Form No. 3461-829 Rev A

TORO

Count on it.

Service Manual

Stripe™ 21 inch Electric Walk Power Mower Service Manual

Published: June 2024

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 the skin and cause 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

Stripe™ 21 inch Electric Walk Power Mower				
Model	**21611**	**21620**	**21621**	**21623**
Series	Flex-Force™	Flex-Force™	Flex-Force™	Flex-Force™
Voltage	60v	60v	60v	60v
Motor	1 kW	1 kW	1 kW	1 kW
Blade Style	Single Blade	Single Blade	Single Blade	Dual Blade
Battery	Lithium-ion	Lithium-ion	Lithium-ion	Lithium-ion
Battery Ports	Single	Single	Single	Single
Transmission	Electric Variable Speed	Electric Variable Speed	Electric Variable Speed	Electric Variable Speed
Traction	Hand Push	Rear Wheel Drive	Rear Wheel Drive	Rear Wheel Drive
Track Drive Motor	36v Brushed	36v Brushed	36v Brushed	36v Brushed
Transmission Lubricant	Non-serviceable	Non-serviceable	Non-serviceable	Non-serviceable
Max Ground Speed	N/A	5 km/h (3.1 mph)	5 km/h (3.1 mph)	5 km/h (3.1 mph)
Deck Size	53.3 cm (21 inches)	53.3 cm (21 inches)	53.3 cm (21 inches)	53.3 cm (21 inches)
Deck Material	Polymer Composite	Polymer Composite	Polymer Composite	Polymer Composite
Handle	2 Position Height	2 Position Height	2 Position Height	2 Position Height
Controls	Single Bail	Dual Bail	Dual Bail	Dual Bail
Storage	SmartStow®	SmartStow®	SmartStow®	SmartStow®
Style	Recycler, Bagger, Rear Side Discharge	Recycler, Bagger, Rear Side Discharge	Recycler, Bagger, Rear Side Discharge	Recycler, Bagger, Rear Side Discharge
Length	91.4 cm (36 inches)	91.4 cm (36 inches)	91.4 cm (36 inches)	91.4 cm (36 inches)
Length (Including Grass Bag)	139.7 cm (55 inches)	139.7 cm (55 inches)	139.7 cm (55 inches)	139.7 cm (55 inches)
Length (Including Handle)	172.7 cm (68 inches) at lowest handle setting	172.7 cm (68 inches) at lowest handle setting	172.7 cm (68 inches) at lowest handle setting	172.7 cm (68 inches) at lowest handle setting
Width	57.2 cm (22.5 inches)	57.2 cm (22.5 inches)	57.2 cm (22.5 inches)	57.2 cm (22.5 inches)
Height	50.8 cm (20 inches)	50.8 cm (20 inches)	50.8 cm (20 inches)	50.8 cm (20 inches)
Wheel Size (Front)	20.3 cm (8 inches)	20.3 cm (8 inches)	20.3 cm (8 inches)	20.3 cm (8 inches)
Wheel Size (Rear)	25.4 cm (10 inches)	25.4 cm (10 inches)	25.4 cm (10 inches)	25.4 cm (9.65 inches)
Handle Height	113 cm (44.5 inches)	113 cm (44.5 inches)	113 cm (44.5 inches)	113 cm (44.5 inches)
SmartStow® Height	119.4 cm (47 inches)	119.4 cm (47 inches)	119.4 cm (47 inches)	119.4 cm (47 inches)
LED Lighting	Not Equipped	Not Equipped	Equipped	Equipped

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

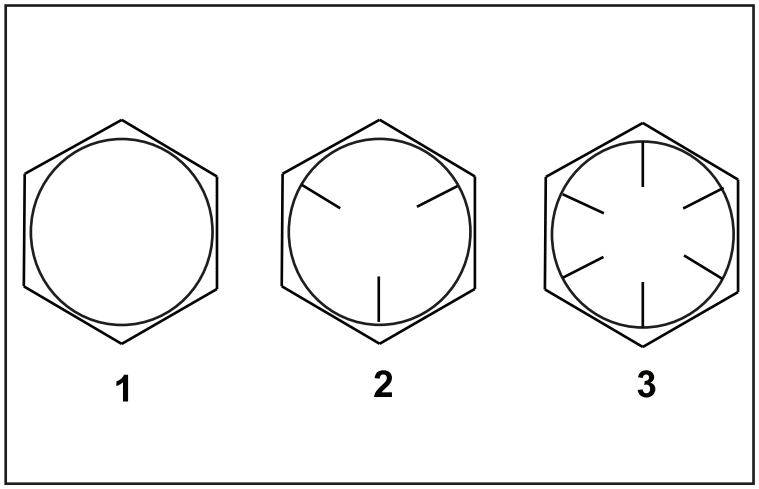

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Figure 1

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

Metric Bolts and Screws

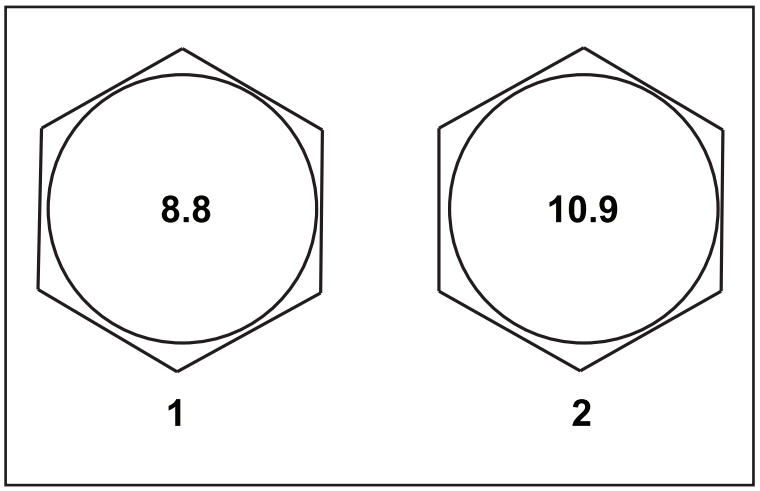

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Figure 2

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

The nominal torque values listed above for Grade 5 and 8 fasteners are based on 75% of the minimum proof load specified in SAE J429. The tolerance is approximately ± 10% of the nominal torque value. Thin nuts include jam nuts.

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

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

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

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

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

SAE Grade 8 Steel Set Screws

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

Wheel Bolts and Lug Nuts

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

**For steel wheels and non-lubricated fasteners.

Thread Cutting Screws (Zinc Plated Steel)

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

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

Conversion Factors

in-lb X 11.2985 = N • cm

ft-lb X 1.3558 = N • m

N • cm X 0.08851 = in-lb

N • cm X 0.73776 = ft-lb

Thread Cutting Screws (Zinc Plated Steel)

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

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

Equivalents and Conversions

Decimal and Millimeter Equivalents

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

U.S. to Metric Conversions

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

Chapter 3

Troubleshooting

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GEARS

The Systematic approach to defining, diagnosing and solving problems.

G

Gather Information

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

E

Evaluate Potential Causes

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

A

Assess Performance

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

R

Repair

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

S

Solution Confirmation

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

General Troubleshooting

Problem	Possible Cause	Corrective Action
The tool will not operate	The charger is not charging the battery.	1. Is the charger physically damaged? If yes, replace the charger. 2. Check if the LEDs light up on the battery. If the LEDs do not light up when the battery State-of-Charge (SOC) button is pressed, replace the battery. 3. When the battery is docked, the battery State-of-Charge (SOC) LEDs should cycle (if the SOC button is pushed immediately before docking the battery), the LEDs will not cycle when the battery is docked. Wait approximately 30 seconds between pressing the SOC button on the battery and docking the battery to test. If the battery LEDs do not cycle when placed on the charger, but do cycle when the SOC button is pressed, the charger will need to be replaced. 4. If none of the above steps resolved the issue or no lights are visible on the charger, replace the charger.
	The battery is not taking a charge.	1. Is the battery physically damaged? If yes, replace the battery. 2. Install the battery on the charger. If the charger light blinks green, the battery is charging. If no lights blink on the charger, replace the charger. 3. If the LEDs on the battery do not turn on when the State-of-Charge (SOC) button is pressed on the battery, replace the battery.
	The tool is not functioning.	1. Is the tool physically damaged? If yes, repair/replace the tool. 2. Verify the safety switch functionality. 3. Check to make sure the battery is charged. If it's not charged, follow the battery and charger testing procedure. If the battery is charged and tool is not functioning, replace/repair the tool.

Error Beep Table

Error Type	Number of Beeps	Next Step
Communication Error	2	1. Verify the motor driver and battery functionality. 2. Replace the motor driver and/or battery as necessary.
Time Out Error	3	1. Verify the motor driver and battery functionality. 2. Replace the motor driver and/or battery as necessary.
Motor Driver Error	4	1. Verify the motor driver functionality. 2. Replace the motor driver as necessary.
Motor Driver Error	5	1. Verify the motor driver functionality. 2. Replace the motor driver as necessary.
Hall Sensor Error	6	1. Verify the error occurs. 2. Replace the motor.
Motor Driver Error	7	1. Verify the motor driver functionality. 2. Replace the motor driver as necessary.
Communication Low Error from Battery, Low Power	8	1. Charge the battery. 2. Replace as necessary.
Motor Driver Block Error	9	1. Verify the motor driver functionality. 2. Replace the motor driver as necessary.
Internal Error Code	10	1. Verify the motor driver functionality. 2. Replace the motor driver as necessary.
Communication High Error from Battery Communication	11	1. Verify the motor driver functionality. 2. Replace the motor driver as necessary.
Motor Error	12	1. Verify the motor driver functionality. 2. Replace the motor driver as necessary.
Current Error	13	1. The cutting motor is overloaded. Reduce the load. 2. Verify the cutting chamber is free from debris and deck is clean.
Precharge Error	14	1. Verify the motor driver functionality. 2. Replace the motor driver as necessary.
Gryoscope Error	15	1. Place the mower flat on the ground and try again. 2. If same error occurs, replace the motor driver.

Error Type	Number of Beeps	Next Step
Temp Error	16	1. Discontinue use and allow the machine to cool. 2. If the same error occurs, replace the motor driver.
Calibration Error	18	1. Verify the motor driver and battery functionality. 2. Replace the motor driver and/or battery as necessary.

Chapter 4

Power Source

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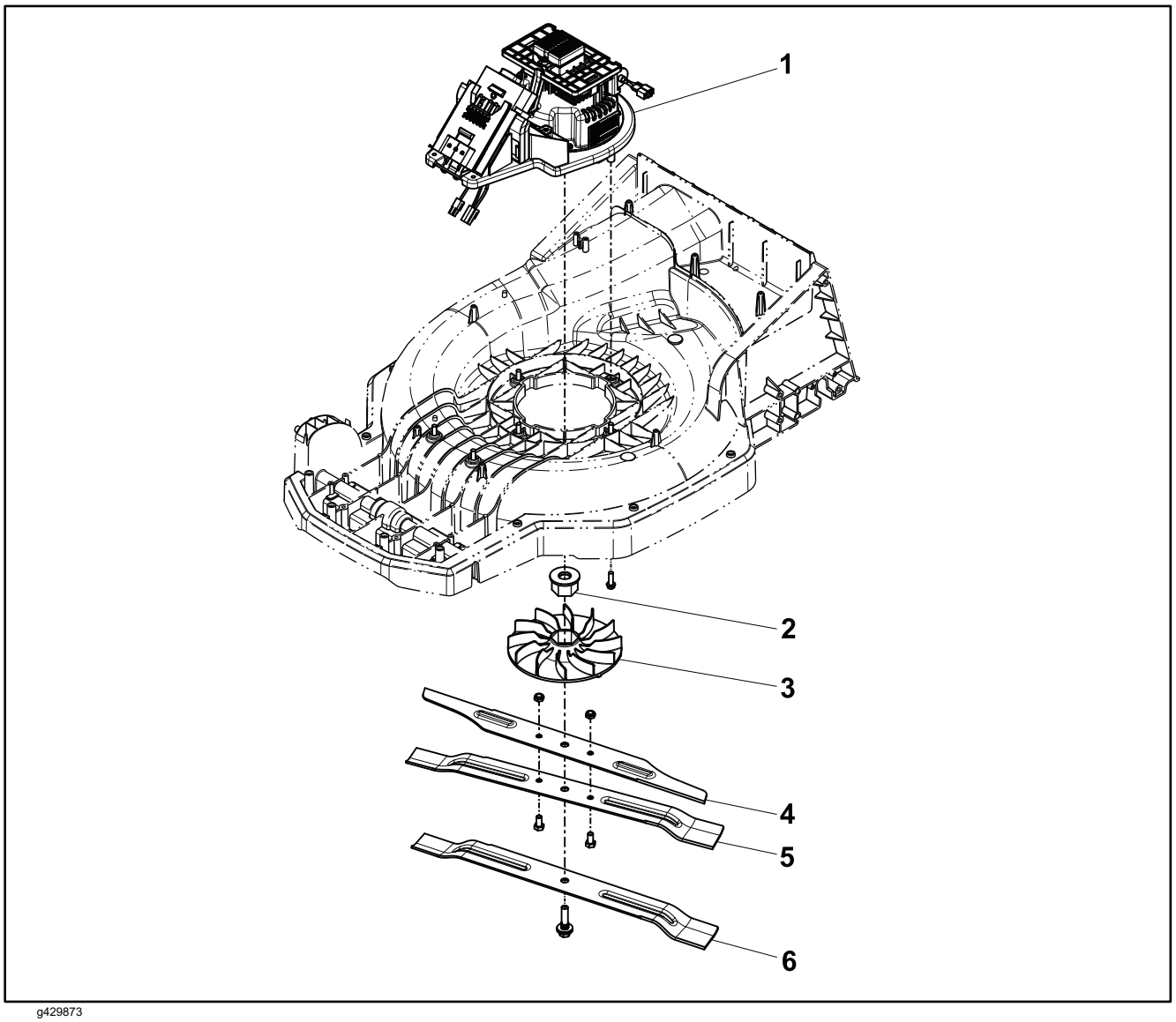
General Information

The power source on the Stripe™ 21 inch Electric Walk Power Mower consists of a motor base, brushless motor, battery receiver, motor controller, motor controller bracket and LED lighting controller. The power source is protected by the upper and lower housing and mounted directly onto the polymer deck assembly.

Service and Repairs

Motor Assembly



g429873

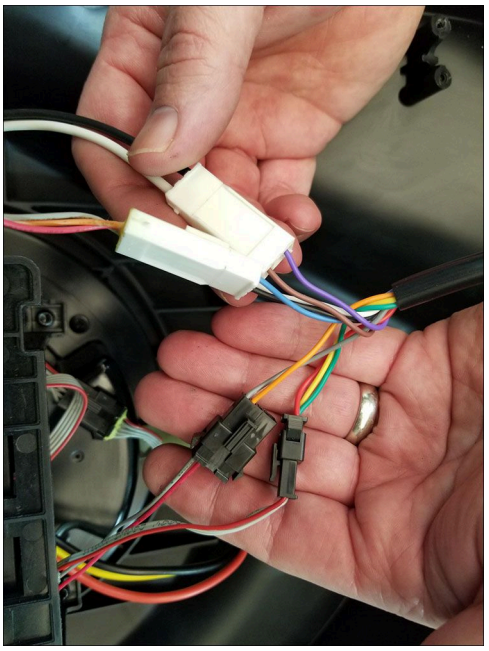
Figure 3

1. Power Assembly
2. Hex Nut
3. Motor Fan
4. Dual Blade
5. Dual Blade
6. Single Blade

Motor Assembly Replacement

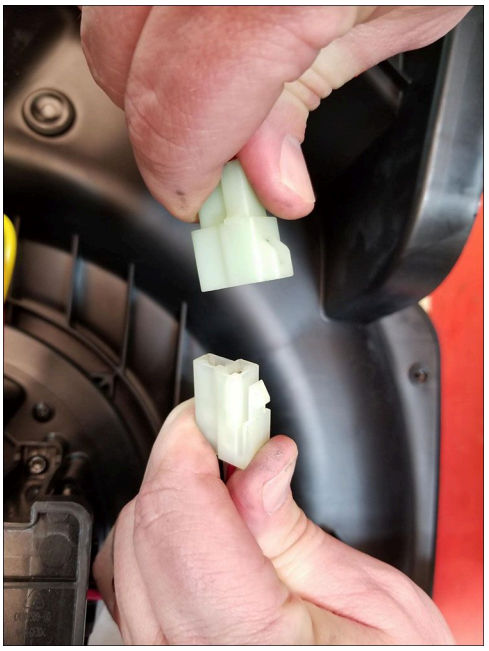
Motor Assembly Removal

1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.
3. Remove the upper shroud. Refer to Upper Shroud Removal (page 5–10).
4. Disconnect the motor controller from the handle controller and transmission wiring.



g429731

Figure 4



g429751

Figure 5

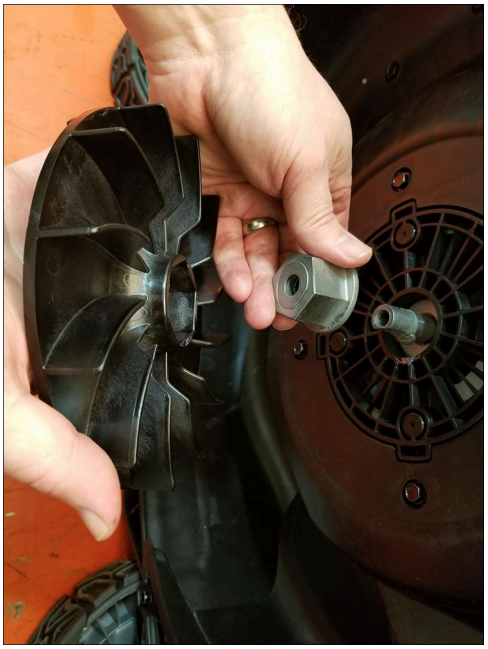
5. Tip the unit onto its side and support the machine.

6. Using a 9/16 inch socket, remove the 3/8 inch bolt securing the blade to the motor assembly. Remove the blade.

g429722

Figure 6

7. Remove the motor fan and hex nut from the motor assembly.



g429727

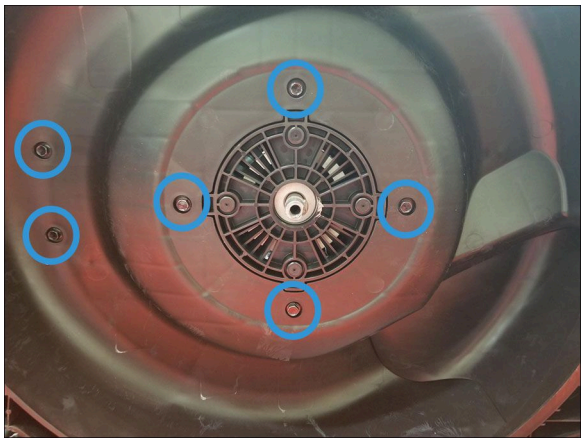
Figure 7

8. Using a 3/8 inch socket, remove the 6 screws securing the motor assembly to the chassis. Remove the motor assembly from the chassis.

⚠ CAUTION ⚠

When the screws are removed, the motor assembly will become loose. To prevent injury, support the motor assembly upon removal.

