TORO®

LAWN-BOY®

Residential Products

TimeCutter® Z / Precision® Z

Zero Radius Turn Riding Mower

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 Demystification Guide (492-4761) and subsequent. For service information on drive systems, please refer to the Hydro-Gear EZT service manual (492-4778). For information specific to the engines used on this unit, refer to the appropriate engine manufacturer's service and repair instructions.

Toro TimeCutter® Z model year 2007 – 2009 and Lawn-Boy Precision® Z model year 2007 – 2009 are covered in this manual. The manual may also be specified for use on later model products.

The hydrostatic transaxle is a sophisticated piece 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.

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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 TimeCutter® Z and the Precision® Z zero radius turn mowers.

The TimeCutter Z and the Precision Z operator's manuals contain safety information and operating tips for safe operating practices. Operator's manuals are available online 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.

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Engine Specifications

Z4200	Kohler, Overhead Valve, Twin Cam, 19.0 hp (14.2kW) @ 3600 RPM High Idle: 3300 ± 100 RPM
Z4200 (CE)	Kohler, Overhead Valve, Twin Cam, 19.0 hp (14.2kW) @ 3600 RPM High Idle: 2650 ± 100 RPM
Z4220	Kohler, Overhead Valve, Twin Cam, 21.0 hp (15.7kW) @ 3600 RPM High Idle: 3300 ± 100 RPM
Z4202 (CE)	Kohler, Overhead Valve, Twin Cam, 20.0 hp (14.9kW) @ 3600 RPM High Idle: 2400 +100/-0 RPM
Z5000	Kohler, Overhead Valve, Twin Cam, 21.0 hp (15.7kW) @ 3600 RPM High Idle: 3300 ± 100 RPM
Z5000 (CE)	Kohler, Overhead Valve, Twin Cam, 21.0 hp (15.7kW) @ 3600 RPM High Idle: 2900 ± 100 RPM
Z5020	Kohler, Overhead Valve, Twin Cam, 23.0 hp (17.2kW) @ 3600 RPM High Idle: 3300 ± 100 RPM
Z5020 (CE)	Kohler, Overhead Valve, Twin Cam, 23.0 hp (17.2kW) @ 3600 RPM High Idle: 2900 +0/-200 RPM
Z5030	Kohler, Overhead Valve, Twin Cam, 23.0 hp (17.2kW) @ 3600 RPM High Idle: 3300 ± 100 RPM
Z5040	Kawasaki, Overhead Valve, 21.0 hp (15.7kW) @ 3600 RPM High Idle: 3450 ± 100 RPM
Z5060	Kohler, Overhead Valve, Twin Cam, 25.0 hp (18.6kW) @ 3600 RPM High Idle: 3300 ± 100 RPM

SPECIFICATIONS

General Specifications

Construction	Frame: drawn 11 gauge steel
Fuel System	Single fuel tank, 3 gallon (11.4 L) capacity, fuel filter: replaceable in-line type, vented fuel cap
Attachment Drive	Electric Clutch
Steering	Levers: Dual wrap-around levers control hydraulic pump Dampening: Dual hydraulic dampeners Turning Radius: Zero Radius Turn (ZRT)
Interlocks	Seat: Operator presence switch Control Lever/Brake: Dual position switch Power Take Off: Position switch
Electrical System	Battery Voltage: 12 volt negative ground Battery Type: BCI Group U1 (wet charge battery) Fuses: (1) 30 amp blade type - main, (1) 25 amp blade type - charge system

Traction System

Transaxle	Twin Hydro-Gear EZT Hydrostatic Transaxles
Transaxle Drive	Belt drive with self-tensioning system

Ground Speed Specifications

Model	Ground Speed
Z4200	Infinite, 0 to 7.0 mph (11.3km/hr) forward 0 to 3.5 mph (5.6km/hr) reverse
Z4200 (CE)	Infinite, 0 to 5.5 mph (9.0km/hr) forward 0 to 2.8 mph (4.5km/hr) reverse
Z4220	Infinite, 0 to 7.0 mph (11.3km/hr) forward 0 to 3.5 mph (5.6km/hr) reverse
Z4202 (CE)	Infinite, 0 to 5.5 mph (9.0km/hr) forward 0 to 2.8 mph (4.5km/hr) reverse
Z5000	Infinite, 0 to 7.0 mph (11.3km/hr) forward 0 to 3.5 mph (5.6km/hr) reverse
Z5000 (CE)	Infinite, 0 to 6.1 mph (9.8km/hr) forward 0 to 3.0 mph (4.9km/hr) reverse
Z5020	Infinite, 0 to 7.0 mph (11.3km/hr) forward 0 to 3.5 mph (5.6km/hr) reverse
Z5020 (CE)	Infinite, 0 to 6.0 mph (9.7km/hr) forward 0 to 3.0 mph (4.8km/hr) reverse
Z5030	Infinite, 0 to 7.0 mph (11.3km/hr) forward 0 to 3.5 mph (5.6km/hr) reverse
Z5040	Infinite, 0 to 7.3 mph (11.8km/hr) forward 0 to 3.7 mph (6.0km/hr) reverse
Z5060	Infinite, 0 to 7.0 mph (11.3km/hr) forward 0 to 3.5 mph (5.6km/hr) reverse

Tire Specifications

	42” (107cm) Mower Deck Models	**50” (127cm) Mower Deck Models**
Rear (drive) tires	18x7.5-8, 2 ply rated	18x9.5-8, 2 ply rated
Front castor tires	410/350 x 4 with “saw tooth” tread	410/350 x 4 with “smooth” tread
Tire pressure	Rear: 13 psi (90kPa) Front: 35 psi (241kPa)	Rear: 13 psi (90kPa) Front: 20 psi (137.9kPa)

SPECIFICATIONS

Mower Deck Specifications

	42” (107cm) Mower Deck Models	50” (127cm) Mower Deck Models
Mower Deck	Right side discharge, 2 blade mid-mounted rotary. Drawn 13 gauge steel deck with welded mounting brackets. Frame supported.	3 blade mid-mounted rotary. Drawn 12 gauge steel deck with welded mounting brackets. Frame supported.
CE model	Recycler cover, baffle and kickers installed	
Deflector	Pivoting deflector (spring loaded)	
Anti-scalp Rollers	Left and right front mounted, Two height positions	Left, center and right front mounted, Four height positions
Height of Cut	Adjusts from 1.5” to 4.5” (7 positions)	
Blade Tip Speed	17,290 ft (5,270m)/min @ 3300 RPM nominal 17,810 ft (5,428m)/min @ 3400 RPM max	17,730 ft (5,404m)/min @ 3300 RPM nominal 18,330 ft (5,587m)/min @ 3400 RPM max

