LCE Products

Toro
36″ & 40″ GrandStand
Service Manual

ABOUT THIS MANUAL

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

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

For additional information on the electrical system, please refer to the Toro Electrical Troubleshooting DVD (492-9193) and subsequent. For service information on drive systems, please refer to the Hydro-Gear BDP service manual (BLN-52503). For information specific to the engines used on this unit, refer to the appropriate engine manufacturer's service and repair instructions.

36" & 40" Toro GrandStand model years 2010, 2011 & 2012 are covered in this manual. The manual may also be specified for use on later model products.

Both 36" and 40" models were used during the writing of this manual. You may see slight differences in the photos depending on which model you are servicing.

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

The hydraulic components are sophisticated pieces of machinery. Maintain strict cleanliness control during all stages of service and repair. Cover or cap all hose ends and fittings whenever they are exposed. Even a small amount of dirt or other contamination can severely damage the system.

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
Residential and Landscape Contractor Service Training Department
8111 Lyndale Avenue South
Bloomington, MN 55420

The Toro Company reserves the right to change product specifications or this manual without notice.

THIS PAGE INTENTIONALLY LEFT BLANK.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

7 - Mower Deck cont.

8 - Electrical

TABLE OF CONTENTS

8 - Electrical cont.

TABLE OF CONTENTS

8 - Electrical cont.

9 - Schematics

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK.

SAFETY INFORMATION

General Information

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

This manual is intended as a service and repair manual only. The safety instructions provided herein are for troubleshooting, service, and repair of the 36” and 40” Toro GrandStand Stand-on Mower. The 36” and 40” GrandStand mower and attachment operator’s manuals contain safety information and operating tips for safe operating practices. Operator’s manuals are available through your Toro parts source or:

The Toro Company
Publications Department
8111 Lyndale Avenue South
Bloomington, MN 55420

Think Safety First

Avoid unexpected starting of engine...

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

Avoid lacerations and amputations...

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

Avoid burns...

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

Avoid fires and explosions...

Avoid spilling fuel and never smoke while working with any type of fuel or lubricant. Wipe up any spilled fuel or oil immediately. Never remove the fuel cap or add fuel when the engine is running. Always use approved, labeled containers for storing or transporting fuel and lubricants.

Avoid asphyxiation...

Never operate an engine in a confined area without proper ventilation.

Avoid injury from batteries...

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

Avoid injury due to inferior parts...

Use only original equipment parts to ensure that important safety criteria are met.

Avoid injury to bystanders...

Always clear the area of bystanders before starting or testing powered equipment.

Avoid injury due to projectiles...

Always clear the area of sticks, rocks, or any other debris that could be picked up and thrown by the powered equipment.

Avoid modifications...

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

Avoid unsafe operation...

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

THIS PAGE INTENTIONALLY LEFT BLANK.

Torque Specifications

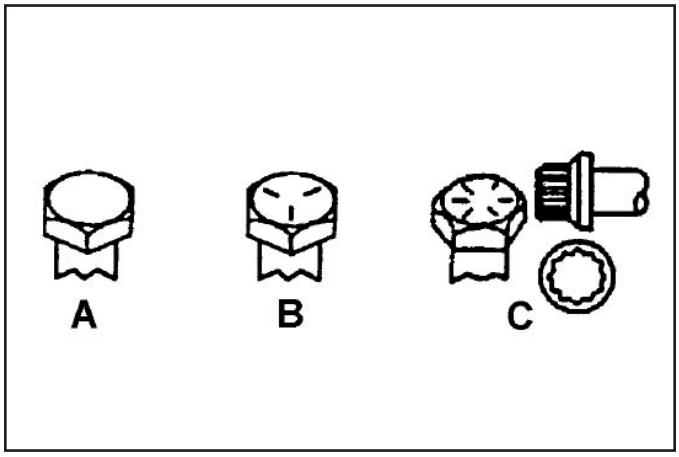
Recommended fastener torque values are listed in the following tables. For critical applications, as determined by Toro, either the recommended torque or a torque that is unique to the application is clearly identified and specified in the service manual.

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

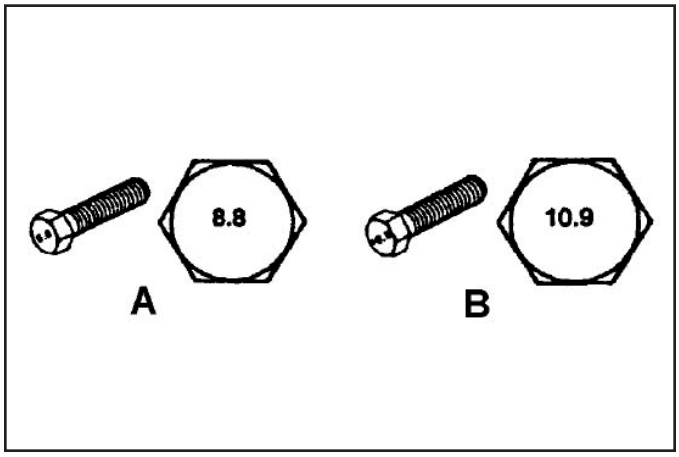
As noted in the following tables, torque values should be reduced by 25% for lubricated fasteners to achieve the similar stress as a dry fastener. Torque values may also have to be reduced when the fastener is threaded into aluminum or brass. The specific torque value should be determined based on the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

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

Fastener Identification



Inch Series bolts and Screws	
(A) Grade 1 & 2 (B) Grade 5	(C) Grade 8



Metric Bolts and Screws	
(A) Class 8.8	(B) Class 10.9

SPECIFICATIONS

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

Thread Size	Grade 1, 5, & 8 with Thin Height Nuts	SAE Grade 1 Bolts, Screws, Studs, & Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)		SAE Grade 5 Bolts, Screws, Studs, & Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)		SAE Grade 8 Bolts, Screws, Studs, & Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)	
	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 ± 2	260 ± 34
# 6 - 40 UNF				17 ± 2	190 ± 20	25 ± 2	280 ± 20
# 8 - 32 UNC	13 ± 2	25 ± 5	282 ± 30	29 ± 3	330 ± 30	41 ± 4	460 ± 45
# 8 - 36 UNF				31 ± 3	350 ± 30	43 ± 4	31 ± 3
# 10 - 24 UNC	18 ± 2	30 ± 5	339 ± 56	42 ± 4	475 ± 45	60 ± 6	674 ± 70
#10 - 32 UNF				48 ± 4	540 ± 45	68 ± 6	765 ± 70
1/4 - 20 UNC	48 ± 7	53 ± 7	599 ± 79	100 ± 10	1125 ± 100	140 ± 15	1580 ± 170
1/4 - 28 UNF	53 ± 7	65 ± 10	734 ± 113	115 ± 10	1300 ± 100	160 ± 15	1800 ± 170
5/16 - 18 UNC	115 ± 15	105 ± 15	1186 ± 169	200 ± 25	2250 ± 280	300 ± 30	3390 ± 340
5/16 - 24 UNF	138 ± 17	128 ± 17	1446 ± 192	225 ± 25	2540 ± 280	325 ± 30	3670 ± 340
	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 ± 4	58 ± 5
3/8 - 24 UNF	17 ± 2	18 ± 2	24 ± 3	35 ± 3	47 ± 4	50 ± 4	68 ± 5
7/16 - 14 UNC	27 ± 3	27 ± 3	37 ± 4	50 ± 5	68 ± 7	70 ± 7	68 ± 9
7/16 - 20 UNF	29 ± 3	29 ± 3	39 ± 4	55 ± 5	75 ± 7	77 ± 7	104 ± 9
1/2 - 13 UNC	30 ± 3	48 ± 7	65 ± 9	75 ± 8	102 ± 11	105 ± 10	142 ± 14
1/2 - 20 UNF	32 ± 3	53 ± 7	72 ± 9	85 ± 8	115 ± 11	120 ± 10	163 ± 14
5/8 - 11 UNC	65 ± 10	88 ± 12	119 ± 16	150 ± 15	203 ± 20	210 ± 20	285 ± 27
5/8 - 18 UNF	75 ± 10	95 ± 15	129 ± 20	170 ± 15	230 ± 20	240 ± 20	325 ± 27
3/4 - 10 UNC	93 ± 12	140 ± 20	190 ± 27	265 ± 25	359 ± 34	374 ± 35	508 ± 47
3/4 - 16 UNF	115 ± 15	165 ± 25	224 ± 34	300 ± 25	407 ± 34	420 ± 35	569 ± 47
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 ± 45	644 ± 61	660 ± 60	895 ± 81

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.

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

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

Standard Torque for Dry, Zinc & Steel Fasteners (Metric Fasteners)

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

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.

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

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

SPECIFICATIONS

Other Torque Specifications

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

Wheel Bolts and Lug Nuts

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

** For steel wheels and non-lubricated fasteners.

Thread Cutting Screws (Zinc Plated Steel)

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

Thread Cutting Screws (Zinc Plated Steel)

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

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

Equivalents & Conversions

Decimal & 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	11/16	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/Sq. In.	Kilopascal	6.895
Work	Foot-pounds	Newton-Meters	1.356
	Foot-pounds	Kilogram-Meters	0.1383
	Inch-pounds	Kilogram-Centimeters	1.152144
Liquid Volume	Quarts	Liters	0.9463
	Gallons	Liters	3.785
Liquid Flows	Gallons/Minute	Liters/Minute	3.785
Temperature	Fahrenheit	Celsius	1. Subtract 32° 2. Multiply by 5/9

GrandStand Specifications

Engine:

	Output (Max. @ 3600 RPM's)
	15 hp (11.2kW)
Make	Kawasaki
Model	FS541V
Hi-Idle (Dom)	3600 RPM
Hi-Idle (Int'l)	3000 RPM
Starter	Electric
Spark Plug	NGK BPR4ES
Oil	SAE 10w-30 / SAE10w-40
Oil Capacity	2.1 qt. (2.0 L)

Fuel System:

Fuel Tank Capacity	7 Gallons (26.5 L)

Traction Drives:

Traction Control	Toro "Split-Handle" Control Levers
Hydraulic Pump	Two Hydro-Gear Model PG 10cc
Hydraulic Wheel Motor	Two Parker TEO-195
Hydraulic Oil Filter	25 Micron Automotive Spin-On Type
Hydraulic Fluid	Toro Hypr-Oil or Equivelant Synthetic 15w50 Motor Oil
Hydraulic Fluid Capacity	2.1 quarts (1.9 liters)
Parking Brake	Standard Equipment
Ground Speed: (Hydro-MPH)	Variable, 0 to 8 (13 kph) MPH Fwd / 0 to 3 (5 kph) MPH Rev
Hourmeter with Service Indicator	Standard Equipment

Wheels and Tires:

Front Caster Tires	11"x4" - 5", 4 ply, Smooth Tread, Semi Pneumatic
Front Caster Fork	Heavy-Duty Design with 1" (25.4mm) Diameter Pivot Shaft
Rear Traction Tires	20"x10"-8", 4 ply with Turf Traction Tread

SPECIFICATIONS

GrandStand Specifications cont.

Mower Drive:

Mower Engagement	Engine Mounted Electric Clutch
Clutch Adjustment	Periodic Air Gap Adjustment Required - .018" ± .003" (0.45 ± 0.0762mm)
PTO Drive Belt	HB Section W/ Aramid (Kevlar) Cords and Dry Clutching Envelope
PTO Idler	Spring Loaded Pivot Hub w/Friction Washer Dampening
Deck Drive Belt	HA Section with Aramid (Kevlar) Cords and Standard (Non-Clutching) Envelope
Deck Drive Idler	Spring Loaded Pivot Hub w/Friction Washer Dampening

Mower Decks:

HOC Range	1" (25.4mm) to 5" (127mm) in 1/4" (6.3mm) Increments
Blades	.250" (6.3mm) Thick, Heat Treated Steel Blades
Spindles	Machined Steel 1.00" (25mm) Diameter Shaft
Spindle Housing	Ductile Cast Iron, 9-3/8" (24cm) Diameter Mounted with Six Bolts
Bearings	Greasable Ball Bearings with Grease Fitting for Lubrication
Construction	7 gauge (.179 inch - 4.5mm) Steel Welded Construction
Blade Tip Speed: Dom (Int'l)	36" (91cm) - 18,420 ft/m calculated @ 3600 engine RPM (15,288 ft/m calculated @ 3000 engine RPM)
	40" (102cm) - 18,278 ft/m calculated @ 3600 engine RPM (15,625 ft/m calculated @ 3000 engine RPM)
Skid Plate	Standard
Adjustable Discharge Baffle	Standard
Rubber Discharge Chute	Standard

Unit Dimensions:

Model No.	Height	Width Deflector Down	Width Deflector Raised	Length Platform Down	Length Platform Up	Weight*
74534	48"	51.5"	37.5"	74"	61"	760 lbs
74536	48"	56"	42"	70"	57"	775 lbs
74534TE	122cm (48")	130cm (51.5")	95cm (37.5")	155cm (61")	188cm (74")	335 kg (760 lbs)
74536TE	122cm (48")	142cm (56")	107cm (42")	145cm (57")	178cm (70")	352 kg (775 lbs)
79534 (CARB)	48"	51.5"	37.5"	74"	61"	760 lbs
79536 (CARB)	48"	56"	42"	70"	57"	775 lbs

**** Estimated operating weight***

Caster Wheel Assembly Replacement

Caster Wheel Assembly Removal

1. Remove the grease cap from the top of the caster wheel pivot tube (Fig. 001).

Fig. 001 DSCN-3918a

2. Remove the nut from the caster fork shaft (Fig. 002).

Fig. 002 DSCN-3921a

3. The caster fork and wheel assembly is now free to be removed.

4. Remove the three Bellville washers from the caster wheel pivot tube (Fig. 003).

Fig. 003 DSCN-3924a

5. Remove the upper tapered roller bearing from the caster wheel pivot tube (Fig. 004).

Fig. 004 DSCN-3927a

6. Remove the grease seal from the bottom of the caster wheel pivot tube (Fig. 005).

Fig. 005 DSCN-3930a

7. The lower tapered roller bearing is now free to be removed (Fig. 006).

Fig. 006 DSCN-3933a

8. Using a blunt punch, remove the upper and lower bearing cups from the caster wheel pivot tube (Fig. 007).

Fig. 007 DSCN-3936a

9. Remove the nut securing the caster wheel axle bolt, then remove the axle bolt (Fig. 008).

Fig. 008 DSCN-0376a

10. The caster wheel assembly is now free to be removed from the caster fork.

11. Remove the seal guard from both sides of the wheel hub (Fig. 009).

Fig. 009 DSCN-0377a

12. Remove the spacer nut from the caster axle (Fig. 010).

Fig. 010 DSCN-0379a

Note: The spacer nuts are both threaded onto the caster axle. One of the spacer nuts will need to be removed after it has been removed from the caster wheel (Fig. 011).

Fig. 011 DSCN-0383a

13. Remove the grease seal from both sides of the caster wheel (Fig. 012).

Fig. 012 DSCN-0387a

14. The LH and RH tapered bearings are now free to be removed (Fig. 013).

Fig. 013 DSCN-0389a

Caster Wheel Assembly Installation

1. Pack the caster wheel tapered roller bearing with high-temp grease (Fig. 014).

Fig. 014 DSCN-0407a

2. Install the bearing into the wheel hub (Fig. 015).

Fig. 015 DSCN-0389a

3. Install grease seal into the wheel hub (Fig. 016).

Fig. 016 DSCN-0393a

4. Repeat steps 1, 2, and 3 on the other side of the caster wheel.

5. Fill the center of the wheel hub with high-temp grease (Fig. 017).

Fig. 017 DSCN-0406a

6. Position the caster axle through the bearing and seal assembly (Fig. 018).

Fig. 018 DSCN-0398a

7. Install a spacer nut onto both ends of the caster axle (Fig. 019).

Note: There should be approximately 3 internal spacer nut threads visible on both sides, indicating the axle is centered.

Fig. 019 DSCN-0379a

8. Position the seal guard onto both sides of the caster wheel hub (Fig. 020).

Fig. 020 DSCN-0377a

9. Secure the caster wheel assembly to the caster fork using the axle bolt and nut (Fig. 021).

Fig. 021 DSCN-0376a

10. Install the upper and lower bearing cups into the pivot tube (Fig. 022).

Fig. 022 DSCN-0410a

Note: A socket can be used as a driver. Take care not to scar the race surface (Fig. 023).

Fig. 023 DSCN-0413a

11. Pack the pivot tube tapered roller bearings with high temperature grease (Fig. 024).

Fig. 024 DSCN-0407a

12. Install the lower bearing into the pivot tube (Fig. 025).

Fig. 025 DSCN-3933a

13. Install grease seal into the base of the pivot tube (Fig. 026).

Fig. 026 DSCN-3930a

14. Install the upper bearing into the pivot tube (Fig. 027).

Fig. 027 DSCN-3927a

15. Install the 3 Bellville washers into the pivot tube (Fig. 028).

Fig. 028 DSCN-3924a

Note: Bottom: Crown Up / Middle: Crown Down / Top: Crown up (Fig. 029).

Fig. 029 DSCN-0423a

16. Position the caster wheel and fork assembly up through the pivot hub.

17. Secure the caster wheel and fork assembly with the nut (Fig. 030).

Fig. 030 DSCN-0360a

18. Tighten locknut until spring washers are flat (15 ft-lbs / 20 Nm) and then back off a 1/4 turn to properly set the pre-load on the bearings.

19. Remove the plug from the side of the pivot hub (Fig. 031).

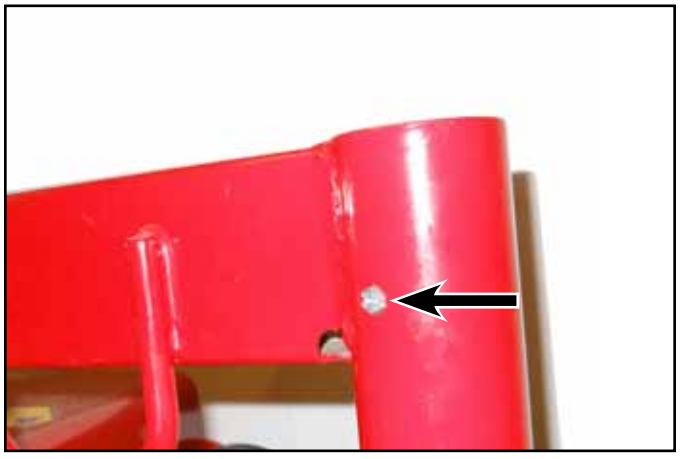


Fig. 031 DSCN-0436a

20. Install a grease zerk into the port on the side of the pivot hub (Fig. 032).

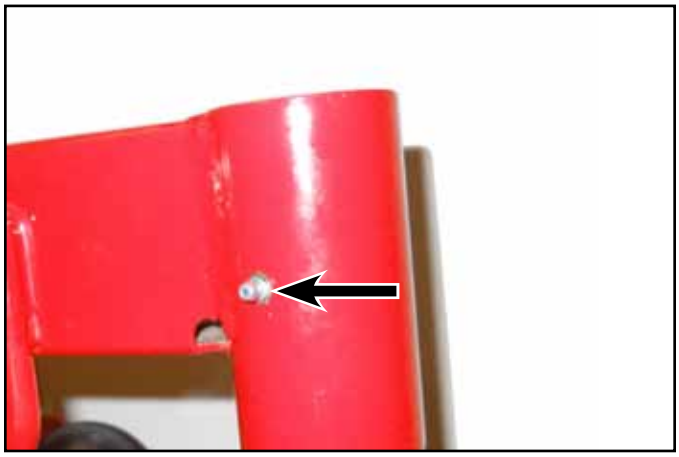


Fig. 032 DSCN-0434a

21. Fill the pivot hub cavity until grease is purging out through the upper bearing (Fig. 033).

Fig. 033 DSCN-0438a

22. Replace the grease zerk with the plug (Fig. 034).

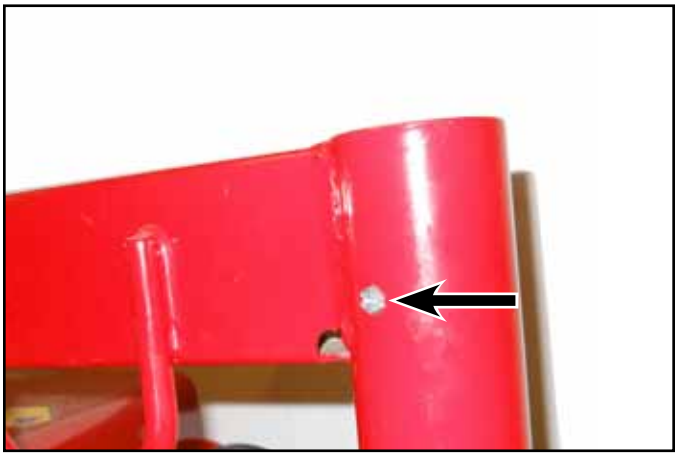


Fig. 034 DSCN-0436a

23. Install the grease cap onto the top of the pivot hub (Fig. 035).

Fig. 035 DSCN-3918a

Fuel Tank Assembly Replacement

Fuel Tank Assembly Removal

1. Turn the fuel shutoff valve to the “OFF” position (Fig. 036).

Fig. 036 DSCN-3940a

2. Siphon the fuel from the fuel tank.

Note: The only recommended way to remove the fuel from the tank is by using a siphon pump.

3. Place the deck into the 1” HOC position.

4. Remove the vent line from the 90 degree vent fitting (Fig. 037).

Fig. 037 DSCN-3941a

5. Remove the 90 degree vent fitting, then rubber grommet from the fuel tank (Fig. 038).

Fig. 038 DSCN-3946a

6. Slide the hose clamp off the fuel pick-up tube fitting, then remove the fuel line from the fitting (Fig. 039).

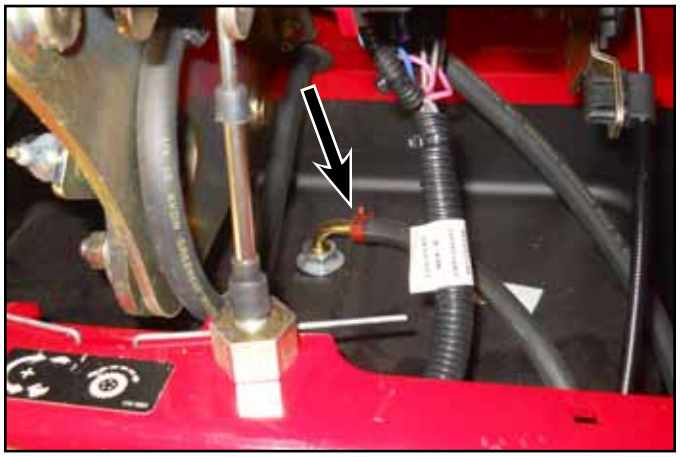


Fig. 039 DSCN-3949a

7. Remove the four thread forming screws securing the tank bracket to the control panel (Fig. 040).

Fig. 040 DSCN-3952a

8. Remove the fuel tank from the control tower (Fig. 041).

Fig. 041 DSCN-3955a

Fuel Tank Assembly Installation

1. Position the fuel tank into the control tower (Fig. 042).

Fig. 042 DSCN-3955a

2. Secure the tank bracket to the control tower using four thread forming screws (Fig. 043).

Fig. 043 DSCN-3952a

3. Slide the fuel line onto the pick-up tube fitting and secure with the hose clamp (Fig. 044).

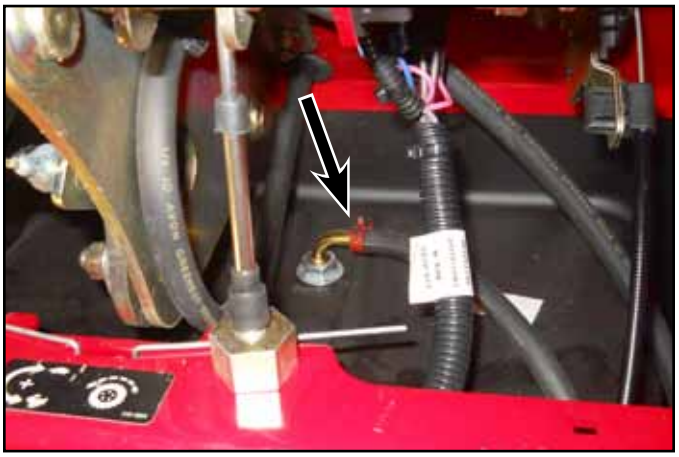


Fig. 044 DSCN-3949a

4. Install the rubber grommet into the fuel tank (Fig. 045).

Fig. 045 DSCN-3958a

5. Install the 90 degree fitting into the rubber grommet (Fig. 046).

Note: A thin film of oil will ease installation of the fitting barb.

Fig. 046 DSCN-3946a

6. Install the vent hose onto vent fitting (Fig. 047).

Fig. 047 DSCN-3941a

Platform & Cushion Assembly Replacement

Platform & Cushion Assembly Removal

1. Remove the hairpin cotter and clevis pin securing the brake link rod to the brake assembly (Fig. 048).

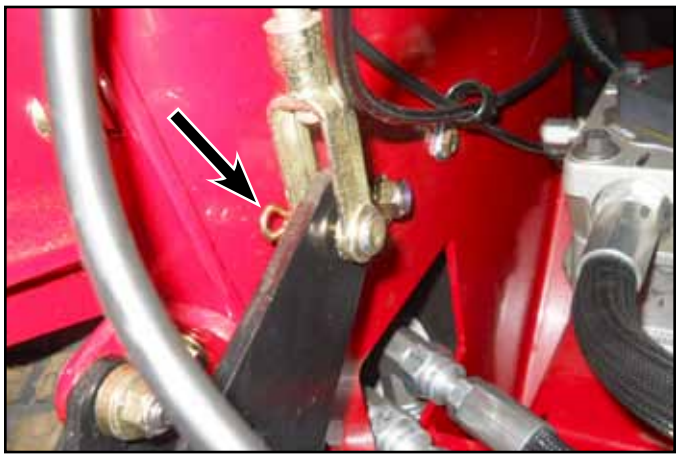


Fig. 048 DSCN-3962a

2. Remove the four sets of bolts and flange nuts that secure the brake assembly to the frame (Fig. 049).

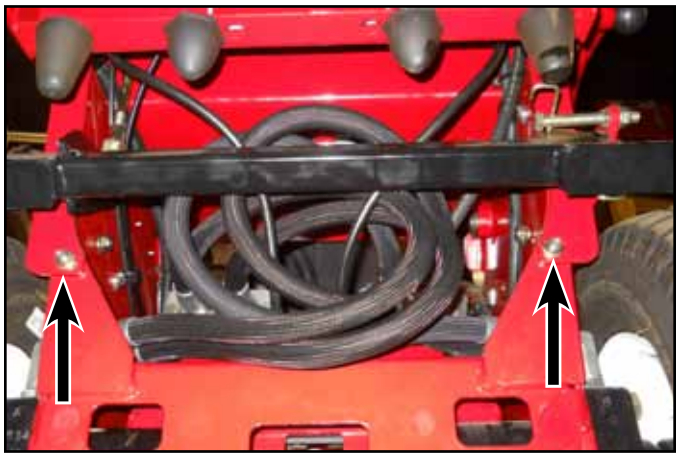


Fig. 049 DSCN-3965a

3. Lower the operator cushion onto the operator platform.

4. Remove the carriage bolts, spacers, friction washers, washers, and nuts securing the pad hinge to the pad links (Fig. 050).

Fig. 050 DSCN-0577a

5. Remove the four sets of bolts and washers securing the upper and lower pad hinges to the cushion pad (Fig. 051).

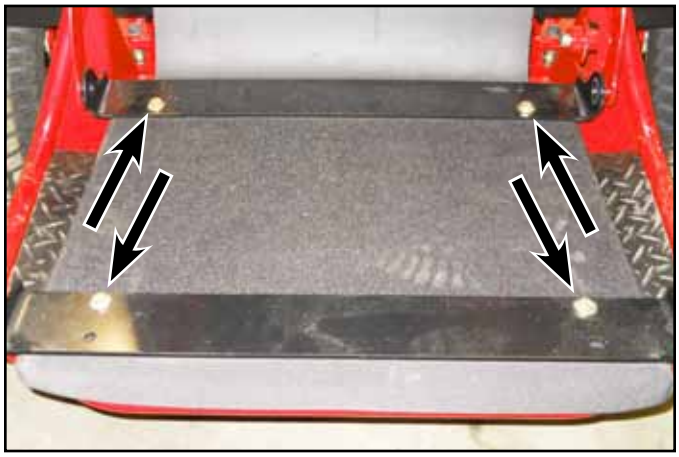


Fig. 051 DSCN-0488a

6. Remove the two thread forming screws securing the shield, foot mat bracket, and foot mat to the platform (Fig. 052).

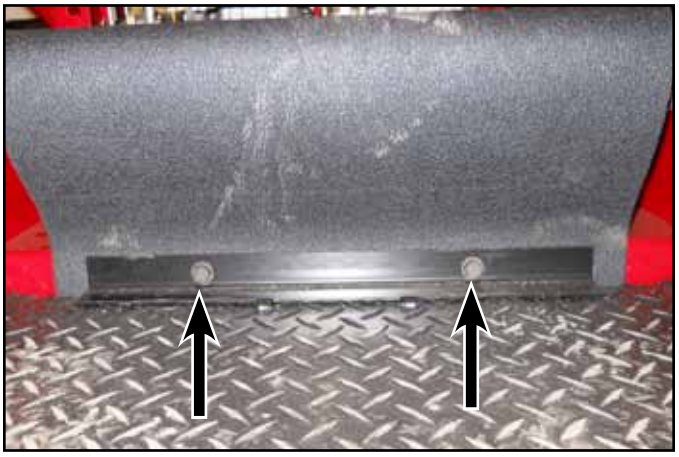


Fig. 052 DSCN-0490a

7. Raise the rear of the machine and remove the tires.

8. Remove the RH and LH carriage bolts, washers, spacers, and nuts securing the platform to the carrier frame (Fig. 053).

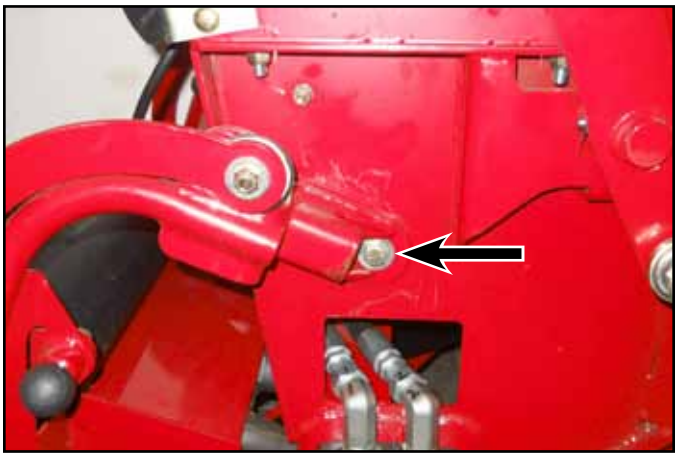


Fig. 053 DSCN-3974a

9. Remove the carriage bolts, friction washers, spacers, and nuts securing the pad link to the platform (Fig. 054).

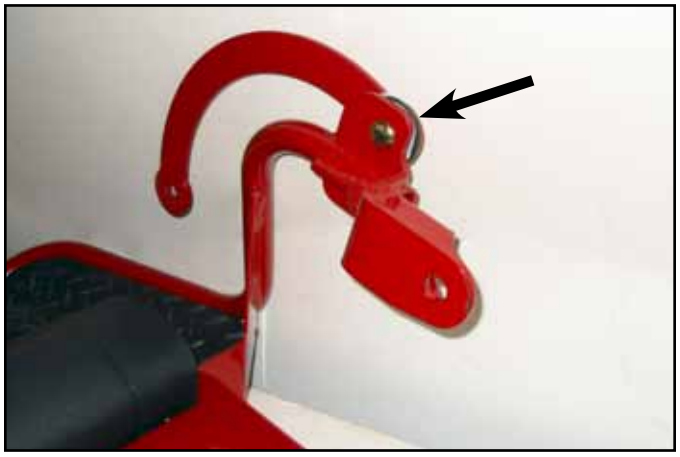


Fig. 054 DSCN-3978a

10. Remove the knob from the platform latch pin (Fig. 055).

Fig. 055 DSCN-0500a

11. Remove the latch pin and spring from the platform (Fig. 056).

Fig. 056 DSCN-0501a

12. Remove the four nuts securing the four rubber bumpers to the platform (Fig. 057).

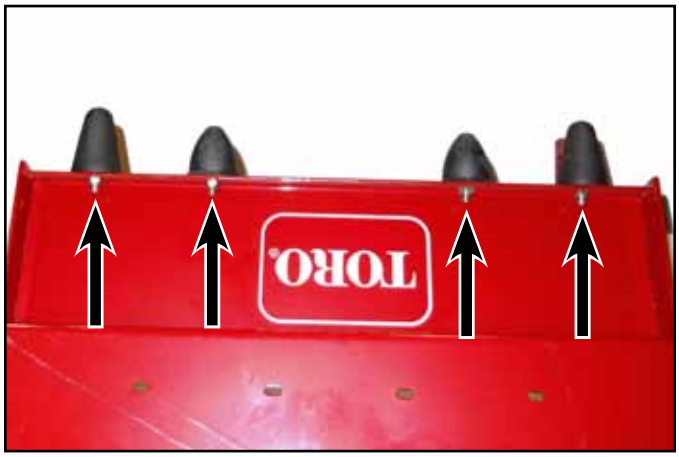


Fig. 057 DSCN-0505a

Platform & Cushion Assembly Installation

1. Secure the four rubber bumpers to the platform using four nuts (Fig. 058).

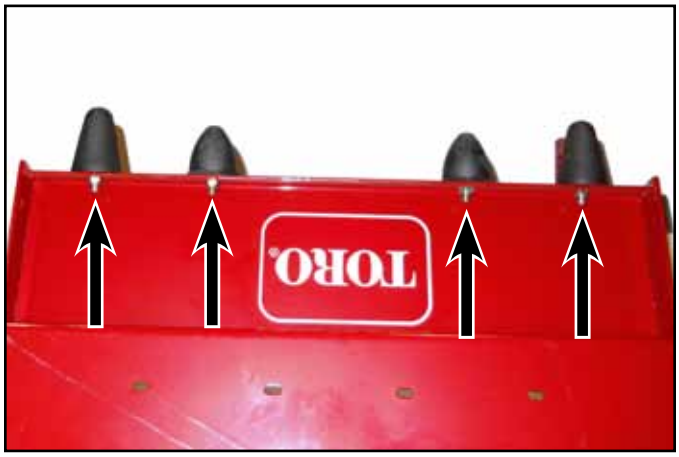


Fig. 058 DSCN-0505a

2. Position the spring on the latch pin (Fig. 059).

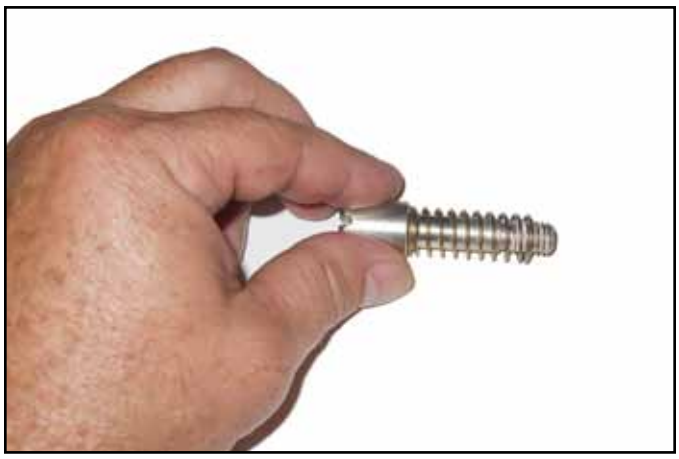


Fig. 059 DSCN-0512a

3. Position the latch pin and spring assembly into the platform (Fig. 060).

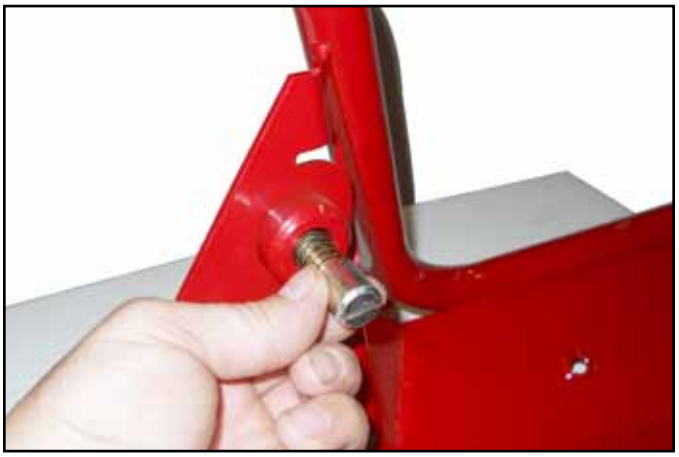


Fig. 060 DSCN-0517a

4. Apply thread-locking compound to the threads of the knob (Fig. 061).

Fig. 061 DSCN-0521a

5. Install the knob onto the latch pin (Fig. 062).

Fig. 062 DSCN-0498a

6. Position the carriage bolt and spacer into the tab on the platform (Fig. 063).

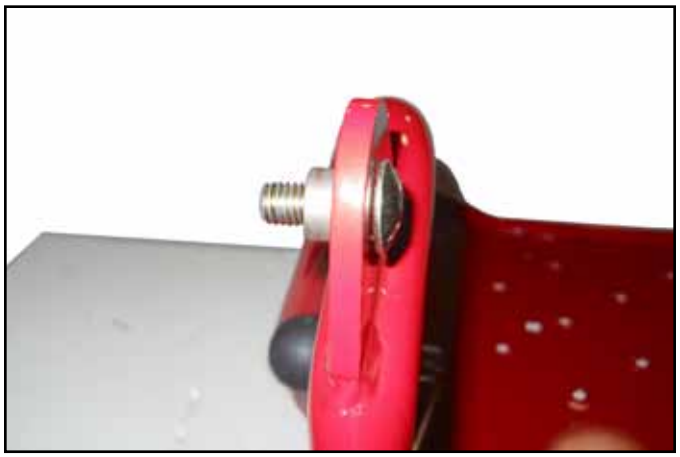


Fig. 063 DSCN-0548a

7. Position the friction washer then pad link over the spacer (Fig. 064).

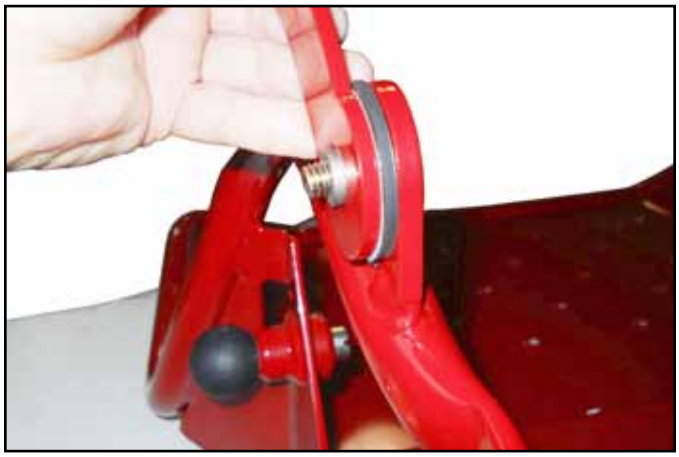


Fig. 064 DSCN-0549a

8. Secure the assembly with a washer and nut (Fig. 065).

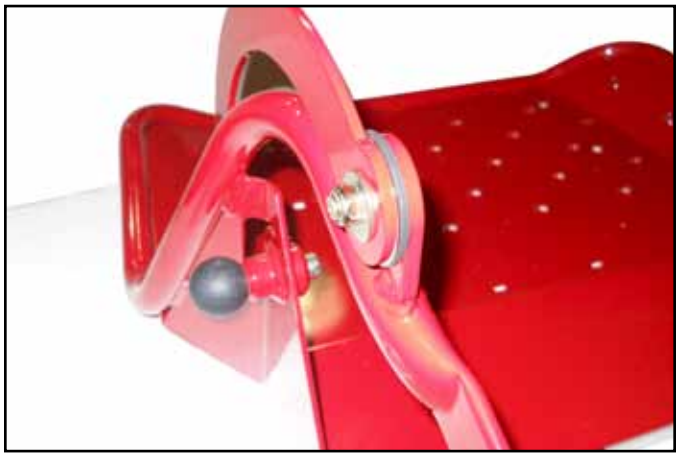


Fig. 065 DSCN-0555a

9. Repeat steps 6, 7, and 8 on the other side.

10. Position the platform assembly onto the frame (Fig. 066).

Fig. 066 DSCN-3979a

11. Place the washer and spacer onto the bolt (Fig. 067).

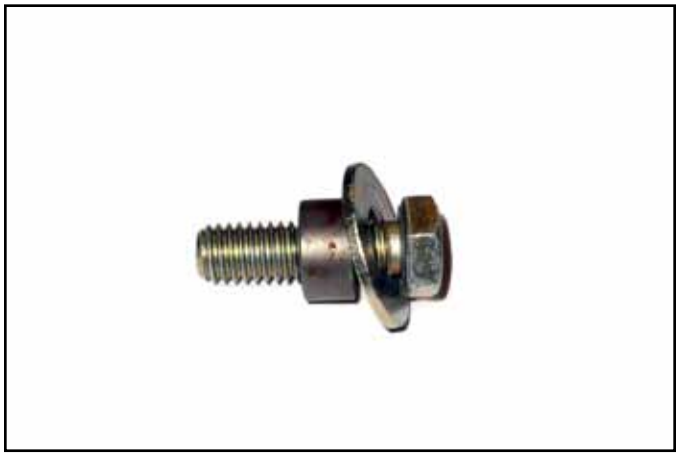


Fig. 067 DSCN-3982a

12. Position the large washer between the platform pivot and frame (Fig. 068).

Fig. 068 DSCN-3984a

13. Secure the platform assembly to the frame using the bolt, washer, spacer, and flange nut (Fig. 069).

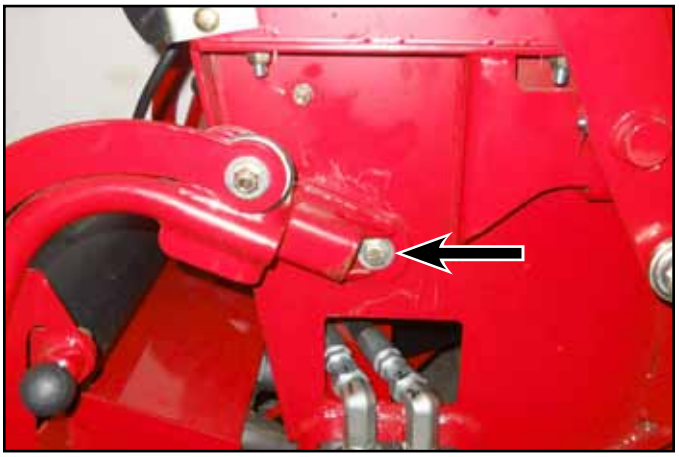


Fig. 069 DSCN-3974a

14. Repeat steps 11 through 13 on the other side of the machine.

15. Install the tires.

16. Secure the shield, foot mat bracket, and foot mat to the platform using two thread forming screws (Fig. 070).

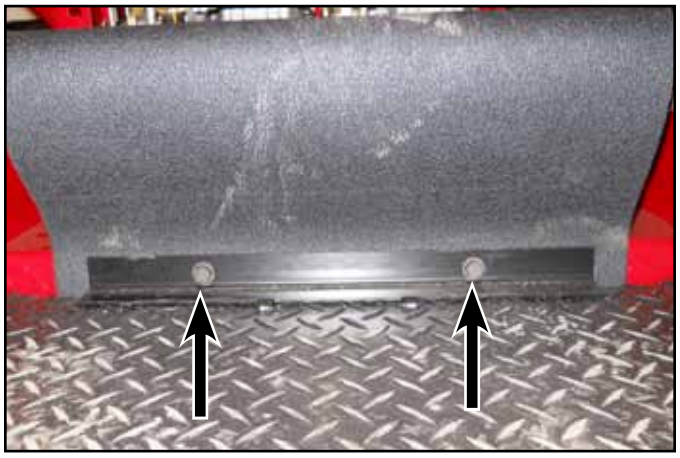


Fig. 070 DSCN-0490a

17. Secure the shield and lower hinge bracket to the operator cushion using two screws and washers (Fig. 071).

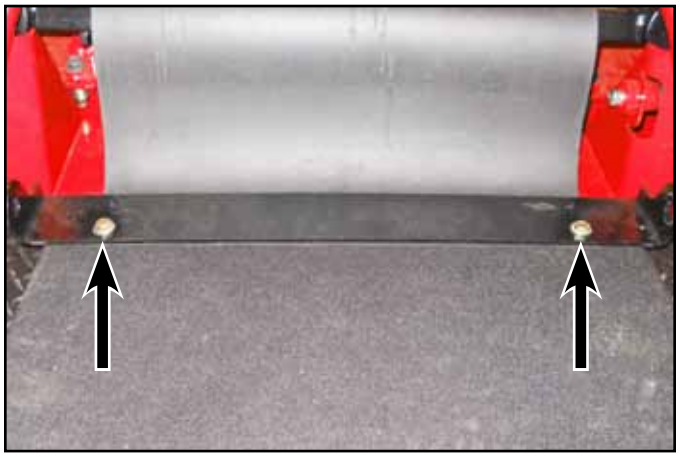


Fig. 071 DSCN-0564a

18. Secure the upper hinge bracket to the operator cushion using two screws and washers (Fig. 072).

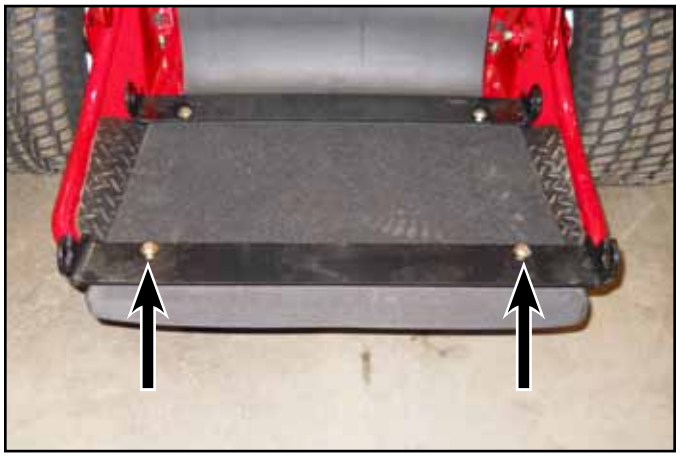


Fig. 072 DSCN-0566a

19. Align the pad link with the lower hinge bracket (Fig. 073).

Fig. 073 DSCN-0568a

20. Place a friction washer between the pad link and lower hinge bracket (Fig. 074).

Fig. 074 DSCN-0571a

21. Insert a carriage bolt through the pad link assembly (Fig. 075).

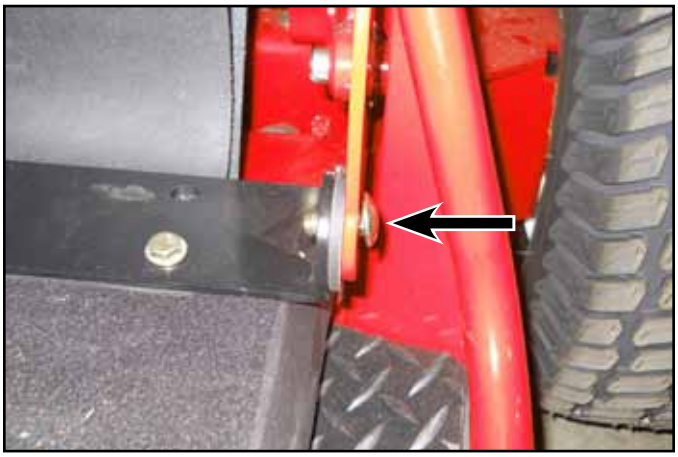


Fig. 075 DSCN-0572a

22. Position the spacer over the carriage bolt and into the friction washer and lower hinge bracket (Fig. 076).

Fig. 076 DSCN-0576a

23. Secure the assembly with a nut and washer (Fig. 077).

Fig. 077 DSCN-0577a

24. Repeat steps 19 through 23 on the other side of the machine.

25. Secure the brake assembly to the frame using four sets of bolts and flange nuts (Fig. 078).

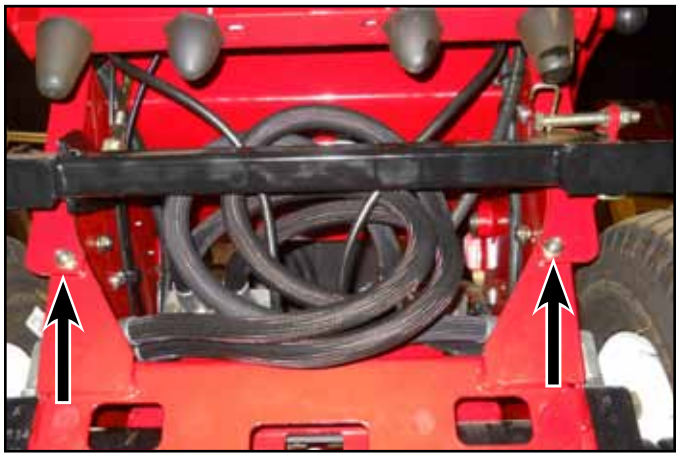


Fig. 078 DSCN-3965a

26. Secure the brake link rod to the brake assembly using the hairpin cotter and clevis pin (Fig. 079).

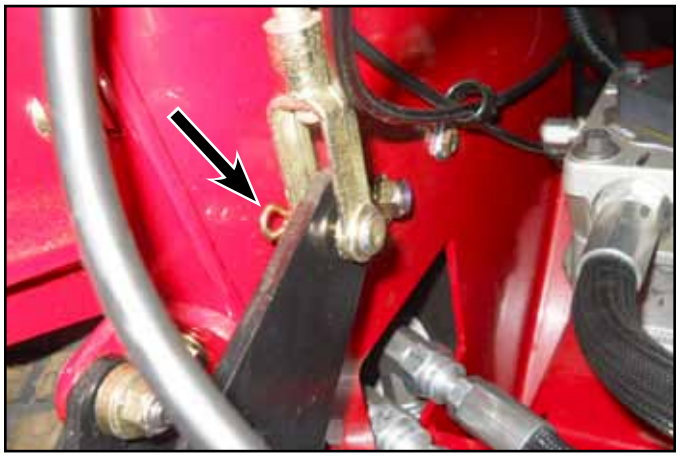


Fig. 079 DSCN-3962a

Engine Base Replacement

Engine Base Removal

1. Remove the negative (black) battery cable from the battery, then remove the positive (red) cable (Fig. 080).

Fig. 080 DSCN-3989a

2. Remove the two sets of hold down bolts and wing nuts securing the battery cover (Fig. 081).

Fig. 081 DSCN-4011a

3. Remove the deck belt extension spring from the deck anchor post, then remove the belt from around the clutch pulley (Fig. 082).

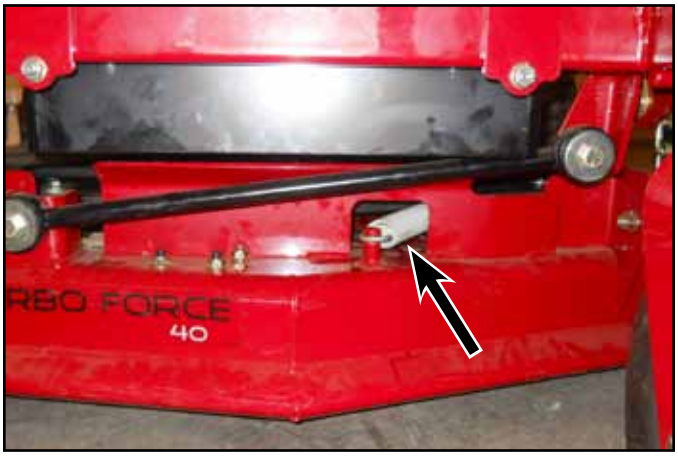


Fig. 082 DSCN-3995a

4. Remove the bolt, washer, and nut securing the front strut to the carrier frame (Fig. 083).

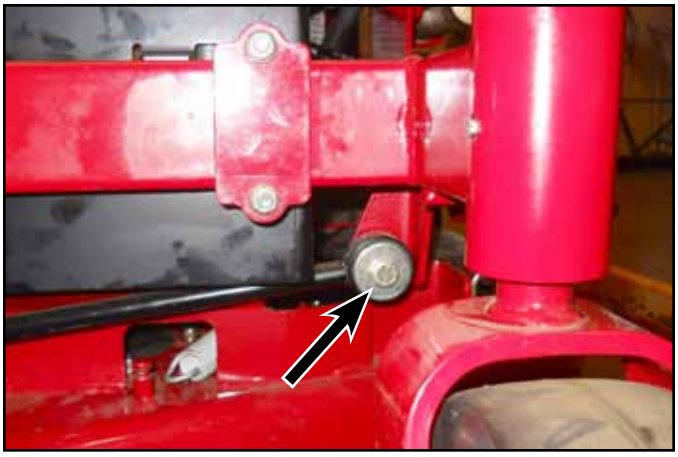


Fig. 083 DSCN-3998a

5. Remove the four carriage bolts and nuts securing the muffler guard to the carrier frame (Fig. 084).

Fig. 084 DSCN-4000a

6. Loosen the cable clamps securing the choke and throttle cables to the engine throttle plate, then remove the “Z” bend of the cables from the engine control arms (Fig. 085).

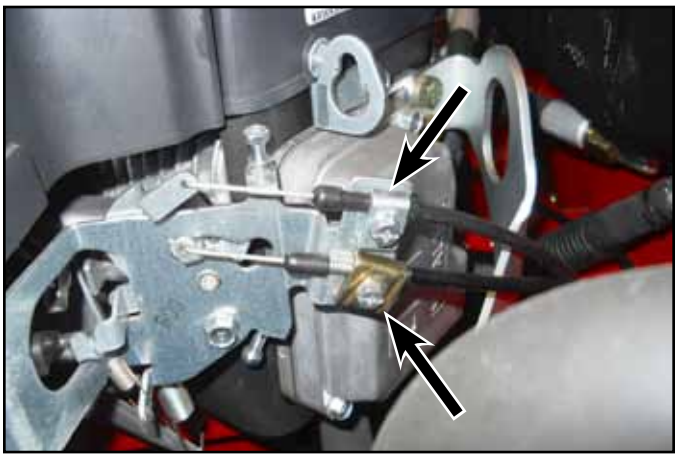


Fig. 085 DSCN-4002a

7. Remove the two sets of bolts, washers, and flange nuts securing the RH and LH muffler mount brackets to the muffler (Fig. 086).

Fig. 086 DSCN-4057a

8. Remove the four sets of nuts and lock washers securing the muffler pipes to the engine (Fig. 087).

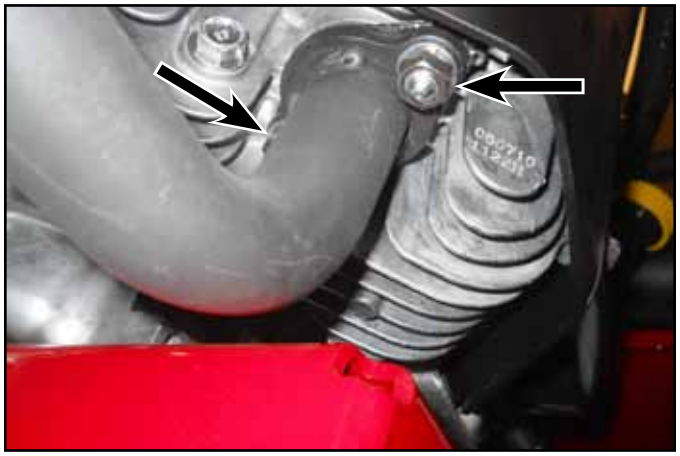


Fig. 087 DSCN-4061a

9. Remove the cable tie securing the choke and throttle cables to the oil drain (Fig. 088).

Fig. 088 DSCN-2683a

10. Raise the rear of the machine so the underside can be accessed.

11. Remove the four sets of bolts, washers, and nuts securing the rear struts to engine base and carrier frame (Fig. 089).

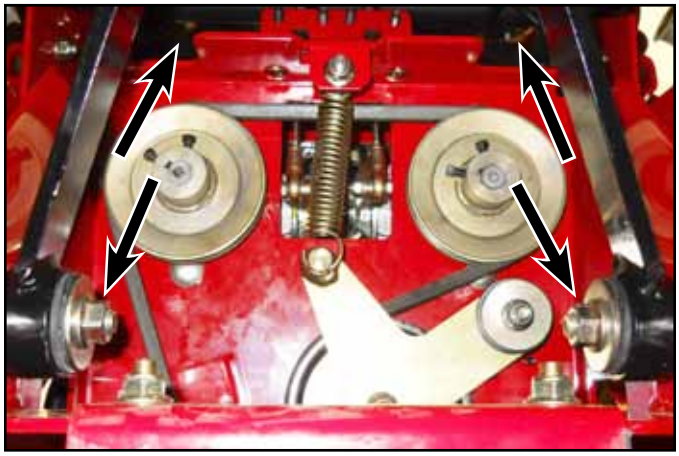


Fig. 089 DSCN-4215a

12. Lower the machine.

13. Place two boards under the mower deck, then lower the deck onto the boards (Fig. 090).

Fig. 090 DSCN-3990a

14. Remove the four sets of bolts and nuts securing the deck lift chains to the mower deck (Fig. 091).

Fig. 091 DSCN-4179a

15. Position an oil pan under the reservoir. Move the hose clamp from the reservoir tank fitting, then remove the low pressure return hose from the base of the reservoir (Fig. 092).

Fig. 092 DSCN-4004a

16. Remove the low pressure suction hose from the filter outlet fitting (Fig. 093).

Fig. 093 DSCN-4007a

17. Slide the hose clamp off the fuel line where it connects to the fuel pump (Fig. 094).

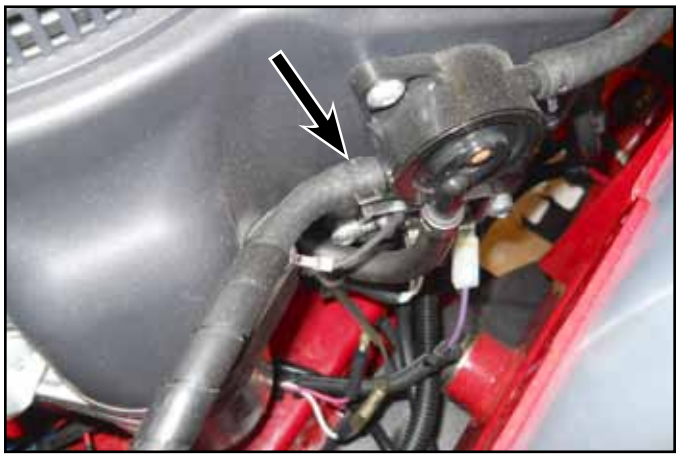


Fig. 094 DSCN-4009a

18. Remove the fuel line from the fuel pump. Drain the fuel into a suitable container .

19. Remove the violet wire from the voltage regulator (Fig. 095).

Fig. 095 DSCN-4012a

20. Unplug the pink wire from the green fuel solenoid wire (Fig. 096).

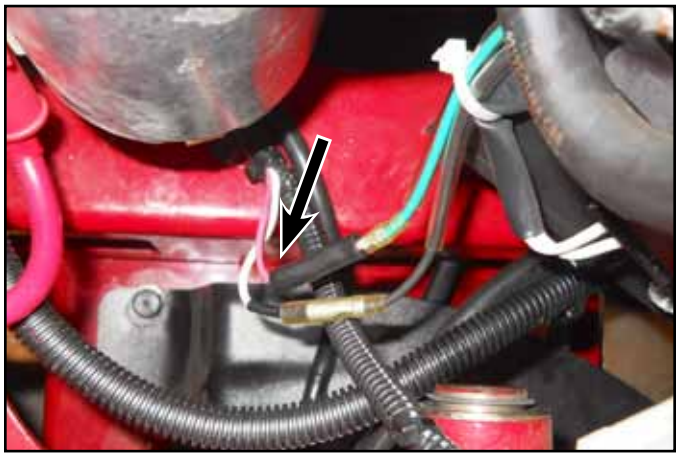


Fig. 096 DSCN-4015a

21. Unplug the white wire from the black magneto wire (Fig. 097).

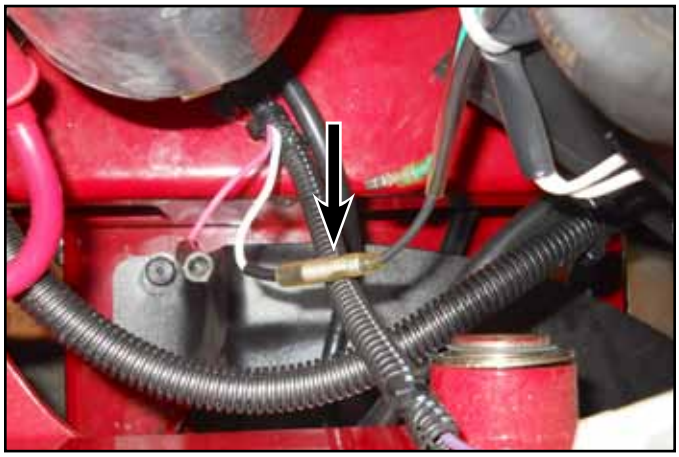


Fig. 097 DSCN-4017a

22. Remove the bolt and washer securing the ground wires to the engine block (Fig. 098).

Fig. 098 DSCN-4026a

23. Remove the green and blue bullet connectors from the two small studs on the solenoid (Fig. 099).

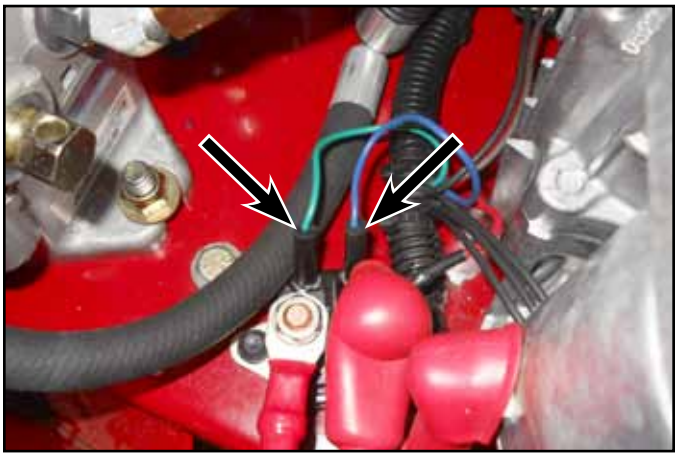


Fig. 099 DSCN-4028a

24. Move the terminal cover off the positive cable coming from the battery, then remove the nut and lock washer securing the positive battery cable and red wire eyelet to the solenoid (Fig. 100).

Fig. 100 DSCN-4030a

25. Unplug the clutch wires from the wiring harness, then push the grommet and the electrical plug connector down through the engine base (Fig. 101).

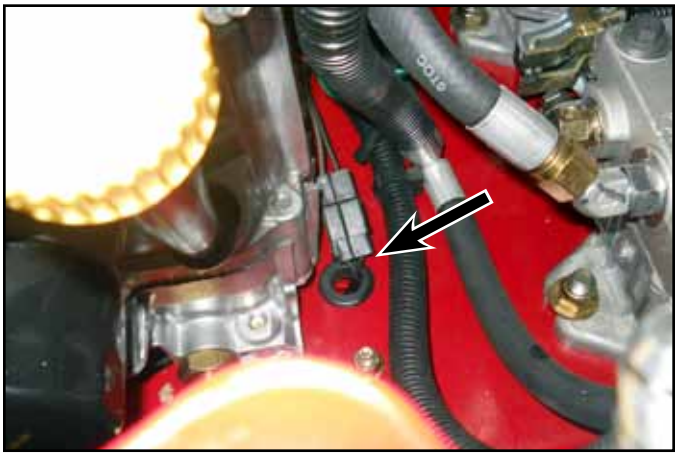


Fig. 101 DSCN-4035a

26. Remove the two wire harness clamps securing the wire harness to the engine base. They are located next to the clutch connector and under the starter.

27. Raise the rear of the machine just enough to remove the tires.

28. Thoroughly clean the area around the hydraulic fittings, then mark the motor fittings and hoses to ensure they are returned to their original location upon assembly (Fig. 102).

Fig. 102 DSCN-4043a

29. Remove the four high pressure hoses from the motors. Cap the hose ends and motor fittings to prevent debris from entering the system (Fig. 103).

Fig. 103 DSCN-4046a

30. Thoroughly clean the area around the hydraulic fittings, then mark the pumps and fittings to ensure they are returned to their original location upon assembly (Fig. 104).

Fig. 104 DSCN-4039a

31. Remove the four high pressure hoses from the pumps. Cap the hose ends and pump fittings to prevent debris from entering the system (Fig. 105).

Fig. 105 DSCN-4054a

32. Remove the bolts and nuts securing the control cable ends to the pump control arms (Fig. 106).

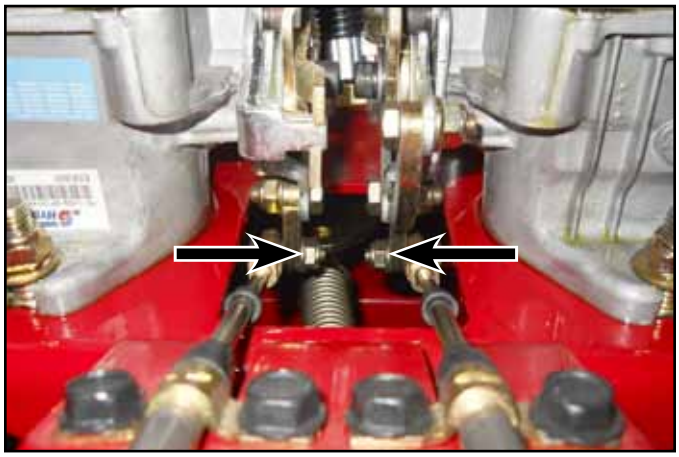


Fig. 106 DSCN-4048a

33. Remove the carriage bolts and flange nuts securing the cable clamp bracket to the engine base (Fig. 107).

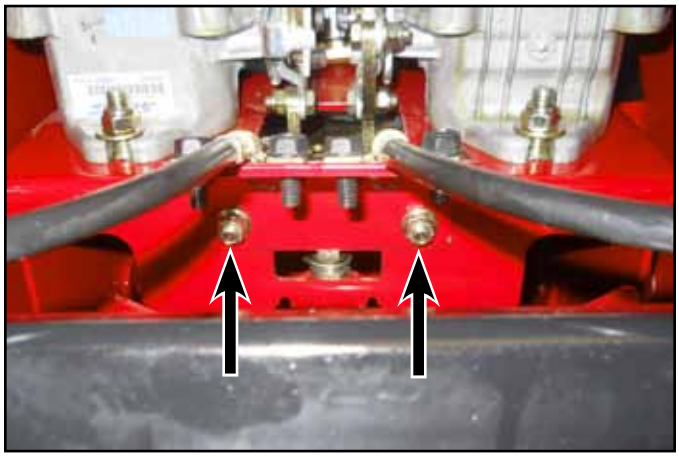


Fig. 107 DSCN-4050a

34. Using two people or a hoist, lift the rear of the carrier frame and tower assembly. Walk the carrier frame and tower assembly forward over the engine and deck assembly (Fig. 108).

Fig. 108 DSCN-4067a

35. Remove the extension spring from the pump idler assembly and anchor bolt (Fig. 109).

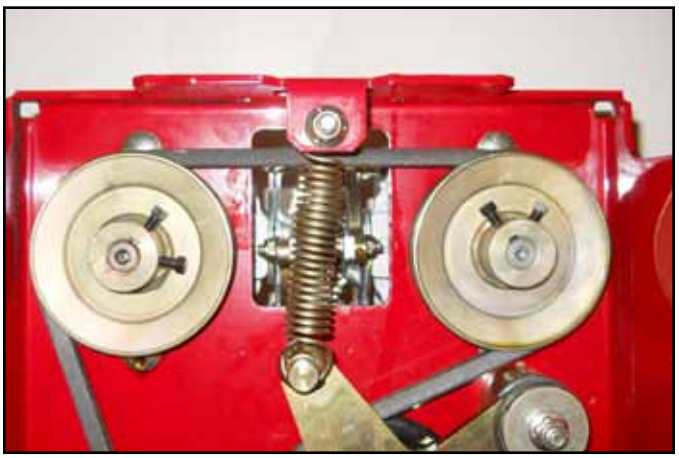


Fig. 109 DSCN-4070a

36. Remove the pump drive belt.

37. Remove the bolt and nut securing the idler arm assembly to the engine base (Fig. 110).

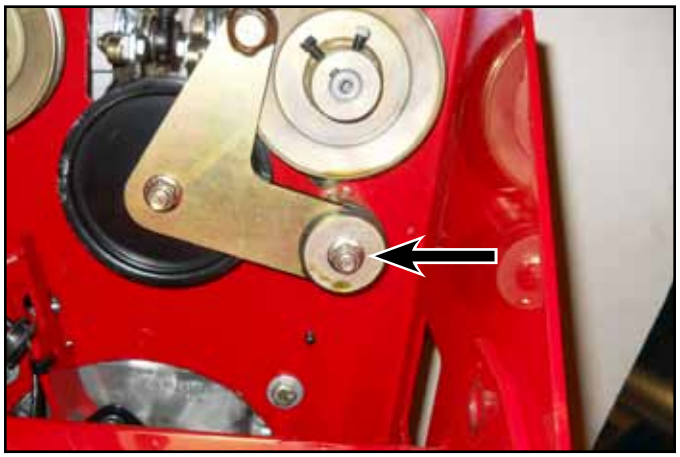


Fig. 110 DSCN-4075a

38. Remove the nut securing the spring anchor post to the engine base (Fig. 111).

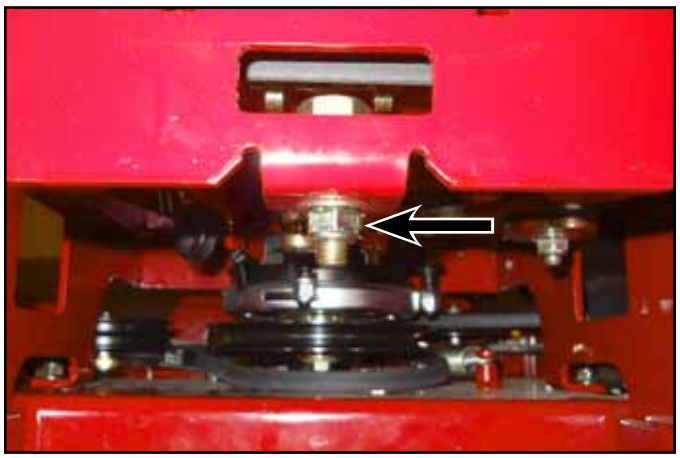


Fig. 111 DSCN-4072a

39. Remove the two set screws securing the pump pullies to the pump output shafts. Remove the pump pullies, then remove the keys from the pump shaft keyways (Fig. 112).

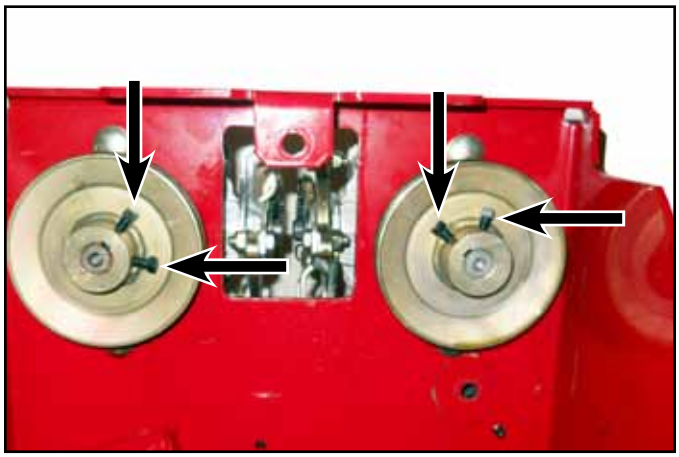


Fig. 112 DSCN-4080a

40. Remove the four sets of carriage bolts, washers, and nuts securing the pumps to the engine base (Fig. 113).

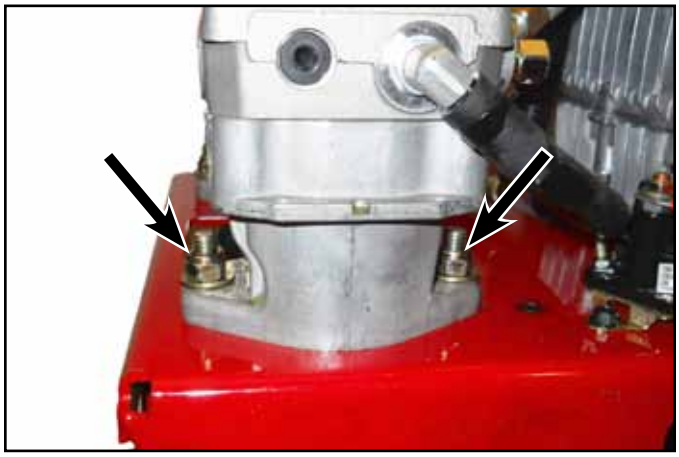


Fig. 113 DSCN-4079a

41. Remove both pumps, with hoses attached, from the engine base (Fig. 114).

Fig. 114 DSCN-4083a

42. Remove the nut and lock washer securing the red starter cable to the solenoid (Fig. 115).

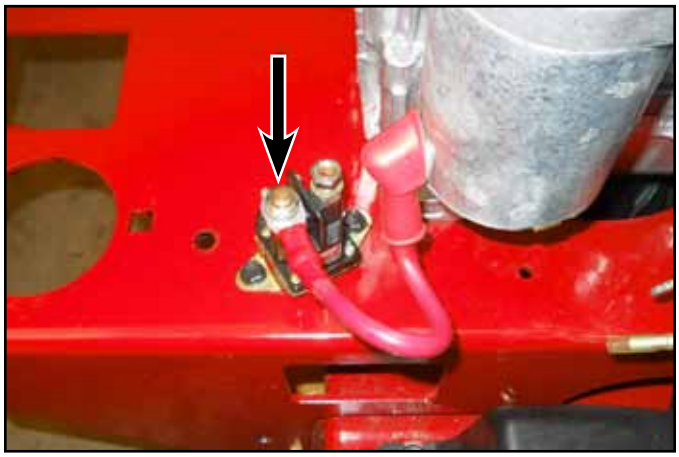


Fig. 115 DSCN-4084a

43. Remove the two thread forming screws securing the solenoid to the engine base (Fig. 116).

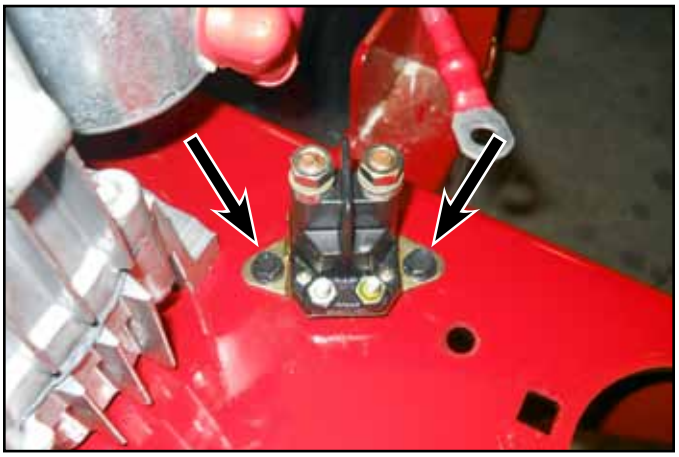


Fig. 116 DSCN-4087a

44. Remove the cable tie securing the clutch wires to the clutch stop (Fig. 117).

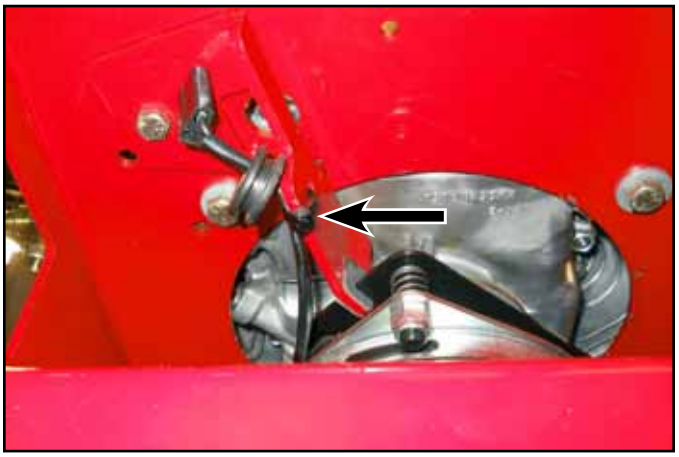


Fig. 117 DSCN-4088a

45. Remove the bolt and nut securing the clutch stop to the engine base (Fig. 118).

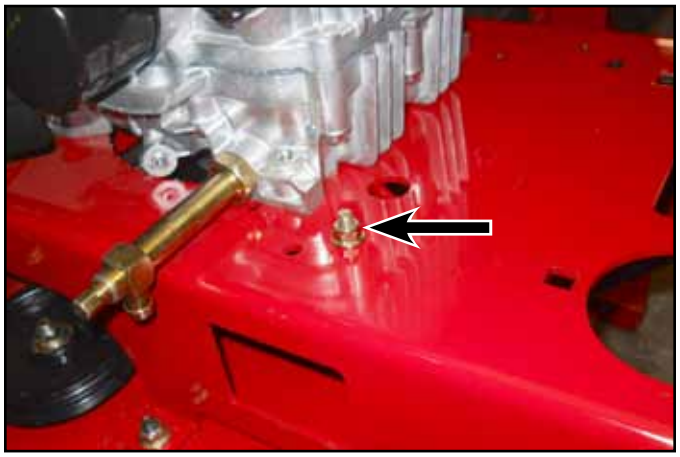


Fig. 118 DSCN-4091a

46. Secure a lift to the engine to support the engine and engine base (Fig. 119).

Fig. 119 DSCN-4093a

47. Remove the two sets of carriage bolts and flange nuts securing the engine base to the rear of the deck (Fig. 120).

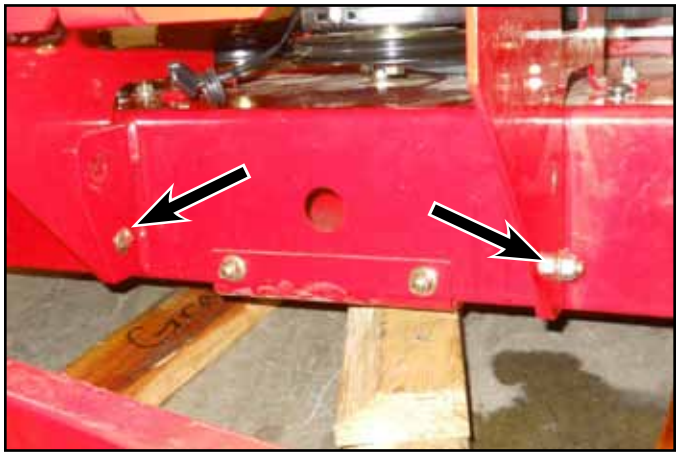


Fig. 120 DSCN-4098a

48. Remove the two flange nuts securing the sides of the engine base to the deck (Fig. 121).

Note: Do not remove the thread forming screws from the deck.

Fig. 121 DSCN-4101a

49. Using the hoist, raise the engine and engine base from the mower deck.

50. Remove the four sets of bolts and Belleville washers securing the engine to the engine base. The engine base is now free to be removed. (Fig. 122).

