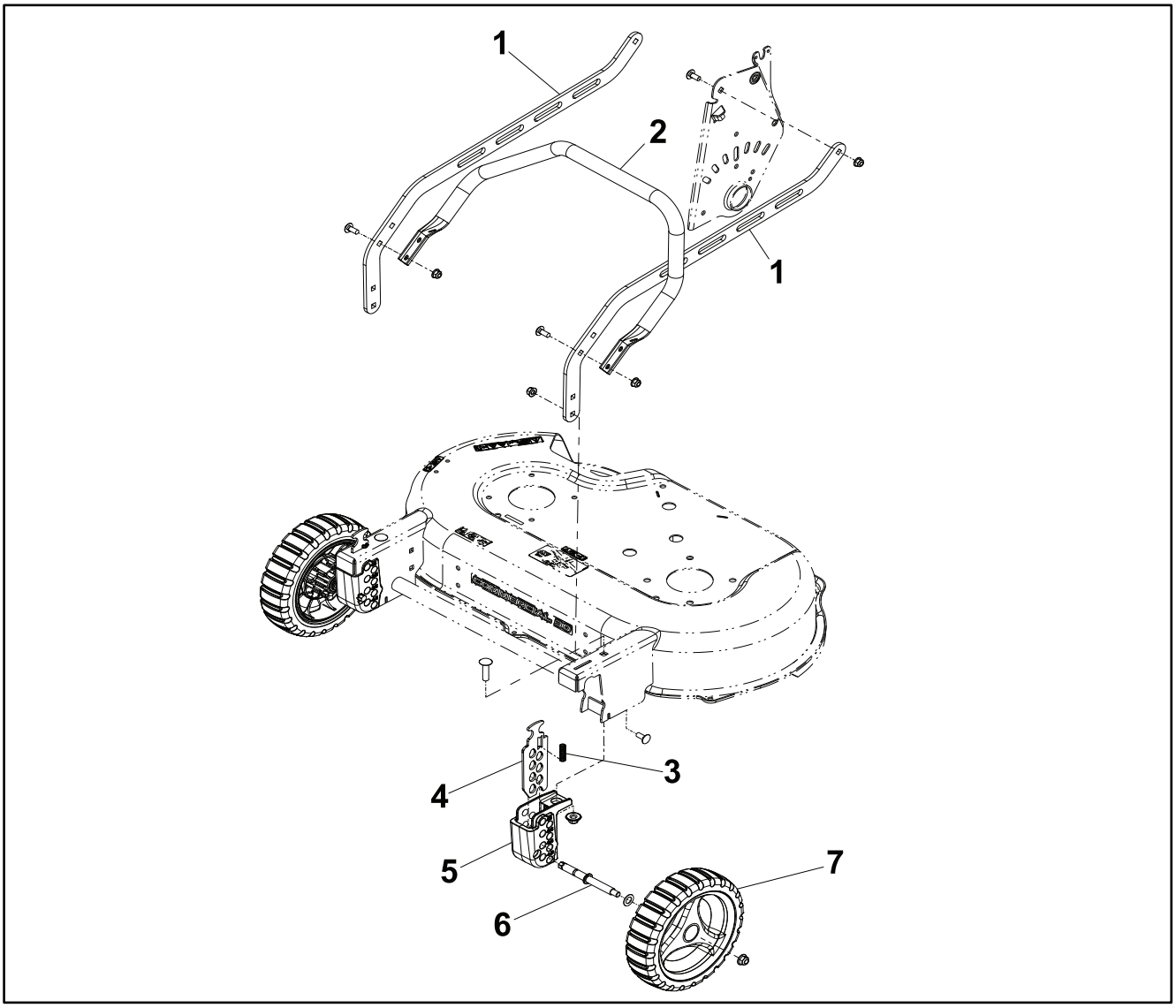


g299500

Figure 361

1. Brace
2. Shield
3. Height Adjustment Lock
4. Spacer
5. Torsion Spring
6. U-Nut
7. Front Bumper Asm.
8. Spring Mandrell
9. Torsion Spring
10. Front Axle Asm.
11. Front Bushing
12. Wheel Cover Spacer
13. Wheel