Dimensions & Weight

Model	Wheel Base[1]	Width[2]	Overall Width[3]	Overall Length	Overall Height
Z4200	48.1” (122.2cm)	40.5” (102.9cm)	53.75” (136.5cm)	73.1” (185.7cm)	37.25” (94.6cm)
Z4200 (CE)	48.1” (122.2cm)	40.5” (102.9cm)	53.75” (136.5cm)	73.1” (185.7cm)	37.25” (94.6cm)
Z4220	48.1” (122.2cm)	40.5” (102.9cm)	53.75” (136.5cm)	73.1” (185.7cm)	37.25” (94.6cm)
Z4202 (CE)	48.1” (122.2cm)	40.5” (102.9cm)	53.75” (136.5cm)	73.1” (185.7cm)	37.25” (94.6cm)
Z5000	48.1” (122.2cm)	43.5” (110.5cm)	63” (160cm)	73.1” (185.7cm)	40.25” (102.2cm)
Z5000 (CE)	48.1” (122.2cm)	43.5” (110.5cm)	63” (160cm)	73.1” (185.7cm)	40.25” (102.2cm)
Z5020	48.1” (122.2cm)	43.5” (110.5cm)	63” (160cm)	73.1” (185.7cm)	40.25” (102.2cm)
Z5020 (CE)	48.1” (122.2cm)	43.5” (110.5cm)	63” (160cm)	73.1” (185.7cm)	40.25” (102.2cm)
Z5030	48.1” (122.2cm)	43.5” (110.5cm)	63” (160cm)	73.1” (185.7cm)	40.25” (102.2cm)
Z5040	48.1” (122.2cm)	43.5” (110.5cm)	63” (160cm)	73.1” (185.7cm)	40.25” (102.2cm)
Z5060	48.1” (122.2cm)	43.5” (110.5cm)	63” (160cm)	73.1” (185.7cm)	40.25” (102.2cm)

1 - center of front tire to center of drive tires
2 - outside rear tires
3 - deck deflector down

SPECIFICATIONS

Dimensions & Weight cont.

Model	Track Width[4]	Track Width[5]	Deck Width	Weight (estimated)
Z4200	32.9” (83.6cm)	29.5” (74.9cm)	53.75” (226.8cm)	500 lbs (226.8kg)
Z4200 (CE)	32.9” (83.6cm)	29.5” (74.9cm)	53.75” (226.8cm)	510 lbs (231kg)
Z4220	32.9” (83.6cm)	29.5” (74.9cm)	53.75” (226.8cm)	500 lbs (226.8kg)
Z4202 (CE)	32.9” (83.6cm)	29.5” (74.9cm)	53.75” (226.8cm)	510 lbs (231kg)
Z5000	34.6” (87.9cm)	29.5” (74.9cm)	63” (160cm)	552 lbs (250.4kg)
Z5000 (CE)	34.6” (87.9cm)	29.5” (74.9cm)	63” (160cm)	572 lbs (259.5kg)
Z5020	34.6” (87.9cm)	29.5” (74.9cm)	63” (160cm)	565 lbs (256.3kg)
Z5020 (CE)	34.6” (87.9cm)	29.5” (74.9cm)	63” (160cm)	585 lbs (265.4kg)
Z5030	34.6” (87.9cm)	29.5” (74.9cm)	63” (160cm)	552 lbs (250.4kg)
Z5040	34.6” (87.9cm)	29.5” (74.9cm)	63” (160cm)	565 lbs (256.3kg)
Z5060	34.6” (87.9cm)	29.5” (74.9cm)	63” (160cm)	565 lbs (256.3kg)

4 - center to center of rear tires
5 - center to center of castor tires

Hydrostatic Transaxle Specifications

Hydro-Gear EZT Hydrostatic Transaxles

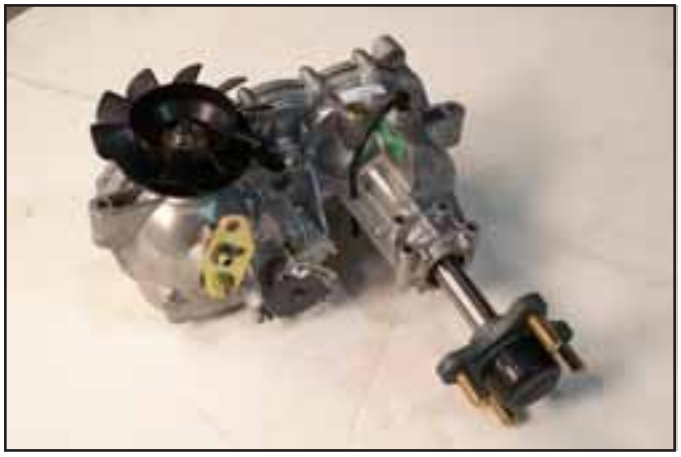


Fig. 001 PICT-9625

Lubrication	SAE 20W-50 API Classification SH/CD
Oil Capacity	1.6 to 1.7 qt. (1.5 to 1.6 liters)
Oil Level	The transaxle is a sealed system and does not require periodic checking. Check oil at the oil fill plug location only. Do not check the oil at the vent tube. Checking oil at the vent tube will give a false reading or no reading at all, since this is the oil expansion area. If the oil needs to be checked, the transaxle must be removed to check oil level and **IT CAN BE ONLY CHECKED COLD.** There is a fill plug located at the top of the transaxle. To check the level of the oil, remove the fill plug. Oil level should be 3/4" (1.9cm) from the top of the oil fill plug.
Fluid Change	The transaxle is factory filled and does not require regular oil changes.

Note: If replacing the transaxle, after installing the hydro rods, loosen the nut and washer located on the cam plate (Fig. 002). Also check the oil prior to installation (Fig. 003).

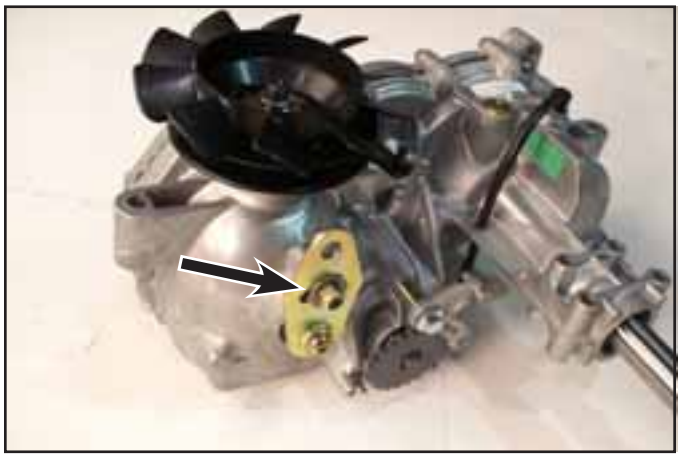


Fig. 002 PICT-9626

Fig. 003 PICT-9629a

Torque Specifications

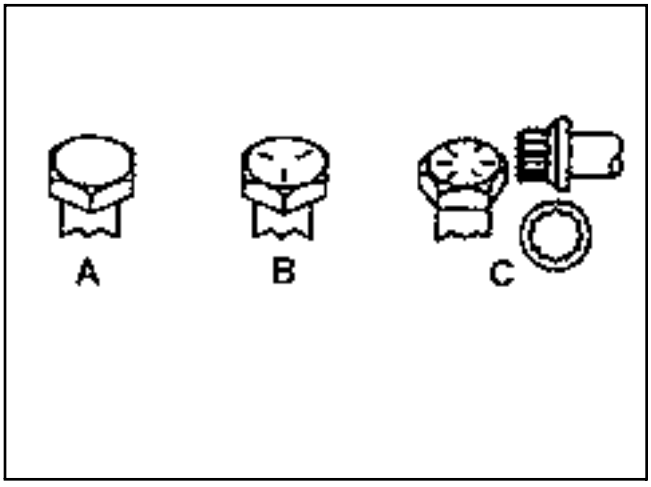
Recommended fastener torque values are listed in the following tables. For critical applications, as determined by Toro, either the recommended torque or a torque that is unique to the application is clearly identified and specified in the service manual.