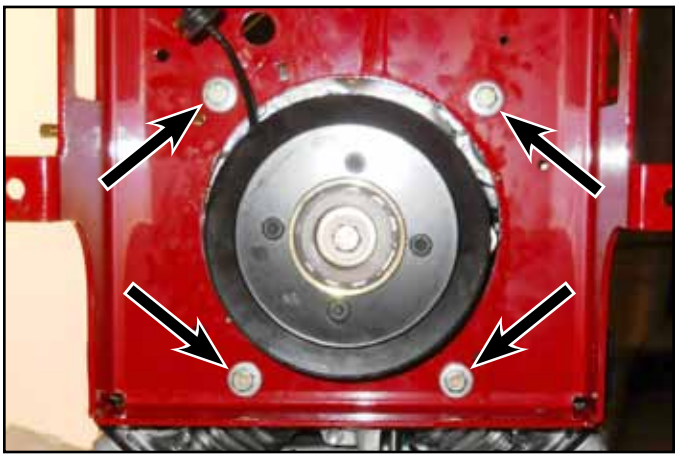


Fig. 122 DSCN-4108a

Engine Base Installation

1. Secure the engine to the engine base using four bolts and Belleville washers. Torque bolts to 30-35 ft-lbs (40.6-47.4 Nm) (Fig. 123).

Note: The crown of the Belleville washer must face the head of the bolt.

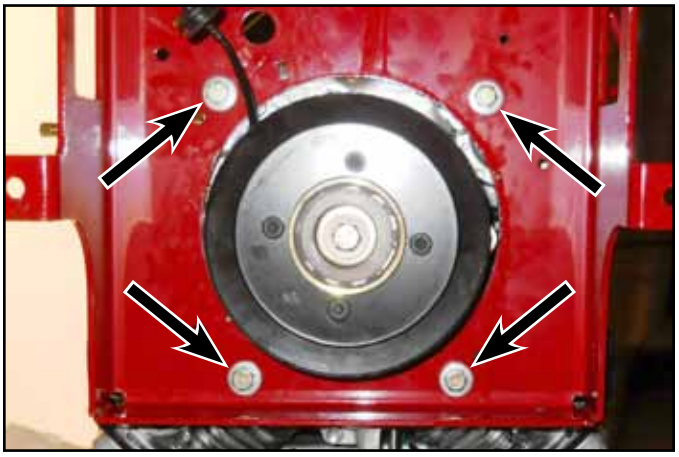


Fig. 123 DSCN-4108a

2. Lower the engine and engine base onto the mower deck.

3. Secure the sides of the engine base to the mower deck using the flange nuts (Fig. 124).

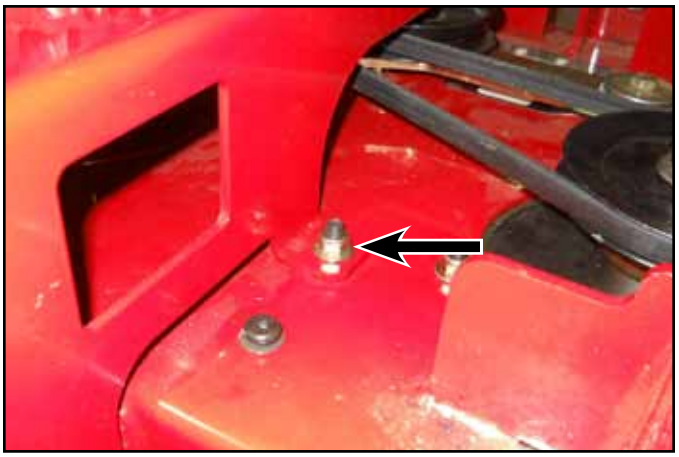


Fig. 124 DSCN-4101a

4. Secure the rear of the engine base to the rear of the deck using two carriage bolts and flange nuts (Fig. 125).

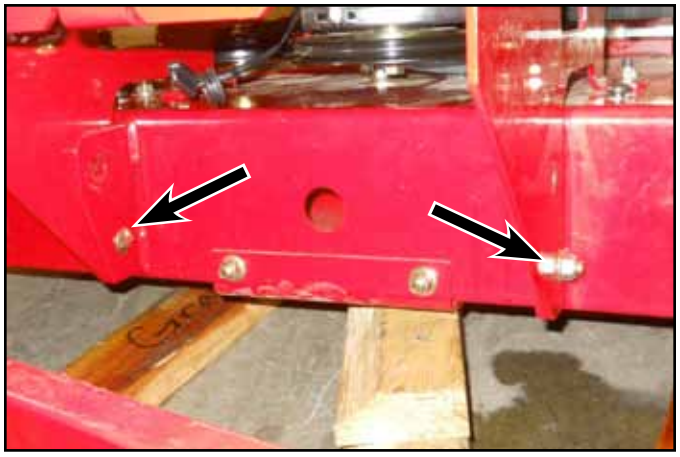


Fig. 125 DSCN-4098a

5. Secure the clutch stop to the engine base using a bolt and flange nut (Fig. 126).

Fig. 126 DSCN-4112a

Note: The clutch stop must be nested into the slot on the clutch (Fig. 127).

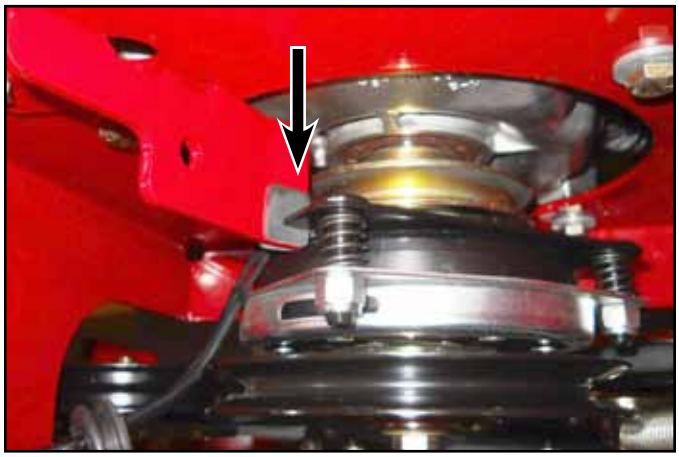


Fig. 127 DSCN-4114a

6. Push the clutch connector up through the engine base and position the grommet into the engine base hole (Fig. 128).

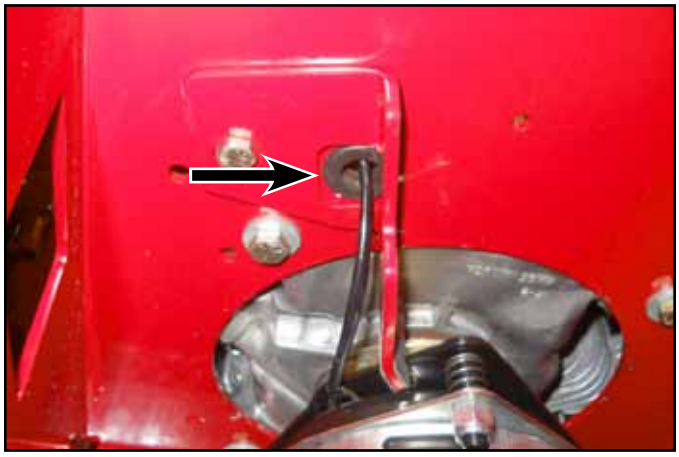


Fig. 128 DSCN-4117a

7. Secure the clutch wires to the clutch stop using a cable tie (Fig. 129).

Fig. 129 DSCN-4118a

8. Place the pivot bolt with washer down through the engine base (Fig. 130).

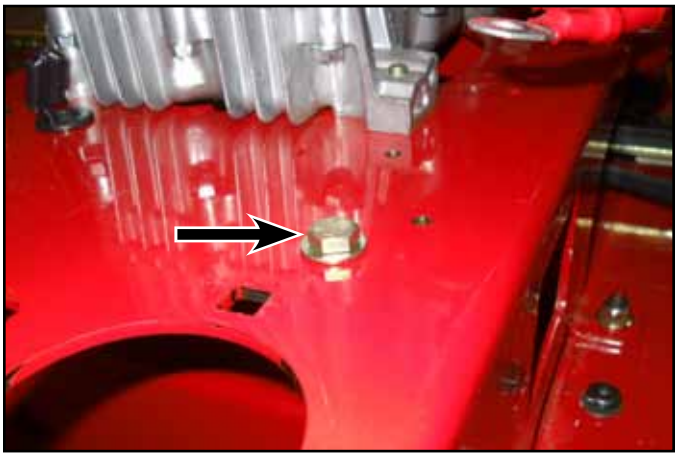


Fig. 130 DSCN-4120a

9. Place the large spacer, one friction composite washer and bushing onto the pivot bolt (Fig. 131).

Fig. 131 DSCN-4124a

10. Place the idler assembly, friction washer, then steel washer onto the pivot bolt (Fig. 132).

Fig. 132 DSCN-4126a

11. Secure the idler assembly with a flange nut (Fig. 133).

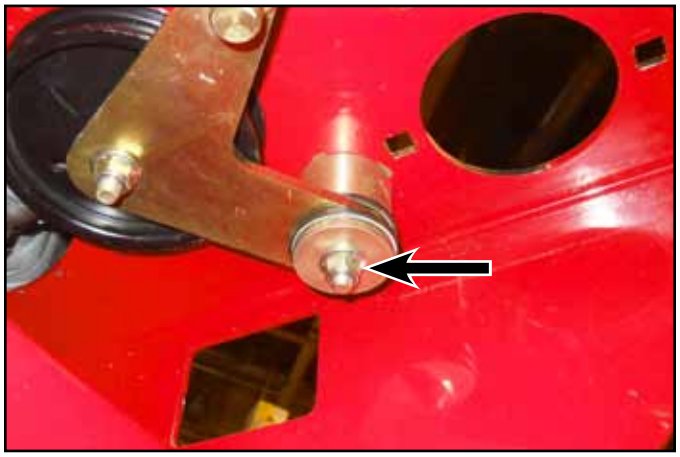


Fig. 133 DSCN-4129a

12. Secure the pumps to the engine base using carriage bolts, washers, and nuts (Fig. 134).

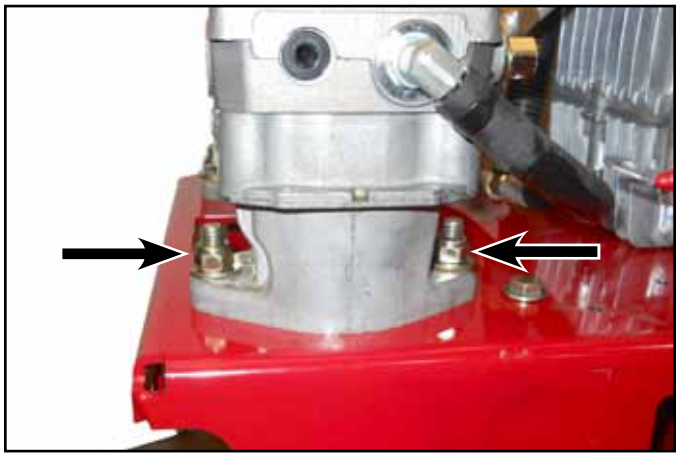


Fig. 134 DSCN-4132a

13. Install the key into the keyway on the pump shaft (Fig. 135).

Fig. 135 DSCN-4139a

14. Apply anti-seize to the pump shaft (Fig. 136).

Fig. 136 DSCN-4146a

15. Apply thread-locking material to the threads of the pump pulley set screws (Fig. 137).

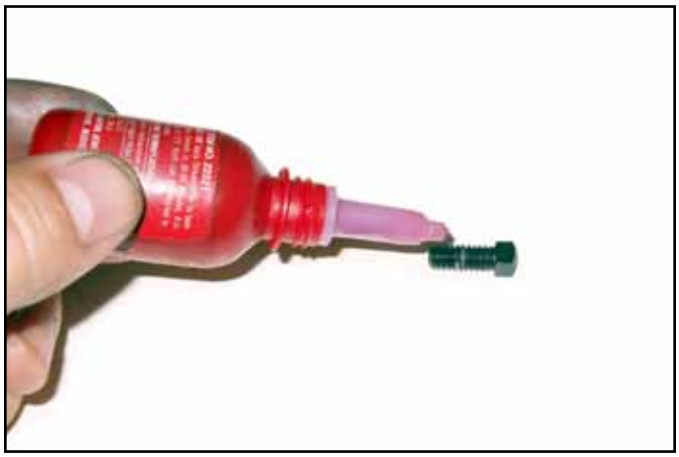


Fig. 137 DSCN-4142a

16. Install the set screws into the pump pulley (Fig. 138).

Note: Ensure the set screws have not protruded into the center of the pulley hub.

Fig. 138 DSCN-4150a

17. Install the pulley onto the pump shaft. The base of the pulley hub should be flush with the base of the pump shaft. Secure the position with the set screws (Fig. 139).

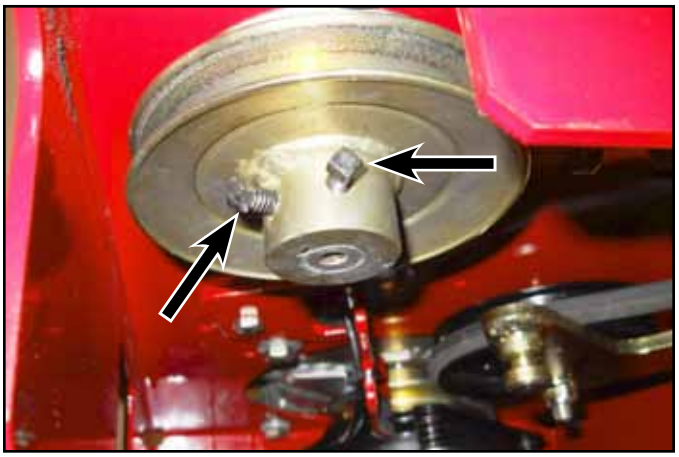


Fig. 139 DSCN-4159a

18. Position the pump drive belt around the engine, idler and pump pulleys (Fig. 140).

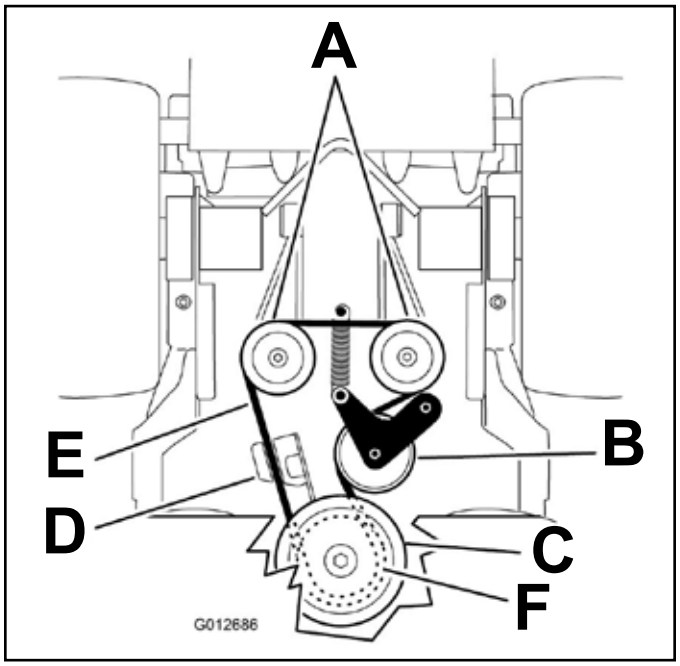


Fig. 140 fig. 67 G012686

A. Hydraulic pumps
B. Idler pulley
C. Clutch pulley
D. Clutch retainer
E. Pump drive belt
F. Pump drive pulley

19. Install the extension spring from the idler bracket to the spring anchor (Fig. 141).

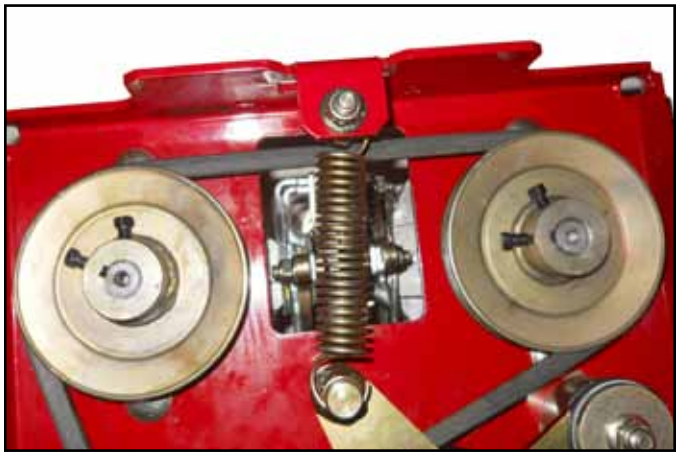


Fig. 141 DSCN-4155

20. Secure the solenoid to the engine base using the two thread forming screws (Fig. 142).

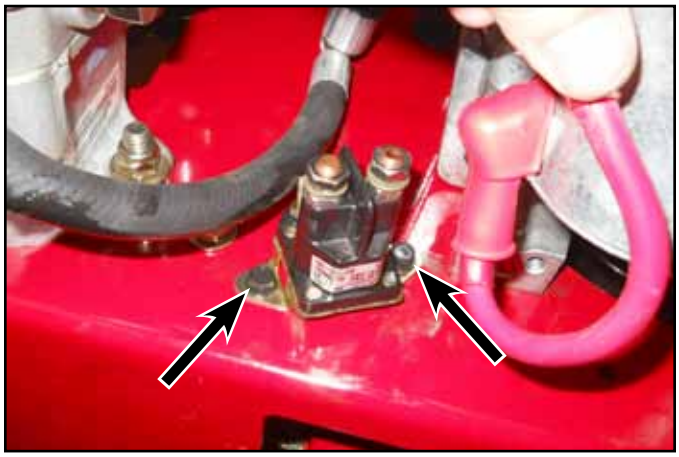


Fig. 142 DSCN-4157a

21. Secure the red cable from the starter to the solenoid post (Fig. 143).

Fig. 143 DSCN-4163a

22. Using two people or a hoist, lift the rear of the carrier frame and tower assembly. Walk the carrier frame and tower assembly rearward over the engine and deck assembly (Fig. 144).

Fig. 144 DSCN-4067a

23. Position exhaust gaskets on the exhaust manifold (Fig. 145).

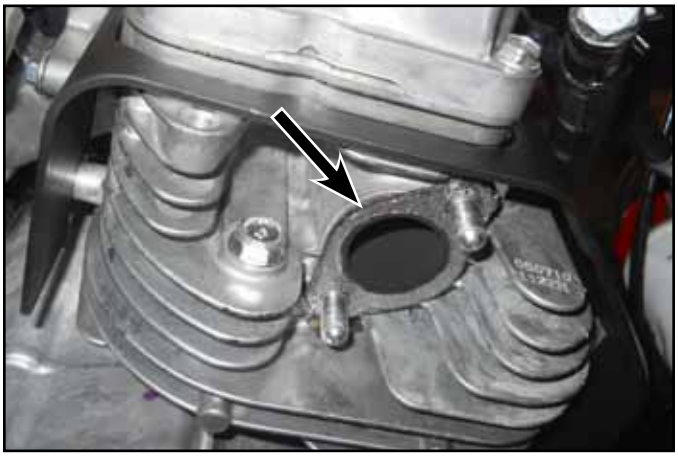


Fig. 145 DSCN-4173a

24. Secure the muffler to the exhaust manifold using nuts and lock washers. Torque to 21 ± 2 ft-lbs (28.4 ± 2.7 Nm) (Fig. 146).

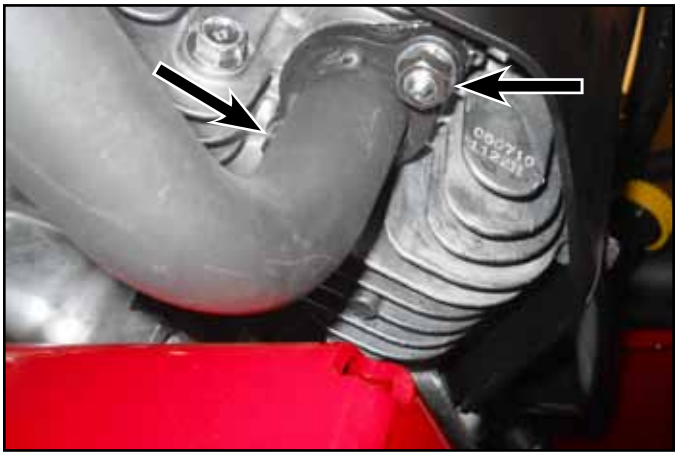


Fig. 146 DSCN-4061a

25. Secure the muffler to the RH and LH muffler brackets using the bolts, thick washers, and flange nuts (Fig. 147).

Fig. 147 DSCN-4178a

26. Secure the deck to the lift chains using the bolts and flange nuts (Fig. 148).

Fig. 148 DSCN-4179a

27. Secure the front strut to the carrier frame using a bolt, large washer, and flange nut (Fig. 149).

Fig. 149 DSCN-4183a

28. Route the belt around the deck and clutch pulleys (Fig. 150) 40” Belt Routing.

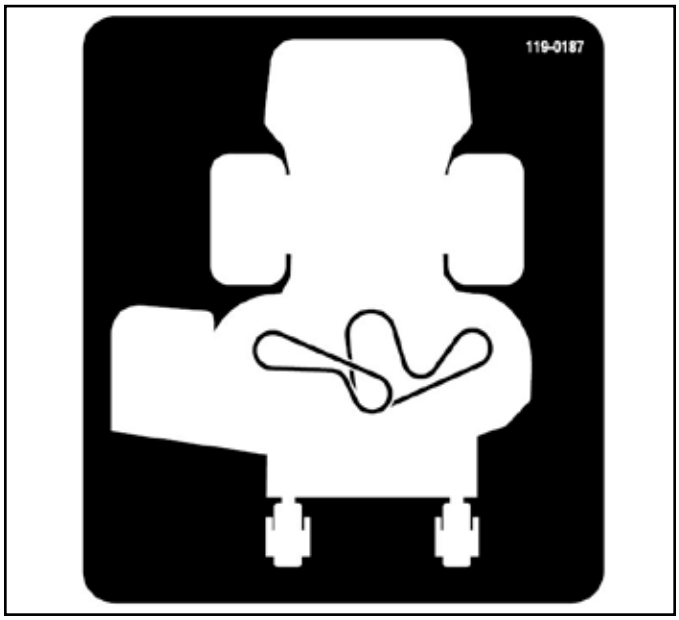


Fig. 150 decal 119-0187

(Fig. 151) 36” Belt Routing

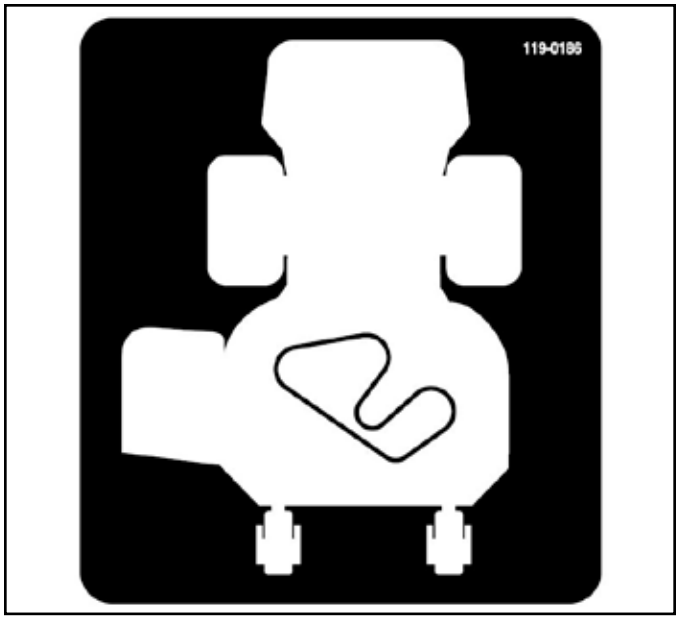


Fig. 151 decal 119-0186

29. Install the extension spring to the idler bracket and spring anchor (Fig. 152).

Fig. 152 DSCN-4185a

30. Hook the “Z” bend of the throttle cable into the throttle control lever and loosely clamp the outer housing of the throttle cable with the cable clamp (Fig. 153).

Fig. 153 DSCN-2672a

31. Move the throttle lever to the “Fast” position (Fig. 154).

Fig. 154 DSCN-2674a

32. With the engine throttle control lever in the “Fast” position, pull the slack from the cable jacket and tighten the throttle cable clamp (Fig. 155).

Fig. 155 IMG-0576a

33. Hook the “Z” bend of the choke cable into the choke control lever and loosely clamp the outer housing of the choke cable with the cable clamp (Fig. 156).

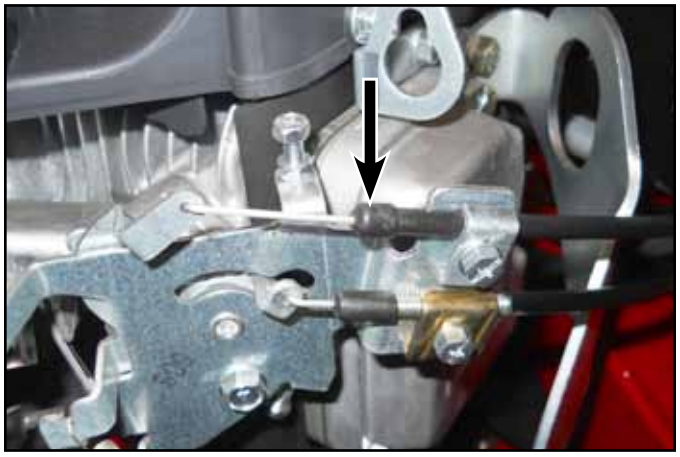


Fig. 156 DSCN-2676a

34. Push the choke knob in so it is in the “Open” position (Fig. 157).

Fig. 157 DSCN-2677a

35. While holding the engine choke control lever in the “Open” position, pull the slack from the cable jacket and tighten the choke cable clamp (Fig. 158).

Fig. 158 IMG-0584a

36. Secure the throttle and choke cable to the oil drain assemble using a cable tie (Fig. 159).

Fig. 159 DSCN-2683a

37. Secure the low pressure return line to the reservoir fitting using the hose clamp (Fig. 160).

Fig. 160 DSCN-4187a

38. Secure the low pressure suction line to the filter fitting (Fig. 161).

Fig. 161 DSCN-4190a

39. Position the muffler guard assembly and loosely install the four carriage bolts, two mounting guard brackets and nuts (Fig. 162).

Fig. 162 DSCN-2678a

40. Make sure the muffler exhaust is centered in the muffler guard assembly, then tighten all four bolts and nuts. Torque the nuts to 19 ± 2 ft-lbs (25.76 ± 2.7 Nm) (Fig. 163).

Fig. 163 DSCN-2680a

41. Secure the wire harness to the engine base using the wire harness plastic anchors.

42. Connect the clutch wire harness to the wire harness (Fig. 164).

Fig. 164 DSCN-2686a

43. Install the battery ground cable and the wiring harness ground wire to the engine block (Fig. 165).

Fig. 165 DSCN-2688a

44. Secure the battery cable and red wire eyelet to the solenoid using a lock washer and nut. Torque the nut to 35 in-lbs. (4 Nm) (Fig. 166).

Fig. 166 DSCN-4030a

45. Connect the green and blue bullet connectors to the two small studs on the solenoid (Fig. 167).

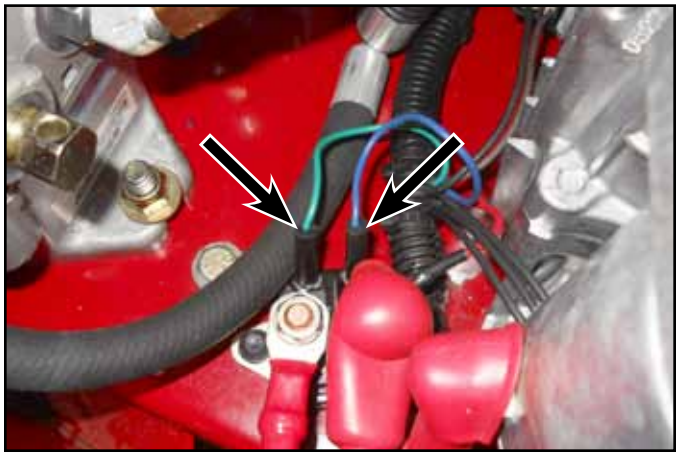


Fig. 167 DSCN-4028a

46. Connect the white wire to the black magneto wire (Fig. 168).

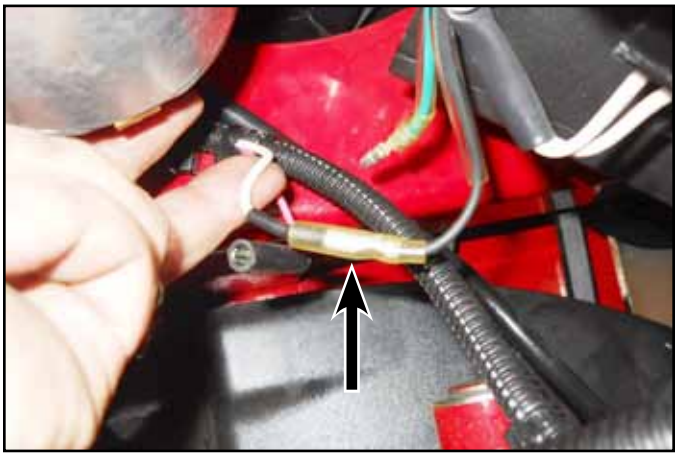


Fig. 168 DSCN-2691a

47. Connect the pink wire to the green fuel solenoid wire (Fig. 169).

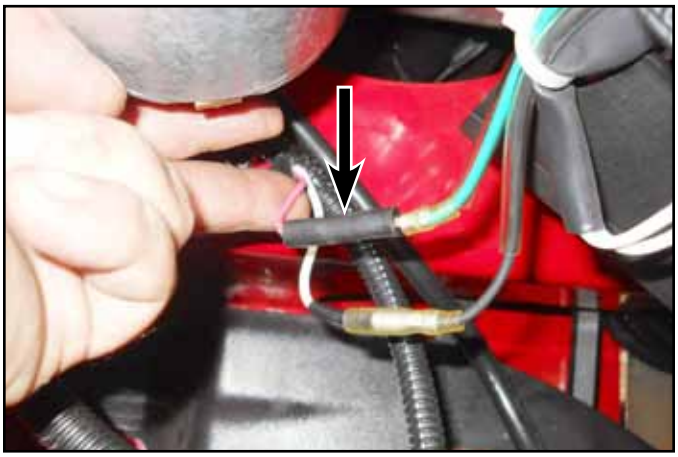


Fig. 169 DSCN-2692a

48. Connect the violet wire to the voltage regulator (Fig. 170).

Fig. 170 DSCN-2695a

49. Secure the fuel line to the fuel pump using the hose clamp (Fig. 171).

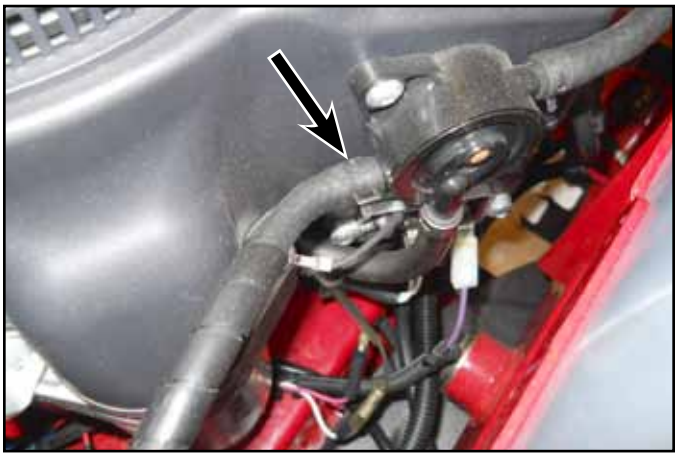


Fig. 171 DSCN-4009a

50. Secure the cable clamp bracket to the engine base using carriage bolts and flange nuts (Fig. 172).

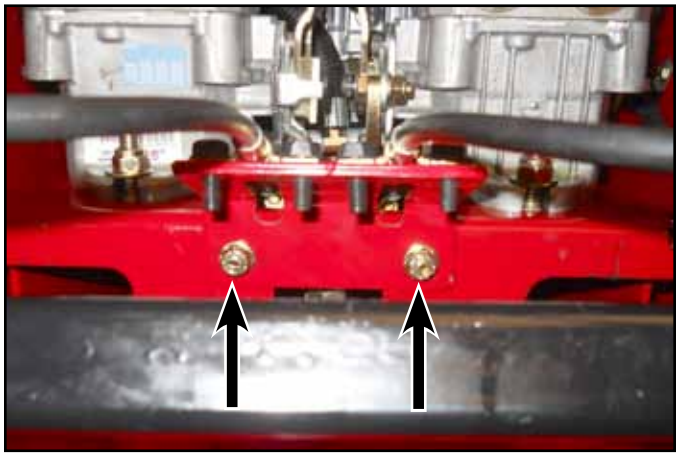


Fig. 172 DSCN-4193a

51. Secure the control cables to the pump link using the bolts and nuts (Fig. 173).

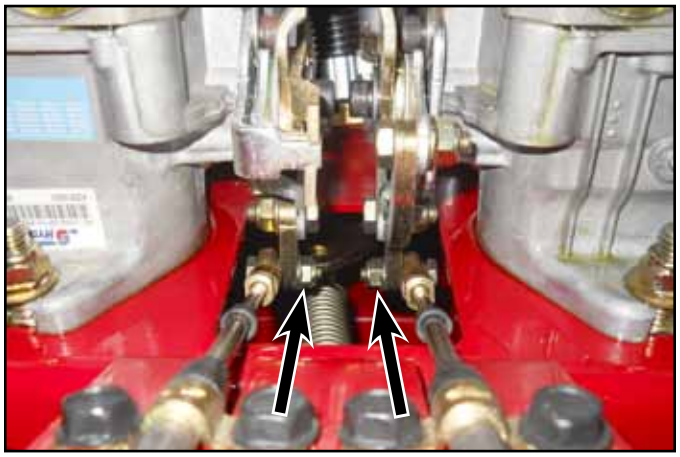


Fig. 173 DSCN-4047a

52. Secure the rear struts to the frame and engine base using the bolts, large washers, and flange nuts (Fig. 174).

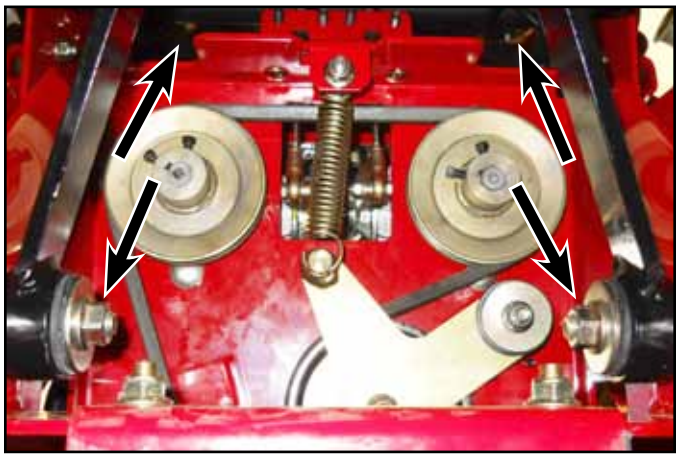


Fig. 174 DSCN-4215a

53. Secure the high pressure hoses to the pump (Fig. 175).

Note: Ensure the hose is installed to the correct wheel motor fitting by using the identification markings. If installed incorrectly, wheel direction will be reversed.

Fig. 175 DSCN-4222a

54. Loop the hoses around the control cables (Fig. 176).

Fig. 176 DSCN-4224a

55. Install the hoses to the wheel motor (Fig. 177).

Note: Ensure the hose is installed to the correct wheel motor fitting by using the identification markings. If installed incorrectly, wheel direction will be reversed.

Fig. 177 DSCN-4227a

56. Install the high pressure hoses to the opposite pump (Fig. 178).

Fig. 178 DSCN-4229a

Note: Ensure the hoses are installed to the correct pump fittings by using the identification markings. If installed incorrectly, wheel direction will be reversed. Loop the hoses around the control cables and opposite side pump hoses (Fig. 179).

Fig. 179 DSCN-4231a

57. Install the hoses to the wheel motor fittings (Fig. 180).

Note: Ensure the hoses are installed to the correct wheel motor fittings by using the identification markings. If installed incorrectly, wheel direction will be reversed.

Fig. 180 DSCN-4236a

58. Position the battery on the battery tray. Using the bolt nut and washer, secure the positive battery cable to the battery. Using the bolt nut and washer, secure the negative battery cable to the battery (Fig. 181).

Fig. 181 DSCN-2698a

59. Install the battery cover with the two hold down bolts and wing nuts (Fig. 182).

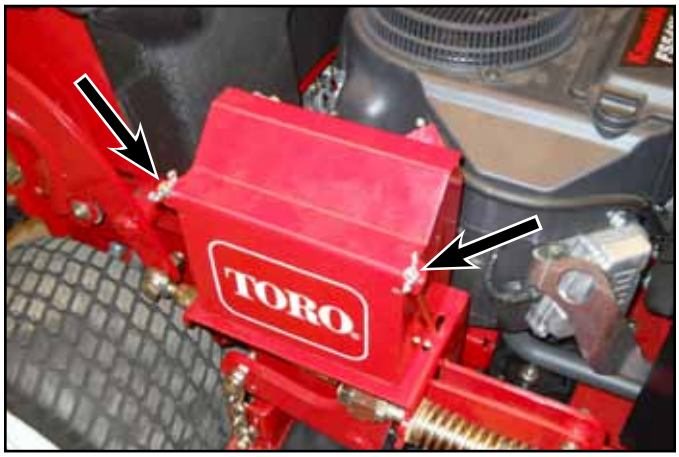


Fig. 182 DSCN-2700a

60. Install both tires.

61. Bleed the hydraulic system. See “Bleeding the Hydraulic System” on page 6-35.

THIS PAGE INTENTIONALLY LEFT BLANK.

LH Motion Control Lever Replacement

LH Motion Control Lever Removal

1. Remove the shoulder bolt and flange nut securing the end of the control cable to the LH motion control lever (Fig. 183).

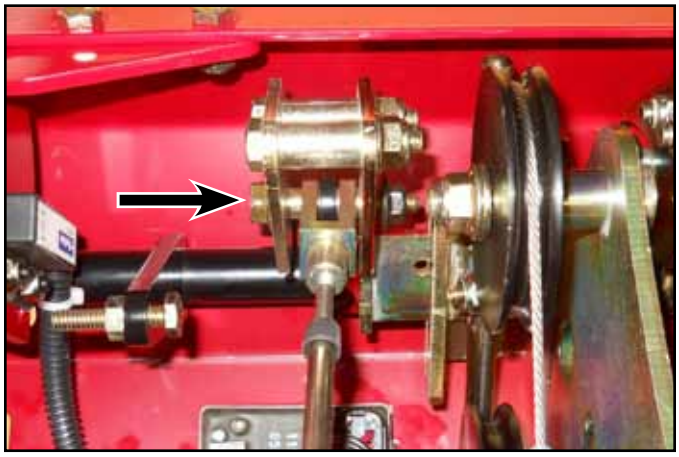


Fig. 183 DSCN-3570

2. Remove the two bolts securing the pivot shaft inside the LH motion control lever. One bolt is located on the outside of the control tower. The second is located at the opposite end of the control handle (Fig. 184).

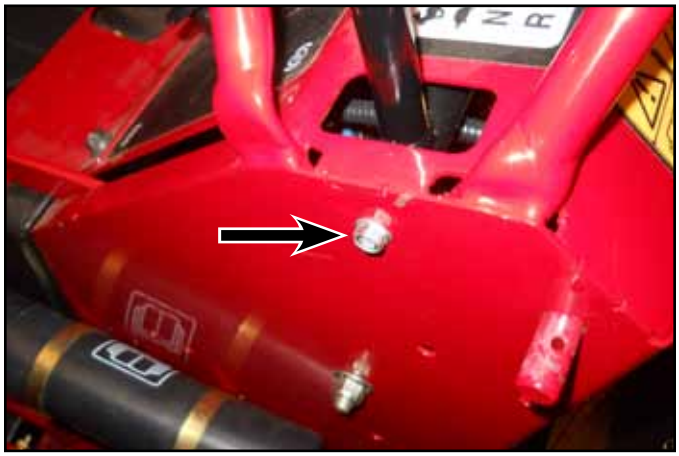


Fig. 184 DSCN-3573

Note: Only one bolt will typically back out due to both threading into the same inner rod. A #4 easy-out can be used to secure the pivot rod. The bolt on the opposite side can then be removed (Fig. 185).

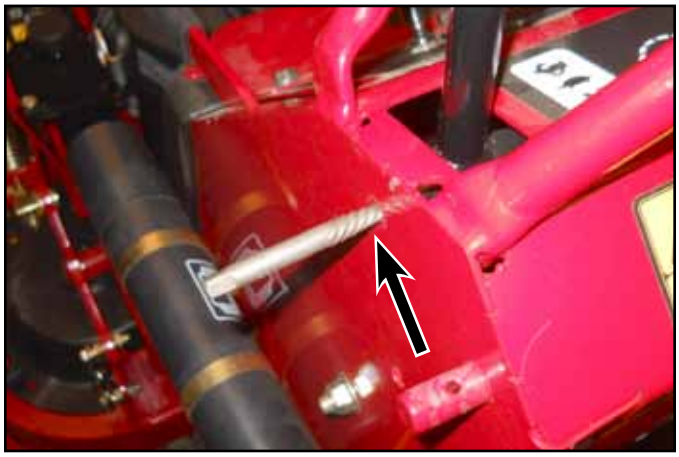


Fig. 185 DSCN-3584a

3. Remove the LH control lever assembly from the control tower.

4. Remove the pivot rod from the motion control handle (Fig. 186).

Fig. 186 DSCN-3591a

5. Remove the bolt and jam nut from the handle assembly (Fig. 187).

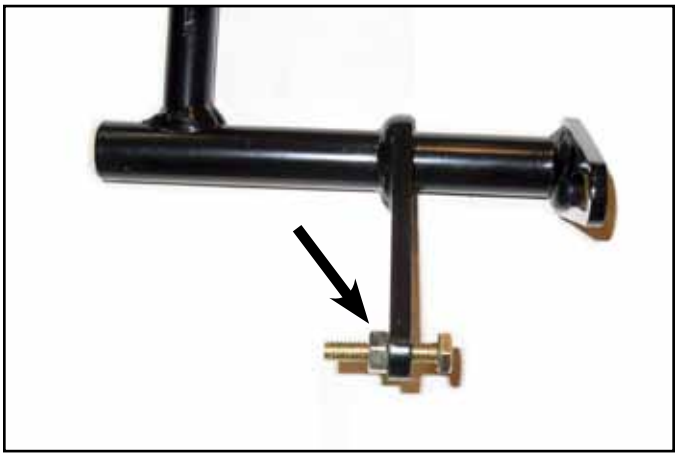


Fig. 187 DSCN-3595a

6. Remove the two plastic bearings from the ends of the control handle (Fig. 188).

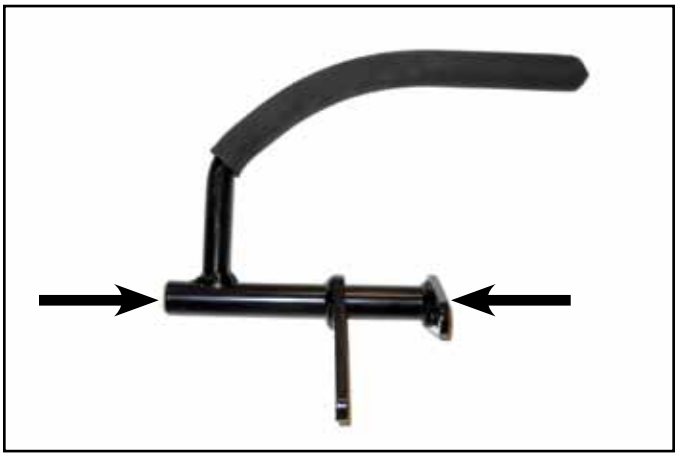


Fig. 188 DSCN-3597a

LH Motion Control Lever Installation

1. Install a plastic bearing into each end of the control handle (Fig. 189).

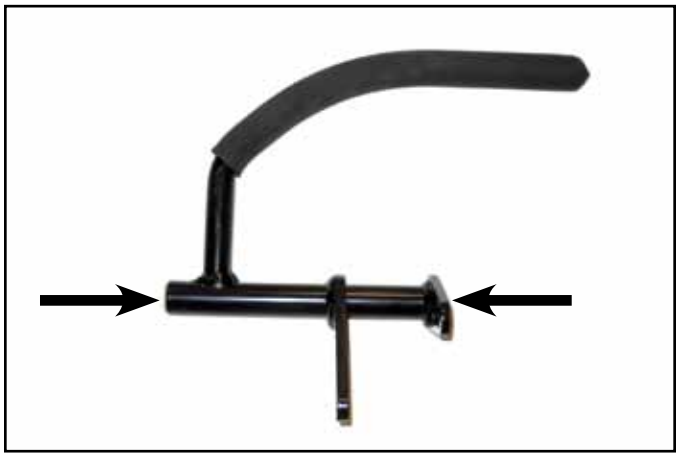


Fig. 189 DSCN-3597a

2. Loosely install the bolt and jam nut to the handle assembly (Fig. 190).

Note: The nut will be tightened in a later step.

Fig. 190 DSCN-3599a

3. Install the pivot rod into the center of the control handle (Fig. 191).

Fig. 191 DSCN-3591a

4. Secure the control handle assembly in the control tower using two bolts (Fig. 192).

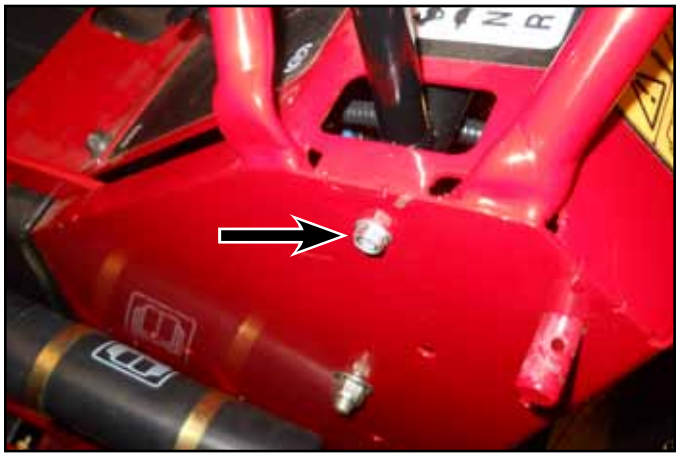


Fig. 192 DSCN-3573a

5. Secure the control cable to the motion control lever using the shoulder bolt and flange nut (Fig. 193).

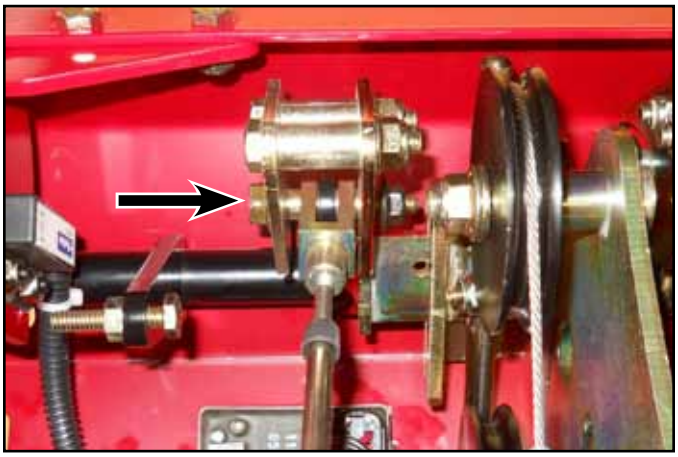


Fig. 193 DSCN-3570

6. Position the neutral switch bolt so the gap between it and the switch is between .05” and .09” (1.27 and 2.29mm). Secure the position using the jam nut (Fig. 194).

Fig. 194 DSCN-3603a

A. .05” to .09” (1.27 to 2.29mm)

RH Motion Control Lever Replacement

RH Motion Control Lever Removal

1. Remove the shoulder bolt and flange nut securing the end of the control cable to the RH motion control lever (Fig. 195).

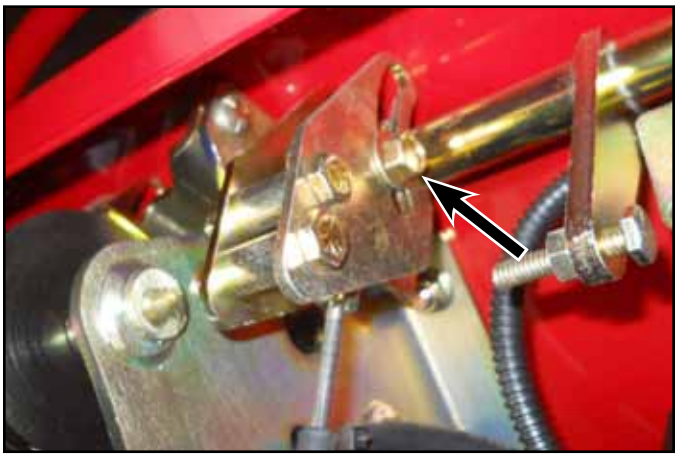


Fig. 195 DSCN-3610a

2. Unplug the wire harness from the OPC switch (Fig. 196).

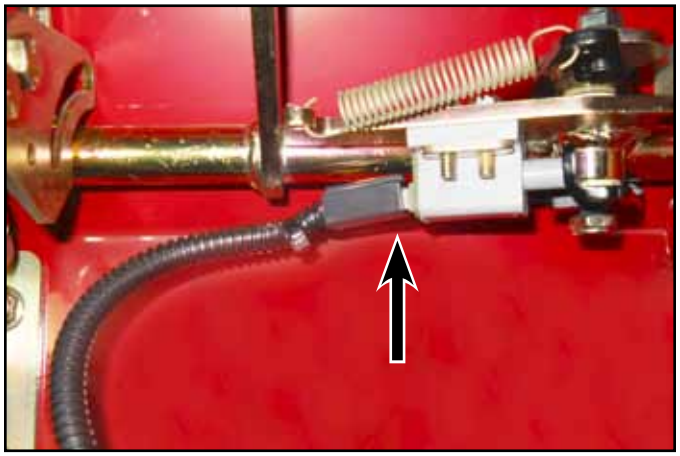


Fig. 196 DSCN-3612a

3. Remove the two screws securing the pivot shaft inside the LH motion control lever (Fig. 197 & 198).

Fig. 197 DSCN-3649a

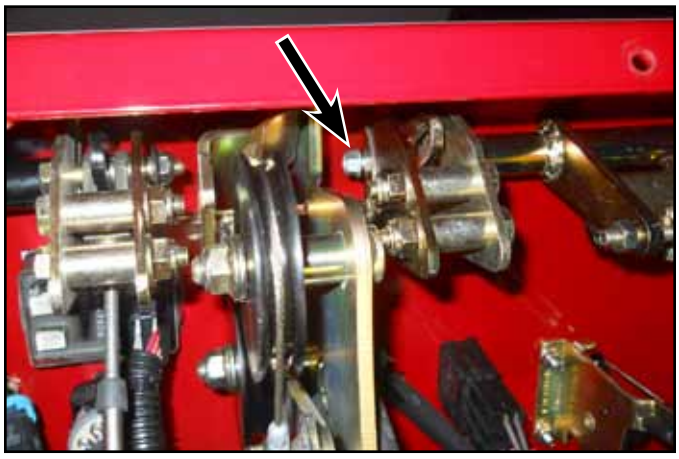


Fig. 198 DSCN-3653a

Note: Only one bolt will typically back out due to both threading into the same inner rod. A #4 easy-out can be used to secure the pivot rod. The bolt on the opposite side can then be removed (Fig. 199).

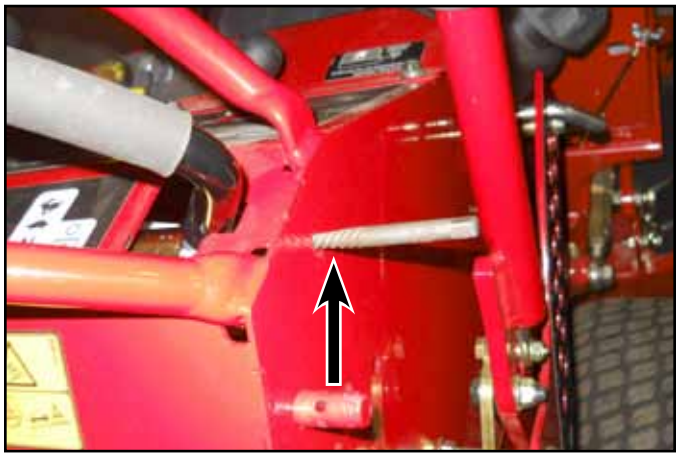


Fig. 199 DSCN-3647a

4. Remove the RH control lever assembly from the control tower.

5. Remove the pivot rod from the motion control handle (Fig. 200).

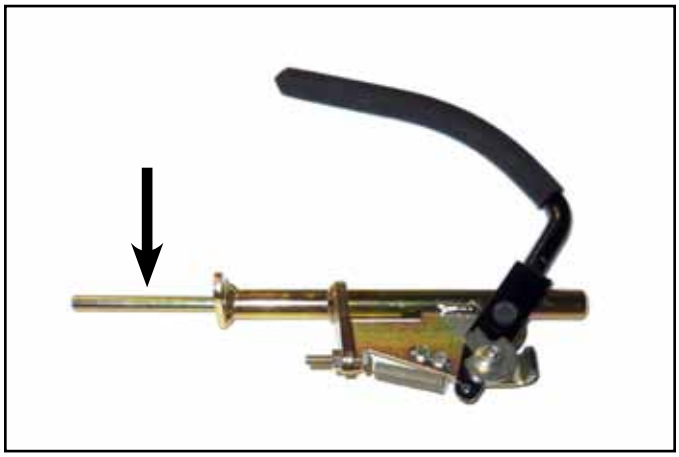


Fig. 200 DSCN-3616a

6. Remove the extension spring from the assembly (Fig. 201).

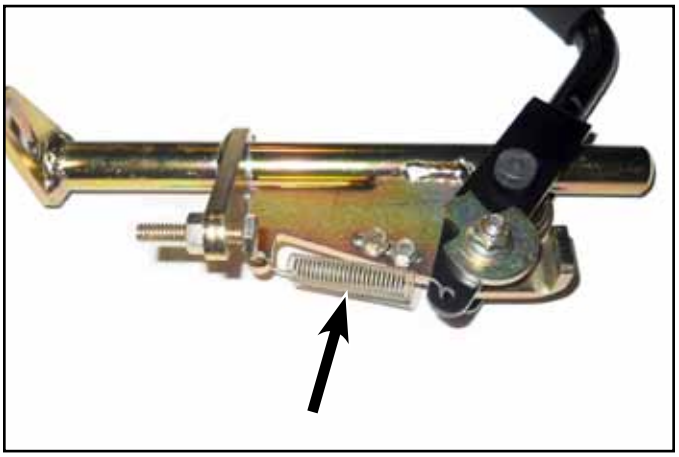


Fig. 201 DSCN-3617a

7. Remove the two screws and tapped plate securing the OPC switch to the control handle assembly (Fig. 202).

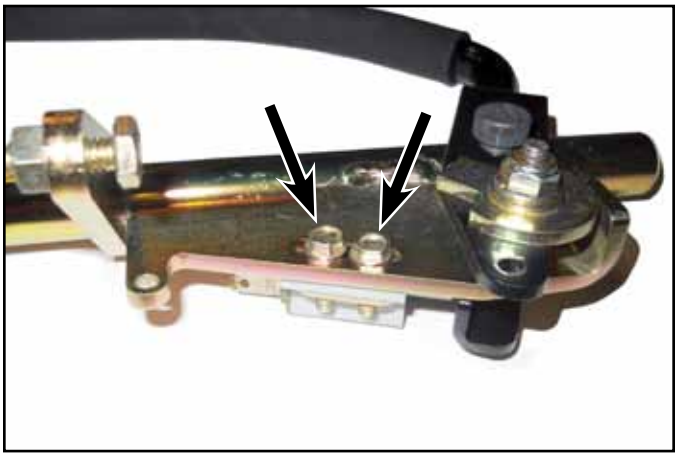


Fig. 202 DSCN-3622a

8. Remove the bolt and nut securing the RH handle to the motion control assembly (Fig. 203).

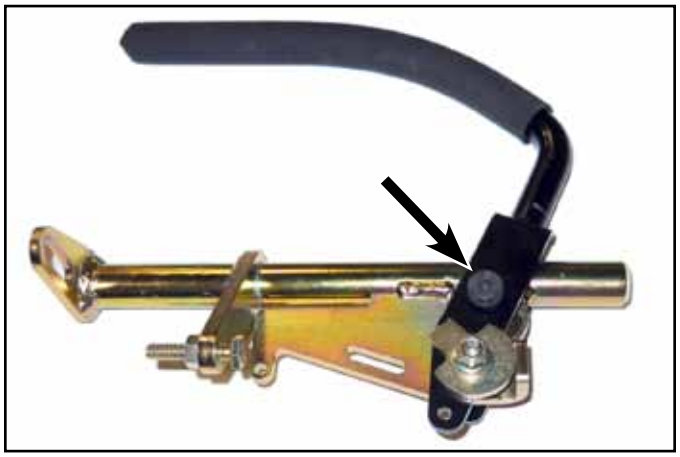


Fig. 203 DSCN-3626a

9. Remove the nut and washer securing the adjustment cam to the RH control lever (Fig. 204).

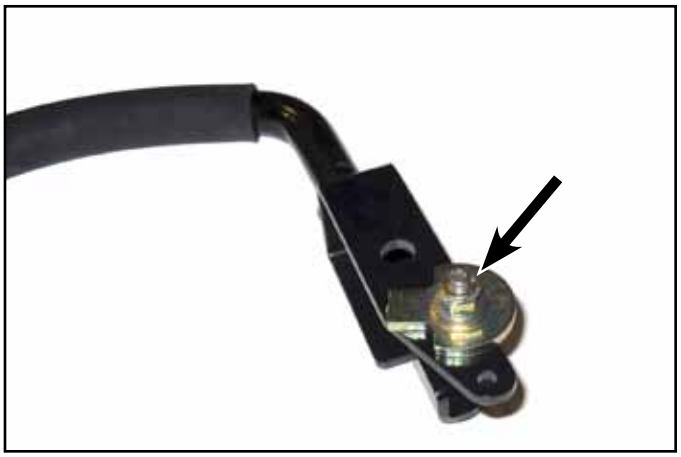


Fig. 204 DSCN-3629a

10. Remove the bolt and jam nut from the motion control assembly (Fig. 205).

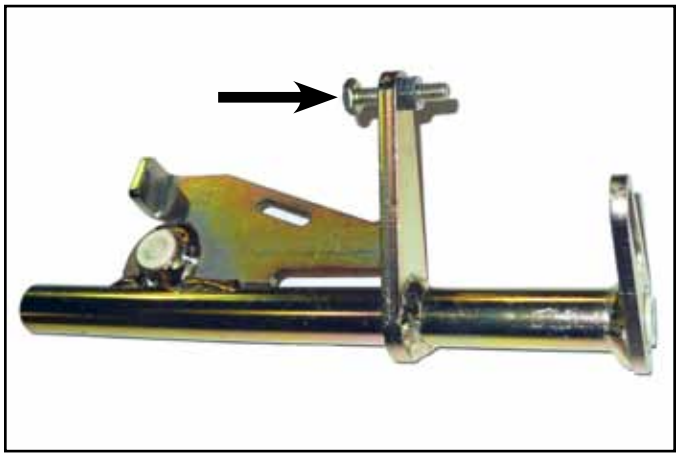


Fig. 205 DSCN-3634a

11. Remove the four plastic bearings from the motion control assembly (Fig. 206).

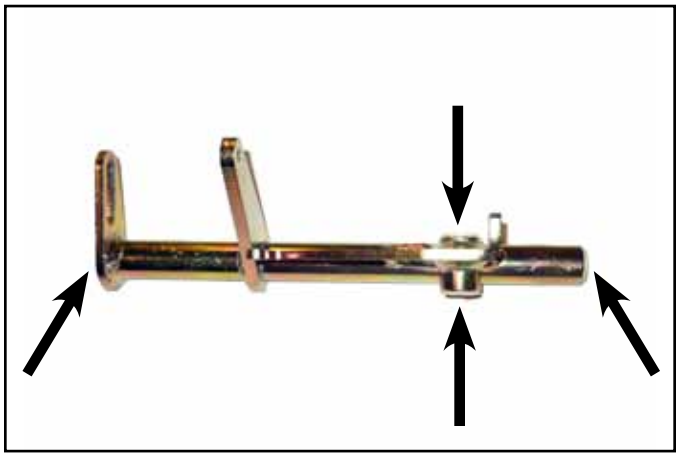


Fig. 206 DSCN-3637a

RH Motion Control Lever Installation

1. Install the four plastic bearings to the motion control assembly (Fig. 207).

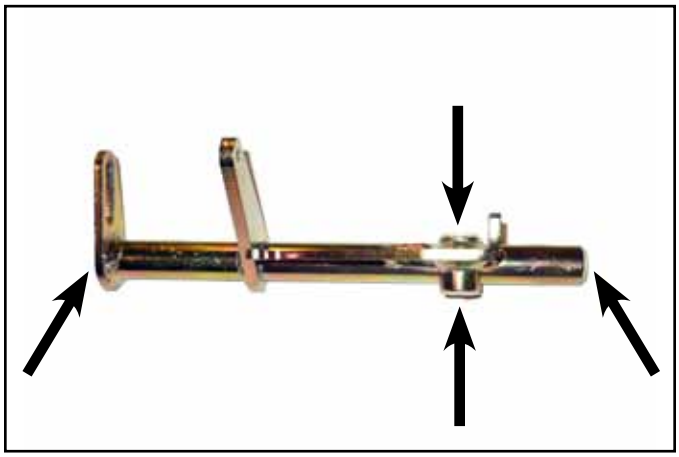


Fig. 207 DSCN-3637a

2. Loosely secure the adjustment cam to the RH control lever (Fig. 208).

Note: This nut will be tightened later in the process.

Fig. 208 DSCN-3629a

3. Loosely install the bolt and jam nut to the handle assembly (Fig. 209).

Note: The nut will be tightened in a later step.

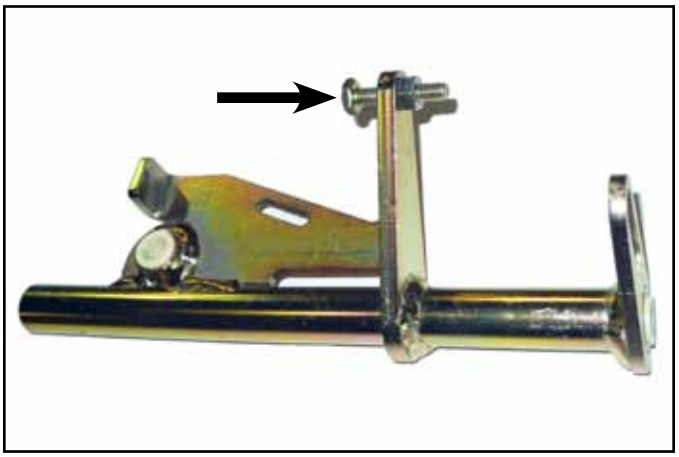


Fig. 209 DSCN-3634a

4. Secure the RH control lever to the motion control assembly with the shoulder bolt and nut (Fig. 210).

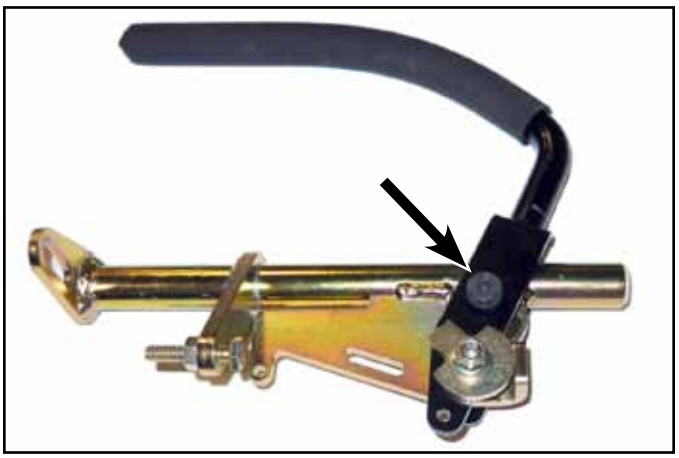


Fig. 210 DSCN-3626a

5. Loosely secure the OPC switch to the motion control assembly (Fig. 211).

Note: The bolts will be tightened later in the process.

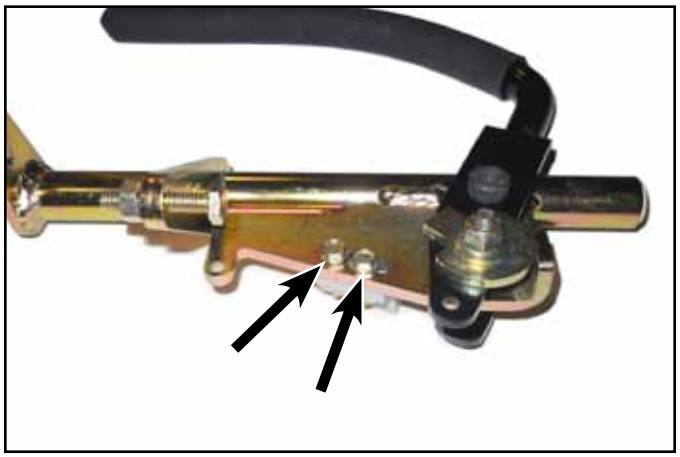


Fig. 211 DSCN-3644a

6. Install the extension spring to the motion control assembly (Fig. 212).

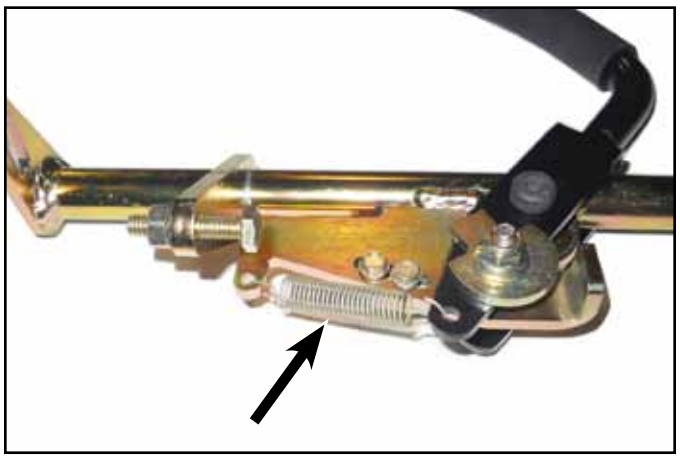


Fig. 212 DSCN-3646a

7. Install the pivot rod into the motion control assembly (Fig. 213).

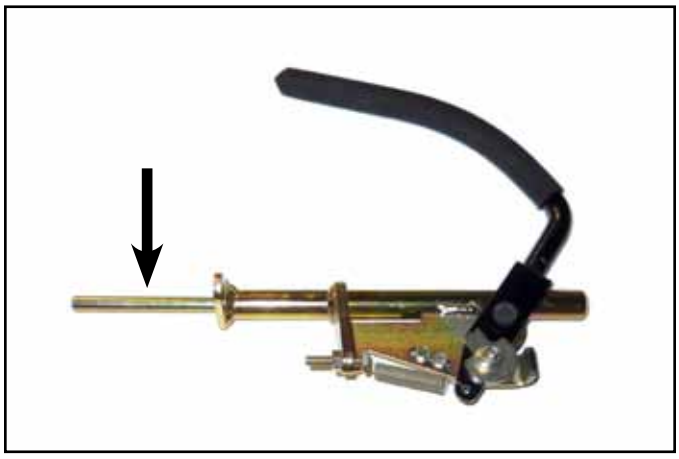


Fig. 213 DSCN-3616a

8. Secure the control handle assembly in the control tower using two bolts (Fig. 214 & 215).

Fig. 214 DSCN-3649a

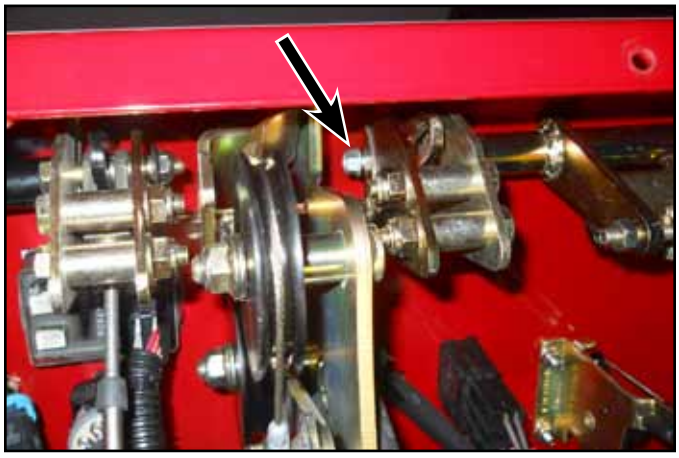


Fig. 215 DSCN-3653a

9. Install the wire harness onto the OPC switch (Fig. 216).

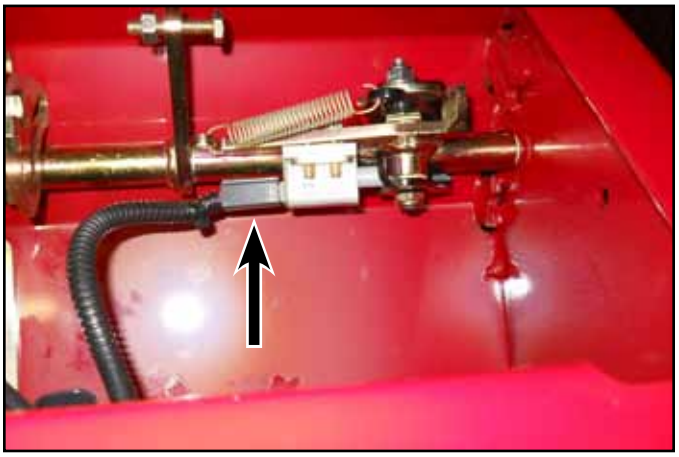


Fig. 216 DSCN-3656a

10. Position the RH control handle so it is horizontally aligned with the LH lever (Fig. 217).

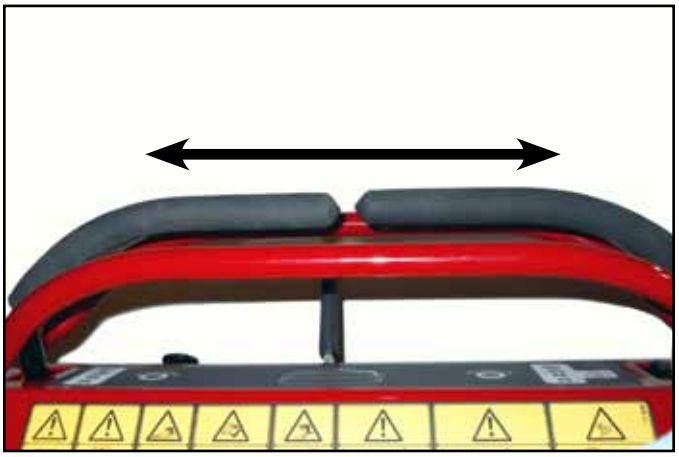


Fig. 217 DSCN-3657a

11. Secure the position of the RH lever by tightening the nut on the adjustment cam on the RH control assembly to correct (Fig. 218).

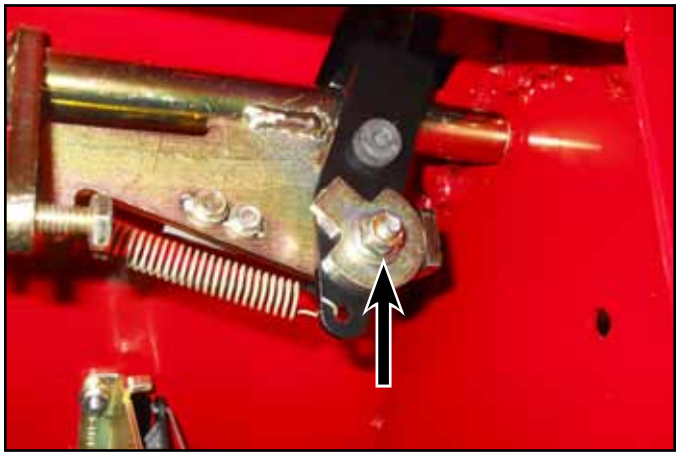


Fig. 218 DSCN-3661a

12. Adjust the OPC switch so there is .125” (3mm) gap between the switch plunger and the control handle tab when the control handle is in the operating position (Fig. 219).

Fig. 219 DSCN-3665a

A. .125” (3mm)

13. Secure the position of the switch by tightening the two mounting screws (Fig. 220).

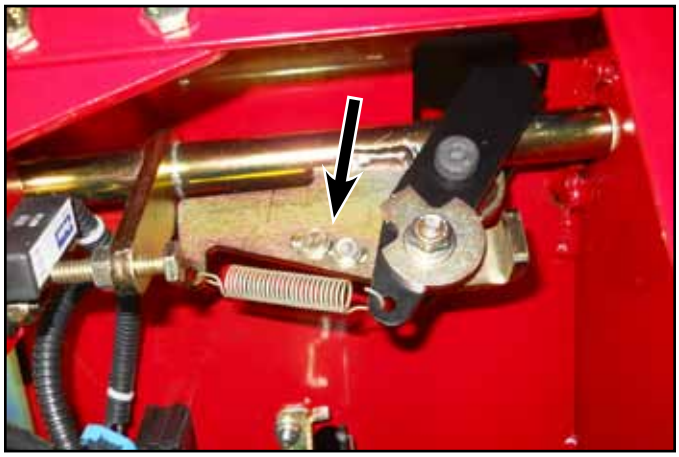


Fig. 220 DSCN-3666a

14. Secure the control cable to the motion control lever using a shoulder bolt and flange nut (Fig. 221).

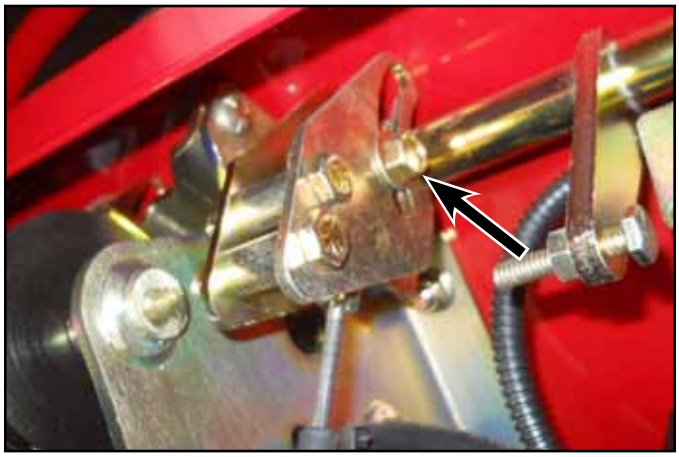


Fig. 221 DSCN-3610a

15. Position the neutral switch bolt so the gap between it and the switch is between .05” and .09” (1.27 and 2.29mm). Secure the position using the jam nut (Fig. 222).