Drive System Assembly 2

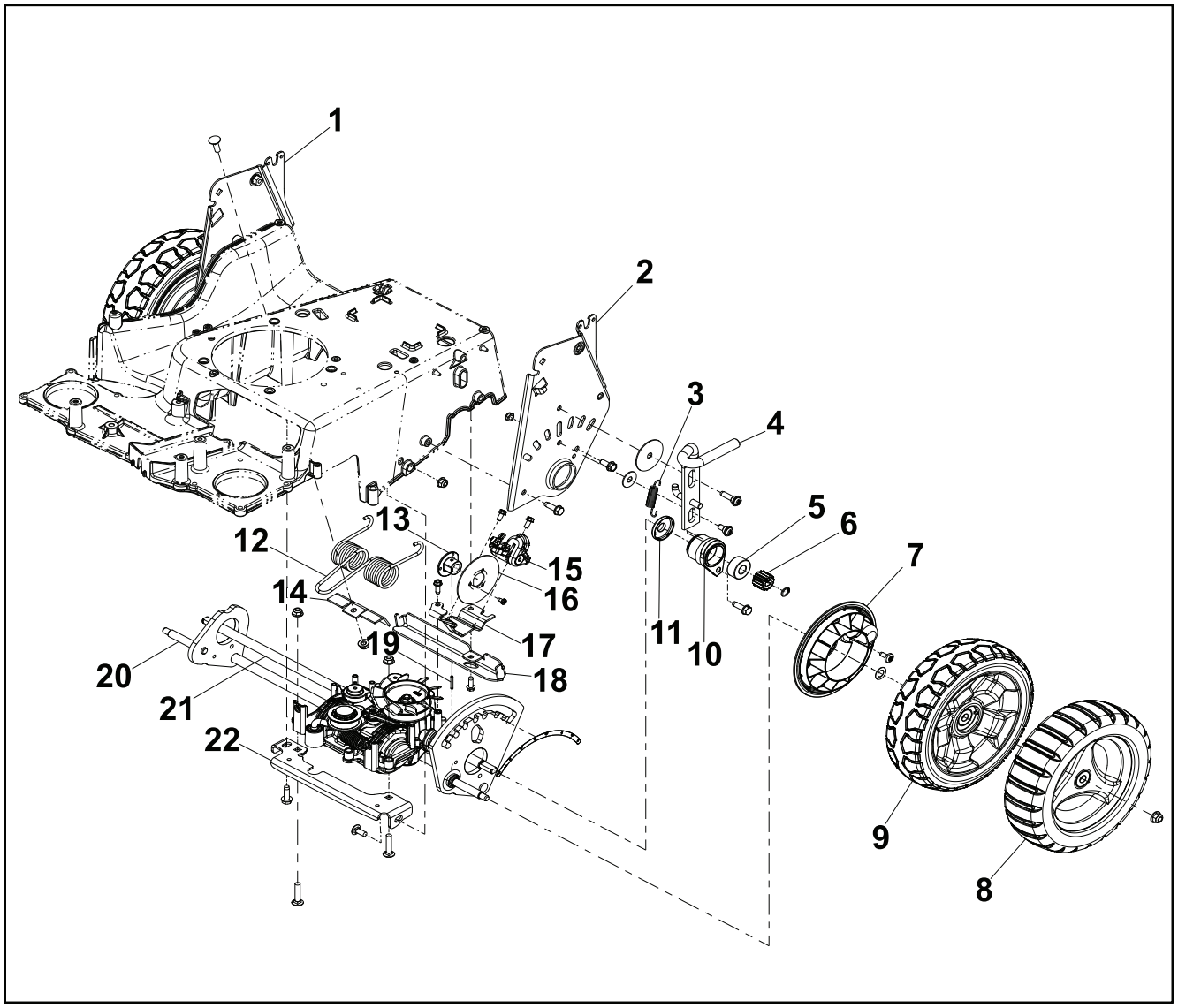


g299501

Figure 362

1. RH Brace
2. Engine Guard
3. Compression Spring
4. Front Height Plate
5. Front Block
6. Wheel Axle
7. 9 inch Wheel Asm. with Bearings

Drive System Assembly 3



g299502

Figure 363

1. RH HOC Plate Asm.
2. LH HOC Plate Asm.
3. Extension Spring
4. Height Adjustment Lock
5. Custom Ball Bearing
6. 15T Pinion Gear
7. Wheel Cover
8. Wheel Asm.
9. 10.5 Inch Wheel Asm.
10. Bearing Retainer Asm.
11. Bearing Cover
12. Torsion Spring
13. Rotor Hub
14. Bracket
15. Disc Brake Caliper
16. Brake Rotor
17. Brake Mount Bracket
18. Cable Guide
19. Roll Pin
20. Rear Axle Asm.
21. Transmission
22. Front Transmission Bracket

Transmission Replacement

Transmission Removal

1. Park the machine on a level surface and engage the parking brake. Stop the engine and wait for all moving parts to stop. Shut the fuel off.
2. Remove the grass bagger assembly if attached.
3. Using an appropriate lifting device, raise the rear of the machine off the ground.
4. Open and secure the rear cover.
5. Remove the 1/4–20 inch taptite screw securing the cover to the frame.

g296174

Figure 364

6. Remove the 4 (1/4–20 inch) taptite screws securing the front cover to the frame.

g296175

Figure 365

7. Rotate the belt tensioner arm by using a 7/16 inch socket on the nut at the bottom side of the transmisison, turning clockwise.

g302330

Figure 366

8. To remove belt tension, align the idler pulley with the access hole on the bottom side of the transmission. Insert a quarter inch screw driver.