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 (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.

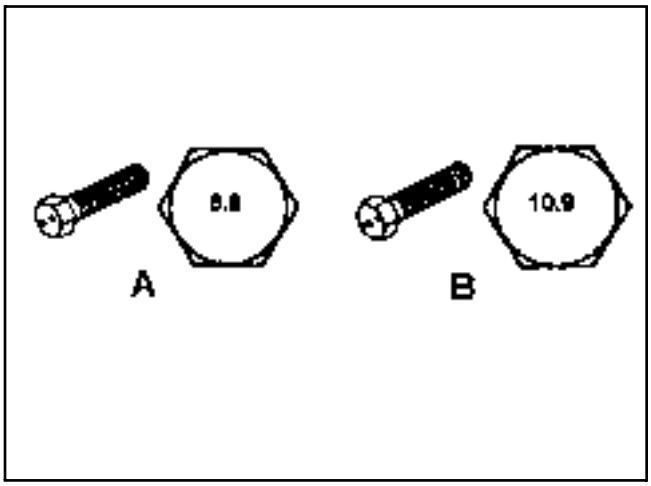
As noted in the following tables, torque values should be **reduced by 25% for lubricated fasteners** to achieve the similar stress as a dry fastener. Torque values may also have to be reduced when the fastener is threaded into aluminum or brass. The specific torque value should be determined based on 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 (B) Grade 5	(C) Grade 8



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

Standard Torque for Dry, Zinc Plated, and 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	170 ± 20	23 ± 2	260 ± 20
# 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 ± 17	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, and 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	640 ± 60 N-cm	78 ± 7 in-lb	885 ± 80 N-cm
M6 X 1.0	96 ± 9 in-lb	1018 ± 100 N-cm	133 ± 13 in-lb	1500 ± 150 N-cm
M8 X 1.25	19 ± 2 ft-lb	26 ± 3 N-m	27 ± 2 ft-lb	36 ± 3 N-m
M10 X 1.5	38 ± 4 ft-lb	52 ± 5 N-m	53 ± 5 ft-lb	72 ± 7 N-m
M12 X 1.75	66 ± 7 ft-lb	90 ± 10 N-m	92 ± 9 ft-lb	125 ± 12 N-m
M16 X 2.0	166 ± 15 ft-lb	225 ± 20 N-m	229 ± 22 ft-lb	310 ± 30 N-m
M20 X 2.5	325 ± 33 ft-lb	440 ± 45 N-m	450 ± 37 ft-lb	610 ± 50 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.

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

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Model & Serial Number Identification

The unit model and serial number plate is located on the frame under the seat as shown (Fig. 004):

Fig. 004 PICT-9150

Grease & Lubrication

The unit should be greased every 25 hours or more often when operated in dusty, dirty, or sandy conditions.

Grease Type: No. 2 general purpose lithium base grease.

1. Some models have a grease fitting on the caster fork area (Fig. 005).

Fig. 005 PICT-9154a

2. A grease fitting is located on each front wheel hub (Fig. 006).

Fig. 006 PICT-9157

Front Castor Fork Replacement

1. Park the unit on a level surface, disengage the blade control (PTO), and turn the ignition key to “Off” to stop the engine. Remove the ignition key.

2. Raise the front of the unit high enough to permit removing the caster forks from the front axle assembly (Fig. 007).

Fig. 007 PICT-9158

Note: There are two different style front axle assemblies and different hardware for each.
Style A (Fig. 008):

Fig. 008 PICT-9160

Style B (Fig. 009):

Fig. 009 PICT-9154a

Style A - Front Axle Assembly Caster Fork Removal

1. Remove the hex head bolt and washer located on top of the caster fork assembly (Fig. 010).

Fig. 010 PICT-9161

2. Remove the caster fork assembly from the front axle (Fig. 011).

Fig. 011 PICT-9162

3. Using a drift punch, tap the bottom ball bearing out of the front axle assembly (Fig. 012).

Fig. 012 PICT-9164

4. Using a drift punch tap the top bearing out of the front axle assembly (Fig. 013).

Fig. 013 PICT-9166

Style A caster fork assembly (Fig. 014)

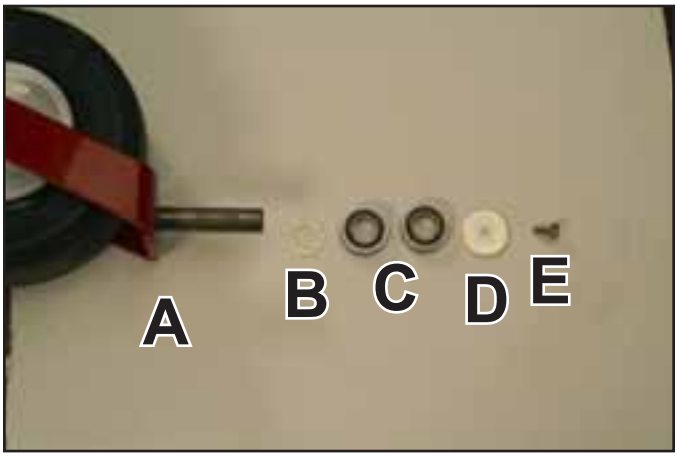

Fig. 014 PICT-9167a

A. Caster fork assembly
B. Thrust washer
C. Ball bearing (2)
D. Washer
E. Bolt

Style A - Front Axle Assembly Caster Fork Installation

1. Tap the bottom and top ball bearings into the front axle assembly (Fig. 015).

Fig. 015 PICT-9172

2. Install the thrust washer onto the caster fork, then install the castor fork assembly into the front axle assembly (Fig. 016).

Fig. 016 PICT-9174

3. Install the washer and bolt and tighten the bolt (Fig. 017).

Fig. 017 PICT-9175

4. Lower the unit and remove the floor jack.

Style B - Front Axle Assembly Caster Fork Removal

1. Remove the plastic dust cover, e-ring and washer. Slide the caster fork down, out of the front axle assembly (Fig. 018).

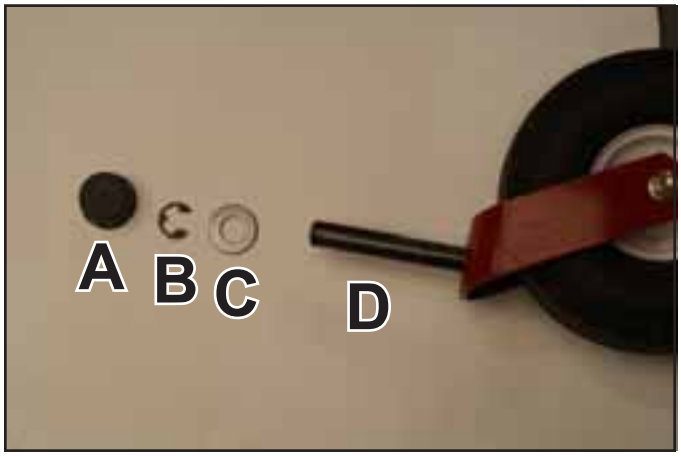

Fig. 018 PICT-9187

A. Plastic dust cap
B. E-ring
C. Washer
D. Castor fork assembly

2. With a drift punch, tap out the bottom flanged bearing and then tap out the top flanged bearing (Fig. 019).

Fig. 019 PICT-9189

Style B - Front Axle Assembly Caster Fork Installation

1. Tap the top and bottom flanged bearings into the front axle assembly (Fig. 020).

Fig. 020 PICT-9190

2. Install the thrust washer onto the caster fork, then install the caster fork assembly into the front axle assembly (Fig. 021).