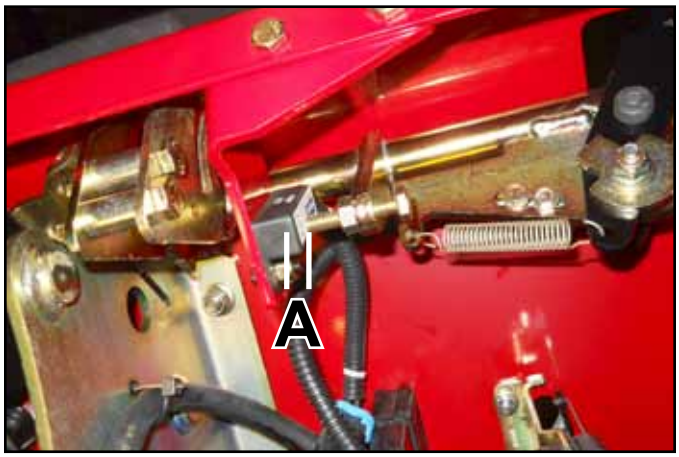


Fig. 222 DSCN-3668a

A. .05” to .09” (1.27 to 2.29mm)

Motion Control Cable Replacement

Motion Control Cable Removal

1. Remove the shoulder bolt and flange nut securing the end of the control cable to the motion control lever (Fig. 223).

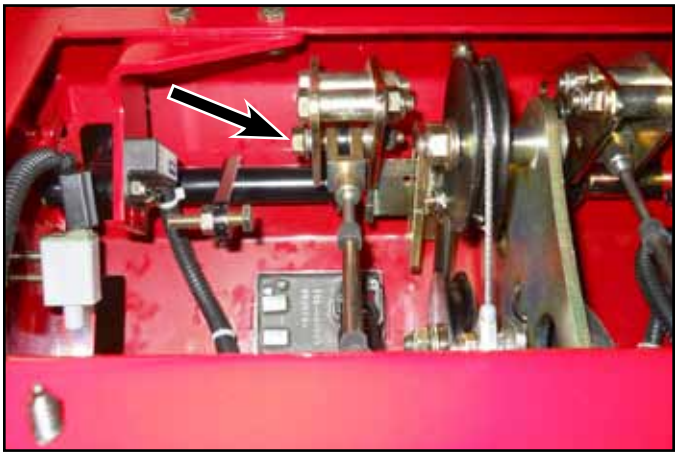


Fig. 223 DSCN-3671a

2. Remove the spring clip from the cross bracket (Fig. 224).

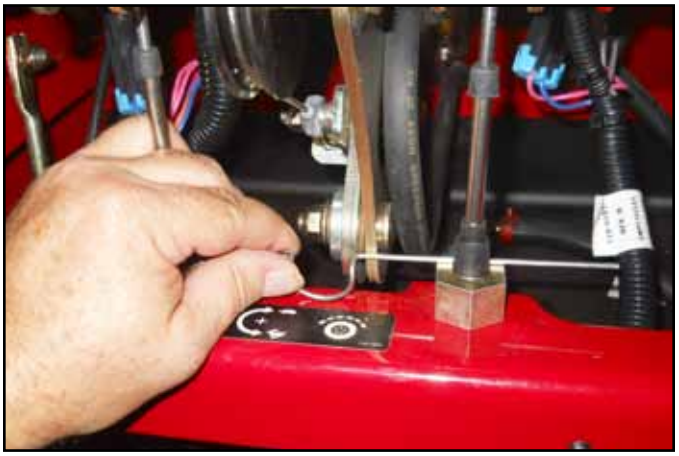


Fig. 224 DSCN-3672a

3. Remove the cable adjustment nut from the cross bracket (Fig. 225).

Fig. 225 DSCN-3674a

4. Remove the two thread forming screws and cable clamp securing the lower cable to the cable bracket (Fig. 226).

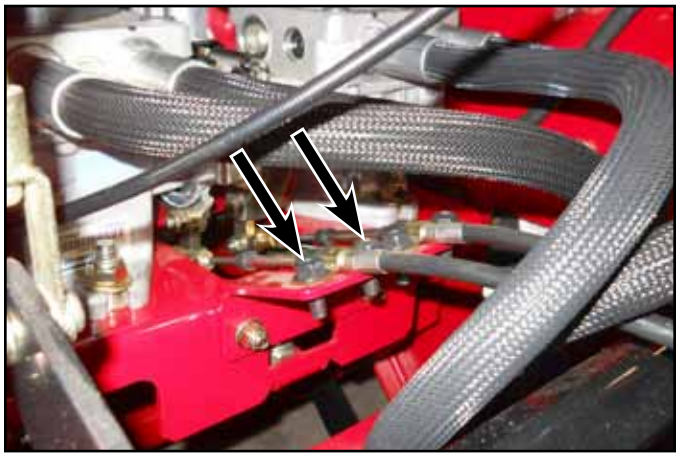


Fig. 226 DSCN-3679a

5. Remove the bolt and flange nut securing the cable to the pump assembly (Fig. 227).

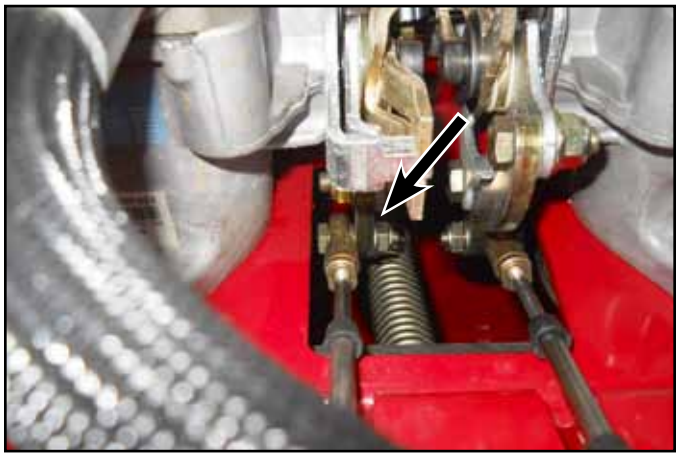


Fig. 227 DSCN-3682a

Motion Control Cable Installation

1. Secure the cable rod end to the pump assembly using the bolt and flange nut (Fig. 228).

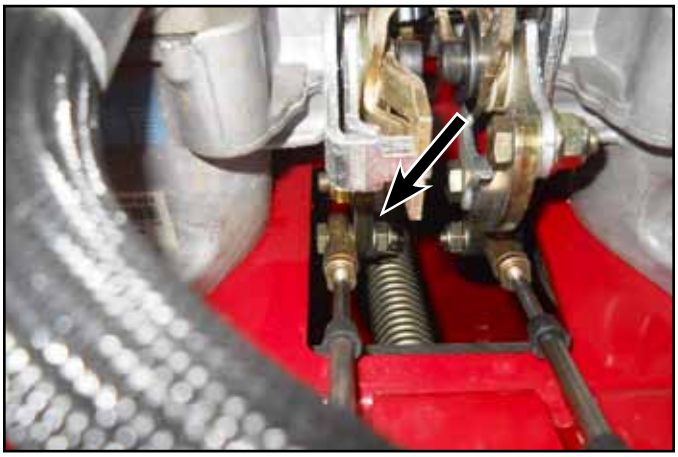


Fig. 228 DSCN-3682a

2. Secure the lower cable to the cable bracket using the two thread forming screws and cable clamp (Fig. 229).

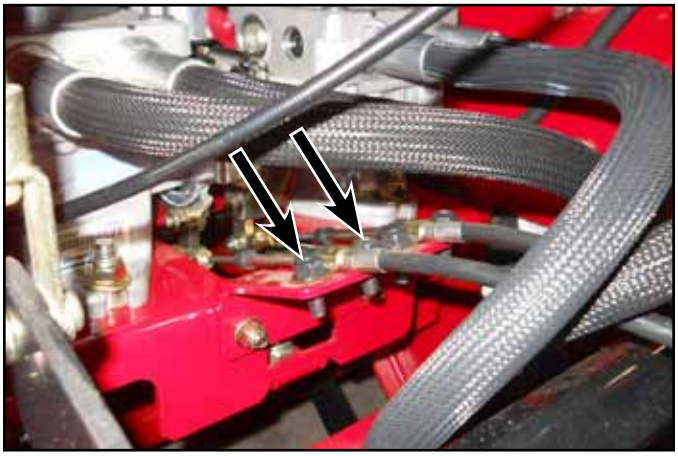


Fig. 229 DSCN-3679a

3. Route the cable upwards, inside of the cable retainer (Fig. 230).

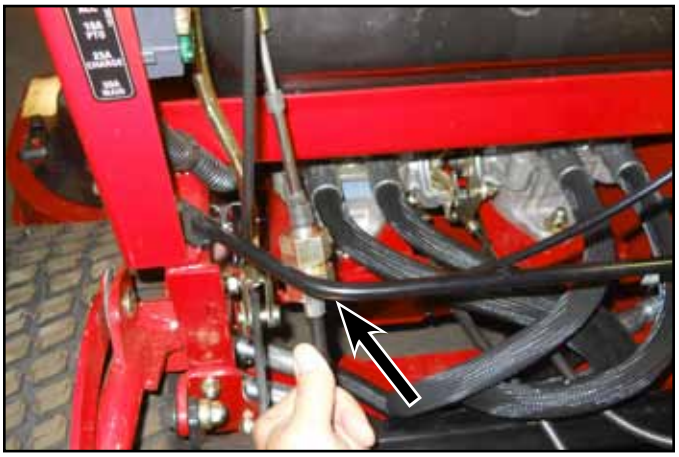


Fig. 230 DSCN-3685a

4

4. Position the cable adjustment nut into the slot on the cross bracket (Fig. 231).

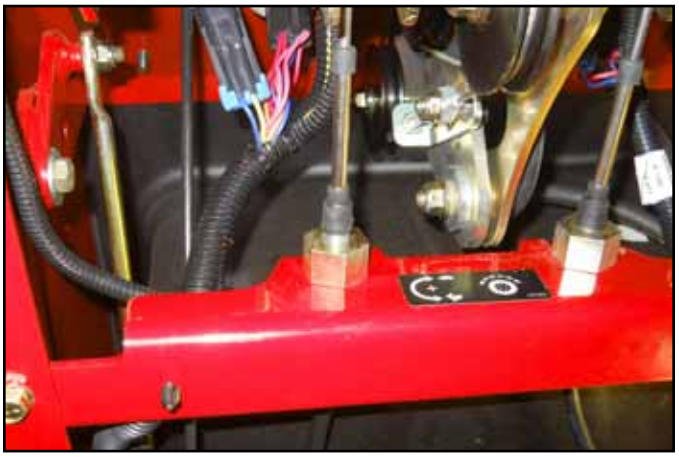


Fig. 231 DSCN-3688a

5. Secure the nut using the spring clip (Fig. 232).

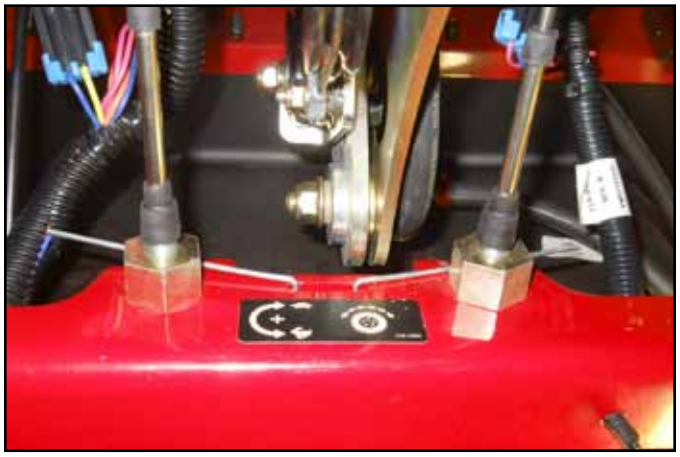


Fig. 232 DSCN-3690a

6. Secure the control cable to the motion control lever using a shoulder bolt and flange nut (Fig. 233).

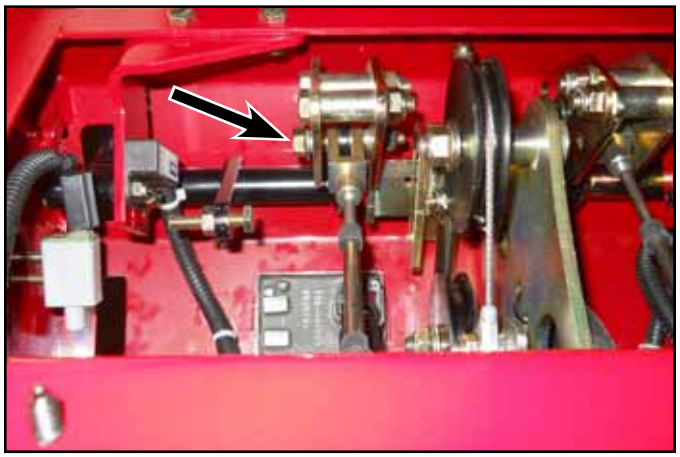


Fig. 233 DSCN-3671a

7. Verify the tracking of the machine. See “Adjusting the Tracking” on page 4-41.

Parking Brake Replacement

Parking Brake Removal

1. Remove the hairpin cotter and clevis pin securing the linkage yoke, at the lower end of the link rod, to the brake assembly (Fig. 234).

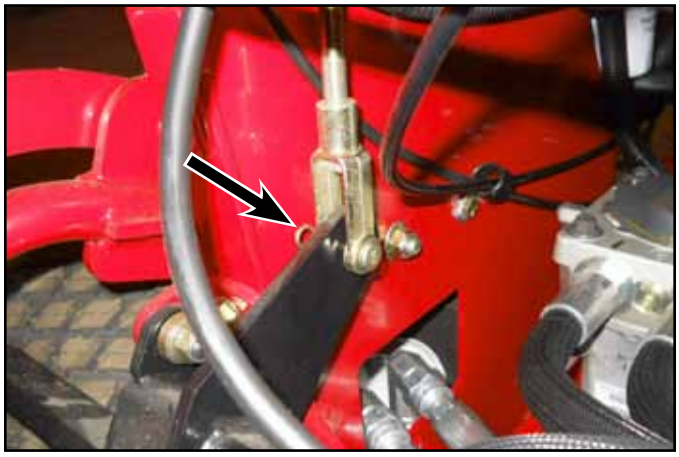


Fig. 234 DSCN-3815a

2. Remove the nut securing the upper end of the link rod to the brake handle (Fig. 235).

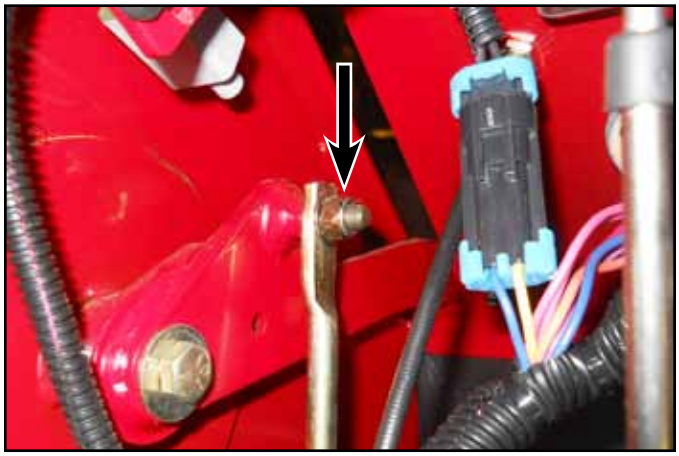


Fig. 235 DSCN-3817a

3. Remove the grip from the brake handle (Fig. 236).

Fig. 236 DSCN-3822a

4. Remove the bolt, washer, and nut securing the brake handle to the control tower (Fig. 237).

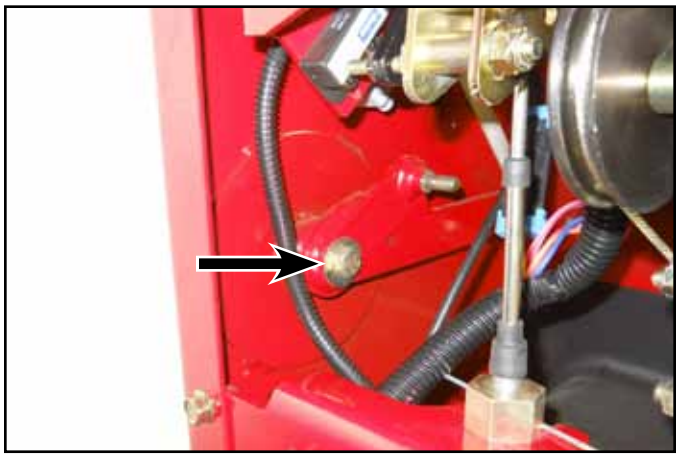


Fig. 237 DSCN-3819a

5. Remove the bolt and nut securing the RH side of the brake and torsion spring assemblies to the chassis (Fig. 238).

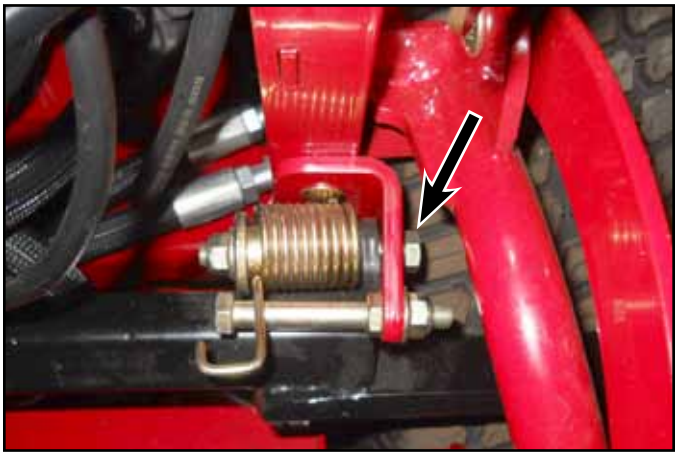


Fig. 238 DSCN-3826a

6. Remove the shoulder bolt, spacer, and nut securing the LH side of the brake assembly to the chassis (Fig. 239).

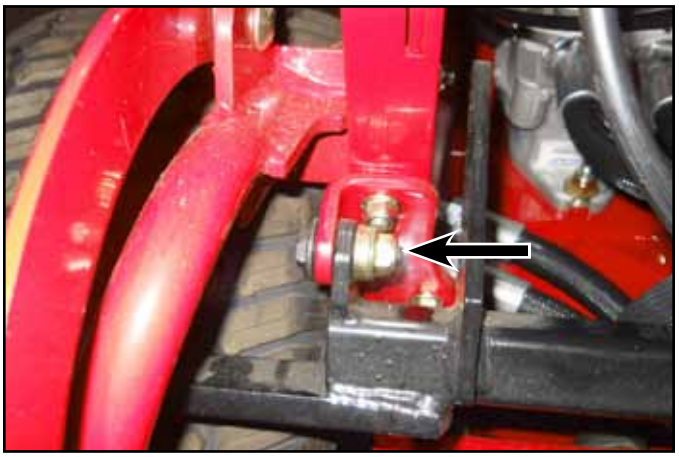


Fig. 239 DSCN-3825a

Parking Brake Installation

1. Secure the LH side of the brake assembly to the chassis using the shoulder bolt, spacer, and nut (Fig. 240).

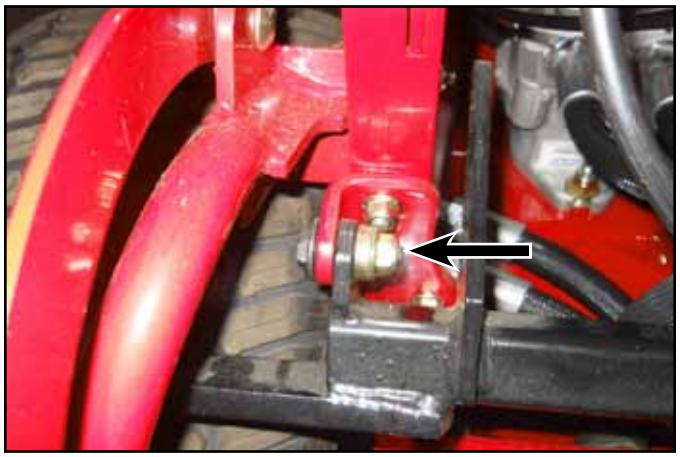


Fig. 240 DSCN-3825a

2. Secure the RH side of the brake and torsion spring assemblies to the chassis using the bolt, spacers, and washers (Fig. 241).

Note: Position one end of the torsion spring under the brake assembly, position the other over the spring anchor bolt.

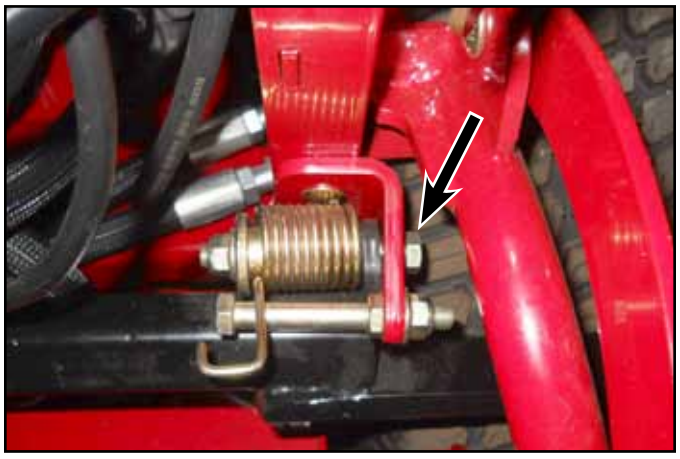


Fig. 241 DSCN-3826a

3. Position the brake handle through the control tower and secure the handle to the tower using the bolt, washer, and nut (Fig. 242).

Note: Do not over tighten. The handle needs to move freely.

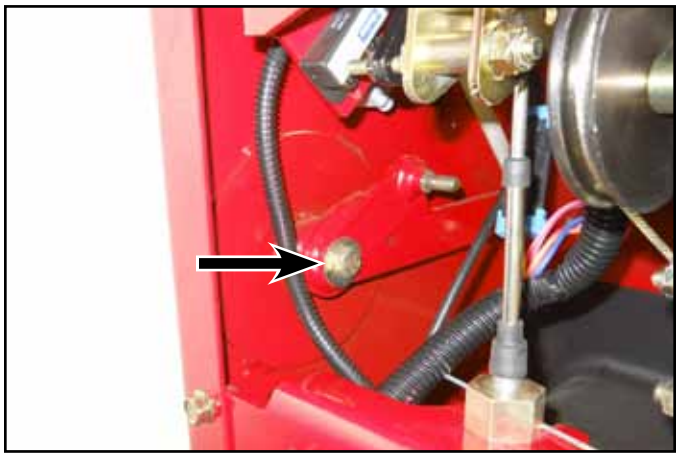


Fig. 242 DSCN-3819a

4. Install the grip onto the brake lever (Fig. 243).

Fig. 243 DSCN-3822a

5. Secure the upper end of the brake rod to the brake handle using the flange nut (Fig. 244).

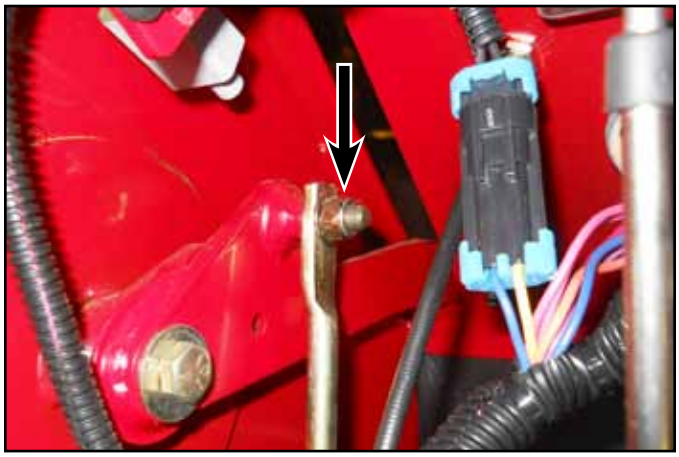


Fig. 244 DSCN-3817a

6. Secure the yoke at the lower end of the brake rod to the brake assembly using the clevis pin (Fig. 245).

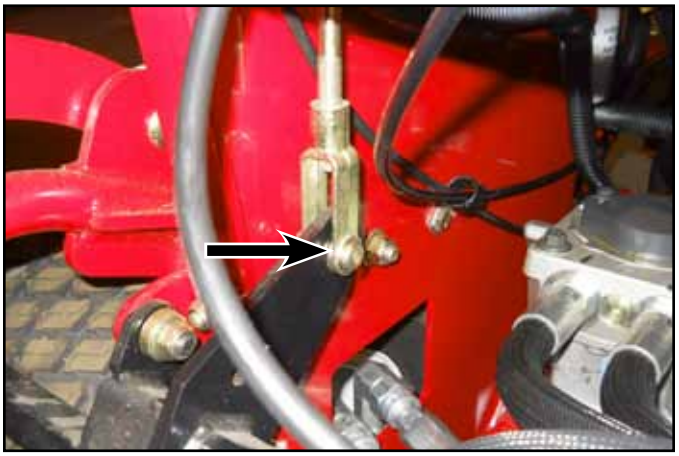


Fig. 245 DSCN-3834a

7. Secure the clevis pin using the hairpin cotter (Fig. 247).

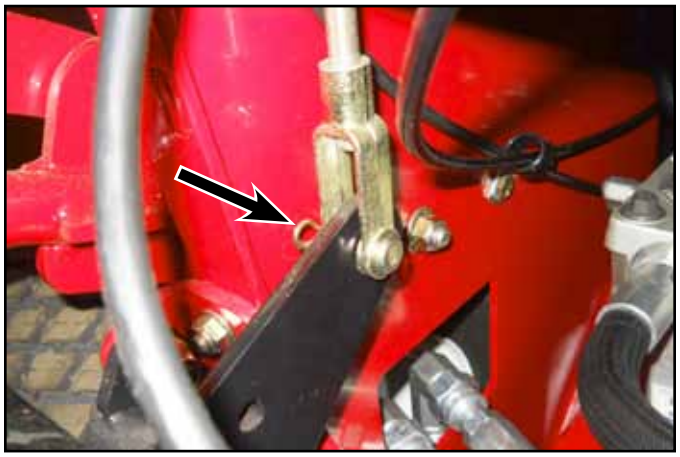


Fig. 247 DSCN-3837a

Note: With the brake handle in the off position, measure the distance between the brake bar and tire. The distance needs to be between 3/16” and 5/16” (5 and 8mm). If adjustment is needed, remove the clevis pin and rotate the yoke accordingly (Fig. 246).

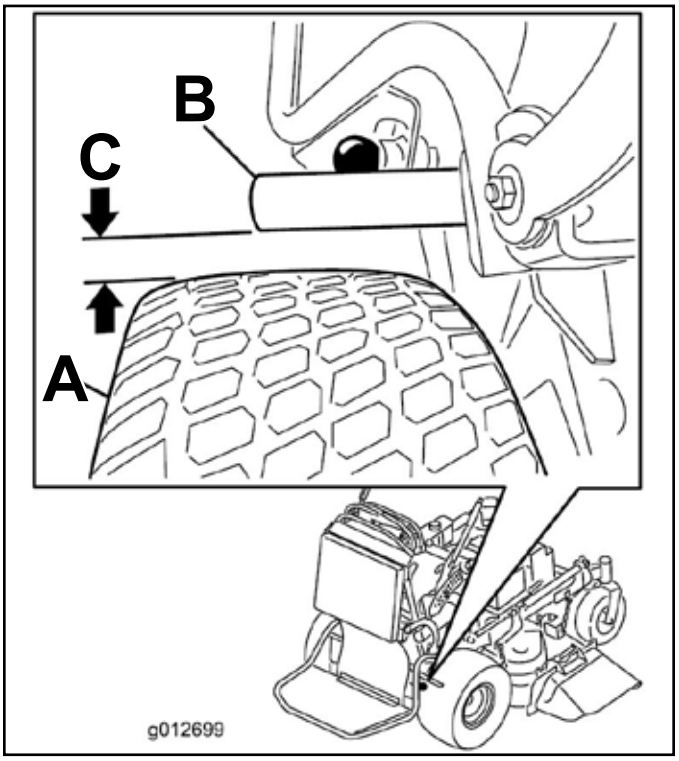


Fig. 246 fig. 60 G012699

A. Tire
B. Brake bar
C. Gap between 3/16” & 5/16” (5 & 8mm)

Height-of-Cut (HOC) Handle Assembly Replacement

HOC Handle Assembly Removal

1. Position two boards under the deck, then lower the deck onto the boards (Fig. 248).

Fig. 248 DSCN-3839a

2. Remove the bolt and nut securing the lift link assembly to the lower end of the HOC handle (Fig. 249).

Fig. 249 DSCN-3841a

3. Remove the snap ring and washer securing the HOC handle assembly to the frame (Fig. 250).

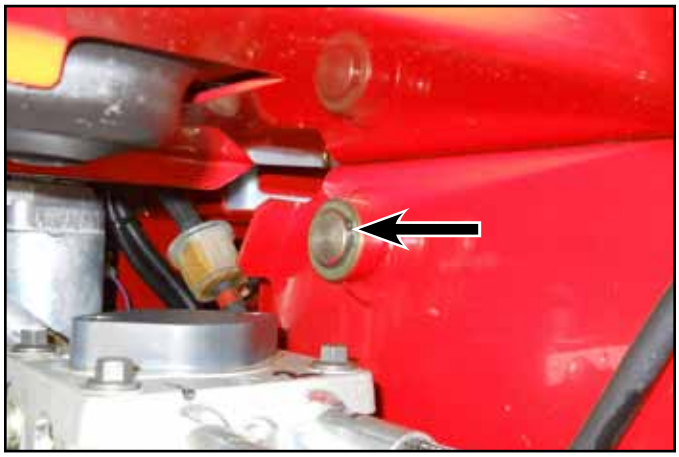


Fig. 250 DSCN-3843a

4. Remove the nuts securing the HOC anchor bolt to the HOC plate assembly (Fig. 251).

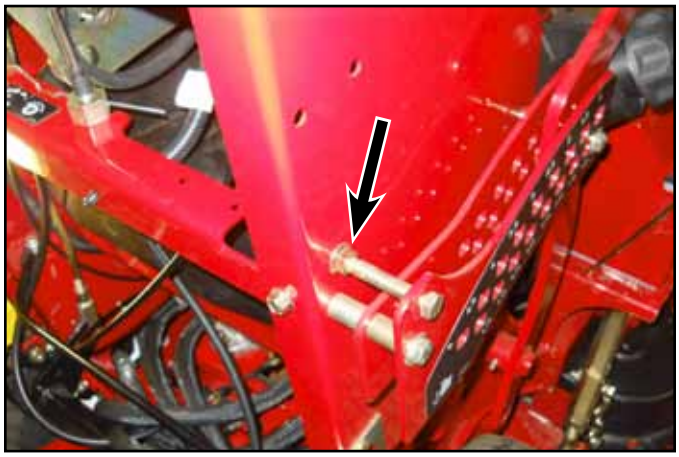


Fig. 251 DSCN-3848a

5. Remove the two sets of bolts, washers, spacers, and nuts securing the HOC plates to the control tower (Fig. 252).

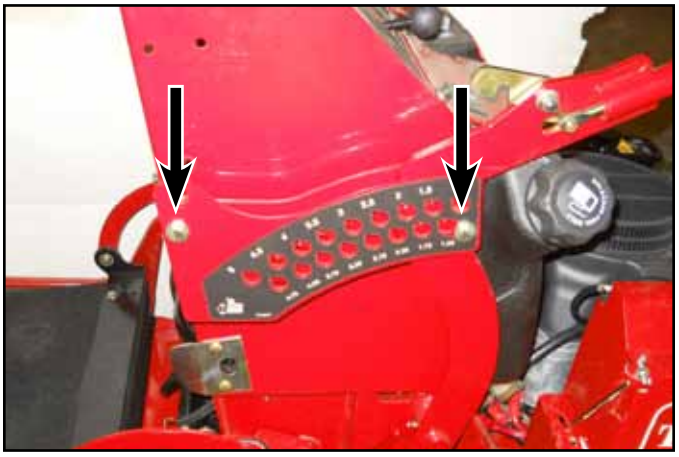


Fig. 252 DSCN-3852a

6. Remove the shoulder bolt and nut securing the latch rod to the HOC latch (Fig. 253).

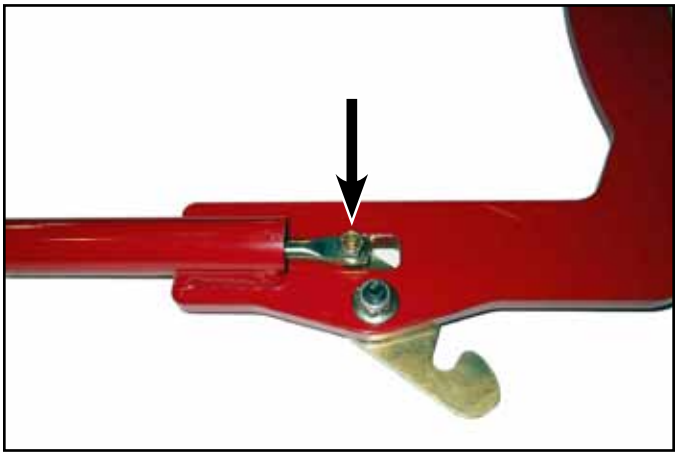


Fig. 253 DSCN-3855a

7. Remove the latch rod assembly, spring and washer out through the top of the HOC handle (Fig. 254).

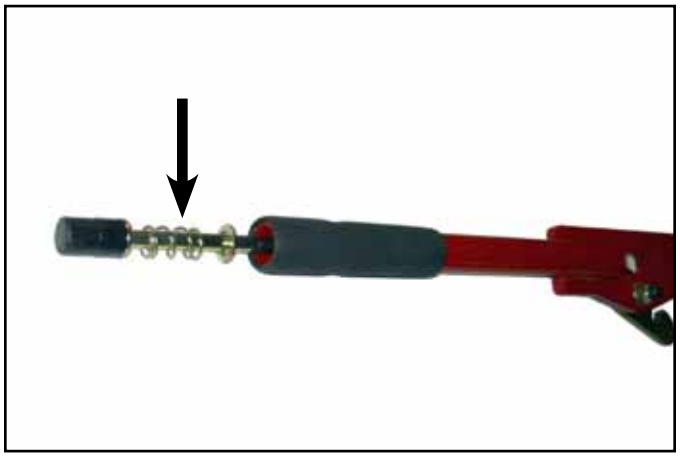


Fig. 254 DSCN-3857a

8. Remove the shoulder bolt, washer, and nut securing the HOC latch to the HOC handle (Fig. 255).

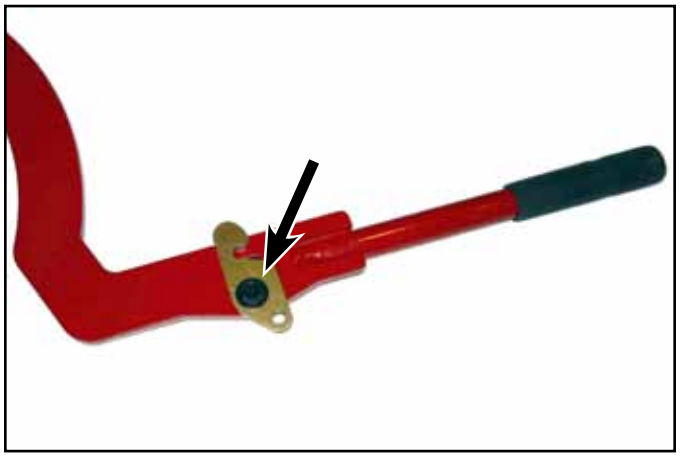


Fig. 255 DSCN-3877a

HOC Handle Assembly Installation

1. Secure the HOC latch to the HOC handle using the shoulder bolt, washer, and nut (Fig. 256).

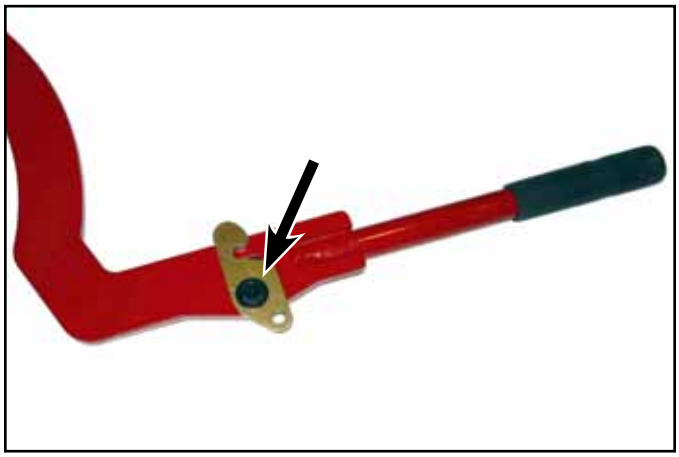


Fig. 256 DSCN-3877a

2. Position the spring and washer onto the latch rod (Fig. 257).

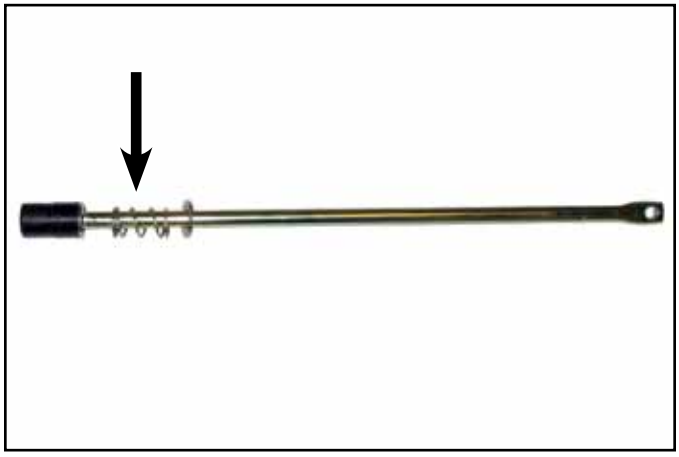


Fig. 257 DSCN-3880a

3. Position the latch rod assembly into the HOC handle (Fig. 258).

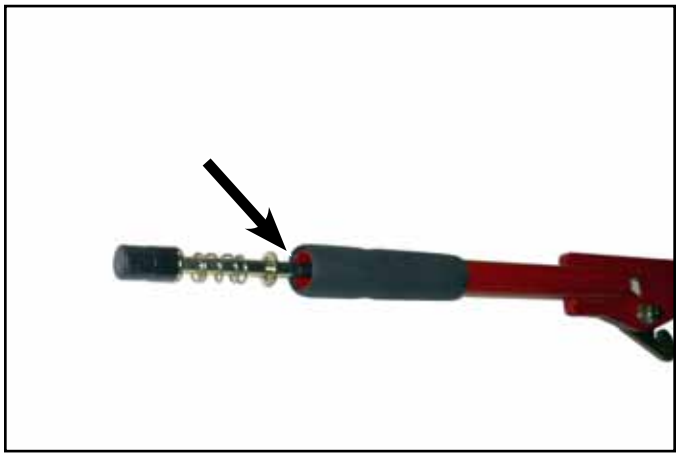


Fig. 258 DSCN-3857a

4. Secure the lower end of the latch rod assembly to the HOC latch using the shoulder bolt and nut (Fig. 259).

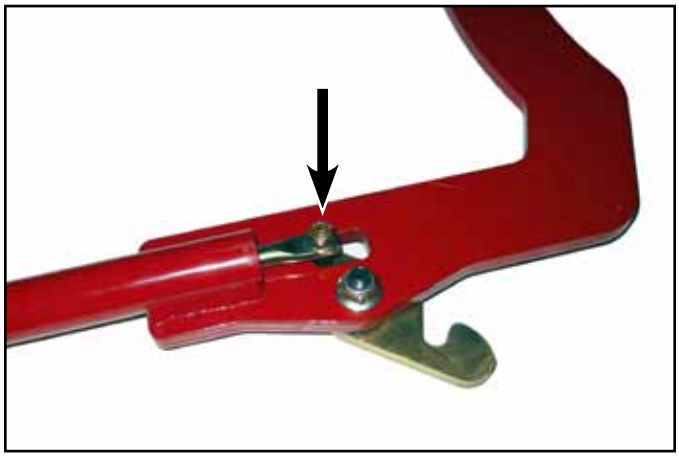


Fig. 259 DSCN-3886a

5. Position the bolt, washer, and spacers into the rear of the HOC plates (Fig. 260).

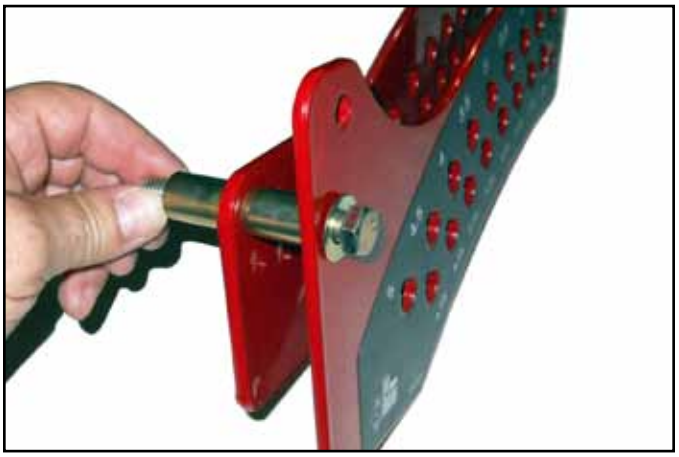


Fig. 260 DSCN-3891a

6. Loosely secure the HOC plates assembly to the control tower using the flange nut (Fig. 261).

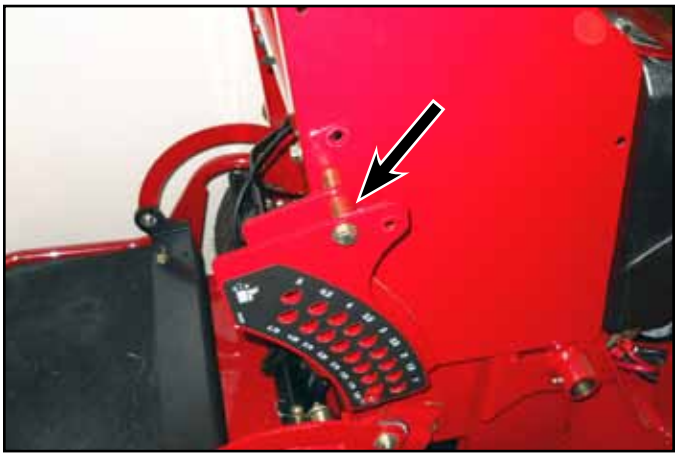


Fig. 261 DSCN-3895a

7. Position the HOC handle pivot shaft through the frame hub (Fig. 262).

Fig. 262 DSCN-3900a

8. Secure the front of the HOC plates to the control tower using the bolt, washer, spacers, and nut. Tighten the rear fastener assembly. (Fig. 263).

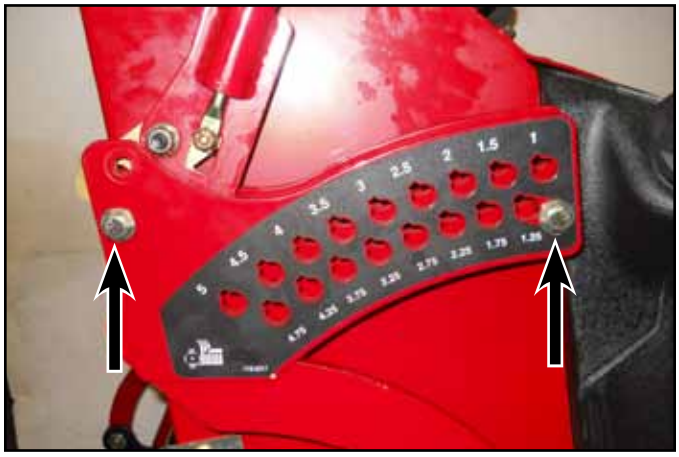


Fig. 263 DSCN-3902a

Note: The HOC handle must be nested in between the HOC plates (Fig. 264).

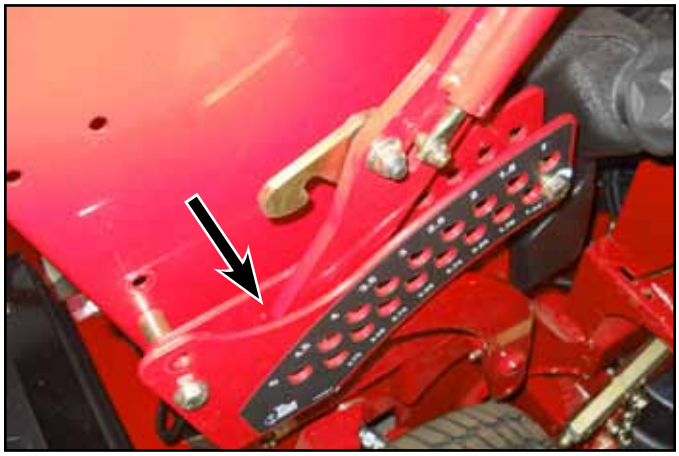


Fig. 264 DSCN-3908a

9. Secure the HOC handle latch bolt to the control tower using the two nuts (Fig. 265).

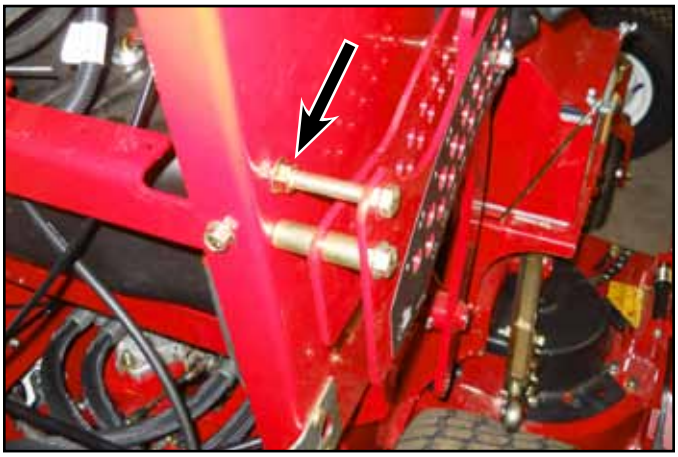


Fig. 265 DSCN-3912a

10. Install the washer and snap ring that secure the HOC handle to the frame (Fig. 266).

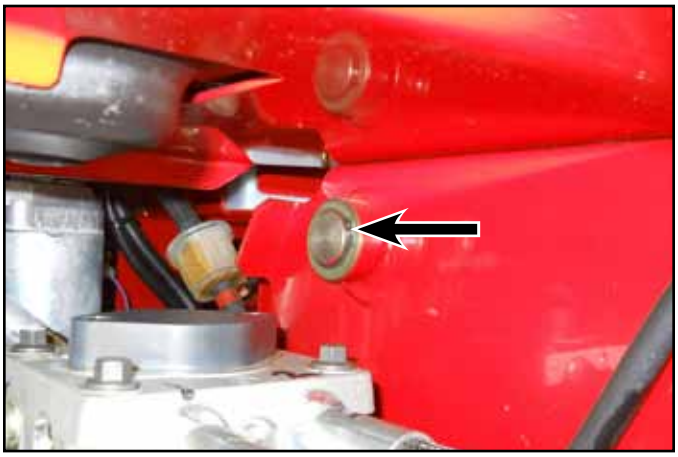


Fig. 266 DSCN-3843a

11. Secure the lift link assembly to the lower end of the HOC handle (Fig. 267).

Fig. 267 DSCN-3841a

12. Pump high temp grease into the HOC handle pivot hub (Fig. 268).

Fig. 268 DSCN-3915a

13. Raise the deck and remove the boards.

Choke Cable Replacement

Choke Cable Removal

1. Remove the bolt and cable clamp securing the choke cable to the engine throttle plate (Fig. 269).

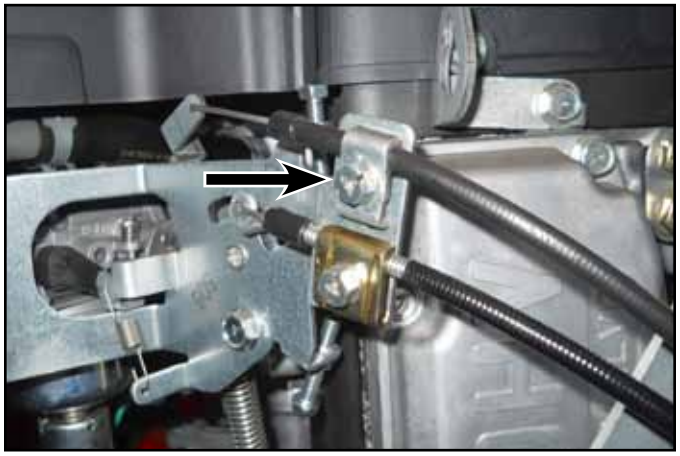


Fig. 269 DSCN-3505a

2. Remove the “Z” bend of the choke cable from the engine choke arm (Fig. 270).

Fig. 270 DSCN-3509a

3. Remove the cable tie securing the choke and throttle cable to the oil drain (Fig. 271).

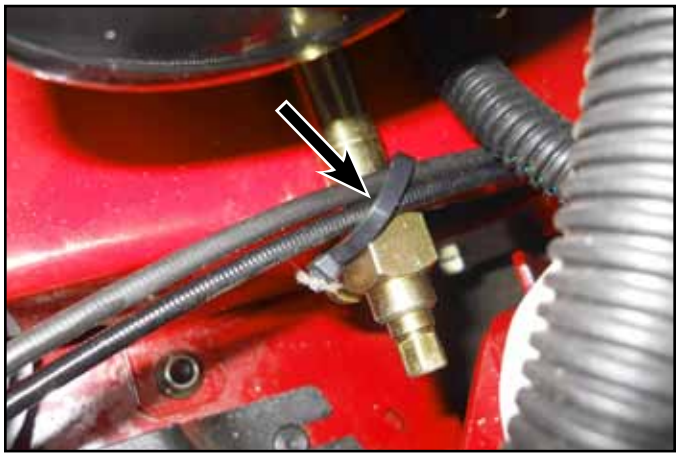


Fig. 271 DSCN-3511a

4. From the rear of the machine, pull the cable rearward from the frame.

5. Remove the nut securing the choke cable to the control panel (Fig. 272).

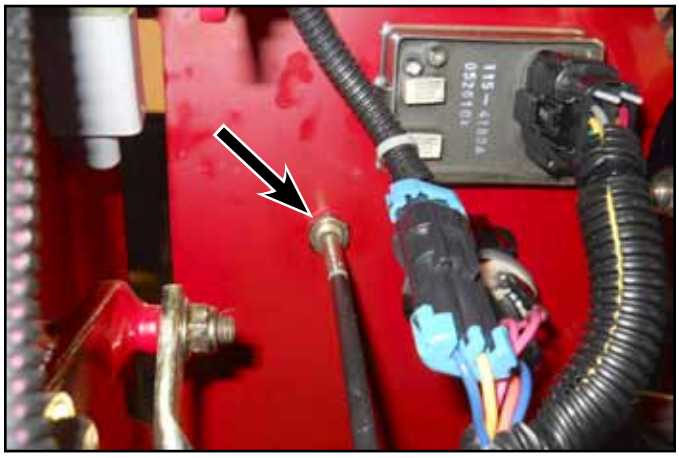


Fig. 272 DSCN-3515a

6. Remove the choke cable from the control panel (Fig. 273).

Fig. 273 DSCN-3518a

Choke Cable Installation

1. Feed the choke cable through the mounting hole in the control panel (Fig. 274).

Fig. 274 DSCN-3518a

2. Secure the choke cable to the control panel using a nut (Fig. 275).

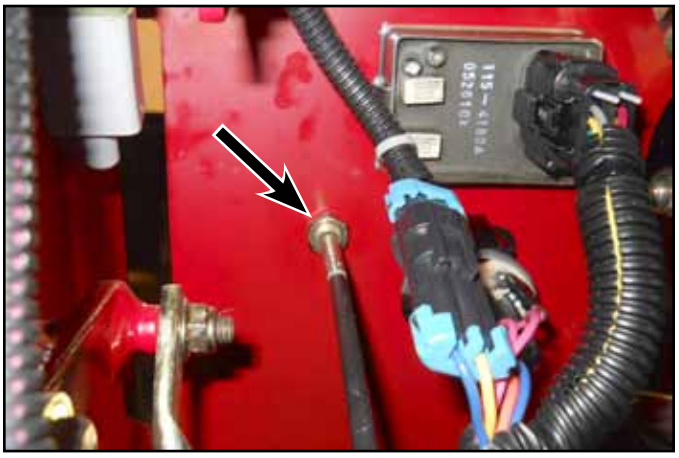


Fig. 275 DSCN-3515a

3. Feed the cable through the frame, to the left of the brake linkage (Fig. 276).

Fig. 276 DSCN-3519a

4. Feed the choke cable through the ”R” clamp located on the carrier frame (Fig. 277).

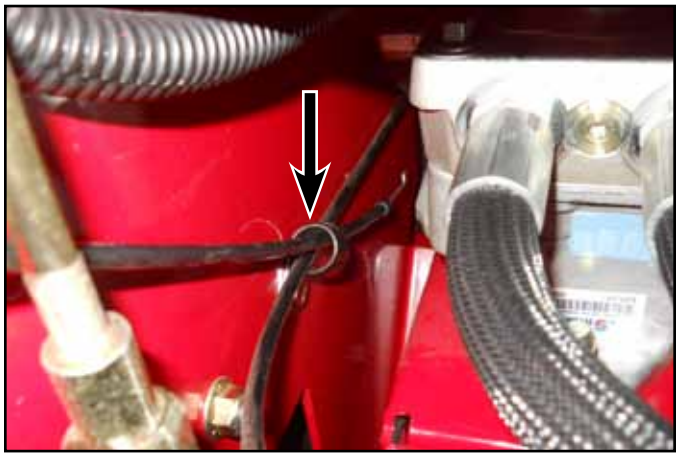


Fig. 277 DSCN-3522a

5. Install the choke cable “Z” bend into the engine choke lever (Fig. 278).

Fig. 278 DSCN-3509a

6. Position the choke cable to the engine throttle plate and loosely install the screw and cable clamp (Fig. 279).

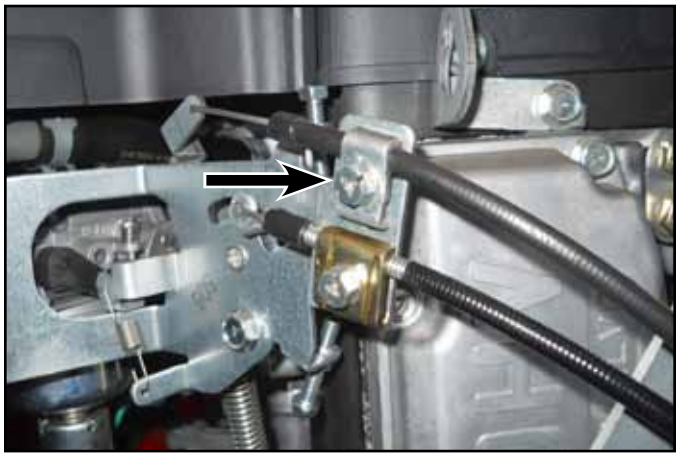


Fig. 279 DSCN-3505a

7. Position the choke knob in the “OPEN” position (Fig. 280).

Fig. 280 DSCN-3525a

8. Ensure the choke is fully open in the throat of the carburetor (Fig. 281).

Fig. 281 DSCN-3528a

9. While holding the engine choke lever in the “OPEN” position, pull the slack from the cable jacket, then secure the position of the choke cable with the screw and cable clamp (Fig. 282).

Fig. 282 DSCN-3530a

10. Secure the choke and throttle cable to the oil drain using a cable tie (Fig. 283).

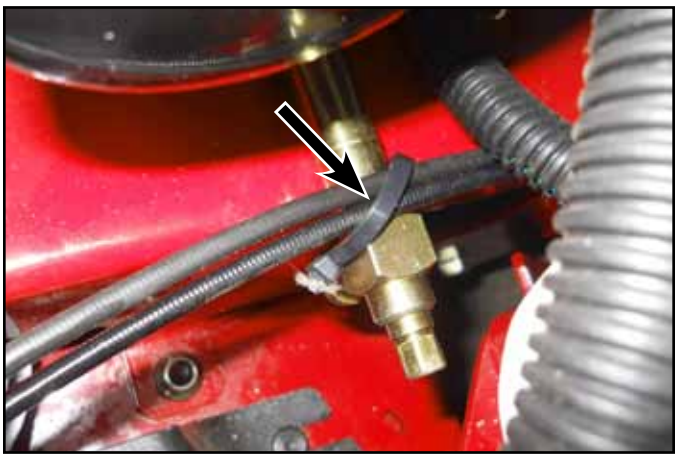


Fig. 283 DSCN-3511a

11. Ensure the choke is functioning correctly by moving the choke knob in and out while observing the choke plate in the carburetor throat.

Throttle Cable Replacement

Throttle Cable Removal

1. Remove the bolt and cable clamp securing the throttle cable to the engine throttle plate (Fig. 284).

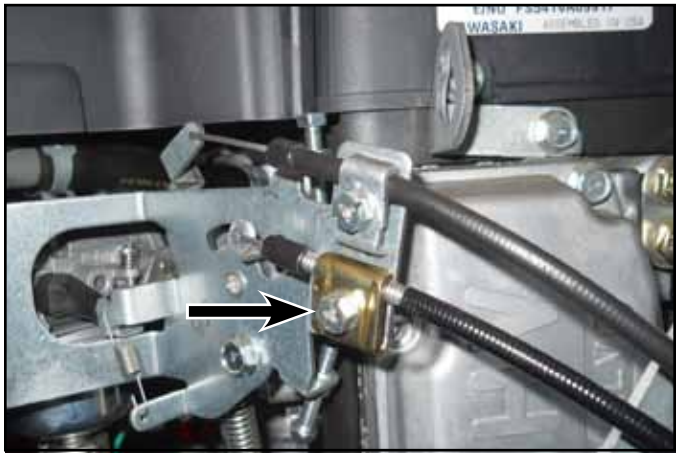


Fig. 284 DSCN-3505a

2. Remove the “Z” bend of the throttle cable from the engine throttle arm (Fig. 285).

Fig. 285 DSCN-3535a

3. Remove the cable tie securing the choke and throttle cable to the oil drain (Fig. 286).

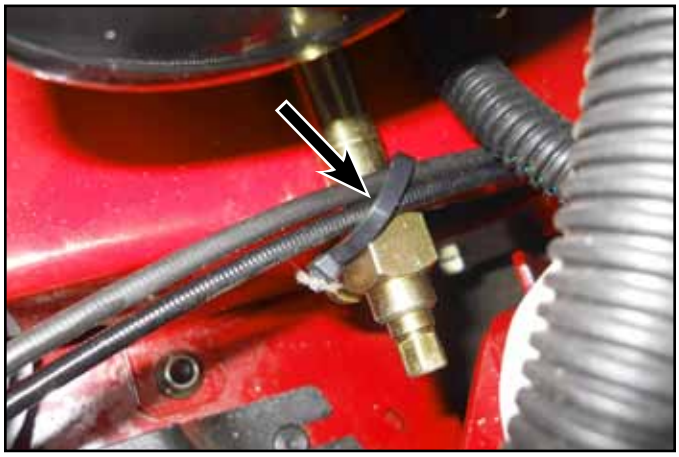


Fig. 286 DSCN-3511a

4. From the rear of the machine, pull the cable rearward from the frame.

5. Remove the throttle knob from the throttle lever (Fig. 287).

Fig. 287 DSCN-3536a

6. Remove the two carriage bolts and nuts securing the throttle lever assembly to the control panel (Fig. 288).

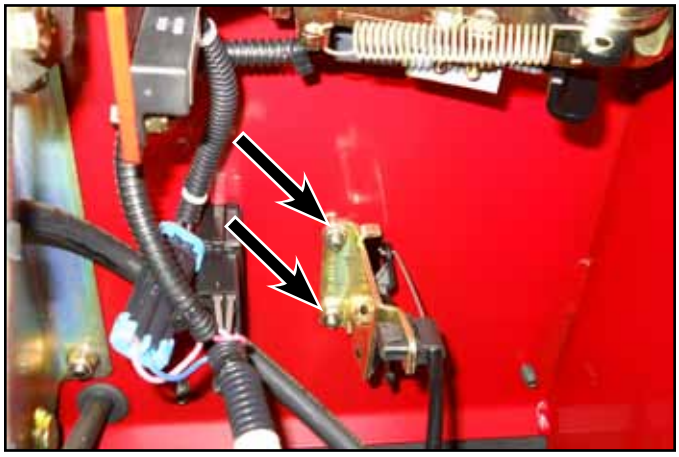


Fig. 288 DSCN-3541a

7. Remove the cable clip and then the “Z” bend of the cable from the throttle control lever assembly (Fig. 289).

Fig. 289 DSCN-3545a

Throttle Cable Installation

1. Hook the “Z” bend of the speed control cable to the speed control lever assembly and secure with the cable clip (Fig. 290).

Fig. 290 DSCN-3552a

2. Secure the lever assembly to the control tower using two carriage bolts and nuts (Fig. 291).

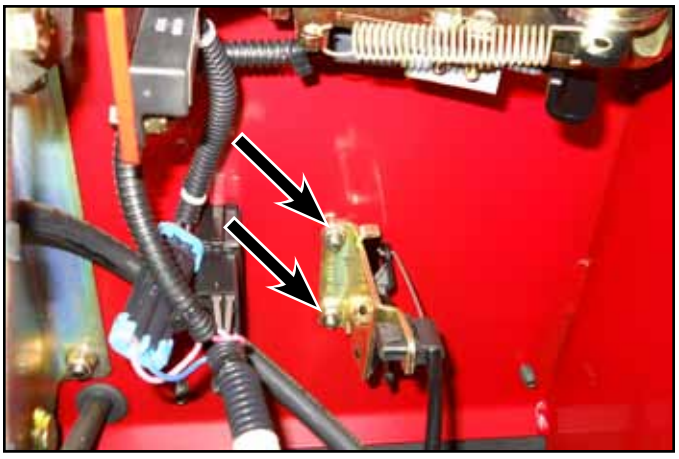


Fig. 291 DSCN-3541a

3. Apply thread-locking material to the threads of the handle knob (Fig. 292).

Fig. 292 DSCN-3554a

4. Install the handle knob to the throttle lever (Fig. 293).

Fig. 293 DSCN-3536a

5. Route the throttle cable downward between the control cables and fuel tank, then forward under the fuel tank shelf. Feed the throttle cable through the ”R” clamp located on the carrier frame (Fig. 294).

Fig. 294 DSCN-3556a

6. Install the throttle cable “Z” bend into the engine throttle lever (Fig. 295).

Fig. 295 DSCN-3535a

7. Position the throttle cable to the engine throttle plate and loosely install the screw and cable clamp (Fig. 296).

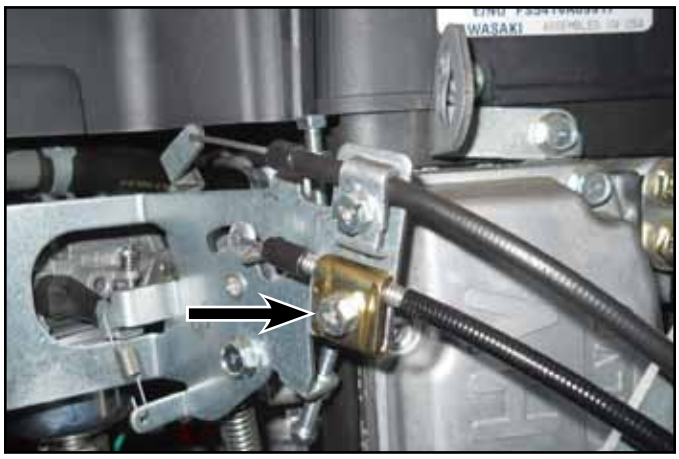


Fig. 296 DSCN-3505a

8. Move the throttle lever to the “FAST” position (Fig. 297).

Fig. 297 DSCN-3536a

9. With the engine throttle control lever in the “Fast” position, pull the slack from the cable jacket and tighten the throttle cable clamp (Fig. 298).

Fig. 298 DSCN-3561a

10. Ensure the throttle is functioning correctly by moving the throttle lever from “FAST” to “SLOW” while observing the engine throttle lever.

Speed Control Replacement

Speed Control Removal

1. Remove the shoulder bolts and flange nuts securing the ends of the control cables to the motion control levers (Fig. 299).

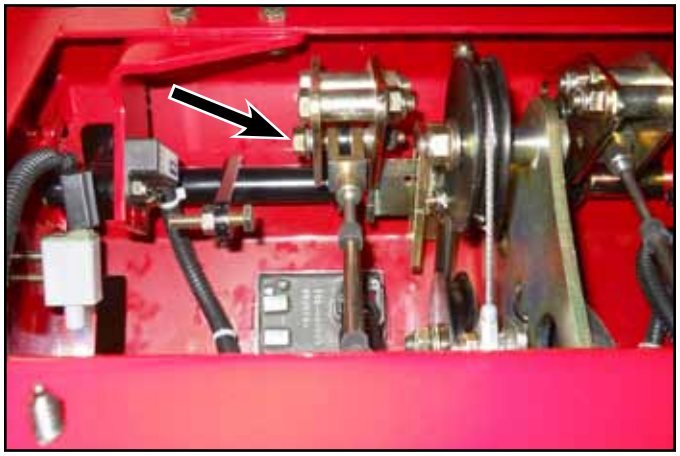


Fig. 299 DSCN-3671a

2. Remove the spring clip (Fig. 300).

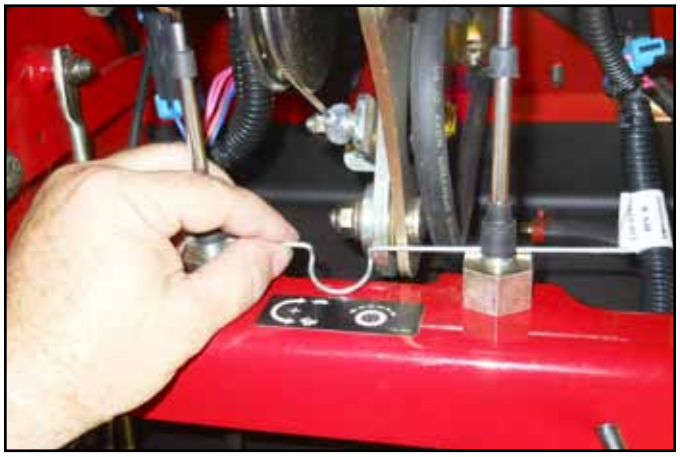


Fig. 300 DSCN-3692a

3. Remove the two cable adjustment nuts from the cross bracket (Fig. 301).

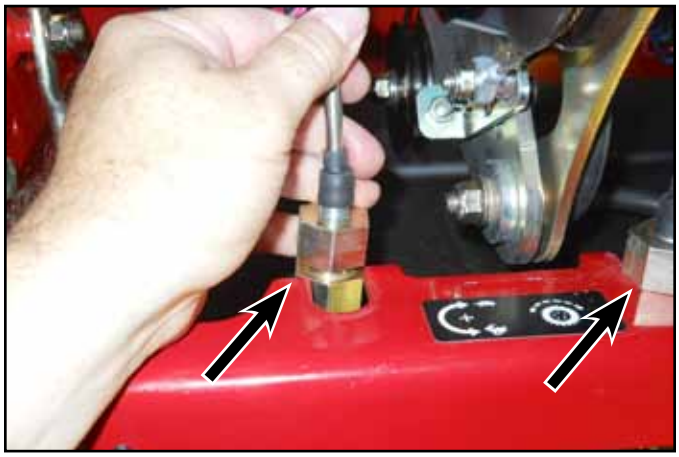


Fig. 301 DSCN-3674a

4. Remove the cable tie securing the fuel vent hose to the speed control base assembly (Fig. 302).

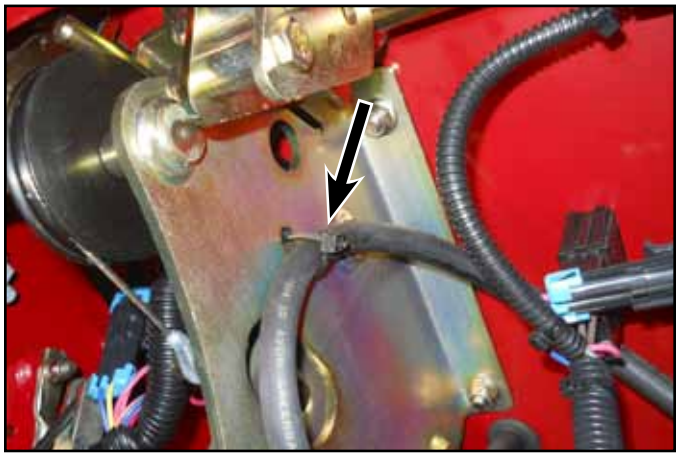


Fig. 302 DSCN-3698a

5. Remove the grip from the speed control lever (Fig. 303).

Fig. 303 DSCN-3705a

6. Remove the two sets of bolts and nuts securing the cross bracket to the control tower (Fig. 304).

Note: Do not remove the wire harness from the cross bracket. The clearance needed is gained by removing the mounting hardware.

Fig. 304 DSCN-3707a

7. Remove the two sets of carriage bolts and nuts securing the speed control assembly to the control panel (Fig. 305).

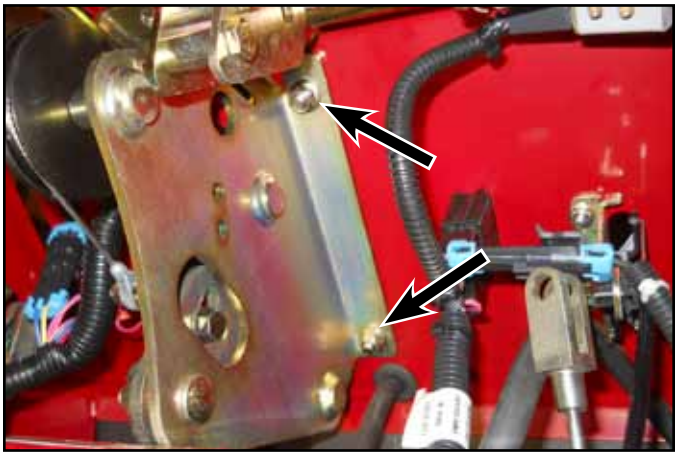


Fig. 305 DSCN-3701a

8. Remove the two sets of carriage bolts and nuts securing the slider bracket to the control assembly (Fig. 306).

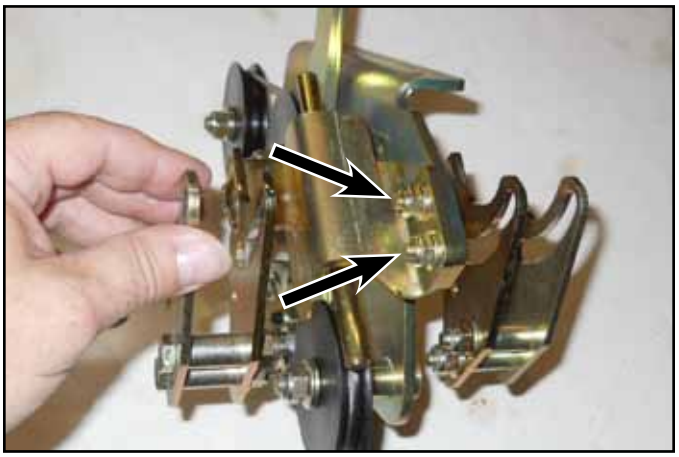


Fig. 306 DSCN-3711a

9. Remove the bolt, nut, and clamp washer securing the slider assembly to the cable (Fig. 307).

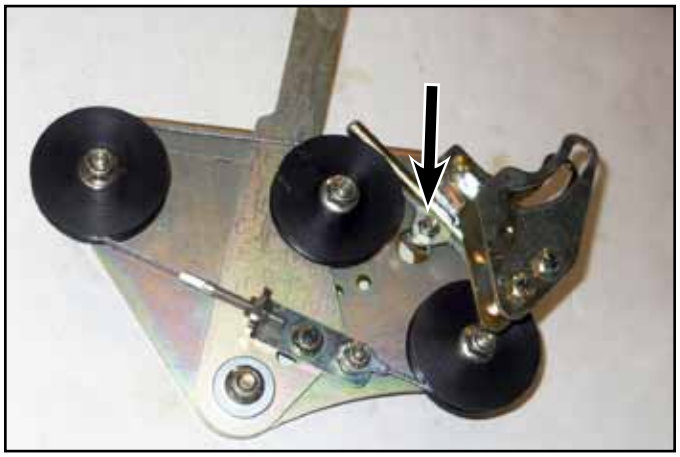


Fig. 307 DSCN-3718a

10. Remove the four sets of bolts, nuts, and spacers securing the slider plates to the slider assembly (Fig. 308).

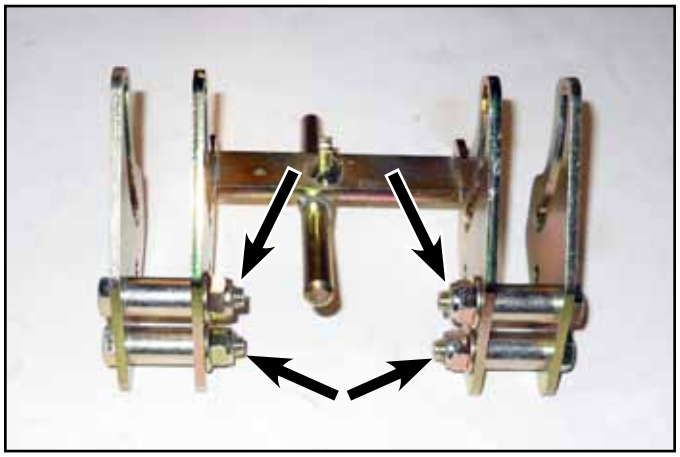


Fig. 308 DSCN-3720a

11. Remove the nuts securing the cable to the control assembly (Fig. 309).

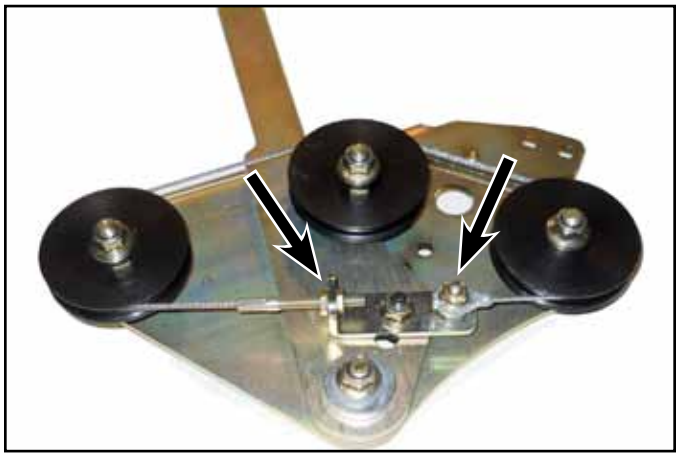


Fig. 309 DSCN-3726a

12. Remove the bolt, spacer, washer, and nut securing the link assembly to the control assembly (Fig. 310).

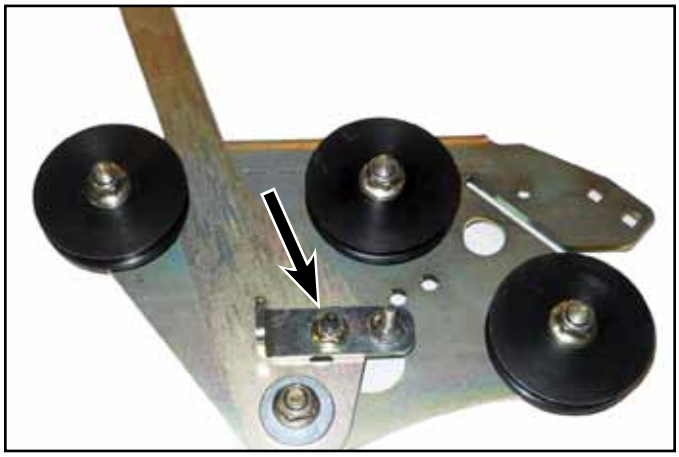


Fig. 310 DSCN-3729a

13. Remove the fastener assembly securing the speed control handle to the control assembly (Fig. 311).

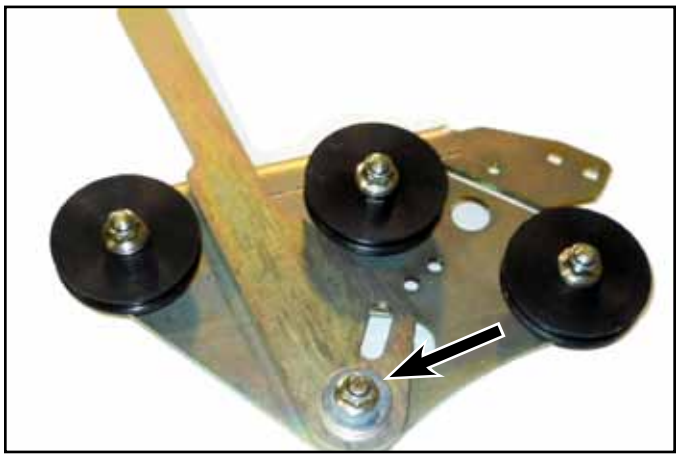


Fig. 311 DSCN-3732a

14. Remove the nuts and washers securing the pulleys to the control assembly (Fig. 312).

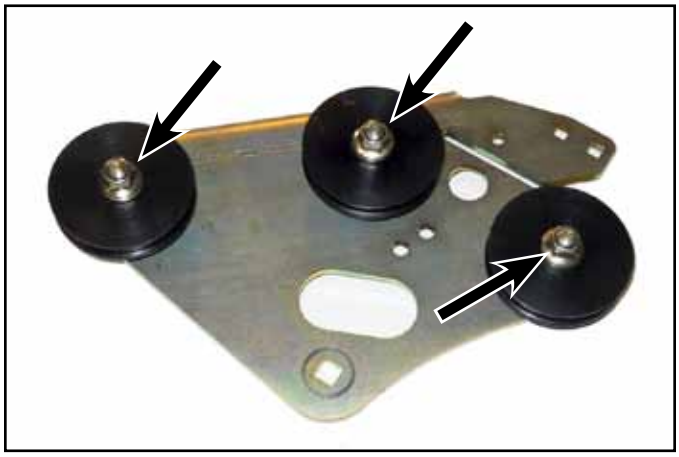


Fig. 312 DSCN-3741a

Speed Control Installation

1. Secure the three pulleys to the control assembly using washers and nuts (Fig. 313).

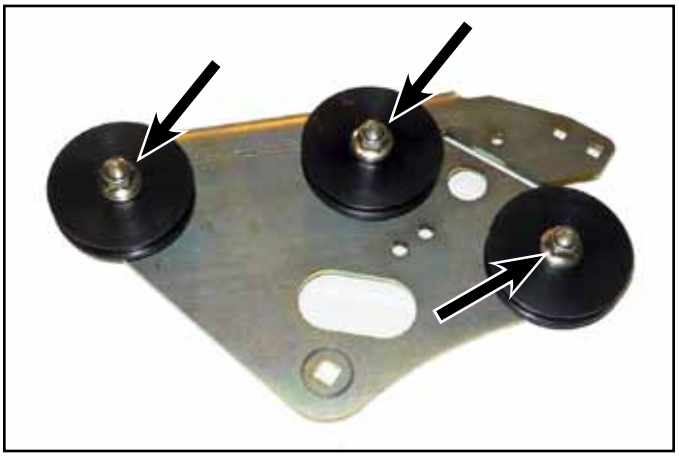


Fig. 313 DSCN-3741a

2. Position the carriage bolt, washer, spacer, and wave washers onto the control assembly (Fig. 314).

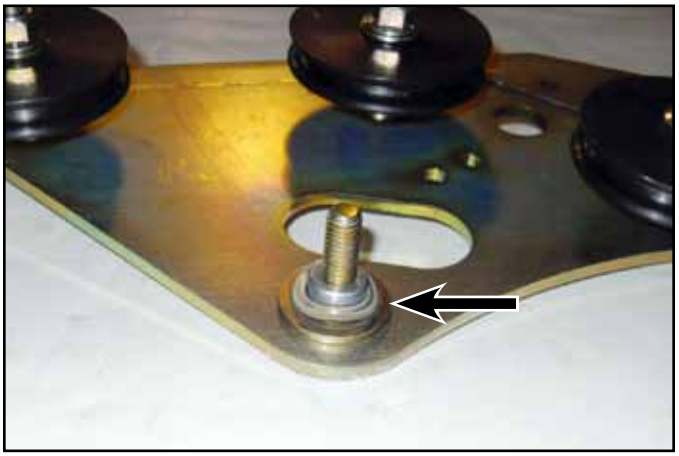


Fig. 314 DSCN-3753a

Note: The wave washers must be nested together, not alternating (Fig. 315).

Fig. 315 DSCN-3748a

3. Secure the handle to the control assembly using the retainer, lock washer, and flange nut (Fig. 316).

Note: The speed control handle must move freely, yet have adequate drag to keep it from moving during operation.

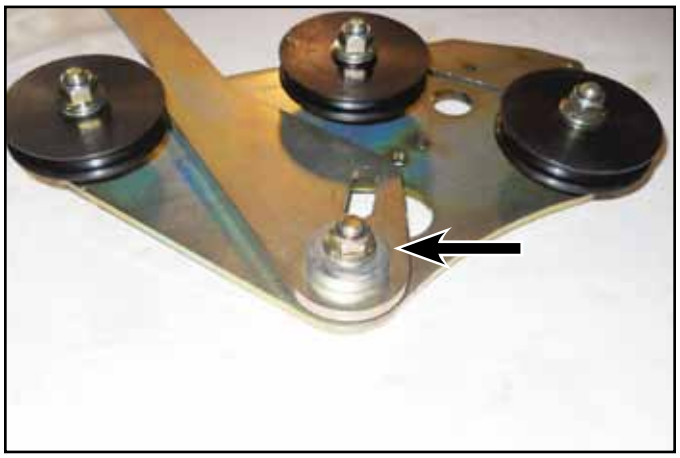


Fig. 316 DSCN-3757a

4. Position the bolt, spacer, and washer into the control handle (Fig. 317).

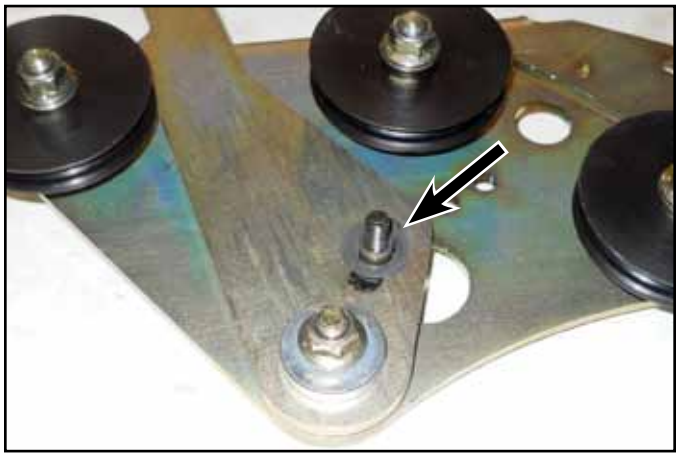


Fig. 317 DSCN-3763a

5. Secure the link assembly to the control handle using a flange nut (Fig. 318).

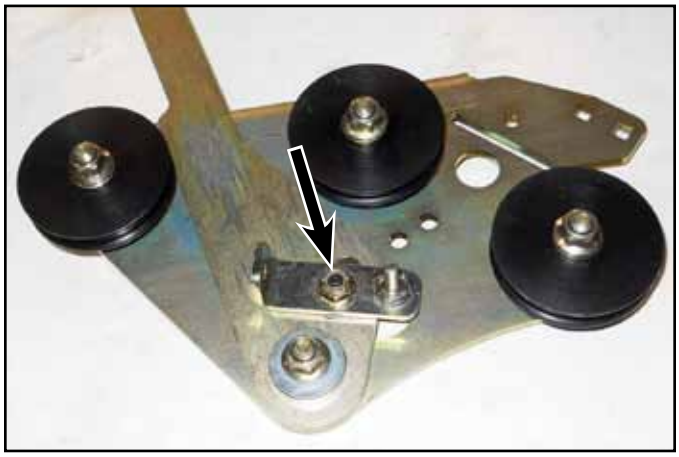


Fig. 318 DSCN-3766a

6. Loosely install the cable eyelet to the link assembly stud (Fig. 319).

Note: This nut will be tightened in a later step.