   Note: Screw driver needs to fit through access hole and the idler pulley slot securing the pulley into position.

g296176

Figure 367

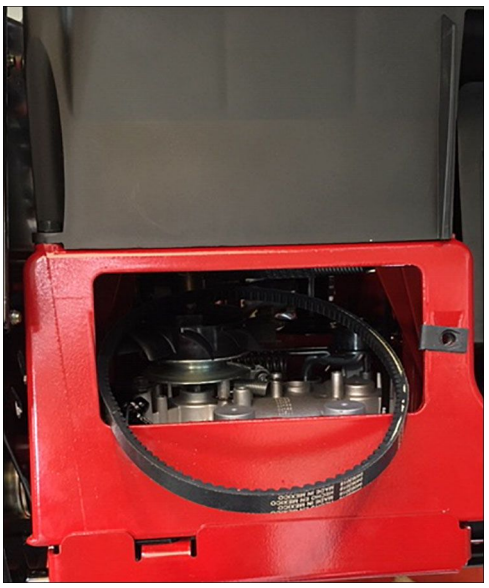
9. Remove the transmission belt from the engine pulley.

   Note: Access belt from the front of the mower.

g302331

Figure 368

10. Remove the belt from the rear of the mower.



g296178

Figure 369

11. Using an appropriate lifting device, lower the rear of the machine off the ground.
12. Set the rear height-of-cut to 5 inch.
13. Using a 9/16 inch socket, remove the 2 nuts securing the wheels to the rear axles.
14. Remove the T-30 screw securing the dust cover to the axle assembly.

g297057

Figure 370

15. Remove the 5/16–18 inch nut on carriage bolt securing the spring bracket to the frame.

g297058

Figure 371

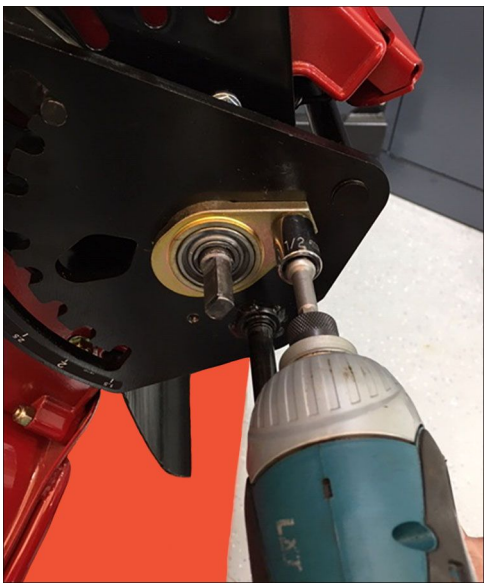
16. Using snap ring pillars, remove the snap ring retaining the pinion gear from axle shaft.

    Note: Inspect the pinion gear to wheel gear mesh for abnormal wear, broken teeth, and uneven wear. Replace pinion gear to wheel gear mesh if needed.

g297059

Figure 372

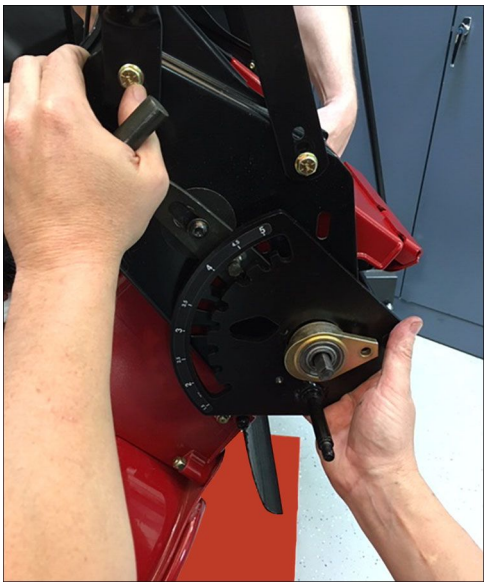
17. Remove the 5/16–18 inch bolt securing the axle bearing housing to the axle height-of-cut plate.



g297060

Figure 373

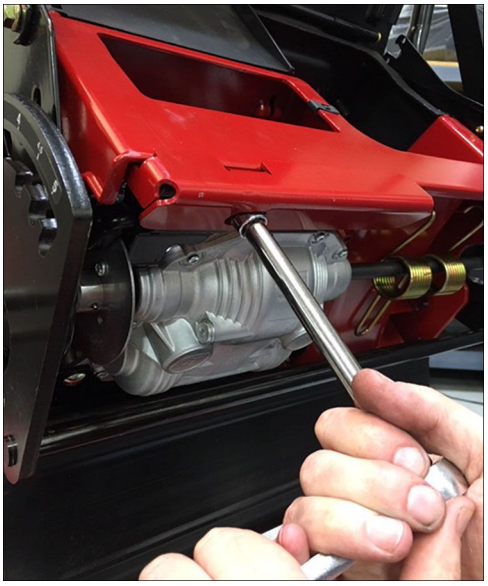
18. While holding up the spring loaded height-of-cut handle, apply pressure to the back of the axle bearing housing assembly, separating from axle weldment.