Fig. 021 PICT-9191

3. Install the washer and the e-ring on the caster fork assembly (Fig. 022).

Fig. 022 PICT-9193

4. Install the plastic dust cap (Fig. 023).

Fig. 023 PICT-9194

5. Grease the caster fork assembly.

6. Lower the unit and remove the floor jack.

Caster Wheel Assembly Removal

1. Park the unit on a level surface, disengage the blade control (PTO), and turn the ignition key to “Off” to stop the engine. Remove the ignition key.

2. Raise the front of the unit (Fig. 024).

Fig. 024 PICT-9158

3. Remove the bolt and nut retaining the wheel assembly to the caster fork (Fig. 025).

Fig. 025 PICT-9195

4. Remove the wheel spanner from the wheel assembly (Fig. 026).

Fig. 026 PICT-9197

5. With a drift punch, tap out both flange bearings from the wheel rims (Fig. 027).

Fig. 027 PICT-9199a

Castor Wheel Assembly Installation

1. Tap the flange bearings into the wheel rims (Fig. 028).

Fig. 028 PICT-9200a

2. Install the wheel spanner into the wheel assembly (Fig. 029).

Fig. 029 PICT-9197

3. Install the bolt and nut retaining the wheel assembly to the caster fork, then tighten the bolt and nut (Fig. 030).

Fig. 030 PICT-9195

4. Lower the unit and remove the floor jack.

Front Axle Assembly Removal

1. Park the unit on a level surface, disengage the blade control (PTO), and turn the ignition key to “Off” to stop the engine. Remove the ignition key.

2. Remove the mower deck, refer to “Mower Deck Removal” on page 6-12.

3. Raise the front of the unit and install jack stands under the frame (Fig. 031).

Fig. 031 PICT-9201

4. Remove the front footrest plate (Fig. 032).

Fig. 032 PICT-9202

5. Remove the footrest from the frame (Fig. 033).

Fig. 033 PICT-9203

6. Remove the lift rod from the front axle (Fig. 034).

Fig. 034 PICT-9205

7. Remove both the right and left castor fork assemblies (Style A construction shown) (Fig. 035).

Fig. 035 PICT-9206

8. Remove the 4 bolts, washers, and nuts retaining the front axle assembly to the frame (Fig. 036).

Fig. 036 PICT-9207

9. Remove the front axle assembly from the frame (Fig. 037).

Fig. 037 PICT-9208

10. Remove the castor fork bearings by using a drift punch and tapping the bearings out of the front axle assembly (Fig. 038).

Fig. 038 PICT-9209a

Front Axle Assembly Installation

1. Tap castor fork bearings into the front axle assembly (Fig. 039).

Fig. 039 PICT-9210a

2. Install the front axle assembly into the frame (Fig. 040).

Fig. 040 PICT-9208

3. Install 4 bolts, washer, and nuts that retain the front axle assembly to the frame and tighten (Fig. 041).

Fig. 041 PICT-9207

4. Install thrust washers onto the caster forks, then install the castor fork assemblies into the front axle assembly (Fig. 042).

Fig. 042 PICT-9211

5. Install the bolts and washers retaining the caster fork assemblies to the front axle assembly and tighten the bolt (Fig. 043).

Fig. 043 PICT-9214

6. Install the lift rod, washer and nut to the front axle assembly (Fig. 044).

Fig. 044 PICT-9205

7. Install the footrest to the frame (Fig. 045).

Fig. 045 PICT-9216

8. Install the footrest plate to the frame with two bolts and washers (Fig. 046).

Fig. 046 PICT-9217

9. Remove the jack stands and lower the unit.

10. Install the mower deck; refer to “Mower Deck Installation” on page 6-13.

Fuel Tank Replacement

Fuel Tank Removal

1. Remove the negative battery cable from the battery (Fig. 047).

Fig. 047 PICT-9219

2. Remove the four screws from the control panel and move the control panel away from the side panel (Fig. 048).

Fig. 048 PICT-9225

3. Remove the fuel cap (Fig. 049).

Fig. 049 PICT-9226

4. Remove the rubber washer from around the fill tube of the fuel tank (Fig. 050).

Fig. 050 PICT-9227

5. Remove the 3 shoulder screws that retain the RH pod to the frame (Fig. 051).

Fig. 051 PICT-9230

6. Remove the RH pod from the frame (Fig. 052).

Fig. 052 PICT-9232

7. Move the hose clamp and disconnect the fuel line from the 90 degree fitting on the top of the fuel tank (Fig. 053).

Fig. 053 PICT-9234

8. Cut and remove the cable tie running through the retention tabs located on the seat/pod bracket (Fig. 054).

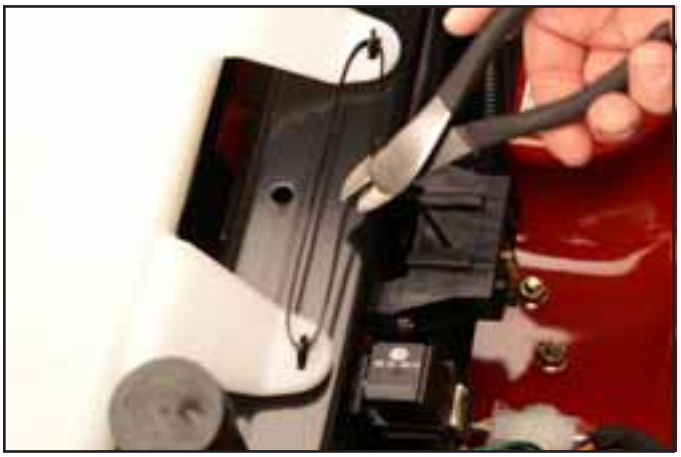

Fig. 054 PICT-9235

9. Remove the fuel tank (Fig. 055).

Fig. 055 PICT-9236

Fuel Tank Installation

1. Install fuel tank onto the frame (Fig. 056).

Fig. 056 PICT-9237

2. Install a cable tie through the retention tabs located on the seat/pod bracket (Fig. 057).

Fig. 057 PICT-9238

3. Install the seal foam on the neck of the fuel tank (Fig. 058).

Fig. 058 PICT-9239

4. Connect the fuel line to the 90 degree fitting and install the hose clamp (Fig. 059).

Fig. 059 PICT-9234

5. Install the RH pod to the frame (Fig. 060).

Fig. 060 PICT-9240

6. Install 3 shoulder screws that retain the RH pod to the frame (Fig. 061).

Fig. 061 PICT-9230

7. Install a rubber washer around the fuel fill tube and install the fuel cap (Fig. 062).

Fig. 062 PICT-9226

8. Install 4 screws in the control panel and tighten (Fig. 063).

Fig. 063 PICT-9241

9. Install the battery negative cable onto the battery (Fig. 064).

Fig. 064 PICT-9219

Seat Pivot/Control Assembly Replacement

Seat Pivot/Control Assembly Removal

1. Remove the negative battery cable from the battery (Fig. 065).

Fig. 065 PICT-9219

2. Remove the wire plug from the seat switch (Fig. 066).

Fig. 066 PICT-9246

3. Remove the wire harness retainer located on the seat base (Fig. 067).

Fig. 067 PICT-9251

4. Remove the hairpin and the clevis pin holding the retaining cable stop for the seat (Fig. 068).

Fig. 068 PICT-9256

5. Remove the shoulder bolts and nuts retaining the seat base to the seat pivot/control assembly and remove seat assembly (Fig. 069).