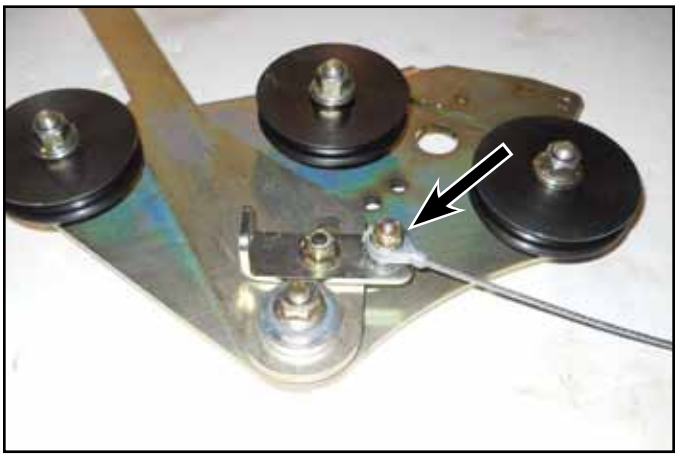


Fig. 319 DSCN-3770a

7. Route the cable around the pulleys and secure to the link assembly using the nut and jam nut, then tighten the nut securing the cable eyelet (Fig. 320).

Note: Do not over tension the cable. The speed control handle must move freely, without the cable binding on the pulleys.

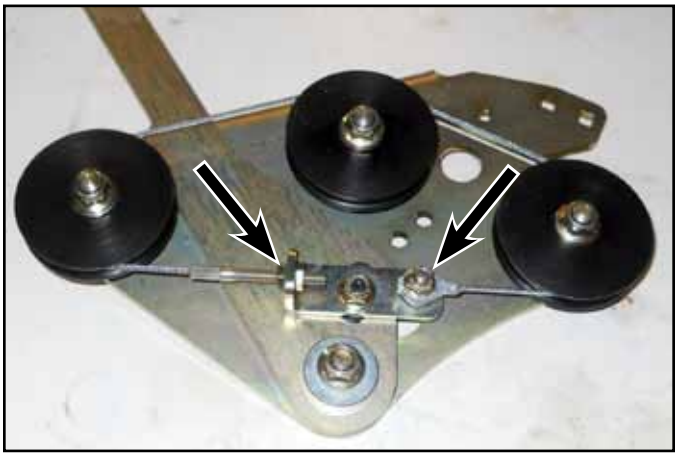


Fig. 320 DSCN-3774a

8. Secure the slider plates to the slider assembly using the four sets of bolts, spacers, and flange nuts (Fig. 321).

Note: The base of the slider plates and the base of the slider assembly MUST be level to each other.

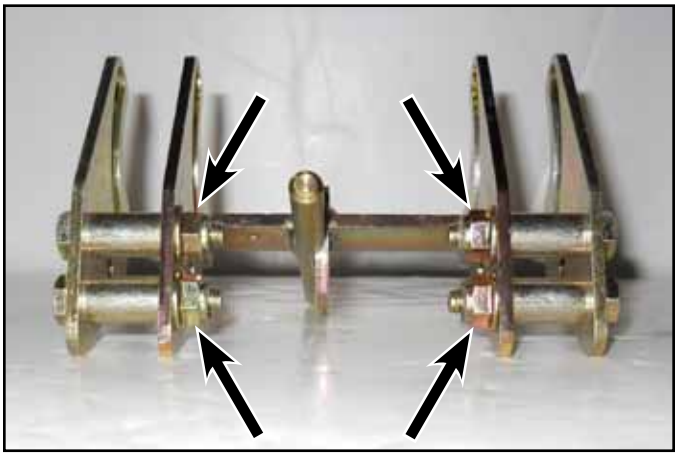


Fig. 321 DSCN-3779

9. Position the slider assembly onto the control assembly so the rod is nested in the upper pulleys (Fig. 322).

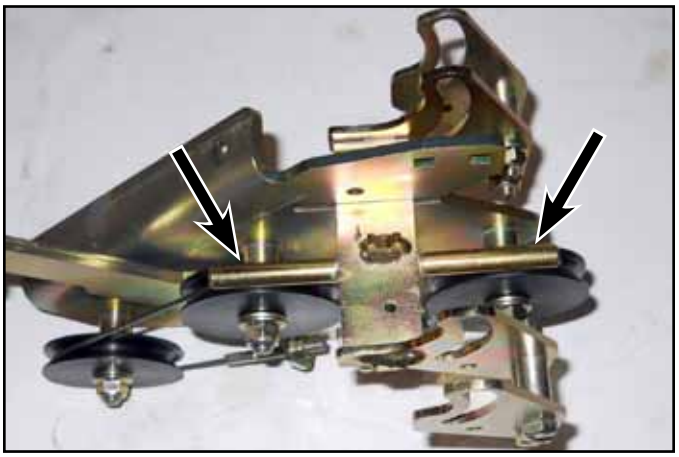


Fig. 322 DSCN-3788a

Note: The cable tab must be located to the inside of the cable (Fig. 323).

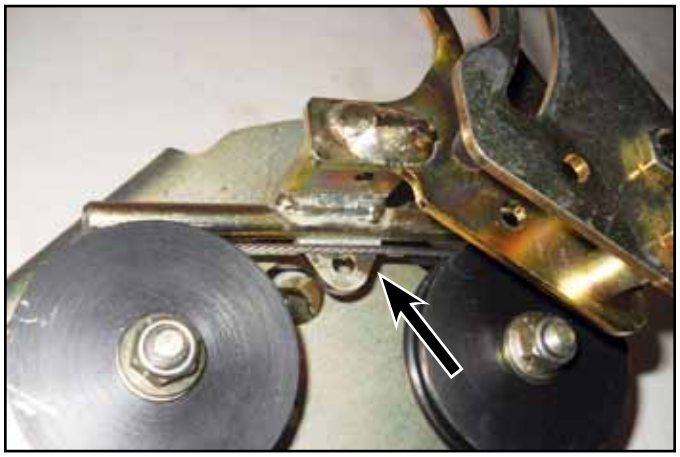


Fig. 323 DSCN-3790a

10. Loosely install the bolt, nut, and cable clamp to the slide assembly (Fig. 324).

Note: This assembly will be tightened in a later step.

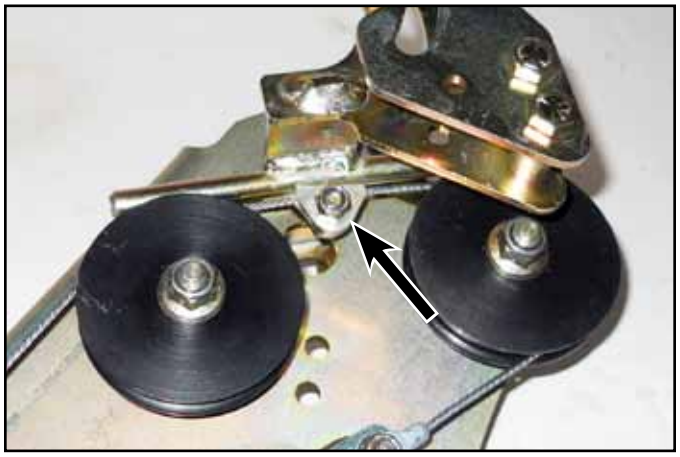


Fig. 324 DSCN-3796a

11. Secure the slider bracket to the control assembly using the two sets of carriage bolts and flange nuts (Fig. 325).

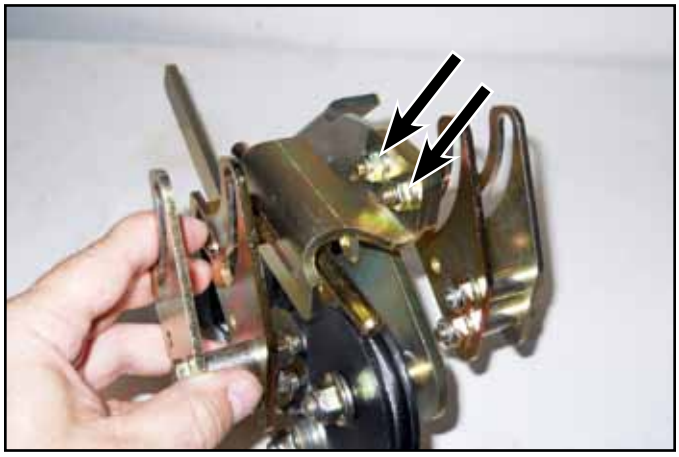


Fig. 325 DSCN-3800a

12. Secure the control assembly to the control tower using two sets of carriage bolts and nuts (Fig. 326).

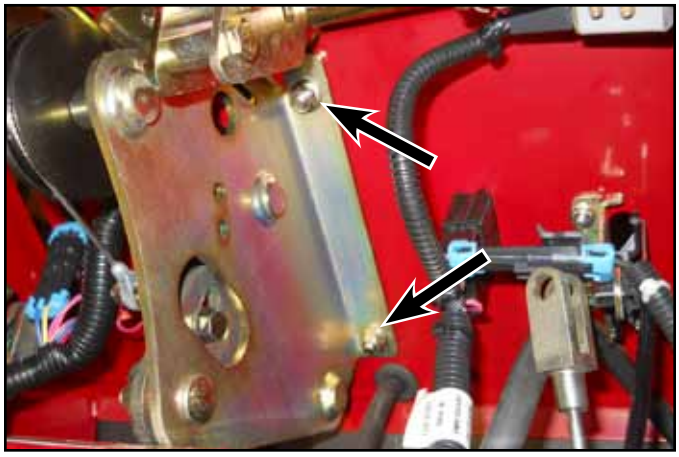


Fig. 326 DSCN-3701a

13. Install the grip onto the speed control lever (Fig. 327).

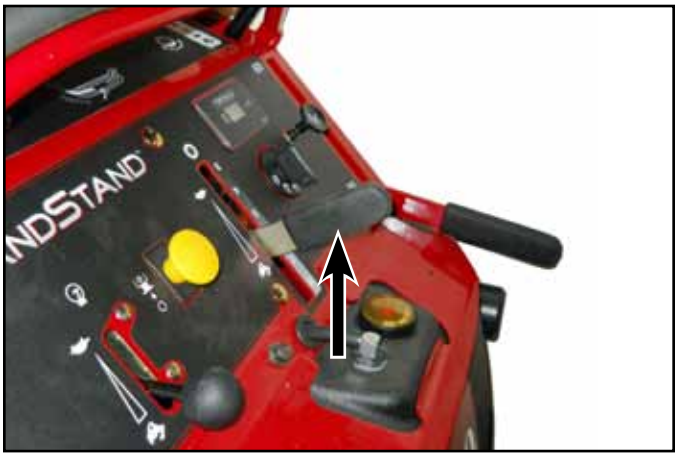


Fig. 327 DSCN-3705a

14. Secure the cross-brace to the control tower using two bolts and flange nuts (Fig. 328).

Fig. 328 DSCN-3707a

15. Secure the fuel vent hose to the control assembly using a cable tie (Fig. 329).

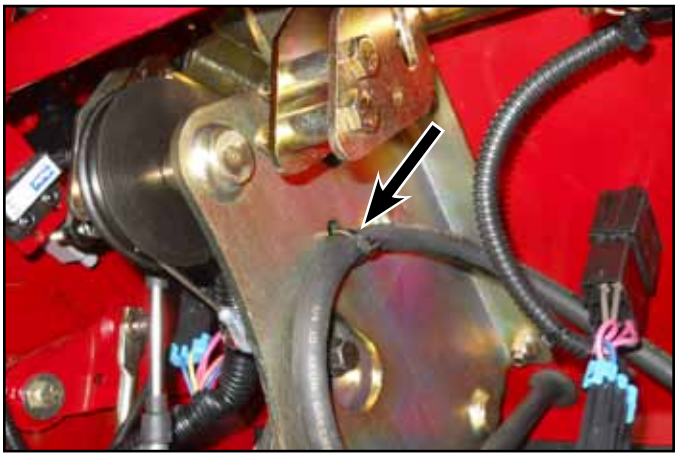


Fig. 329 DSCN-3803a

16. Position the cable adjustment nuts in the slots on the cross brace and secure using the spring clip (Fig. 330).

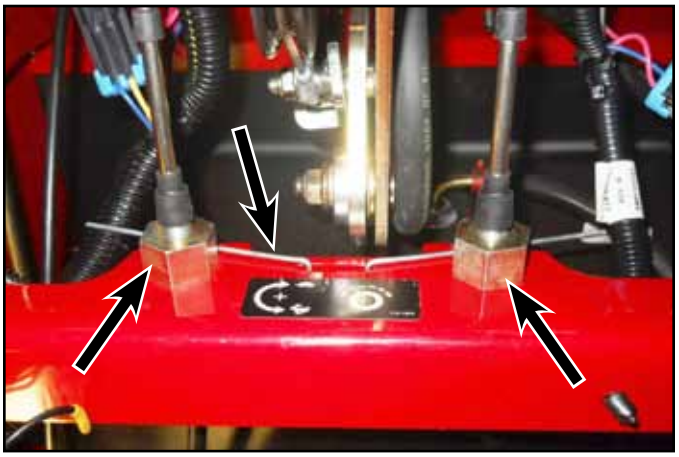


Fig. 330 DSCN-3804a

17. Secure the control cables to the motion control levers using a shoulder bolt and flange nut (Fig. 331).

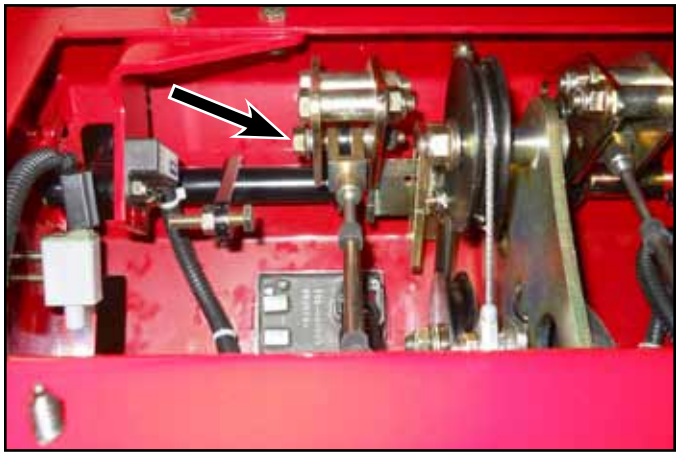


Fig. 331 DSCN-3671a

18. Place the speed control lever into the “FAST” position (Fig. 332).

Fig. 332 DSCN-3806a

19. Pull the RH and LH slider spacers rearward as far as possible (Fig. 333).

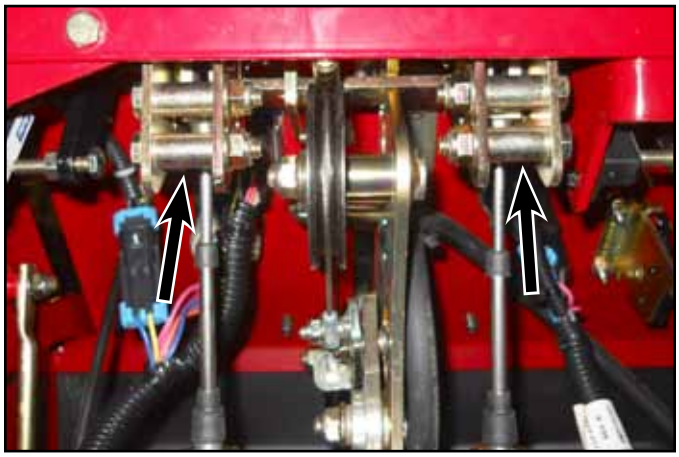


Fig. 333 DSCN-3812a

20. Tighten the clamp assembly to secure the cable to the slider assembly (Fig. 334).

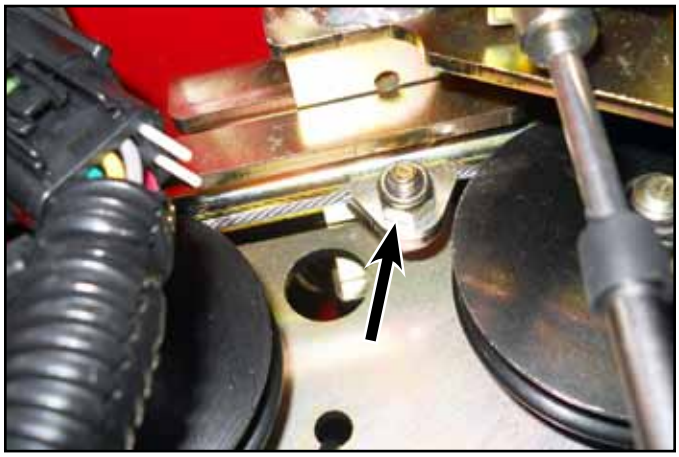


Fig. 334 DSCN-3811a

Adjusting the Tracking

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

1. While driving the machine, push both control levers forward the same distance.
2. Check if the machine tracks to one side. If it does, stop the machine and set the parking brake.
3. Release the operator cushion from the rear of the machine.
4. Rotate the right cable adjustment to position the right motion control in the center of the control panel neutral lock slot. Then, rotate the left cable adjustment in quarter-turn increments until the machine tracks straight (Fig. 335).

Note: Only adjust the left cable to match the left wheel speed to the right wheel speed. Do not adjust the right wheel speed as this will position the right motion control lever out of the center for the control panel neutral lock slot.

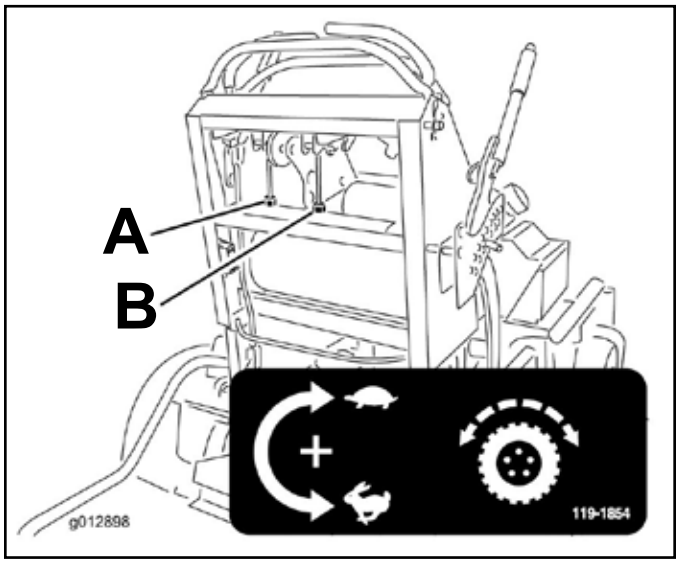


Fig. 335 fig. 55 G012898

A. Left cable adjustment B. Right cable adjustment

5. Check for proper tracking

5. Repeat adjustment until the tracking is correct.

7. Check that the machine does not creep from neutral with the park brakes disengaged.

Important

Do not rotate the linkage too far, as this may cause the machine to creep in neutral.

Speed Control Adjustment

1. Loosen the clamp assembly securing the speed control assembly to the speed control cable (Fig. 336).

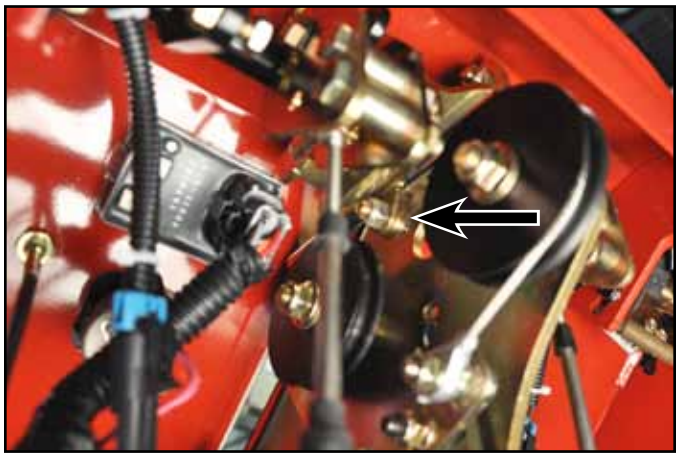


Fig. 336 DSC-0534a

2. Move the speed control lever to the “Fast” position (Fig. 337).

Fig. 337 DSC-0539a

3. Pull the RH and LH idler spacers rearward as far as possible (Fig. 338).

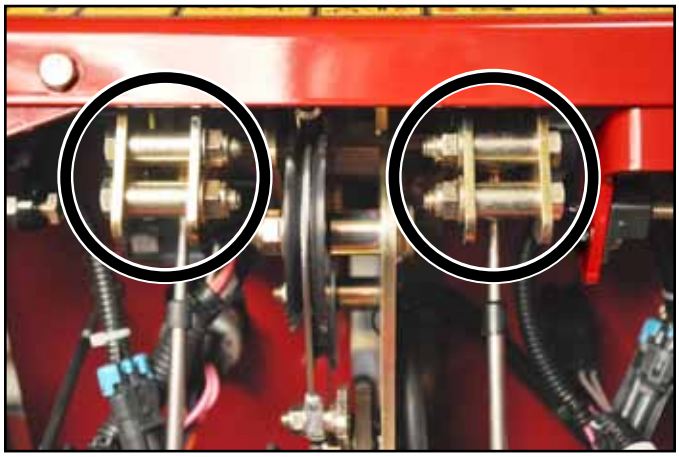


Fig. 338 DSC-0540a

4. Tighten the clamp assembly securing the speed control cable to the speed control assembly (Fig. 339).

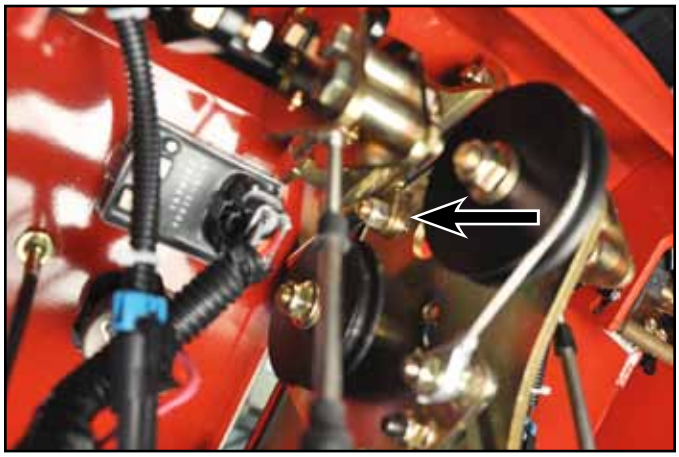


Fig. 339 DSC-0534a

5. Verify that the speed control lever and motion control levers operate smoothly.

THIS PAGE INTENTIONALLY LEFT BLANK.

Engine Replacement

Engine Removal

1. Turn the engine off and remove the key from the ignition.

2. Turn the fuel shutoff valve to the “OFF” position (Fig. 340).

Fig. 340 DSCN-2516a

3. Drain the engine oil.

4. Remove the two sets of wingnuts and hold down bolts securing the battery cover, then remove the cover (Fig. 341).

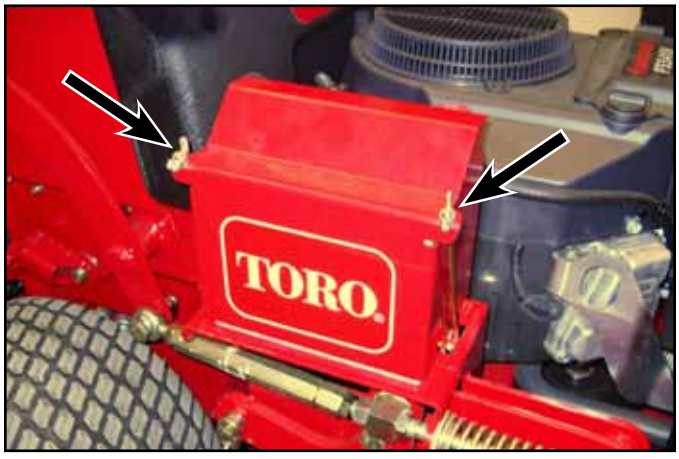


Fig. 341 DSCN-2263a

5. Remove the bolt, washer, and nut securing the black ground cable to the battery terminal (Fig. 342).

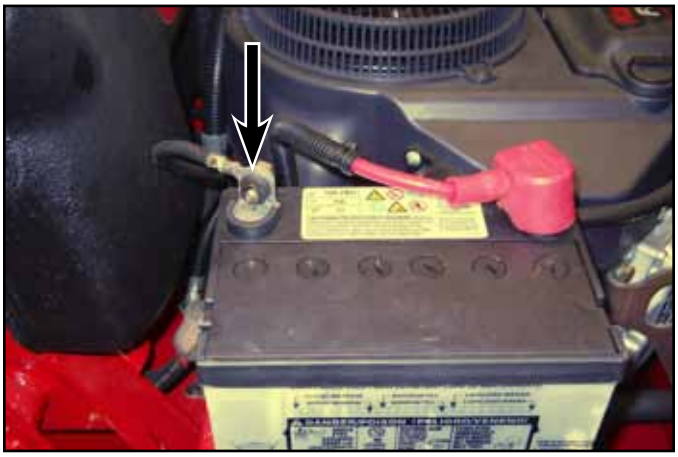


Fig. 342 DSCN-2265a

6. Remove the bolt, washer, and nut securing the red positive cable to the battery terminal, then remove the battery (Fig. 343).

Fig. 343 DSCN-2270a

7. Slide the hose clamp off the fuel line where it connects to the fuel pump (Fig. 344).

Fig. 344 DSCN-2517a

8. Remove the fuel line from the fuel pump. Drain the fuel into a suitable container (Fig. 345).

Fig. 345 DSCN-2521a

9. Remove the violet wire from the voltage regulator (Fig. 346).

Fig. 346 DSCN-2522a

10. Unplug the pink wire from the green fuel solenoid wire (Fig. 347).

Fig. 347 DSCN-2526a

11. Unplug the white wire from the black magneto wire (Fig. 348).

Fig. 348 DSCN-2527a

12. Remove the bolt and washer securing the ground wires to the engine block (Fig. 349).

Fig. 349 DSCN-2530a

13. Remove nut and lock washer securing the starter wire to the solenoid (Fig. 350).

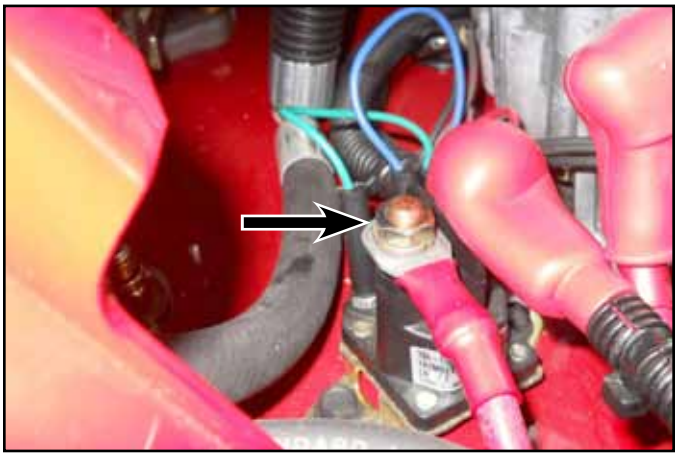


Fig. 350 DSCN-2533a

14. Unplug the clutch wires from the wiring harness (Fig. 351).

Fig. 351 DSCN-2536a

15. Push the grommet and the electrical plug connector down through the engine base (Fig. 352).

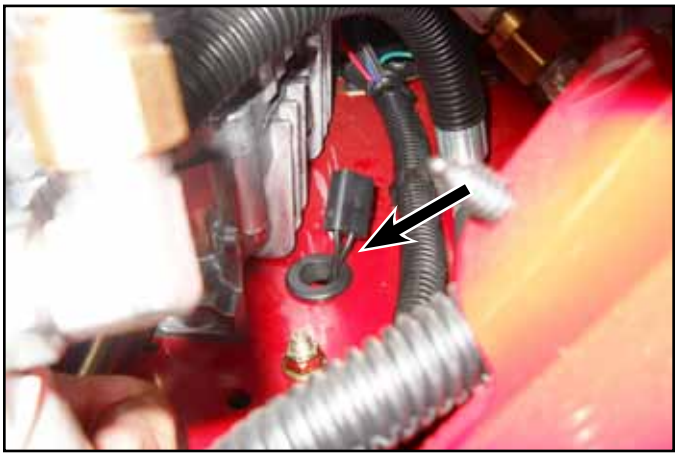


Fig. 352 DSCN-2547a

16. Remove the four nuts, two mounting guard brackets, and four carriage bolts securing the muffler guard assembly to the front frame, then remove the muffler guard (Fig. 353).

Fig. 353 DSCN-2549a

17. Loosen the screw on the choke cable clamp and disconnect the choke cable from the engine choke lever (Fig. 354).

Fig. 354 DSCN-2551a

18. Loosen the screw on the throttle cable clamp and disconnect the throttle cable from the engine throttle lever (Fig. 355).

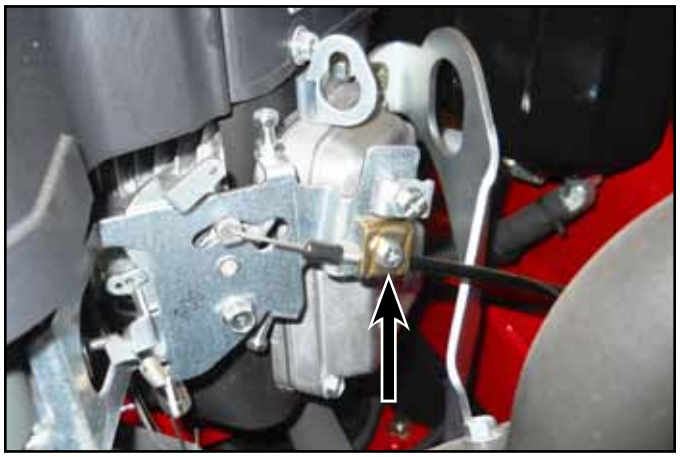


Fig. 355 DSCN-2556a

19. Remove the cable clamp securing the throttle and choke cable to the engine oil drain (Fig. 356).

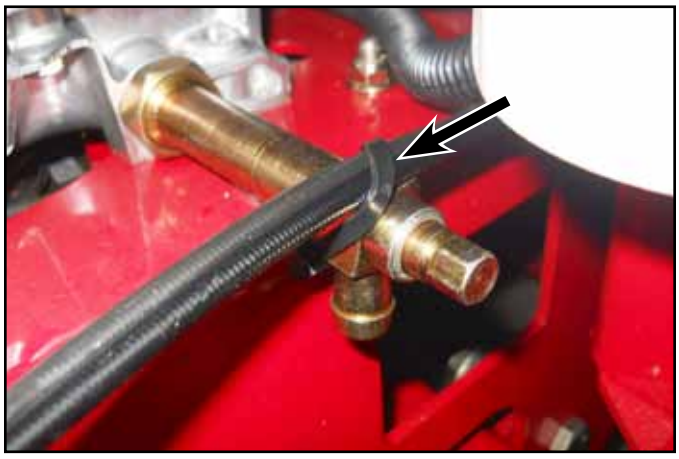


Fig. 356 DSCN-2561a

20. Lower the HOC (height of cut) to the lowest HOC.

21. Remove the belt covers.

22. **36” Deck:** Using a spring tool, remove the extension spring from the deck anchor post (Fig. 357).

Fig. 357 DSCN-2562a

23. **40” Deck:** Using a spring tool, remove the extension spring from the deck anchor post (Fig. 358).

Fig. 358 DSCN-2564a

24. **40” Deck:** Using a spring tool, remove the RH spindle extension spring from the RH deck anchor post (Fig. 359).

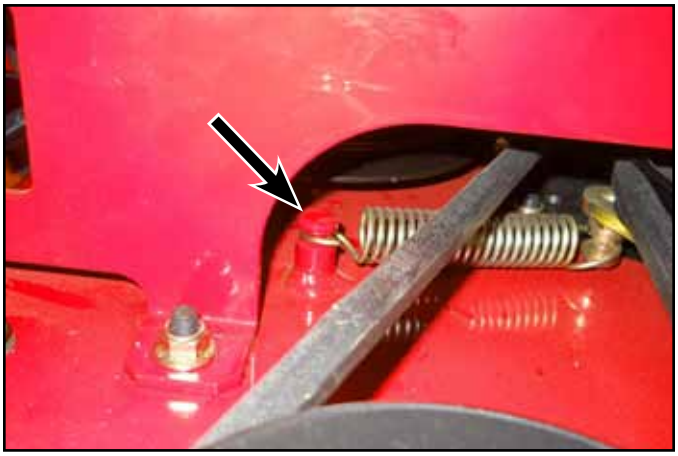


Fig. 359 DSCN-2582a

5

25. Raise the machine so the underside of the chassis can be accessed.

26. Remove the cable tie securing the clutch wire harness to the clutch anchor (Fig. 360).

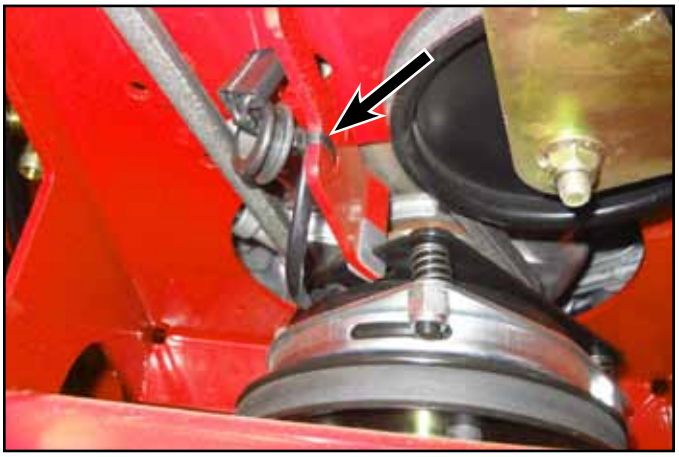


Fig. 360 DSCN-2566a

27. Remove the deck belt from the clutch pulley (Fig. 361).

Fig. 361 DSCN-2569a

28. Remove the extension spring from the drive idler pulley assembly (Fig. 362).

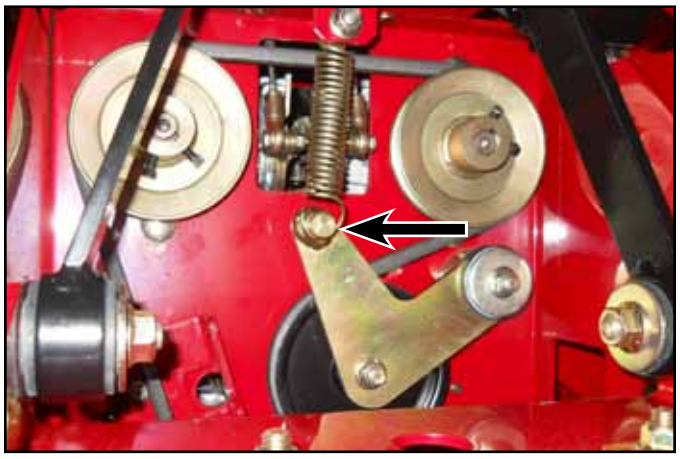


Fig. 362 DSCN-2574a

29. Remove the drive belt from the engine pulley (Fig. 363).

Fig. 363 DSCN-2575a

30. Remove the bolt and nut securing the clutch anchor to the engine base (Fig. 364).

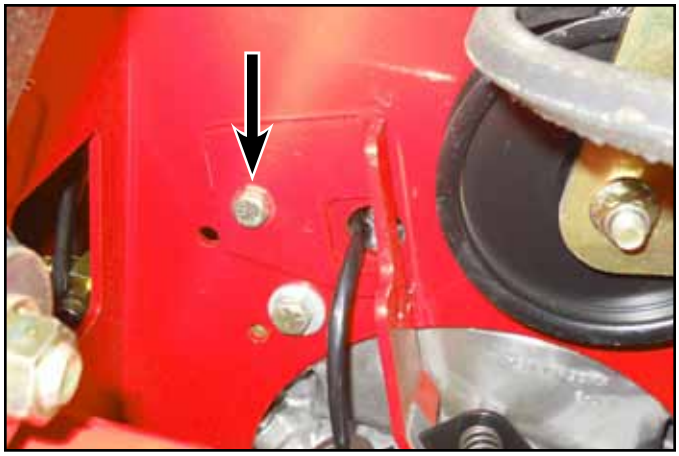


Fig. 364 DSCN-2578a

31. Remove the four bolts and Belleville washers securing the engine to the engine base (Fig. 365).

Fig. 365 DSCN-2581a

32. Using a hoist, remove the engine from the engine base (Fig. 366).

Fig. 366 DSCN-2587a

33. Remove one spark plug and feed a minimum of two feet (61cm) of 3/8” (.95cm) rope into the cylinder to prevent engine crankshaft rotation (Fig. 367).

Note: Rotate the crankshaft as needed to permit feeding the rope into the cylinder.

Fig. 367 IMG-9634a

5

34. Remove the bolt, spring washer, and washer securing the clutch to the engine crankshaft. (Fig. 368).

Fig. 368 DSCN-2589a

35. Remove the clutch from the engine crankshaft.

36. Remove the drive pulley from the engine crankshaft (Fig. 369).

Fig. 369 DSCN-2594a

37. Remove the key from the engine crankshaft keyway (Fig. 370).

Fig. 370 DSCN-2597a

38. Loosen the jam nut securing the position of the oil drain assembly, then remove the oil drain (Fig. 371).

Fig. 371 DSCN-2602a

39. Remove the two bolts, spacers and nuts securing the left and right side muffler brackets to the muffler (Fig. 372).

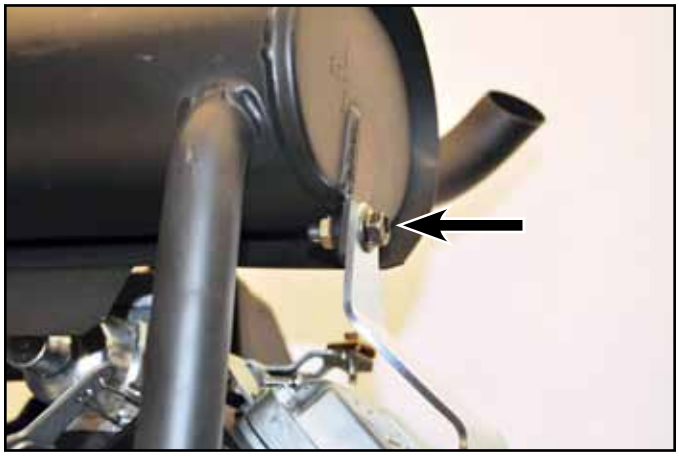


Fig. 372 IMG-0542a

40. Remove four nuts and lock washers securing the muffler to the engine (Fig. 373).

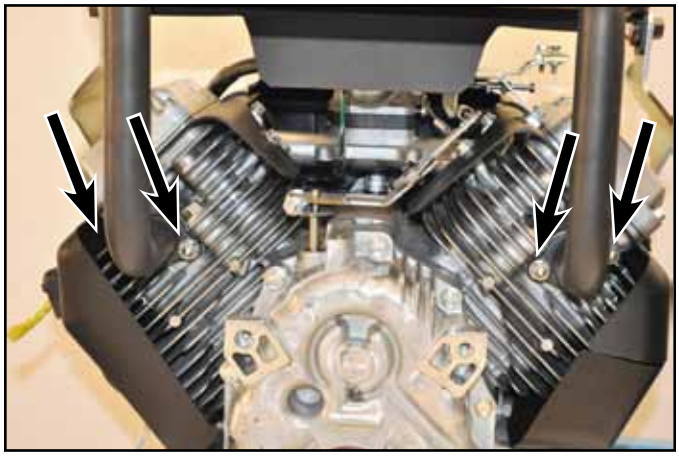


Fig. 373 IMG-0522a

41. Remove the four bolts and lock washers securing the right and left hand muffler brackets to the engine (Fig. 374).

Fig. 374 IMG-0528a

Engine Installation

1. Secure the RH and LH muffler brackets to the engine using four bolts and lock washers (Fig. 375).

Fig. 375 IMG-0528a

2. Position an exhaust gasket on the exhaust studs for both exhaust ports (Fig. 376).

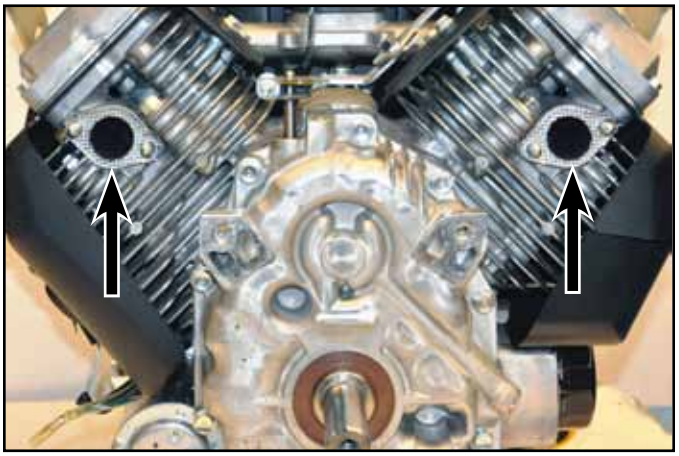


Fig. 376 IMG-0531a

3. Secure the muffler to the engine using four nuts and lock washers. Torque to 19 ± 2 ft-lbs. (26 ± 3 Nm) (Fig. 377).

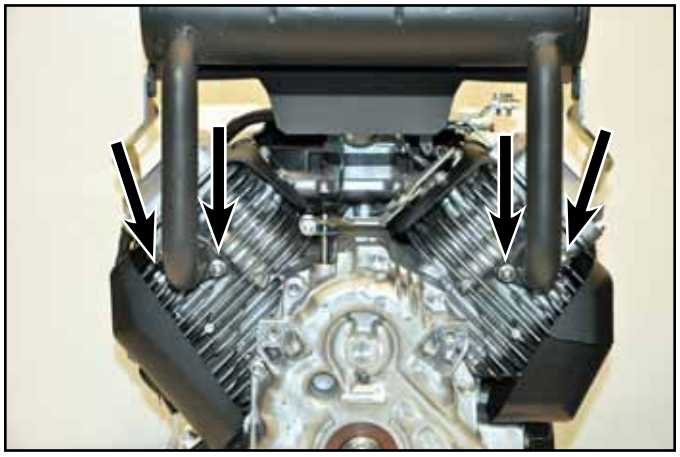


Fig. 377 IMG-0532a

4. Install the two bolts, spacers, and nuts securing the left and right side muffler brackets to the muffler (Fig. 378).

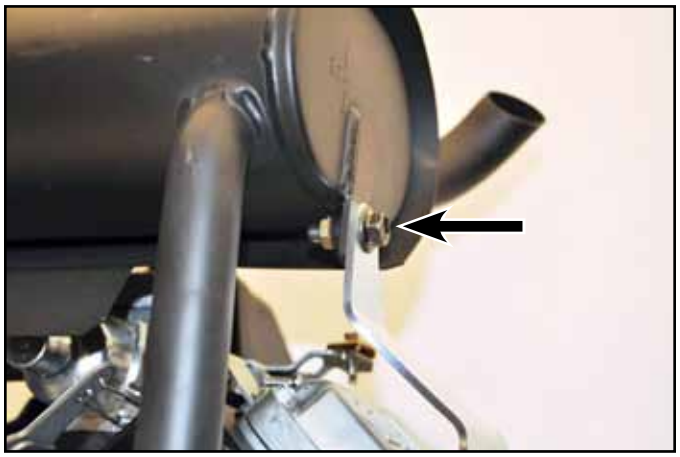


Fig. 378 IMG-0542a

5. Install the oil drain assembly into the engine sump (Fig. 379).

Note: Position the oil drain assembly with the exit port pointing downward, then secure the position with the jam nut.

Fig. 379 DSCN-2602a

6. Remove one spark plug and feed a minimum of two feet (61cm) of 3/8" (.95cm) rope into the cylinder to prevent engine crankshaft rotation (Fig. 380).

Note: Rotate the crankshaft as needed to permit feeding the rope into the cylinder.

Fig. 380 IMG-9634a

7. Install the key into the engine crankshaft keyway and apply anti seize around the crankshaft (Fig. 381).

Fig. 381 DSCN-2603a

8. Install the drive pulley onto the engine crankshaft with the large hub towards the engine (Fig. 382).

Fig. 382 DSCN-2605a

9. Using a feeler gauge, check the clutch air gap at each of the three adjustment slots. Set the gap to .015” (0.381mm). Make sure the gauge is inserted between the armature and the rotor friction surfaces (Fig. 383).

Fig. 383 PICT-0554a

10. Install the spring washer (crown toward the bolt head) and flat washer to the clutch bolt (Fig. 384).

Fig. 384 IMG-9630a

11. Apply thread locking compound to the threads of the clutch bolt (Fig. 385).

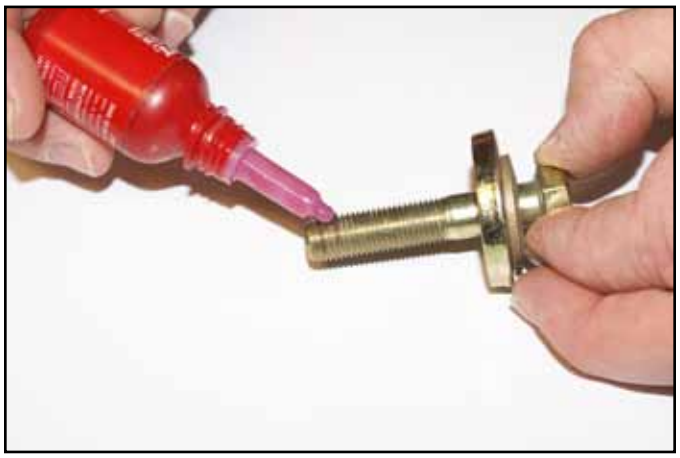


Fig. 385 PICT-8700a

12. Torque the clutch bolt to 55 ft-lbs. (75 Nm) (Fig. 386).

Fig. 386 DSCN-2612a

13. Remove the rope from the engine cylinder and replace the spark plug (Fig. 387).

Fig. 387 IMG-9634a

14. Using a hoist, position the engine onto the engine base (Fig. 388).

Fig. 388 DSCN-2587a

15. Secure the engine to the engine base using the four sets of bolts and Belleville washers. Torque the bolts to 30 - 35 ft-lbs. (41 - 47 Nm) (Fig. 389).

Fig. 389 DSCN-2581a

16. Secure the PTO stop bracket to the engine base using a bolt and nut (Fig. 390).

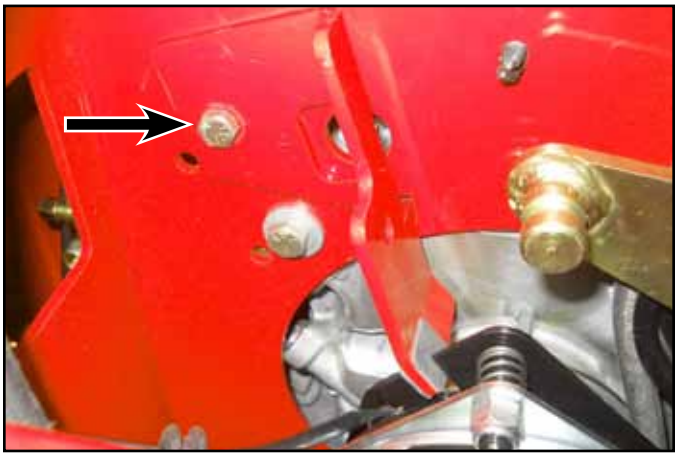


Fig. 390 DSCN-2642a

Note: Ensure the PTO stop bracket is nested in the slot on the clutch plate (Fig. 391).

Fig. 391 DSCN-2645a

17. Feed the clutch wire harness up through the engine base (Fig. 392).

Fig. 392 DSCN-2647a

18. Install the rubber grommet into the engine base (Fig. 393).

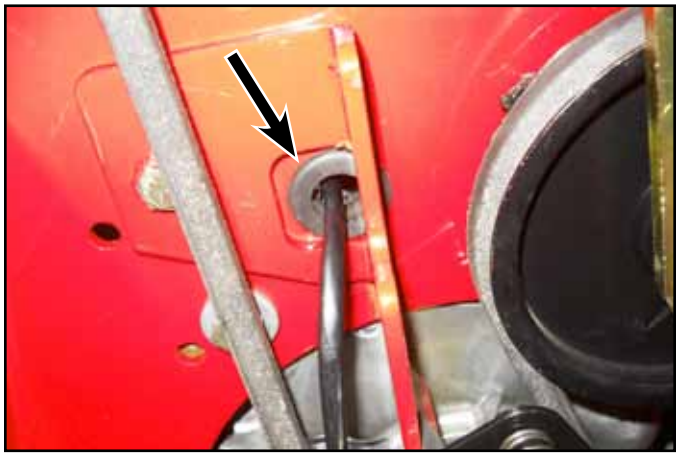


Fig. 393 DSCN-2649a

19. Secure the wire harness to the PTO stop bracket using a cable tie (Fig. 394).

Fig. 394 DSCN-2658a

20. Position the pump drive belt around the engine drive pulley, the two hydraulic pump pulleys, and the idler pulley (Fig. 395).

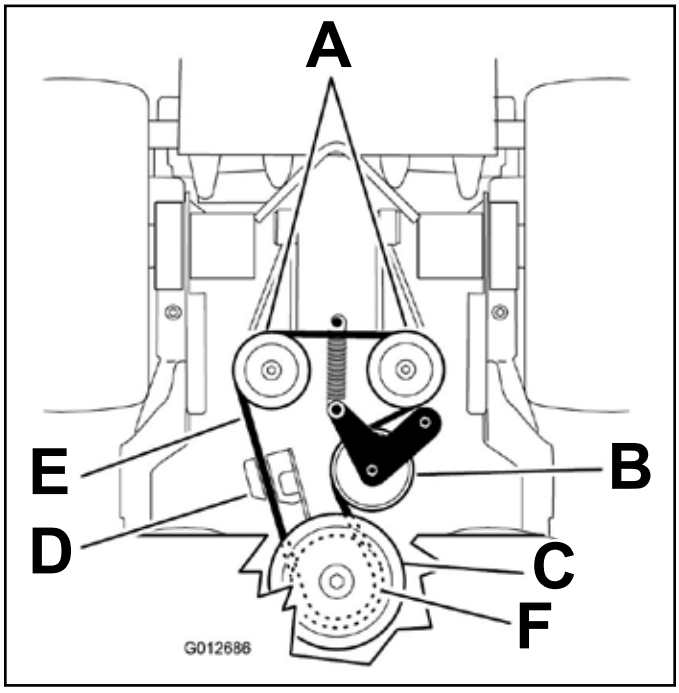


Fig. 395 fig. 67 G012686

A. Hydraulic pumps
B. Idler pulley
C. Clutch pulley
D. Clutch retainer
E. Pump drive belt
F. Pump drive pulley

21. Install the extension spring from the idler bracket to the spring anchor (Fig. 396).

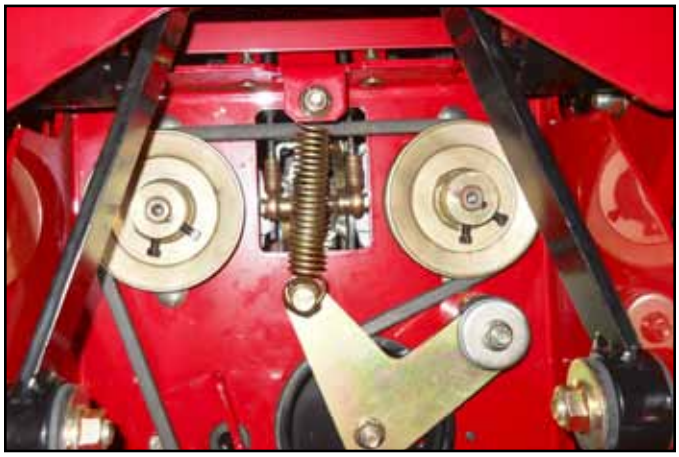


Fig. 396 DSCN-2660a

22. **36” Deck:** Route the deck belt around the deck spindle pulleys. Refer to decal 119-0186 (Fig. 397).

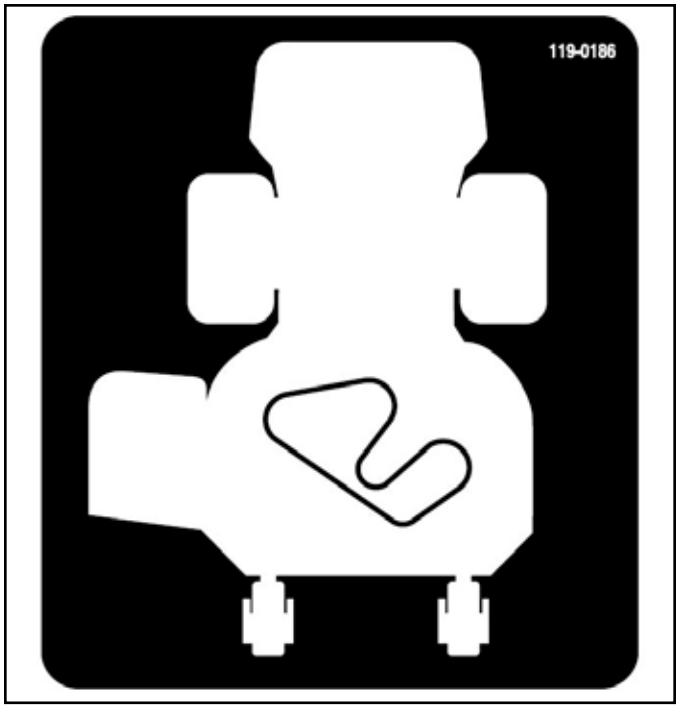


Fig. 397 decal 119-0186

23. **36” Deck:** Install the extension spring to the idler bracket and spring anchor (Fig. 398).

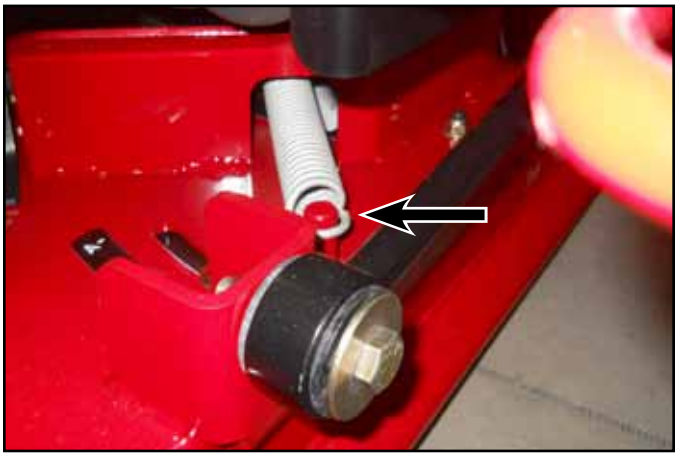


Fig. 398 DSCN-2666a

24. **40” Deck:** Route the deck belts around the deck spindle pulleys. Refer to decal 119-0187 (Fig. 399).

Fig. 399 decal 119-0187

25. **40” Deck:** Install the extension spring to the LH idler bracket and spring anchor (Fig. 400).

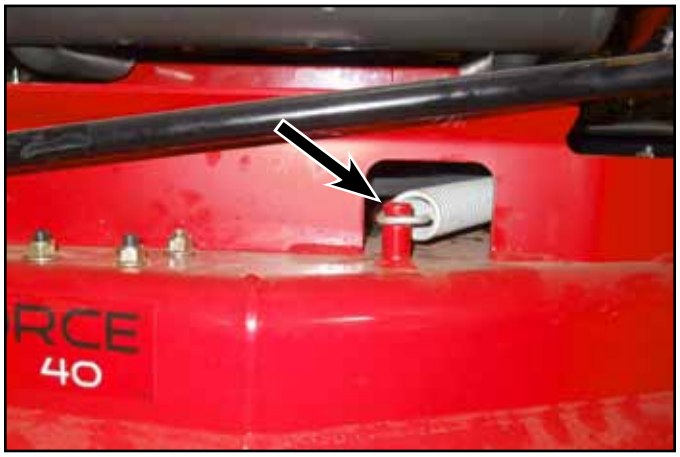


Fig. 400 DSCN-2670a

26. **40” Deck:** Install the extension spring to the RH idler bracket and spring anchor (Fig. 401).

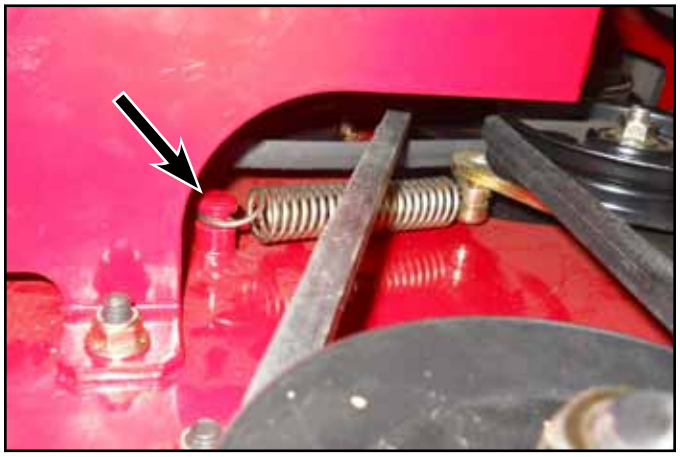


Fig. 401 DSCN-2667a

27. Install the belt covers.

28. Hook the “Z” bend of the throttle cable into the throttle control lever and loosely clamp the outer housing of the throttle cable with the cable clamp (Fig. 402).

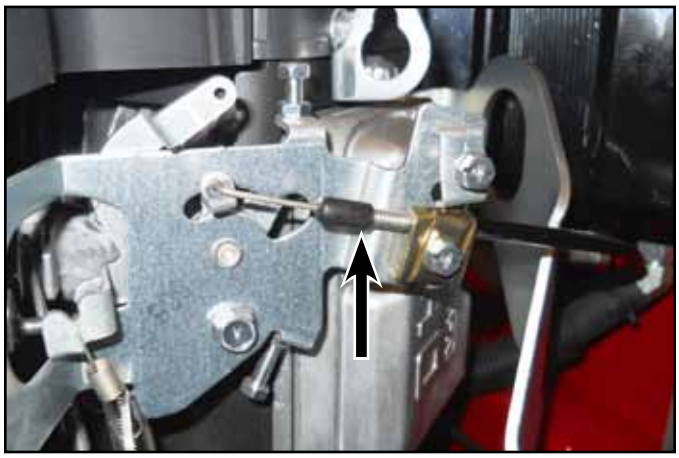


Fig. 402 DSCN-2672a

29. Move the throttle lever to the “Fast” position (Fig. 403).

Fig. 403 DSCN-2674a

30. With the engine throttle control lever in the “Fast” position, pull the slack from the cable jacket and tighten the throttle cable clamp (Fig. 404).

Fig. 404 IMG-0576a

31. Hook the “Z” bend of the choke cable into the choke control lever and loosely clamp the outer housing of the choke cable with the cable clamp (Fig. 405).

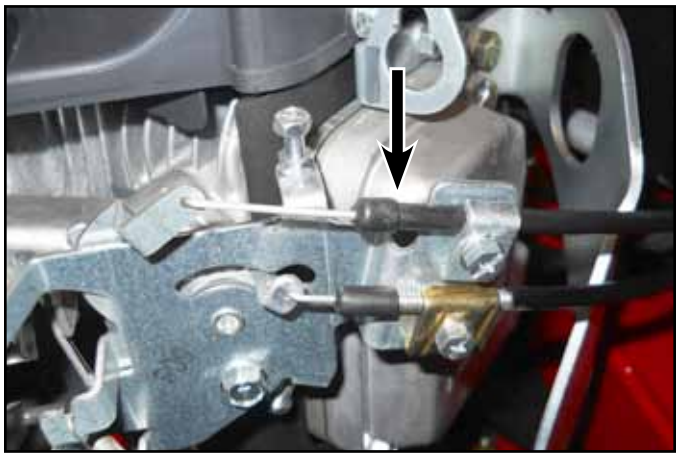


Fig. 405 DSCN-2676a

5

32. Push the choke knob in so it is in the “Open” position (Fig. 406).

Fig. 406 DSCN-2677a

33. While holding the engine choke control lever in the “Open” position, pull the slack from the cable jacket and tighten the choke cable clamp (Fig. 407).

Fig. 407 IMG-0584a

34. Secure the throttle and choke cable to the oil drain assemble using a cable tie (Fig. 408).

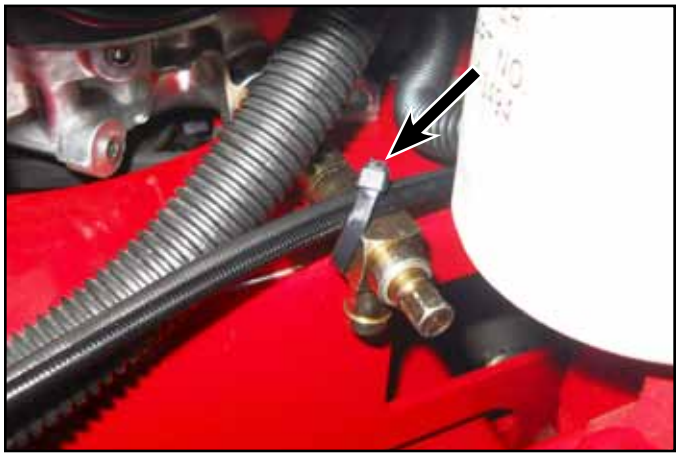


Fig. 408 DSCN-2683a

35. Position the muffler guard assembly and loosely install the four carriage bolts, two mounting guard brackets and nuts (Fig. 409).

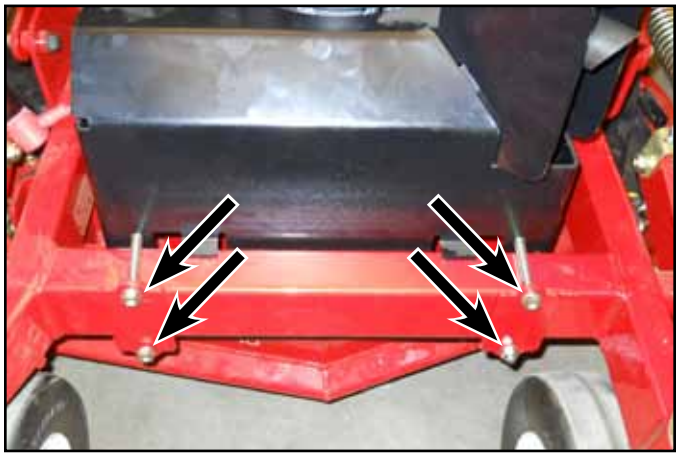


Fig. 409 DSCN-2678a

36. Make sure the muffler exhaust is centered in the muffler guard assembly, then tighten all four bolts and nuts. Torque the nuts to 19 ± 2 ft-lbs. (25.76 ± 2.7 Nm) (Fig. 410).

Fig. 410 DSCN-2680a

37. Connect the clutch wire harness to the wire harness (Fig. 411).

Fig. 411 DSCN-2686a

38. Install the battery ground wire and the wiring harness ground wire to the engine block (Fig. 412).

Fig. 412 DSCN-2688a

39. Install the starter wire to the solenoid using a lock washer and nut. Torque nut to 35 in-lbs (4 Nm) (Fig. 413).

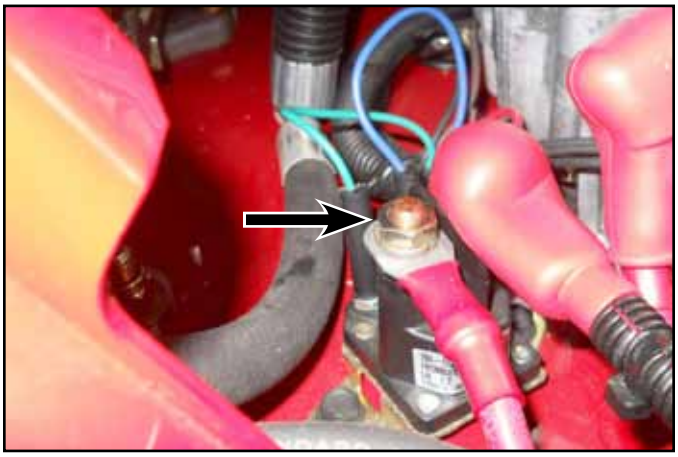


Fig. 413 DSCN-2533a

40. Connect the white wire to the black magneto wire (Fig. 414).

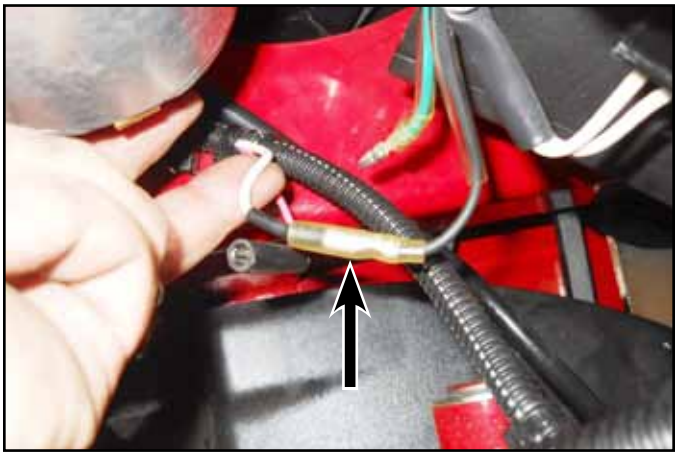


Fig. 414 DSCN-2691a

41. Connect the pink wire to the green fuel solenoid wire (Fig. 415).

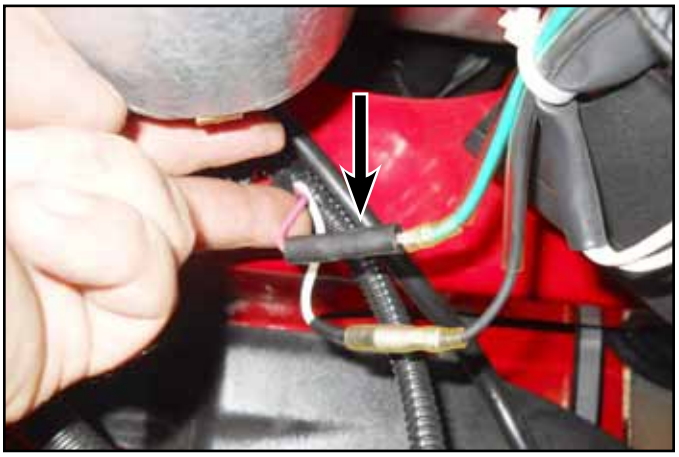


Fig. 415 DSCN-2692a

42. Connect the violet wire to the voltage regulator (Fig. 416).

Fig. 416 DSCN-2695a

43. Secure the fuel line to the fuel pump using the hose clamp (Fig. 417).

Fig. 417 DSCN-2517a

44. Position the battery on the battery tray. Using the bolt nut and washer, secure the positive battery cable to the battery. Using the bolt nut and washer, secure the negative battery cable to the battery (Fig. 418).

Fig. 418 DSCN-2698a

45. Install the battery cover with the two hold down bolts and wing nuts (Fig. 419).

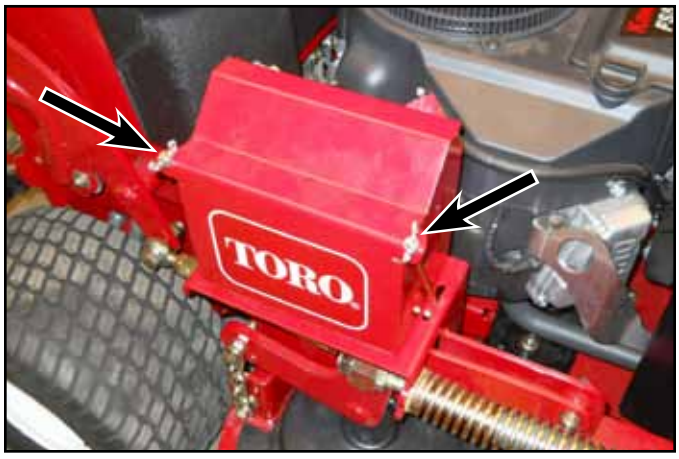


Fig. 419 DSCN-2700a

46. Fill the engine with oil to the specified level.

47. Turn the fuel shutoff valve to the “ON” position (Fig. 420).

Fig. 420 DSCN-2702a

THIS PAGE INTENTIONALLY LEFT BLANK.

Pump Drive Belt Replacement

Pump Drive Belt Removal

1. **36” Deck:** Using a spring tool, remove the extension spring from the deck anchor post (Fig. 421).

Fig. 421 DSCN-2562a

2. **40” Deck:** Using a spring tool, remove the LH extension spring from the deck anchor post (Fig. 422).

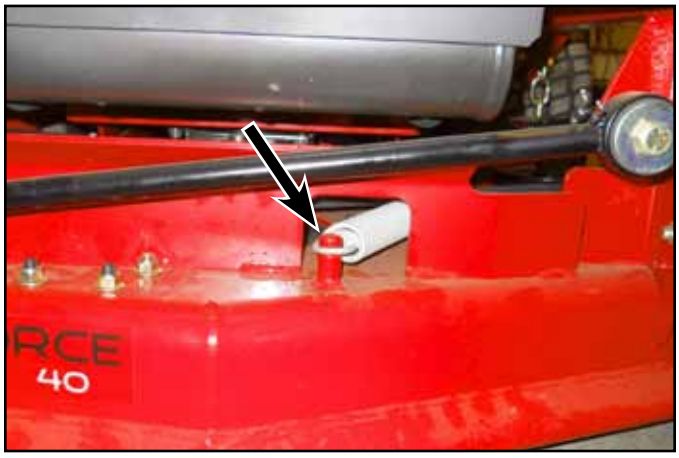


Fig. 422 DSCN-2564a

3. Raise the machine so the underside of the chassis can be accessed.

4. Remove the deck belt from the clutch pulley (Fig. 423).

Fig. 423 DSCN-2569a

5. Remove the extension spring from the drive idler pulley assembly (Fig. 424).

Fig. 424 DSCN-2574a

6. Remove the drive belt from the engine pulley and pump pulleys (Fig. 425).

Fig. 425 DSCN-2575a

Pump Drive Belt Installation

1. Position the pump drive belt around the engine drive pulley, the two hydraulic pump pulleys, and the idler pulley (Fig. 426).

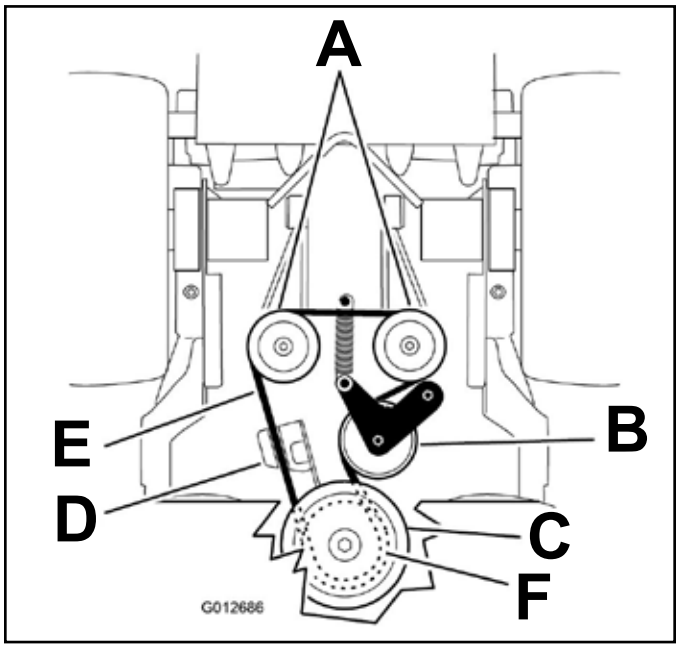


Fig. 426 fig. 67 G012686

A. Hydraulic pumps
B. Idler pulley
C. Clutch pulley
D. Clutch retainer
E. Pump drive belt
F. Pump drive pulley

2. Install the extension spring from the idler bracket to the spring anchor (Fig. 427).

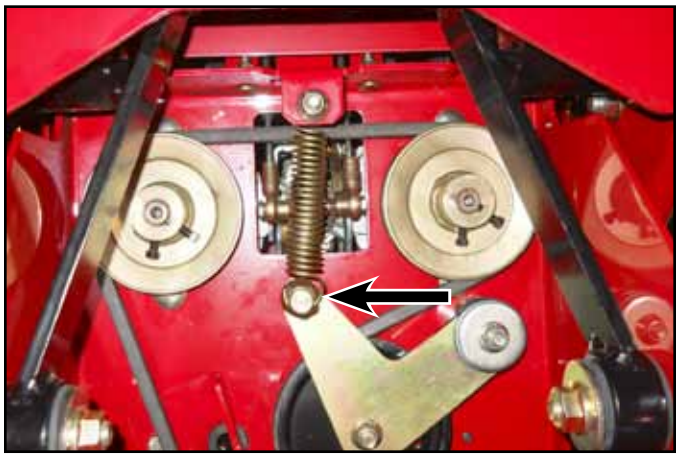


Fig. 427 DSCN-2660a

3. **36” Deck:** Route the deck belt around the deck spindle pulleys. Refer to decal 119-0186 (Fig. 428).

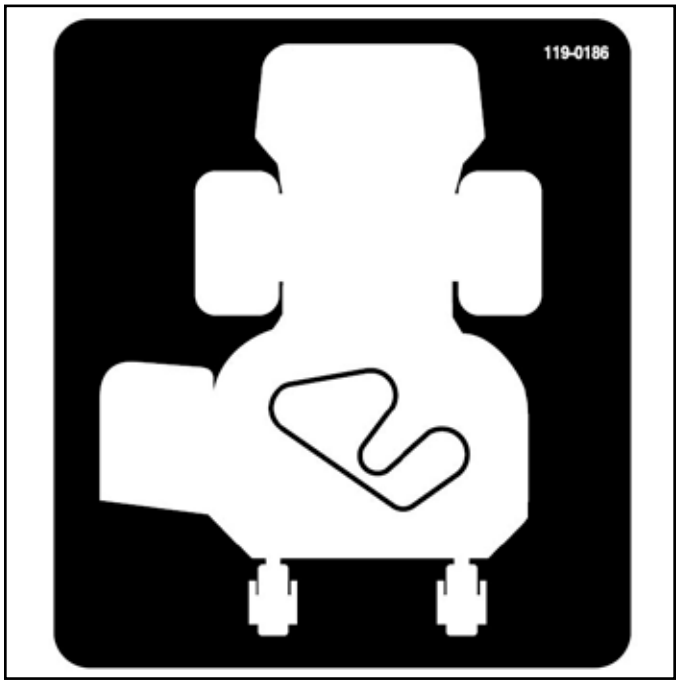


Fig. 428 decal 119-0186

4. **36” Deck:** Install the extension spring to the idler bracket and spring anchor (Fig. 429).

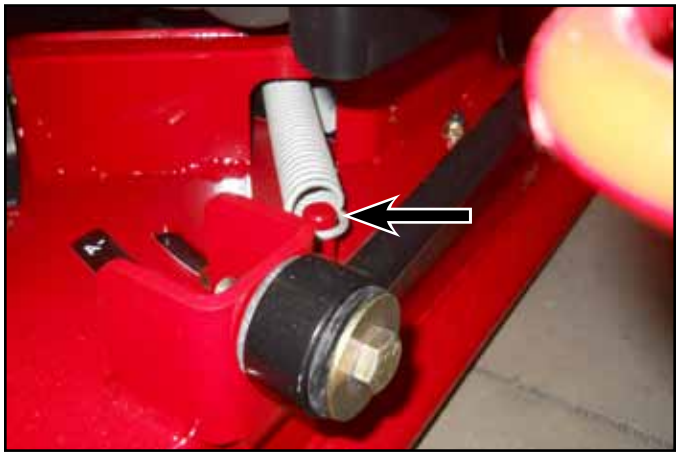


Fig. 429 DSCN-2666a

5. **40”Deck:** Route the deck belts around the deck spindle pulleys. Refer to decal 119-0187 (Fig. 430).

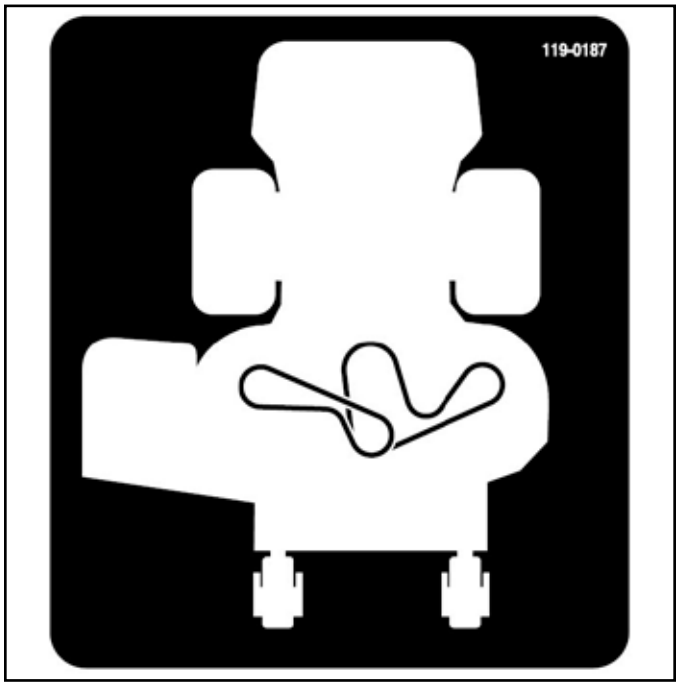


Fig. 430 decal 119-0187

6. **40” Deck:** Install the extension spring to the LH idler bracket and spring anchor (Fig. 431).