g297061

Figure 374

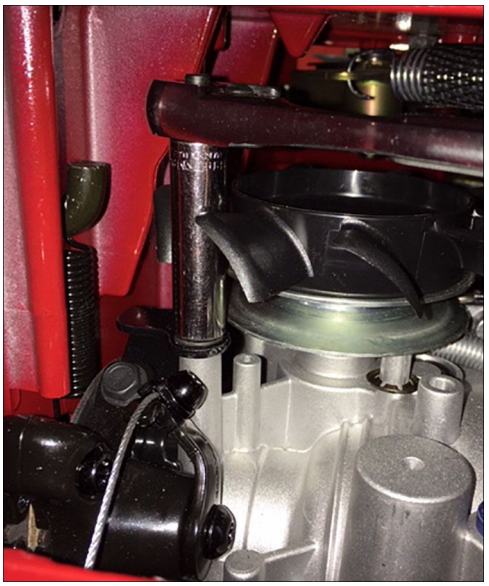
19. Remove the 1/4–20 taptite screw securing the transmission cable guide to the frame.



g297062

Figure 375

20. Remove the 1/4–20 inch bolt securing the parking brake to the transmission.



g297064

Figure 376

21. Remove the 2 Phillip head screws from the trailing shield to the main frame.

g297065

Figure 377

22. Remove the 5/16–18 inch nut to carriage bolt on LH side. Remove the RH 5/16–18 inch taptite screw to main frame securing the transmission assembly to the main housing.

g297066

Figure 378

g297531

Figure 379

23. Slide transmission to the right. Line up RH side height-of-cut notch with bolt.

g297894

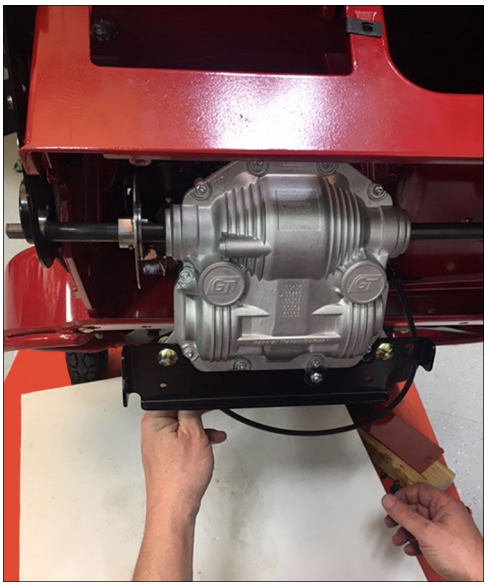
Figure 380

24. Remove the height-of-cut weldment from the chassis. Slide the LH side of the height-of-cut weldment first before the RH side.

g297895

Figure 381

25. Center the transmission. Pinch the traction cable towards the transmission and rotate the front transmission and cable downward.



g297896

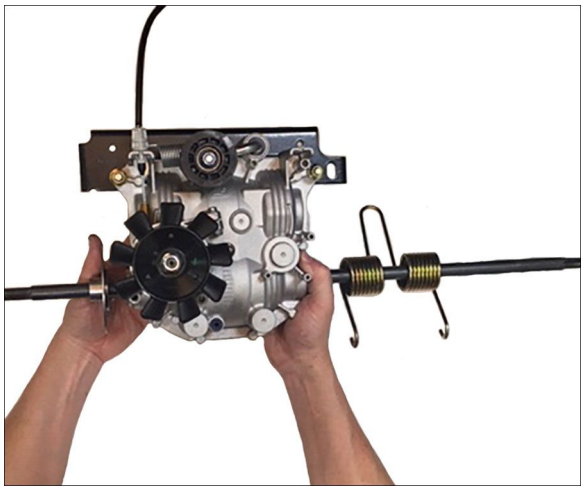
Figure 382

26. To remove the transmission from the frame, rotate the transmission upside down and slide the transmission to the right. Remove the transmission from the frame with the traction cable attached.

g298181

Figure 383

27. Remove the torsion spring from the RH side axle shaft.



g298182

Figure 384

28. Using needle a nose plier, squeeze the cable anchor and remove cable anchor from the cable mount.

g298183

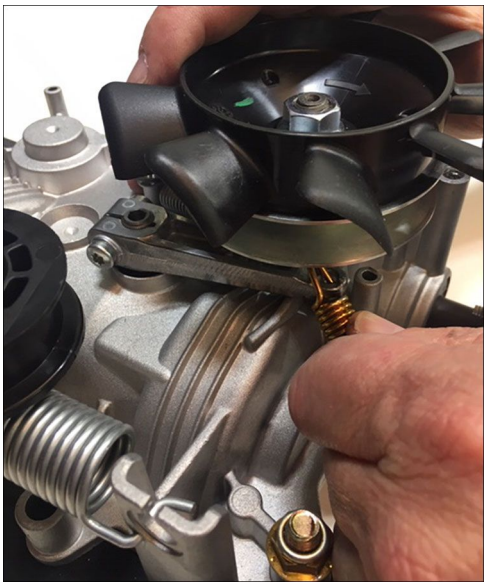
Figure 385

29. Pull the cable and remove from the cable anchor mount.

g298184

Figure 386

30. Remove the spring hook from the transmission clutch lever.



g298185

Figure 387

Transmission Disassembly

1. Remove the 2 (5/16–18 inch) nuts from carriage bolts securing the transmission mount plate to the transmission.

g299150

Figure 388

2. Support the transmission axle, drive the roll pin out using a 3/16 inch punch securing the brake hub to the transmission axle. Slide the brake hub from the transmission axle.