Fig. 069 PICT-9257

6. Remove the 3 shoulder screws retaining the LH pod to the frame (Fig. 070).

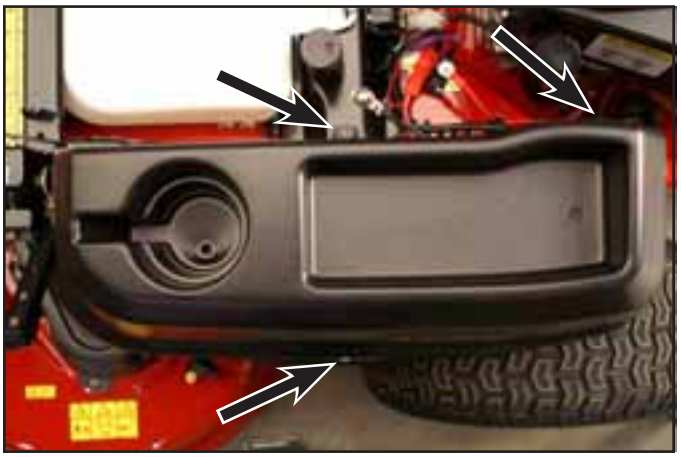

Fig. 070 PICT-9259

7. Remove the LH pod from the unit (Fig. 071).

Fig. 071 PICT-9260

8. Remove the four screws on the control panel and move the control panel away from the side panel (Fig. 072).

Fig. 072 PICT-9225

9. Remove the fuel cap and the rubber washer.

10. Remove the 3 shoulder screws retaining the RH pod to the frame (Fig. 073).

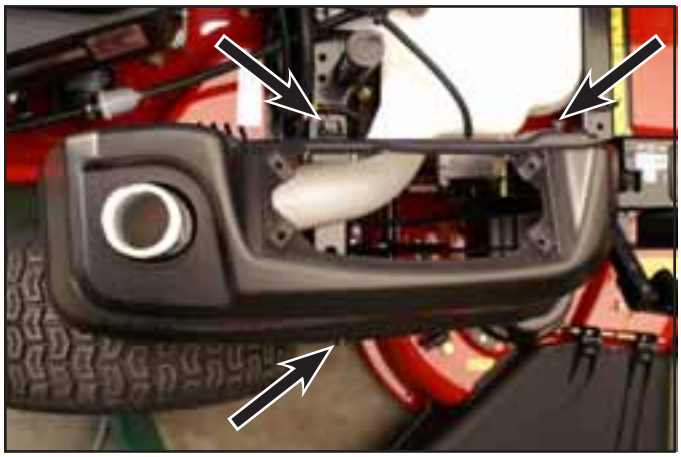

Fig. 073 PICT-9262

11. Remove the RH pod from the frame (Fig. 074).

Fig. 074 PICT-9232

12. Cut and remove the tie cable running through the retention tabs located on the seat/pods bracket (Fig. 075).

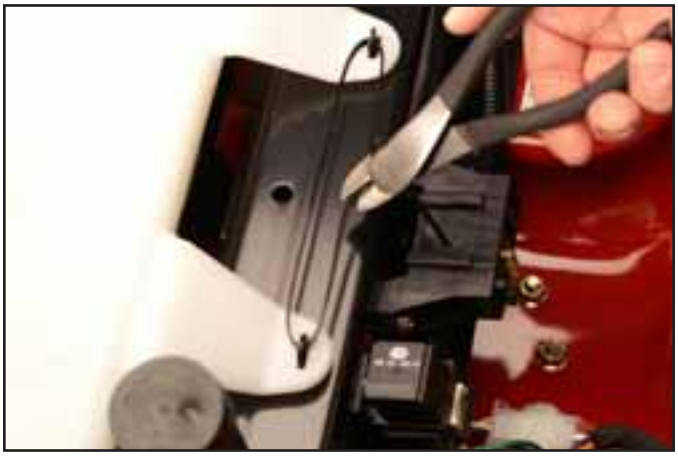

Fig. 075 PICT-9235

13. Remove the fuel tank from the frame (Fig. 076).

Fig. 076 PICT-9265a

14. Remove the right and left control covers (Fig. 077).

Fig. 077 PICT-9275

15. Remove the screw securing the parking brake cable to the RH and LH activator arm assembly (Fig. 078).

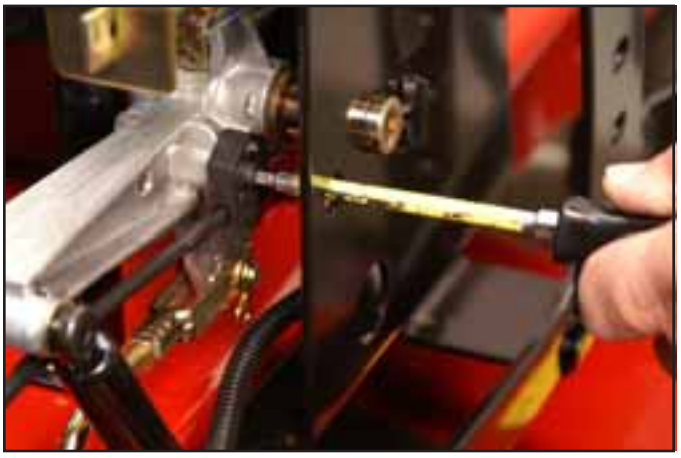

Fig. 078 PICT-9278

16. Remove the z-bend of the parking brake cable from the RH and LH gear control (Fig. 079).

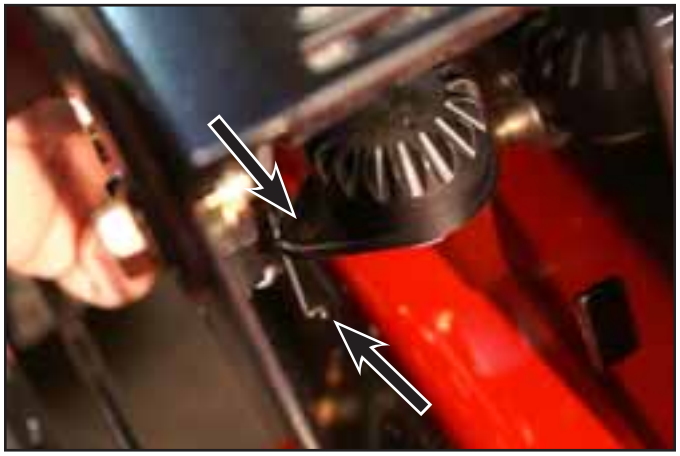

Fig. 079 PICT-9282

17. Pull the RH and LH brake cables out of the seat pivot/control assembly area.

18. Push in the clip that retains the neutral switch to the seat pivot/control assembly located below the neutral slot for the forward/reverse levers (Fig. 080).