Motor Assembly Removal (continued)

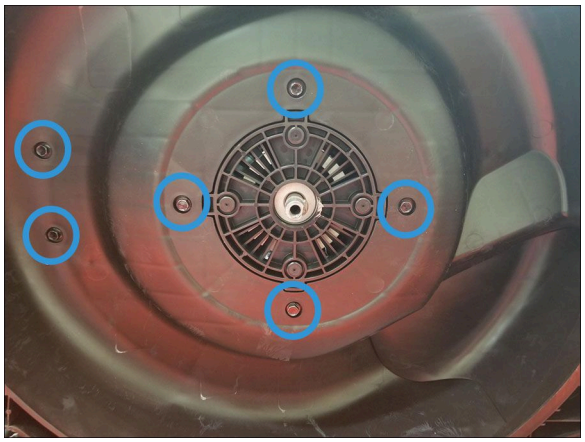


g429740

Figure 8

Motor Assembly Installation

1. Place the motor assembly onto the deck assembly. Using a 3/8 inch socket, install the 6 screws securing the motor assembly to the chassis.

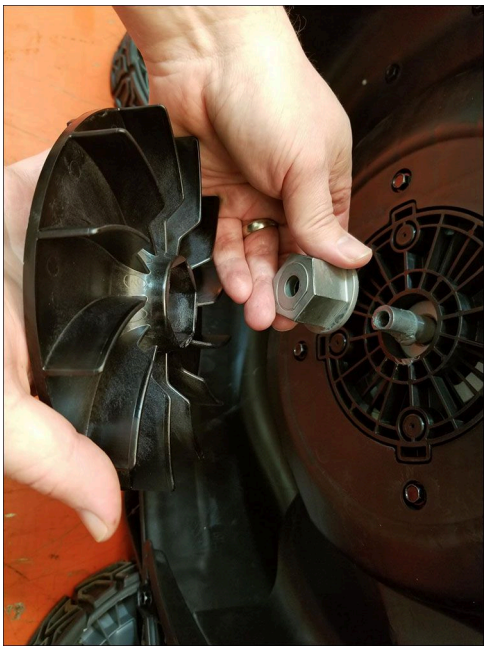


g429740

Figure 9

2. Install the hex nut and motor fan to the motor assembly.

   Note: Be sure that the orientation is as shown in Figure 10.



g429727

Figure 10

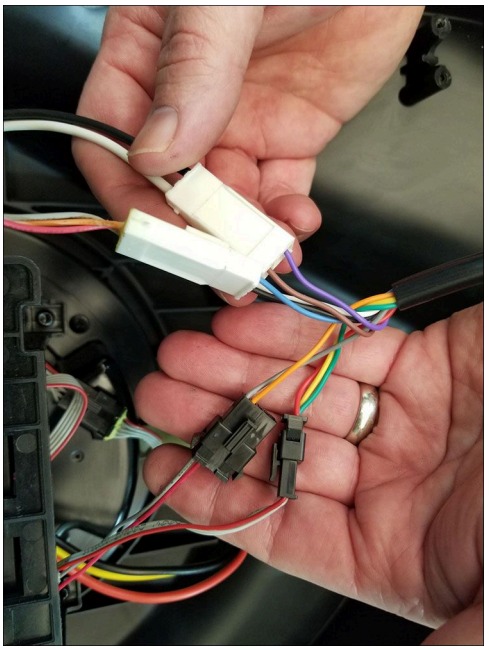
3. Using a 9/16 inch socket, install the 3/8 inch bolt securing the blade to the motor assembly with the blade nested into the motor fan.

   Note: The motor fan has raised sections to position the blade to the fan correctly.

g429722

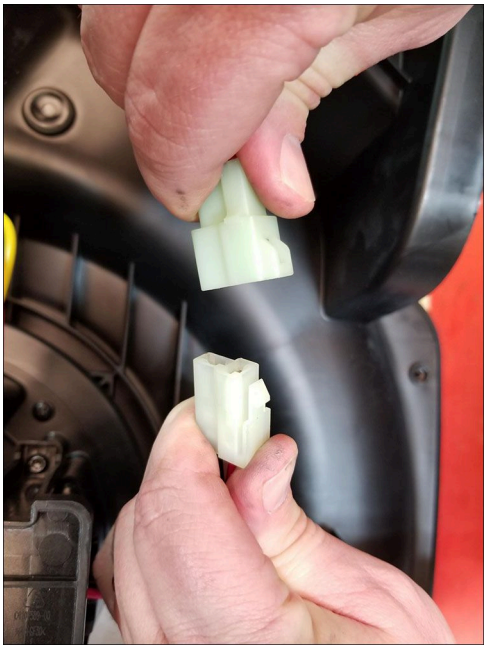
Figure 11

4. Position the unit with the wheels down.
5. Connect the motor controller to the handle controller and the transmission wiring.



g429731

Figure 12



g429751

Figure 13

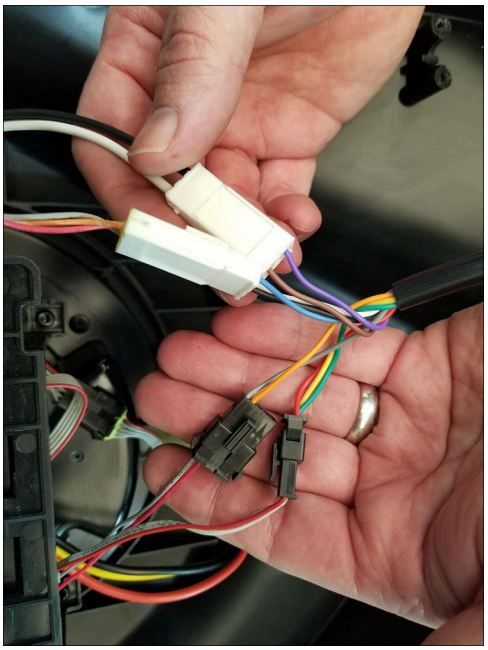
6. Install the upper shroud. Refer to Upper Shroud Installation (page 5–11).
7. Install the battery into the battery housing.

Motor Controller Replacement

Motor Controller Removal

1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.

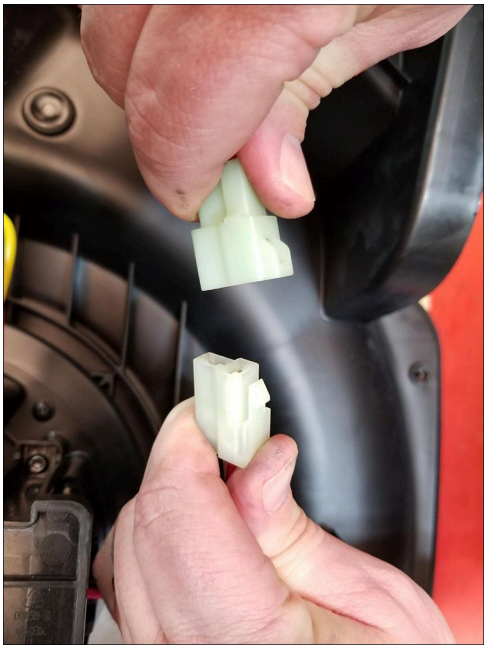
2. Remove the battery from the battery housing.
3. Remove the chassis shroud. Refer to Chassis Shroud Removal (page 5–6).
4. Disconnect the handle controller from the motor controller.



g429731

Figure 14

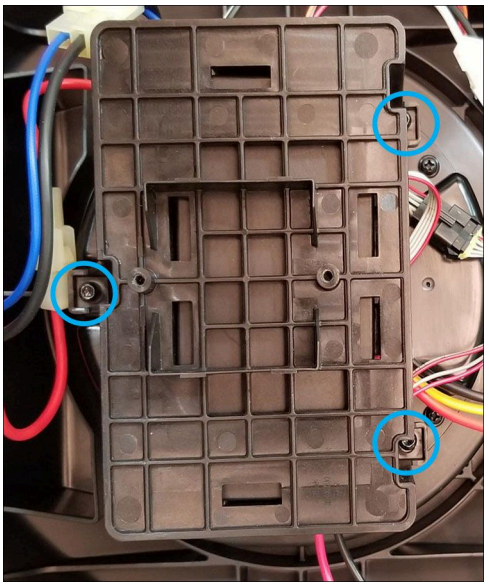
5. Disconnect the transmission wire from the motor controller.



g429751

Figure 15

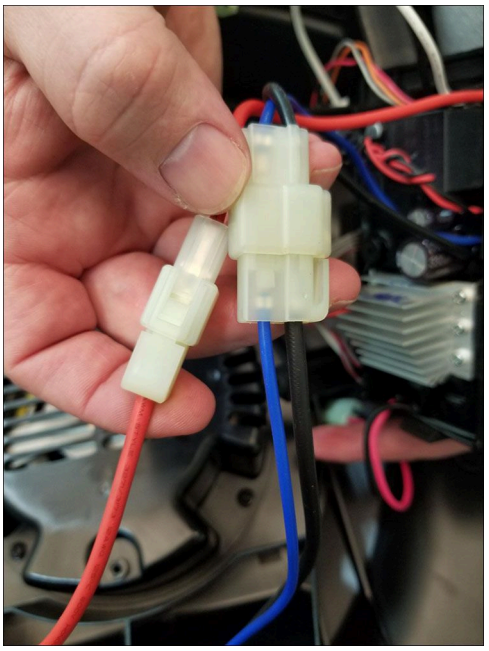
6. Using a T15 driver, remove the 3 torx screws securing the motor controller bracket to the motor cover.



g446920

Figure 16

7. Disconnect the battery receiver from the motor controller.

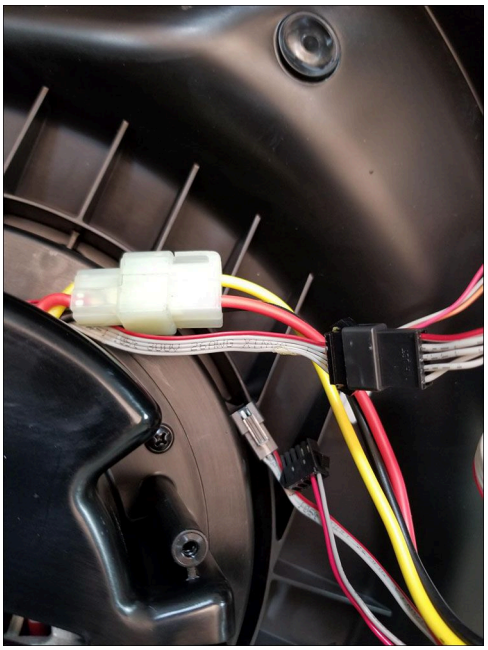


g429719

Figure 17

8. Disconnect motor controller wires from the motor harness. Remove the motor controller.

Motor Controller Removal (continued)

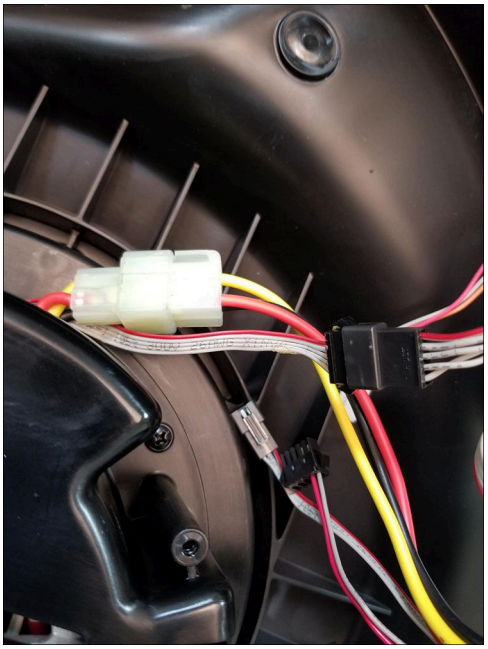


g429741

Figure 18

Motor Controller Installation

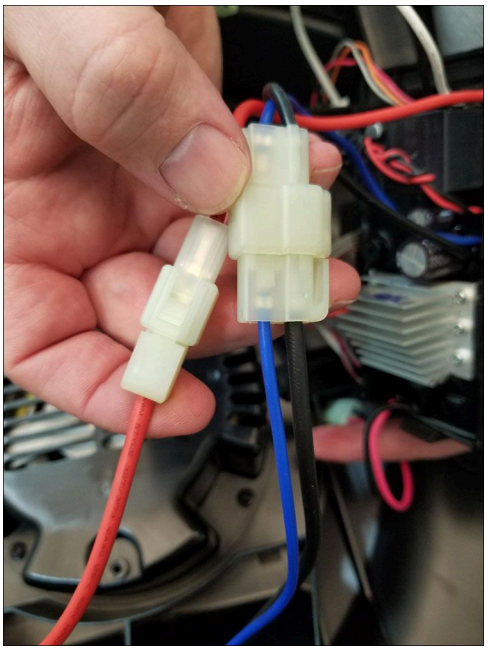
1. Install the motor controller. Connect the motor controller wires to the motor harness.



g429741

Figure 19

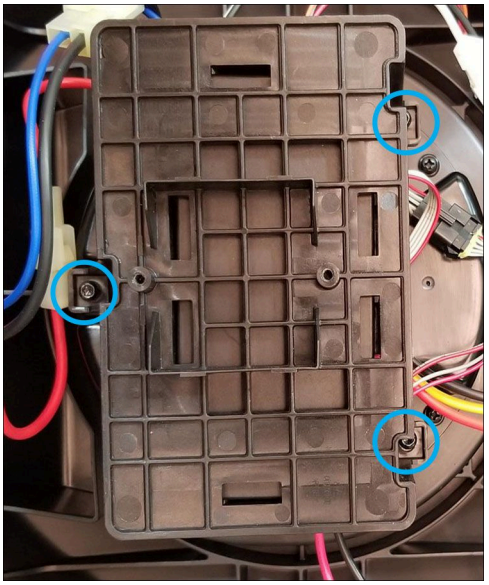
2. Connect the battery receiver to the motor controller.



g429719

Figure 20

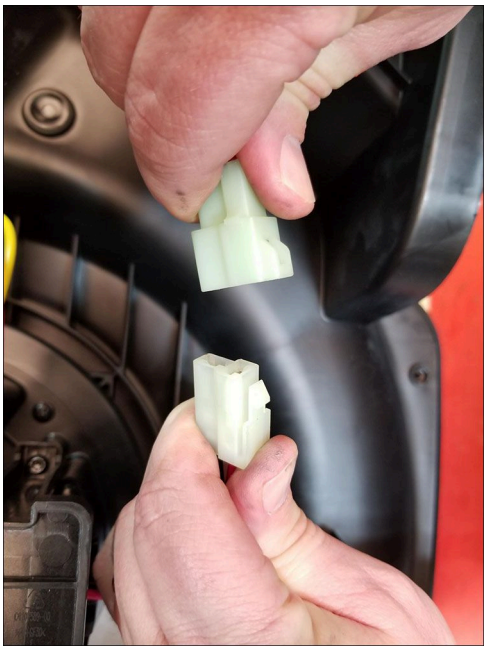
3. Using a T15 driver, install the 3 torx screws to secure the motor controller to the motor cover.



g446920

Figure 21

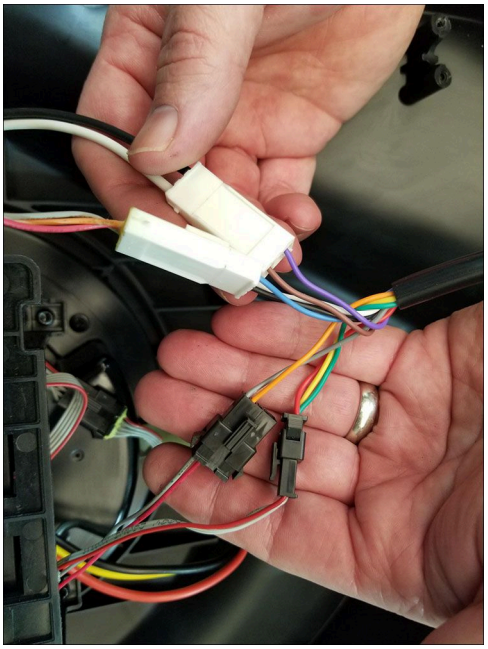
4. Connect transmission wire to the motor controller.



g429751

Figure 22

5. Connect the handle controller harness to the motor controller harness.



g429731

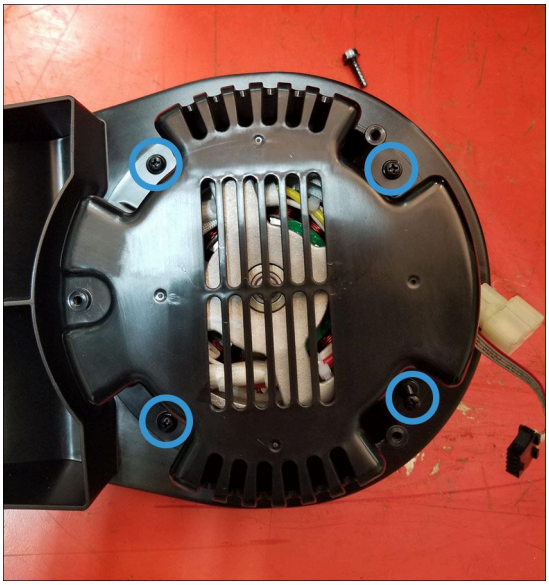
Figure 23

6. Install the chassis shroud. Refer to Chassis Shroud Installation (page 5–8).
7. Install the battery into the battery housing.