g299143

Figure 389

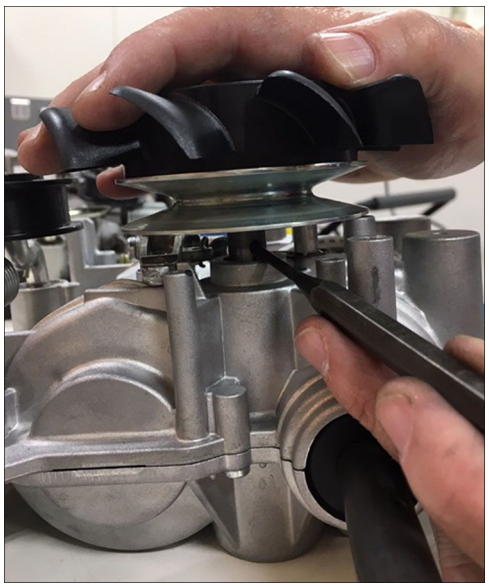
3. Remove the T-25 mounting screws securing the brake rotor to the brake hub.

   Note: Mounting screws may vary per unit.

g299144

Figure 390

4. Secure the input shaft with a 1/8 inch drift punch inserted into the whole on the input shaft.



g299145

Figure 391

5. Using a 9/16 inch socket, remove the nut securing the fan to the input shaft.

g304900

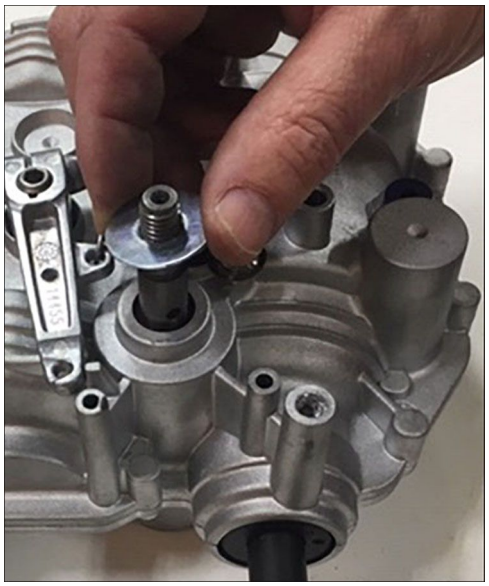
Figure 392

6. Using a 9/16 inch socket, remove the nut securing the input pulley to the input shaft.

g304907

Figure 393

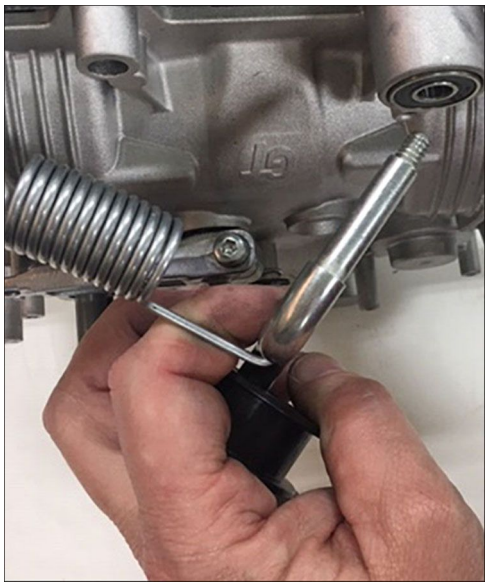
7. Remove the washer from the input shaft.



g304923

Figure 394

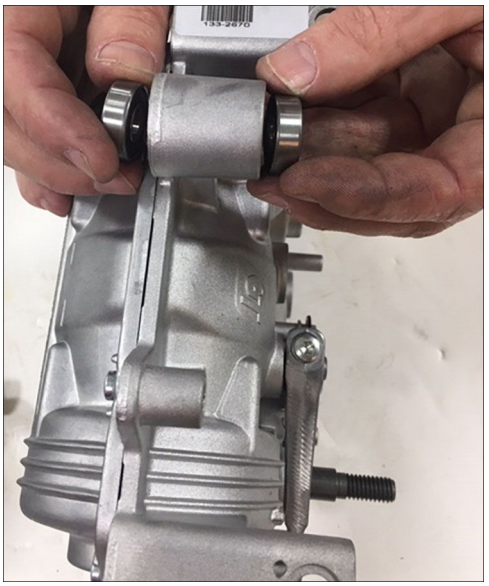
8. Remove the 1/4 inch nut from the idler shaft on the bottom side of the transmission.
9. Pull the idler shaft out of the pivot bearing.