Fig. 080 PICT-9345

19. Remove the RH and LH neutral switch and pull the wire assembly out of the control linkage area (Fig. 081).

Fig. 081 PICT-9342a

20. Remove the shoulder screw and washer that hold the motion control damper to the RH and LH activator assembly (Fig. 082).

Fig. 082 PICT-9341

21. Remove the hairpin and clevis pin on the adjustable yokes for both the right hand and left hand hydro links (Fig. 083).

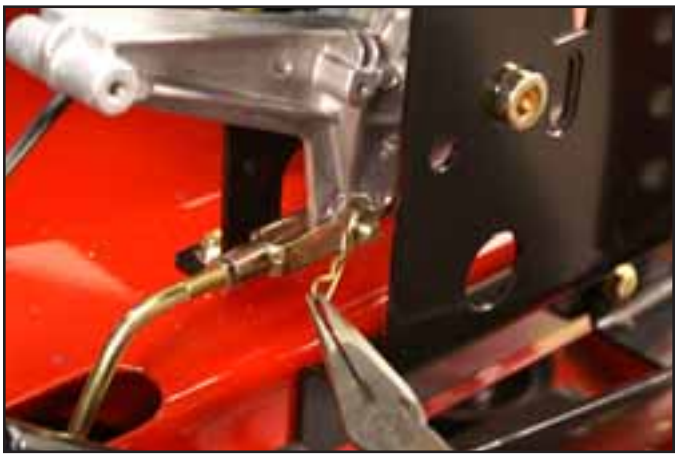

Fig. 083 PICT-9286

22. Put a 2 x 4 piece of wood under both sides of the mower deck and lower the mower to the lowest height of cut (Fig. 084).

Fig. 084 PICT-9291

23. Remove the 2 bolts and nuts that retain the lift arm assembly to the lift lever assembly (Fig. 085).

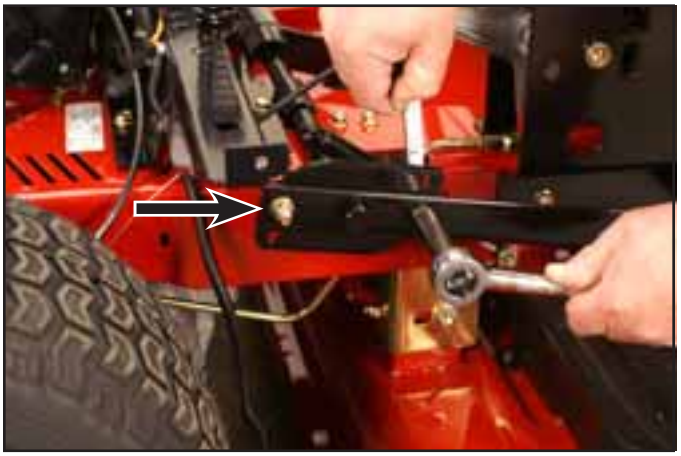

Fig. 085 PICT-9293

24. Remove the bolt, washer and nut retaining the HOC sector to the frame and remove the bolt and nut on the top that retains the HOC sector to the seat pivot/control assembly (Fig. 086).

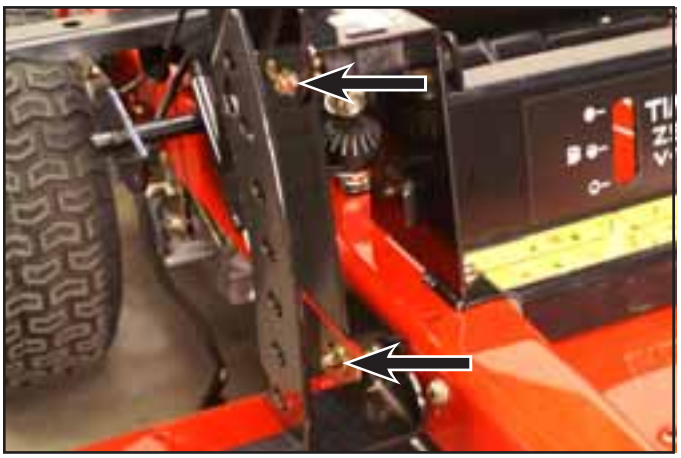

Fig. 086 PICT-9294

25. Remove the two bolts and nuts located in the front of the seat pivot/control assembly (Fig. 087).

Fig. 087 PICT-9296

26. Remove the two bolts and nuts located on the backside of the seat pivot/control assembly (Fig. 088).

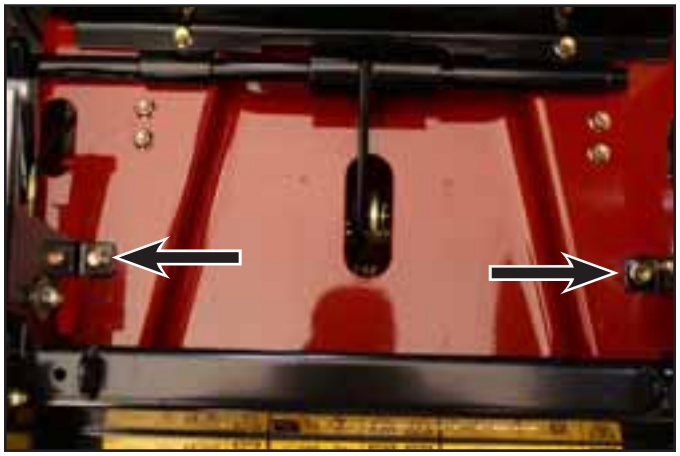

Fig. 088 PICT-9298

27. On the left side remove the 2 bolts and nuts retaining the seat pivot/control assembly to the frame (Fig. 089).

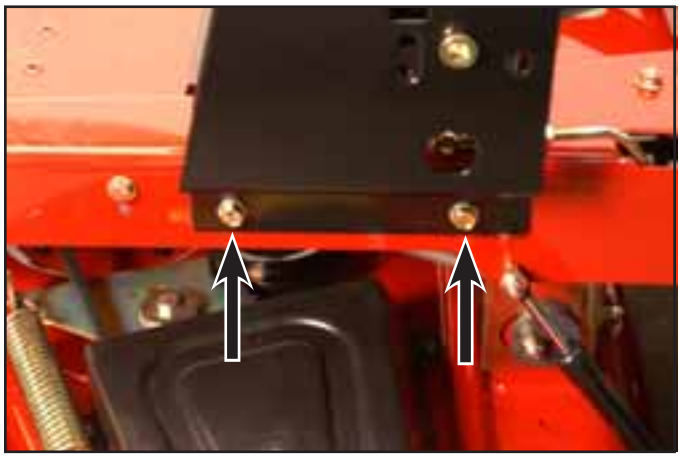

Fig. 089 PICT-9299

28. On the right side remove the remaining bolt and nut retaining the seat pivot/control assembly to the frame (Fig. 090).