Motor Replacement

Motor Removal

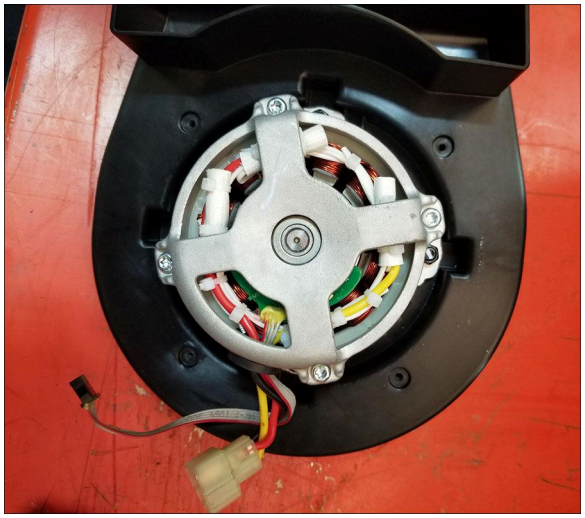
1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.
3. Remove the chassis shroud. Refer to Chassis Shroud Removal (page 5–6).
4. Remove the motor assembly. Refer to Motor Assembly Removal (page 4–4).
5. Using a screwdriver, remove the 4 Phillips-head screws securing the motor cover to the motor frame. Remove the motor cover.



g429742

Figure 24

6. Using a 3/8 inch socket or wrench, remove the 4 (M6) nuts securing the motor to the motor frame. Remove the motor.

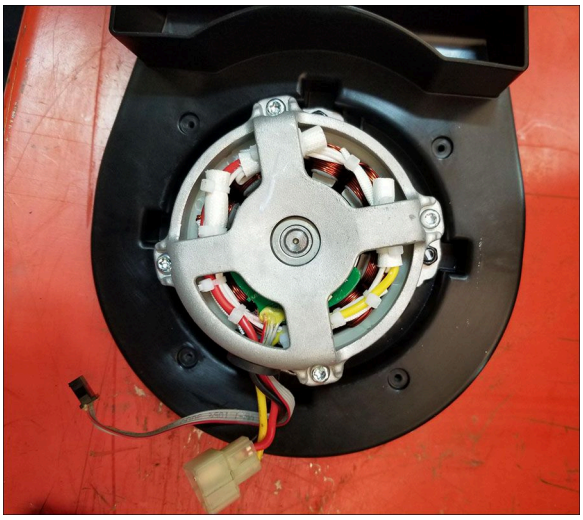


g429743

Figure 25

Motor Installation

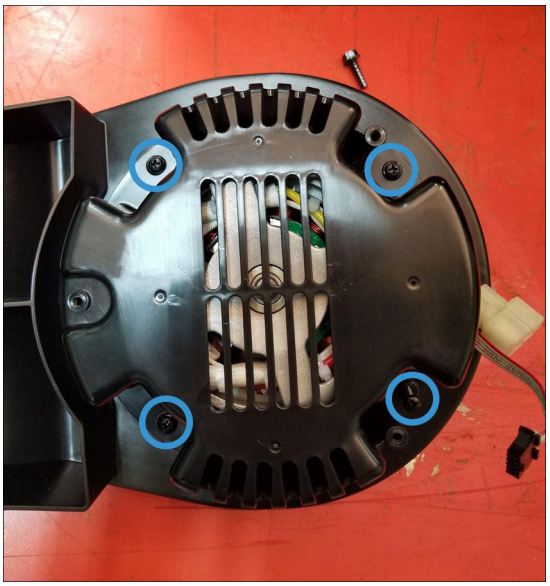
1. Install the motor. Using a 3/8 inch socket or wrench, install the 4 (M6) nuts securing the motor to the motor frame.



g429743

Figure 26

2. Install the motor cover. Using a screwdriver, install the 4 Phillips-head screws securing the motor cover to the motor frame.



g429742

Figure 27

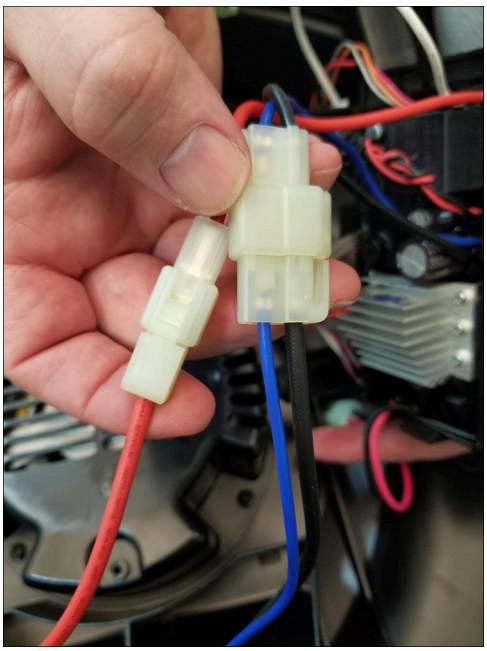
3. Install the motor assembly. Refer to Motor Assembly Installation (page 4–6).
4. Install the battery into the battery housing.

Battery Receiver Replacement

Battery Receiver Removal

1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.

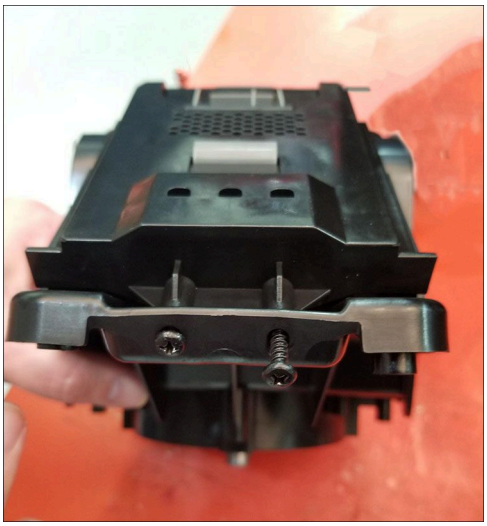
3. Remove the motor assembly from the deck assembly. Refer to Motor Assembly Removal (page 4–4).
4. Disconnect the battery receiver wires from the motor controller.



g429719

Figure 28

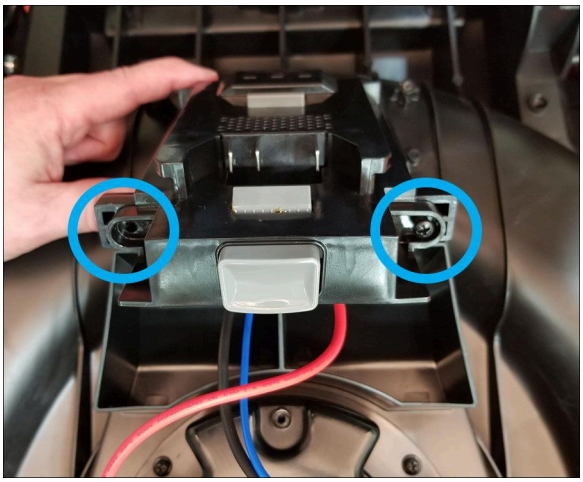
5. Using a screwdriver, remove the 4 Phillips-head screws securing the battery receiver to the motor assembly. Remove the battery receiver.



g429720

Figure 29

Battery Receiver Removal (continued)

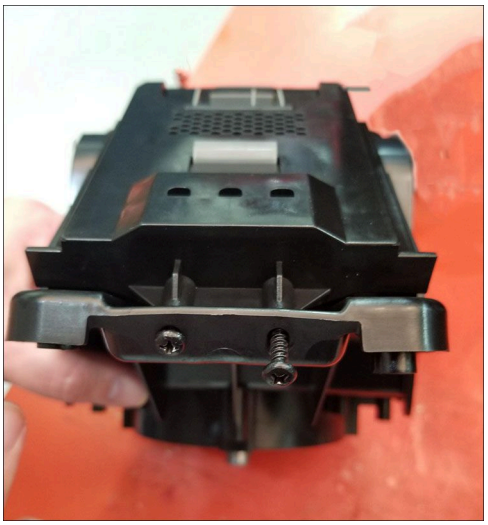


g446238

Figure 30

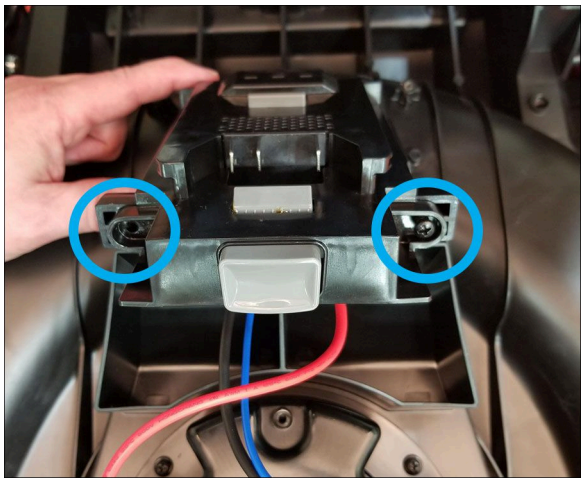
Battery Receiver Installation

1. Install the battery receiver in the motor assembly. Using a screwdriver, install the 4 Phillips-head screws to secure the battery receiver to the motor assembly.



g429720

Figure 31



g446238

Figure 32

2. Connect the battery receiver wires to the motor controller.
3. Install the motor assembly into the deck. Refer to Motor Assembly Installation (page 4–6).
4. Install the battery into the battery housing.

Table of Contents

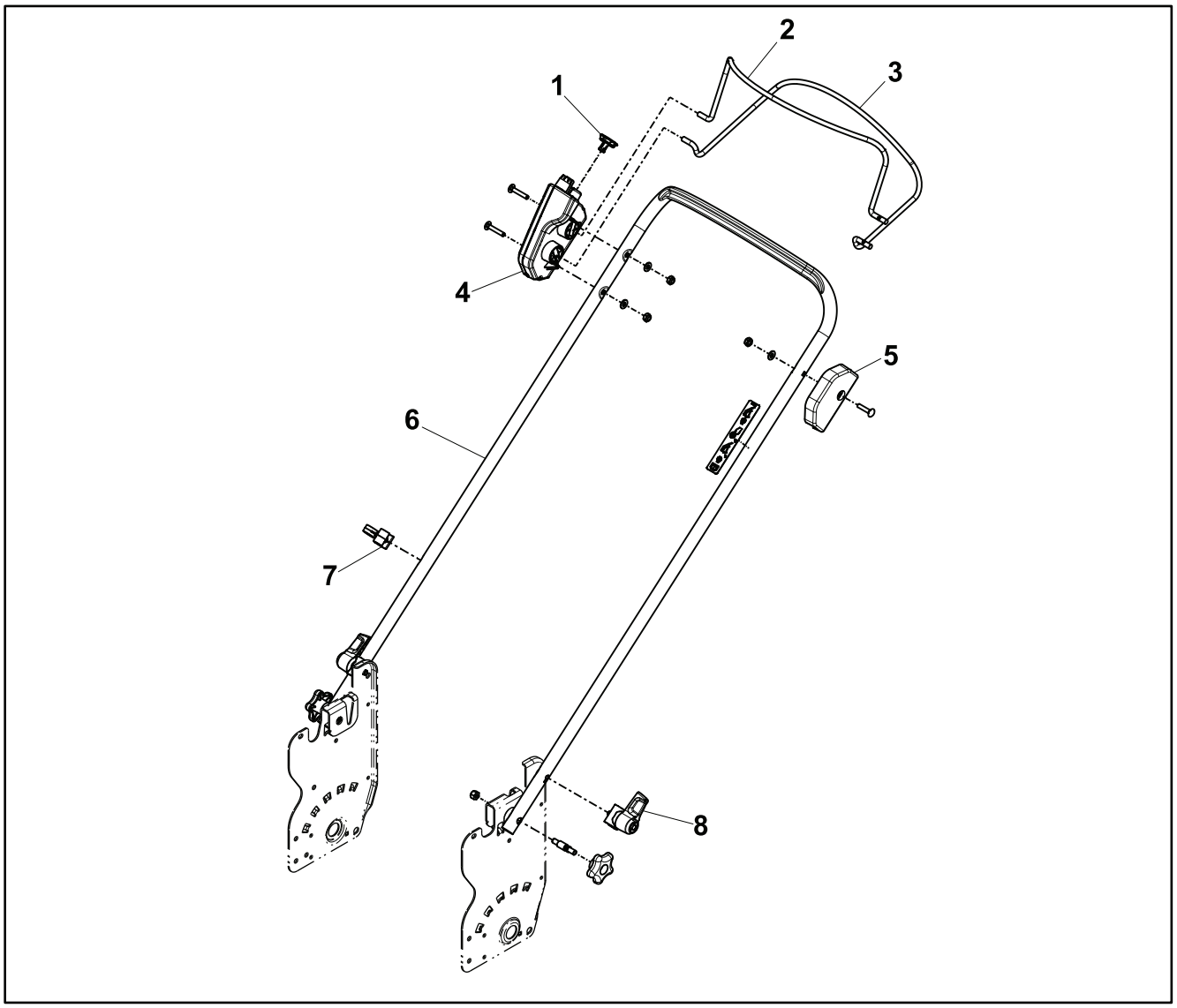
General Information

The deck and frame of the Stripe™ 21 inch Electric Walk Power Mower is made completely of polymer material. Models may come equipped with a single or dual blade. The deck design allows for optimal recycling of grass clippings.

Controls consist of a top bail for operator presence, a lower bail for traction (if equipped), a blade start button, and a ground speed dial (if equipped). The handle can be put into the SmartStow® position for upright storage and easy access for deck cleaning.

Service and Repairs

Handle Assembly

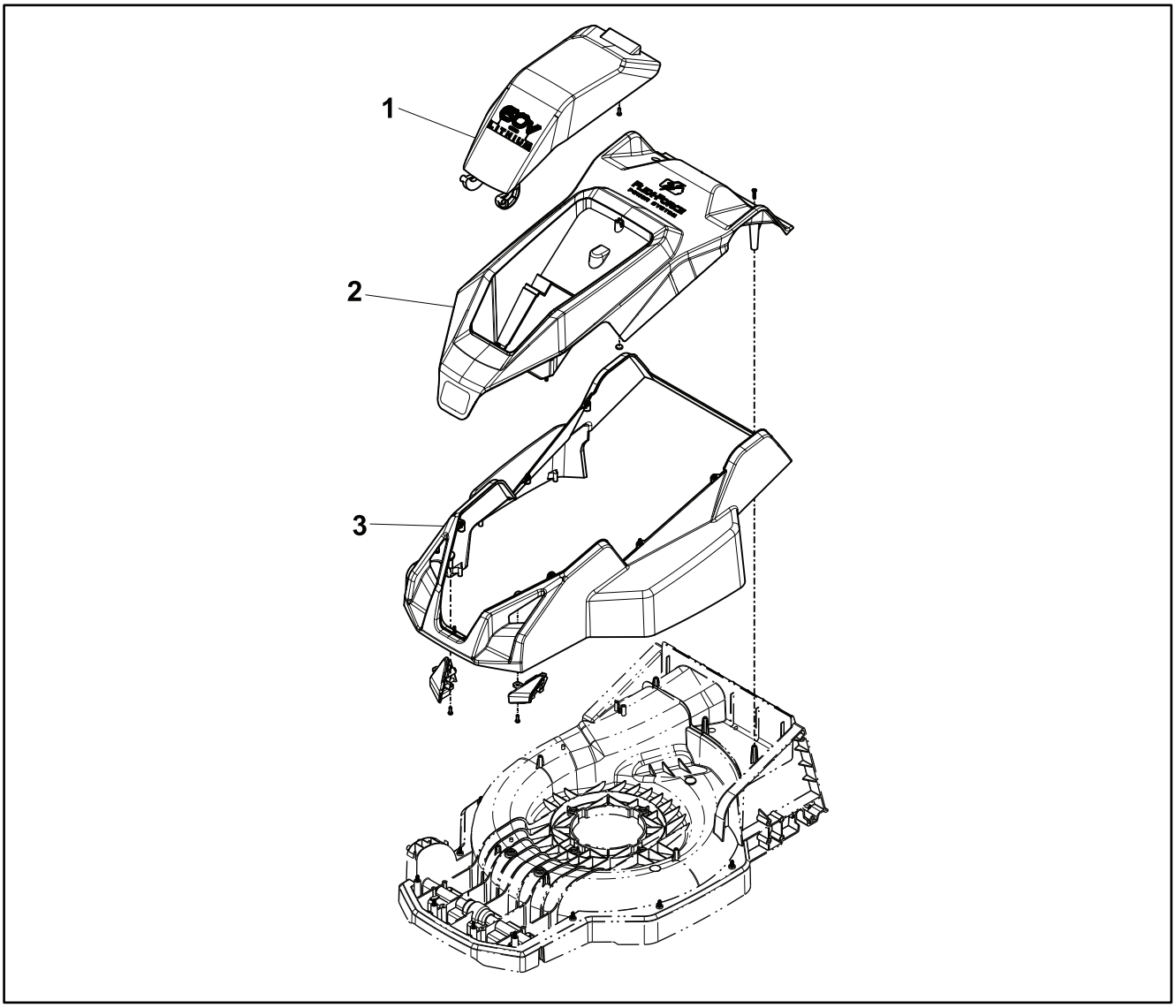


g429876

Figure 33

1. Bail Key
2. Blade Bail
3. Traction Bail
4. Control Assembly
5. Pivot Base
6. Mower Handle
7. Cable Guide
8. Quick Release Assembly

Shroud Assembly

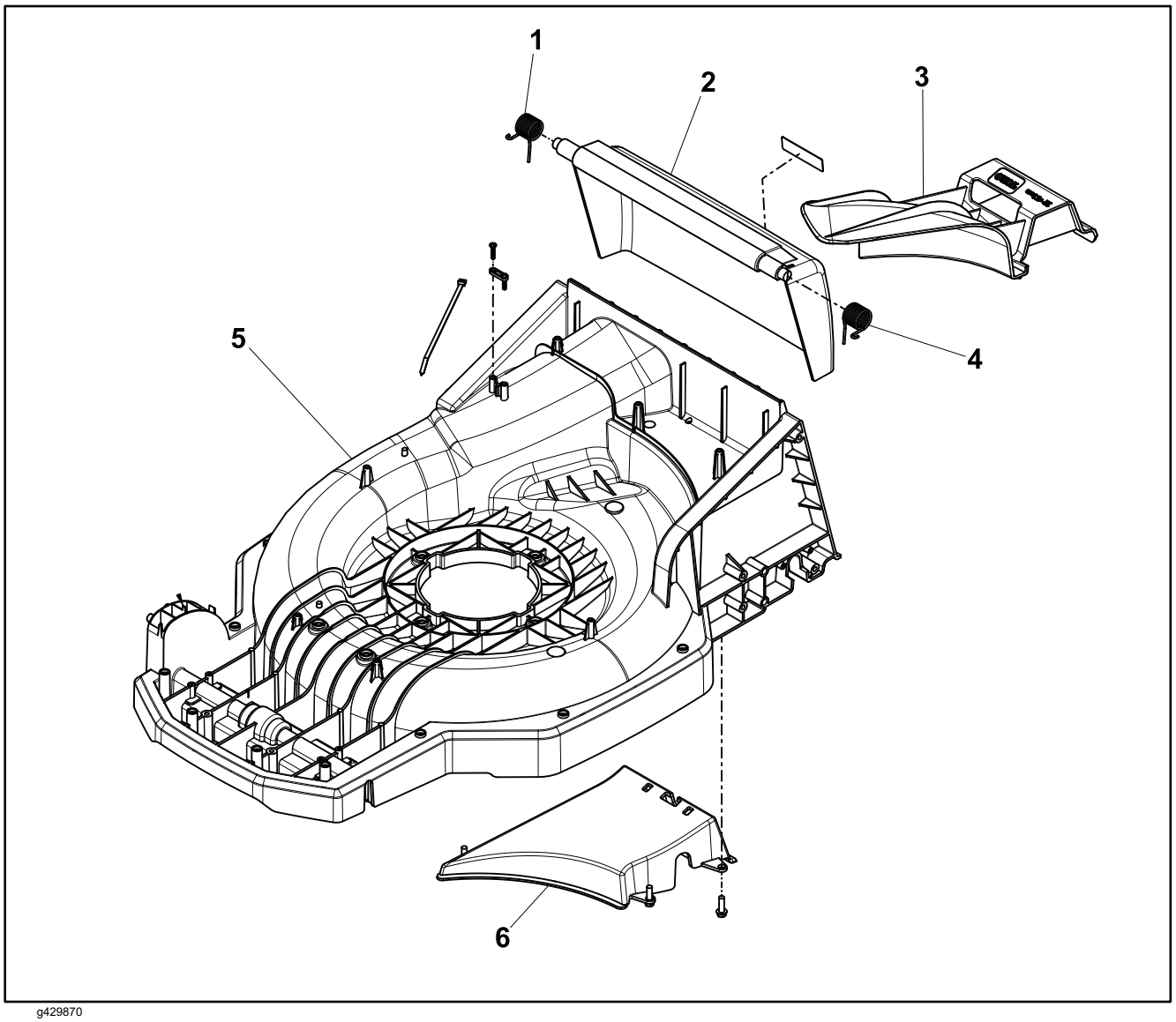


g429872

Figure 34

1. Battery Cover Assembly
2. Top Shroud
3. Bottom Shroud

Chassis Rear Door



g429870

Figure 35

1. RH Torsion Spring
2. Rear Door Assembly
3. Discharge Plug
4. LH Torsion Spring
5. Plastic 21 inch Deck
6. Discharge Ramp

Chassis Shroud Replacement

Chassis Shroud Removal

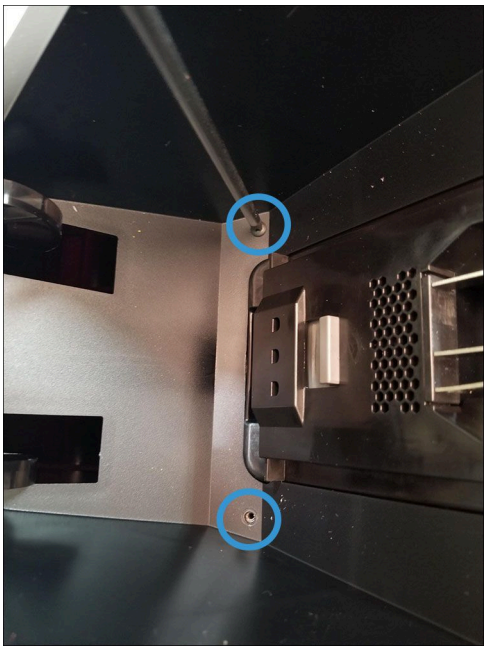
1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.
3. Using a screwdriver, remove the 3 Phillips-head screws securing the upper shroud to the chassis.

g429723

Figure 36

Note: Use a magnet to assist in removing the screws from the shroud cavity.