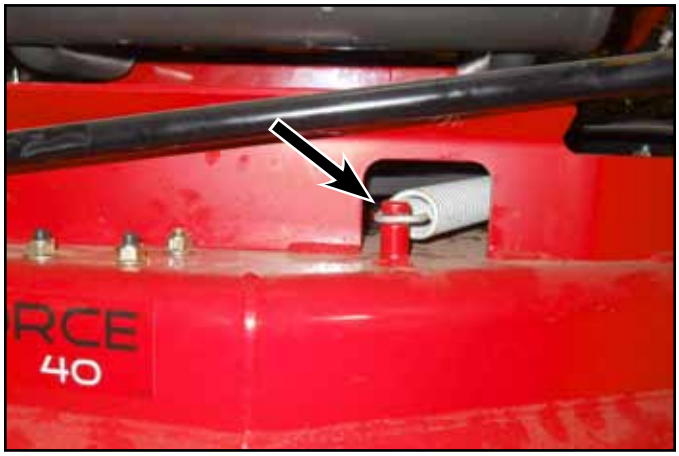


Fig. 431 DSCN-2670a

Pump Drive Belt Idler Replacement

Pump Drive Belt Idler Removal

1. Raise the machine so the underside of the chassis can be accessed.

2. Remove the extension spring from the drive idler pulley assembly (Fig. 432).

Fig. 432 DSCN-2574a

3. Remove the belt from around the idler and pump pulleys.

4. Remove the bolt and nut securing the idler assembly to the engine base, then remove the assembly (Fig. 433).

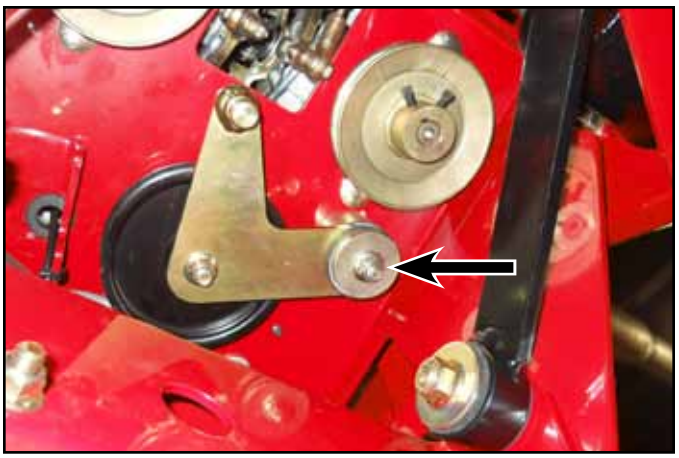


Fig. 433 DSCN-2799a

5. Remove the large spacer, two friction composite washers, spacer and washer (Fig. 434).

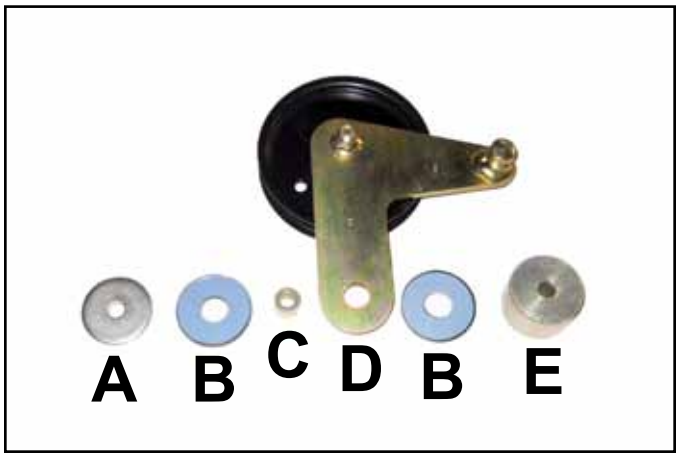


Fig. 434 DSCN-2779a

A. Steel Washer
B. Friction Composite Washer (2)
C. Bushing
D. Idler Plate
E. Large Spacer

6. Remove the bolt, washers and nut securing the idler pulley to the idler plate (Fig. 435).

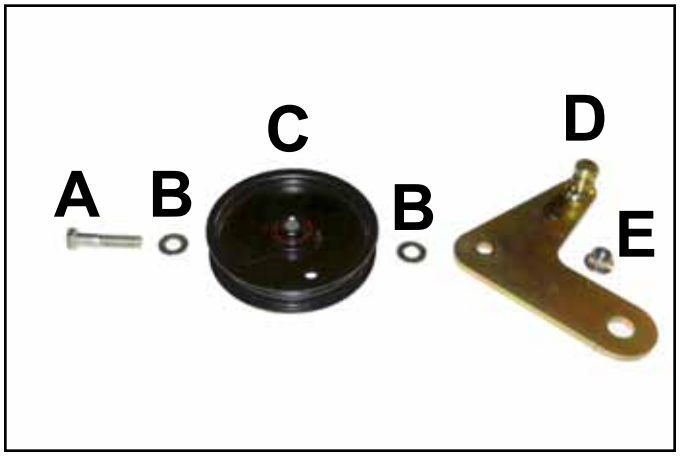


Fig. 435 DSCN-2784a

A. Bolt
B. Washer (2)
C. Idler Pulley
D. Idler Plate
E. Nut

Pump Drive Belt Idler Installation

1. Secure the idler pulley to the idler plate using a bolt, washers and a nut (Fig. 436).

Note: The pulley hub needs to face the idler plate.

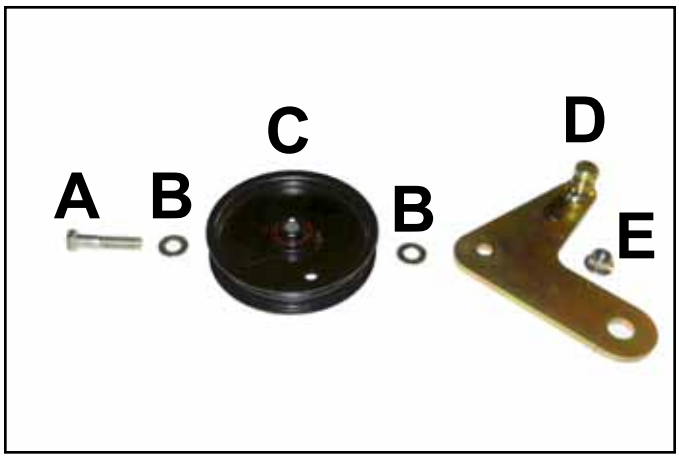


Fig. 436 DSCN-2784a

A. Bolt
B. Washer (2)
C. Idler Pulley
D. Idler Plate
E. Nut

2. Place the pivot bolt with washer down through the engine base (Fig. 437).

Fig. 437 DSCN-2789a

3. Place the large spacer, one friction composite washer and bushing onto the pivot bolt (Fig. 438).

Fig. 438 DSCN-2793a

4. Place the idler assembly onto the pivot bolt (Fig. 439).

Fig. 439 DSCN-2797a

6

5. Place one friction composite washer and steel washer onto the pivot bolt (Fig. 440).

Fig. 440 DSCN-2795a

B. Secure the idler assembly with a nut (Fig. 441).

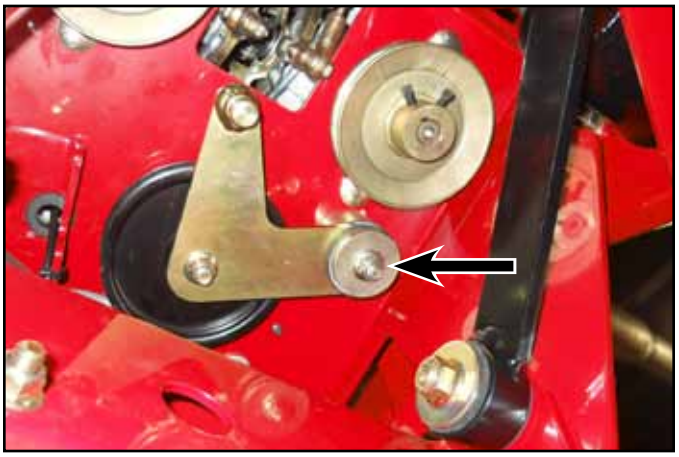


Fig. 441 DSCN-2799a

6. Position the pump drive belt around the engine, idler and pump pulleys (Fig. 442).

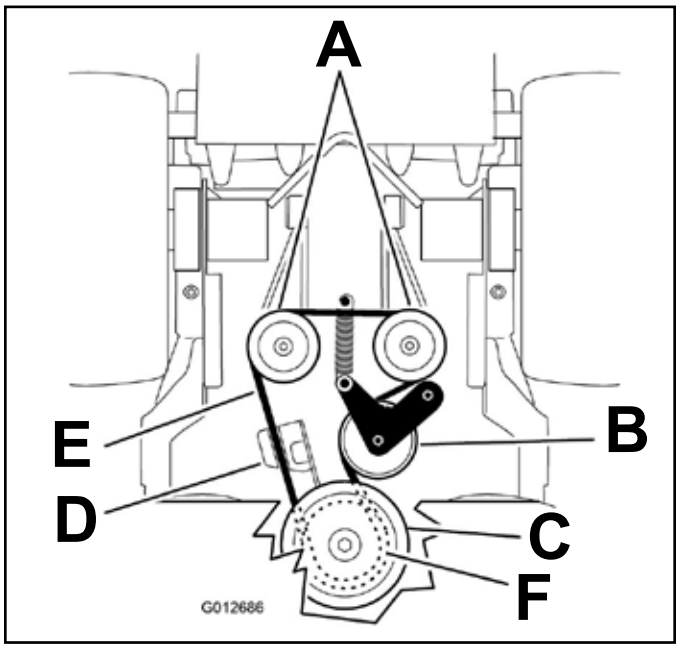


Fig. 442 fig. 67 G012686

A. Hydraulic pumps
B. Idler pulley
C. Clutch pulley
D. Clutch retainer
E. Pump drive belt
F. Pump drive pulley

7. Install the extension spring from the idler bracket to the spring anchor (Fig. 443).

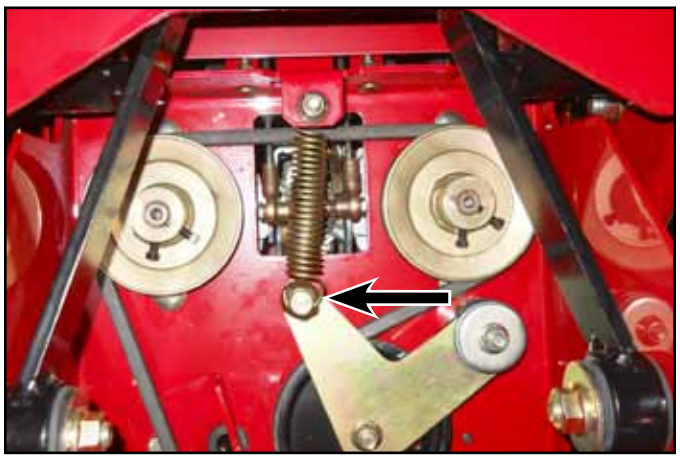


Fig. 443 DSCN-2660a

Pump Replacement

Note: Cleanliness is a key factor in a successful repair of any hydraulic system. Thoroughly clean all exposed surfaces prior to any type of maintenance. Cleaning all parts by using a solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign material and chemicals. Protect all exposed sealing areas and open cavities from damage and foreign material.

Upon removal, all seals, o-rings, and gaskets should be replaced. During installation, lightly lubricate all seals, o-rings, and gaskets with clean petroleum jelly prior to assembly.

Pump Removal

1. Place the deck in the lowest HOC (height of cut).
2. Engage the parking brake.
3. Loosen the four lug nuts (Fig. 444).

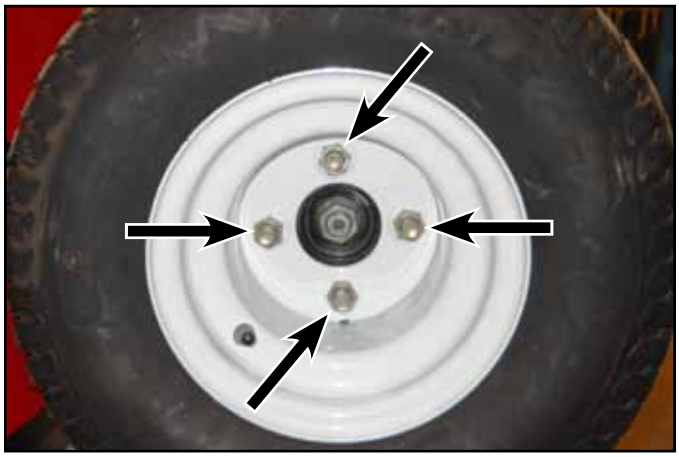


Fig. 444 DSCN-2805a

4. Raise the rear of the machine.
5. Release the parking brake.
6. Remove the four lug nuts and then the tire assembly (Fig. 445).

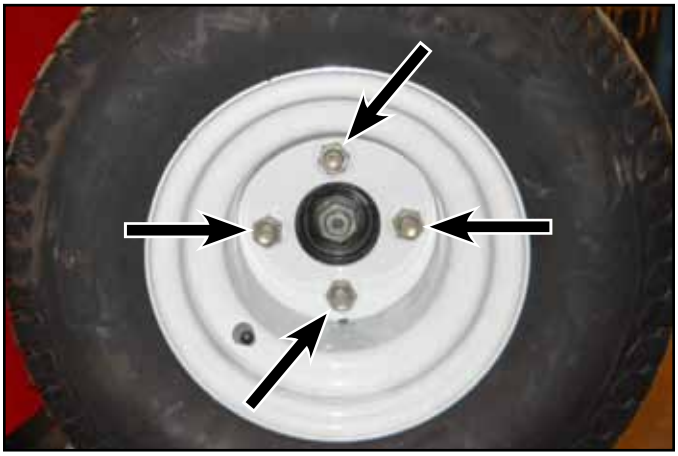


Fig. 445 DSCN-2805a

7. Remove the extension spring from the drive idler pulley assembly (Fig. 446).

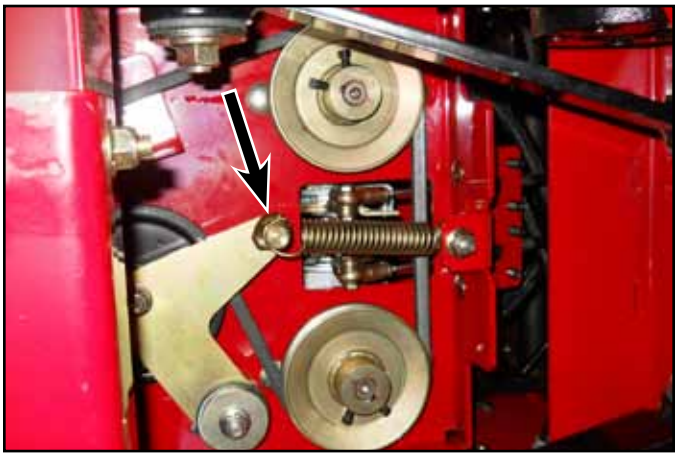


Fig. 446 DSCN-2959a

8. Remove the belt from around the pump pulley (Fig. 447).

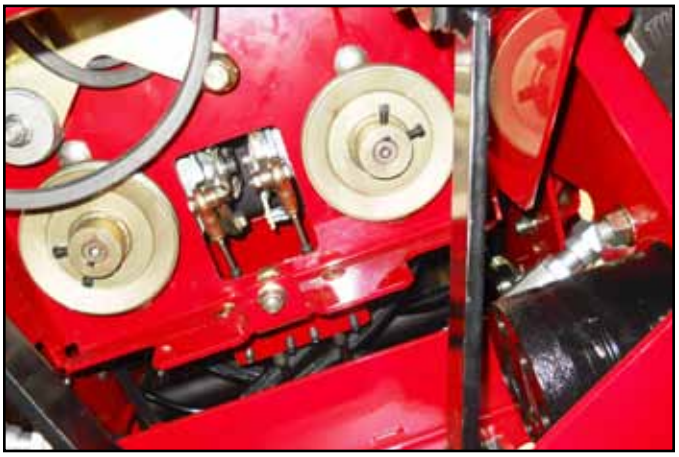


Fig. 447 DSCN-2962a

9. Remove the two set screws securing the pump pulley to the pulley shaft, then remove the pulley (Fig. 448).

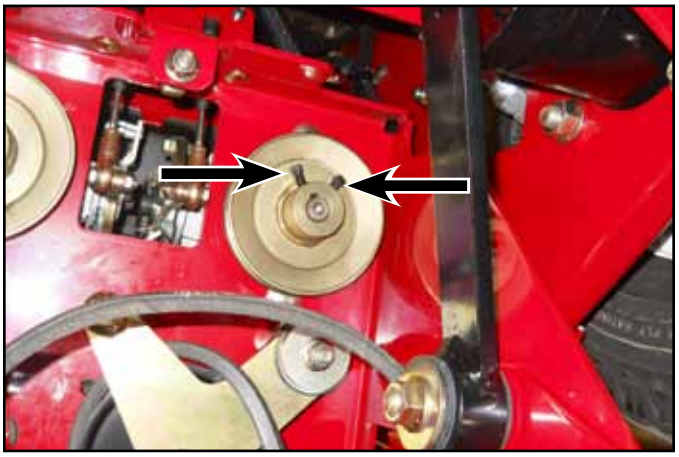


Fig. 448 DSCN-2965a

10. Remove the key from the pulley shaft keyway (Fig. 449).

Fig. 449 DSCN-2971a

11. Remove the bolt and nut securing the control cable to the pump control arm (Fig. 450).

Fig. 450 DSCN-2978a

12. Mark the high pressure hoses and wheel motor fittings to ensure they are re-installed correctly (Fig. 451).

Fig. 451 DSCN-2986a

13. Mark the high pressure hoses and pump to ensure they are re-installed correctly (Fig. 452).

Fig. 452 DSCN-2980a

14. Place a drain pan under the wheel motor and disconnect both hydraulic hoses from the wheel motor fittings (Fig. 453).

Fig. 453 DSCN-2989a

15. Remove the two high pressure hoses from the pump (Fig. 454).

Fig. 454 DSCN-2990a

16. Remove the low pressure suction line from the pump fitting (Fig. 455).

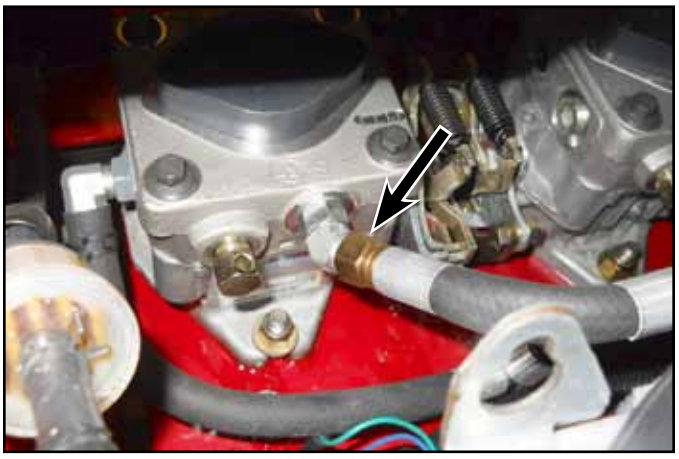


Fig. 455 DSCN-2992a

17. Move the hose clamp securing the low pressure return hose to the pump fitting, then remove the hose (Fig. 456).

Fig. 456 DSCN-2995a

18. Remove the two sets of bolts, washers and nuts securing the pump to the engine base (Fig. 457).

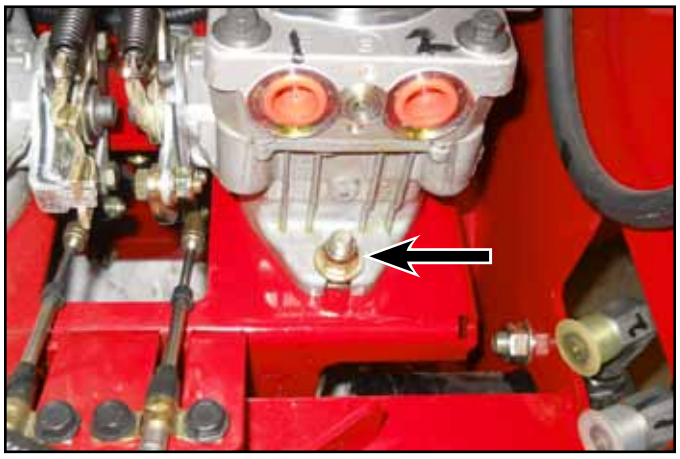


Fig. 457 DSCN-3045a

19. Remove the pump.

20. Loosen the jam nut securing the return hose fitting, then remove the fitting (Fig. 458).

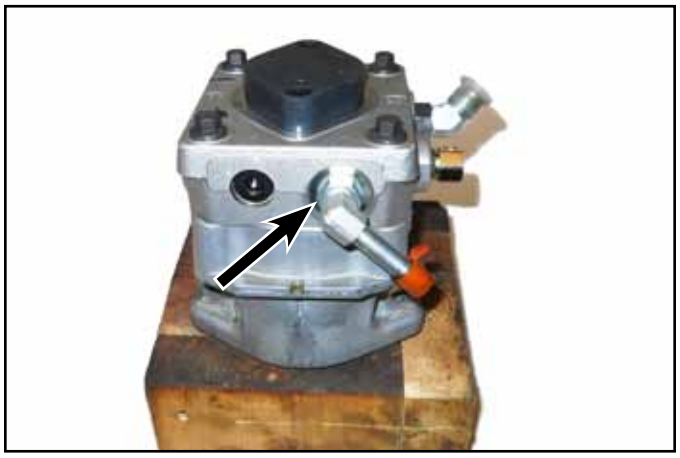


Fig. 458 DSCN-3029a

21. Loosen the jam nut securing the suction hose fitting, then remove the fitting (Fig. 459).

Fig. 459 DSCN-3032a

22. Remove the two sets of bolts and nuts securing the pump control arm to the pump RTN (Return to Neutral) assembly (Fig. 460).

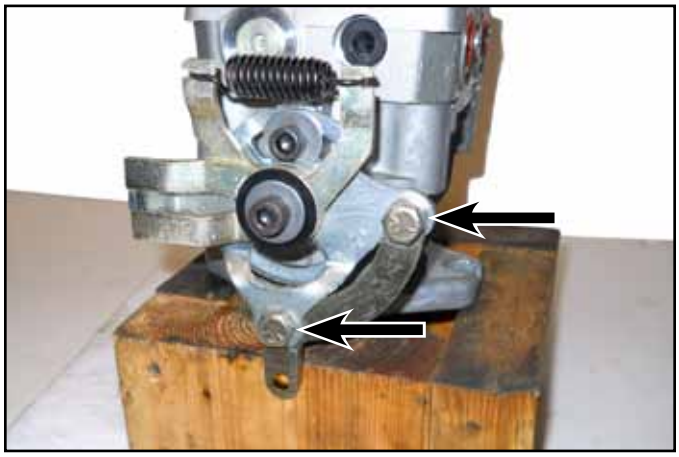


Fig. 460 DSCN-3038a

23. To service the pump, refer to the HydroGear Pump Service Manual (BLN-52503).

Pump Installation

1. Transfer the high pressure hose identification marks to the replacement pump.

2. Secure the pump control arm to the RTN (Return to Neutral) assembly using the bolts and nuts (Fig. 461).

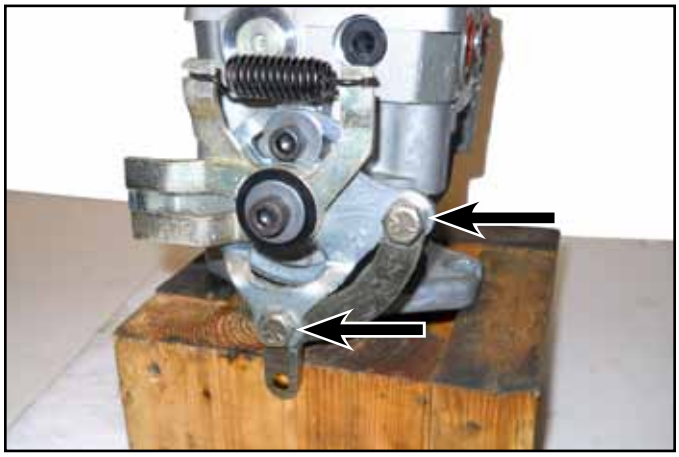


Fig. 461 DSCN-3038a

3. Install the suction hose fitting to the pump (Fig. 462).

Note: Do not tighten the jam nut at this time.

Fig. 462 DSCN-3032a

4. Install the return hose fitting, orientate as shown, then secure the position using the jam nut (Fig. 463).

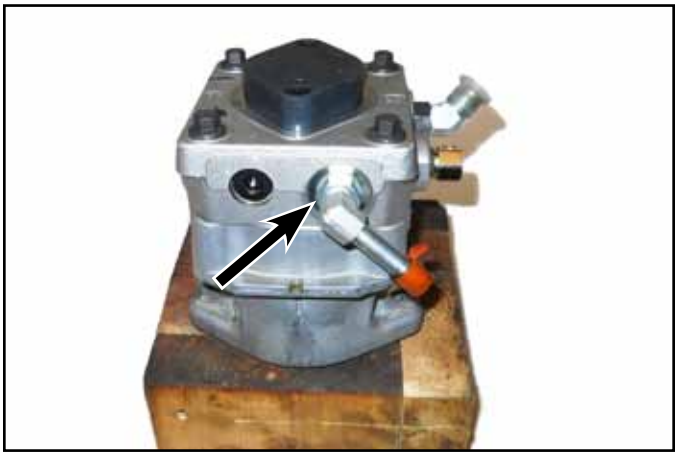


Fig. 463 DSCN-3029a

5. Secure the pump to the engine base using the carriage bolts, washers and nuts (Fig. 464).

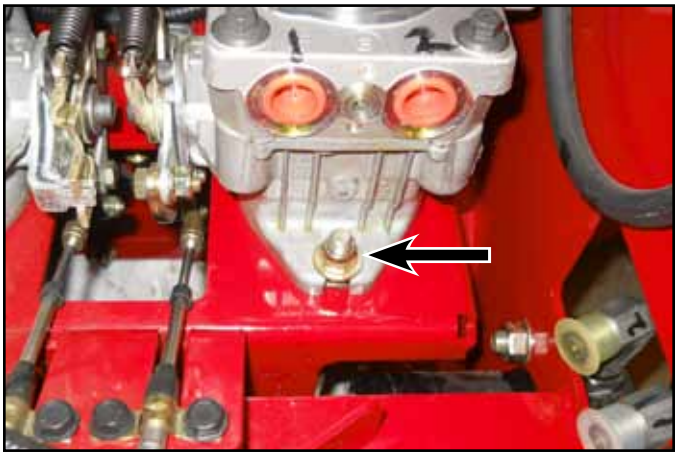


Fig. 464 DSCN-3045a

6. Secure the return hose to the pump fitting using the hose clamp (Fig. 465).

Fig. 465 DSCN-3049a

7. Secure the suction hose to the pump fitting (Fig. 466).

Note: Secure the position of the fitting using the jam nut.

Fig. 466 DSCN-3051a

8. Install the high pressure hose to the pump (Fig. 467).

Note: Ensure the hose is installed to the correct pump fitting by using the identification markings. If installed incorrectly, wheel direction will be reversed.

Fig. 467 DSCN-3052a

9. Loop the hose around the control cables and opposite side pump hoses (Fig. 468).

Fig. 468 DSCN-3055a

10. Install the hose to the wheel motor (Fig. 469).

Note: Ensure the hose is installed to the correct wheel motor fitting by using the identification markings. If installed incorrectly, wheel direction will be reversed.

Fig. 469 DSCN-3057a

11. Install the second high pressure hose to the pump (Fig. 470).

Fig. 470 DSCN-3059a

12. Loop the hose around the control cables and opposite side pump hoses (Fig. 471).

Fig. 471 DSCN-3061a

13. Install the hose to the wheel motor (Fig. 472).

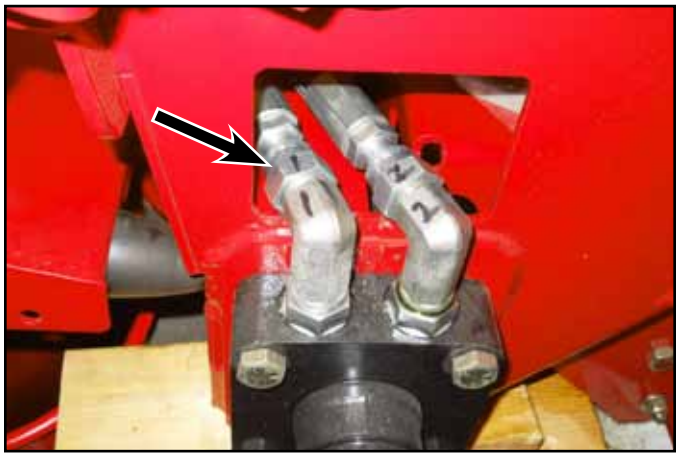


Fig. 472 DSCN-3063a

14. Secure the control cable to the pump control arm (Fig. 473).

Fig. 473 DSCN-2978a

15. Install the key into the keyway on the pump shaft (Fig. 474).

Fig. 474 DSCN-2971a

16. Apply anti-seize to the pump shaft (Fig. 475).

Fig. 475 DSCN-3079a

17. Apply thread-locking material to the threads of the pump pulley set screws (Fig. 476).

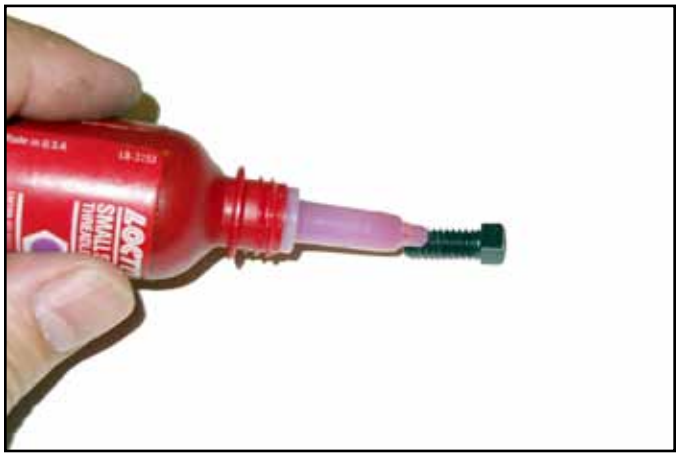


Fig. 476 DSCN-3069a

18. Install the set screws into the pump pulley (Fig. 477).

Note: Ensure the set screws have not protruded into the center of the pulley hub.

Fig. 477 DSCN-3071a

19. Install the pulley onto the pump shaft. The base of the pulley hub should be flush with the base of the pump shaft. Secure the position with the set screws (Fig. 478).

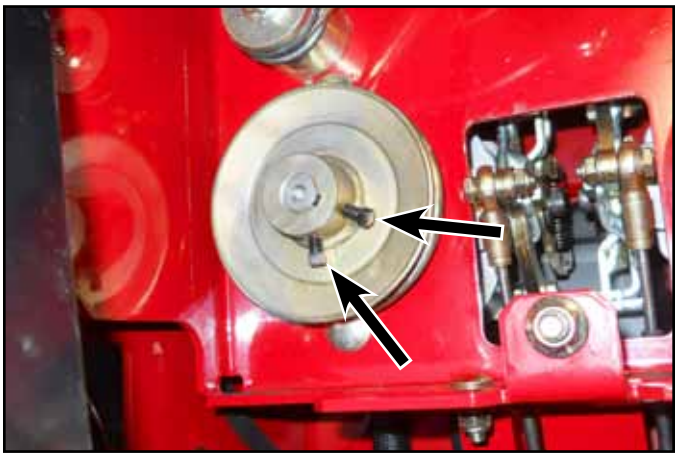


Fig. 478 DSCN-3081a

20. Position the pump drive belt around the engine, idler and pump pulleys (Fig. 479).

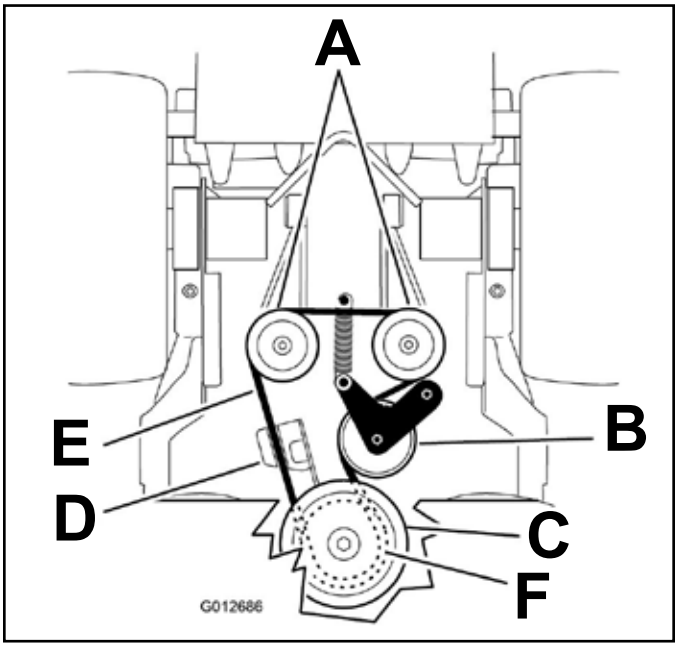


Fig. 479 fig. 67 G012686

A. Hydraulic pumps
B. Idler pulley
C. Clutch pulley
D. Clutch retainer
E. Pump drive belt
F. Pump drive pulley

21. Install the extension spring from the idler bracket to the spring anchor (Fig. 480).

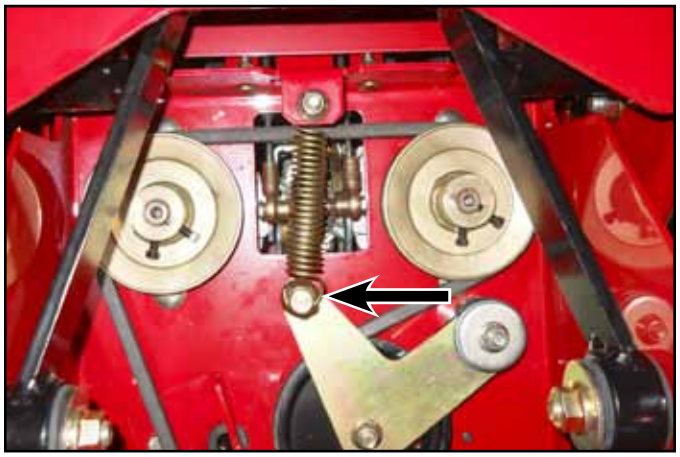


Fig. 480 DSCN-2660a

22. Secure the tire assembly to the wheel motor hub using the four wheel lug nuts (Fig. 481).

Note: The four wheel lug nuts will be torqued in a later step.

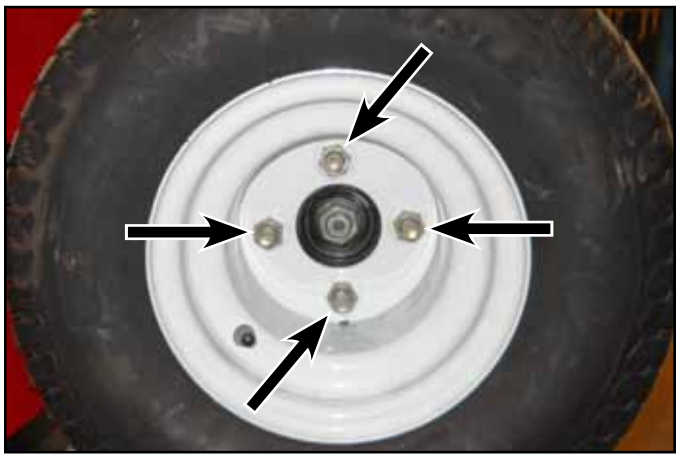


Fig. 481 DSCN-2805a

23. Lower the machine to the ground.

24. Apply the parking brake.

25. Torque the wheel lug nuts to 85 ± 8 ft-lbs. (115 ± 11 Nm) (Fig. 482).

Fig. 482 DSCN-2880a

26. Purge the air from the hydraulic system. See “Bleeding the Hydraulic System” on page 6-35.

Wheel Motor Replacement

Note: Cleanliness is a key factor in a successful repair of any hydraulic system. Thoroughly clean all exposed surfaces prior to any type of maintenance. Cleaning all parts by using a solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign material and chemicals. Protect all exposed sealing areas and open cavities from damage and foreign material.

Upon removal, all seals, o-rings, and gaskets should be replaced. During installation, lightly lubricate all seals, o-rings, and gaskets with clean petroleum jelly prior to assembly.

Wheel Motor Removal

1. Engage the parking brake.

2. Loosen the wheel motor nut (Fig. 483).

Fig. 483 DSCN-2805a

3. Loosen the four lug nuts (Fig. 484).

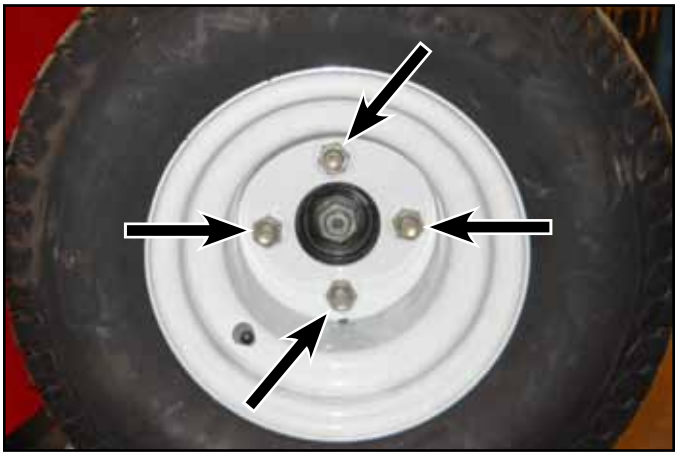


Fig. 484 DSCN-2805a

4. Raise the rear of the machine.

5. Release the parking brake.

6. Remove the four lug nuts and remove the tire (Fig. 485).

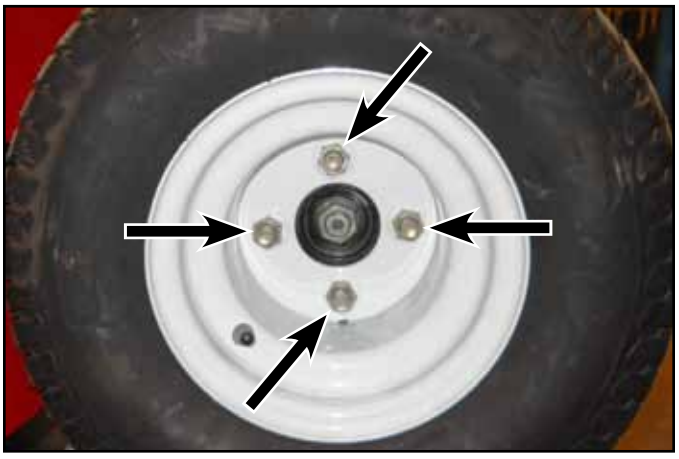


Fig. 485 DSCN-2805

7. Remove the wheel motor nut (Fig. 486).

Fig. 486 DSCN-2806a

8. Install a hub puller (Toro p/n: TOR6006) onto the wheel lug bolts (Fig. 487).

Note: The lug bolts need to be installed backwards so the flat side is against the puller.

Fig. 487 DSCN-2813a

9. Advance the forcing screw through the wheel hub until it firmly contacts the wheel motor shaft (Fig. 488).

Fig. 488 DSCN-2817a

10. Tighten the lug nuts evenly (approximately 1/4 to 1/2 turn at a time) until the hub pops off the wheel motor shaft (Fig. 489).

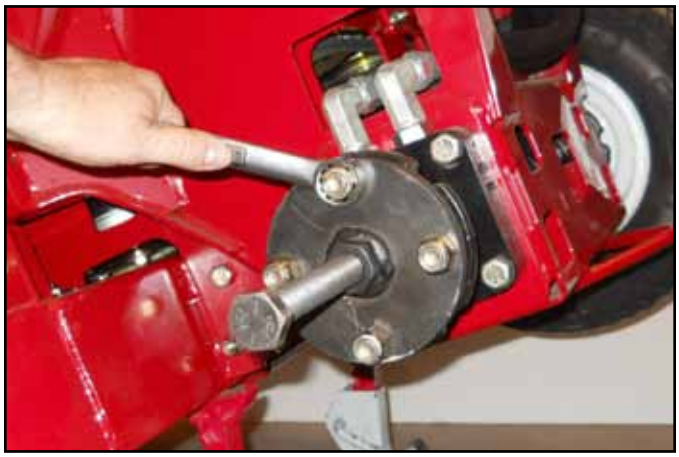


Fig. 489 DSCN-2822a

11. Remove the hub puller from the hub.

12. Remove the woodruff key from the wheel motor shaft keyway (Fig. 490).

Fig. 490 DSCN-2827a

13. Mark the hose and motor ports to ensure they are installed correctly (Fig. 491).

Fig. 491 DSCN-2829a

14. Place a drain pan under the wheel motor and disconnect both hydraulic hoses from the wheel motor (Fig. 492).

Fig. 492 DSCN-2834a

15. Cap the hose ends to prevent debris from entering the system (Fig. 493).

Note: If the wheel motor is going to be reused, cap the hydraulic fittings to prevent debris from entering the system.

Fig. 493 DSCN-2840a

16. Loosen the jam nut securing the position of the fittings, then remove the hydraulic fittings (Fig. 494).

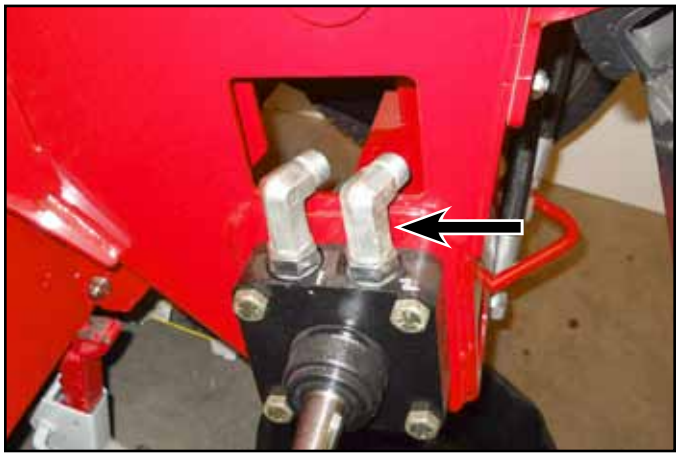


Fig. 494 DSCN-2836a

17. Remove the four bolts and nuts securing the wheel motor to the frame, then remove the wheel motor (Fig. 495).

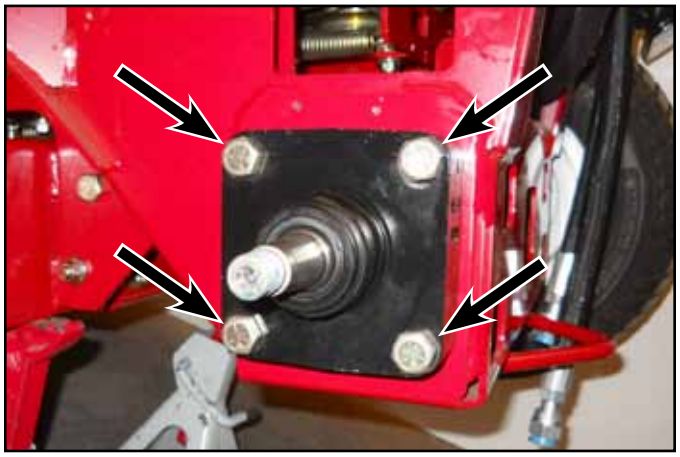


Fig. 495 DSCN-2843a

18. To service the wheel motor, refer to the Parker/Ross Wheel Motor Service Manual (HY13-1512-006-M1/US).

Wheel Motor Installation

1. Transfer the port identification markings to the new motor (Fig. 496).

Fig. 496 DSCN-2854a

2. Secure the wheel motor to the frame using the four bolts and nuts. Torque the fasteners to 86 ± 9 ft-lbs. (117 ± 12 Nm) (Fig. 497).

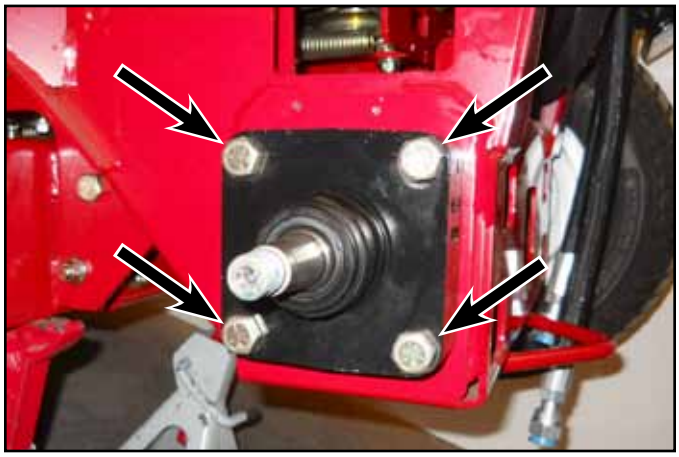


Fig. 497 DSCN-2843a

3. Install the two hydraulic fittings into the motor. (Fig. 498).

Note: Do not tighten the jam nuts until the hoses are connected.

Fig. 498 DSCN-2836a

4. Install the two hydraulic hoses, then secure the position of the hose fittings using the jam nuts (Fig. 499).

Note: Ensure the hoses are connected to the correct port by using the identification markings.

Fig. 499 DSCN-2829a

5. Install the woodruff key into the wheel motor shaft keyway (Fig. 500).

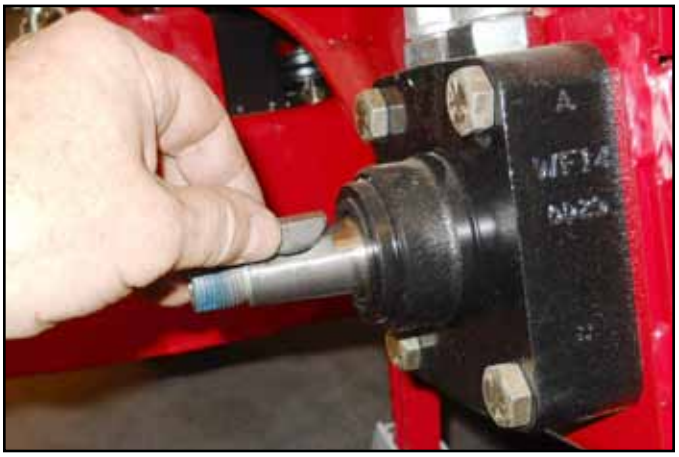


Fig. 500 DSCN-2827a

6. Apply thread-locking material to the threads of the wheel motor nut (Fig. 501).

Fig. 501 DSCN-2871a

7. Secure the wheel hub onto the wheel motor shaft using the wheel motor nut (Fig. 502).

Note: The wheel motor nut will be torqued in a later step.

Fig. 502 DSCN-2806a

8. Secure the tire to the wheel motor hub using the four wheel lug nuts (Fig. 503).

Note: The four wheel lug nuts will be torqued in a later step.

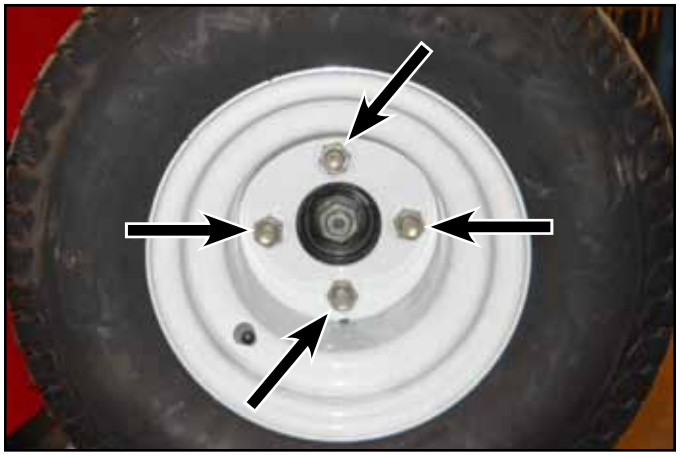


Fig. 503 DSCN-2805a

9. Lower the machine to the ground.

10. Apply the parking brake.

11. Torque the wheel motor nut to 200 ± 25 ft-lbs. (271 ± 34 Nm) (Fig. 504).

Fig. 504 DSCN-2875a

12. Torque the wheel lug nuts to 85 ± 8 ft-lbs. (115 ± 11 Nm) (Fig. 505).

Fig. 505 DSCN-2880a

13. Purge the air from the hydraulic system. See “Bleeding the Hydraulic System” on page 6-35.

Reservoir Tank Replacement

Note: Cleanliness is a key factor in a successful repair of any hydraulic system. Thoroughly clean all exposed surfaces prior to any type of maintenance. Cleaning all parts by using a solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign material and chemicals. Protect all exposed sealing areas and open cavities from damage and foreign material.

Upon removal, all seals, o-rings, and gaskets should be replaced. During installation, lightly lubricate all seals, o-rings, and gaskets with clean petroleum jelly prior to assembly.

Reservoir Tank Removal

1. Move the hose clamp securing the low pressure return hose to the reservoir fitting (Fig. 506).

Fig. 506 DSCN-2884a

2. Position a drain pan under the reservoir tank. Remove the low pressure return hose from the fitting and drain the fluid into the pan (Fig. 507).

Fig. 507 DSCN-2887a

3. Remove the low pressure suction hose from the reservoir fitting (Fig. 508).

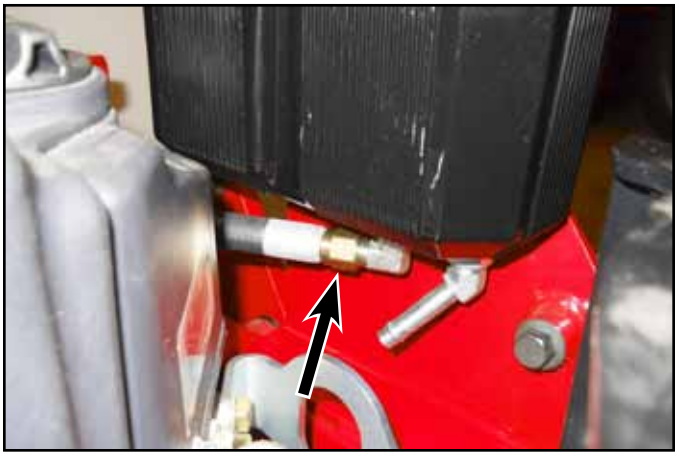


Fig. 508 DSCN-2887a

4. Remove the two sets of bolts, washers and nuts securing the reservoir tank to the tank bracket, then remove the reservoir tank (Fig. 509).

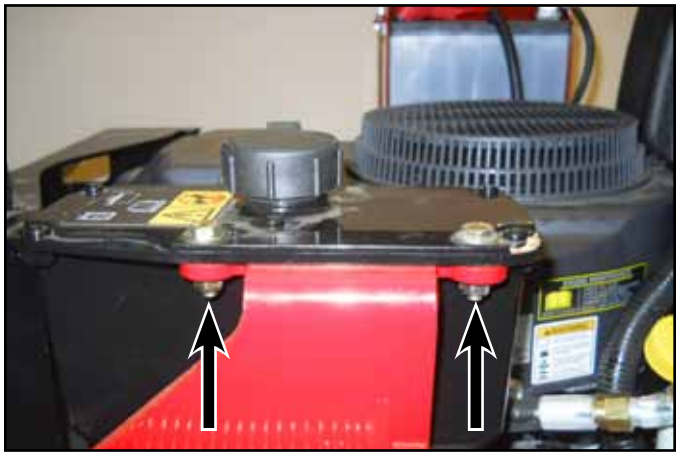


Fig. 509 DSCN-2890a

5. Loosen the jam nut securing the return hose fitting, then remove the fitting (Fig. 510).

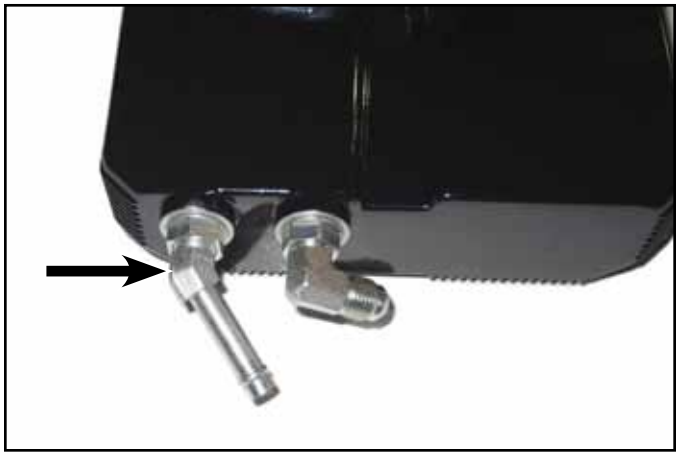


Fig. 510 DSCN-2898a

6. Loosen the jam nut securing the suction hose fitting, then remove the fitting (Fig. 511).

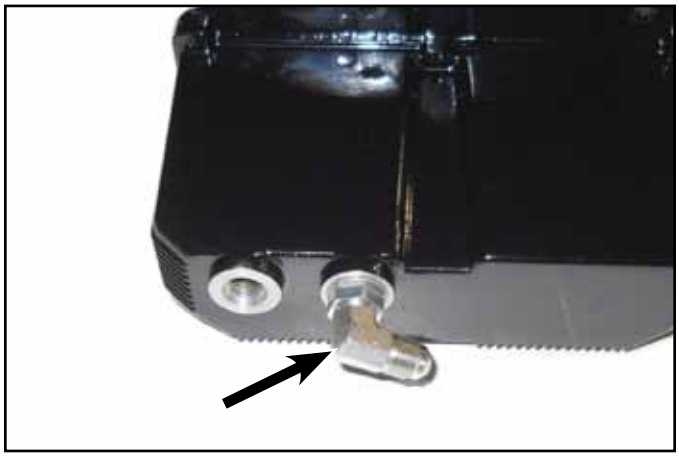


Fig. 511 DSCN-2901a

Reservoir Tank Installation

1. Install the suction hose fitting into the reservoir tank and secure the position using the jam nut (Fig. 512).

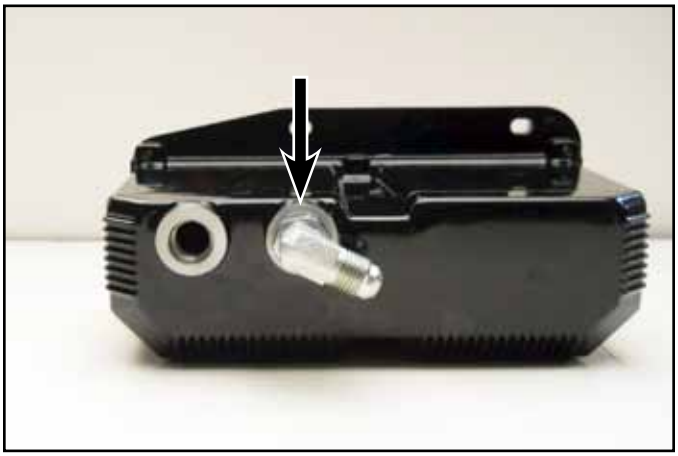


Fig. 512 DSCN-2905a

2. Install the return hose fitting into the reservoir tank and secure the position using the jam nut (Fig. 513).

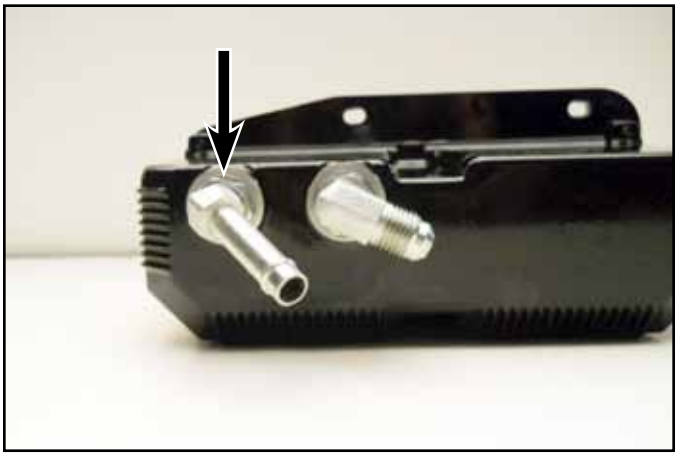


Fig. 513 DSCN-2903a

3. Secure the reservoir tank to the tank bracket using the two sets of bolts, washers and nuts (Fig. 514).

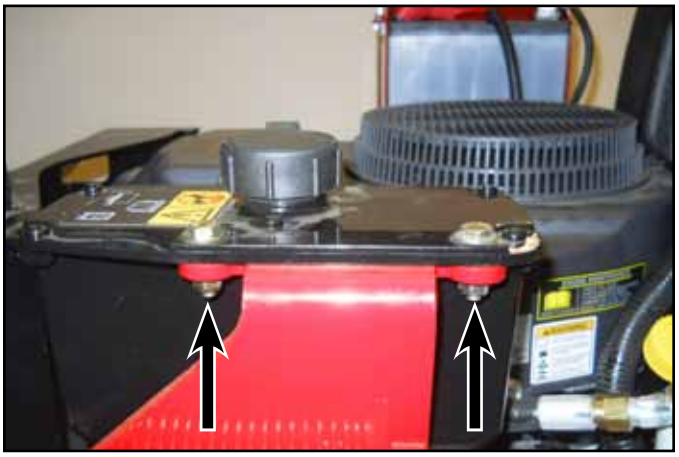


Fig. 514 DSCN-2890a

4. Install the suction hose to the suction fitting (Fig. 515).

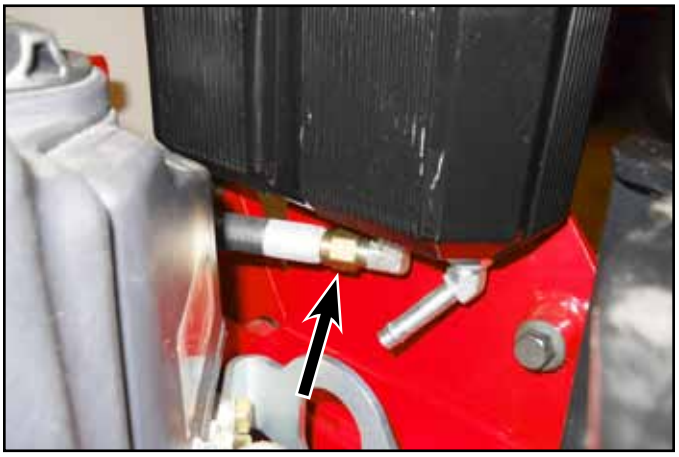


Fig. 515 DSCN-2887a

5. Secure the return hose to the return fitting using the hose clamp (Fig. 516).

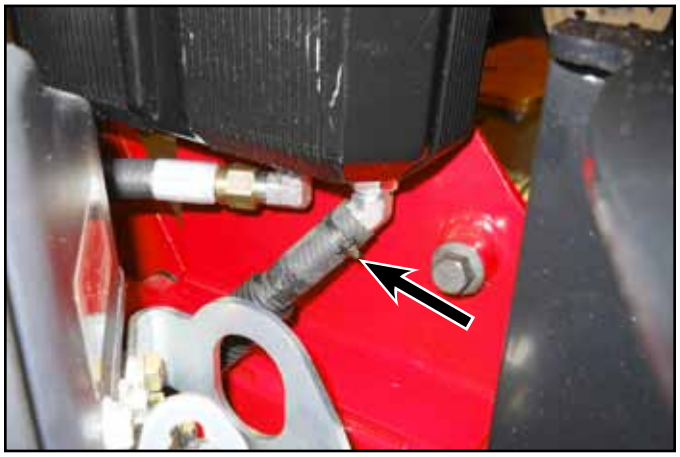


Fig. 516 DSCN-2906a

6. Fill the reservoir to the “COLD” fluid level with the specified hydraulic fluid. See your Operator’s Manual for the specified fluid (Fig. 517).

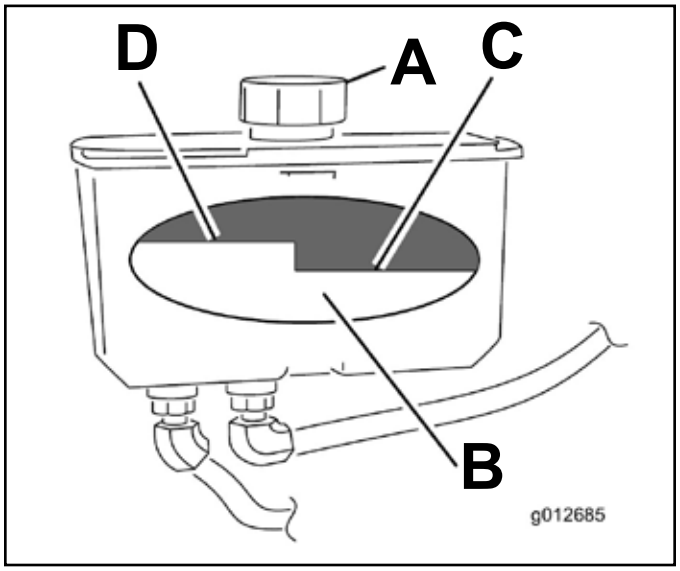


Fig. 517 fig. 71 G012685

A. Cap
B. Baffle
C. Cold fluid level-full
D. Hot fluid level-full

7. Purge the air from the hydraulic system. See “Bleeding the Hydraulic System” on page 6-35.

Hydraulic Filter Mount Replacement

Note: Cleanliness is a key factor in a successful repair of any hydraulic system. Thoroughly clean all exposed surfaces prior to any type of maintenance. Cleaning all parts by using a solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign material and chemicals. Protect all exposed sealing areas and open cavities from damage and foreign material.

Upon removal, all seals, O-rings, and gaskets should be replaced. During installation, lightly lubricate all seals, O-rings, and gaskets with clean petroleum jelly prior to assembly.

Hydraulic Filter Mount Removal

1. Place an oil pan under the filter and remove the hydraulic oil filter (Fig. 518).

Fig. 518 DSCN-2910a

2. Remove the suction hose from the filter mount inlet fitting (Fig. 519).

Fig. 519 DSCN-2913a

3. Remove the suction hose from the filter mount outlet fitting (Fig. 520).

Fig. 520 DSCN-2914a

4. Loosen the jam nut and remove the inlet fitting (Fig. 521).

Fig. 521 DSCN-2916a

5. Loosen the jam nut and remove the outlet fitting (Fig. 522).

Fig. 522 DSCN-2919a

6. Remove the two bolts and washers securing the hydraulic filter mount to the filter bracket (Fig. 523).

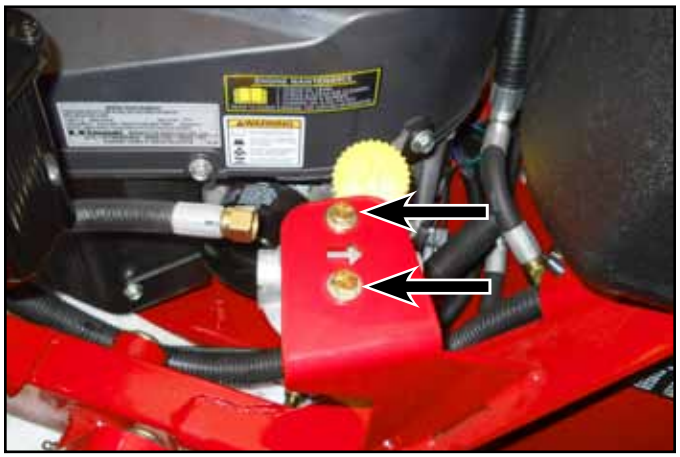


Fig. 523 DSCN-2921a

Hydraulic Filter Mount Installation

1. Secure the hydraulic filter mount to the filter bracket using the two bolts and nuts (Fig. 524).

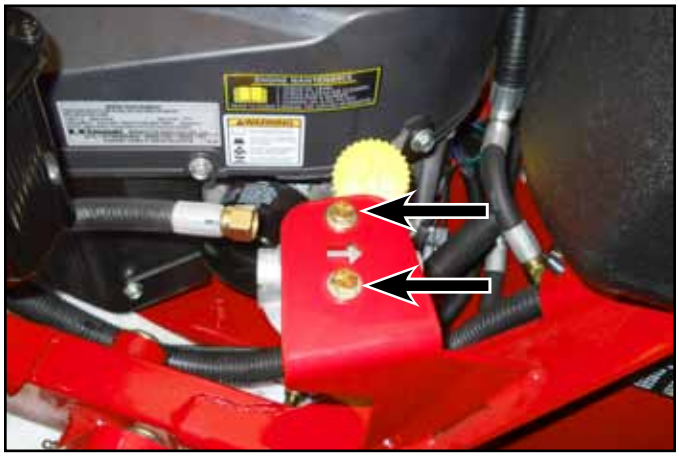


Fig. 524 DSCN-2921a

Note: Position the filter mount so the "FLOW" arrow aligns with the arrow in the filter bracket (Fig. 525).

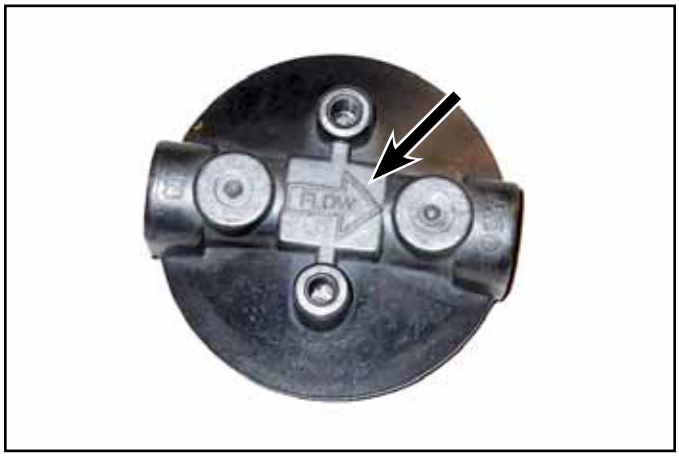


Fig. 525 DSCN-2928a

2. Install the outlet fitting into the filter mount outlet port (Fig. 526).

Note: Do not tighten the jam nut at this time.

Fig. 526 DSCN-2919a

3. Secure the suction hose to the outlet fitting, then secure the position of the fitting with the jam nut (Fig. 527).

Fig. 527 DSCN-2936a

4. Install the inlet fitting into the filter mount inlet port (Fig. 528).

Note: Do not tighten the jam nut at this time.

Fig. 528 DSCN-2916a

5. Secure the suction hose to the inlet fitting, then secure the position of the fitting with the jam nut (Fig. 529).

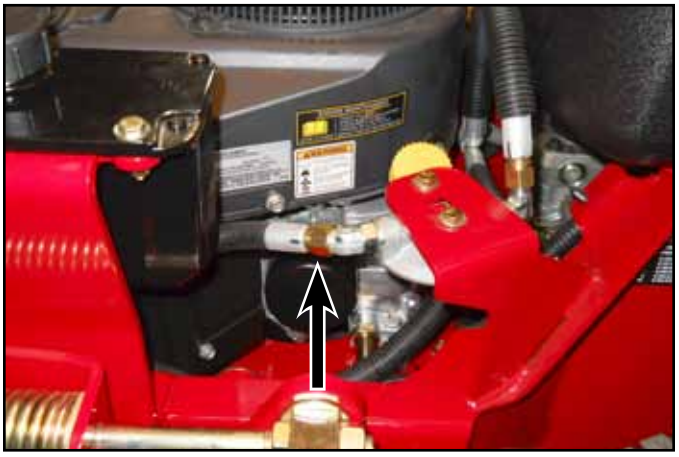


Fig. 529 DSCN-2913a

6. Apply a thin coat of hydraulic fluid to the rubber gasket on the replacement filter (Fig. 530).

Fig. 530 DSCN-2956a

7. Install the replacement filter to the filter mount (Fig. 531).

Fig. 531 DSCN-2910a

8. Fill the reservoir to the “COLD” fluid level with the specified hydraulic fluid. See your Operator’s Manual for the specified fluid (Fig. 532).

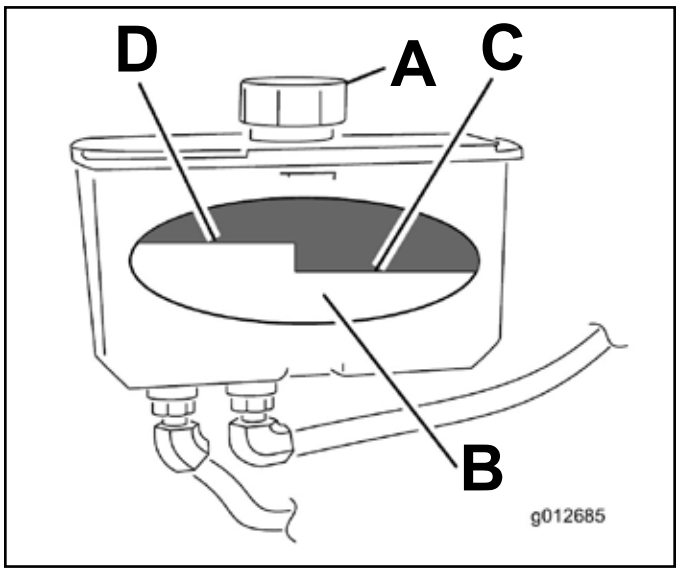


Fig. 532 fig. 71 G012685

A. Cap
B. Baffle
C. Cold fluid level-full
D. Hot fluid level-full

9. Purge the air from the hydraulic system. See “Bleeding the Hydraulic System” on page 6-35.

Hydraulic Testing

Note: Cleanliness is a key factor in a successful repair of any hydraulic system. Thoroughly clean all exposed surfaces prior to any type of maintenance. Cleaning all parts by using a solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign material and chemicals. Protect all exposed sealing areas and open cavities from damage and foreign material.

When using a Bi-Directional Flow Test Kit, determining directional flow is not necessary. The flow meter may be connected in either direction into the forward and reverse high pressure system lines.

Caution: Ensure all fittings and hoses are attached securely. This test is performed on the machine’s high pressure system. Failure to comply could result in serious injury.

1. Place the deck into the transport position.
2. Apply the parking brake.
3. Loosen the four lug nuts (Fig. 533).

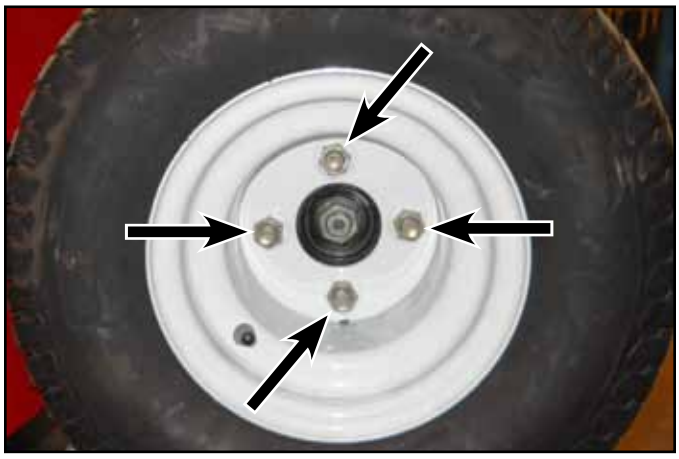


Fig. 533 DSCN-2805

4. Raise the rear of the machine and secure with jack stands (Fig. 534).

Fig. 534 DSCN-2811a

5. Release the parking brake.

6. Remove the 4 lug nuts and the wheel assembly (Fig. 535).

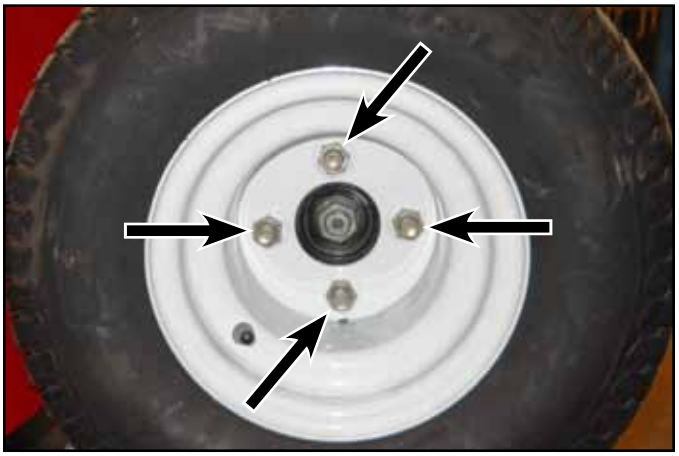


Fig. 535 DSCN-2805a

7. Thoroughly clean the area around the hydraulic fittings to prevent debris from entering the system.

8. Mark the hoses and corresponding wheel motor fitting ports so the hoses get connected back in their original locations (Fig. 536).

Fig. 536 DSCN-2830a

9. Position a drain pain under the wheel motor.
10. Disconnect both hydraulic hoses from the wheel motor (Fig. 537).

Fig. 537 DSCN-2833a

11. Cap the wheel motor fittings so debris does not enter the system.

12. Attach the hydraulic hoses to the flow test gauge (Fig. 538).

Note: When using a flow test gauge that is not bi-directional, damage to the flow tester could occur if the machine is operated in reverse.

Fig. 538 IMG-0916a

13. Open the restriction valve all the way (counter-clockwise) (Fig. 539).

Fig. 539 IMG-0917a

14. Run the machine for 2 minutes in forward (no load) to purge air from the system.

15. Run the machine at full throttle (no load). Verify the RPM with a tachometer: 3200 ± 150 RPMs. Do not exceed 3600 RPM.

16. With the drive control fully forward, slowly tighten the restriction valve until the gauge indicates 300 PSI (21 bar) (Fig. 540).

Fig. 540 IMG-0921a

17. Record the flow reading from the bi-directional flow meter. Make a second flow reading at 1100 PSI and record that reading (Fig. 541).

Fig. 541 IMG-0920a

Subtract the first reading from the second reading and determine if it is an acceptable GPM.

Example:

1st Reading: 300 psi (21 bar) reading 7 gpm (26 l/m)

2nd Reading: 1100 psi (76 bar) reading 3 gpm (11 l/m)

7 gpm (1st reading)

- 3 gpm (2nd reading)

4 gpm (the difference)

Refer to the Hydro-Gear pump service manual for maximum acceptable flow droop, or difference.

18. After all necessary repairs have been made, re-connect the hydraulic hoses to the wheel motor fittings.

19. Secure the tire assembly to the wheel motor hub using the four wheel lug nuts (Fig. 542).

Note: The four wheel lug nuts will be torqued in a later step.

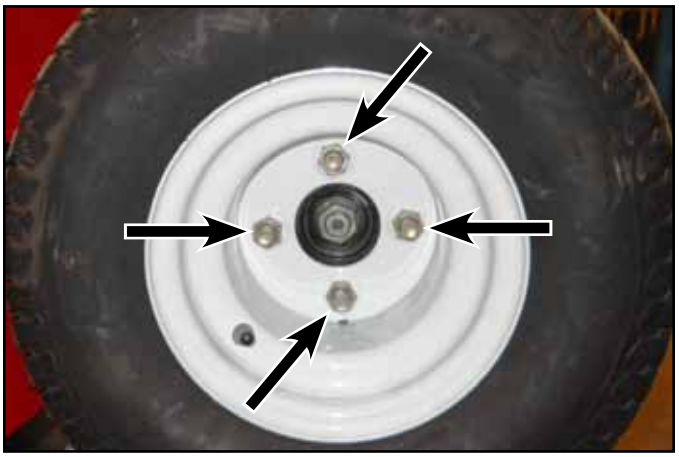


Fig. 542 DSCN-2805a

20. Lower the machine onto the ground.

21. Apply the parking brake.

22. Torque the wheel lug nuts to 85 ± 8 ft-lbs. (115 ± 10.8 Nm) (Fig. 543).

Fig. 543 DSCN-2880a

23. Purge the air from the hydraulic system. See “Bleeding the Hydraulic System” on page 6-35.

Bleeding the Hydraulic System

Due to the effects air has on efficiency in hydrostatic drive applications, it is critical that air is purged from the system.

These purge procedures should be implemented anytime a hydrostatic system has been opened for maintenance or any additional oil has been added to the system.

Air creates inefficiency because it has compression and expansion rates that are higher than that of oil.

Air trapped in the oil may cause the following symptoms:

- Noisy operation
- Lack of power or drive after short-term operation
- High operation temperature and excessive expansion of oil.

Before starting, make sure the reservoir is at the proper oil level.

The following procedures should be performed with the vehicle drive wheels off the ground, then repeated under normal operating conditions.

WARNING

POTENTIAL FOR SERIOUS INJURY

Certain procedures require the vehicle engine to be operated and the vehicle to be raised off of the ground. To prevent possible injury to the servicing technician and/or bystanders, ensure the vehicle is properly secured.

1. Disengage the PTO.
2. Stop the engine and wait for all moving parts to stop before leaving the operating position.
3. Support the rear of the machine on jack stands high enough to raise the drive wheels off the ground.
4. With the bypass valve open and the engine running, slowly move the directional control in both forward and reverse directions (5 to 6 times). As air is purged from the unit, the oil level will drop.
5. With the bypass valve closed and the engine running, slowly move the directional control in both forward and reverse directions (5 to 6 times). Check the oil level, and add oil as required after stopping engine.
6. It may be necessary to repeat Steps 4 and 5 until all the air is completely purged from the system. When normal forward and reverse speed is obtained, purging is complete.

THIS PAGE INTENTIONALLY LEFT BLANK.

36” Mower Deck Belt Replacement

36” Mower Deck Belt Removal

1. Turn the ignition off and remove the key.
2. Move the mower deck to the 1” (25mm) HOC.
3. Remove the belt covers.
4. Remove the extension spring from the anchor post (Fig. 544).

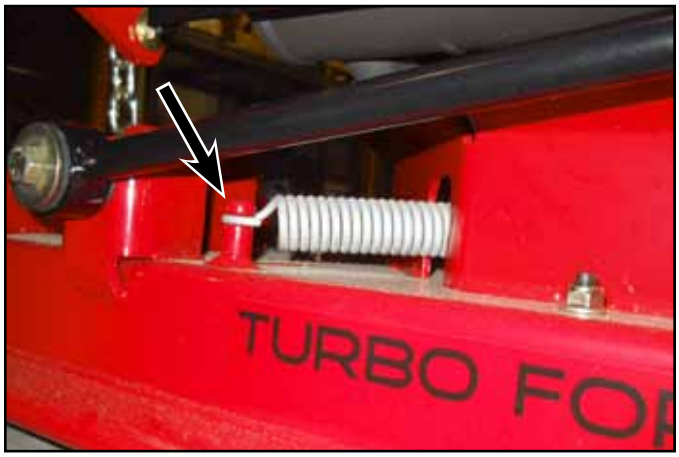


Fig. 544 DSCN-3449a

5. Remove the belt from the deck and clutch pulleys.

36” Mower Deck Belt Installation

1. Route the belt around the deck and clutch pulleys (Fig. 545).

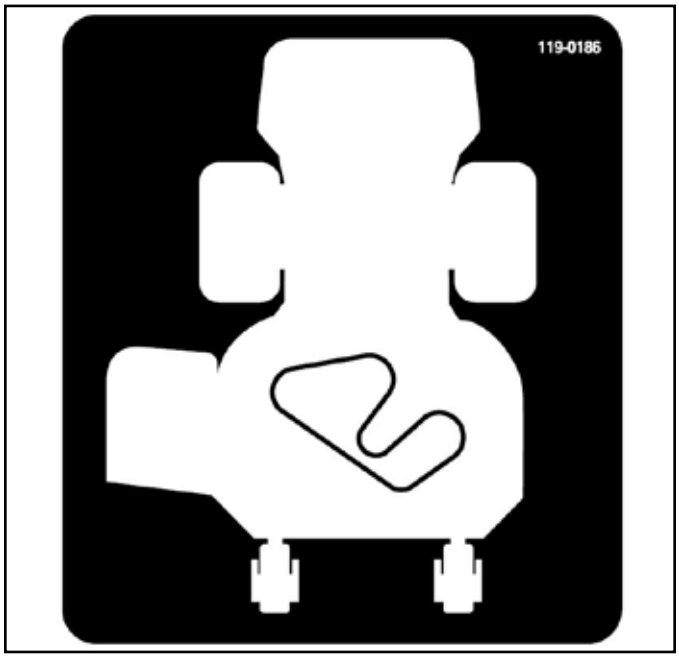


Fig. 545 fig. 119-0186

2. Install the extension spring to the idler bracket and spring anchor (Fig. 546).

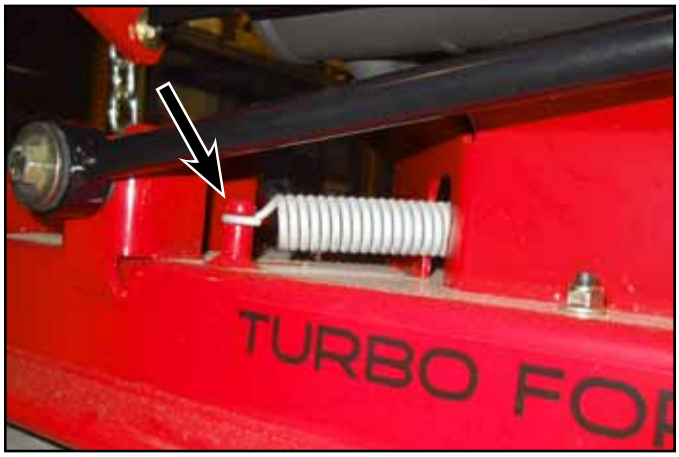


Fig. 546 DSCN-3449a

3. Install the belt covers.

40” Mower Deck Belts Replacement

40” Mower Deck RH Spindle Belt Removal

1. Turn the ignition off and remove the key.
2. Move the mower deck to the 1” (25mm) HOC.
3. Remove the RH belt cover.
4. Remove the RH extension spring from the anchor post (Fig. 547).