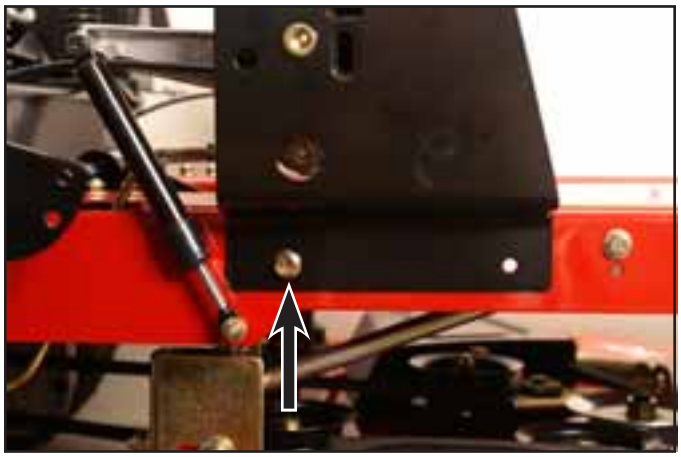

Fig. 090 PICT-9364

29. Remove the seat pivot/control assembly from the frame (Fig. 091).

Note: The right handle assembly is being removed. The left hand side is removed the same way.

Fig. 091 PICT-9301

30. Remove the two bolts and washers retaining the handle assembly to the actuator arm (Fig. 092).

Fig. 092 PICT-9310a

31. Pull back on the actuator arm and install a small punch in the hole located on the return plate (Fig. 093).

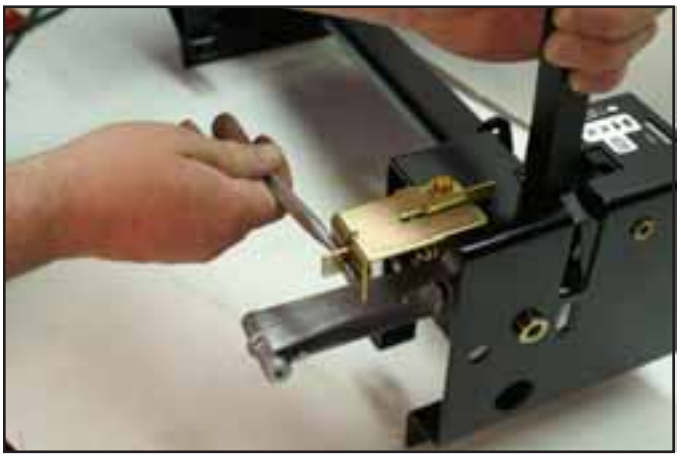

Fig. 093 PICT-9325

32. Remove the screw retaining the bracket return to the seat pivot/control assembly (Fig. 094).

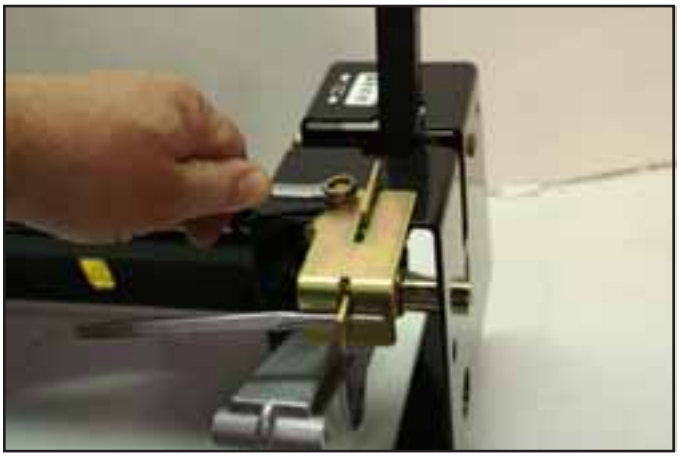

Fig. 094 PICT-9326

33. With a 1/4” Allen wrench and a 7/16” wrench, remove the nut from the end of the eccentric (Fig. 095).

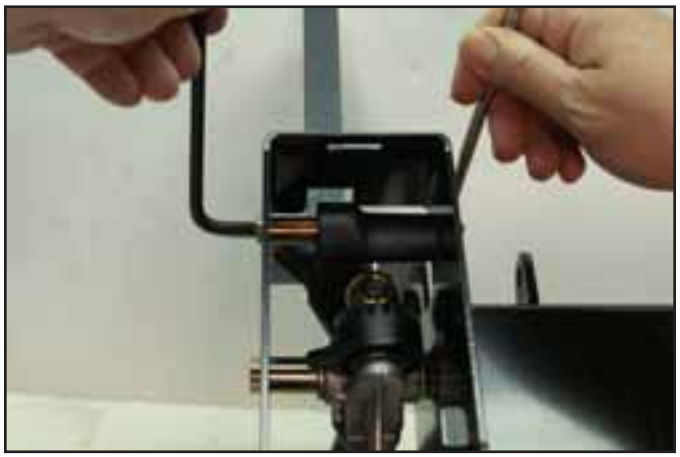

Fig. 095 PICT-9315

34. With a 3/8” Allen wrench and a 5/8” wrench, remove the nut, washer and shoulder bolt retaining the activator arm to the seat pivot/control assembly (Fig. 096).

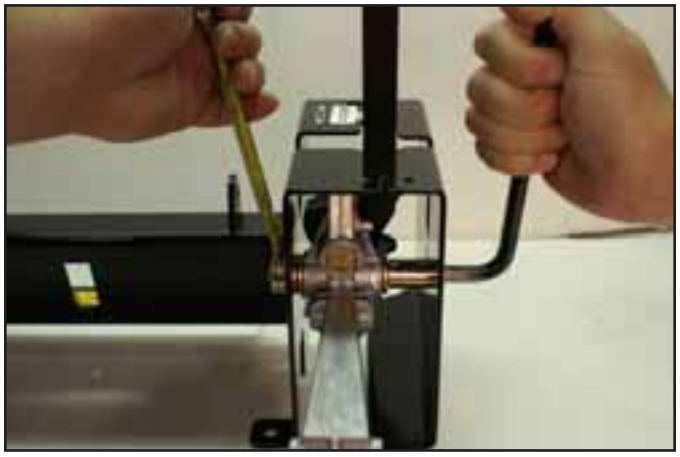

Fig. 096 PICT-9316

35. Remove the activator arm and actuator from the seat pivot/control assembly (Fig. 097).

Fig. 097 PICT-9317

Seat Pivot/Control Assembly Installation

Note: Perform the same installation on the RH and LH side.

1. Install the activator and actuator arm assembly into the seat pivot/control assembly using a shoulder bolt (Fig. 098).