4. Using a screwdriver, remove the 2 Phillips-head screws securing the shroud to the chassis by the battery receiver.



g429724

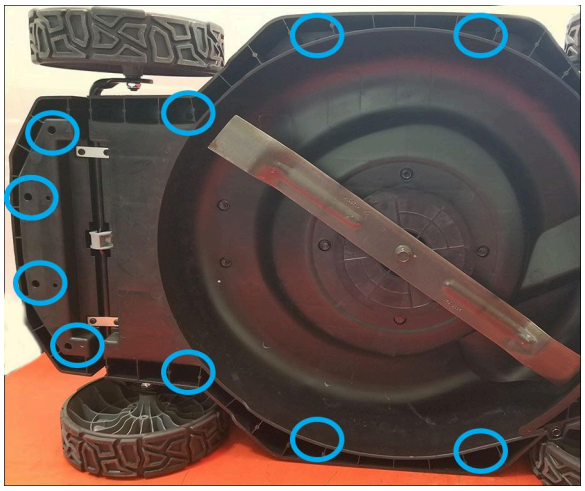
Figure 37

5. Tip the unit onto its side and support the machine.
6. Using a screwdriver, remove the 10 Phillip-head screws securing the chassis shroud to the chassis.

g446736

Figure 38

Chassis Shroud Removal (continued)



g446742

Figure 39

7. Position the unit with the wheels down.
8. Remove the chassis shroud.

   Note: Lift the chassis shroud from the front first for easy removal.

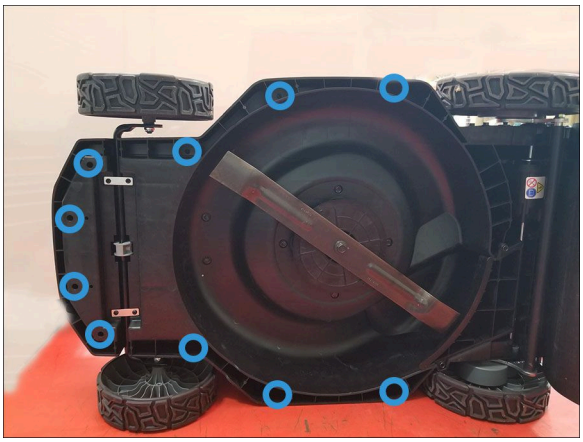
   Note: For units equipped with LED lights, make sure to remove the screw attaching the LED board to the chassis shroud.

g429726

Figure 40

Chassis Shroud Installation

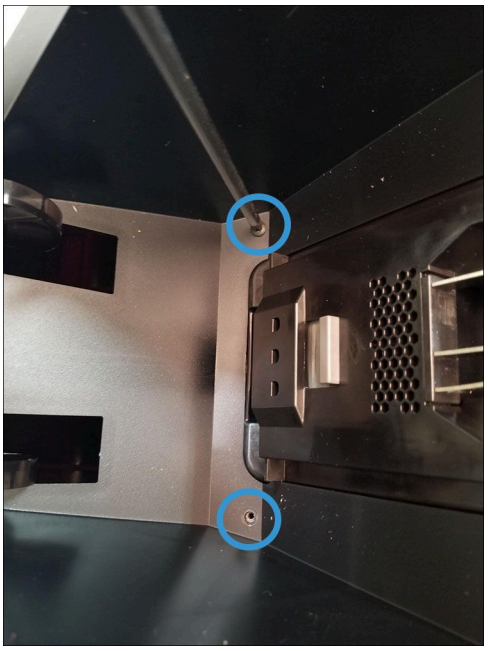
1. Install the chassis shroud onto the deck.
2. Tip the unit onto its side and support the machine.
3. Using a screwdriver, install the 10 Phillips-head screws to secure the upper shroud to the chassis.



g429725

Figure 41

4. Position the unit with the wheels down.
5. Using a screwdriver, install the 2 Phillips-head screws securing the shroud to the chassis by the battery receiver.



g429724

Figure 42

6. Route the control wires from the handle through the slot provided in the shroud.
7. Using a screwdriver, install the 3 Phillips-head screws securing the upper shroud to the chassis.

g429723

Figure 43

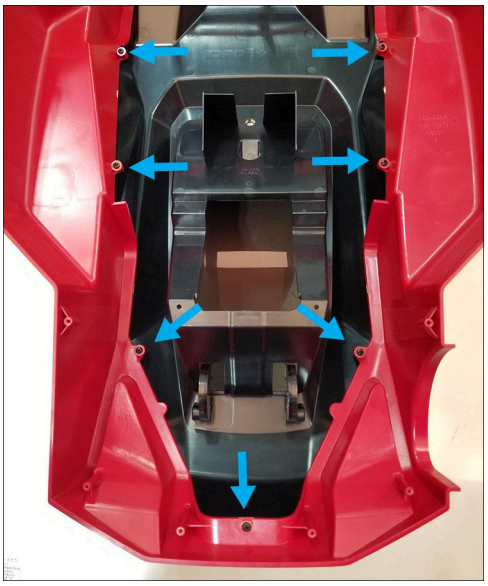
8. Install the battery into the battery housing.

Upper Shroud Replacement

Upper Shroud Removal

1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.
3. Remove the chassis shroud. Refer to Chassis Shroud Removal (page 5–6).
4. Using a screwdriver, install the 7 Phillips-head screws securing the upper shroud to the lower shroud.

Upper Shroud Removal (continued)



g446744

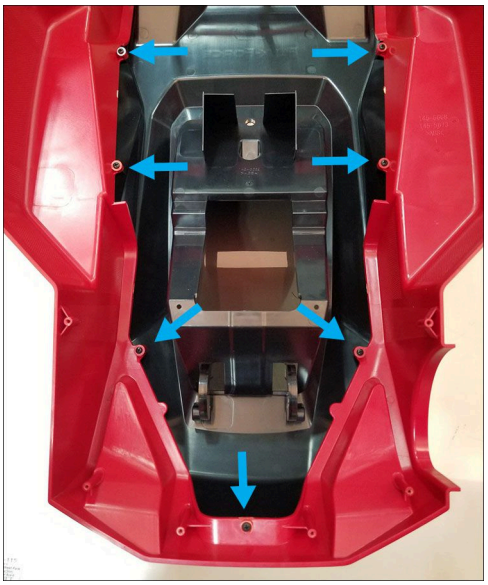
Figure 44

5. Remove the upper shroud.

   Note: For battery door removal, compress the tabs on the battery door to remove it from the upper shroud.

Upper Shroud Installation

1. Install the upper shroud.
2. Using a screwdriver, install the 7 Phillips-head screws securing the upper shroud to the lower shroud.



g446744

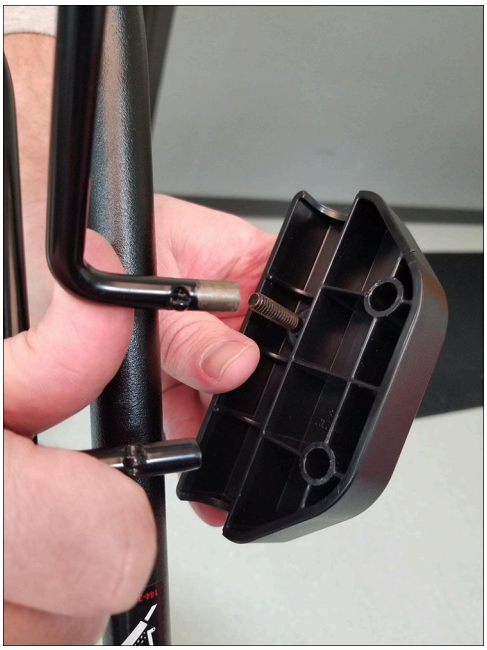
Figure 45

3. Install the chassis shroud. Refer to Chassis Shroud Installation (page 5–8).
4. Install the battery into the battery housing.

Handle Assembly Replacement

Handle Assembly Removal

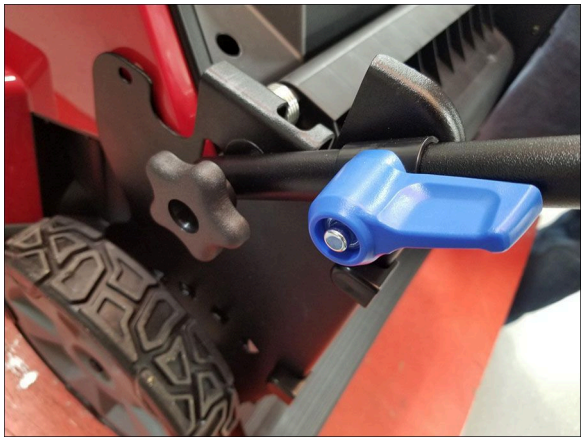
1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.
3. Using a 7/16 inch socket, remove the 1/4 inch nylock nut from the 1/4 inch carriage bolt securing the bale bracket to the handle tube. Remove the bale bracket.



g429717

Figure 46

4. Remove the top and bottom bales from the handle controller.
5. Remove the handle controller. Refer to Handle Controller Removal (page 7–3).
6. Remove the LH and RH handle knobs.



g429734

Figure 47

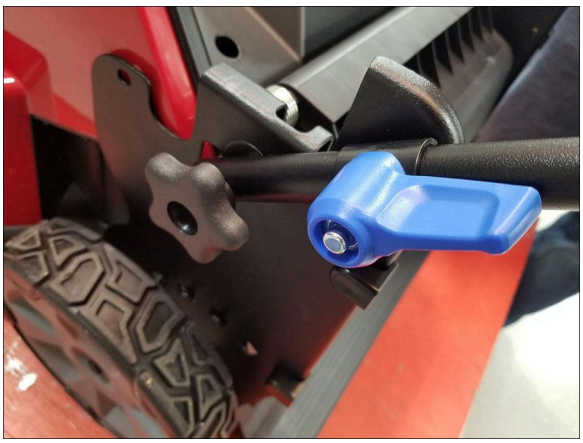
7. Remove the handle tube from the chassis.
8. Remove the quick release assemblies (blue knobs) from the handle tube.

Handle Assembly Removal (continued)

Note: No tools are needed to remove the quick release assemblies from the handle tube.

Handle Assembly Installation

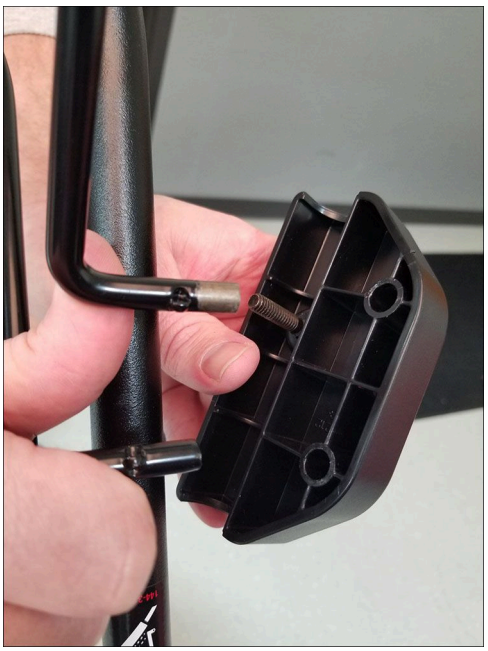
1. Install the quick release assembly (blue knobs) to the handle tube.
2. Install the handle tube to the chassis.
3. Install the LH and RH handle knobs.



g429734

Figure 48

4. Install the handle controller. Refer to Handle Controller Installation (page 7–4).
5. Install the top and bottom bales to the handle controller.
6. Using a 7/16 inch socket, install the 1/4 inch nylock nut to the 1/4 inch carriage bolt securing the bale bracket to the handle tube.



g429717

Figure 49

7. Install the battery into the battery housing.

Chapter 6

Drive System

Table of Contents

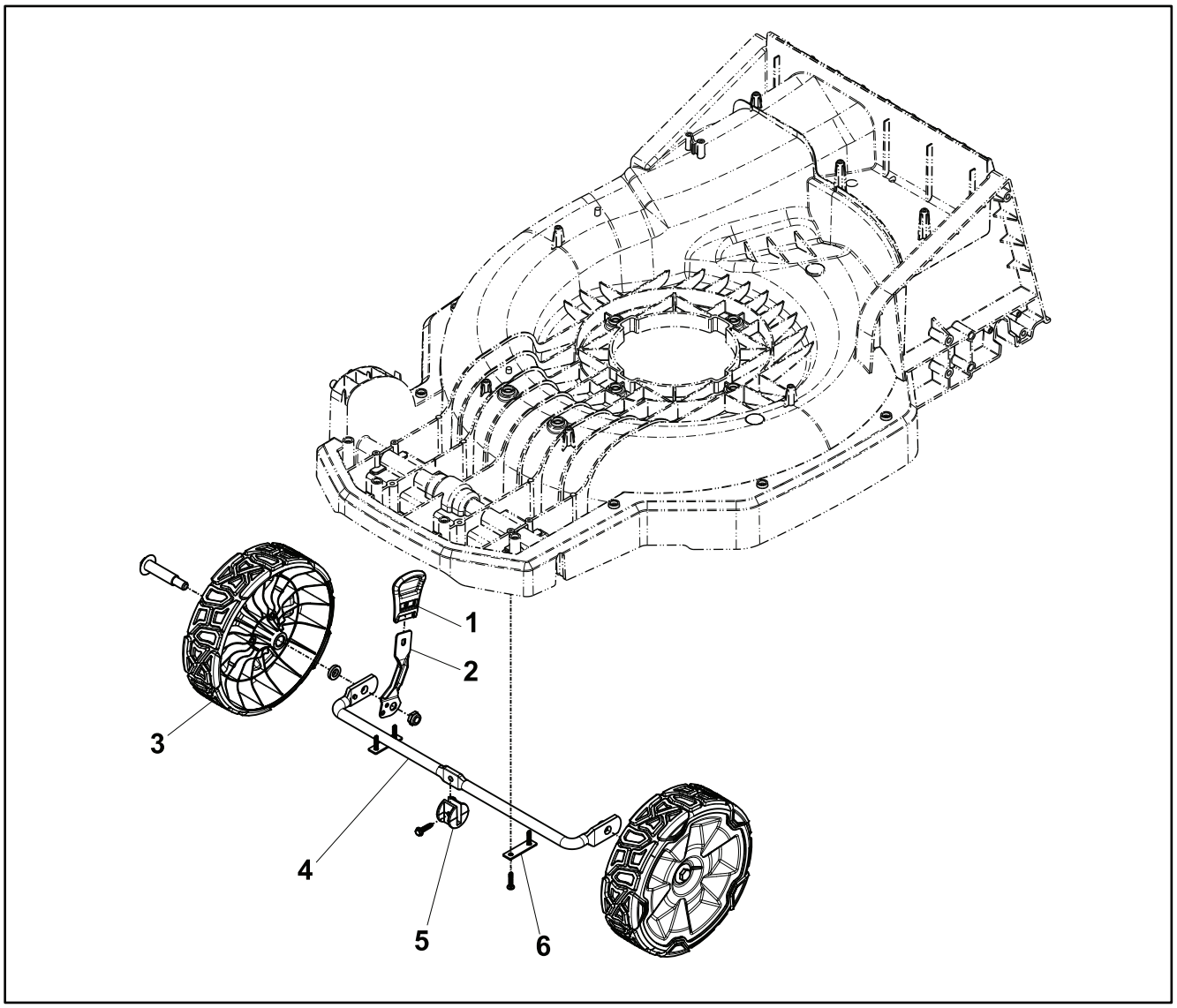
General Information

The transmission of the Stripe™ 21 inch electric walk power mower is driven by an electric motor. The handle controls provide the signal to the motor controller on the power source. The motor controller then sends a signal to the transmission. The transmission is not serviceable.

The rear axle has a 4-piece design. A plastic roller on the rear axle rod rolls over the cut grass clippings, dispensing them on the lawn in a striped pattern. The front axle is retained to the chassis by axle straps and an axle stop. The axle straps prevent up-and-down movement, and the axle stop prevents side-to-side movement.