Fig. 547 DSCN-3117a

5. Remove the RH belt from the deck pulleys (Fig. 548).

Fig. 548 DSCN-3119a

40” Mower Deck RH Spindle Belt Installation

1. Route the RH belt around the deck pulleys (Fig. 549). Form 3368-755, Page 10, Belt Routing

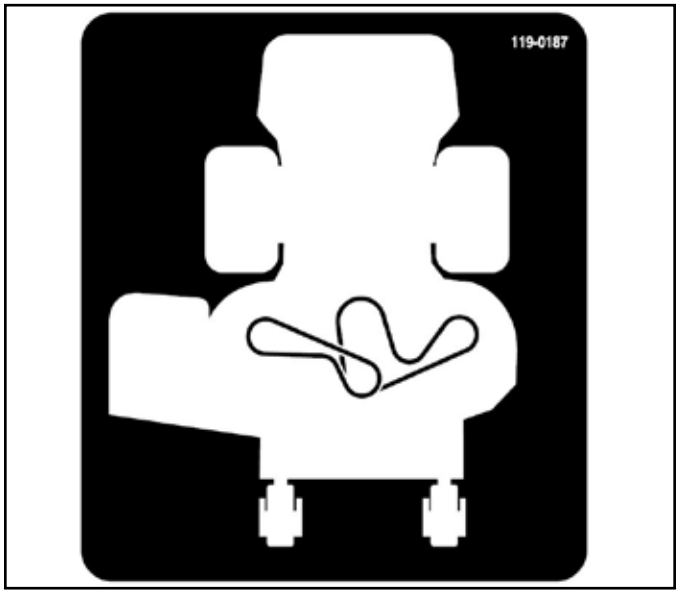


Fig. 549 fig. 119-0187

2. Install the extension spring to the RH idler bracket and spring anchor (Fig. 550).

Fig. 550 DSCN-3117a

3. Install the RH belt cover.

40” Mower Deck LH Spindle Belt Removal

1. Turn the ignition off and remove the key.
2. Move the mower deck to the 1” (25mm) HOC.
3. Remove the belt covers.
4. Remove the RH extension spring from the anchor post (Fig. 551).

Fig. 551 DSCN-3117a

5. Remove the RH belt from the deck pulleys (Fig. 552).

Fig. 552 DSCN-3119a

6. Remove the LH extension spring from the anchor post (Fig. 553).

Fig. 553 DSCN-3121a

7. Remove the LH belt from around the deck and clutch pulleys (Fig. 554).

Fig. 554 DSCN-3124a

40” Mower Deck LH Spindle Belt Installation

1. Route the LH belt around the deck pulleys (Fig. 555).

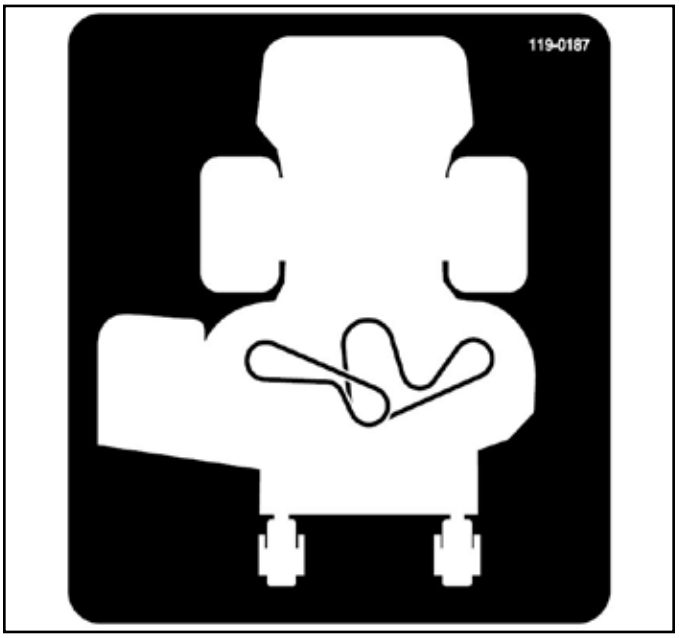


Fig. 555 fig. 119-0187

2. Install the extension spring to the LH idler bracket and spring anchor (Fig. 556).

Fig. 556 DSCN-3121a

3. Route the RH belt around the deck pulleys (Fig. 557).

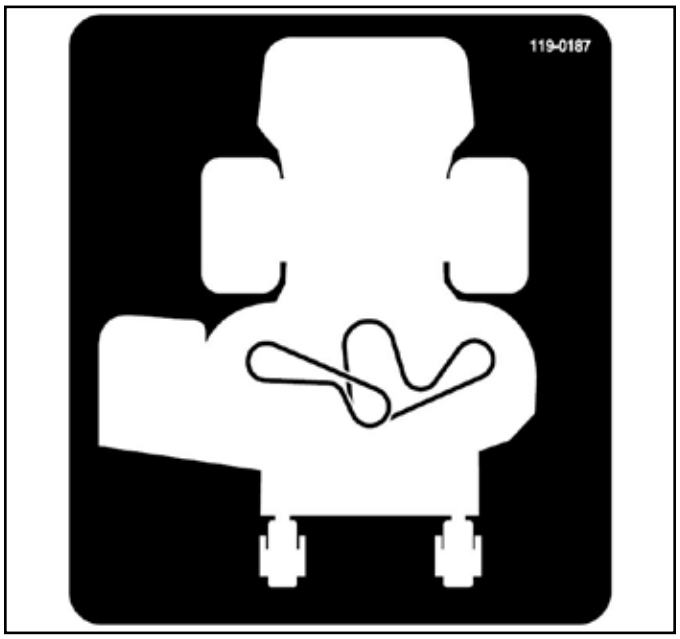


Fig. 557 fig. 119-0187

4. Install the extension spring to the RH idler bracket and spring anchor (Fig. 558).

Fig. 558 DSCN-3117a

5. Install the belt covers.

Spindle Assembly Replacement

Spindle Assembly Removal

1. Turn the ignition off and remove the key.
2. Remove the belt cover.
3. Remove the extension spring from the anchor post (Fig. 559).

Fig. 559 DSCN-3121a

4. Remove the belt from the mower deck pulleys (Fig. 560).

Fig. 560 DSCN-3124a

5. Raise the machine so the underside of the deck can be accessed.
6. Block the mower deck blade and remove the blade bolt, washer, and blade from the spindle (Fig. 561).

Fig. 561 DSCN-3147a

7. Remove the six nuts securing the thread forming screws (Fig. 562).

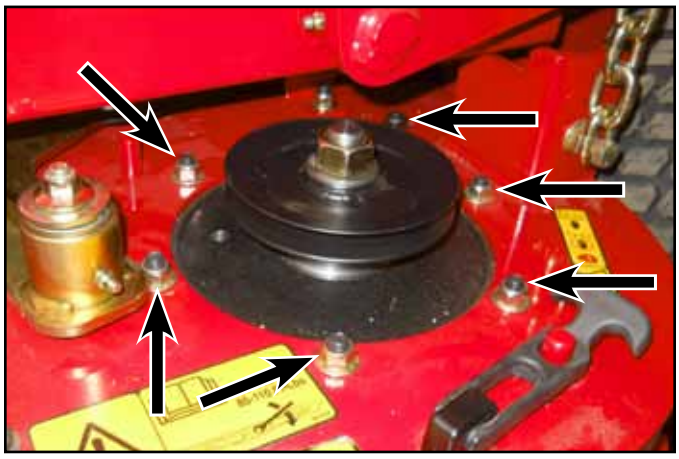


Fig. 562 DSCN-3152a

8. Remove the six thread forming screws securing the spindle assembly to the deck (Fig. 563).

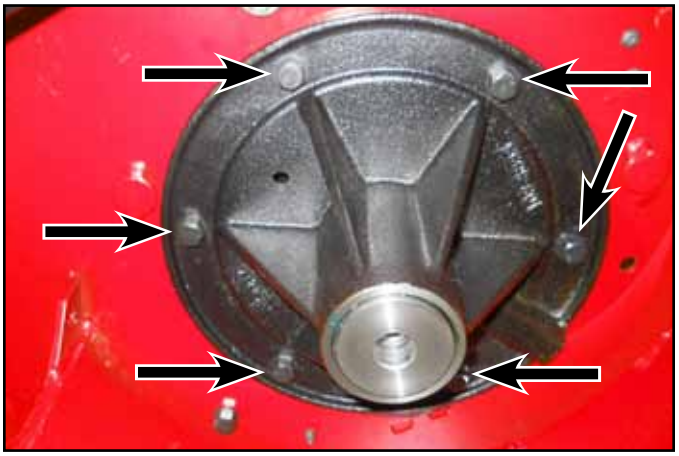


Fig. 563 DSCN-3153a

To service the spindle assembly, refer to “Spindle Service” on page 7-8.

Spindle Assembly Installation

1. Secure the spindle assembly to the deck using six thread forming screws (Fig. 564).

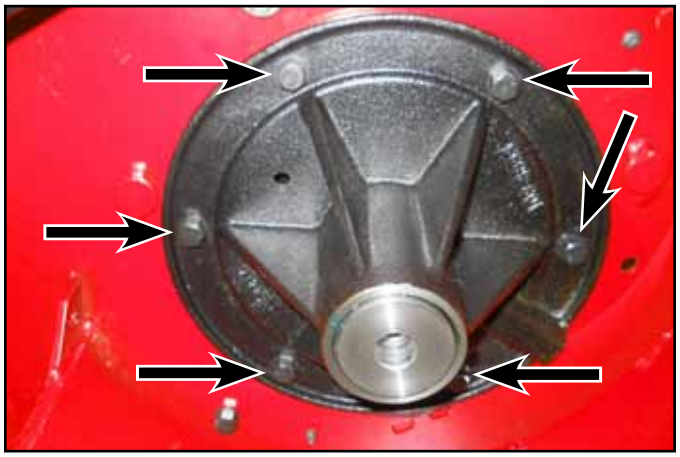


Fig. 564 DSCN-3153a

2. Secure the thread forming screws with nuts (Fig. 565).

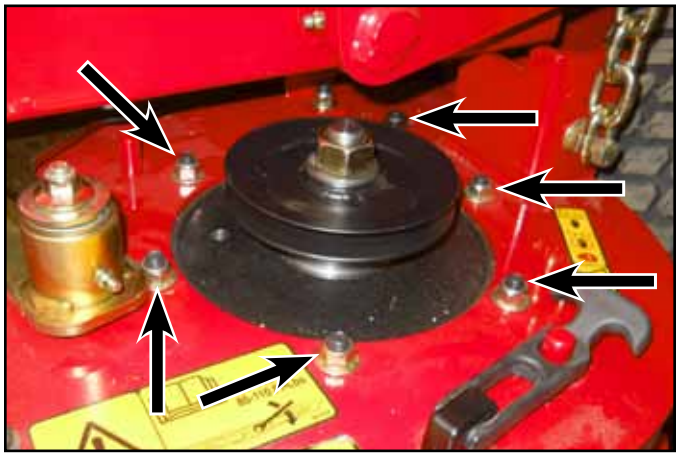


Fig. 565 DSCN-3152a

3. Secure the mower deck blade to the spindle assembly using the blade bolt, and washer. With the mower blade blocked, torque the blade bolt to 85-110 ft. lbs. (115-149 Nm). (Fig. 566).

Fig. 566 DSCN-3220a

Note: The crown of the washer faces the bolt head (Fig. 567).

Fig. 567 DSCN-3216a

4. Route the belt around the deck pulleys (Fig. 568, 40" deck and Fig. 569, 36" deck).

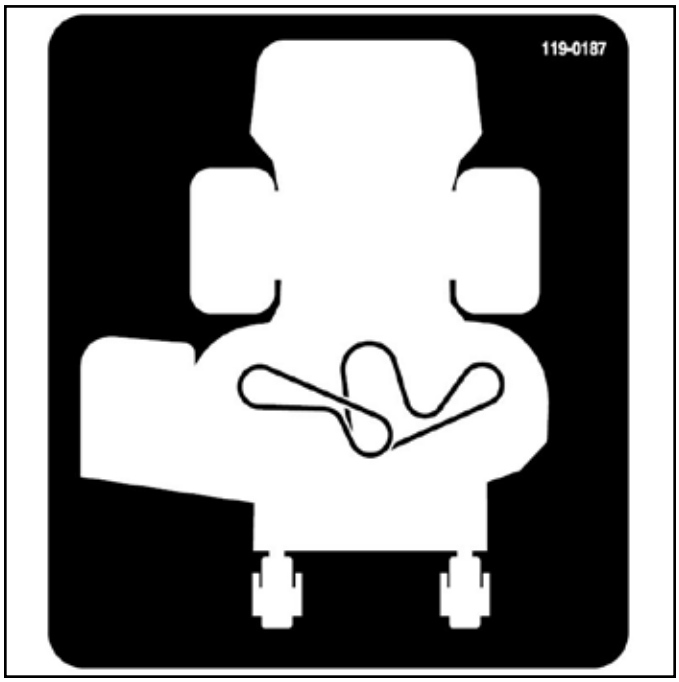


Fig. 568 fig. 119-0187

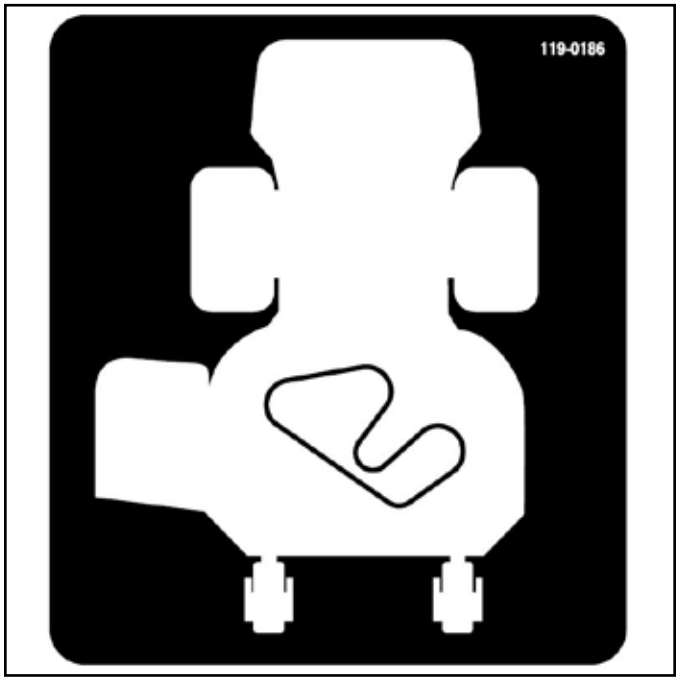


Fig. 569 fig. 119-0186

5. Install the extension spring to the idler bracket and spring anchor (Fig. 570).

Fig. 570 DSCN-3121a

6. Install the belt covers.

Spindle Service

Note: Once the spindle is removed, the following procedure can be used to rebuild the spindle assembly.

1. With the blade firmly secured in a vise, remove the nut and washer securing the pulley to the spindle shaft (Fig. 571).

Fig. 571 DSCN-3171a

2. Remove the bearing shield from the spindle assembly (Fig. 572).

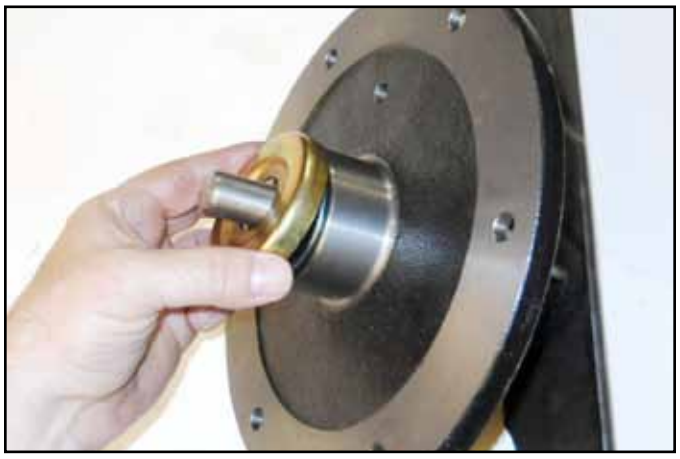


Fig. 572 DSCN-3178a

3. Remove the spindle shaft and blade from the spindle housing (Fig. 573).

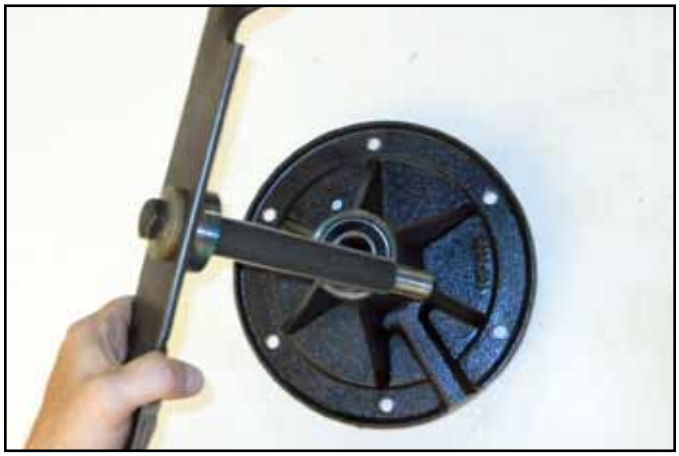


Fig. 573 DSCN-3179a

4. With the spindle shaft firmly secured in a vise, remove the nut and washer securing the blade to the spindle shaft (Fig. 574).

Fig. 574 DSCN-3184a

5. Remove the upper and lower bearings from the spindle housing (Fig. 575).

Fig. 575 DSCN-3185a

6. Remove the bearing spacer from the spindle housing (Fig. 576).

Note: Inspect all spindle assembly components. Replace any that are damaged or worn.

Fig. 576 DSCN-3191a

7. Install the upper bearing into the spindle housing (Fig. 577).

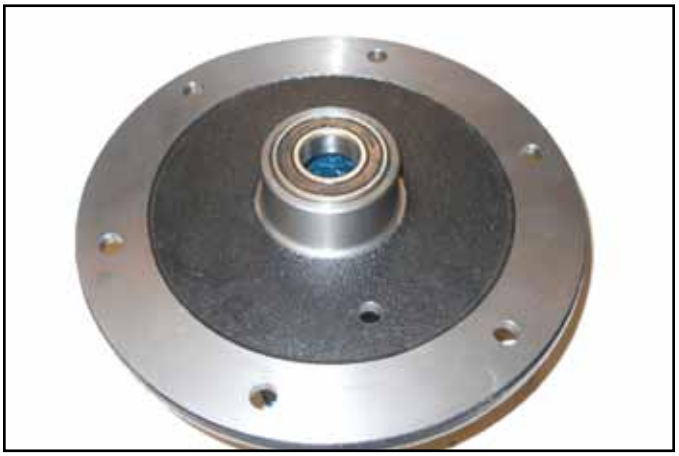


Fig. 577 DSCN-3193a

8. Position the bearing spacer in the spindle housing (Fig. 578).

Fig. 578 DSCN-3195a

9. With the bearing spacer centered in the housing, fill the cavity between the spacer and housing with high temp grease (Fig. 579).

Fig. 579 DSCN-3198a

10. Install the lower bearing into the spindle housing and add a couple of pumps of high temp grease to the center of the bearing spacer. (Fig. 580).

Fig. 580 DSCN-3202a

11. Install the spindle shaft into the spindle housing (Fig. 581).

Note: Rotate the spindle shaft as it is inserted through the spindle housing to spread the grease.

Fig. 581 DSCN-3205a

12. Position the bearing shield onto the top of the spindle housing (Fig. 582).

Fig. 582 DSCN-3207a

13. Secure the pulley to the spindle shaft using the washer and nut. The torque will be applied in a later step (Fig. 583).

Note: The welded side of the pulley hub faces upward.

Fig. 583 DSCN-3158a

14. Secure the blade to the spindle shaft using the washer and blade bolt. The torque will be applied in a later step (Fig. 584).

Fig. 584 DSCN-3212a

Note: The crown of the washer faces the bolt head (Fig. 585).

Fig. 585 DSCN-3216a

15. With the spindle shaft firmly secured in a vise, apply 100-130 ft-lbs. (135-176 Nm) torque to the nut securing the pulley to the spindle shaft (Fig. 586).

Fig. 586 DSCN-3171a

16. Secure the spindle assembly to the deck using six thread forming screws (Fig. 587).

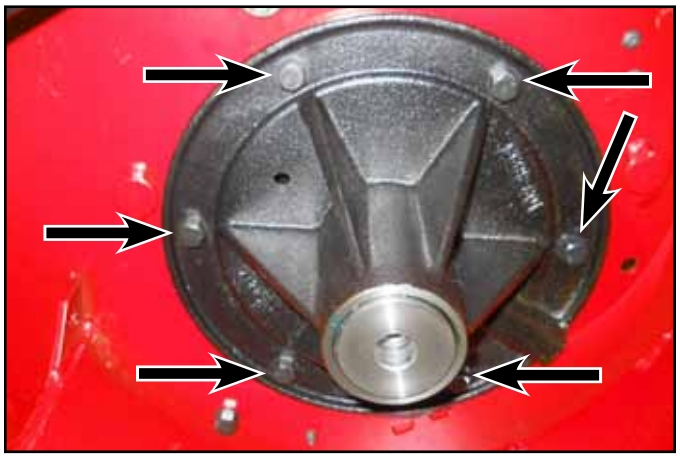


Fig. 587 DSCN-3153a

17. Secure the thread forming screws with nuts (Fig. 588).

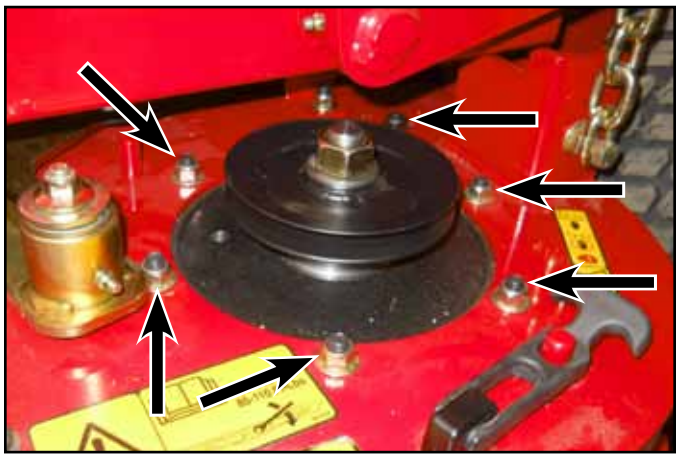


Fig. 588 DSCN-3152a

18. With the mower blade blocked, torque the blade bolt to 85-110 ft. lbs. (115-149 Nm). (Fig. 589).

Fig. 589 DSCN-3220a

19. Route the belt around the deck pulleys (Fig. 590, 40" deck and Fig. 591, 36" deck).

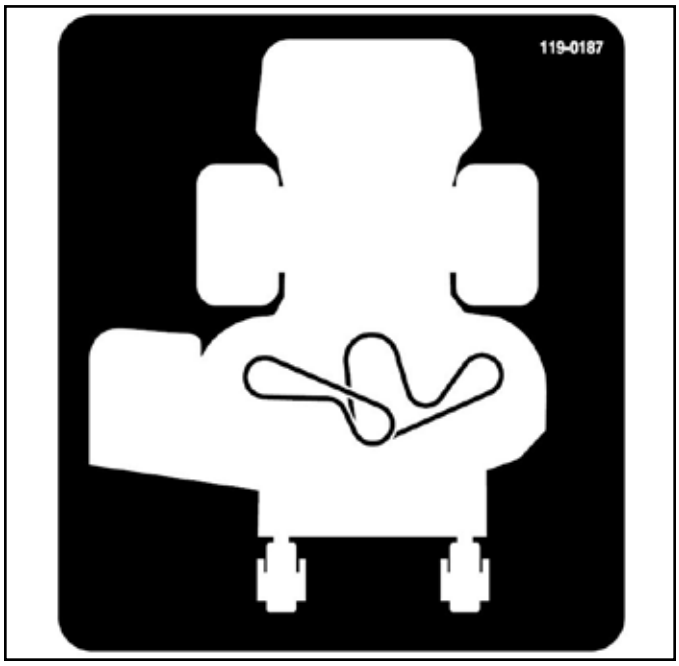


Fig. 590 fig. 119-0187

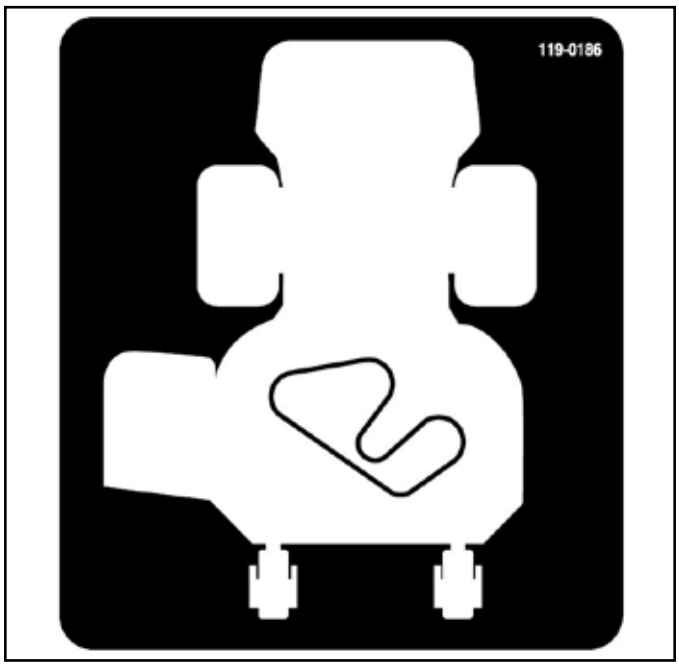


Fig. 591 fig. 119-0186

20. Install the extension spring to the idler bracket and spring anchor (Fig. 592).

Fig. 592 DSCN-3121a

22. Install the belt covers.

36” Mower Deck Belt Idler Replacement

36” Mower Deck Belt Idler Removal

1. Turn the ignition off and remove the key.
2. Move the mower deck to the 1” (25mm) HOC.
3. Remove the belt covers.
4. Remove the extension spring from the anchor post (Fig. 593).

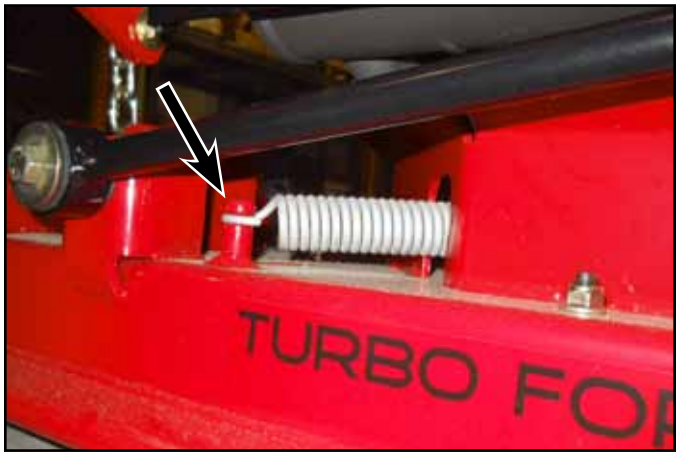


Fig. 593 DSCN-3449a

5. Remove the belt from the idler pulley.
6. Raise the machine to access to underside of the mower deck.

7. Remove the bolt, washers, and flange nut securing the idler assembly to the mower deck (Fig. 594).

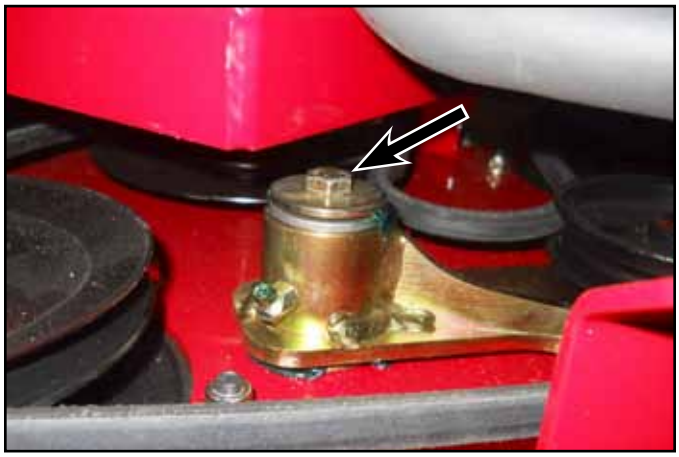


Fig. 594 DSCN-3452a

8. Remove the spacer from the idler arm assembly (Fig. 595).

Fig. 595 DSCN-3455a

9. Remove the grease fitting from the idler arm hub (Fig. 596).

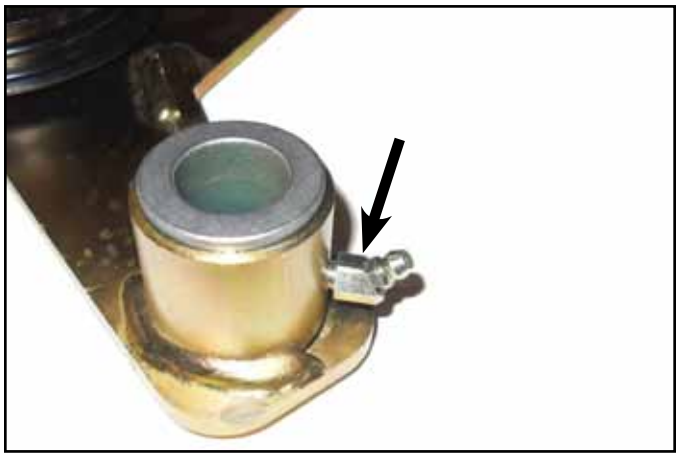


Fig. 596 DSCN-3457a

10. Using a punch, remove the upper and lower bushings (Fig. 597).

Fig. 597 DSCN-3459a

11. Remove the carriage bolt, washer, and flange nut securing the idler pulley to the idler arm (Fig. 598).

Fig. 598 DSCN-3462a

36” Mower Deck Belt Idler Installation

1. Install the upper and lower bushings into the idler arm hub (Fig. 599).

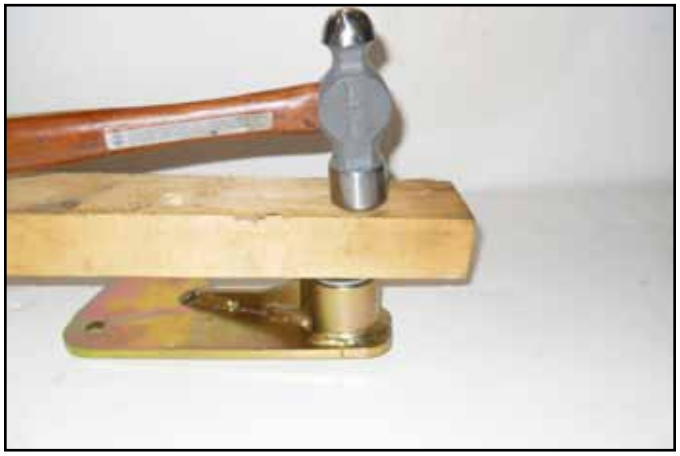


Fig. 599 DSCN-3465a

2. Install the grease fitting into the idler arm hub (Fig. 600).

Note: Install the fitting so it is pointing upwards.

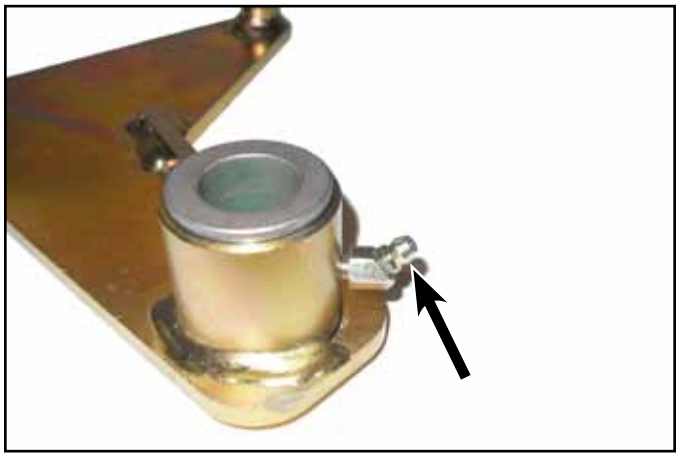


Fig. 600 DSCN-3468a

3. Secure the idler pulley to the idler arm using the carriage bolt, washer, and flange nut (Fig. 601).

Fig. 601 DSCN-3480a

Note: The taller side of the idler pulley hub faces the idler arm (Fig. 602).

Fig. 602 DSCN-3239a

4. Install the spacer into the idler arm assembly (Fig. 603).

Fig. 603 DSCN-3482a

5. Position the bolt, upper and lower washers, onto the idler arm assembly (Fig. 604).

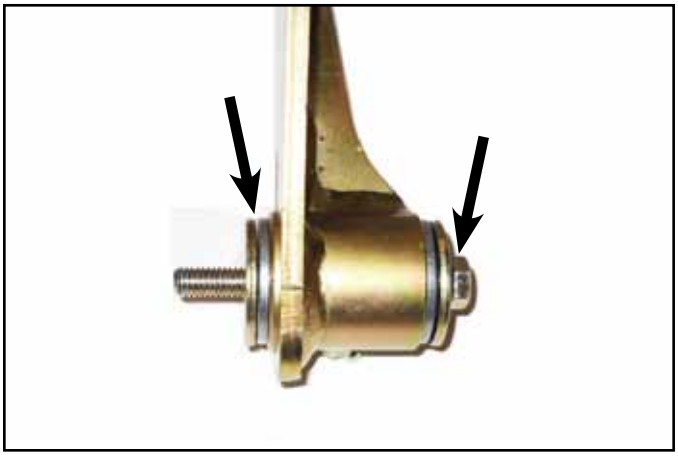


Fig. 604 DSCN-3487a

6. Position the assembly onto the mower deck (Fig. 605).

Fig. 605 DSCN-3489a

7. Secure the assembly using the flange nut (Fig. 606).

Fig. 606 DSCN-3492a

8. Route the belt around the deck pulleys (Fig. 607).

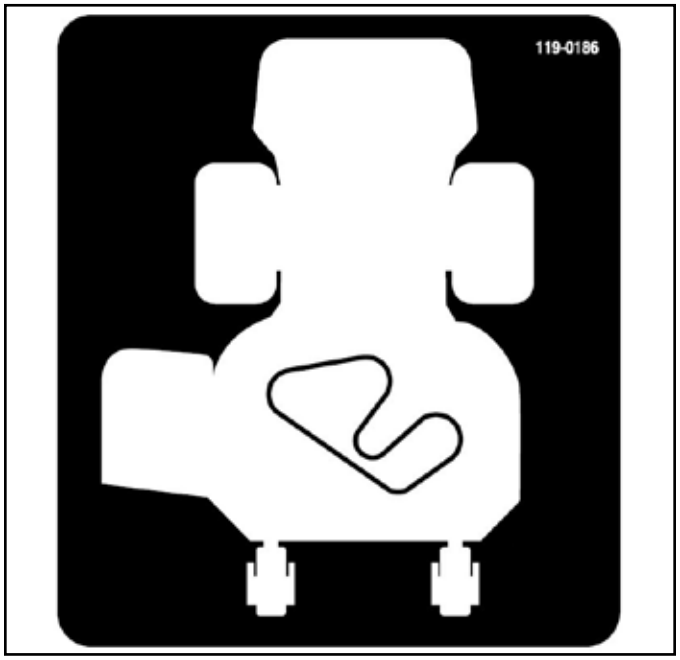


Fig. 607 fig. 119-0186

9. Install the extension spring to the idler bracket and spring anchor (Fig. 608).

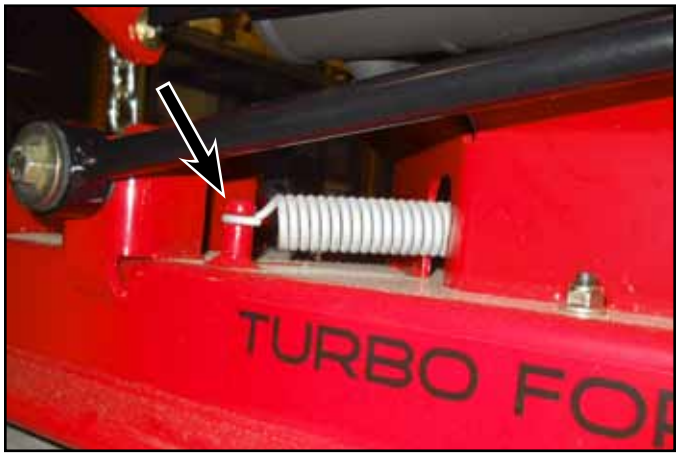


Fig. 608 DSCN-3449a

10. Pump high temp grease into the idler hub (Fig. 609).

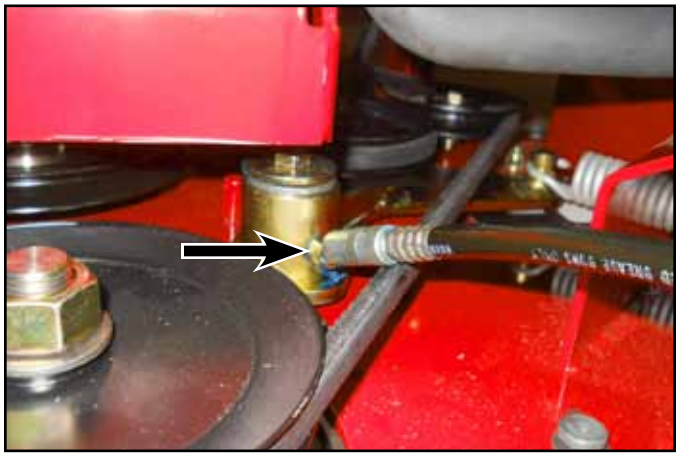


Fig. 609 DSCN-3495a

11. Install the belt cover.

40” Mower Deck Belts Idler Replacement

40” Mower Deck Belts LH Idler Removal

1. Turn the ignition off and remove the key.
2. Remove the belt cover.
3. Remove the extension spring from the anchor post (Fig. 610).

Fig. 610 DSCN-3121a

4. Remove the belt from the mower deck pulleys (Fig. 611).

Fig. 611 DSCN-3125a

5. Raise the machine so the underside of the deck can be accessed.

6. Remove the bolt, washers, and flange nut securing the idler assembly to the mower deck (Fig. 612).

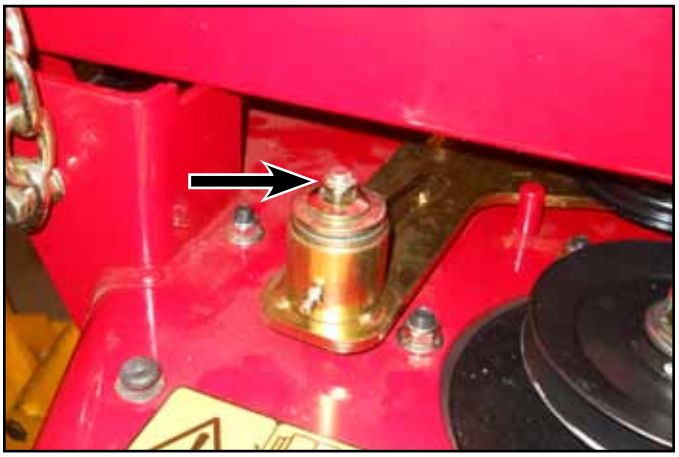


Fig. 612 DSCN-3225a

7. Remove the spacer from the idler arm assembly (Fig. 613).

Fig. 613 DSCN-3255a

8. Using a punch, remove the upper and lower bushings (Fig. 614).

Fig. 614 DSCN-3233a

9. Remove the grease fitting from the idler arm hub (Fig. 615).

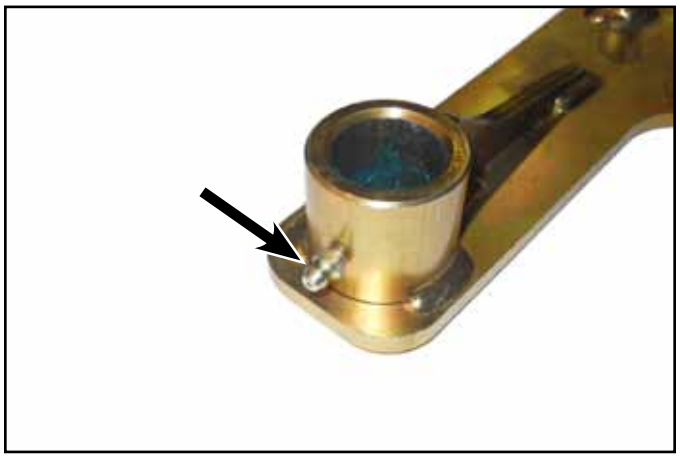


Fig. 615 DSCN-3235a

10. Remove the carriage bolt, washer, and flange nut securing the idler pulley to the idler arm (Fig. 616).

Fig. 616 DSCN-3237a

40” Mower Deck Belts LH Idler Installation

1. Secure the idler pulley to the idler arm using the carriage bolt, washer, and flange nut (Fig. 617).

Fig. 617 DSCN-3243a

Note: The taller side of the idler pulley hub faces the idler arm (Fig. 618).

Fig. 618 DSCN-3239a

2. Install the grease fitting into the idler arm hub (Fig. 619).

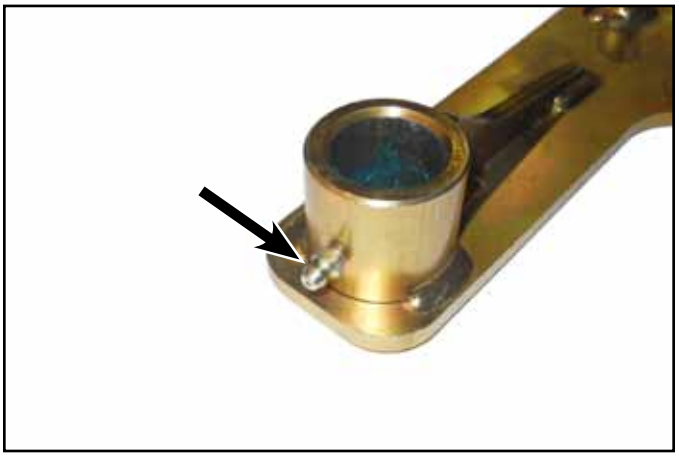


Fig. 619 DSCN-3235a

3. Install the upper and lower bushings into the idler arm hub (Fig. 620).

Fig. 620 DSCN-3248a

4. Install the spacer into the idler arm assembly (Fig. 621).

Fig. 621 DSCN-3255a

5. Position the bolt with washer up through the mower deck (Fig. 622).

Fig. 622 DSCN-3257a

6. Place a large washer onto the bolt (Fig. 623).

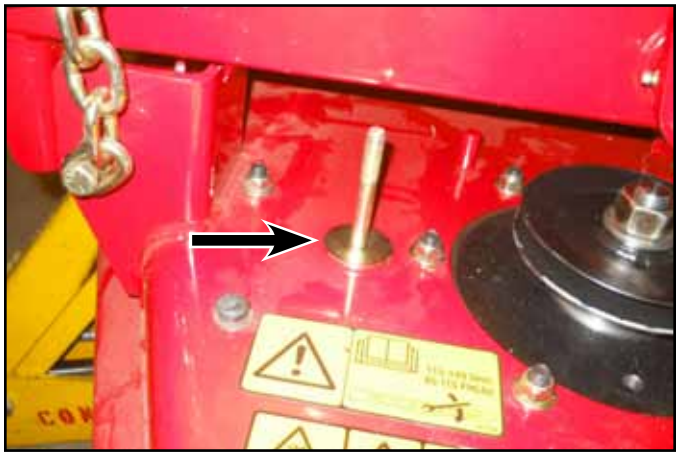


Fig. 623 DSCN-3260a

7. Place the idler assembly onto the bolt (Fig. 624).

Fig. 624 DSCN-3262a

8. Place a large washer onto the bolt (Fig. 625).

Fig. 625 DSCN-3263a

9. Secure the assembly using the flange nut (Fig. 626).

Fig. 626 DSCN-3266a

10. Route the belt around the deck pulleys (Fig. 627).

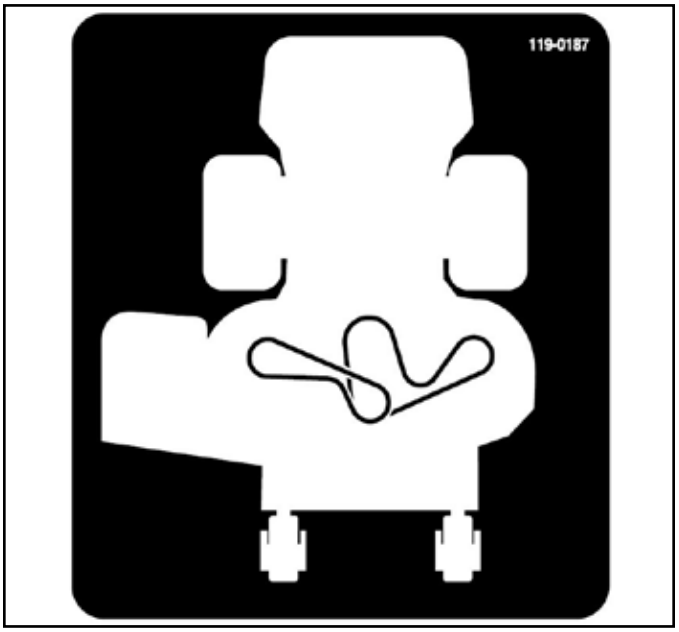


Fig. 627 fig. 119-0187

11. Install the extension spring to the idler bracket and spring anchor (Fig. 628).

Fig. 628 DSCN-3121a

12. Pump high temp grease into the idler hub (Fig. 629).

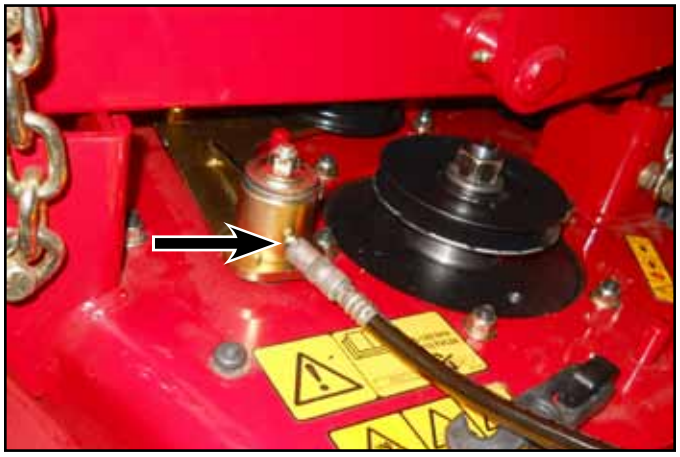


Fig. 629 DSCN-3269a

13. Install the belt cover.

40” Mower Deck Belts RH Idler Removal

1. Turn the ignition off and remove the key.
2. Remove the belt cover.
3. Remove the extension spring from the anchor post (Fig. 630).

Fig. 630 DSCN-3117a

4. Remove the bolt and nut securing the idler assembly to the idler mount (Fig. 631).

Fig. 631 DSCN-3271a

5. Remove the spacer, two washers, and two friction washers from the assembly (Fig. 632).

Fig. 632 DSCN-3274a

6. Remove the carriage bolt, washer, and flange nut securing the idler pulley to the idler arm (Fig. 633).

Fig. 633 DSCN-3275a

40” Mower Deck Belts RH Idler Installation

1. Secure the idler pulley to the idler arm using the carriage bolt, washer, and flange nut (Fig. 634).

Fig. 634 DSCN-3275a

Note: The taller side of the idler pulley hub faces the idler arm (Fig. 635).

Fig. 635 DSCN-3239a

2. Place the bolt through the two washers, two friction washers, spacer, and idler arm (Fig. 636).

Fig. 636 DSCN-3277a

Note: The two friction washers must have the spacer nested into their center (Fig. 637).

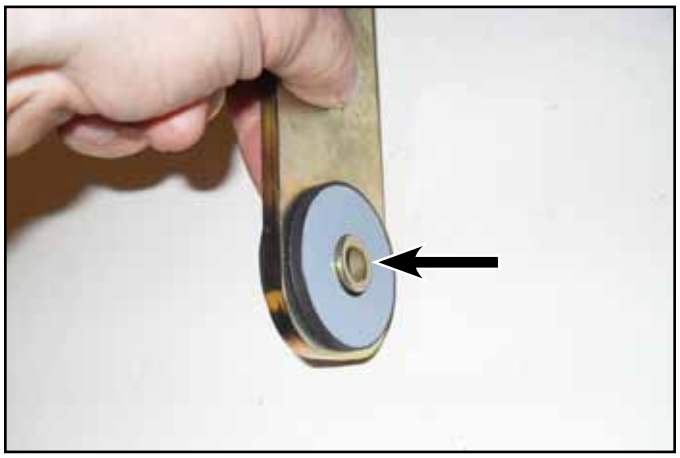


Fig. 637 DSCN-3280a

3. Secure the idler assembly to the idler mount using the bolt and nut (Fig. 638).

Fig. 638 DSCN-3271a

4. Install the extension spring to the idler bracket and spring anchor (Fig. 639).

Fig. 639 DSCN-3117a

5. Install the belt cover.

Baffles & Skid Plate Replacement

Fixed Baffle Removal

1. Raise the machine to access the underside of the deck.

2. Remove the carriage bolt and nut securing the LH side of the baffle (Fig. 640).

Fig. 640 DSCN-3288a

3. **36” Deck Only:** Remove the carriage bolt and nut securing the RH side of the baffle (Fig. 641).

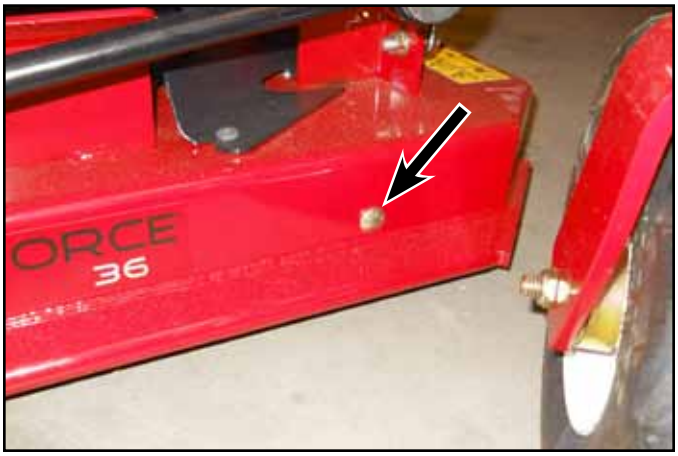


Fig. 641 DSCN-3300a

7

4. **40” Deck Only:** Remove the nut securing the thread forming screw on the RH side of the baffle (Fig. 642).

Fig. 642 DSCN-3292a

5. **40” Deck Only:** Remove the thread forming screw securing the RH side of the baffle (Fig. 643).

Fig. 643 DSCN-3296a

Fixed Baffle Installation

1. **36” Deck Only:** Loosely install the carriage bolt and nut that secure the LH side of the baffle (Fig. 644).

Fig. 644 DSCN-3288a

2. **36” Deck Only:** Secure the RH side of the baffle using the carriage bolt and nut, then tighten the LH carriage bolt and nut (Fig. 645).

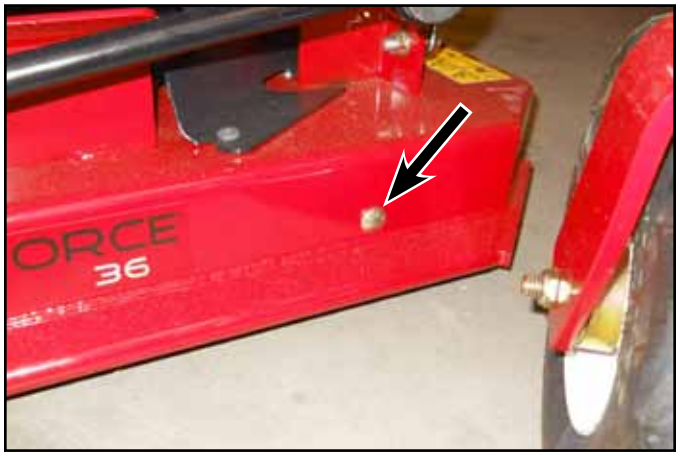


Fig. 645 DSCN-3300a

3. **40” Deck Only:** Loosely install the carriage bolt and nut that secure the LH side of the baffle (Fig. 646).

Fig. 646 DSCN-3288a

4. **40” Deck Only:** Secure the RH side of the baffle using the thread forming screw, then tighten the LH carriage bolt and nut (Fig. 647).

Fig. 647 DSCN-3296a

5. **40” Deck Only:** Secure the thread forming screw using the nut (Fig. 648).

Fig. 648 DSCN-3292a

Adjustable Discharge Baffle Removal

1. Remove the nut securing the thread forming screw on the LH side of the baffle (Fig. 649).

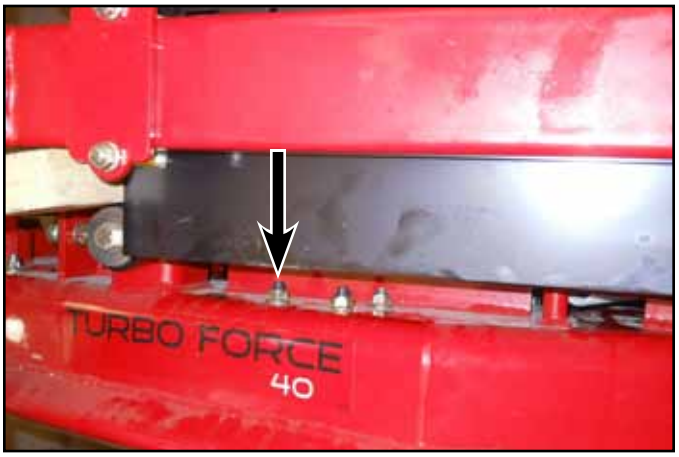


Fig. 649 DSCN-3302a

2. Raise the machine to access the underside of the mower deck.

3. Remove the thread forming screw securing the LH side of the baffle (Fig. 650).

Fig. 650 DSCN-3307a

4. Remove the carriage bolt and flange nut securing the RH side of the baffle (Fig. 651).

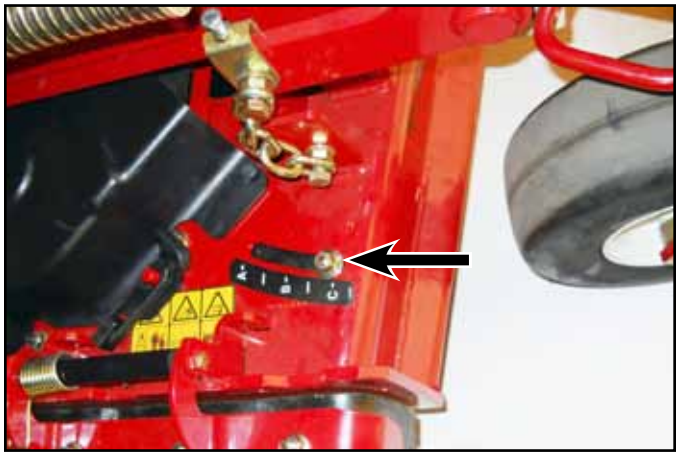


Fig. 651 DSCN-3308a

Adjustable Discharge Baffle Installation

1. Loosely install the carriage bolt and flange nut securing the RH side of the baffle (Fig. 652).

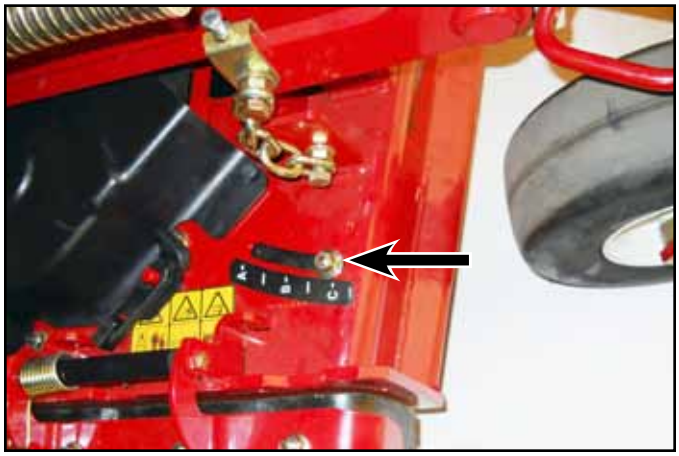


Fig. 652 DSCN-3308a

2. Secure the LH side of the baffle using the thread forming screw (Fig. 653).

Fig. 653 DSCN-3307a

3. Secure the thread forming screw using a nut (Fig. 654).

Fig. 654 DSCN-3302a

4. Secure the desired position of the baffle by tightening the flange nut (Fig. 655).

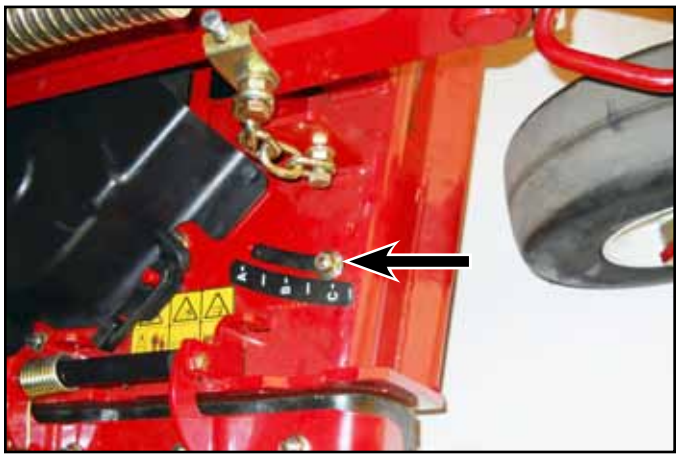


Fig. 655 DSCN-3308a

Discharge Baffle Removal

1. Remove the two nuts securing the two thread forming screws (Fig. 656).

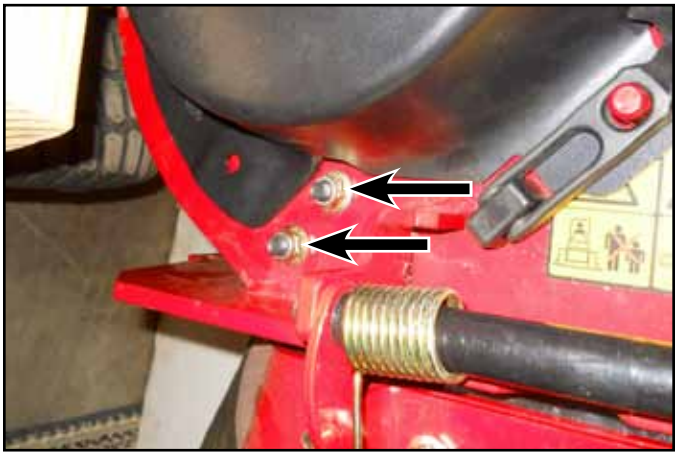


Fig. 656 DSCN-3284a

2. Raise the machine to access the underside of the mower deck.

3. Remove the two thread forming screws securing the discharge baffle (Fig. 657).

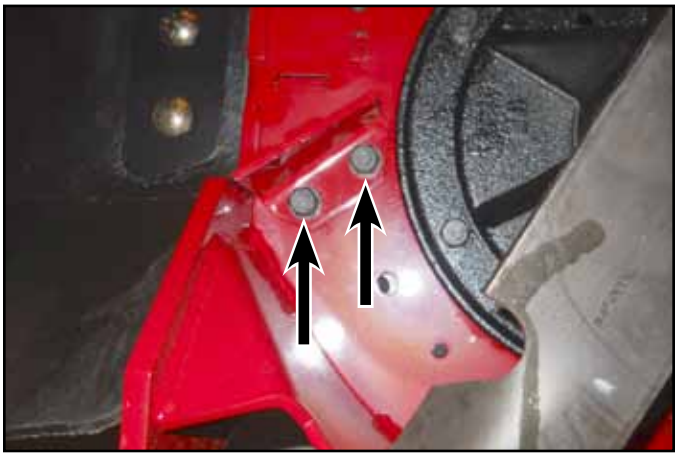


Fig. 657 DSCN-3286a

Discharge Baffle Installation

1. Secure the discharge baffle using two thread forming screws (Fig. 658).

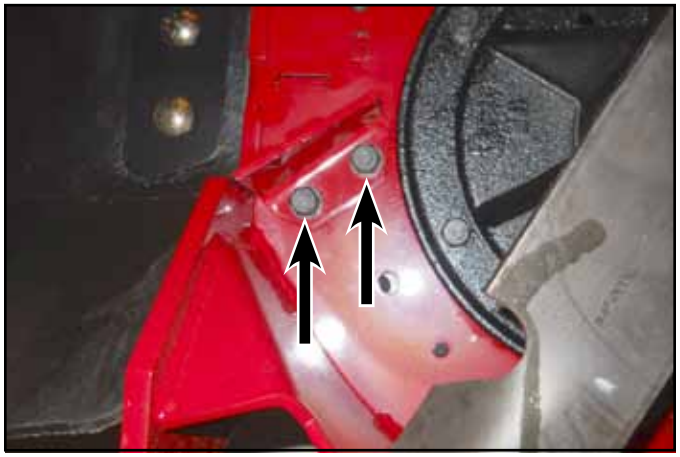


Fig. 658 DSCN-3286a

2. Secure the two thread forming screws using two nuts (Fig. 659).

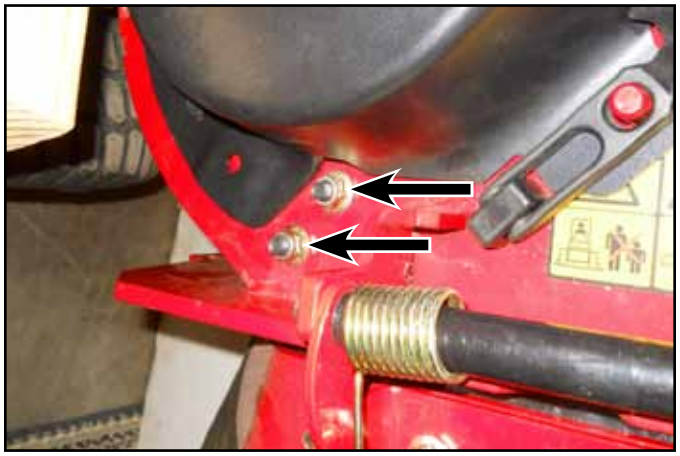


Fig. 659 DSCN-3284a

Skid Plate Removal

1. Raise the machine to access the underside of the mower deck.

2. **36” Deck Only:** Remove the four sets of carriage bolts and nuts securing the skid plate to the mower deck (Fig. 660).

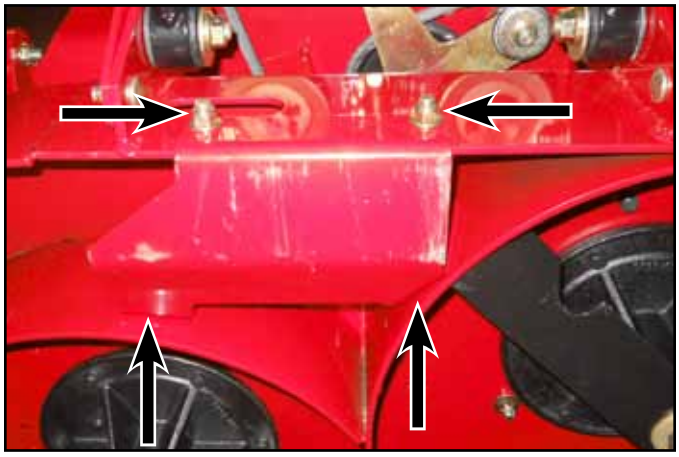


Fig. 660 DSCN-3502a

3. **40” Deck Only:** Remove the three sets of carriage bolts and nuts securing the skid plate to the mower deck (Fig. 661).

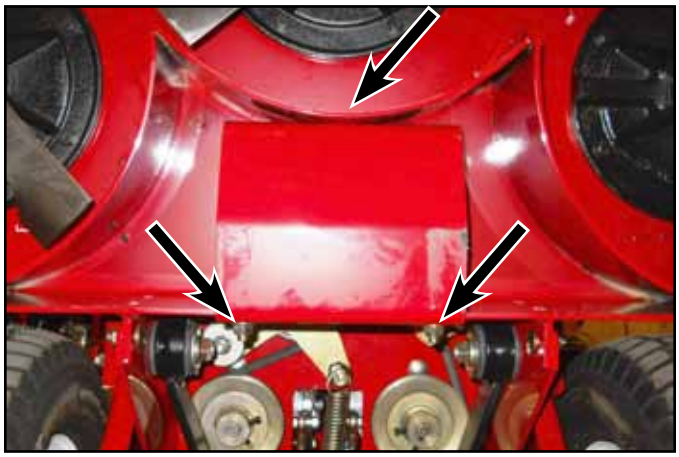


Fig. 661 DSCN-3310a

Skid Plate Installation

1. **36” Deck Only:** Secure the skid plate to the mower deck using the four sets of carriage bolts and nuts (Fig. 662).

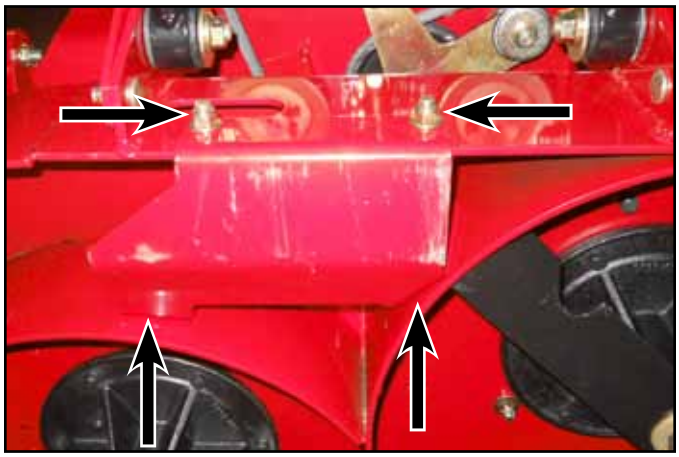


Fig. 662 DSCN-3502a

2. **40” Deck Only:** Secure the skid plate to the mower deck using the three sets of carriage bolts and nuts (Fig. 663).

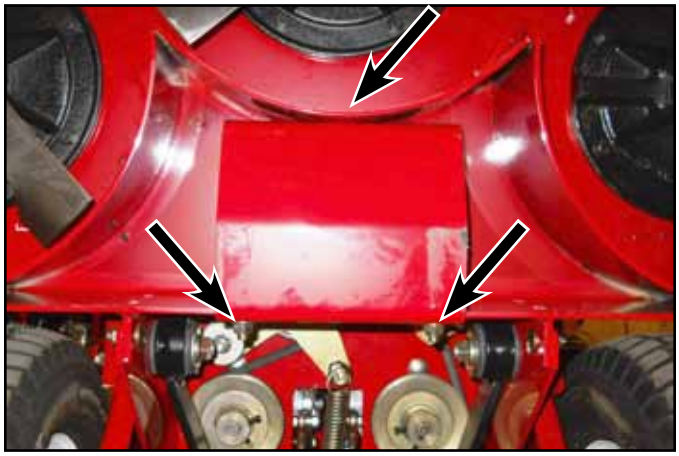


Fig. 663 DSCN-3310a

Grass Deflector Replacement

Grass Deflector Removal

1. Remove the “J” hook of the torsion spring from the deflector mount (Fig. 664).

Fig. 664 DSCN-3315a

2. Remove the bolt, nut and spacer securing the deflector assembly to the mower deck (Fig. 665).

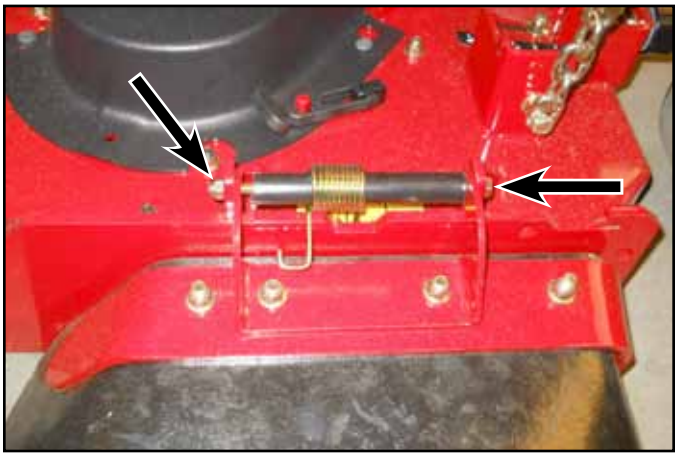


Fig. 665 DSCN-3317a

3. Remove the four sets of carriage bolts and nuts securing the deflector mount, deflector, and deflector strap to the rubber deflector (Fig. 666).

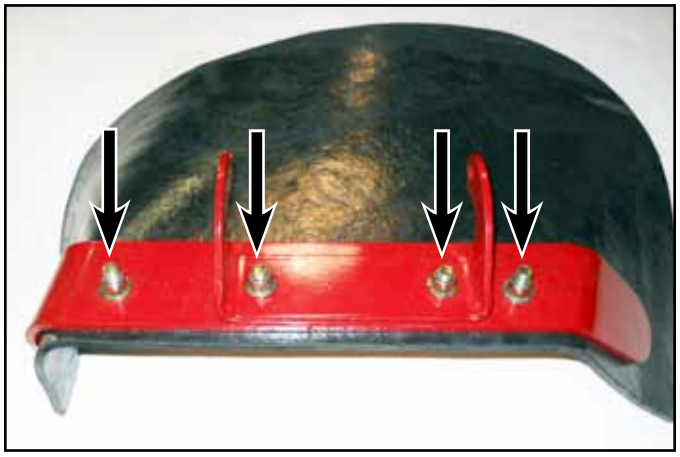


Fig. 666 DSCN-3320a

Grass Deflector Installation

1. Position the four carriage bolts into the discharge strap (Fig. 667).

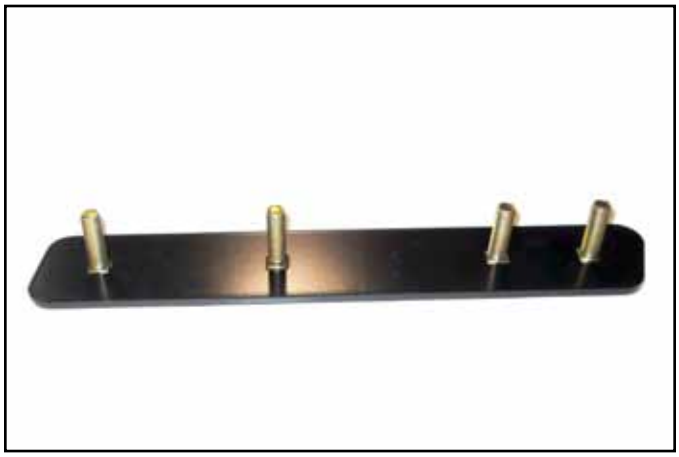


Fig. 667 DSCN-3322a

2. Position the rubber deflector onto the four carriage bolts (Fig. 668).

Fig. 668 DSCN-3325a

3. Secure the deflector using the two outmost carriage bolts and nuts (Fig. 669).

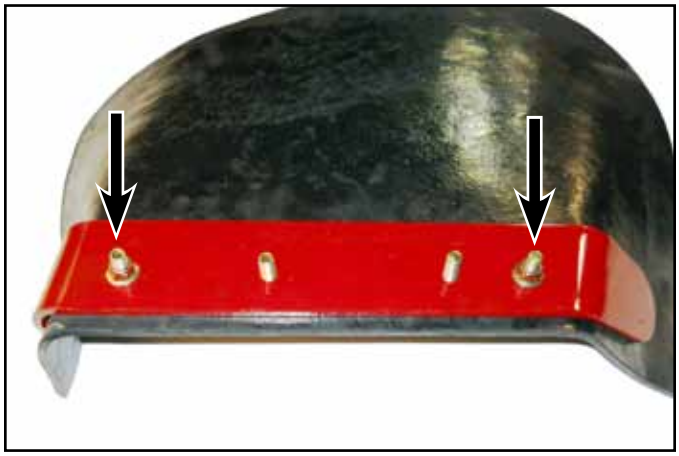


Fig. 669 DSCN-3334a

4. Secure the deflector mount to the assembly using the two carriage bolts and nuts (Fig. 670).

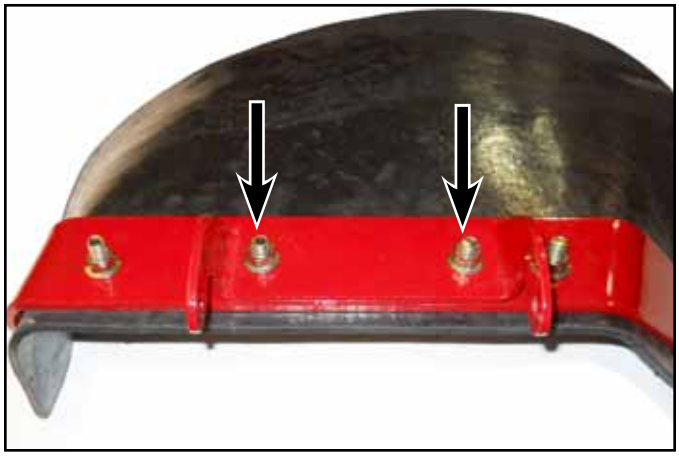


Fig. 670 DSCN-3336a

5. Position the deflector assembly, spacer, and torsion spring onto the mower deck (Fig. 671).

Note: The torsion spring "J" hooks must straddle the deck plate.

Fig. 671 DSCN-3338a

6. Secure the deflector assembly to the deck using the bolt and nut (Fig. 672).

Note: Do not over tighten the bolt and nut. The deflector assembly must move freely.

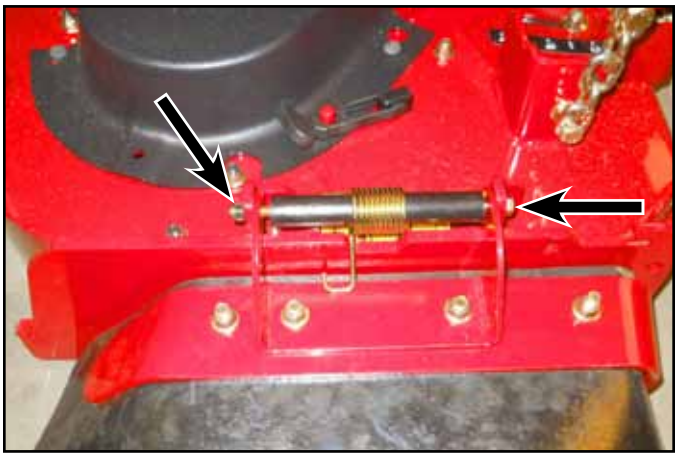


Fig. 672 DSCN-3340a

7. Hook the "J" hook of the torsion spring onto the defector mount (Fig. 673).

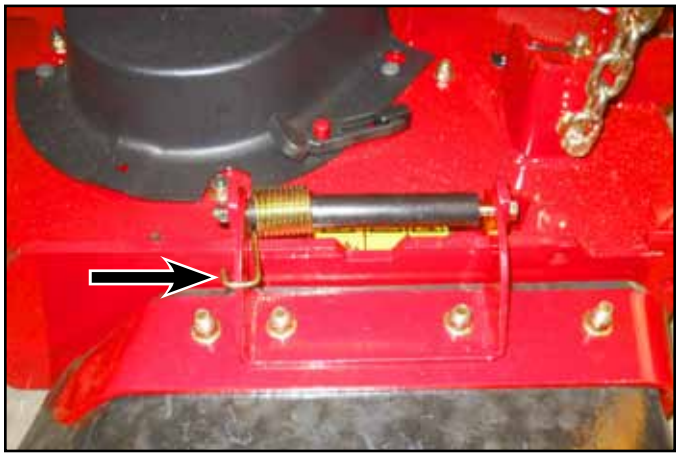


Fig. 673 DSCN-3342a

Deck Strut Replacement

Rear Strut Removal

1. Raise the machine to access the underside of the mower deck.

2. Remove the bolt, nut and washer securing the strut to the frame assembly (Fig. 674).

Note: If the bolt must be replaced, loosen the wheel motor to gain the clearance needed to remove.