g304924

Figure 395

10. Remove idler shaft and spring from the spring mount.
11. Remove the bearings from the transmission.

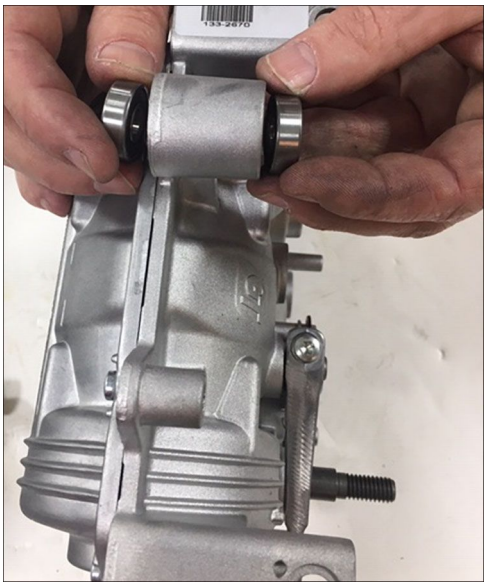


g299151

Figure 396

Transmission Assembly

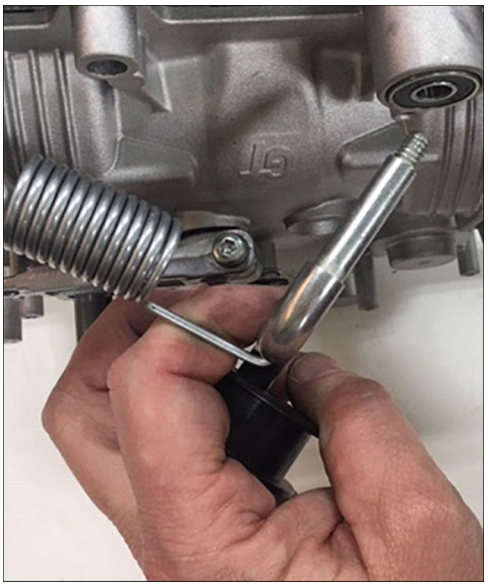
1. Install the bearings to the transmission.



g299151

Figure 397

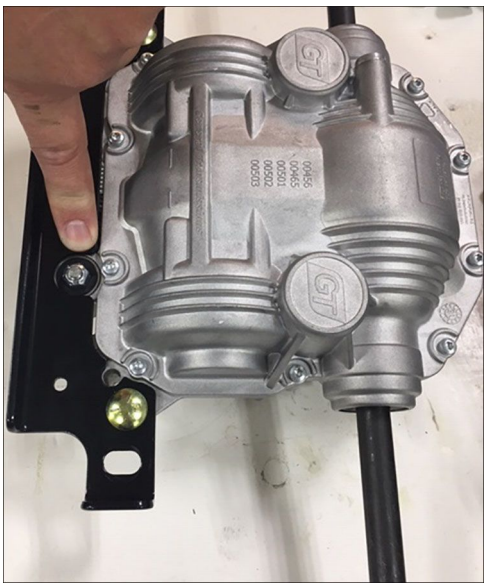
2. Install the idler shaft and spring to the spring mount.
3. Install the idler shaft into the pivot bearing.



g304924

Figure 398

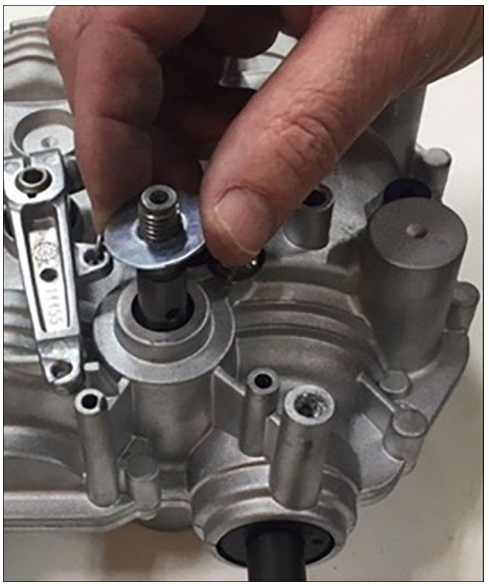
4. Install the M8 inch nut to the idler shaft on the bottom side of the transmission.



g309825

Figure 399

5. Install the washer to the input shaft.



g304923

Figure 400

6. Using a 9/16 inch socket, install the nut securing the input pulley to the input shaft. Torque nut to 70.8 in-lbs. (8 Nm).

g304907

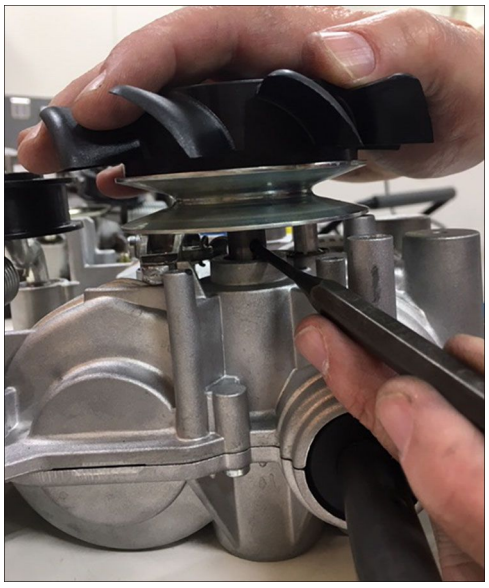
Figure 401

7. Using a 9/16 inch socket, install the nut securing the fan to the input shaft. Torque nut to 70.8 in-lbs. (8 Nm).

g304900

Figure 402

8. Secure the input shaft with a 1/8 inch drift punch inserted into the whole on the input shaft.



g299145

Figure 403

9. Install the T-25 mounting screws securing the brake rotator to the brake hub. Torque mounting screws to 38 ± 7 in-lbs. (4.3 ± 0.8Nm).