Service and Repairs

Front Axle Assembly

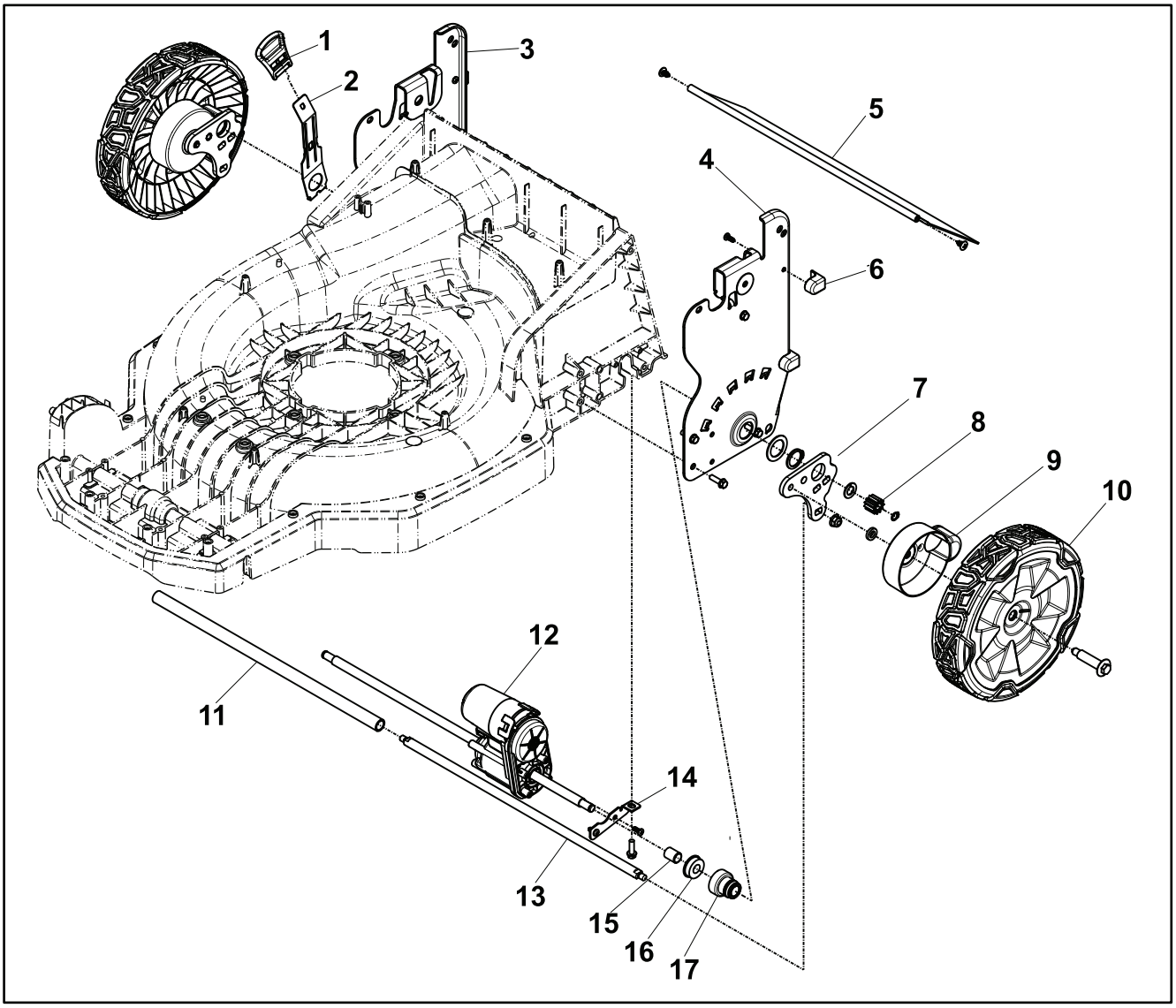


g429874

Figure 50

1. Height-of-Cut Knob
2. Spring Arm
3. 8 inch Wheel Assembly
4. Front Axle
5. Axle Stop
6. Axle Strap

Rear Transmission & Height-of-Cut Assembly



g429875

Figure 51

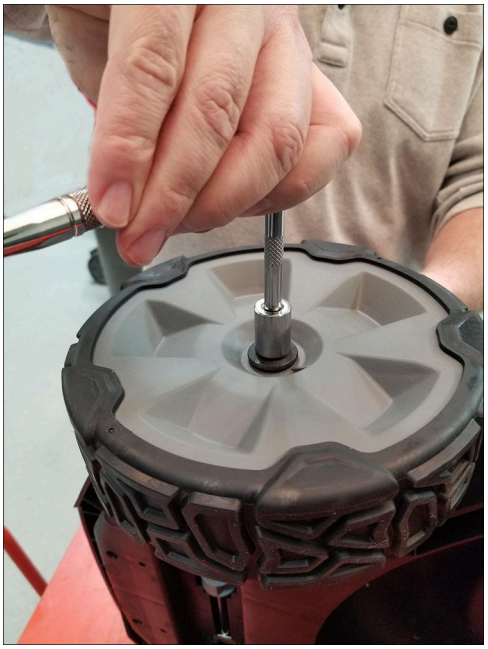
1. Height-of-Cut Knob
2. Spring Arm
3. RH Height-of-Cut Plate
4. LH Height-of-Cut Plate
5. Trailing Shield
6. SmartStow® Pad
7. Rear Pivot Bracket
8. Pinion Gear
9. Gear Assembly Cover
10. Wheel Assembly
11. Striper Roller
12. Electric Transmission
13. Rear Connecting Rod
14. Transmission Bracket
15. Sleeve Bushing
16. Ball Bearing
17. Height-of-Cut Bearing Retainer

Front Axle & Height-of-Cut Replacement

Front Axle & Height-of-Cut Removal

1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.
3. Tip the unit onto its side and support the machine.
4. Using a 9/16 inch wrench and a 1/2 inch socket, remove the 3/8 inch shoulder bolt and nut securing the wheel to the front axle. Repeat on the other side.

   Note: The RH side wheel contains the height-of-cut lever.

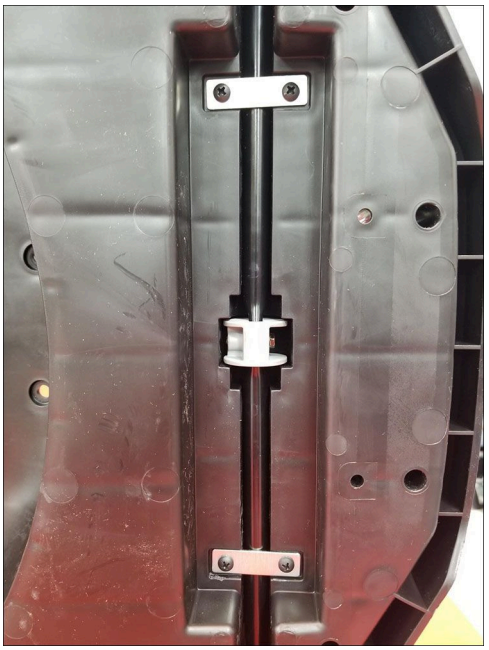


g429730

Figure 52

5. Using a screwdriver, remove the 4 Phillips-head screws securing the axle straps to the chassis.

Front Axle & Height-of-Cut Removal (continued)



g429728

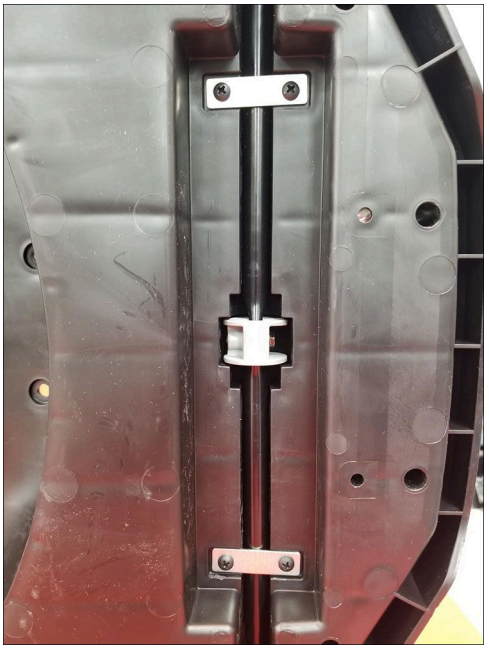
Figure 53

6. Remove the front axle.

   Note: If removing the stop from axle, using a 9/32 inch socket, remove the screw.

Front Axle & Height-of-Cut Installation

1. Install the front axle.
2. Using a screwdriver, install the 4 Phillips-head screws to secure the axle straps to the chassis.

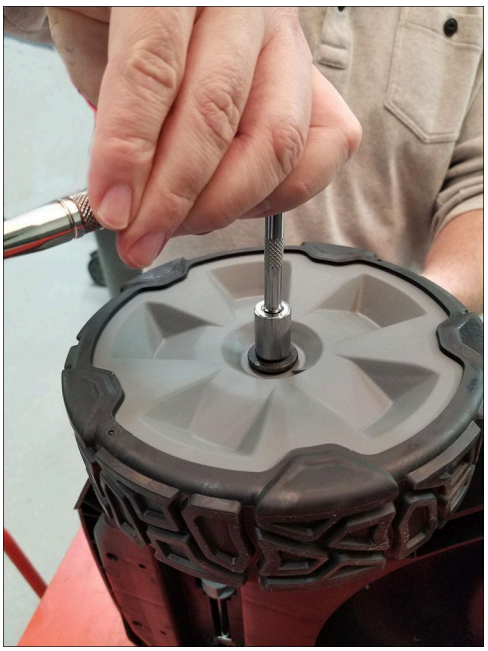


g429728

Figure 54

3. Using a 9/16 inch wrench and a 1/2 inch socket, install the 3/8 inch shoulder bolt and nut to secure the wheel to the front axle. Repeat on the other side.

   Note: The RH side wheel contains the height-of-cut lever. Place the height-of-cut lever into position before securing the wheel.



g429730

Figure 55

4. Position the unit with the wheels down.
5. Install the battery into the battery housing.

Rear Axle & Height-of-Cut Plate Replacement

Rear Axle & Height-of-Cut Plate Removal

1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.
3. Lift the machine so that the rear wheels are off the ground.
4. Remove the LH and RH rear wheels. Refer to Rear Wheel Removal (page 6–17).
5. Using a set of snap ring pliers, remove the LH and RH snap rings securing the pinion gears to the axle shaft. Remove the pinion gears and washers.

g429747

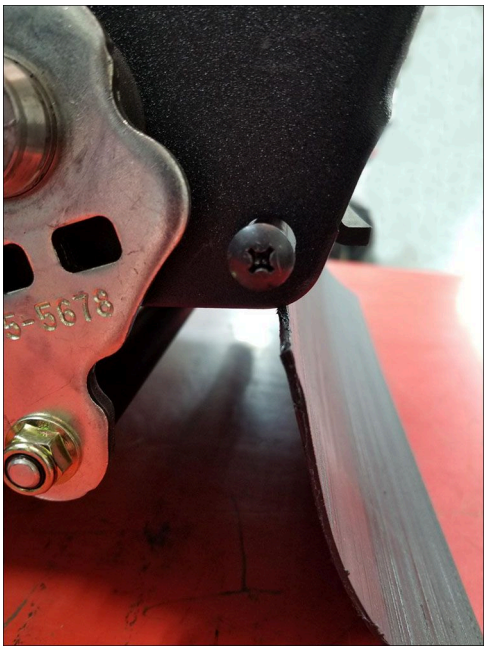
Figure 56

6. Remove the LH and RH large snap ring securing the pivot arms to the axle bushing.

g446937

Figure 57

7. Using a screwdriver, remove the 2 Phillips-head screws securing the trailing shield to the chassis. Compress the shield to remove.



g429750

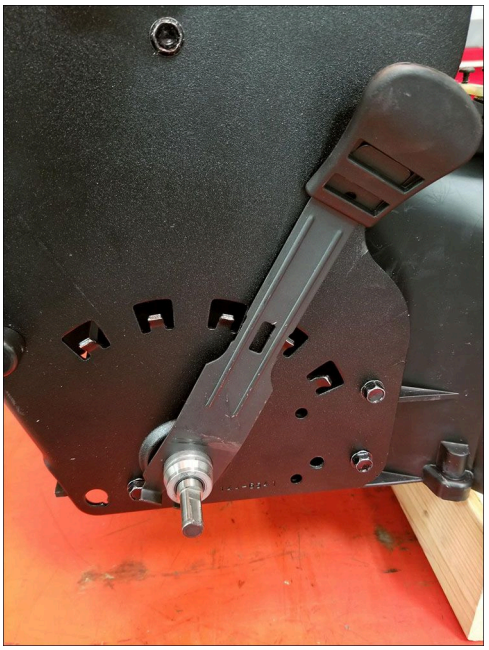
Figure 58

8. Using a 1/2 inch socket or wrench, remove the 2 (5/16 inch) nuts securing the axle rod to the LH and RH pivot arms. Remove the axle and roller.

g429745

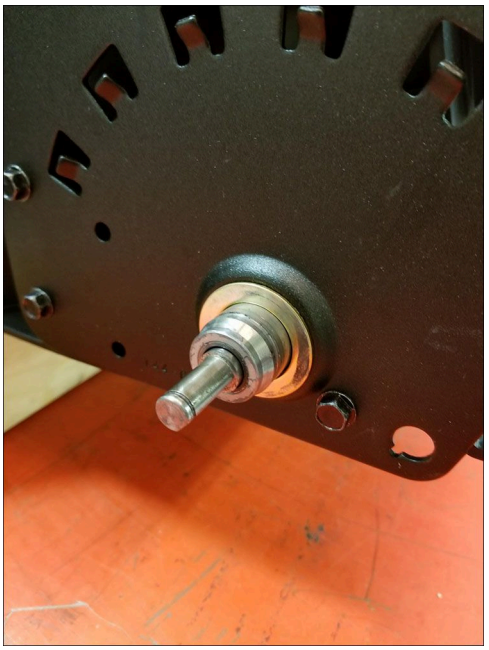
Figure 59

9. Remove the height-of-cut lever from the RH side of the unit and remove the height-of-cut washer from the LH side.



g429737

Figure 60

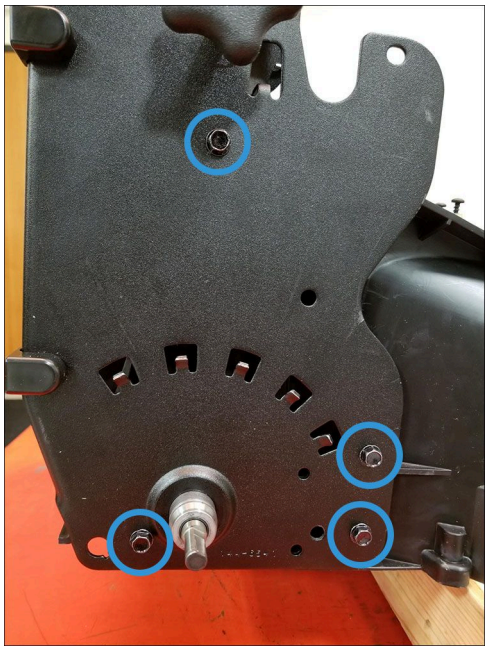


g429738

Figure 61

10. Using a 3/8 inch socket, remove the 8 screws securing the LH and RH height-of-cut plates to the chassis.

Rear Axle & Height-of-Cut Plate Removal (continued)



g429736

Figure 62

11. Remove the height-of-cut plates, rear bag door/springs, and transmission bearings.

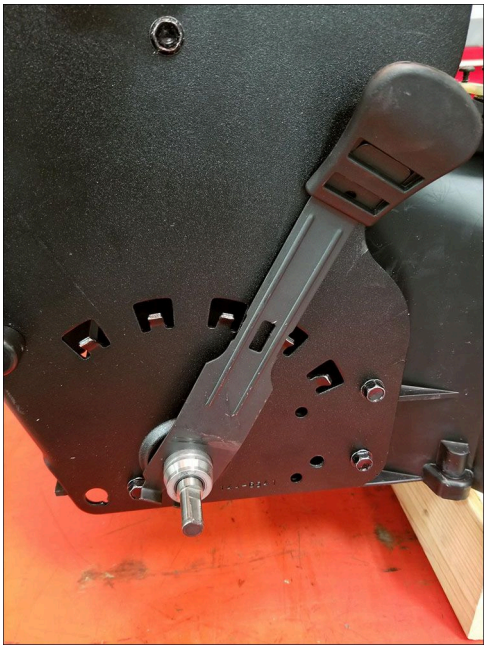
Rear Axle & Height-of-Cut Plate Installation

1. Install the height-of-cut plates, rear bag door/springs, and transmission bearings.
2. Using a 3/8 inch socket, install the 8 (3/8 inch) screws to secure the LH and RH height-of-cut plates to the chassis.

g429736

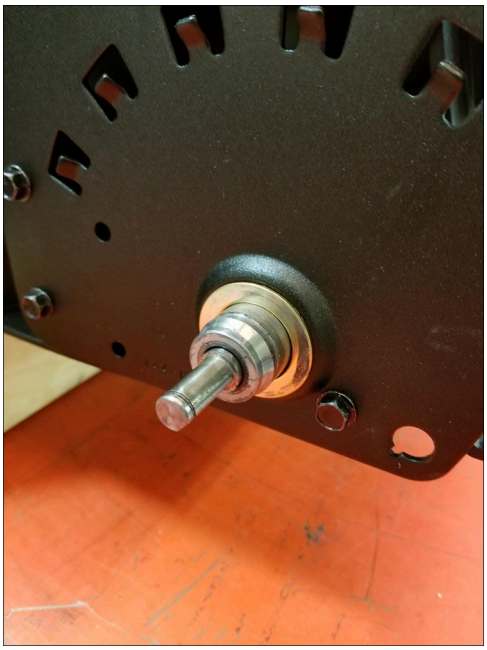
Figure 63

3. Install the height-of-cut lever to the RH side of the unit and install the height-of-cut washer to the LH side.



g429737

Figure 64



g429738

Figure 65

4. Install the LH and RH large snap rings to secure the pivot arms to the axle bushing.

g446937

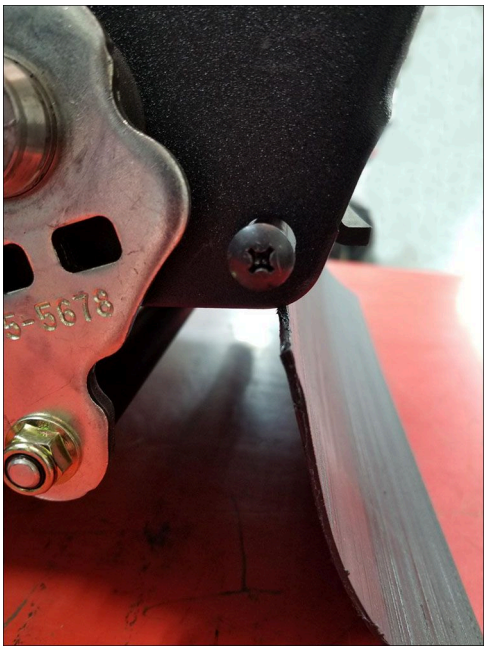
Figure 66

5. Using a 1/2 inch socket or wrench, install the 2 (5/16 inch) nuts to the axle rod.

g429745

Figure 67

6. Install the trailing shield. Using a screwdriver, install the 2 Phillips-head screws to secure the trailing shield to the chassis.



g429750

Figure 68

7. Install the pinion gears and washers. Install the LH and RH snap rings to secure the pinion gears to the axle shaft.

   Note: Apply antifreeze to the pinion gears to reduce seizing.

g429747

Figure 69

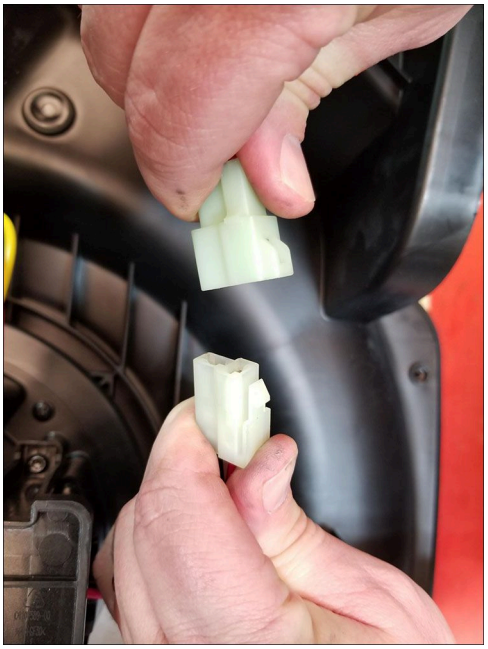
8. Install the LH and RH rear wheels. Refer to Rear Wheel Installation (page 6–18).