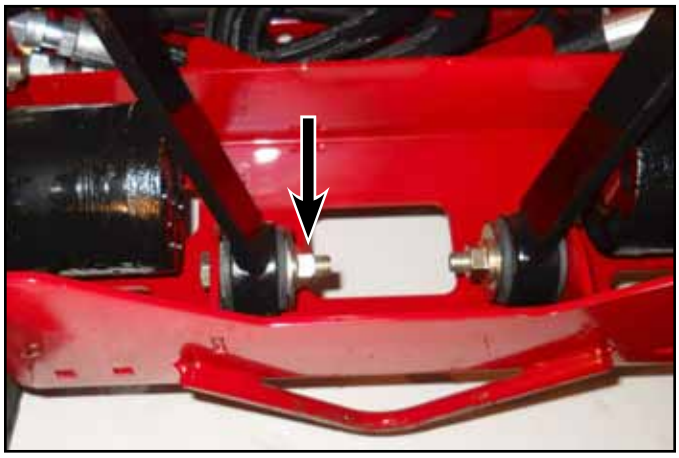


Fig. 674 DSCN-3352a

3. Remove the bolt, nut and washer securing the strut to the engine base and deck (Fig. 675).

Fig. 675 DSCN-3347a

4. Remove the spacer from the suspension bushing (Fig. 676).

Fig. 676 DSCN-3354a

5. Using an arbor press, remove the suspension bushing from the strut (Fig. 677).

Fig. 677 DSCN-3358a

6. Repeat steps 4 and 5 on the other end of the strut.

Rear Strut Installation

1. Apply a thin layer of grease to the outer lip of the suspension bushing (Fig. 678).

Fig. 678 DSCN-3362a

2. Using an arbor press, install the suspension bushing into the strut (Fig. 679).

Fig. 679 DSCN-3363a

3. Install the spacer into the suspension bushing (Fig. 680).

Fig. 680 DSCN-3366a

4. Repeat steps 1 through 3 on the other end of the strut.

5. Loosely install the bolt, washer, and nut securing the rear of the strut to the frame (Fig. 681).

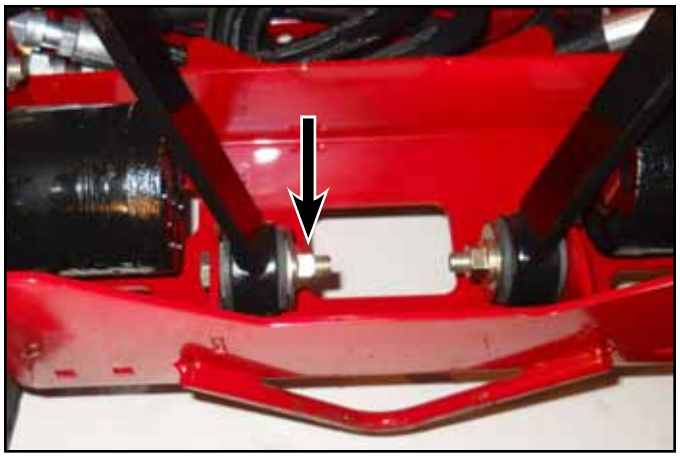


Fig. 681 DSCN-3352a

6. Secure the front end of the strut to the engine base and deck using the bolt, washer and nut (Fig. 682).

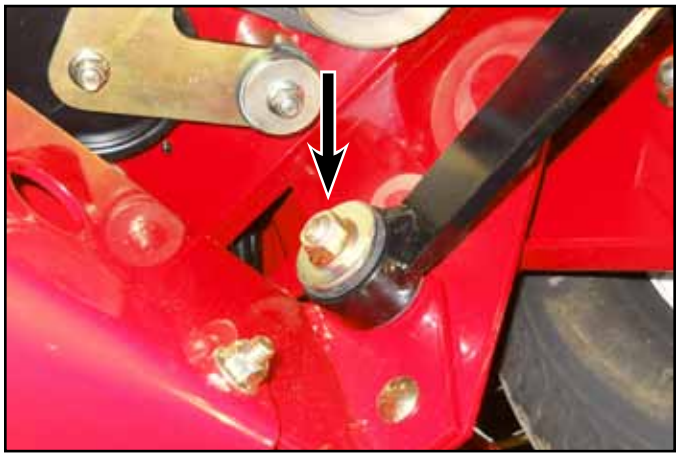


Fig. 682 DSCN-3347a

7. Tighten the rear bolt and nut.

Front Strut Removal

1. Remove the bolt, nut and washer securing the strut to the frame (Fig. 683).

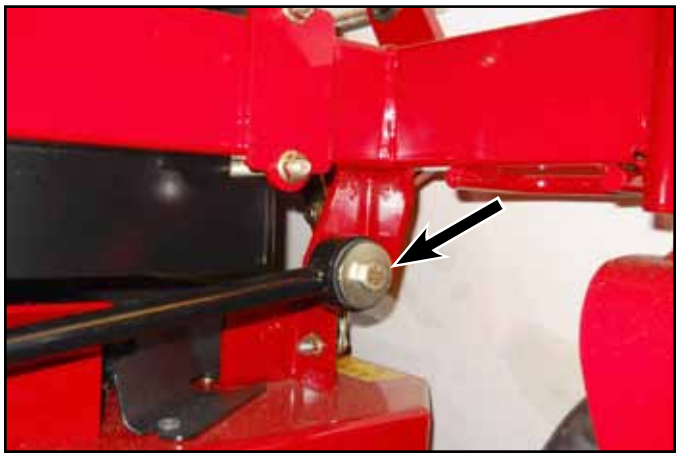


Fig. 683 DSCN-3370a

2. Remove the bolt, washer and nut securing the strut to the deck (Fig. 684).

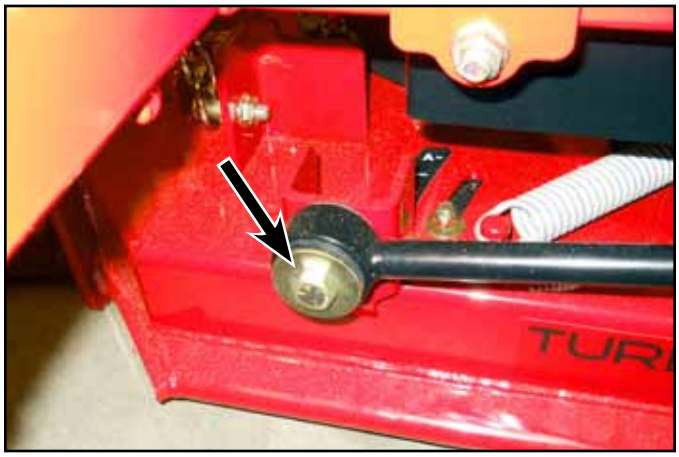


Fig. 684 DSCN-3367a

3. Remove the spacer from the suspension bushing (Fig. 685).

Fig. 685 DSCN-3373a

4. Using an arbor press, remove the suspension bushing from the strut (Fig. 686).

Fig. 686 DSCN-3375a

5. Repeat steps 3 and 4 on the other end of the strut.

Front Strut Installation

1. Apply a thin layer of grease to the outer lip of the suspension bushing (Fig. 687).

Fig. 687 DSCN-3362a

2. Using an arbor press, install the suspension bushing into the strut (Fig. 688).

Fig. 688 DSCN-3375a

3. Install the spacer into the suspension bushing (Fig. 689).

Fig. 689 DSCN-3373a

4. Repeat steps 1 through 3 on the other end of the strut.

5. Loosely install the bolt, washer and nut securing the strut to the frame (Fig. 690).

Fig. 690 DSCN-3370a

6. Secure the other end of the strut to the deck using the bolt, washer and nut (Fig. 691).

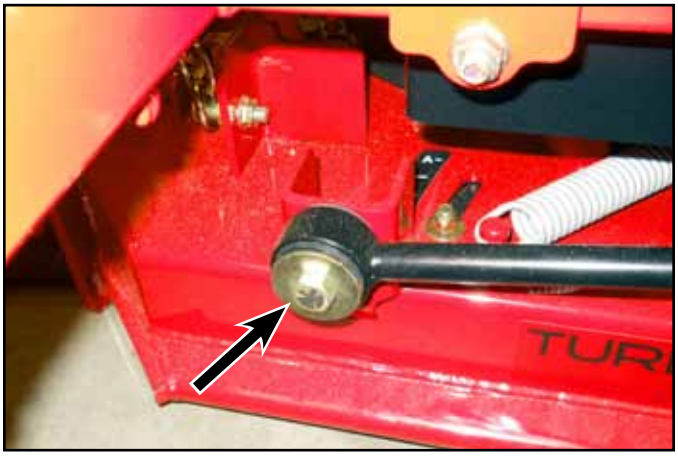


Fig. 691 DSCN-3367a

7. Tighten the bolt and nut securing the other end of the strut.

Mower Deck Replacement

Mower Deck Removal

1. Remove the belt covers.
2. Remove the extension spring from the anchor post (Fig. 692).

Fig. 692 DSCN-3121a

3. Raise the machine to access the underside of the mower.
4. Remove the deck belt from the PTO clutch (Fig. 693).

Fig. 693 DSCN-3379a

5. Remove the two sets of bolts, washers and nuts securing the RH and LH rear struts to the engine base and deck (Fig. 694).

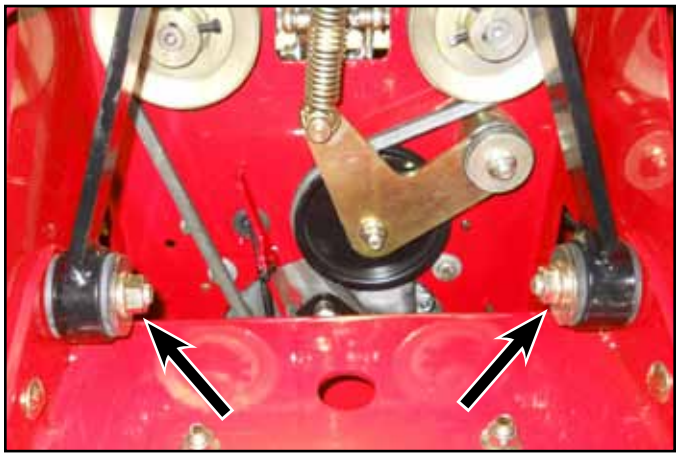


Fig. 694 DSCN-3384a

6. Place the HOC (Height of Cut) into the transport position.

7. Using a strap, secure the rear of the engine base (Fig. 695) to the cable retainer (Fig. 696).

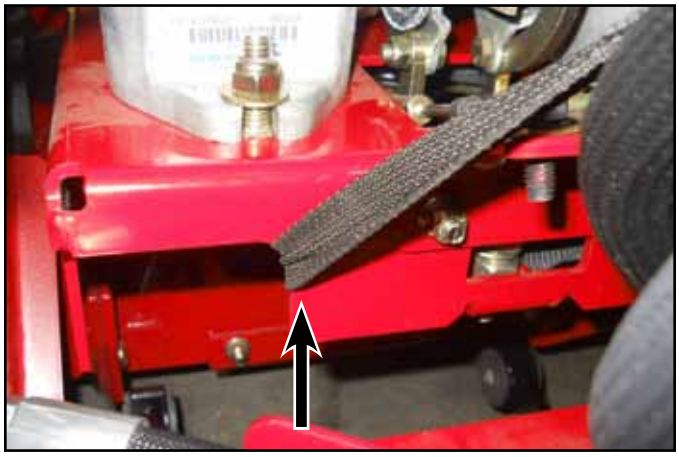


Fig. 695 DSCN-3388a

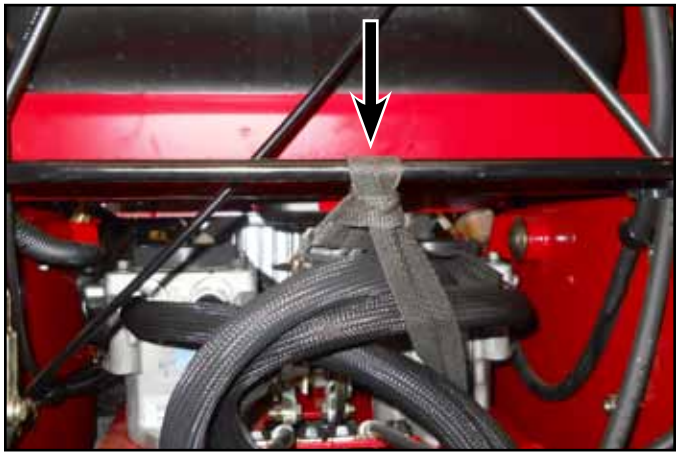


Fig. 696 DSCN-3392a

8. Using a strap, secure the front of the engine base to the carrier frame (Fig. 697).

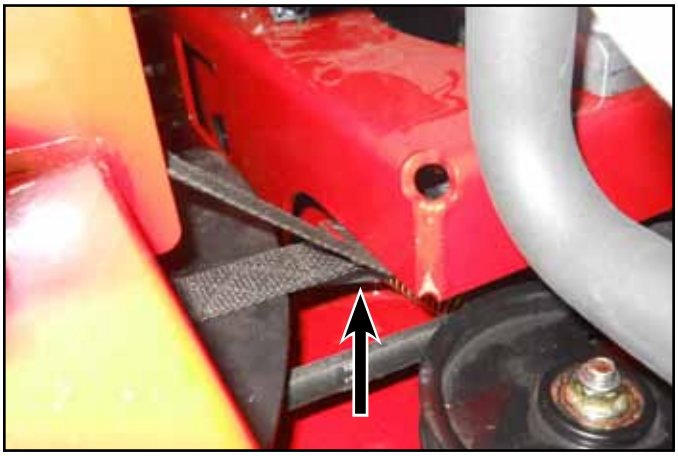


Fig. 697 DSCN-3399a

9. Remove the two sets of carriage bolts and flange nuts securing the engine base to the rear of the deck (Fig. 698).

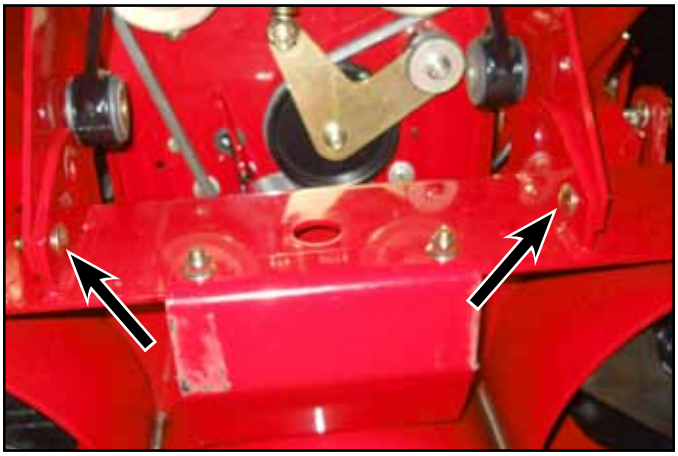


Fig. 698 DSCN-3405a

10. Remove the two flange nuts securing the engine base to the top of the mower deck (Fig. 699).

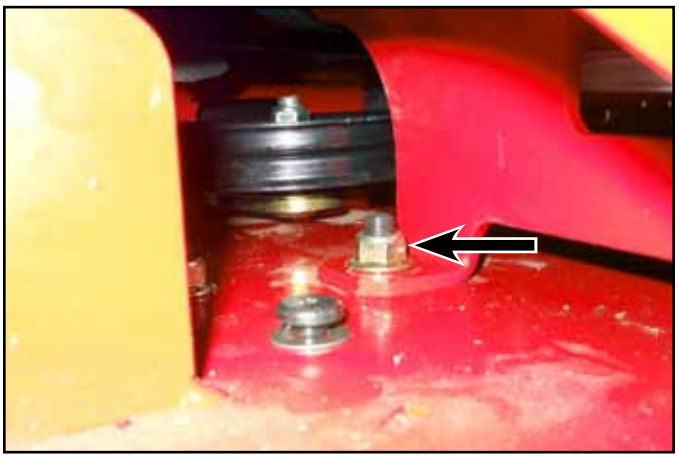


Fig. 699 DSCN-3412a

11. Place a 2”x4” under each side of the mower deck, then lower the deck onto the boards (Fig. 700).

Fig. 700 DSCN-3414a

12. Remove the bolt, washer and nut securing the front strut to the mower deck (Fig. 701).

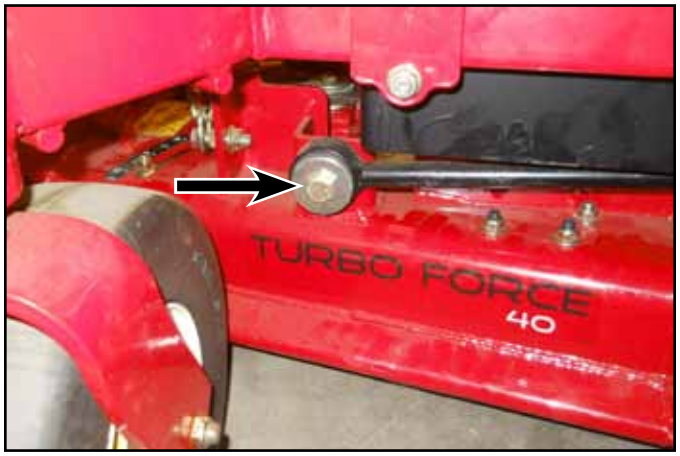


Fig. 701 DSCN-3415a

13. Remove the four flange nuts securing the lift chains to the mower deck (Fig. 702).

Note: The HOC handle will spring to the transport position once the deck is unsecured.

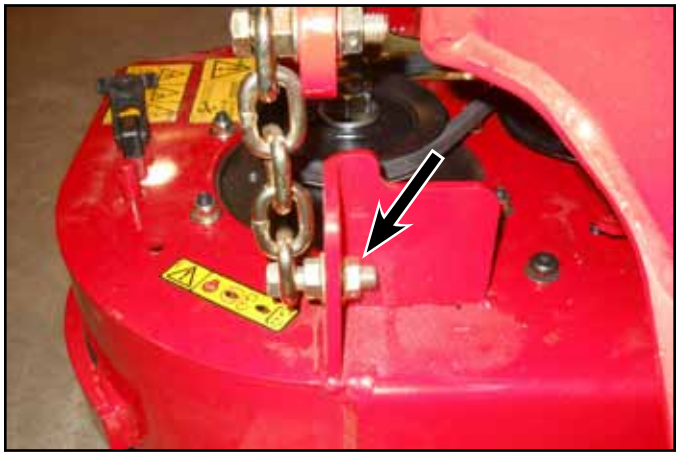


Fig. 702 DSCN-3419a

14. Slide the deck out from under the chassis (Fig. 703).

Note: The rear of the machine can be raised to ease removal.

Fig. 703 DSCN-3429a

Mower Deck Installation

1. Position the mower deck under the chassis.

2. Secure the four lift chains to the mower deck using the flange nuts (Fig. 704).

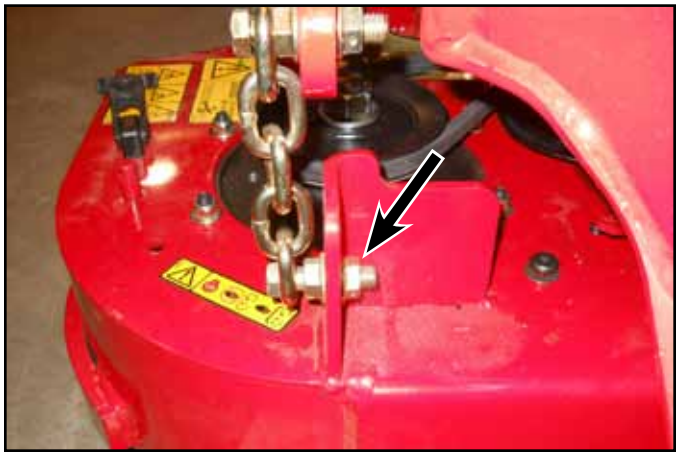


Fig. 704 DSCN-3419a

3. Secure the front strut to the mower deck using the bolt, washer, and flange nut (Fig. 705).

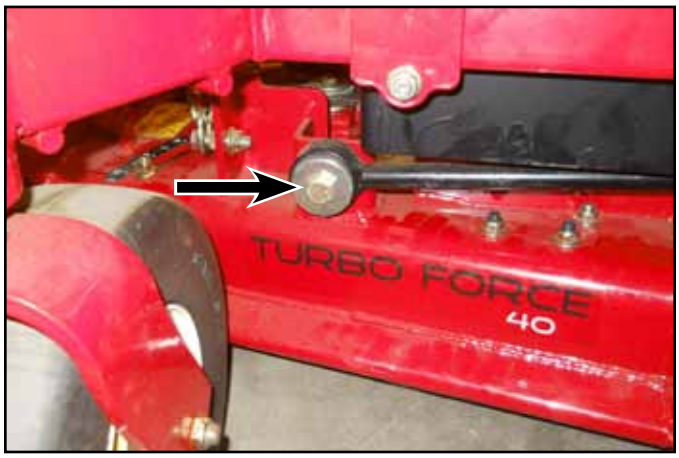


Fig. 705 DSCN-3415a

7

4. Raise the HOC handle to the transport position. Guide the engine base onto the screws protruding through the deck (Fig. 706).

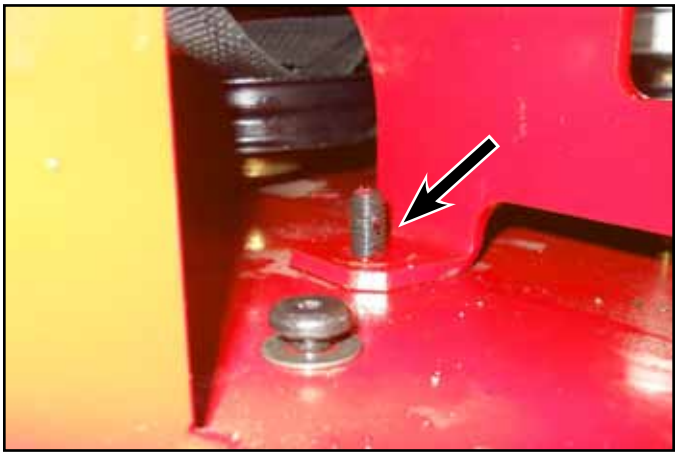


Fig. 706 DSCN-3430a

Note: The rear deck mounts must be to the inside of the engine base mounts (Fig. 707).

Fig. 707 DSCN-3437a

5. Loosely install the flange nuts onto the two screws (Fig. 708).

Fig. 708 DSCN-3442a

6. Loosely install the two sets of carriage bolts through the deck and engine base (Fig. 709).

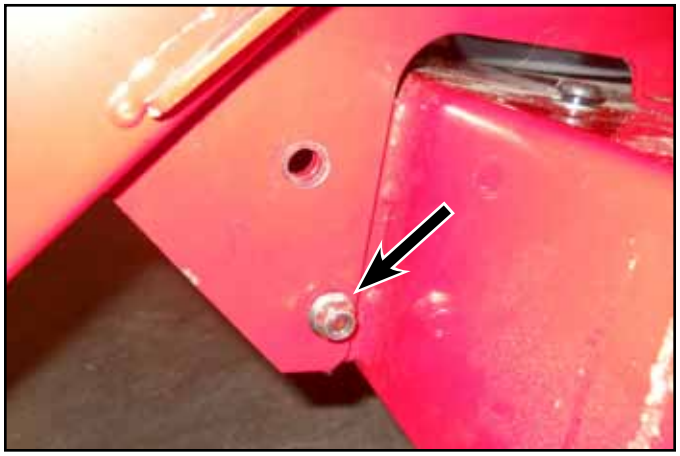


Fig. 709 DSCN-3440a

7. Secure the two rear struts using the two sets of bolts, washers and flange nuts (Fig. 710).

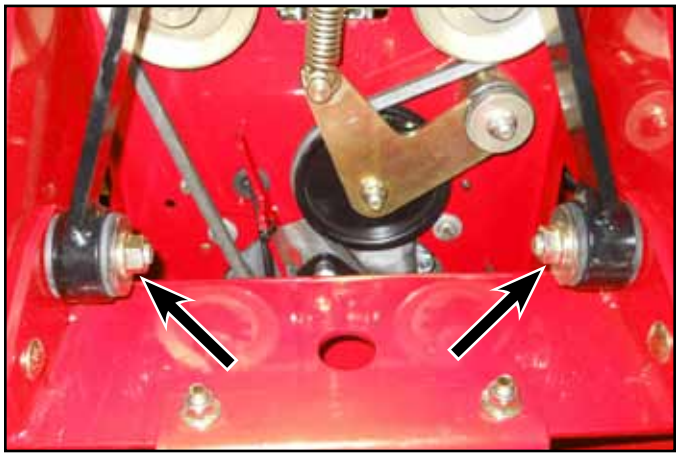


Fig. 710 DSCN-3384a

8. Tighten the two sets of carriage bolts and flange nuts securing the engine base to the rear of the deck (Fig. 711).

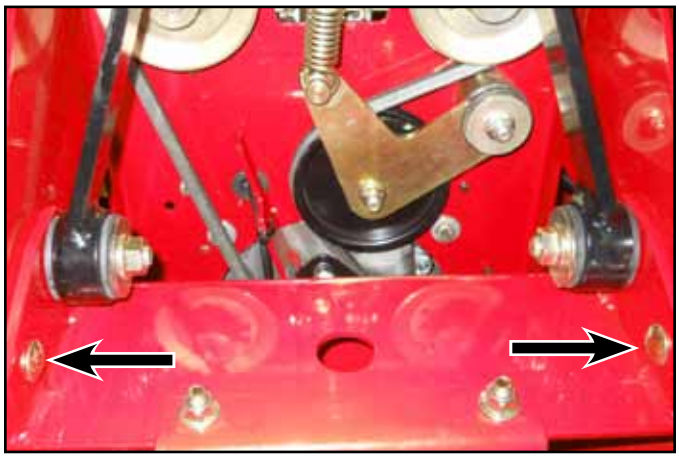


Fig. 711 DSCN-3384a

9. Tighten the two flange nuts securing the engine base to the top of the deck (Fig. 712).

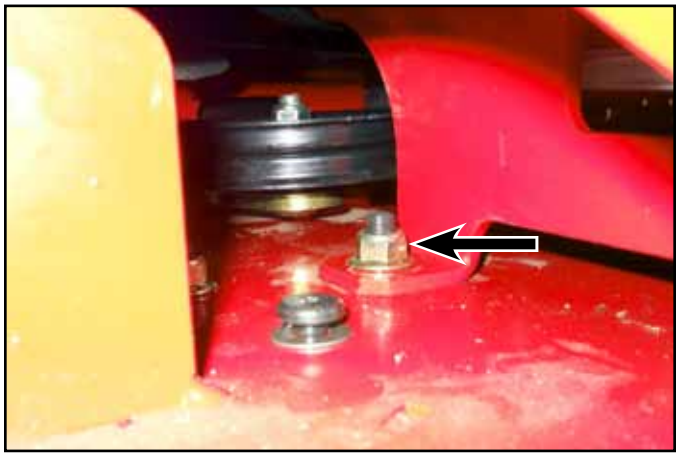


Fig. 712 DSCN-3412a

10. Remove the straps from the front and rear of the engine base.

11. Route the belt around the deck and clutch pulleys (Fig. 713, 40” deck and Fig. 714, 36” deck).

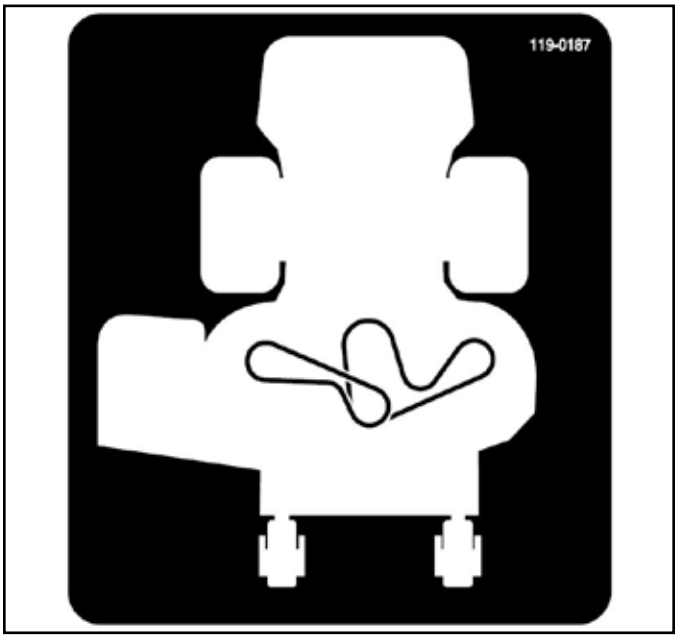


Fig. 713 fig. 119-0187

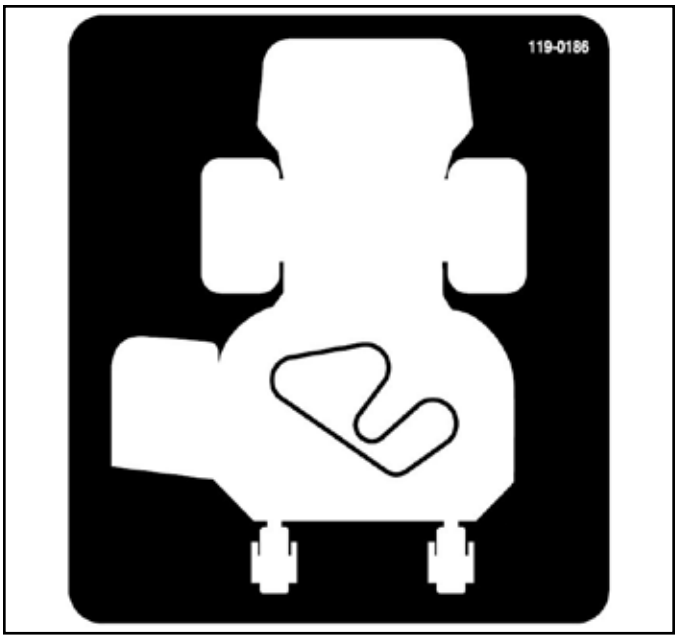


Fig. 714 fig. 119-0186

12. Install the extension spring to the idler bracket and spring anchor (Fig. 715).

Fig. 715 DSCN-3121a

13. Install the belt covers.

Mower Deck Adjustments

Leveling the Mower

Preparing the Machine

1. Position mower on a flat surface.

2. Disengage the PTO, move the motion control levers to the neutral locked position and set the parking brake.

3. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

4. Check the tire pressure of both drive tires. If needed, adjust to 13 psi (90 kPa).

5. Lower the mower to the 3” (76mm) height-of-cut position.

Note: The actual cutting height will not be adjusted until the deck has been leveled. Refer to “Adjusting the Height of Cut” on page 7-52.

6. Check the distance between the swivels, measure at the center of the swivels (center-to-center length) on the threaded rod. This length needs to be 19-1/2” (49.5cm) for 36” mower decks and 17-3/16” (43.7cm) for 40” mower decks (Fig. 716).

7. Inspect the four chains. The chains need to have tension.

8. If either rear chain is loose, the length of the threaded rod on that side will need to be adjusted to get equal tension on both rear chains.

9. Use the jam nuts at the front swivel to adjust the length between front and rear swivels on that side (Fig. 716).

10. If either front chain is loose, loosen the nut on the upper chain bolt and the jam nut on the adjustment bolt.

11. Use the adjustment bolt to get equal tension on both front chains (Fig. 716).

12. Tighten the nut on the upper chain bolt and the jam nut on the adjustment bolt.

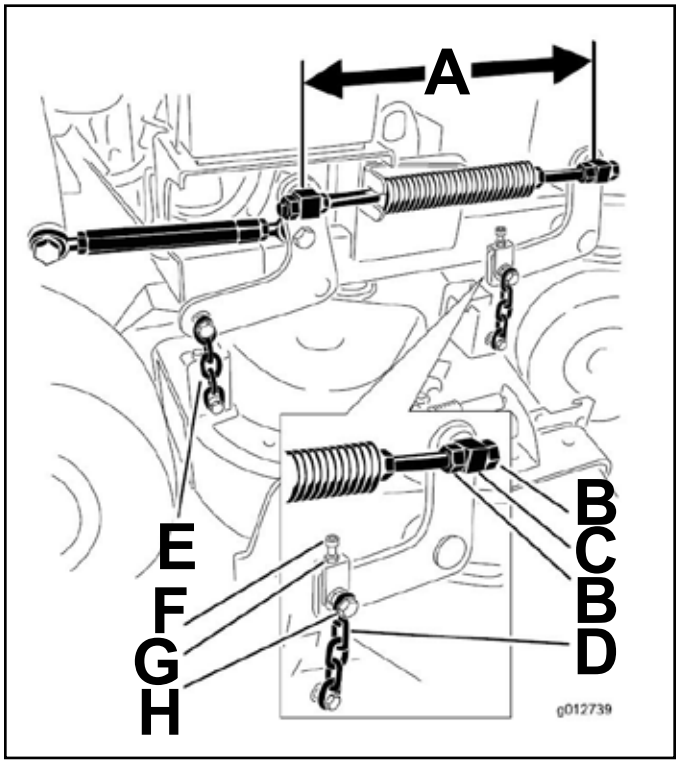


Fig. 716 fig. 83 G012739

A. Measure here at the center of the swivels (cntr-to-cntr length)
B. Swivel jam nuts
C. Front swivel
D. Front chain
E. Rear chain
F. Adjustment bolt
G. Jam Nut
H. Upper chain bolt

7

Adjusting the Left Side Front-to-Rear Mower Pitch

1. Position the left blade front-to-rear.
2. Measure the left blade at the A location, from a level surface to the cutting edge of the blade tip and record this measurement (Fig. 717).
3. Measure the left blade at the B location, from a level surface to the cutting edge of the blade tip and record this measurement (Fig. 717).
4. The mower blade should be a 1/4” to 3/8” (6 to 10mm) lower at position A than at position B (Fig. 717). If it is not correct, proceed to the following steps.

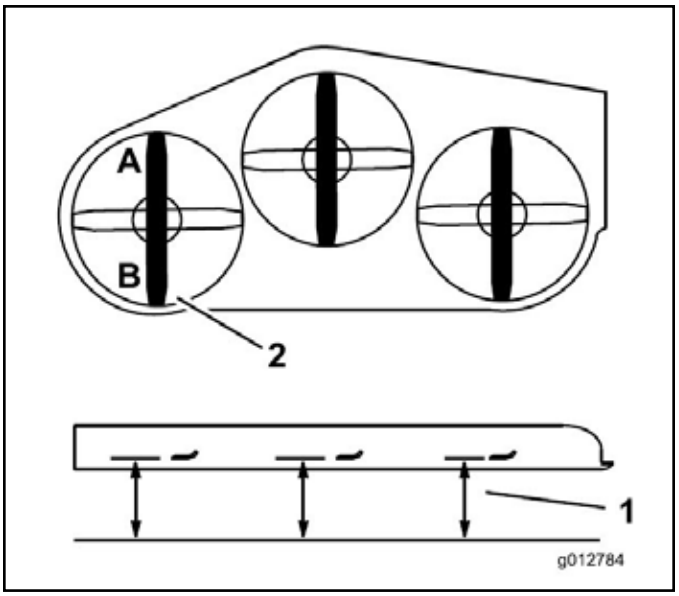


Fig. 717 fig. 84 G012784

1. Measure here from the blade to a hard surface
2. Measure at A & B

5. Loosen the nut on the upper chain bolt and the jam nut on the adjustment bolt (Fig. 718).
6. Use the adjustment bolt to achieve 1/4” to 3/8” (6 to 10mm) lower in front at A than in the rear at B (Fig. 718).
7. Tighten the nut on the upper chain bolt and the jam nut on the adjustment bolt.

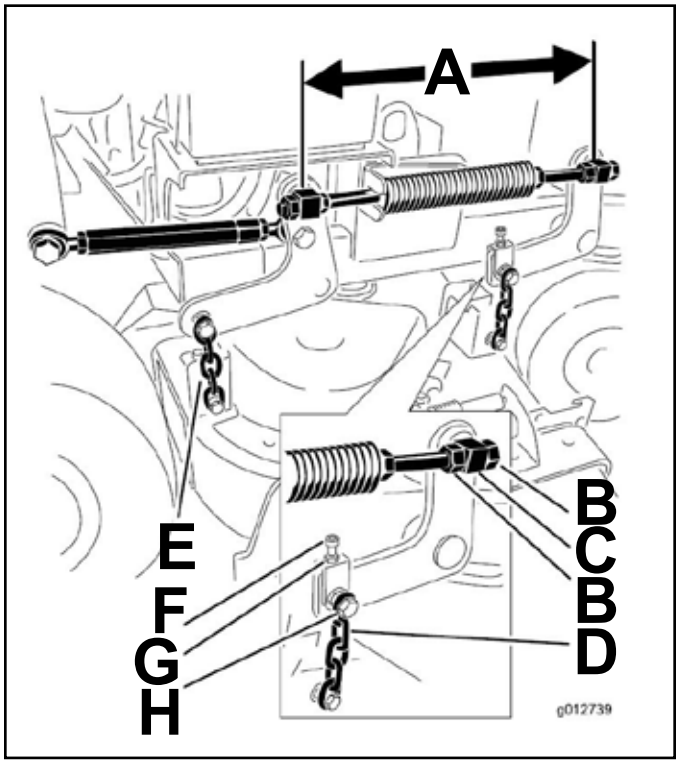


Fig. 718 fig. 83 G012739

A. Measure here at the center of the swivels (cntr-to-cntr length)
B. Swivel jam nuts
C. Front swivel
D. Front chain
E. Rear chain
F. Adjustment bolt
G. Jam Nut
H. Upper chain bolt

7

Leveling the Mower Side-to-Side

1. Position the left blade front-to-rear (Fig. 719).
2. Measure the left blade at the A location, from a level surface to the cutting edge of the blade tip and record this measurement (Fig. 719).
3. Position the right blade front-to-rear (Fig. 719).
4. Measure the right blade at the C location, from a level surface to the cutting edge of the blade tip and record this measurement (Fig. 719).
5. The measurement between location A and C needs to be within 1/8”. If it is not correct, adjust the front chain at location C to achieve the correct height.

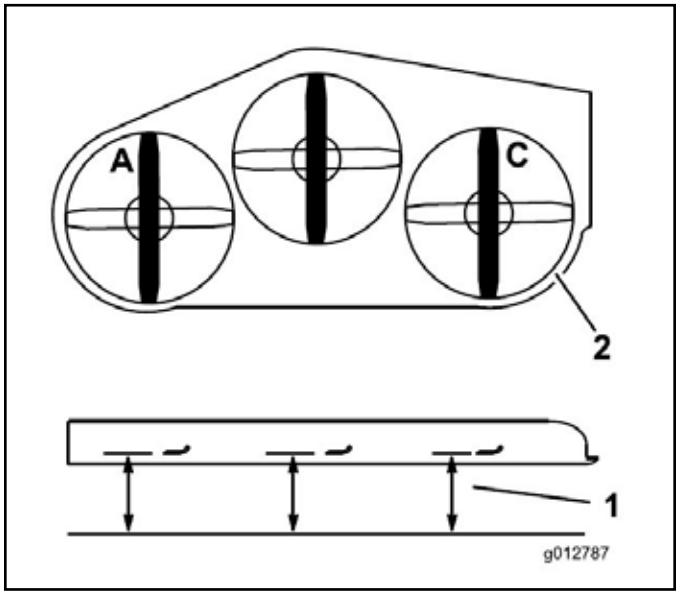


Fig. 719 fig. 85 G012787

1. Measure here from the blade to a hard surface
2. Measure at A & C

Adjusting the Right Side Front-to-Rear Mower Pitch

1. Position the right blade front-to-rear (Fig. 720).
2. Measure the right blade at the C location, from a level surface to the cutting edge of the blade tip and record this measurement (Fig. 720).
3. Measure the right blade at the D location, from a level surface to the cutting edge of the blade tip and record this measurement (Fig. 720).
4. The mower blade should be a 1/4” to 3/8” (6 to 10mm) lower at position C than at position D (Fig. 720). If it is not correct, proceed to the following steps.
5. The length of the threaded rod on the right side will need to be adjusted to achieve proper front-to-rear pitch.
6. Use the jam nuts at the front swivel to adjust the length between front and rear swivels on that side.
7. Check to make sure there is equal tension on all four chains. To get equal tension on all four chains, make minor adjustments to maintain proper deck pitch.

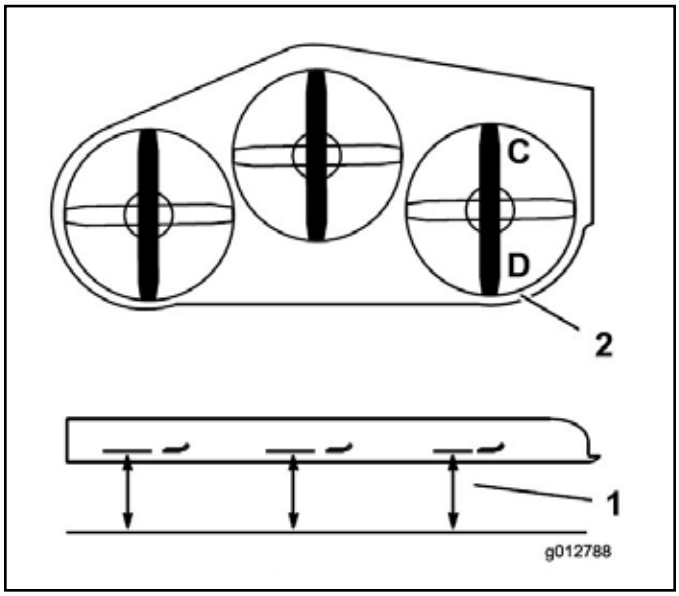


Fig. 720 fig. 86 G012788

1. Measure here from the blade to a hard surface
2. Measure at C & D

Adjusting the Height of Cut

1. Lower the mower to the 3” (76mm) height-of-cut position.
2. Position the left blade front-to-rear (Fig. 721).
3. Measure the left blade at the A location, from a level surface to the cutting edge of the blade tip and record this measurement (Fig. 721).
4. Position the right blade front-to-rear (Fig. 721).
5. Measure the right blade at the C location, from a level surface to the cutting edge of the blade tip and record this measurement (Fig. 721).
6. The measurement between location A and C needs to be within an 1/8” of the 3” (76mm) height-of-cut setting. If it is not correct, proceed to the following steps.

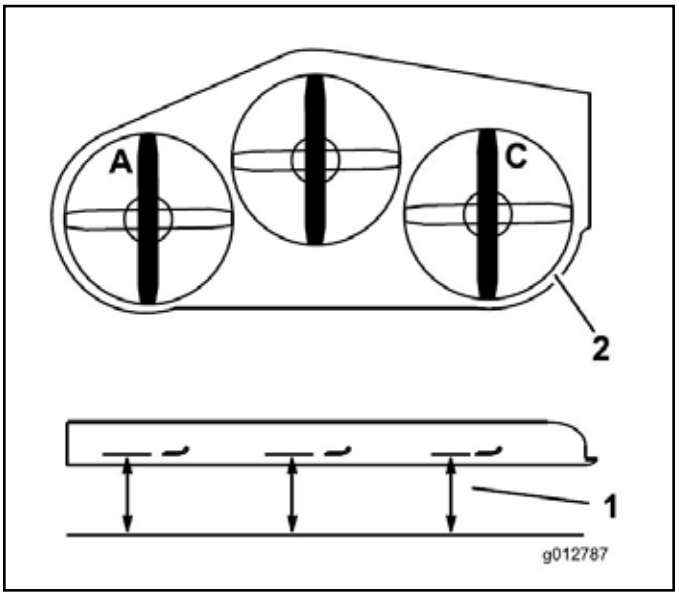


Fig. 721 fig. 85 G012787

1. Measure here from the blade to a hard surface
2. Measure at A & C

7. Loosen the jam nuts at both ends of the turnbuckle (Fig. 722).

Note: The end of the turnbuckle with the groove machined in it has left hand threads (Fig. 722).

8. Adjust the turnbuckle to raise or lower the deck height to achieve 3” at locations A and C.
9. Tighten the jam nuts at both ends of the turnbuckle.

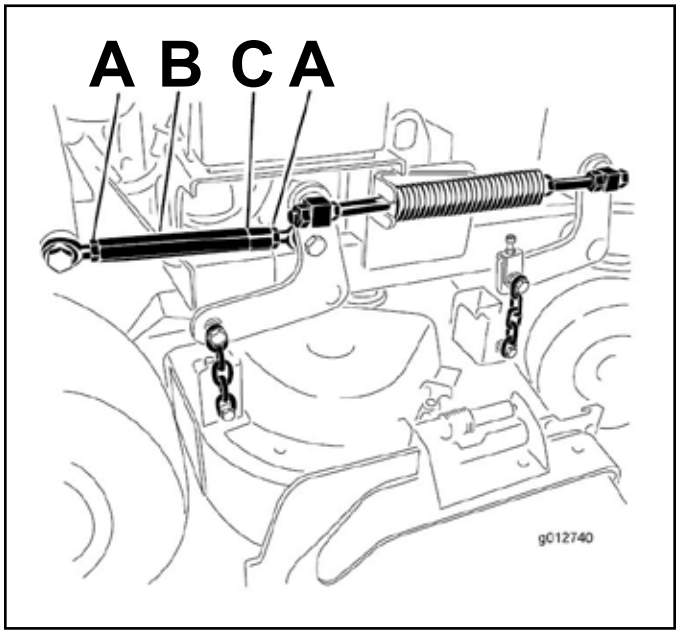


Fig. 722 fig. 87 G012740

A. Jam nut
B. Turnbuckle
C. Groove indicating left hand threads

Additional information can be found in the LCE Electrical Troubleshooting DVD #492-9193, available through your Toro parts supplier.

CAUTION

Before performing any tests with a continuity light or ohmmeter, disconnect the component from the wire harness. This ensures you are testing the component rather than another circuit.

Interlock modules MUST be removed from the circuit before performing any tests with an ohmmeter or continuity light. Battery voltage can damage these modules if applied to the wrong terminals.

Component Testing

Ignition Switch

Purpose

The ignition switch provides the proper switching for the starter, ignition, accessories, and safety circuits.

Location

The ignition switch is located on the control panel (Fig. 723).

Fig. 723 DSCN-2194a

How It Works

Detents inside the switch gives it 3 positions: OFF, RUN and START. The START position is spring loaded so the cylinder automatically returns to RUN once the key is released (Fig. 724).

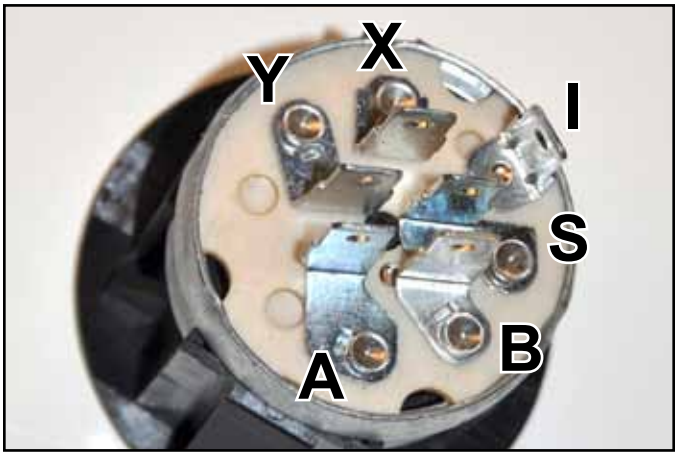


Fig. 724 IMG-1192a

B - Battery voltage “in”
S - Starting circuit
I - Safety & starting circuit
A - Auxiliary circuit
Y - Alternator/Regulator circuit
X - Alternator/Regulator circuit

Testing

1. Disconnect the switch from the wire harness.

2. Verify that continuity exists between the terminals listed for the switch position (see table below). Verify that there is NO continuity between the terminals not listed for the switch position (see table below):

OFF	No continuity between terminals
RUN	Continuity – B I A and X Y
START	Continuity – B I S

8

Power Take Off (PTO) Switch

Purpose

The Power Take Off (PTO) Switch is used to turn on the Electric PTO Clutch and function as part of the safety interlock system.

Location

The PTO switch is located on the control panel (Fig. 725).

Fig. 725 DSCN-2194a

How It Works

The PTO switch has 3 positions: Fully depressed (OFF), a middle detent (RUN) and a momentary full out (START). When the PTO switch is pulled out to the “START” position, contacts inside the switch electrically connect various terminals. Those terminals allow voltage to flow to the electric clutch which causes it to engage.

Testing

1. Disengage the PTO, set the parking brake, turn the ignition to OFF and remove the key.
2. Disconnect the wire harness from the PTO switch.
3. Press in on the locking tabs on each side of the switch and pull the switch out of the control panel.
4. Verify that there is continuity between the appropriate terminals in the ON and OFF positions (Fig. 726). Use diagram below.
5. Replace the switch if your test results do not correspond with those given in the diagram below (Fig. 726).

Fully Depressed “OFF”	Middle Detent “RUN”	Momentary Full Out “START”
1-7 Continuity	1-7 No Continuity	1-7 No Continuity
1-4 No Continuity	1-4 Continuity	1-4 Continuity
3-6 No Continuity	3-6 No Continuity	3-6 Continuity

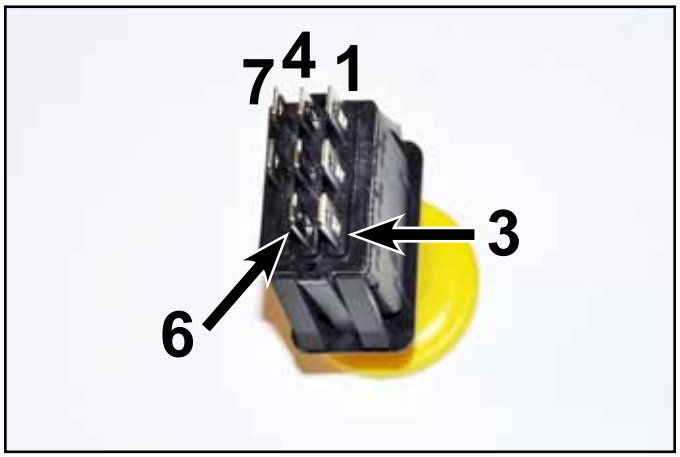


Fig. 726 IMG-1193a

Electric (PTO) Clutch

Purpose

This clutch electrically controls the engagement and disengagement of the Power Take Off (PTO) pulley, which drives the mower deck belt.

Location

The electric clutch is located on the PTO end of the engine crankshaft, under the machine (Fig. 727).

Fig. 727 DSCN-2195a

How It Works

The PTO clutch is composed of three major components: the field, the clutch plate, and the friction plate. The clutch plate always turns with the engine. The field is a coil of wire on an iron core, which becomes an electromagnet when power is applied.

The friction plate is the only piece that can slide up and down on the crankshaft axis. It is normally spring-loaded so that it is not in contact with the clutch plate and is pressed against the brake material opposite the clutch. When power is applied, the friction plate is drawn toward the clutch plate and the two rotate as one.

Testing

If the electric PTO clutch is not engaging or is suspected as a cause of electrical problems, use the trouble-shooting procedures below. These procedures will help you determine if the clutch has failed or is the cause of the electrical problem.

Coil Resistance Measurement

1. Disengage the PTO, set the parking brake, turn the ignition OFF, and remove the key.
2. Disconnect clutch wire connector from the wire harness.
3. Set the multimeter or volt/ohm meter to check resistance (ohms).
4. Connect the multimeter leads to the wires in the clutch connector (Fig. 728).
5. The meter should read between 2.40 ohms and 3.40 ohms. If the reading is above or below these readings, the field has failed and needs to be replaced. If the reading is between these two limits, measure the clutch current draw (next).

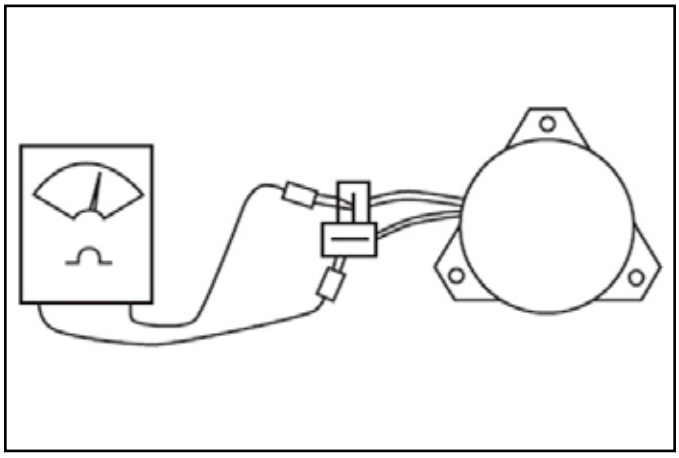


Fig. 728 coil resist measurmt

Measuring Clutch Current Draw

1. Disengage the PTO, set the parking brake, turn the ignition OFF, and remove the key.
2. Disconnect the clutch wire connector from the wire harness.
3. Set the multimeter to check amps (10 amp scale).
4. Connect the positive meter lead to the tractor terminal (1) of the clutch wire (Fig. 729).
5. Connect the negative meter lead to the corresponding wire terminal (3) (Fig. 729).
6. Connect a short jumper lead from terminal (2) to terminal (4) (Fig. 729).

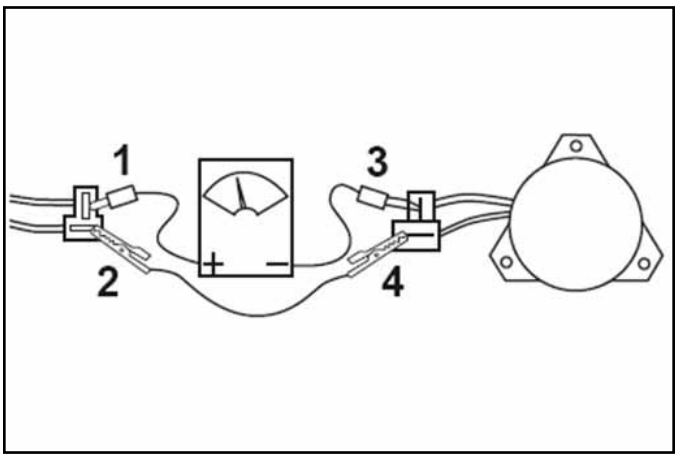


Fig. 729 clutch current draw

7. Turn the ignition key to the “RUN” position and the PTO switch to the “ON” position.
8. If the meter reads 4.2 amps or above, the system is functioning properly. If the meter reading is below 4.2 amps, check the electrical system for problems (i.e., the battery, ignition switch, PTO switch, or wiring harness may be malfunctioning).

Solenoid

Purpose

The purpose of the solenoid is to connect the battery to the starter motor on the engine when the ignition switch is turned to “START”. The solenoid is used to protect the ignition switch from the high current drawn from by the starter motor (Fig. 730).

Fig. 730 IMG-1198a

Location

The solenoid is located between the RH hydraulic pump and the engine, on the RH side of the machine (Fig. 731).

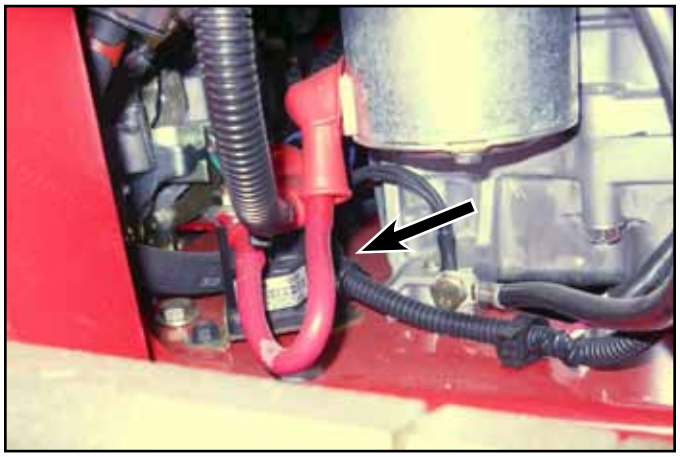


Fig. 731 DSCN-2201a

How It Works

The solenoid has two primary parts. One, a coil wire is wrapped around an iron core. Whenever 12 volts is applied to the coil, it becomes a magnet. The other part is a bar type switch. Because it has a large contact area with contact terminals, it can easily handle the high current loads required by the starter motor of the engine.

When 12 volts is applied to the coil, it becomes an electromagnet. This quickly pulls the contact bar toward the contacts and closes the switch. When power is removed from the coil, the spring loaded bar returns to its “normal open” position. The solenoid closes and opens the switch very quickly. This minimizes the “arcing” that can damage other kinds of switches.

The ignition switch is protected because only a small amount of current is needed to activate the coil.

Testing

1. Disconnect the solenoid from the wire harness.
2. With a multimeter set to the ‘ohms’ setting, ensure terminals “C” and “D” are open (no continuity).
3. Apply +12 VDC to terminal “A” and ground terminal “B”. Terminals “C” and “D” should now be closed (continuity) (Fig. 732).
4. You should be able to hear the solenoid switch “click” when you make the connection (Fig. 732).

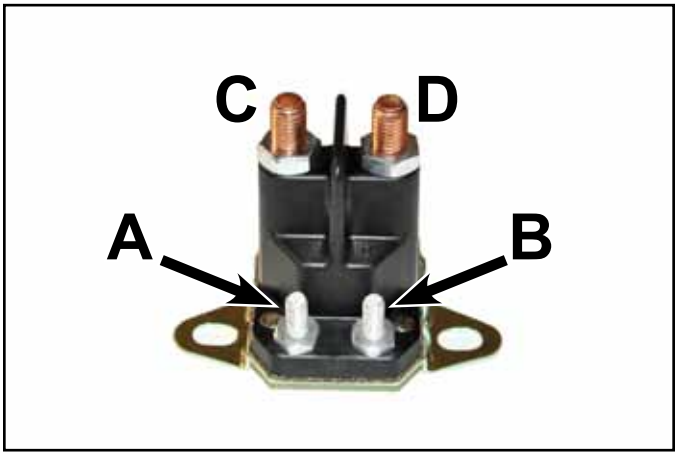


Fig. 732 IMG-1198a

A & B Coil Terminals C & D Contact Terminals

Operator Presence Control (OPC) Switch

Purpose

The Operator Presence Control (OPC) Switch is part of the safety circuit. If the PTO is engaged and the operator vacates the machine, the PTO will shut down (Fig. 733).

Fig. 733 IMG-0001a

Location

The Operator Presence Control (OPC) Switch is located inside the RH side of the control panel, as part of the RH control lever assembly (Fig. 734).

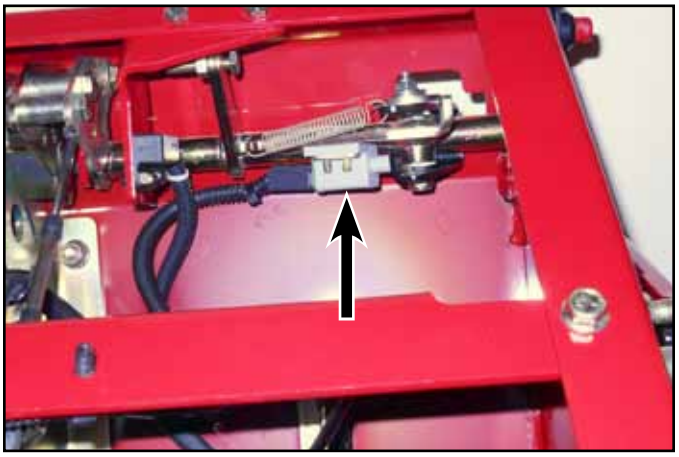


Fig. 734 DSCN-2208a

How It Works

This is a “Normally Closed (NC)” switch. The letters “NC” will be stamped on the terminals. When the RH control lever is in the “UP” position, the switch is open and there is no continuity between the switch terminals.

Testing

Turn the ignition key to the run position (do not start the machine). While observing the black triangle for the OPC indicator on the hour meter, move the RH control lever up and down. If the black triangle turns on and off, the switch is good.

If the black triangle for the OPC indicator fails to turn on when the RH control lever is moved up and down, the switch needs to be checked for continuity.

1. Disconnect the switch from the wire harness.
2. With a multimeter set to the “Ohms” setting or a continuity light, verify that there is continuity between the terminals (plunger out).
3. With the plunger pushed in, there should be NO continuity between the terminals.

Neutral (Proximity) Switch

Purpose

The Neutral Switch is part of the safety circuit. The neutral switch is used to ensure the motion control levers are in the neutral position allowing the machine to start (Fig. 735).

Fig. 735 0001

Location

The Neutral Switches are located in the control tower (Fig. 736).

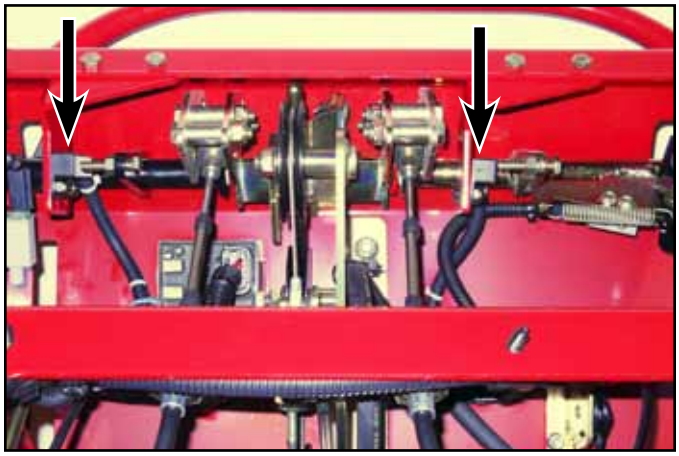


Fig. 736 DSCN-2209a

How It Works

The neutral (proximity) switch is a “normally open” switch. The contacts close when a piece of steel (bolt) is placed close to the switch. The specified gap between the bolt and the face of the switch is .070” ± .020” (1.8 ± .5mm). The switch will open when the bolt is moved away. The switches are wired in series.

Testing

Turn the ignition key to the run position (do not start the machine). While observing the black triangle for the Neutral indicator on the hour meter, move one of the control levers in and out of the neutral position. If the black triangle turns on and off, the switch is good.

If the black triangle for the neutral indicator fails to turn on when the control lever is moved in and out of the neutral position, the switch needs to be checked for continuity.

1. Disconnect the switch from the wire harness.
2. With a multimeter set to the “Ohms” setting or a continuity light, verify that there is continuity between the terminals (control handles in neutral position).
3. With the the control handle moved from the neutral position, there should be NO continuity between the terminals.

Parking Brake Switch

Purpose

The Parking Brake Switch is part of the safety circuit. The parking brake switch is used to shut down the engine if the machine leaves neutral with the parking brake on (Fig. 737).

Fig. 737 IMG-0001a

Location

The Parking Brake Switch is located inside the LH side of the control panel, as part of the parking brake control lever assembly (Fig. 738).

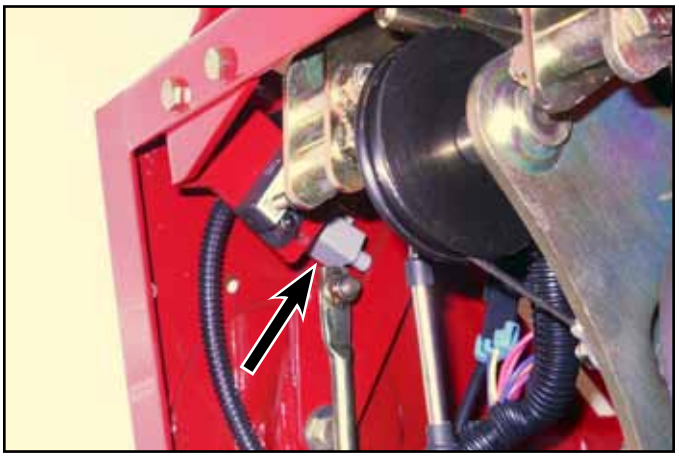


Fig. 738 DSCN-2213a

How It Works

This is a “Normally Closed (NC)” switch. The letters “NC” will be stamped on the terminals. When the parking brake is engaged, the switch is closed and there is continuity between the switch terminals.

Testing

Turn the ignition key to the run position (do not start the machine). While observing the black triangle for the parking brake indicator on the hour meter, engage and disengage the parking brake. If the black triangle turns on and off, the switch is good.

If the black triangle for the parking brake indicator fails to turn on when the parking brake is engaged and disengaged, the switch needs to be checked for continuity.

1. Disconnect the switch from the wire harness.
2. With a multimeter set to the “Ohms” setting or a continuity light, verify that there is continuity between the terminals (plunger out).
3. With the plunger pushed in, there should be NO continuity between the terminals.

Fuse Block & Fuses

Purpose

The fuse block houses the electrical system fuses.

Location

The fuse block is located on the rear, LH side of the control tower (Fig. 739).

Fig. 739 DSCN-2216a

How It Works

The fuse block houses the fuses that protect the electrical system from electrical surges.

Testing

The fuses used in this application can be visually inspected. A failed fuse can be identified by the broken/ melted element inside the fuse cover or a damaged spade (Fig. 740).

Fig. 740 IMG-1214a

Hour Meter/Control Module

Purpose

The hour meter/control module keeps track of the actual running hours of the engine. It has safety interlock indicators to let the operator know the position of the corresponding component. It also provides the operator with the battery output voltage.

Location

The hour meter is located on the control panel (Fig. 741).

Fig. 741 DSCN-2194a

How It Works

1. Hour Meter – Hours are accumulated when 12.8 volts are generated by the engine. Battery voltage is not great enough to engage the hour meter function (Fig. 742).

2. Battery Light Indicator – If the ignition key is turned to the “ON” position for a few seconds, the battery voltage will be displayed in the area the hours are normally displayed. The battery light turns on when the battery charge is below 12 volts (Fig. 742).

3. Safety Interlock Indicators – The display uses black triangles to indicate the position of an interlock system component (Fig. 742).

Note: The neutral indicator is the only triangle that MUST be on for the unit to start.

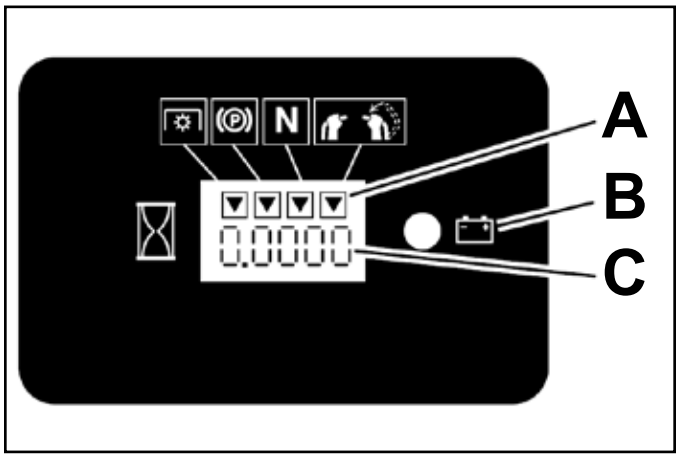


Fig. 742 fig. 5 G009467

A. Safety interlock symbols
B. Battery Light
C. Hour Meter

Testing

The hour meter is tested by testing the inputs. As an example, if the neutral indicator (black triangle) will not illuminate, the neutral switch needs to be tested. If the switch tests good, the hour meter is at fault. This troubleshooting method will work for any of the inputs.

Component Replacement

Ignition Switch

Ignition Switch Removal

1. Remove the wire harness and spade connector from the back of the ignition switch (Fig. 743).

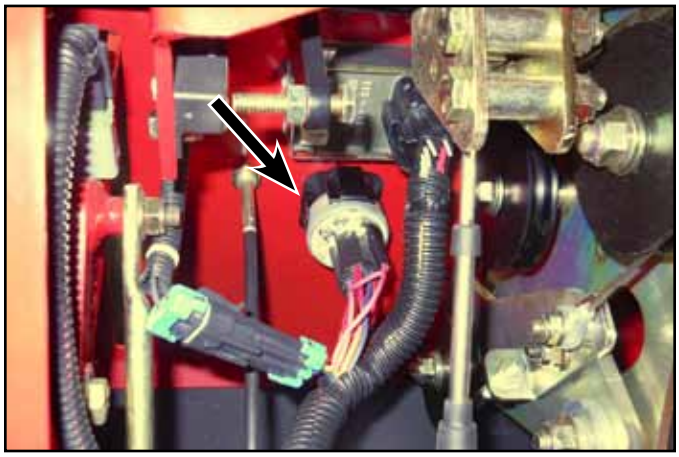


Fig. 743 DSCN-2219a

2. Depress the two tabs on the sides of the switch (Fig. 744).

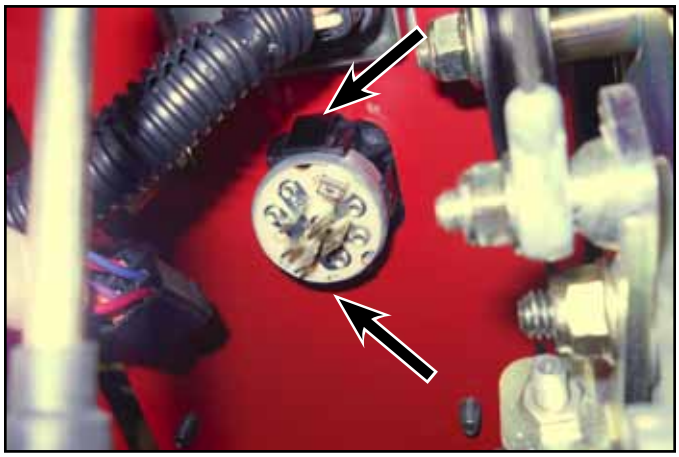


Fig. 744 DSCN-2223a

3. Remove the switch out through the front of the control panel (Fig. 745).

Fig. 745 DSCN-2224a

Ignition Switch Installation

1. Install the switch in through the control panel. Ensure that the mounting clips have secured the switch in the control panel (Fig. 746).

Fig. 746 DSCN-2224a

Note: The switch must be orientated so it can be read from the operator position (Fig. 747).

Fig. 747 DSCN-2227a

2. Install the spade connector with the two pink wires to the “I” terminal of the switch (Fig. 748).

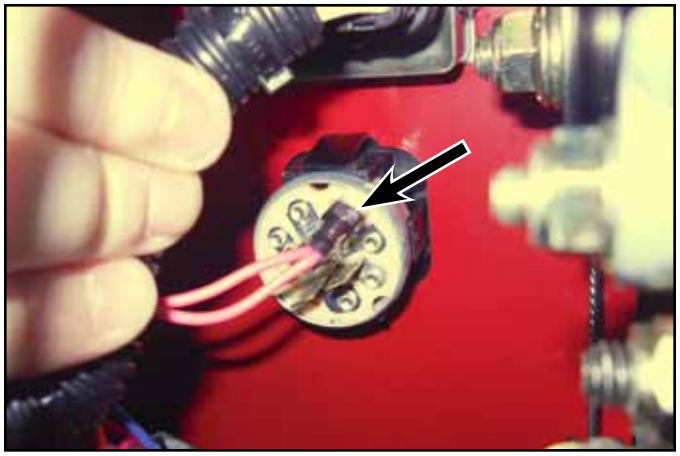


Fig. 748 DSCN-2232a

3. Install the wire harness to the switch (Fig. 749).

Fig. 749 DSCN-2234a

Power Take Off (PTO) Switch

Power Take Off (PTO) Switch Removal

1. Remove the wire harness from the back of the PTO switch (Fig. 750).

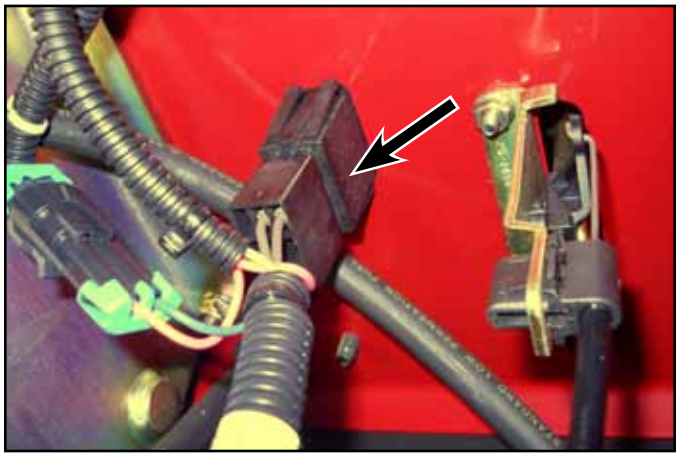


Fig. 750 DSCN-2248a

2. Depress the four tabs securing the switch to the control panel (Fig. 751).

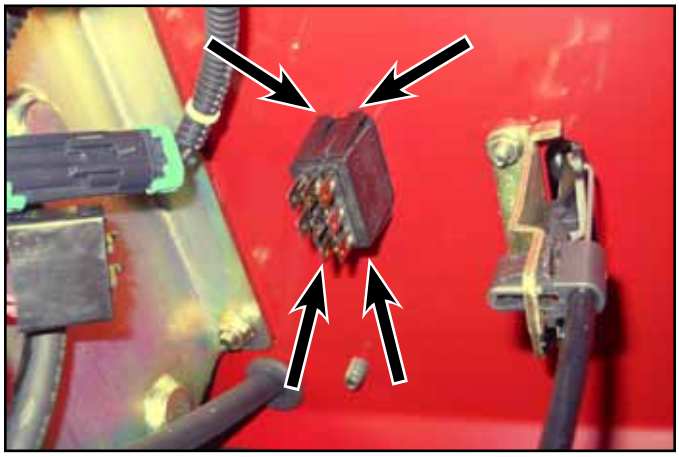


Fig. 751 DSCN-2257a

3. Remove the switch out through the front of the control panel (Fig. 752).

Fig. 752 DSCN-2258a

Power Take Off (PTO) Switch Installation

1. Install the switch in through the control panel. Ensure that the mounting clips have secured the switch in the control panel (Fig. 753).

Fig. 753 DSCN-2258a

2. Install the wire harness to the back of the switch (Fig. 754).

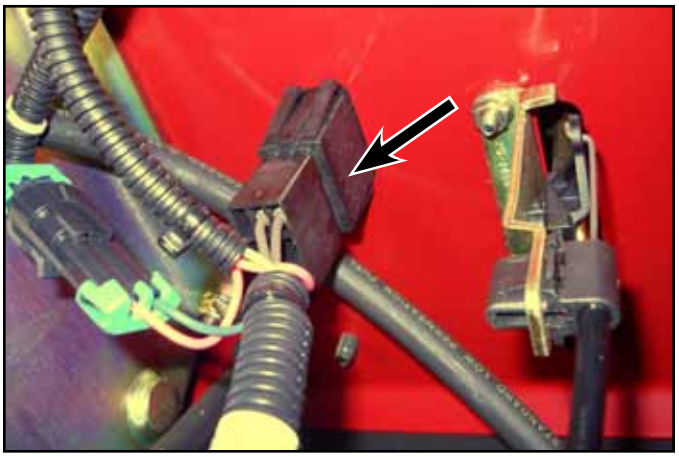


Fig. 754 DSCN-2248a

Electric (PTO) Clutch Switch

Electric (PTO) Clutch Removal

1. Turn the engine off and remove the key from the ignition.

2. Turn the fuel shutoff valve to the “OFF” position (Fig. 755).

Fig. 755 DSCN-2516a

3. Remove the two sets of wingnuts and hold down bolts securing the battery cover, then remove the cover (Fig. 756).

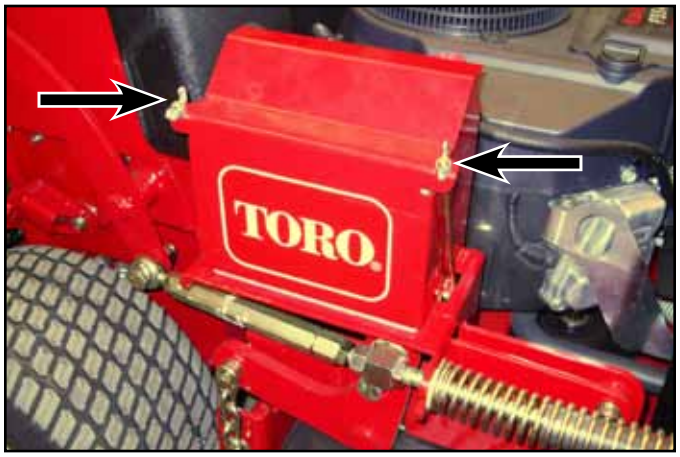


Fig. 756 DSCN-2263a

4. Remove the bolt, washer, and nut securing the black ground cable to the battery terminal (Fig. 757).

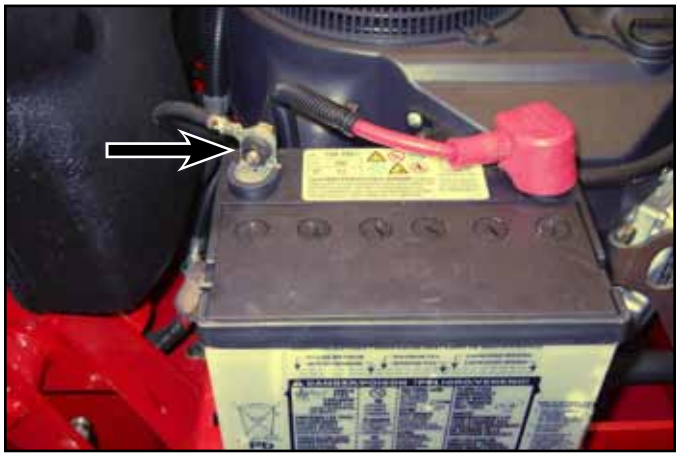


Fig. 757 DSCN-2265a

5. Remove the bolt, washer, and nut securing the red positive cable to the battery terminal, then remove the battery (Fig. 758).

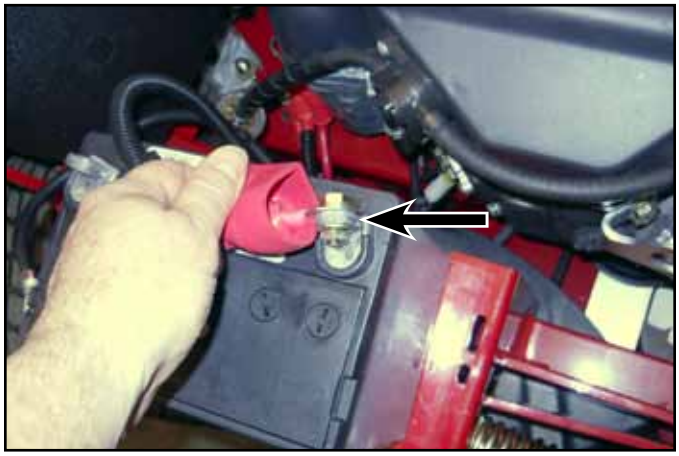


Fig. 758 DSCN-2270a

6. Slide the hose clamp off the fuel line where it connects to the fuel pump (Fig. 759).

Fig. 759 DSCN-2517a

7. Remove the fuel line from the fuel pump. Drain the fuel into a suitable container (Fig. 760).

Fig. 760 DSCN-2521a

8. Remove the violet wire from the voltage regulator (Fig. 761).

Fig. 761 DSCN-2522a

9. Unplug the pink wire from the green fuel solenoid wire (Fig. 762).

Fig. 762 DSCN-2526a

10. Unplug the white wire from the black magneto wire (Fig. 763).

Fig. 763 DSCN-2527a

11. Remove the bolt and washer securing the ground wires to the engine block (Fig. 764).

Fig. 764 DSCN-2530a

12. Remove nut and lock washer securing the starter wire to the solenoid (Fig. 765).

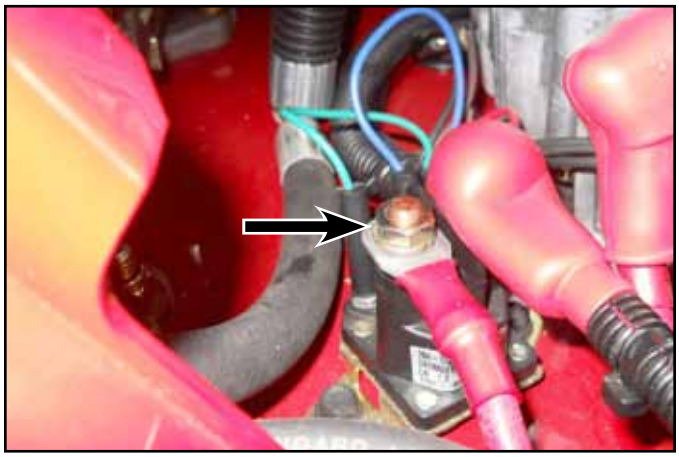


Fig. 765 DSCN-2533a

13. Unplug the clutch wires from the wiring harness (Fig. 766).

Fig. 766 DSCN-2536a

14. Push the grommet and the electrical plug connector down through the engine base (Fig. 767).

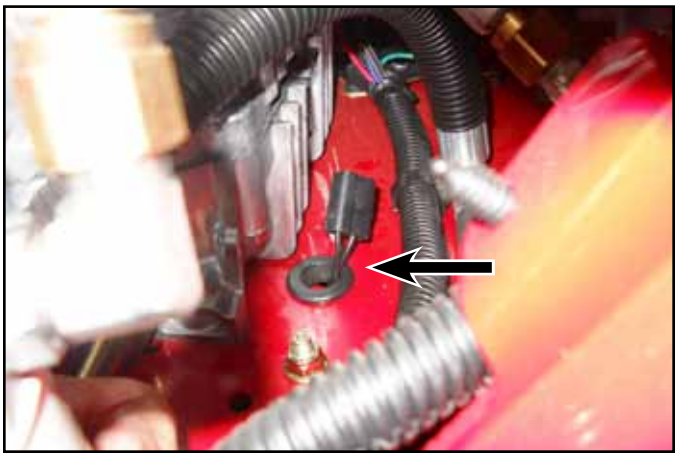


Fig. 767 DSCN-2547

15. Remove the four nuts, two mounting guard brackets and four carriage bolts securing the muffler guard assembly to the front frame, then remove the muffler guard (Fig. 768).

Fig. 768 DSCN-2549

16. Loosen the screw on the choke cable clamp and disconnect the choke cable from the engine choke lever (Fig. 769).

Fig. 769 DSCN-2551a

17. Loosen the screw on the throttle cable clamp and disconnect the throttle cable from the engine throttle lever (Fig. 770).