   Note: Mounting screws may vary per unit.

g299144

Figure 404

10. Slide the brake hub into the transmission axle. Support the transmission axle, drive the roll pin in using a 3/16 inch punch securing the brake hub to the transmission axle.

g299143

Figure 405

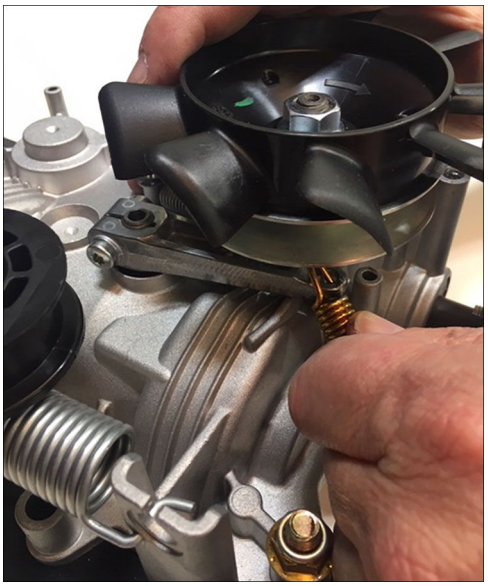
11. Install the 2 (5/16–18 inch) nuts from carriage bolts securing the transmission mount plate to the transmission. Torque nuts to 160 ± 16 in-lbs. (18 ± 2 Nm).

g299150

Figure 406

Transmission Installation

1. Install the spring hook to the transmission lever.



g298185

Figure 407

2. Install the cable to the cable anchor mount.

g298184

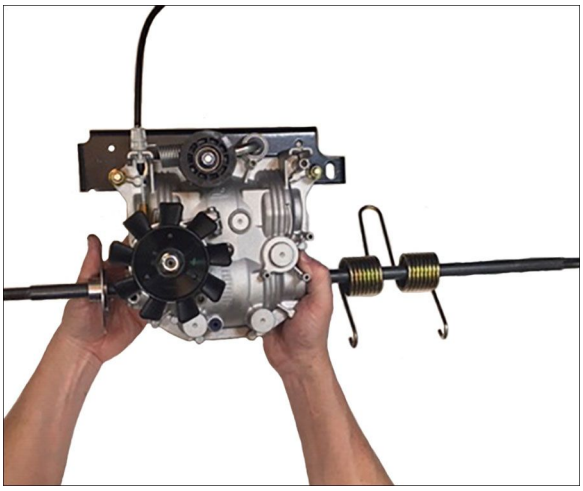
Figure 408

3. Using needle a nose plier, install the cable anchor to the cable mount.

g298183

Figure 409

4. Install the height-of-cut spring to the RH side axle shaft.



g298182

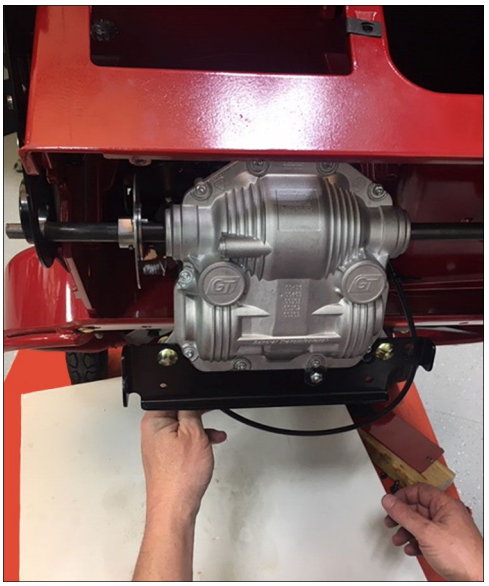
Figure 410

5. Install the transmission to the frame with the traction cable attached.

g298181

Figure 411

6. Rotate the front transmission and cable upward. Pinch the traction cable towards the transmission.



g297896

Figure 412

7. Slide the RH side of the height-of-cut weldment first before the LH side. Install the height-of-cut weldment to the chassis.

g297895

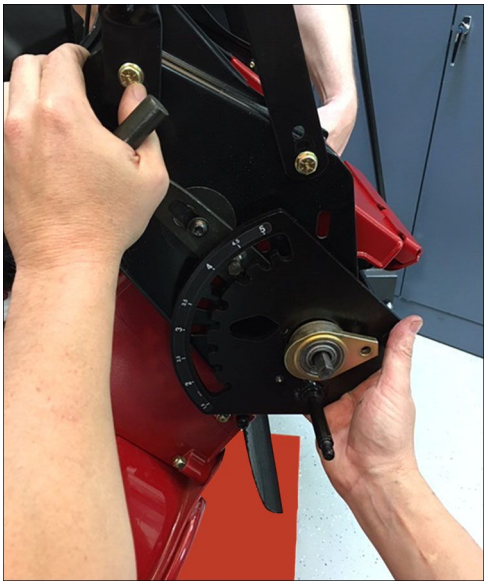
Figure 413

8. Line up the RH side height-of-cut notch with bolt. Slide the transmission to the left.

g297894

Figure 414

9. Put anti-seize inside the axle bearing before sliding over the shaft. Install the axle bearing housing assembly over the axle. Line up the mounting hole on the bearing housing assembly to the weldment hole. Install the bearing retainers into the rear axle weldment and rear height-of-cut plate for alignment purposes before securing the transmission to the frame. Install the 5/16–18 inch bolt to the axle weldment. Torque bolt to 160 ± 16 in-lbs. (18 ± 2 Nm).