9. Install the battery into the battery housing.

Transmission Replacement

Transmission Removal

1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.
3. Lift the machine so the rear wheels are off the ground.
4. Remove the chassis shroud. Refer to Chassis Shroud Removal (page 5–6).
5. Remove the rear axle and height-of-cut plates. Refer to Rear Axle & Height-of-Cut Plate Removal (page 6–7).
6. Disconnect the transmission wire harness from the motor controller.



g429751

Figure 70

7. Tip the unit onto its side and support the machine.
8. Using a 3/8 inch socket, remove the screws securing the transmission bracket to the chassis.

g446236

Figure 71

Transmission Removal (continued)

9. Remove the transmission and wiring.

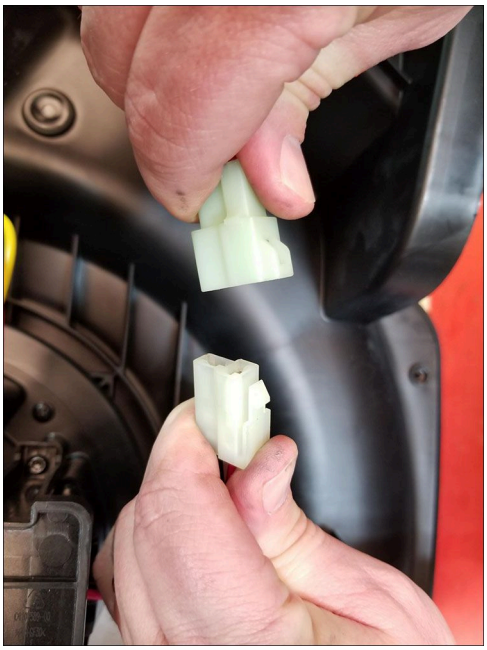
Transmission Installation

1. Install the transmission and wiring.
2. Using a 3/8 inch socket, install the bolt to secure the transmission bracket to the chassis.

g446236

Figure 72

3. Place the unit wheels down.
4. Connect the transmission wire harness to the motor controller.



g429751

Figure 73

5. Install the rear axle and height-of-cut plates. Refer to Rear Axle & Height-of-Cut Plate Installation (page 6–11).
6. Install the chassis shroud. Refer to Chassis Shroud Installation (page 5–8).
7. Install the battery into the battery housing.

Rear Wheel Replacement

Rear Wheel Removal

1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the harness from the powerhead.
3. Remove the grass bagger assembly if attached.
4. Using a 1/2 inch socket wrench, remove the 3/8 inch wheel bolt securing the LH wheel to the LH pivot arm. Remove the wheel and gear cover. Repeat on the RH side of the unit.

g445308

Figure 74

5. Using snap ring pliers, remove the snap ring from the LH transmission axle shaft. Repeat on the RH side of the unit.

g445309

Figure 75

6. Remove the pinion gear, thrust washer, and rear pivot from the LH transmission axle shaft. Repeat on the RH side of the unit.

Rear Wheel Installation

1. Install the rear pivot, thrust washer, and pinion gear onto the LH transmission axle shaft. Repeat on the RH side of the unit.
2. Install the snap ring onto the LH transmission axle shaft. Repeat on the RH side of the unit.

3. Install the gear cover and wheel to the LH pivot arm and secure with the (3/8–16 inch) wheel bolt. Torque the bolt to 35 ± 1.69 N•m (315 ± 15 in-lb). Repeat on the RH side of the unit.

g445308

Figure 76

Table of Contents

General Information

The machine has 5 operation controls that are linked to the electronic switches. The controls include a start button, an operator presence bail, traction bail, a traction speed control knob and a blade speed max button. Both the start button and blade bail are normally open circuits and are needed for the machine operation. When the starter button is pushed and the safety bail is pulled, the circuits close and the motor/driver is signaled to turn ON. The starter switch returns to an open state after being pushed. The safety bail switch will need to stay in the closed circuit (pulled) position for operation. Once the bail switch is opened (released), the motor drive will be powered down.

Service and Repairs

Handle Controller Assembly

Handle Controller Removal

1. Park the machine on a level surface. Remove the key from the bail control assembly. Ensure that all parts have stopped moving.
2. Remove the battery from the battery housing.
3. Using a 7/16 inch socket or wrench, remove the 2 (1/4 inch) nylock nuts and 1/4 inch carriage bolts securing the handle controller to the handle tube. Remove the handle controller.

g429732

Figure 77

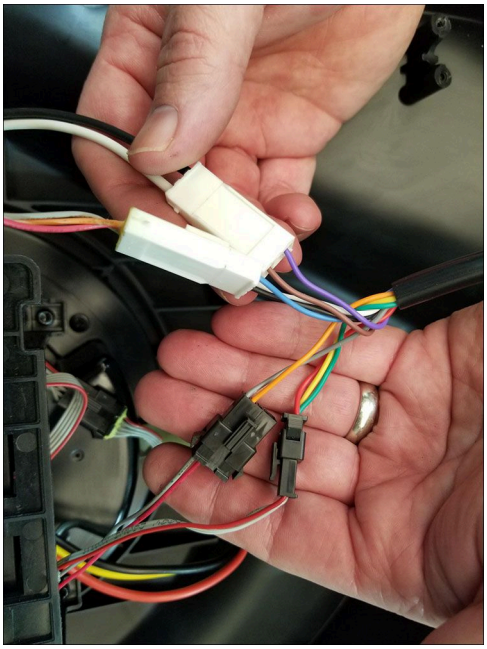
4. Remove the cable guide securing the handle controller cable to the handle tube.
5. Remove the chassis shroud. Refer to Chassis Shroud Removal (page 5–6).
6. Using a screwdriver, remove the 2 Phillips-head screws securing the cable anchor to the chassis.

g429733

Figure 78

Handle Controller Removal (continued)

7. Disconnect the 4 handle controller wires from the motor controller.

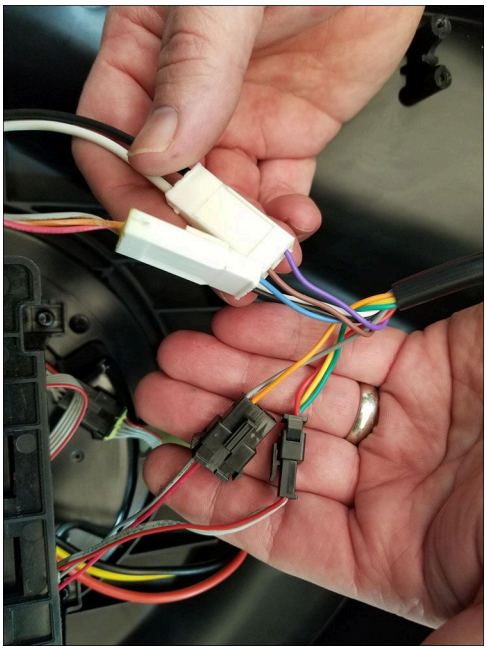


g429731

Figure 79

Handle Controller Installation

1. Connect the 4 handle controller wires to the motor controller.



g429731

Figure 80

2. Using a screwdriver, install the 2 Phillips-head screws to secure the cable anchor to the chassis.

g429733

Figure 81

3. Install the cable guide to secure the handle controller cable to the handle tube.
4. Install the handle controller. Using a 7/16 inch socket or wrench, install the 2 (1/4 inch) nylock nuts and 1/4 inch carriage bolts securing the handle controller to the handle tube.

g429732

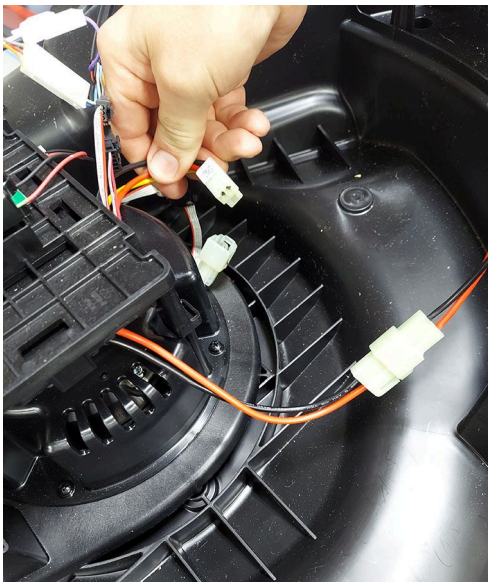
Figure 82

5. Install the chassis shroud. Refer to Chassis Shroud Installation (page 5–8).
6. Install the battery into the battery housing.

Electrical Drive Testing

Voltage to 2–Bail Control Assembly from Controller Test

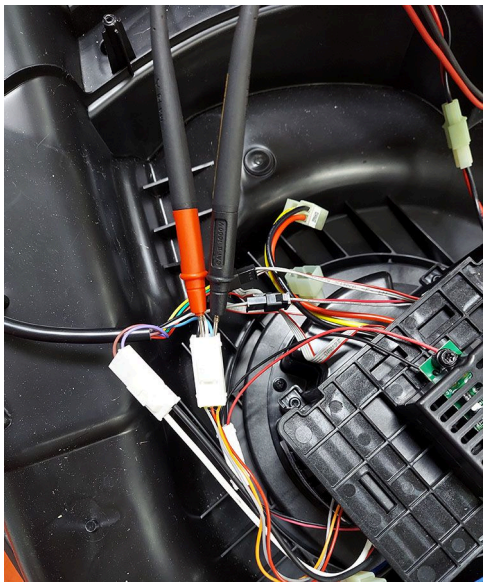
1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



g495339

Figure 83

2. Install the battery.
3. To test the voltage on the red wire motor controller control side, engage the operator presence bail while putting the positive lead from the DVOM (Digital Volt/Ohm Meter) to the red wire and the negative lead to the orange wire. The voltage should be approximately 22 VDC.



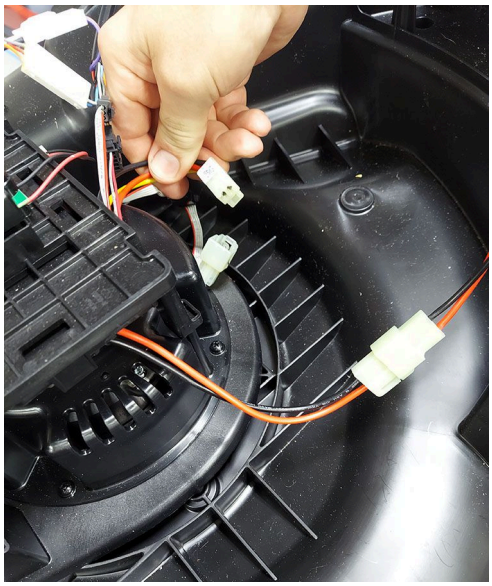
g495323

Figure 84

4. If there is no voltage found on the test, replace the motor driver/controller.

Traction Bail Test

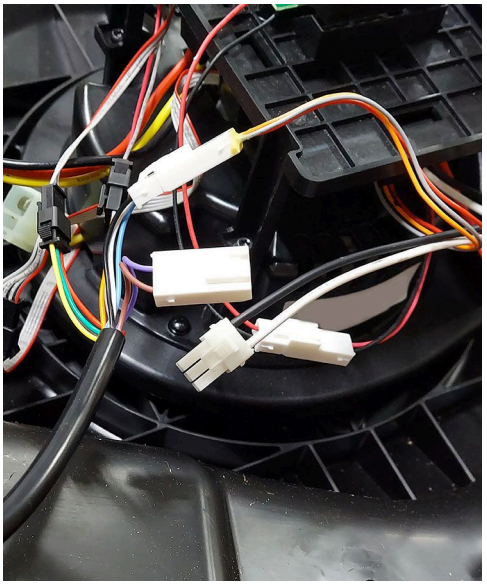
1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



g495339

Figure 85

2. Disconnect the violet/brown connector from the handle controller to the motor controller.

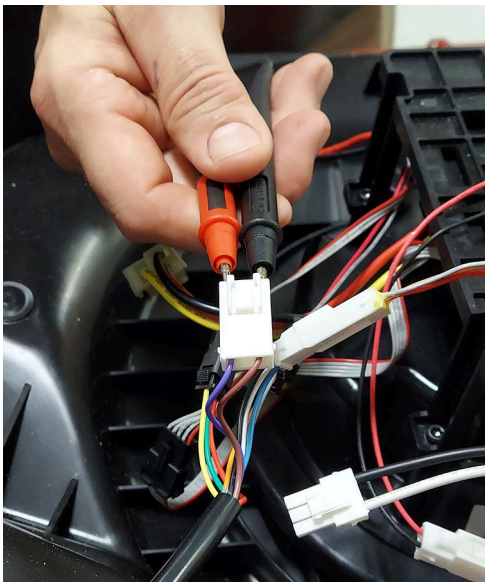


g495327

Figure 86

3. Remove the battery.
4. Test the continuity between the violet and brown wire with the traction bail engaged. There should be continuity between the wires. With the bail disengaged, there is no continuity.

Traction Bail Test (continued)



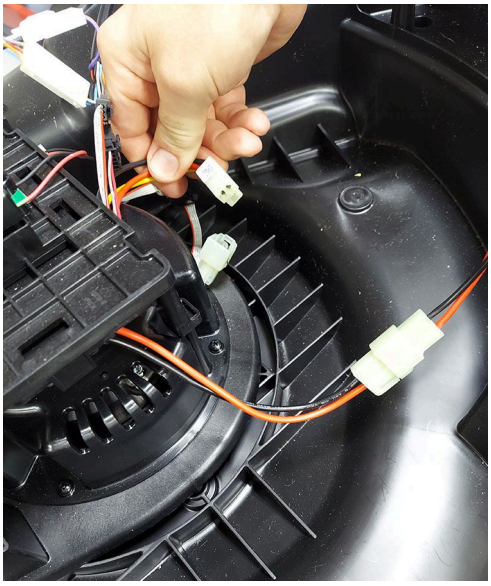
g495315

Figure 87

5. Verify the traction bail is fully seated in the switch on the 2–bail handle controller. If not, engage the bail and retest. If the bail is fully seated, replace the control assembly as it's not serviceable.

Voltage Output to Transmission (Battery Installed) Test

1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



g495339

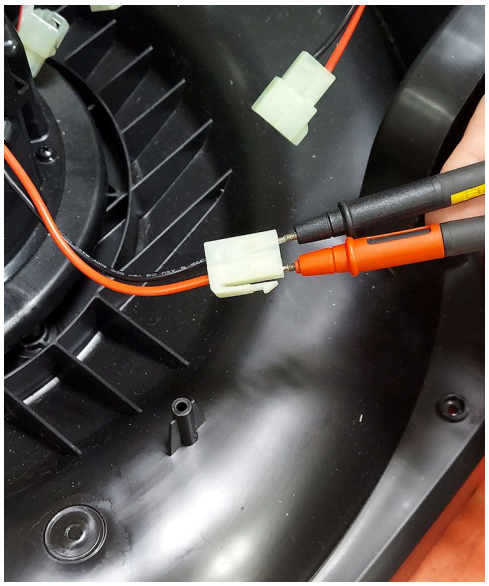
Figure 88

2. Disconnect the harness with red and black wires from the controller to the transmission.

g495321

Figure 89

3. Install the battery.
4. Test the voltage on the red wire from the controller side of the connector to the transmission using the black wire as negative.

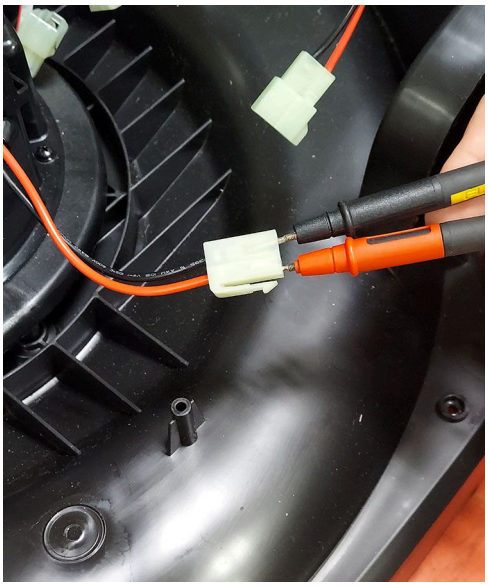


g495322

Figure 90

5. With both traction bail and operator presence bail engaged, use the negative lead on the black wire. Voltage should be approximately 15 VDC on minimum speed setting and 18 VDC on max drive setting.

Voltage Output to Transmission (Battery Installed) Test (continued)



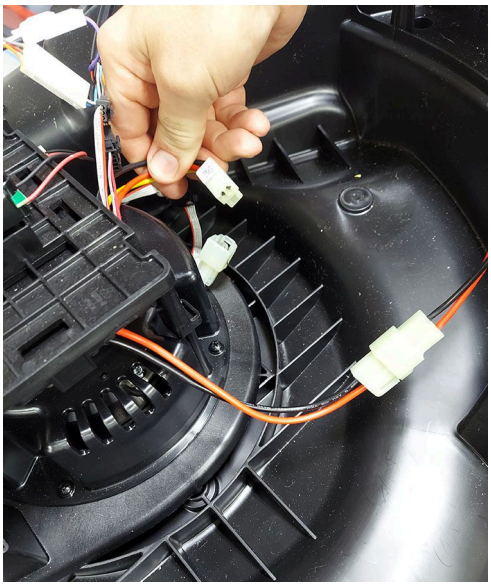
g495322

Figure 91

6. If there is no voltage output from the motor driver/controller, then test the motor driver/controller function. Ensure the other end of the transmission harness is fully seated to the transmission motor. If the transmission harness is fully seated, and there is no voltage output from the motor driver/controller, replace the transmission.