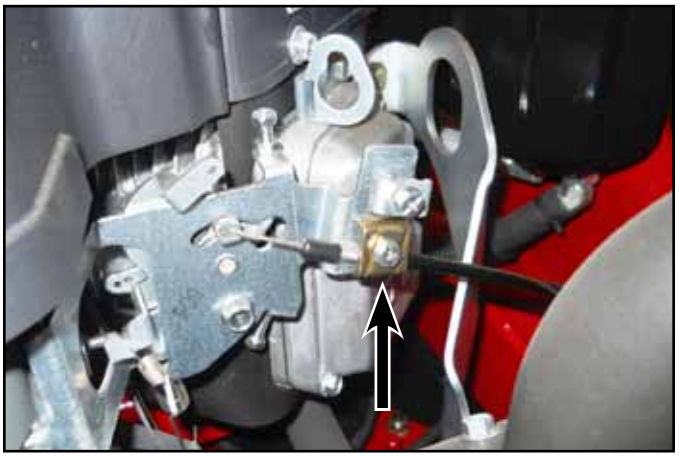


Fig. 770 DSCN-2556a

18. Remove the cable clamp securing the throttle and choke cable to the engine oil drain (Fig. 771).

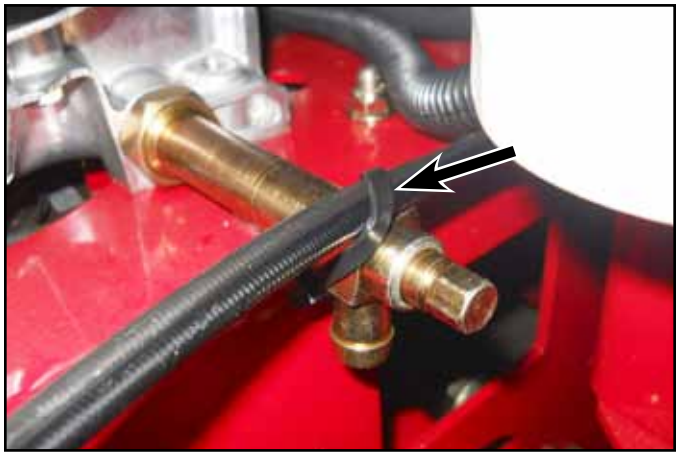


Fig. 771 DSCN-2561a

19. Lower the HOC (height of cut) to the lowest HOC.

20. Remove the belt covers.

21. **36" Deck:** Using a spring tool, remove the extension spring from the deck anchor post (Fig. 772).

Fig. 772 DSCN-2562a

22. **40” Deck:** Using a spring tool, remove the extension spring from the deck anchor post (Fig. 773).

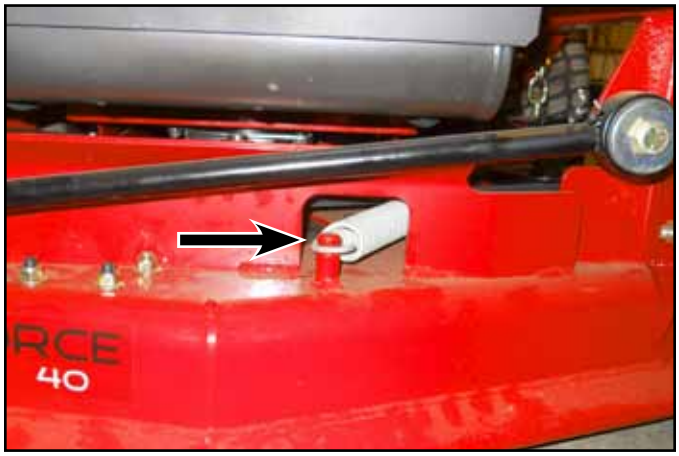


Fig. 773 DSCN-2564a

23. **40” Deck:** Using a spring tool, remove the RH spindle extension spring from the RH deck anchor post (Fig. 774).

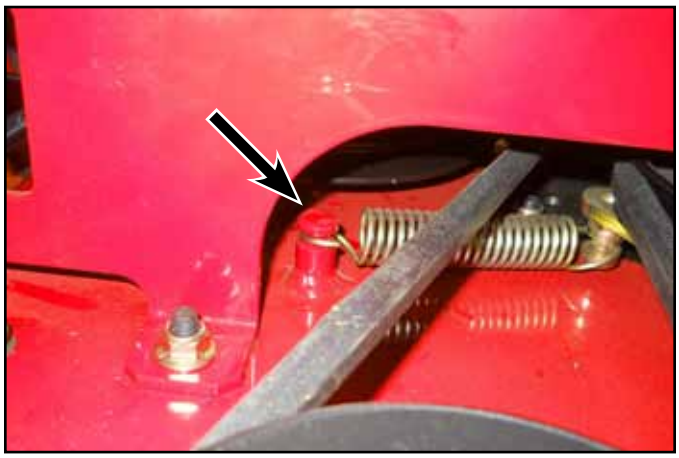


Fig. 774 DSCN-2582a

24. Raise the machine so the underside of the chassis can be accessed.

25. Remove the cable tie securing the clutch wire harness to the clutch anchor (Fig. 775).

Fig. 775 DSCN-2566a

26. Remove the deck belt from the clutch pulley (Fig. 776).

Fig. 776 DSCN-2569a

27. Remove the extension spring from the drive idler pulley assembly (Fig. 777).

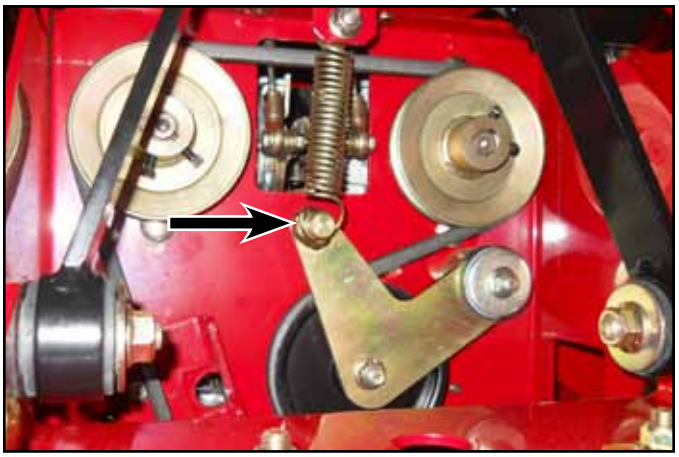


Fig. 777 DSCN-2574a

28. Remove the drive belt from the engine pulley (Fig. 778).

Fig. 778 DSCN-2575a

29. Remove the bolt and nut securing the clutch anchor to the engine base (Fig. 779).

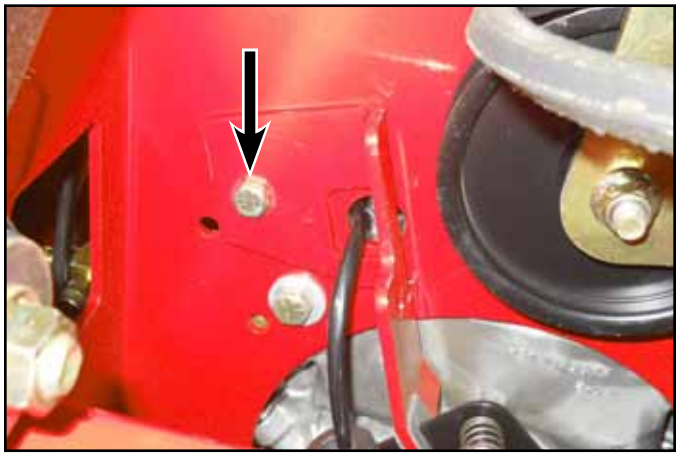


Fig. 779 DSCN-2578a

30. Remove the four bolts and Belleville washers securing the engine to the engine base (Fig. 780).

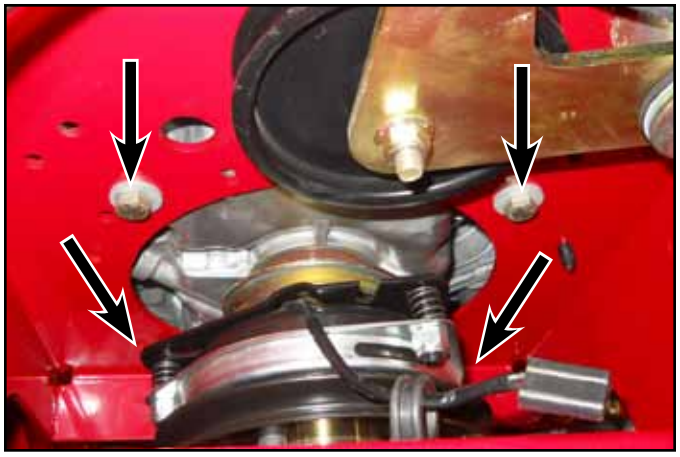


Fig. 780 DSCN-2581a

31. Remove the engine from the engine base (Fig. 781).

Fig. 781 DSCN-2587a

32. Remove one spark plug and feed a minimum of two feet (61cm) of 3/8” (.95cm) rope into the cylinder to prevent engine crankshaft rotation (Fig. 782).

Note: Rotate the crankshaft as needed to permit feeding the rope into the cylinder.

Fig. 782 IMG-9634a

33. Remove the bolt, spring washer, and washer securing the clutch to the engine crankshaft (Fig. 783).

Fig. 783 IMG-9630a

34. Remove the clutch from the engine crankshaft.

Electric (PTO) Clutch Installation

1. Using a feeler gauge, check the clutch air gap at each of the three adjustment slots. Set the gap to .015” (0.381mm). Make sure the gauge is inserted between the armature and the rotor friction surfaces (Fig. 784).

Fig. 784 PICT-0554a

2. Install the spring washer (crown toward the bolt head) and flat washer to the clutch bolt (Fig. 785).

Fig. 785 IMG-9630a

3. Apply thread locking compound to the threads of the clutch bolt (Fig. 786).

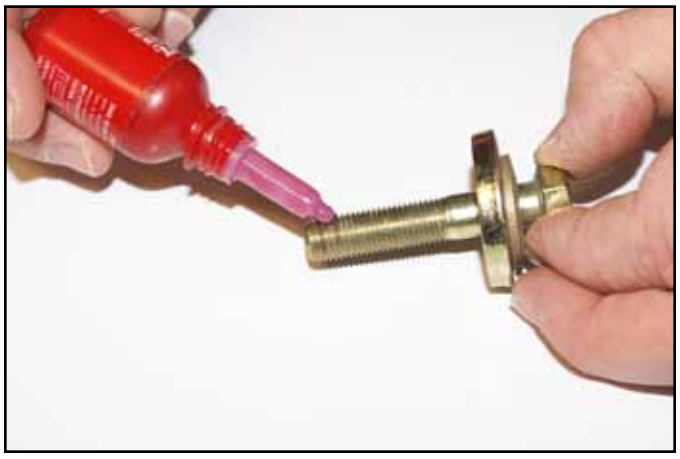


Fig. 786 PICT-8700a

4. Torque the clutch bolt to 55 ft-lbs. (75 Nm) (Fig. 787).

Fig. 787 DSCN-2612a

5. Remove the rope from the engine cylinder and replace the spark plug (Fig. 788).

Fig. 788 IMG-9634a

6. Position the engine onto the engine base (Fig. 789).

Fig. 789 DSCN-2587a

7. Secure the engine to the engine base using the four sets of bolts and Belleville washers. Torque the bolts to 30 - 35 ft-lbs. (41 - 47 Nm) (Fig. 790).

Note: The crown of the washer must face the bolt head.

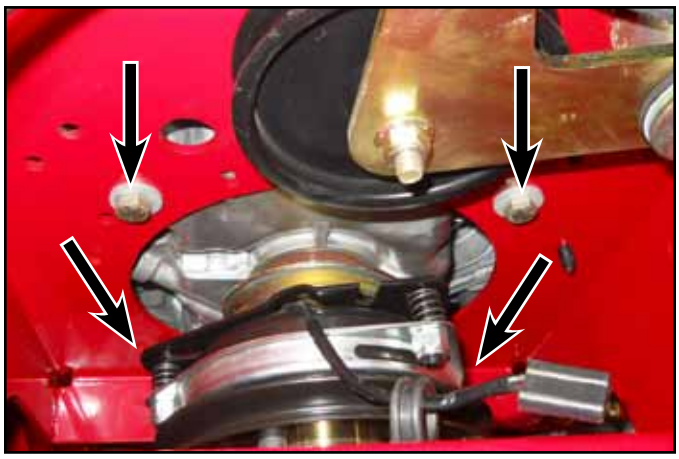


Fig. 790 DSCN-2581a

8. Secure the PTO stop bracket to the engine base using a bolt and nut (Fig. 791).

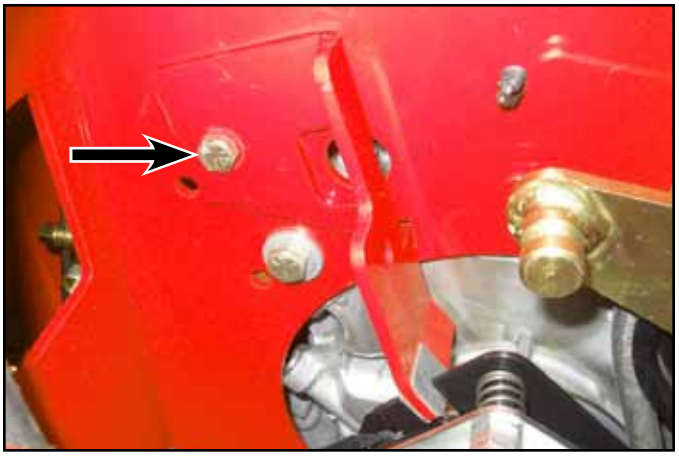


Fig. 791 DSCN-2642a

Note: Ensure the PTO stop bracket is nested in the slot on the clutch plate (Fig. 792).

Fig. 792 DSCN-2645a

9. Feed the clutch wire harness up through the engine base (Fig. 793).

Fig. 793 DSCN-2647a

10. Install the rubber grommet into the engine base (Fig. 794).

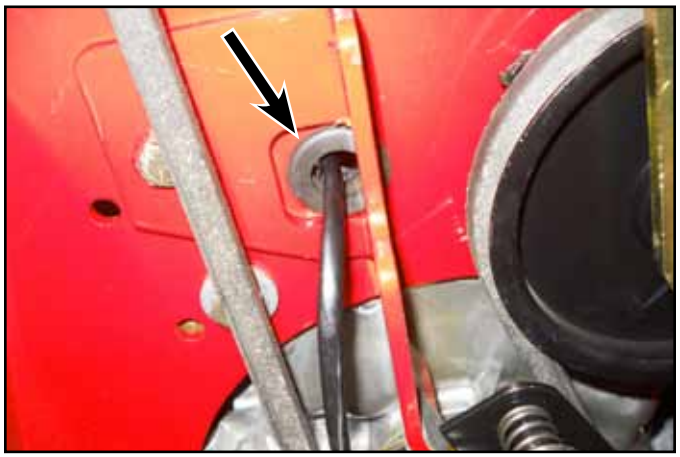


Fig. 794 DSCN-2649a

11. Secure the wire harness to the PTO stop bracket using a cable tie (Fig. 795).

Fig. 795 DSCN-2658a

12. Position the pump drive belt around the engine drive pulley, the two hydraulic pump pulleys, and the idler pulley (Fig. 796).

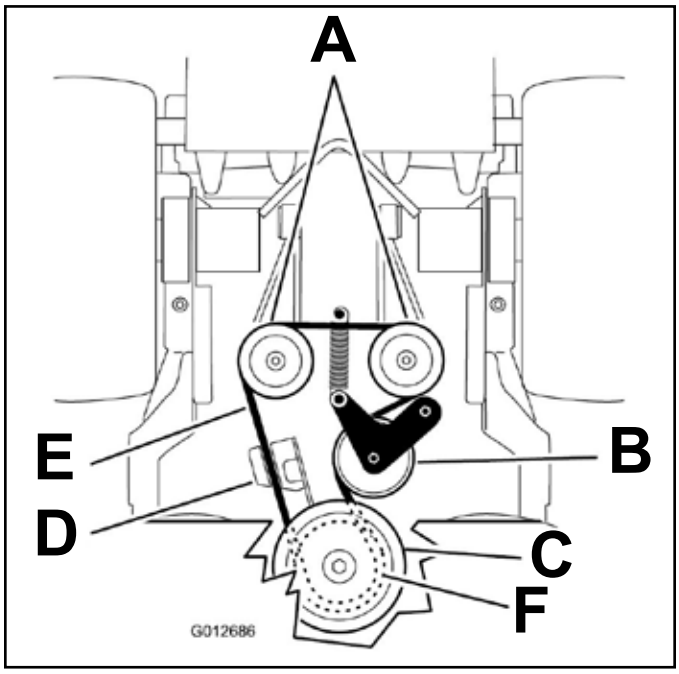


Fig. 796 fig. 67 G012686

A. Hydraulic pumps
B. Idler pulley
C. Clutch pulley
D. Clutch retainer
E. Pump drive belt
F. Pump drive pulley

13. Install the extension spring from the idler bracket to the spring anchor (Fig. 797).

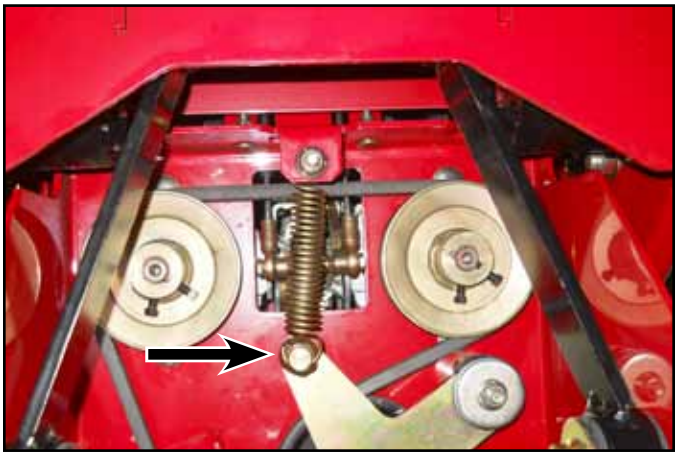


Fig. 797 DSCN-2660a

14. **36” Deck:** Route the deck belt around the deck spindle pulleys. Refer to decal 119-0186 (Fig. 798).

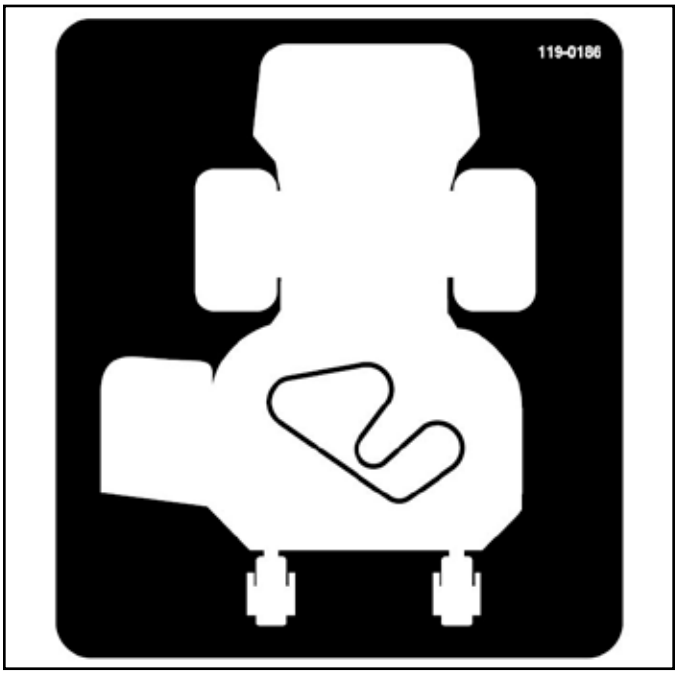


Fig. 798 decal 119-0186

15. **36” Deck:** Install the extension spring to the idler bracket and spring anchor (Fig. 799).

Fig. 799 DSCN-2666a

16. **40”Deck:** Route the deck belts around the deck spindle pulleys. Refer to decal 119-0187 (Fig. 800).

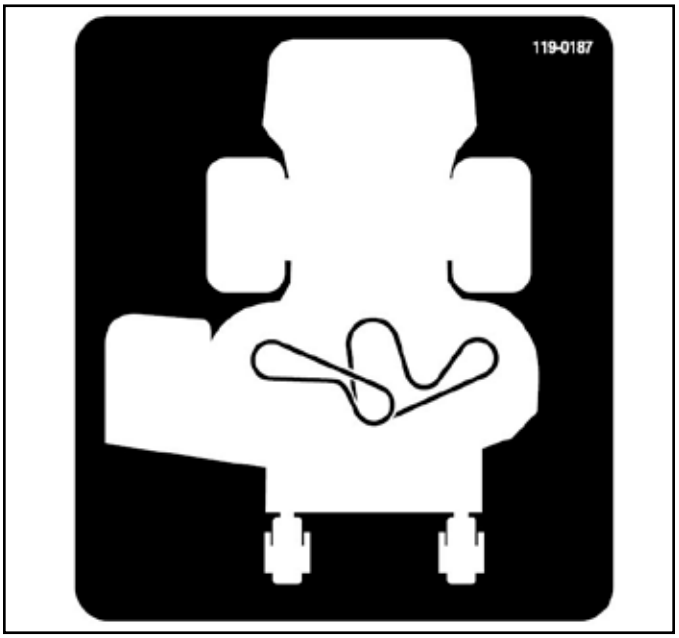


Fig. 800 decal 119-0187

17. **40” Deck:** Install the extension spring to the LH idler bracket and spring anchor (Fig. 801).

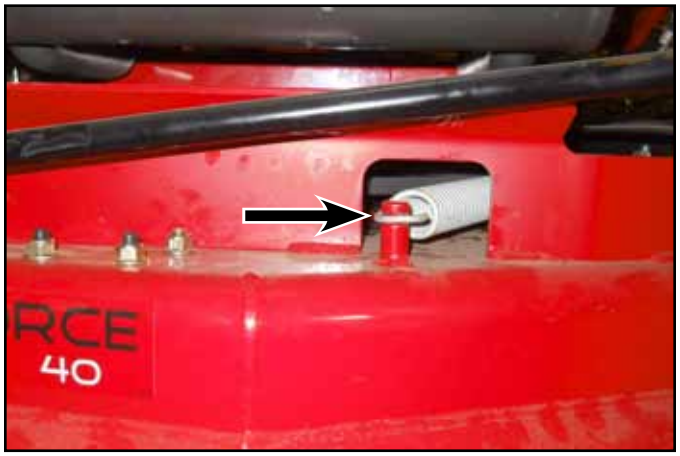


Fig. 801 DSCN-2670a

18. **40” Deck:** Install the extension spring to the RH idler bracket and spring anchor (Fig. 802).

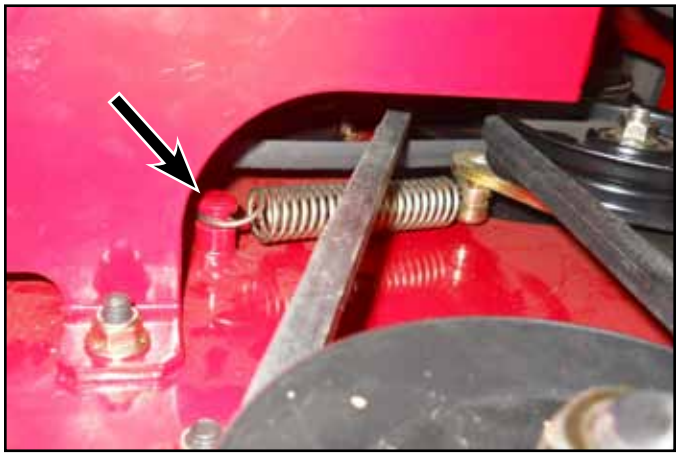


Fig. 802 DSCN-2667a

19. Install the belt covers.

20. Hook the “Z” bend of the throttle cable into the throttle control lever and loosely clamp the outer housing of the throttle cable with the cable clamp (Fig. 803).

Fig. 803 DSCN-2672a

21. Move the throttle lever to the “Fast” position (Fig. 804).

Fig. 804 DSCN-2674a

22. With the engine throttle control lever in the “Fast” position, pull the slack from the cable jacket and tighten the throttle cable clamp (Fig. 805).

Fig. 805 IMG-0576a

23. Hook the “Z” bend of the choke cable into the choke control lever and loosely clamp the outer housing of the choke cable with the cable clamp (Fig. 806).

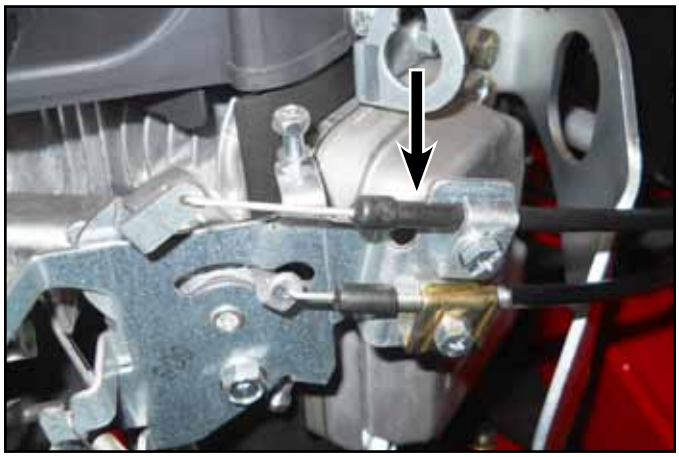


Fig. 806 DSCN-2676a

24. Push the choke knob in so it is in the “Open” position (Fig. 807).

Fig. 807 DSCN-2677a

25. While holding the engine choke control lever in the “Open” position, pull the slack from the cable jacket and tighten the choke cable clamp (Fig. 808).

Fig. 808 IMG-0584a

26. Secure the throttle and choke cable to the oil drain assemble using a cable tie (Fig. 809).

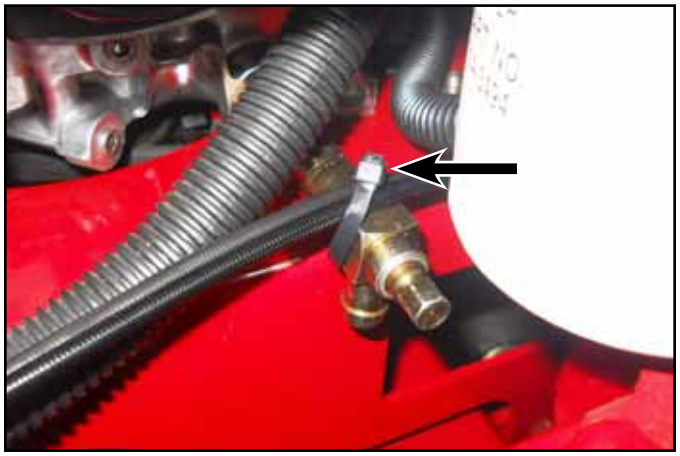


Fig. 809 DSCN-2683a

27. Position the muffler guard assembly and loosely install the four carriage bolts, two mounting guard brackets and nuts (Fig. 810).

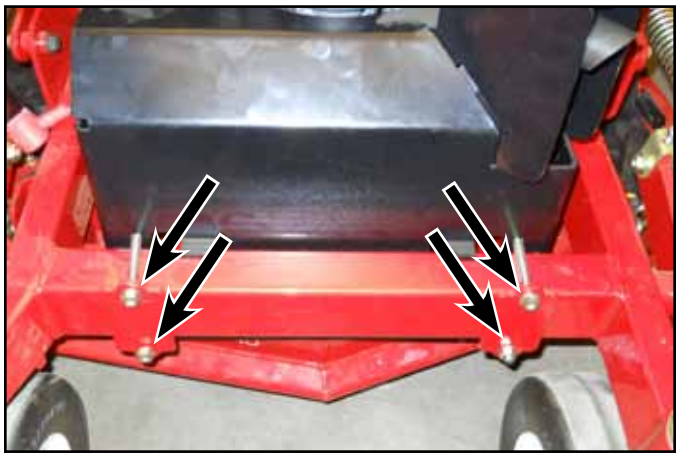


Fig. 810 DSCN-2678a

28. Make sure the muffler exhaust is centered in the muffler guard assembly then tighten all four bolts and nuts. Torque the nuts to 19 ± 2 ft-lbs. (25.76 ± 2.7 Nm) (Fig. 811).

Fig. 811 DSCN-2680a

29. Connect the clutch wire harness to the wire harness (Fig. 812).

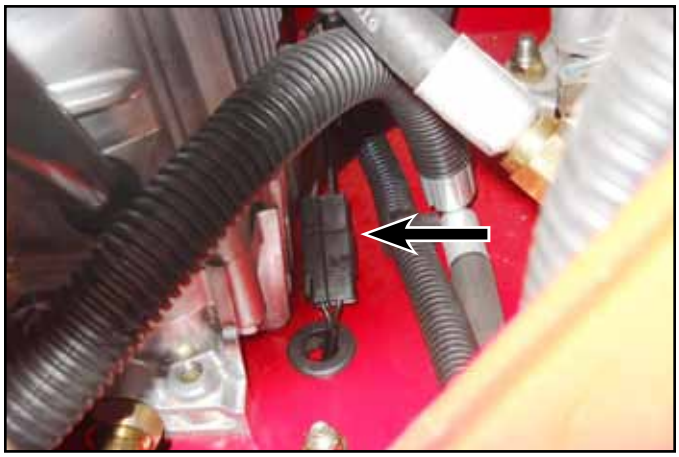


Fig. 812 DSCN-2686a

30. Install the battery ground wire and the wiring harness ground wire to the engine block (Fig. 813).

Fig. 813 DSCN-2688a

31. Install the starter wire to the solenoid using a lock washer and nut. Torque nut to 35 in-lbs. (4 Nm) (Fig. 814).

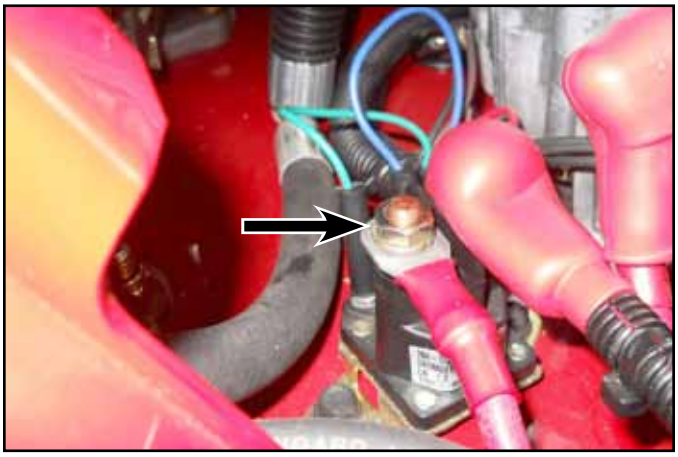


Fig. 814 DSCN-2533a

32. Connect the white wire to the black magneto wire (Fig. 815).

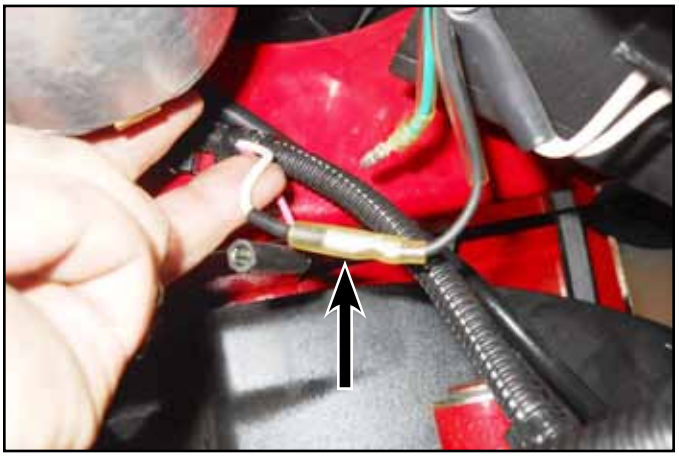


Fig. 815 DSCN-2691

33. Connect the pink wire to the green fuel solenoid wire (Fig. 816).

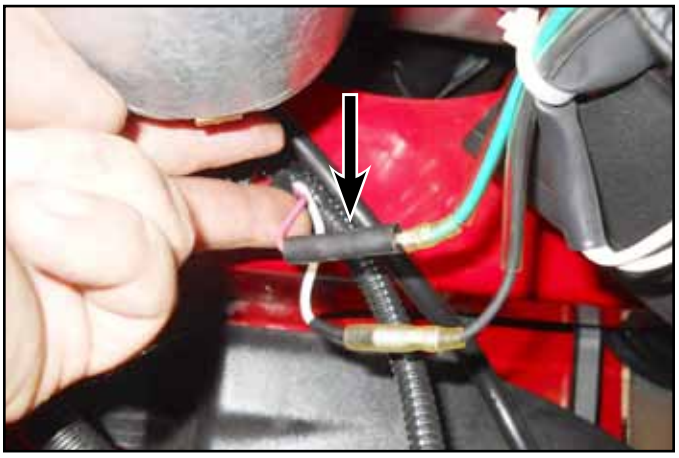


Fig. 816 DSCN-2692a

34. Connect the violet wire to the voltage regulator (Fig. 817).

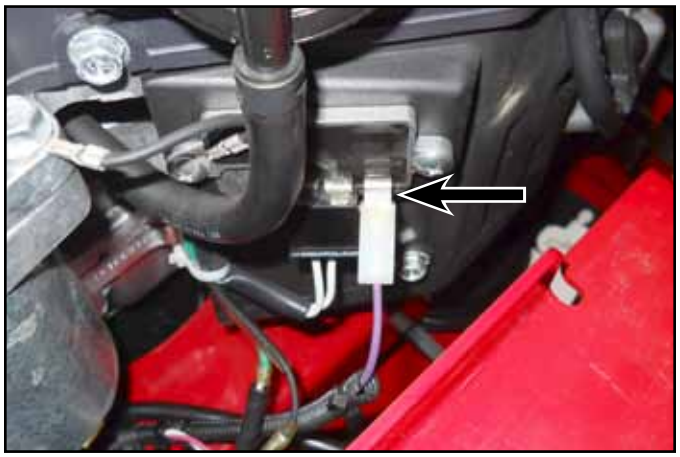


Fig. 817 DSCN-2695a

35. Secure the fuel line to the fuel pump using the hose clamp (Fig. 818).

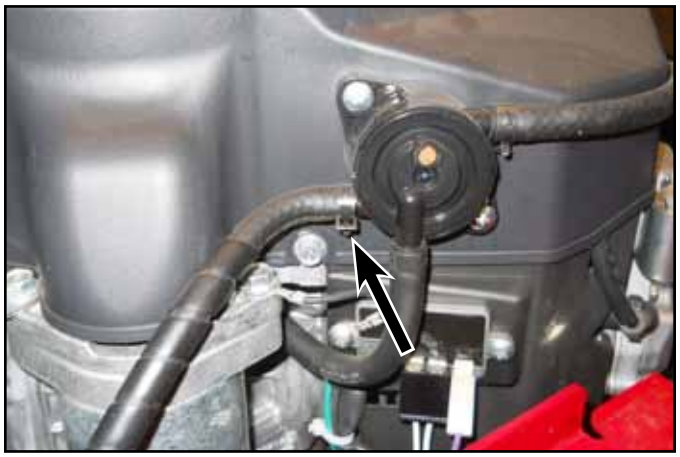


Fig. 818 DSCN-2517a

36. Position the battery on the battery tray. Using the bolt nut and washer, secure the positive battery cable to the battery. Using the bolt nut and washer, secure the negative battery cable to the battery (Fig. 819).

Fig. 819 DSCN-2698a

37. Install the battery cover with the two hold down bolts and wing nuts (Fig. 820).

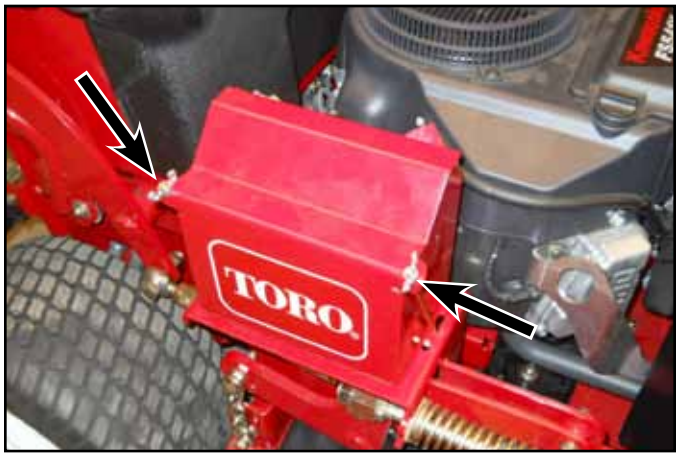


Fig. 820 DSCN-2700a

38. Turn the fuel shutoff valve to the “ON” position (Fig. 821).

Note: If a new electric PTO clutch was installed, the clutch must be burnished. Refer to “Electric PTO Clutch Burnishing Procedure” following.

Fig. 821 DSCN-2702a

Electric PTO Clutch Burnishing Procedure

Note: This procedure needs to be done only when installing a new clutch.

The clutch should be burnished as part of the pre-delivery service, or whenever a new clutch is installed. Burnishing polishes the clutch plate, allowing for smooth clutch engagement.

With deck drive belt installed, run the engine at half throttle. Engage and disengage the mower 5 times (10 seconds on/10 seconds off).

Increase engine RPM to 3/4 to full throttle. Engage and disengage mower 5 times (10 seconds on/10 seconds off).

Using a feeler gauge, check the clutch air gap at each of the 3 adjustment slots. The gap should be between 0.015” (0.381mm). Make sure the gauge is inserted between the armature and the rotor friction surfaces. Adjust the clutch as necessary (Fig. 822).

Fig. 822 PICT-0554a

Solenoid

Solenoid Removal

1. Remove the two sets of wingnuts and hold down bolts securing the battery cover then remove the cover (Fig. 823).

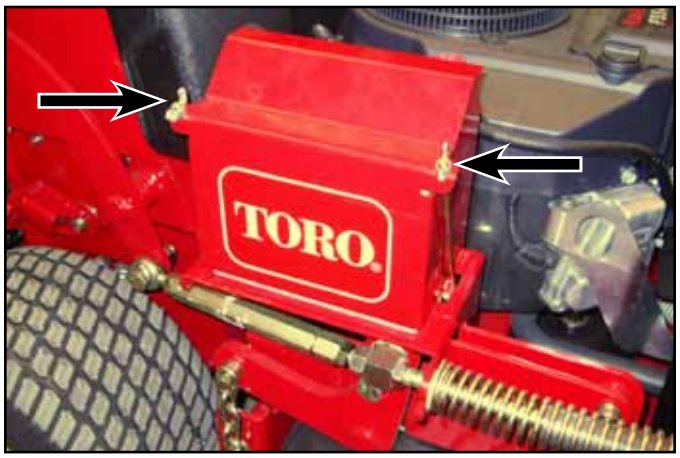


Fig. 823 DSCN-2263a

2. Remove the bolt, washer, and nut securing the black ground cable to the battery terminal (Fig. 824).

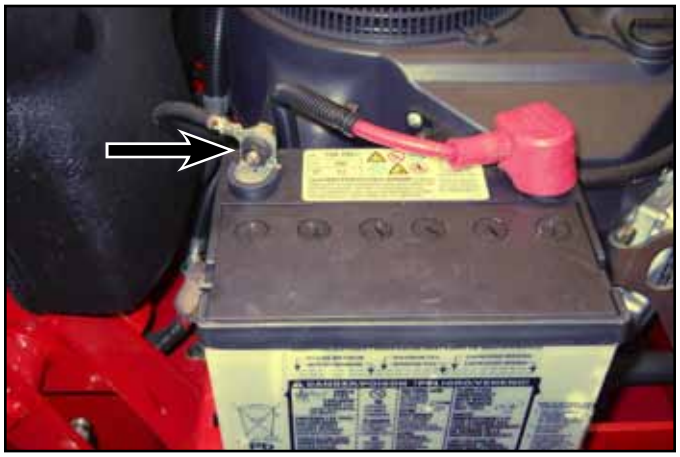


Fig. 824 DSCN-2265a

3. Remove the bolt, washer, and nut securing the red positive cable to the battery terminal, then remove the battery (Fig. 825).

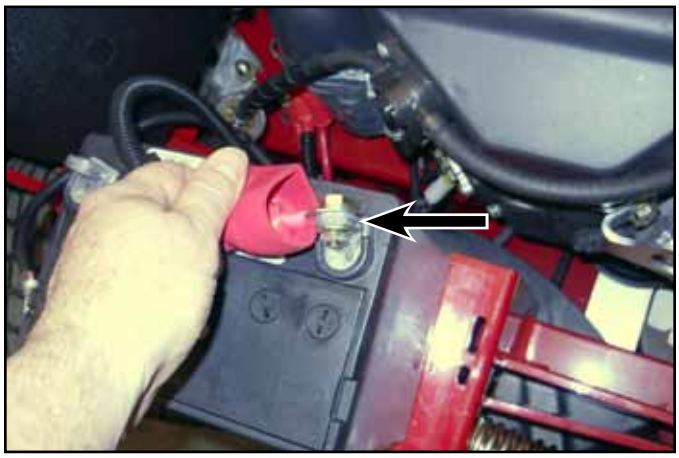


Fig. 825 DSCN-2270a

4. Move the terminal cover off the positive cable coming from the battery, then remove the nut and lock washer securing the positive battery cable and red wire eyelet to the solenoid (Fig. 826).

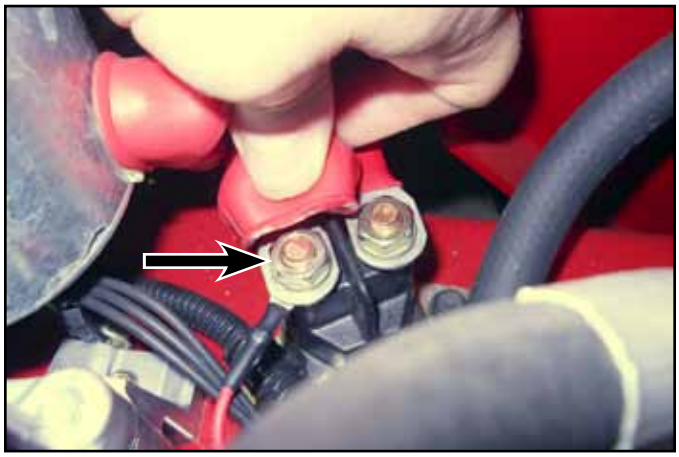


Fig. 826 DSCN-2353a

5. Remove the nut and lock washer securing the positive cable that goes to the starter (Fig. 827).

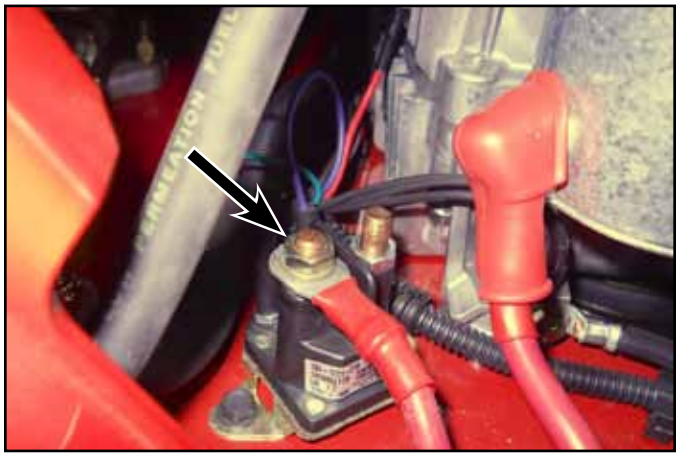


Fig. 827 DSCN-2276a

6. Remove the green and blue bullet connectors from the two small studs on the solenoid (Fig. 828).

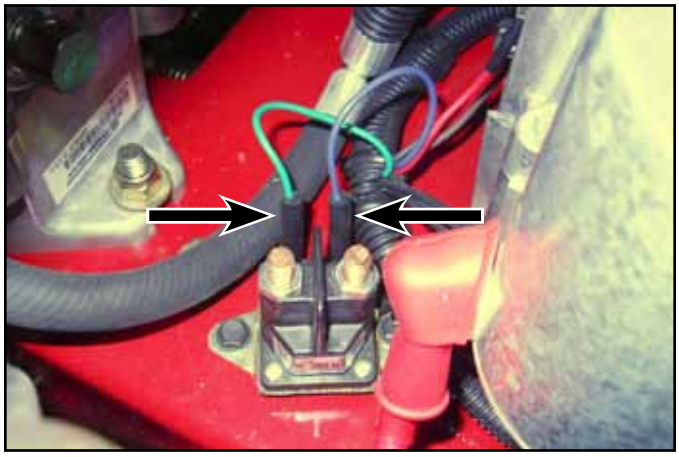


Fig. 828 DSCN-2278a

8

7. Remove the two thread forming screws securing the solenoid the engine base plate (Fig. 829).

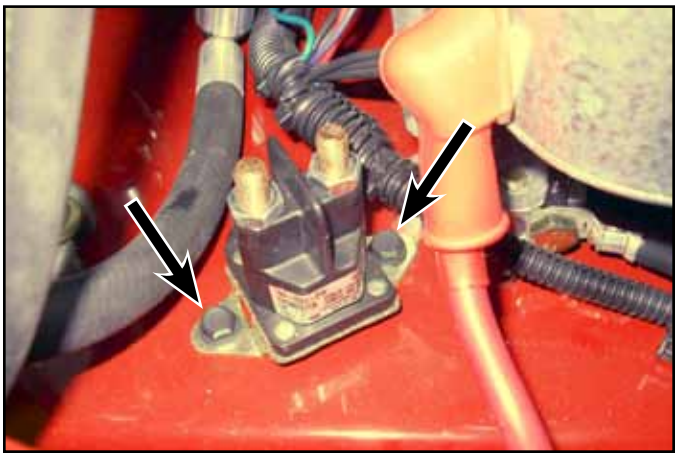


Fig. 829 DSCN-2280a

Solenoid Installation

1. Secure the solenoid to the engine base using two thread forming screws (Fig. 830).

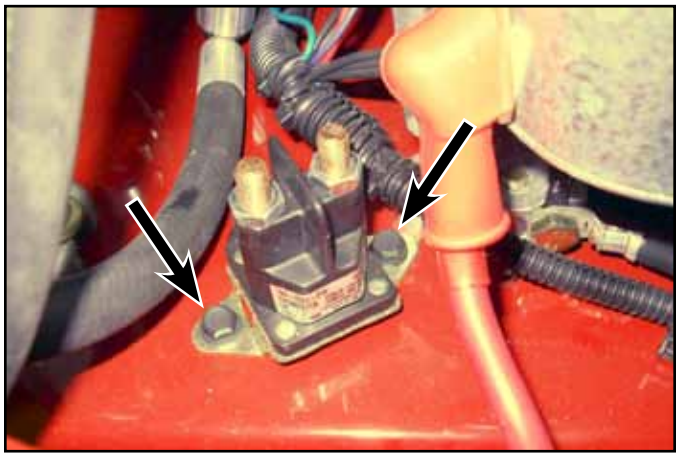


Fig. 830 DSCN-2280a

2. Install the blue and green wires to the two small studs on the solenoid using the wire's bullet connectors (Fig. 831).

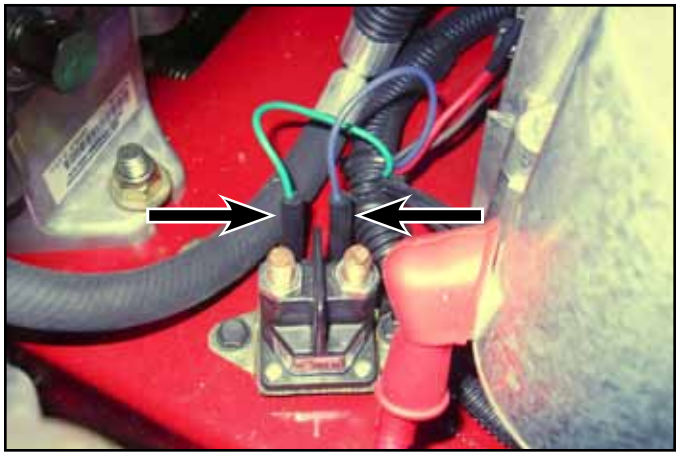


Fig. 831 DSCN-2278a

3. Secure the starter positive cable to the LH solenoid stud with a nut and lock washer. Torque to 35 in-lbs. (4 Nm) (Fig. 832).

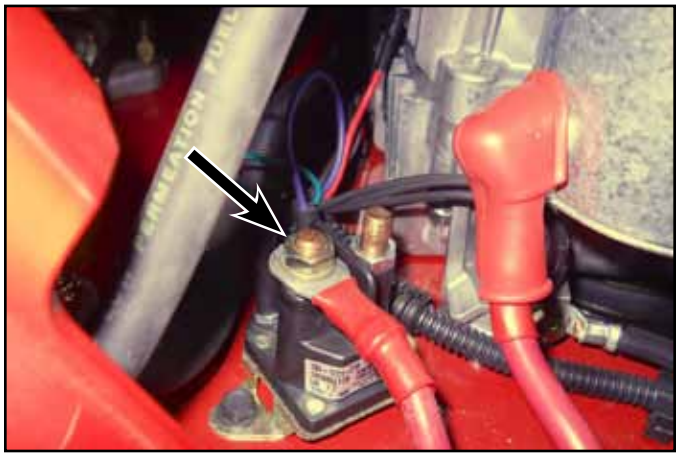


Fig. 832 DSCN-2276a

8. Secure the positive battery cable and the wire harness red wire eyelet to the solenoid using a nut and lock washer, torque to 35 in-lbs. (4 Nm), then position the positive cable terminal cover over the terminal connection (Fig. 833).

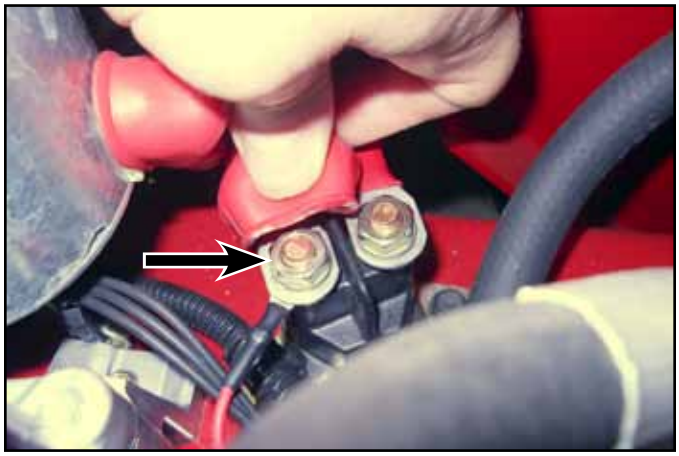


Fig. 833 DSCN-2353a

9. Position the battery onto the battery bracket then secure the red positive cable to the battery positive terminal using the bolt, washer, and nut (Fig. 834).

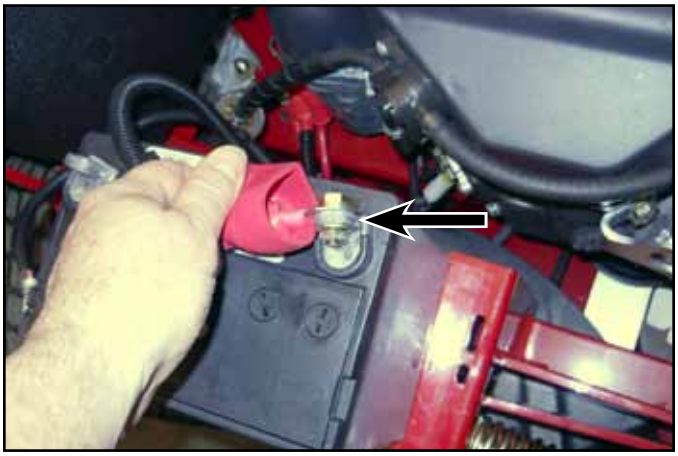


Fig. 834 DSCN-2270a

10. Secure the black ground cable to the battery negative terminal using the bolt, washer and nut (Fig. 835).

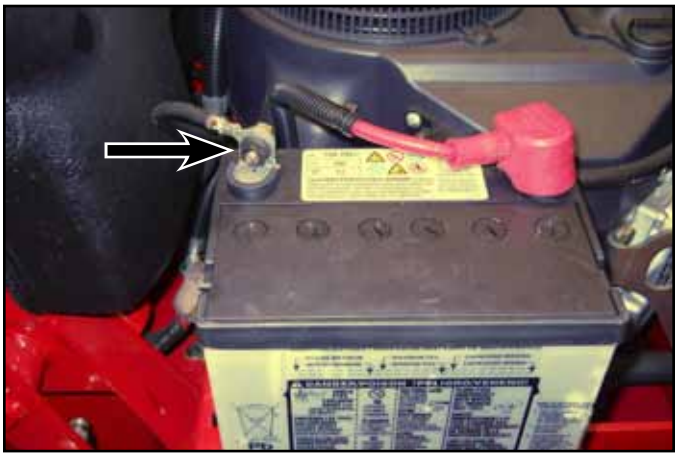


Fig. 835 DSCN-2265a

11. Secure the battery cover using the two sets of wingnuts and hold down bolts (Fig. 836).

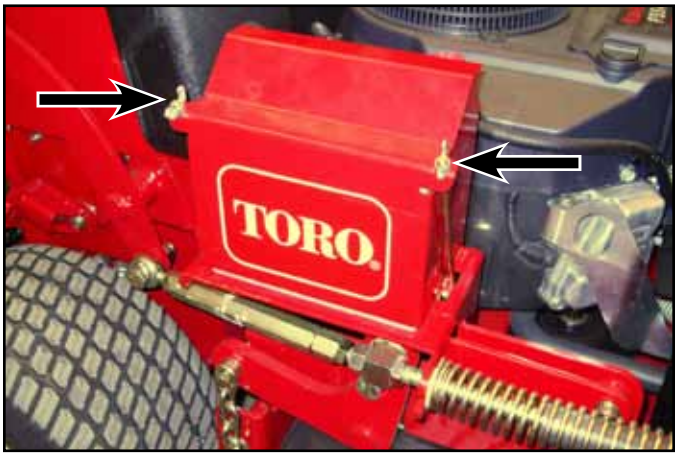


Fig. 836 DSCN-2263a

Operator Presence Control (OPC) Switch

Operator Presence Control (OPC) Switch Removal

1. Remove the wire harness from the switch (Fig. 837).

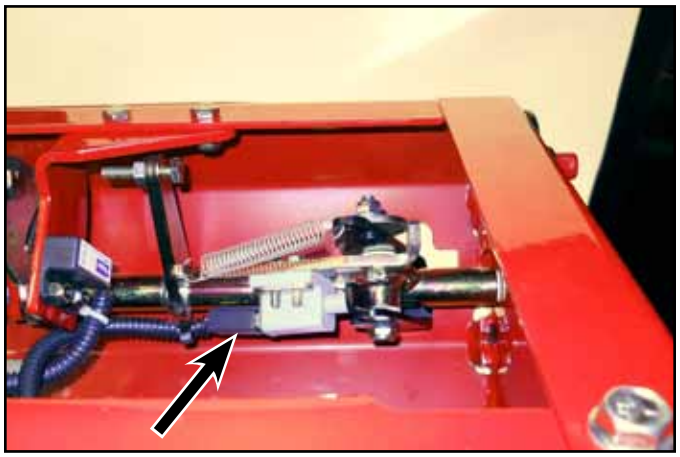


Fig. 837 DSCN-2285a

2. Remove the two screws and threaded plate that secure the switch to the control handle assembly and remove the switch (Fig. 838).

Fig. 838 DSCN-2291a

Operator Presence Control (OPC) Switch Installation

1. Loosely install the two screws and threaded plate that secure the switch to the control handle assembly (Fig. 839).

Fig. 839 DSCN-2291a

2. Move the RH control lever to the operating position (Fig. 840).

Fig. 840 DSCN-2294a

3. Position the switch so there is an 1/8” (3mm) gap between the switch plunger and the tab on the handle assembly (Fig. 841).

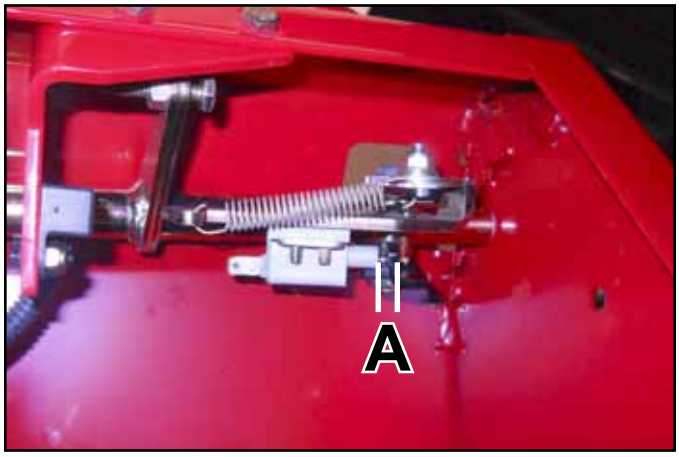


Fig. 841 DSCN-2295a

A. 1/8” (3mm)

4. Secure the position of the switch by tightening the two mounting screws (Fig. 842).

Fig. 842 DSCN-2291a

8

5. Plug the wire harness into the switch (Fig. 843).

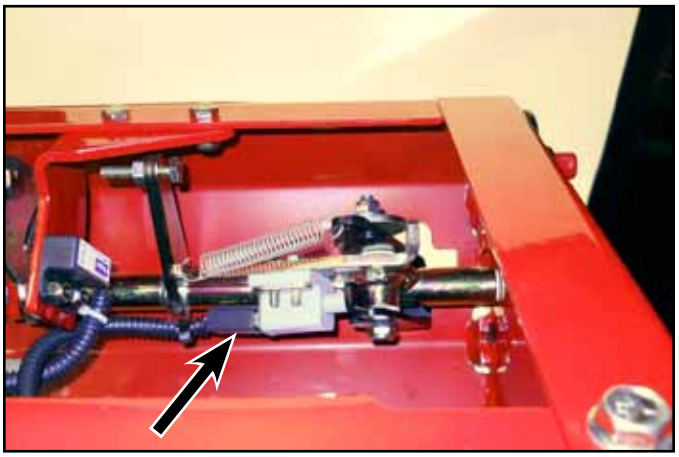


Fig. 843 DSCN-2285a

Neutral (Proximity) Switch

Neutral (Proximity) Switch Removal

1. Disconnect the wire harness from the switch (Fig. 844).

Fig. 844 DSCN-2304a

2. Remove the two screws and nuts that secure the switch to the switch mounting bracket and remove the switch (Fig. 845).

Fig. 845 DSCN-2305a

Neutral (Proximity) Switch Installation

1. Loosely install the two screws and nuts that secure the switch to the switch mounting bracket (Fig. 846).

Fig. 846 DSCN-2305a

2. With the controls in the neutral position, position the switch so the target printed on the body of the switch is aligned with the bolt attached to the control lever assembly (Fig. 847).

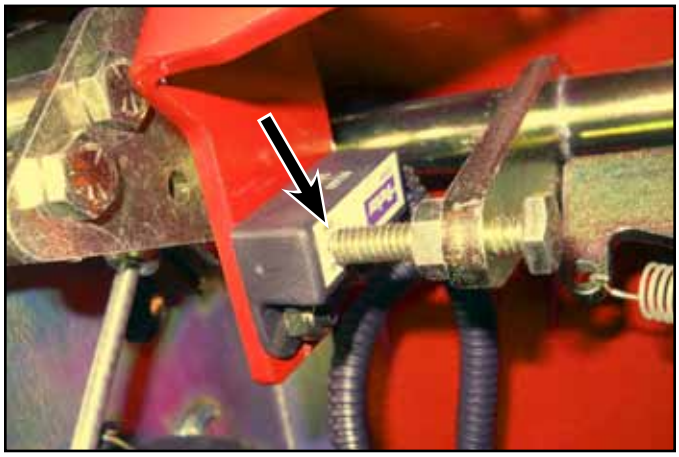


Fig. 847 DSCN-2308a

3. Secure the position of the switch by tightening the two mounting screws (Fig. 848).

Fig. 848 DSCN-2305a

Note: Ensure the end of the bolt is within .070” ± .020” (1.8 ± 0.5mm) of the switch body (Fig. 849).

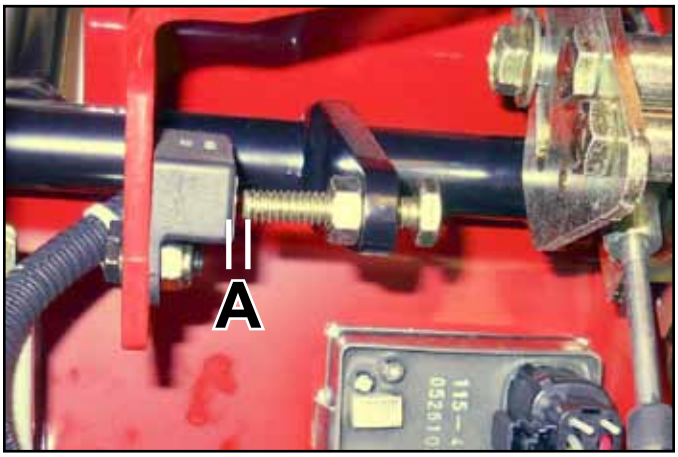


Fig. 849 DSCN-2329a

A. .070” ± .020” (1.8 ± 0.5mm)

8

4. Plug the wire harness into the switch (Fig. 850).

Fig. 850 DSCN-2304a

Parking Brake Switch

Parking Brake Switch Removal

1. Remove the wire harness from the switch (Fig. 851).

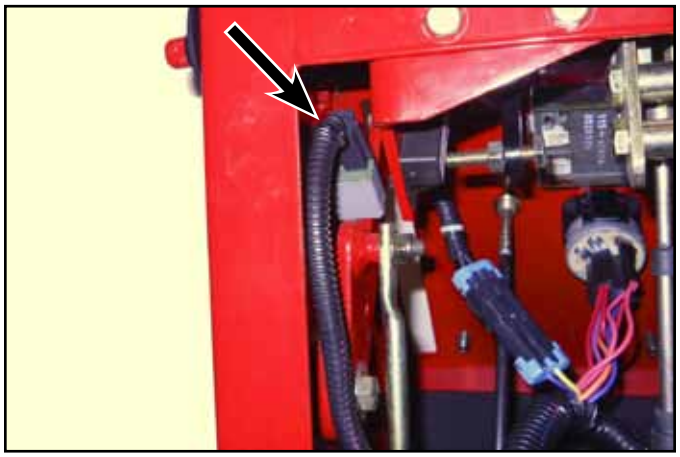


Fig. 851 DSCN-2345a

2. Remove the two screws and threaded plate that secure the switch to the switch bracket (Fig. 852).

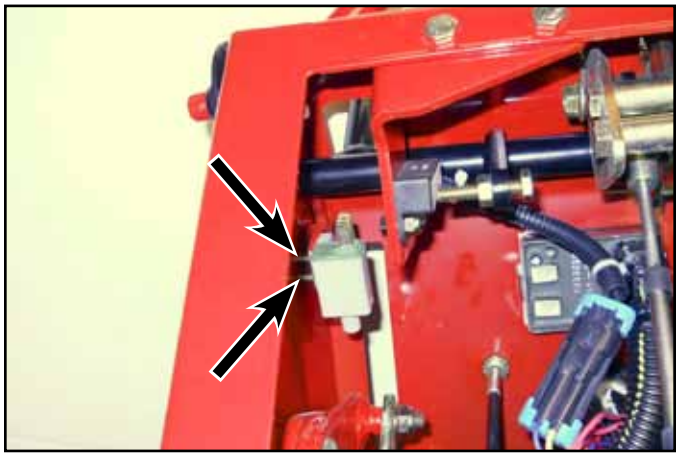


Fig. 852 DSCN-2326a

Parking Brake Switch Installation

1. Loosely install the two screws and threaded plate that secure the switch to the brake assembly (Fig. 853).

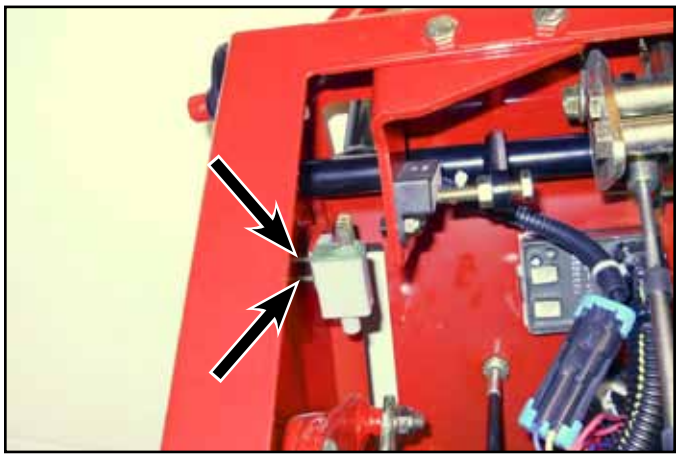


Fig. 853 DSCN-2326a

2. With the brake engaged, position the switch so there is an 1/8” (3mm) gap between the switch body and the tab on the brake arm (Fig. 854).

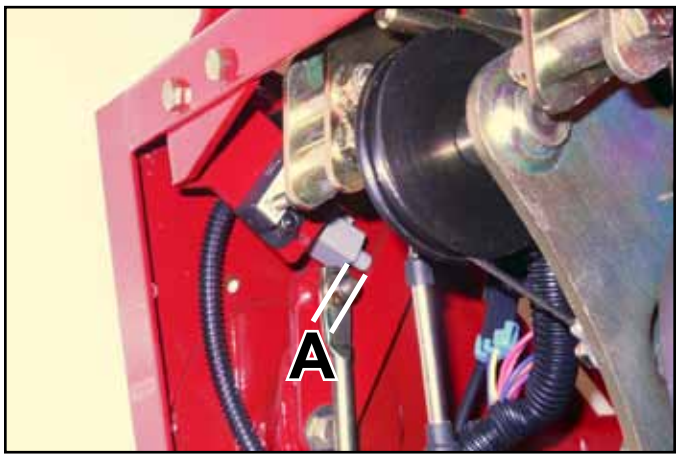


Fig. 854 DSCN-2213a

A. 1/8” (3mm)

3. Secure the position of the switch by tightening the two mounting screws (Fig. 855).

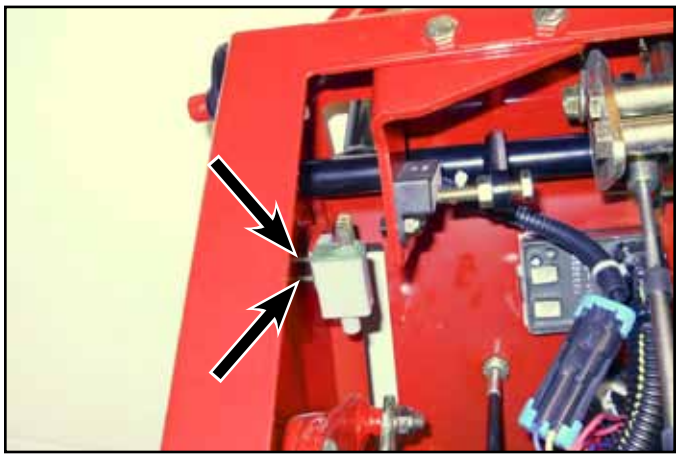


Fig. 855 DSCN-2326a

4. Plug the wire harness into the switch (Fig. 856).

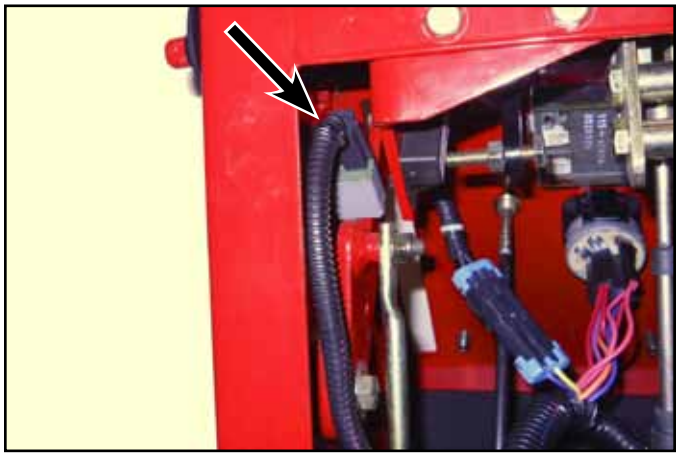


Fig. 856 DSCN-2345a

8

Hour Meter/Control Module

Hour Meter/Control Module Removal

1. Remove the wire harness from the back of the hour meter (Fig. 857).

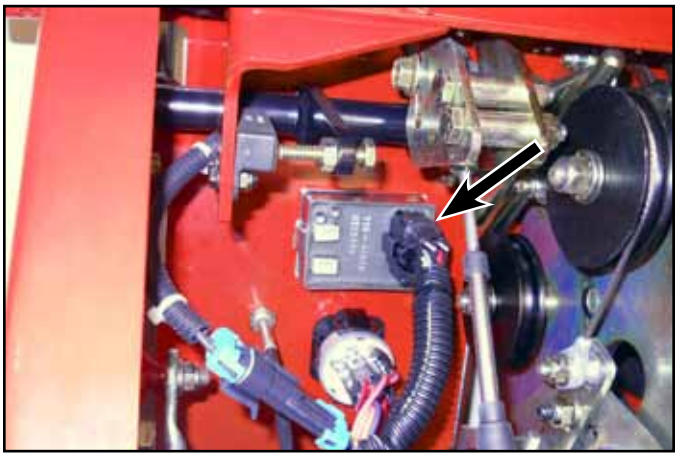


Fig. 857 DSCN-2328a

2. Depress the two tabs securing the hour meter to the control panel (Fig. 858).

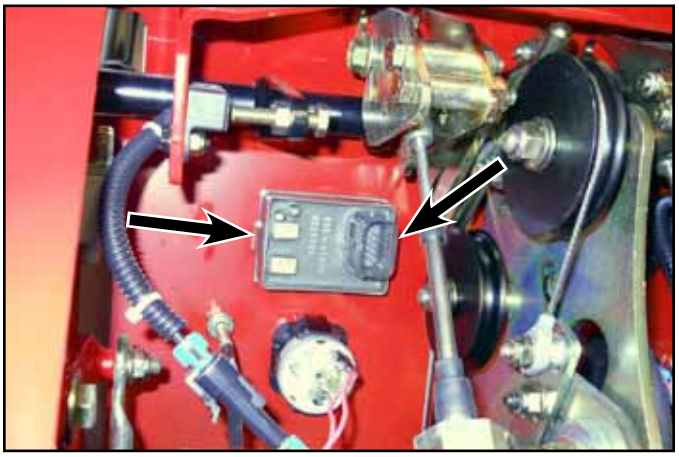


Fig. 858 DSCN-2330a

3. Remove the hour meter out through the front of the control panel (Fig. 859).

Fig. 859 DSCN-2333a

Hour Meter/Control Module Installation

1. Install the hour meter in through the control panel. Ensure that the mounting clips have secured the switch in the control panel (Fig. 860).

Fig. 860 DSCN-2333a

Note: The hour meter must be orientated so it can be read from the front of the machine (Fig. 861).

Fig. 861 DSCN-2338a

2. Install the wire harness to the back of the hour meter (Fig. 862).

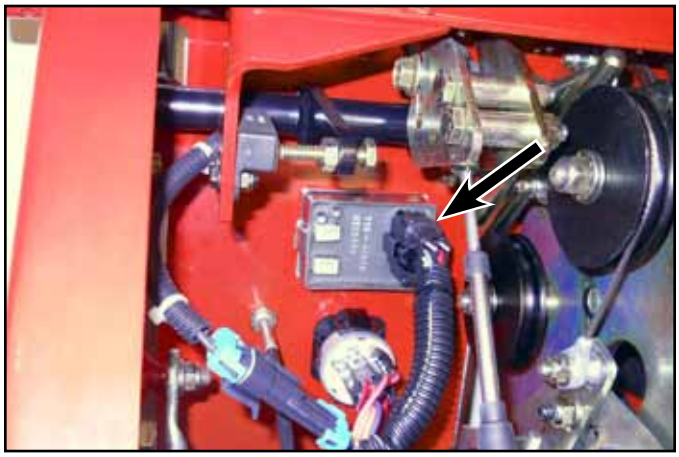


Fig. 862 DSCN-2328a

THIS PAGE INTENTIONALLY LEFT BLANK.

36” & 40” Toro GrandStand Hydraulic Schematic

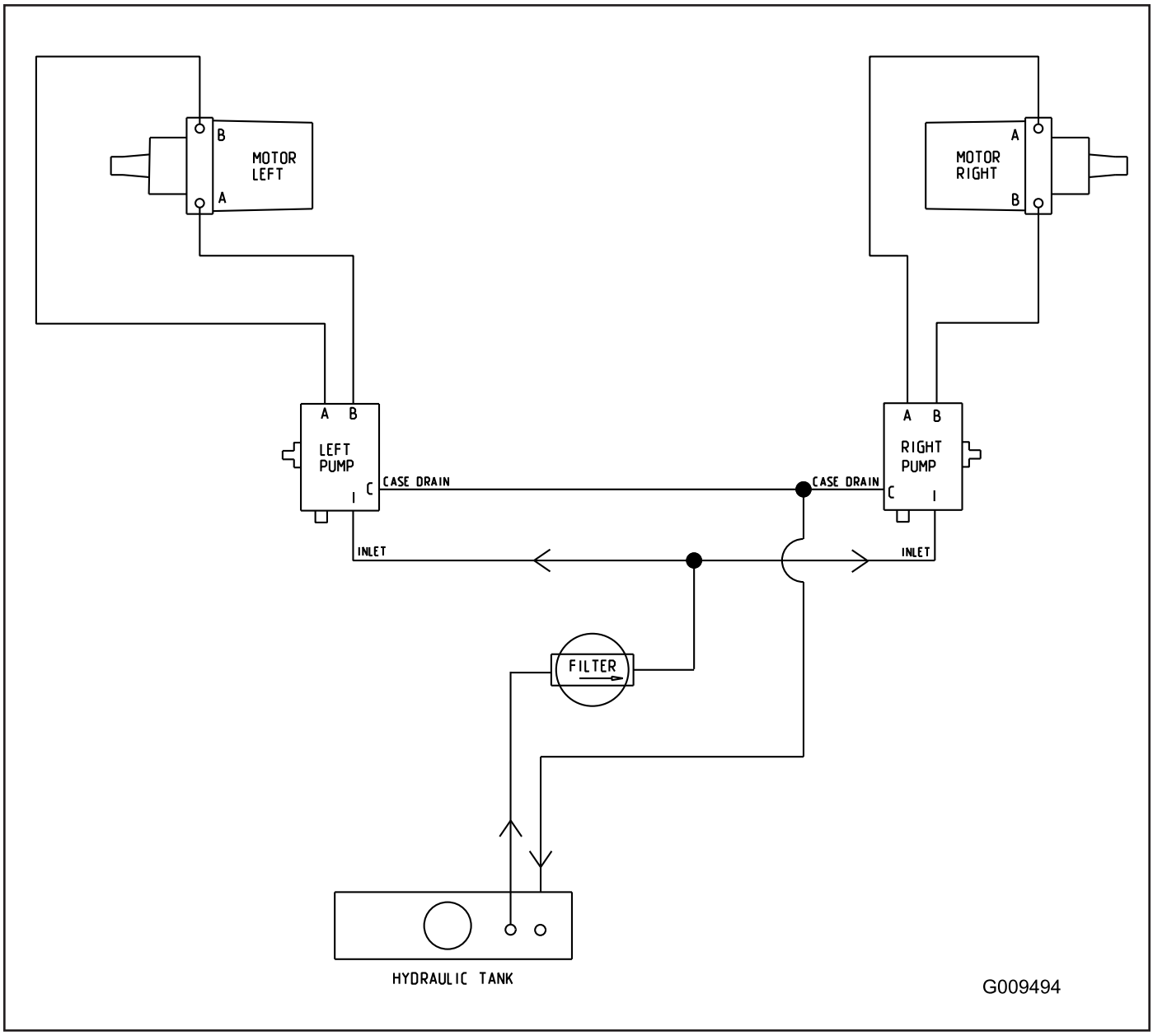


Fig. 863 fig. G009494

36” & 40” Toro GrandStand Electrical Schematic

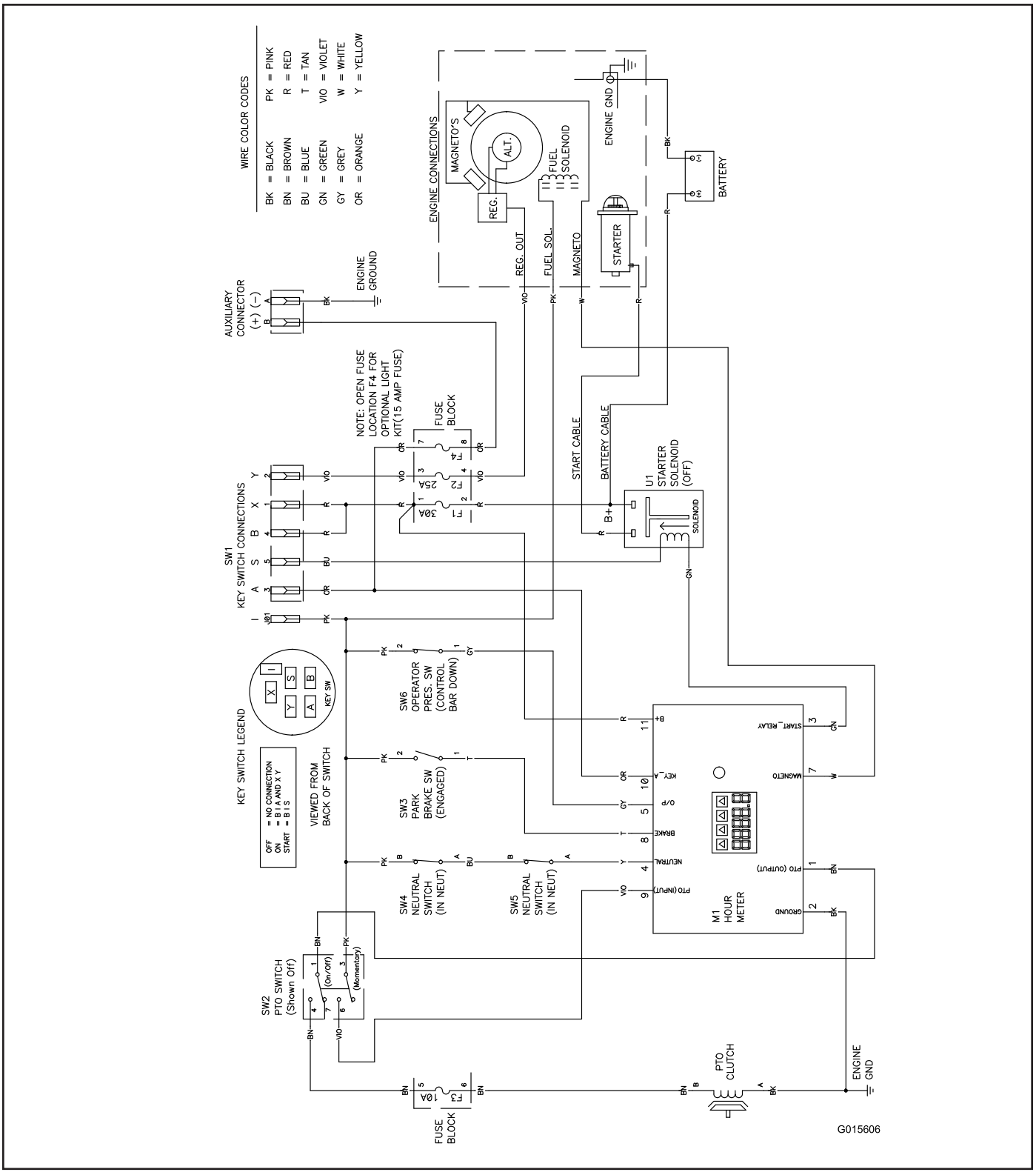


Fig. 864 fig. G015606 elec scheme

Toro
36″ & 40″ GrandStand
Service Manual

Form Number 492-9236