g297061

Figure 415

10. Install LH 5/16–18 inch nut to carriage bolt and the RH 7/16–18 inch taptite screw to the main frame securing the transmission assembly to the main housing. Torque nut to carriage bolt to 140 ± 5 in-lbs. (16 ± 0.5 Nm). Torque taptite screw to 160 ± 16 in-lbs. (18 ± 2 Nm).

g297531

Figure 416

g297066

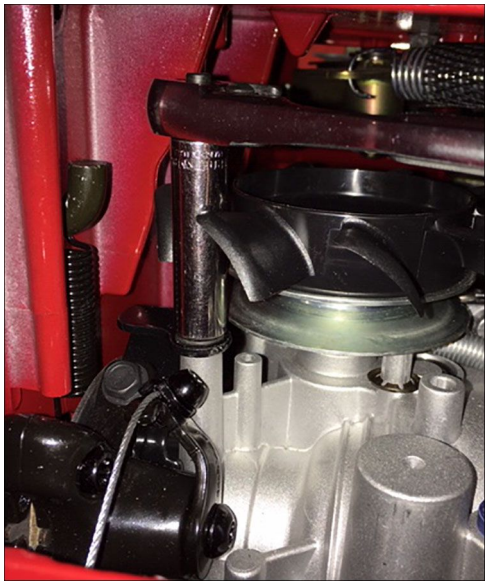
Figure 417

11. Install the 2 Phillip head screws securing the trailing shield to the main frame. Torque screws to 9 ± 1 in-lbs. (1 Nm).

g297065

Figure 418

12. Install the 1/4–20 inch bolt securing the parking brake to the transmission. Torque bolt to 85 ± 15 in-lbs. (9 ± 2 Nm).



g297064

Figure 419

13. Install the 1/4–20 taptite screw securing the transmission cable guide to the frame.

g297062

Figure 420

14. Using snap ring pillars, Install the snap ring retaining the pinion gear to axle shaft.

g297059

Figure 421

15. Install the 5/16–18 inch nut on carriage bolt securing the spring bracket to the frame. Torque nut to 115 ± 15 in-lbs. (13 ± 2 Nm).

g297058

Figure 422

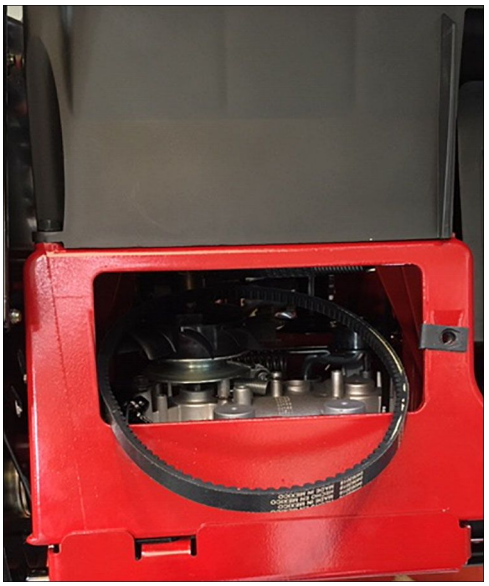
16. Install the T-30 screw securing the dust cover to the axle assembly. Torque screw to 55 ± 5 in-lbs. (6 ± 1 Nm).

g297057

Figure 423

17. Using a socket, install the 2 (3/8–16 inch) nuts securing the wheels to the rear axles. Torque nuts to 180 ± 20 in-lbs. (20 ± 2 Nm).

18. Install the belt through the rear of the mower.



g296178

Figure 424

19. Install the transmission belt to the engine pulley.

    Note: Access belt from the front of the mower.

g296177

Figure 425

20. Install the transmission belt to the transmission pulley.
21. Using a 7/16 inch socket on the bottom of the transmission, release pressure on the quarter inch screw driver. Remove the quarter inch screw driver, allowing idler arm to put tension on the belt.
22. Install the belt to the input pulley on the transmission.
23. Install the 4 (1/4–20 inch) taptite screws securing the belt cover to the frame. Torque bolts to 55 ± 5 in-lbs. (6 ± 1 Nm).

g296175

Figure 426

24. Install the 1/4–20 inch taptite screw securing the frame cover to the frame. Torque bolt to 110 ± 11 in-lbs. (12 ± 2 Nm).

g296174

Figure 427

25. Lower the rear cover.
26. Using an appropriate lifting device, lower the rear of the machine to the ground.
27. Reinstall the cable guide.