Variable Speed Dial Test

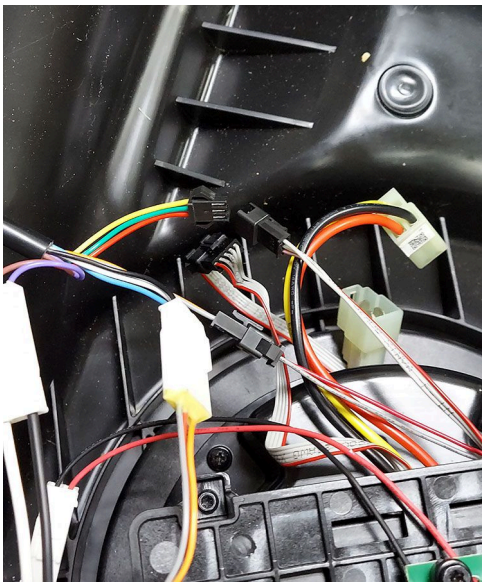
1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



g495339

Figure 92

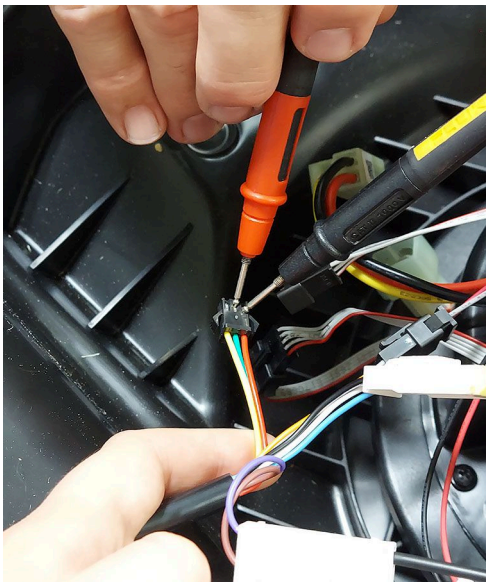
2. Disconnect the harness from the 2–bail handle controller to the motor drive/controller (yellow/green/red wires).



g495316

Figure 93

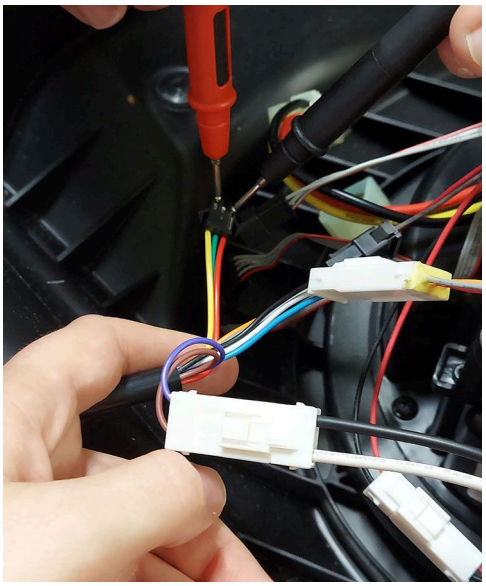
3. Remove the battery.
4. Ohm test the green and red wires. They should have a constant 50k ohm reading.



g495317

Figure 94

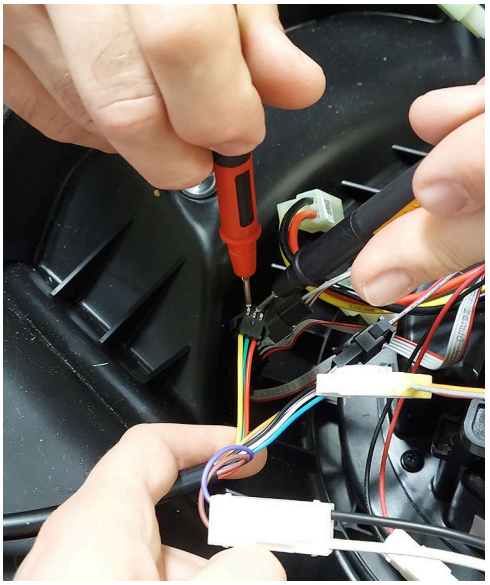
5. Ohm test the red and yellow wires. The minimum setting should be approximately 50k ohms. The max setting should be approximately 1.5k ohms.



g495318

Figure 95

6. Ohm test the green and yellow wires. At the minimum setting should be approximately 1.5k ohms. The max setting should be approximately 0 ohms. If no change in the ohm reading as dial is turned, replace the 2–bail handle assembly.

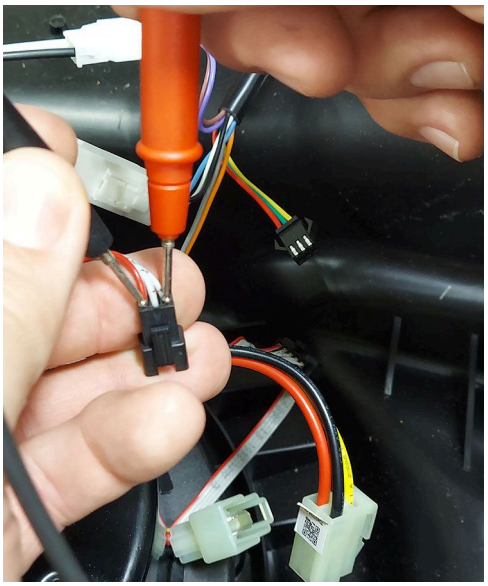


g495319

Figure 96

7. Install the battery.
8. Test the voltage of grey wire farthest from the red wire in the connector from the controller using the negative on the red wire. The voltage should have 5 VDC with the battery installed (voltage signal to dial) while the operator presence bail is engaged. If no voltage output from the motor driver/controller, test and verify the power to the motor driver/controller. If there is voltage to the driver/controller, but not to the speed dial, replace the motor driver/controller.

Variable Speed Dial Test (continued)

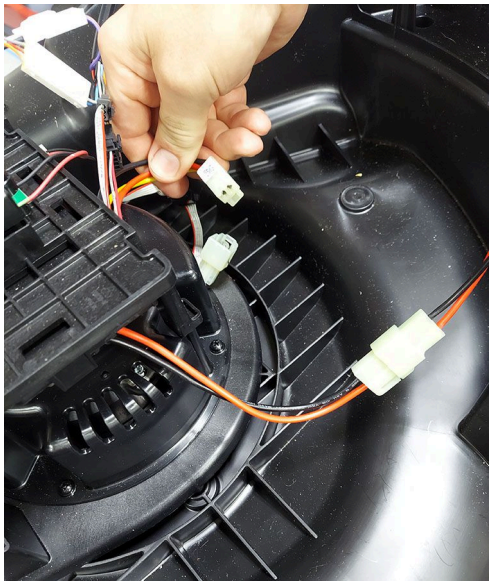


g495320

Figure 97

Max Button Test

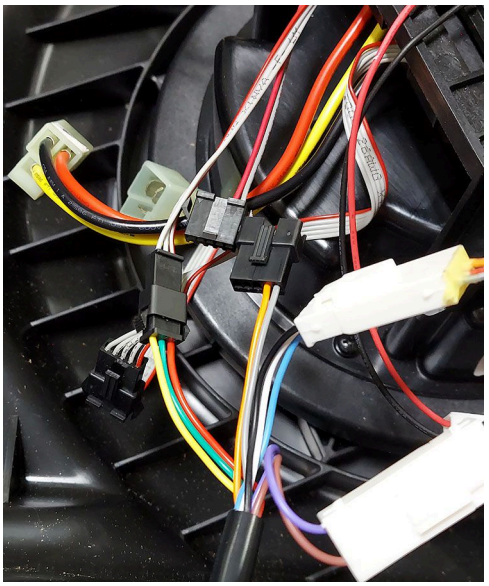
1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



g495339

Figure 98

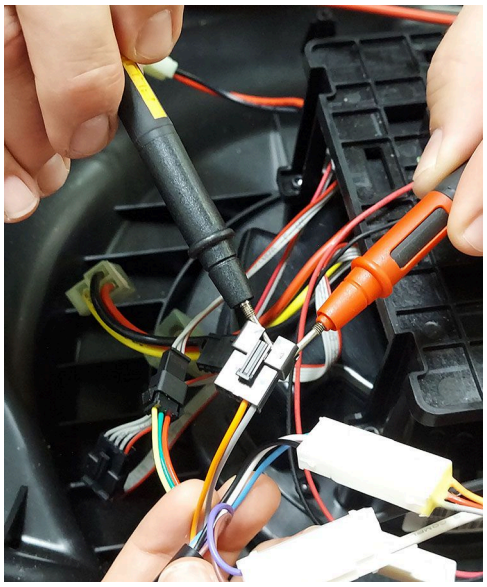
2. Disconnect the harness containing the orange and grey wire from the red and grey wires.



g495306

Figure 99

3. Remove the battery.
4. Test the continuity between the orange and grey wire. With the max button held, there should be continuity (approximately 20 ohms) between the wires. Not depressed should be open.

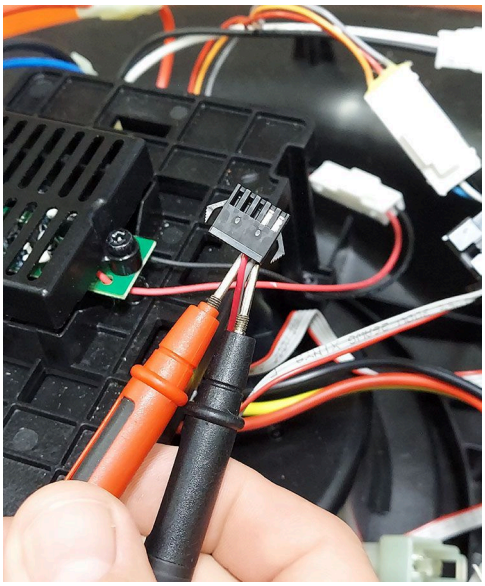


g495307

Figure 100

5. With the battery installed, there should be approximately 5 VDC on the red wire, using grey wire as a ground, coming from the motor driver/controller while the operator presence bail is engaged.

Max Button Test (continued)



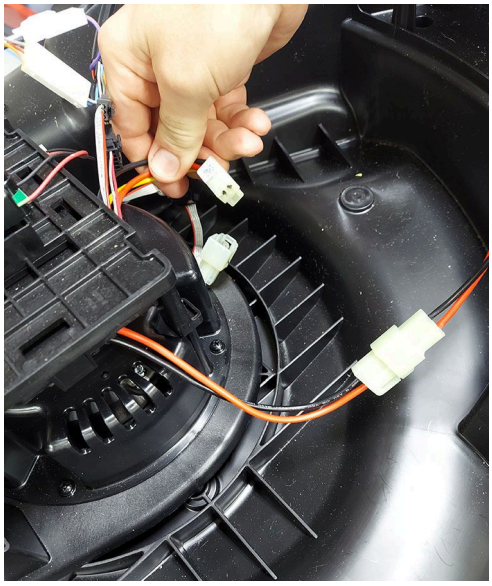
g495308

Figure 101

6. If depressing the max button does not change the state, replace the 2–bail controller assembly. If 5 VDC is not present, verify the motor driver/controller function, replace as needed.

Operator Presence Bail Test

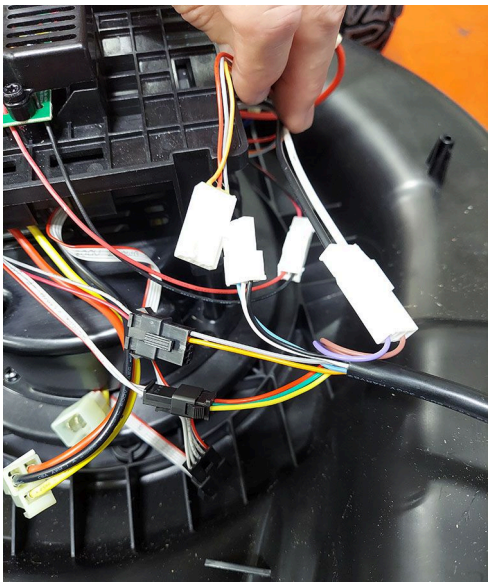
1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



g495339

Figure 102

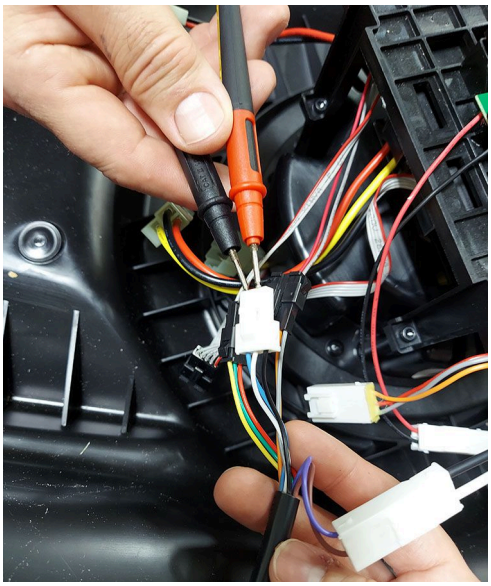
2. Disconnect the harness connector with the white/blue/black from the motor driver/controller to the 2–bail controller assembly.



g495311

Figure 103

3. Remove the battery.
4. Test the continuity on the 2–bail controller assembly connector. There should be continuity between the white and blue wire when the bail is engaged. With bail disengaged, there should be no continuity between any of the 3 wires.

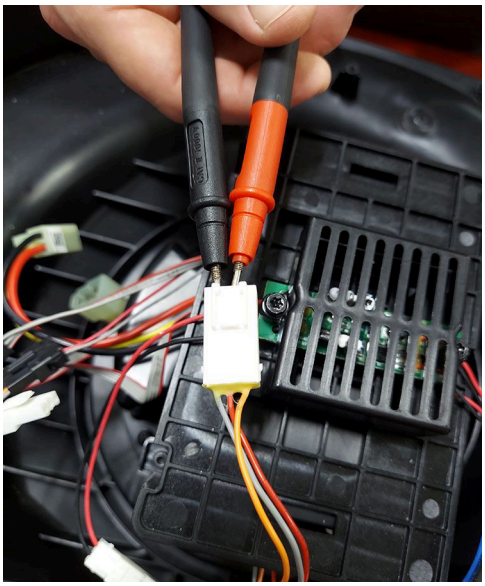


g495312

Figure 104

5. Install the battery.
6. Test voltage output from the motor driver/controller on the red wire using the grey wire as ground. The voltage should read approximately 22 VDC.

Operator Presence Bail Test (continued)



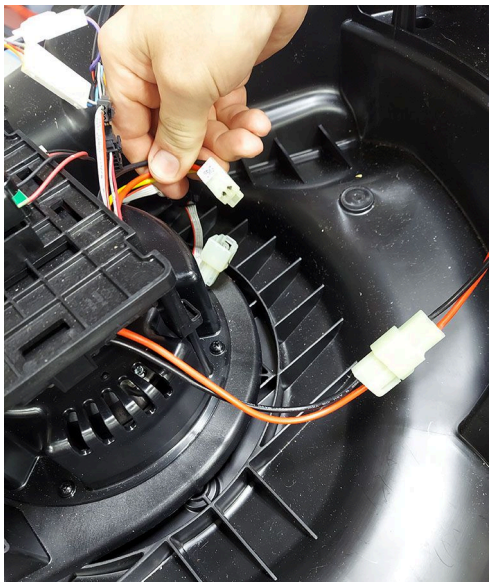
g495313

Figure 105

7. If no change-in-state during continuity testing, verify the bail is fully seated. If fully seated, replace the 2–bail controller assembly.
8. If there is Incorrect voltage reading on the red wire, verify the motor driver/controller function, replace as needed.

Key Switch/Button Testing

1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



g495339

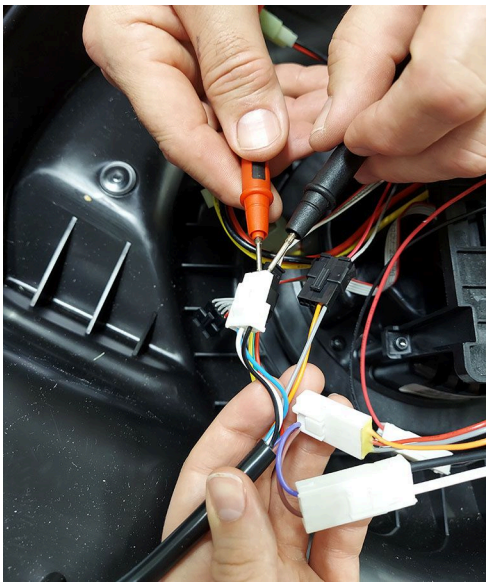
Figure 106

2. Disconnect the blue/white/black wire from the red/orange/grey wire of the 2–bail controller assembly to the motor driver/controller.

g495302

Figure 107

3. Remove the battery.
4. Test the continuity between the white and black wires. When the key switch/button is depressed, there should be continuity between the wires.



g495303

Figure 108

5. Install the battery.
6. Test the voltage output from the motor driver/controller on the red wire using the grey wire as ground. The voltage should be approximately 22 VDC.

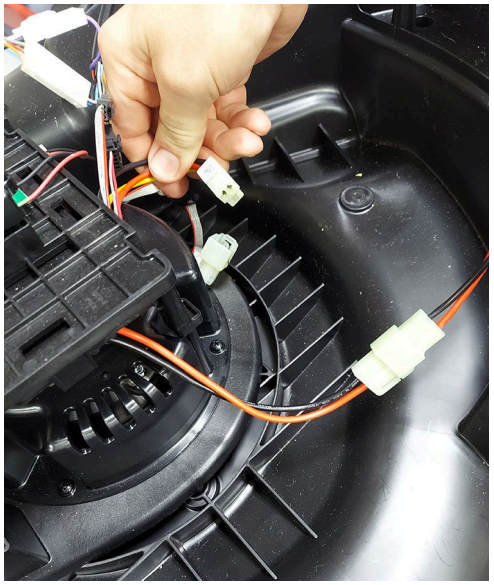
g495304

Figure 109

7. If no change-in-state during continuity testing, verify the key switch is fully seated. If after verifying the key is fully seated and there's still no continuity with button pressed, replace 2–bail controller.
8. If there is Incorrect voltage reading on the red wire, verify the motor driver/controller function, replace as needed.

LED Lights

1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



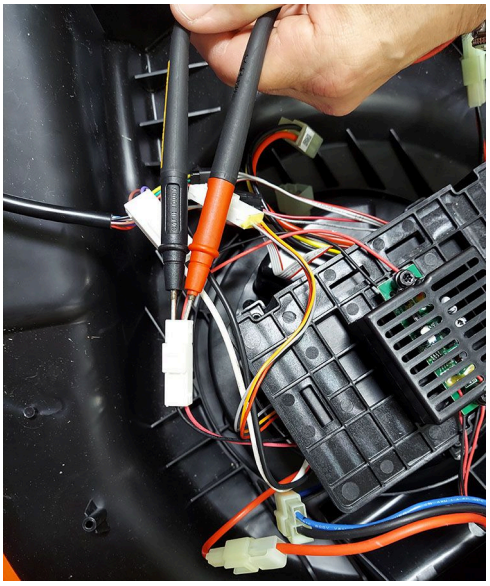
g495339

Figure 110

2. Install the battery.
3. With the operator presence bail engaged and key switch/button pushed, test the voltage input to the LED control board to the red and black connector,

using the positive lead on the red wire and negative lead on the black wire. The voltage reading out of the controller should be the same as battery voltage.

Note: With the motor disconnected, the machine will beep. Release the operator presence bail to stop the beeping.



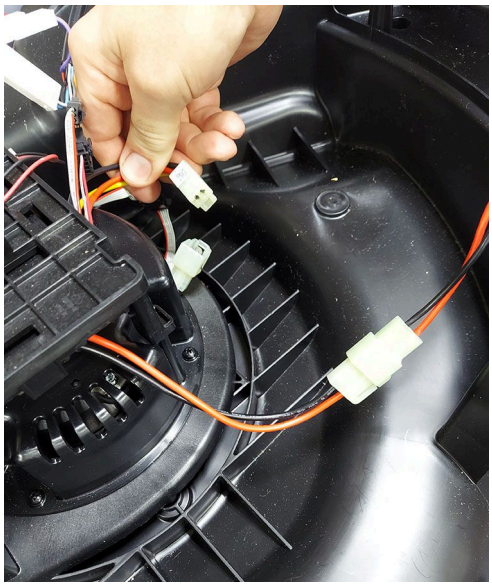
g495305

Figure 111

4. If no voltage output from the motor driver/controller to the LED control board, replace controller.
5. If there is voltage output to the LED connector, but the lights don't function, replace the LED light assembly.

Motor Driver/Controller

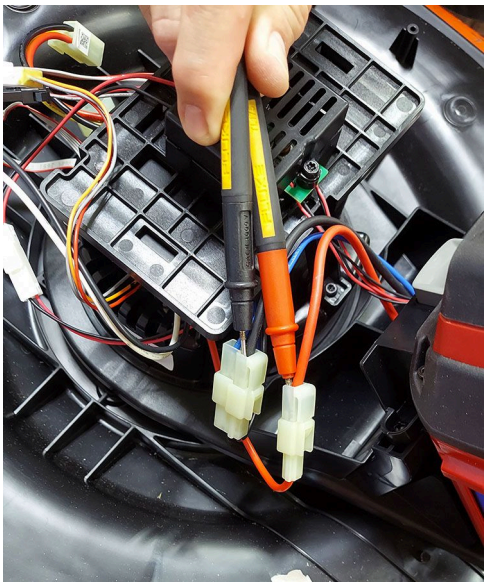
1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



Voltage to Bail Control Assembly step 1

Figure 112

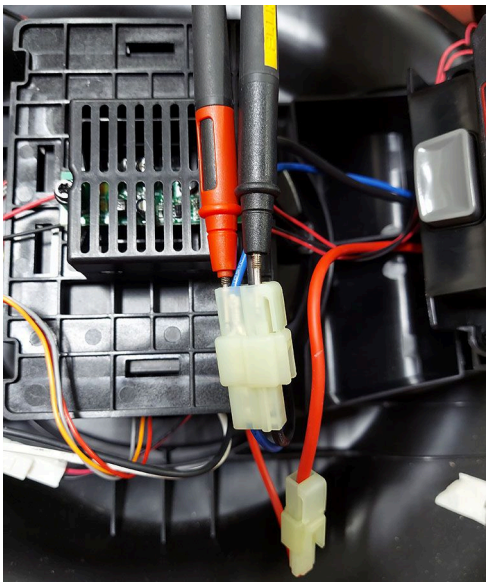
2. Install the battery.
3. Verify the voltage from the battery by testing the red and black wire with VDOM (Digital Volt/Ohm Meter). Input voltage should be the same as the battery voltage.



g495309

Figure 113

4. Verify the communication signal from the battery to the motor driver/controller by testing the blue wire voltage, with the negative lead on the black wire. There should get approximately 1.8 VDC while the operator presence bail is engaged.



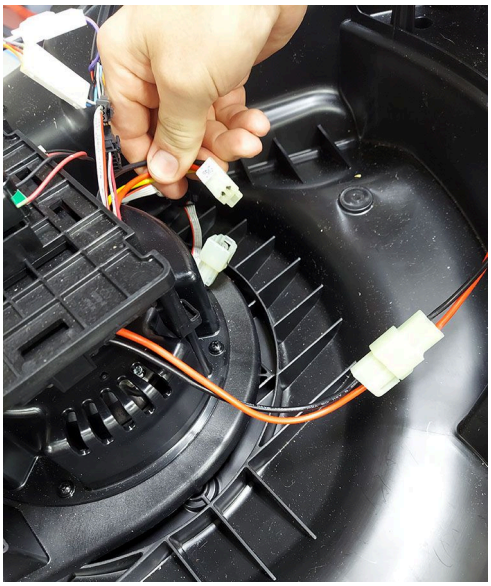
g495310

Figure 114

5. If all inputs are correct and there is no output to the blade motor, replace the motor driver/controller.

Blade Motor

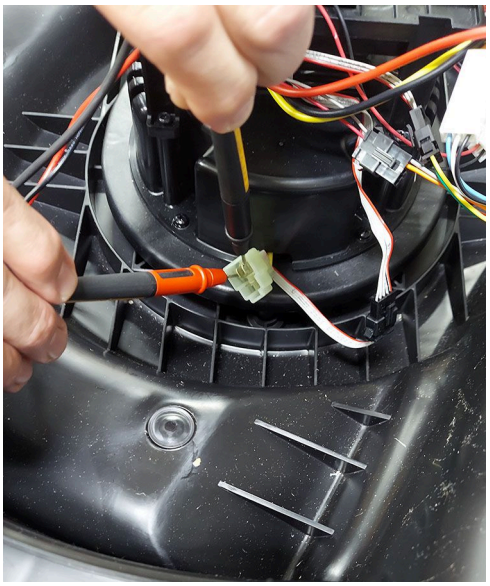
1. Unplug the blade motor power connector with the black, red and yellow wires from the controller to the blade motor.



g495339

Figure 115

2. Remove the battery.
3. Test continuity between all combinations of the phase wires on the motor side of the connector.



g495301

Figure 116

4. No continuity between any 2 phase wires would indicate broken wires in the windings. Replace the motor.

Table of Contents

Electrical Drawing Abbreviations

The following abbreviations are used for wire harness colors on the electrical schematics and wire harness drawings in this chapter.

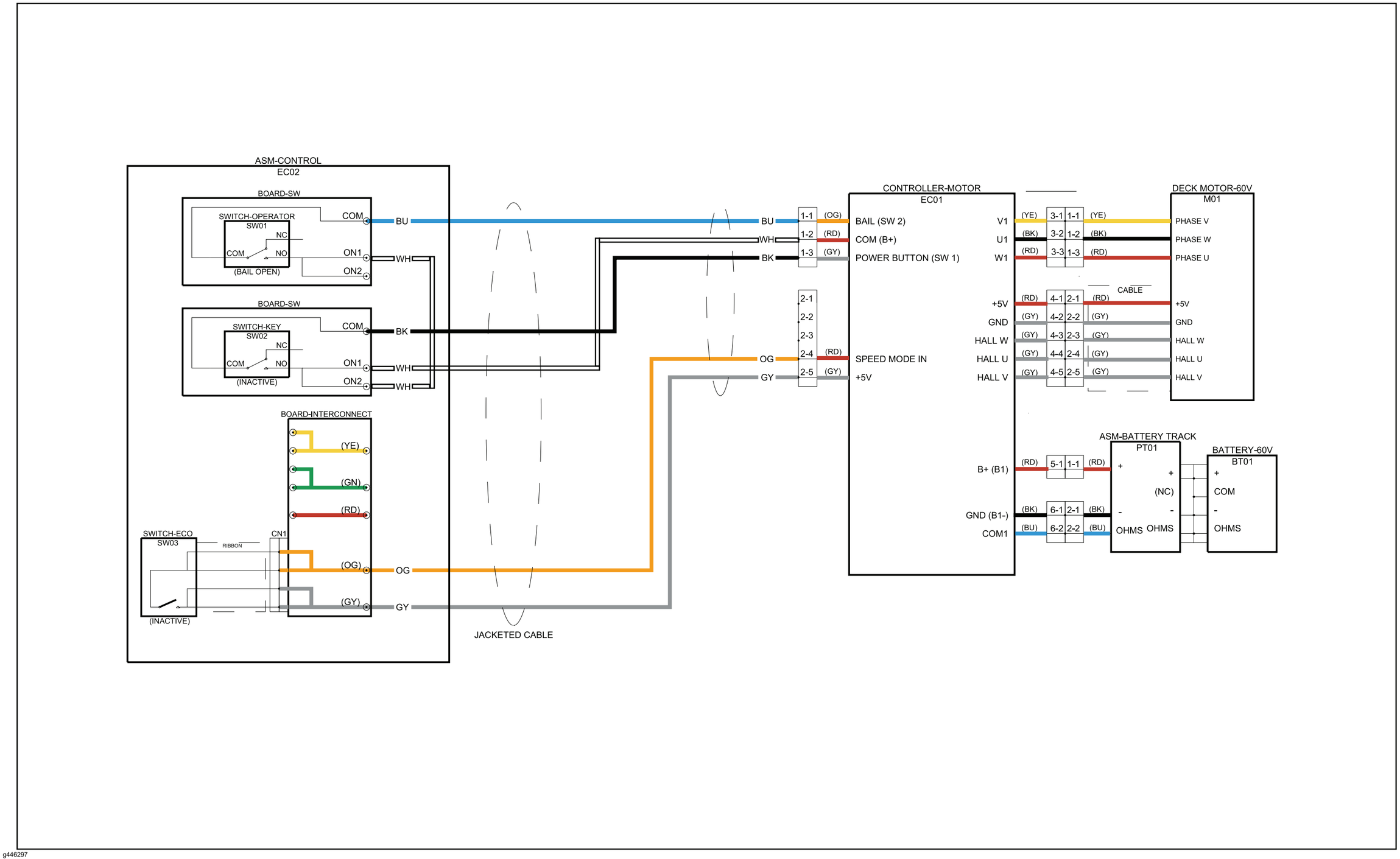
Abbreviation	Color
BK	Black
BR or BN	Brown
BU	Blue
GN	Green
GY	Gray
OR or OG	Orange
PK	Pink
R or RD	Red
T or TN	Tan
VIO or VT	Violet
W or WH	White
Y or YE	Yellow

Numerous harness wires include a line with an alternate color. These wires are identified with the wire color followed by a / or _ and then the line color (e.g, R/BK is a red wire with a black line; OR_BK is an orange wire with a black line).

Note: The electrical harness drawings in this chapter identify both the wire color and the wire gauge. For example, 16 BK on a harness diagram identifies a 16 gauge wire with black insulation.

Note: A splice used in a wire harness will be identified on the wire harness diagram by SP. The manufacturing number of the splice is also identified on the wire harness diagram (e.g., SP01 is splice number 1).

Electrical Schematic (Model 21611)



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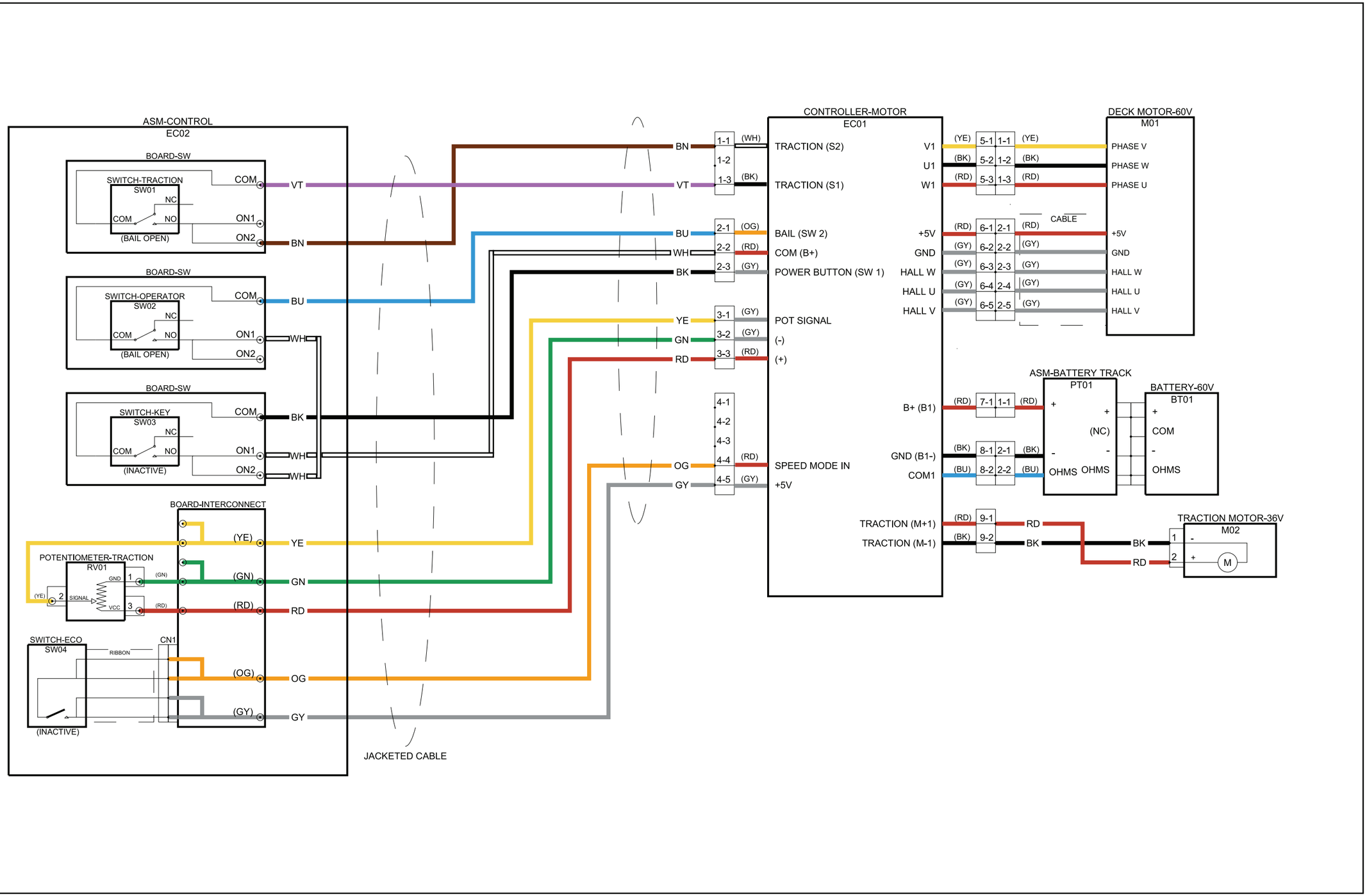
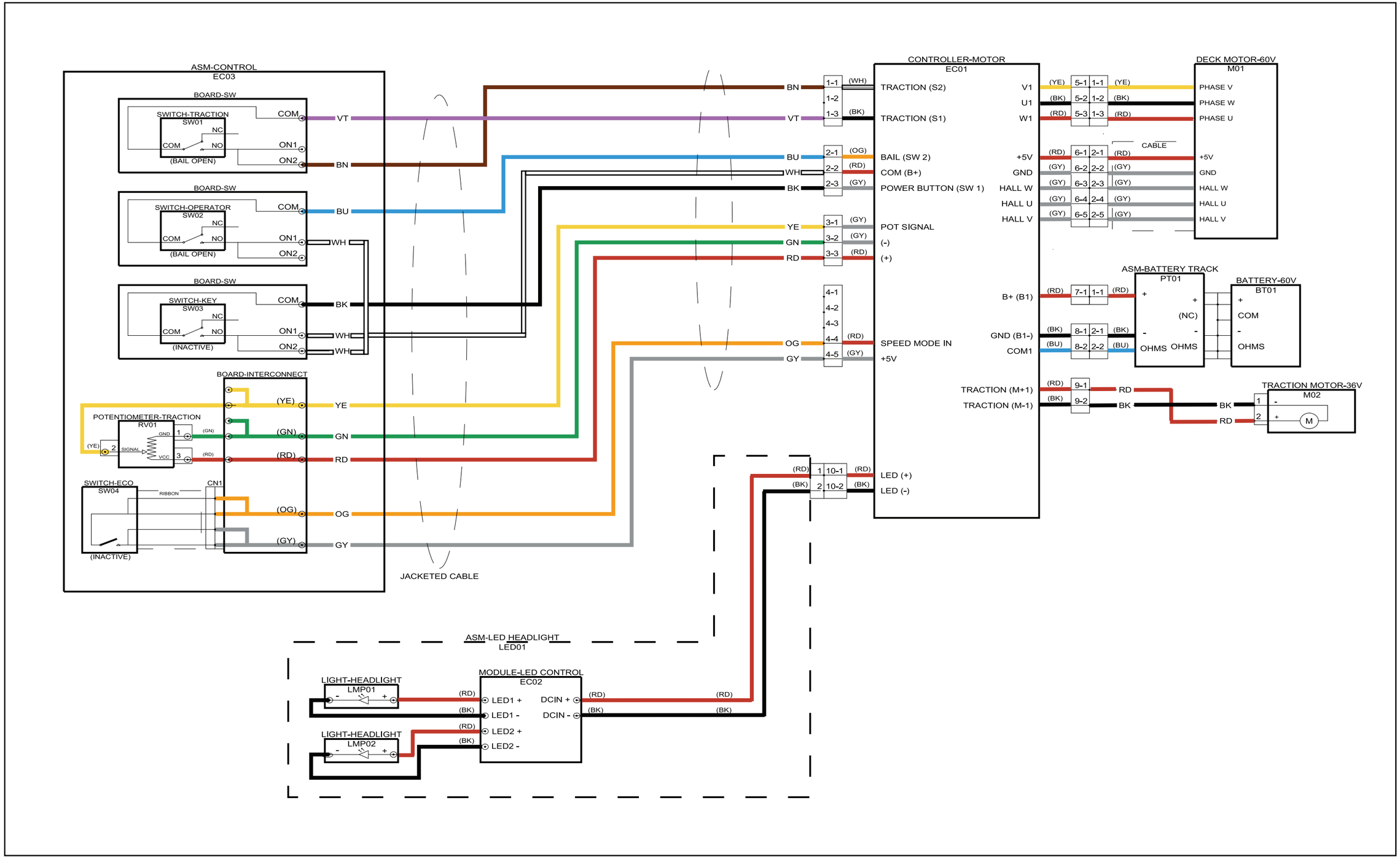

ASM-CONTROL
EC02
BOARD-SW
SWITCH-TRACTION
SW01
NC
COM
NO
(BAIL OPEN)
COM
ON1
ON2
VT
BN
BOARD-SW
SWITCH-OPERATOR
SW02
NC
COM
NO
(BAIL OPEN)
COM
ON1
ON2
BU
WH
BOARD-SW
SWITCH-KEY
SW03
NC
COM
NO
(INACTIVE)
COM
ON1
ON2
BK
WH
WH
BOARD-INTERCONNECT
(YE)
YE
(GN)
GN
(RD)
RD
(OG)
OG
(GY)
GY
POTENTIOMETER-TRACTION
RV01
GND
SIGNAL
VCC
1
2
3
(YE)
(GN)
(RD)
SWITCH-ECO
SW04
RIBBON
CN1
(INACTIVE)
JACKETED CABLE
BN
VT
BU
WH
BK
YE
GN
RD
OG
GY
1-1
1-2
1-3
2-1
2-2
2-3
3-1
3-2
3-3
4-1
4-2
4-3
4-4
4-5
(WH)
(BK)
(OG)
(RD)
(GY)
CONTROLLER-MOTOR
EC01
TRACTION (S2)
TRACTION (S1)
BAIL (SW 2)
COM (B+)
POWER BUTTON (SW 1)
POT SIGNAL
(-)
(+)
SPEED MODE IN
+5V
V1
U1
W1
+5V
GND
HALL W
HALL U
HALL V
B+ (B1)
GND (B1-)
COM1
TRACTION (M+1)
TRACTION (M-1)
DECK MOTOR-60V
M01
PHASE V
PHASE W
PHASE U
CABLE
+5V
GND
HALL W
HALL U
HALL V
5-1
5-2
5-3
6-1
6-2
6-3
6-4
6-5
1-1
1-2
1-3
2-1
2-2
2-3
2-4
2-5
(YE)
(BK)
(RD)
(GY)
ASM-BATTERY TRACK
PT01
BATTERY-60V
BT01
7-1
8-1
8-2
9-1
9-2
1-1
2-1
2-2
+
-
(NC)
OHMS
COM
TRACTION MOTOR-36V
M02
M
1
2

g446302

Electrical Schematic (Models 21621 & 21623)



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