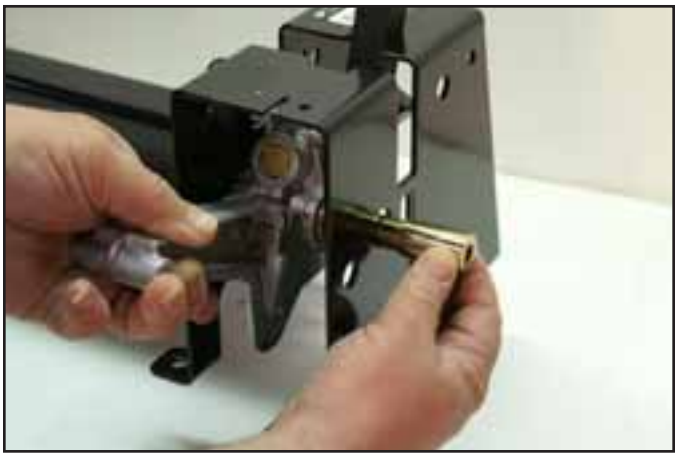

Fig. 098 PICT-9318

2. Install a washer and a nut onto the shoulder bolt and tighten (Fig. 099).

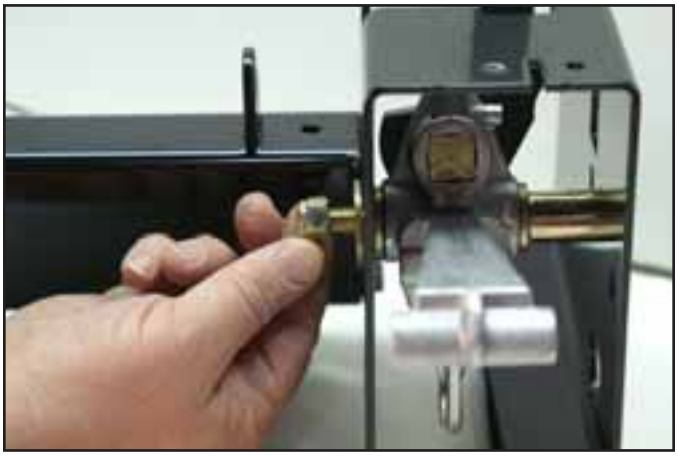

Fig. 099 PICT-9320

3. Install an eccentric screw through the eccentric. Make sure the tab of the eccentric fits into the slot on the seat pivot/control assembly (Fig. 100).

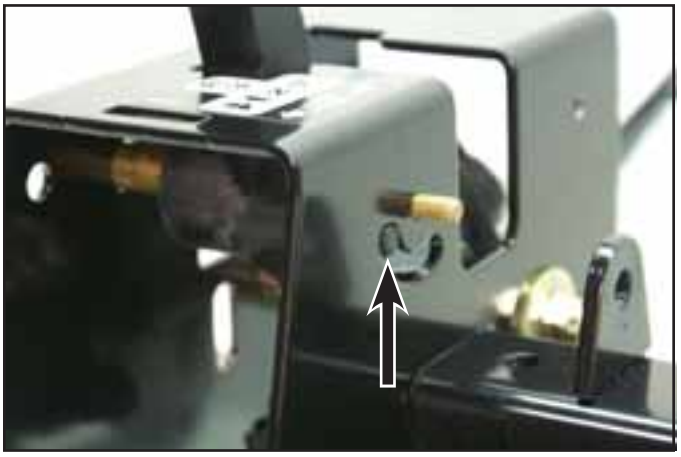

Fig. 100 PICT-9322

4. Install the nut on the eccentric screw and tighten (Fig. 101).

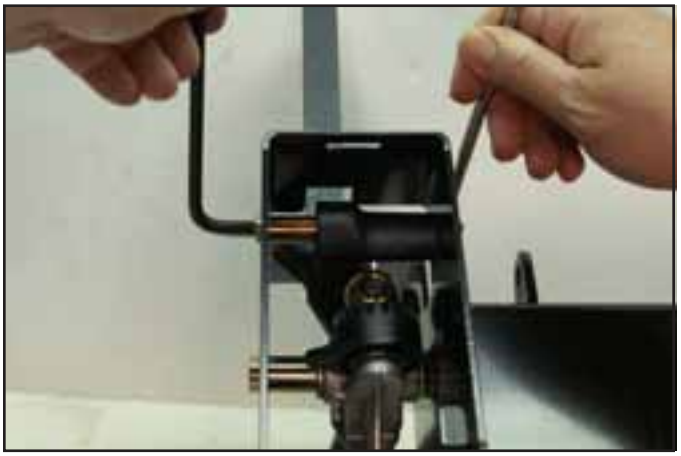

Fig. 101 PICT-9315

5. With a punch installed on the end of the return plate and spring, install the bracket return onto the seat pivot/control assembly (Fig. 102).

Fig. 102 PICT-9330

6. Install a screw through the bracket return and tighten (Fig. 103). Remove the punch from the end of the plate return.

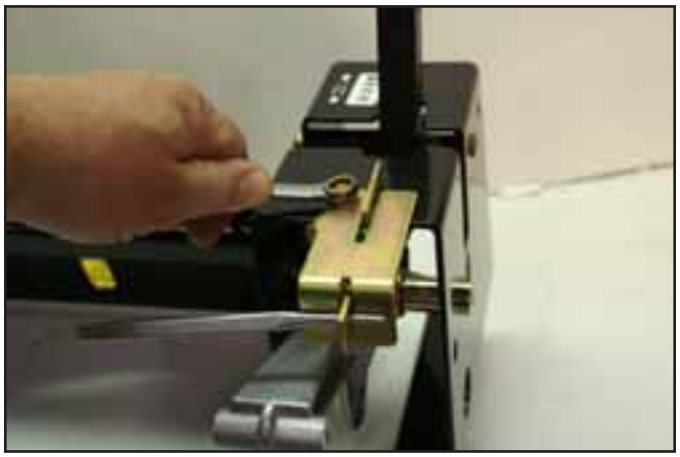

Fig. 103 PICT-9326

7. Install 2 bolts and washers in the handle assembly and the actuator arm and tighten (Fig. 104).

Fig. 104 PICT-9310a

8. Install the seat pivot/control assembly on the frame (Fig. 105).

Fig. 105 PICT-9301

9. On the right side install one bolt and nut retaining the seat pivot/control assembly to the frame; tighten the bolt and nut (Fig. 106).

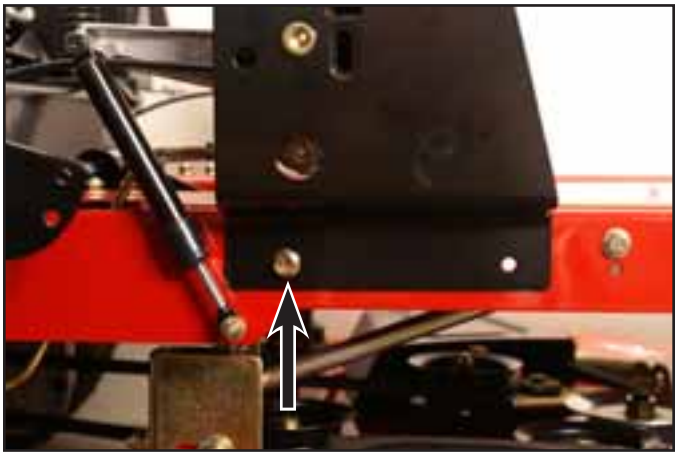

Fig. 106 PICT-9364

10. On the left side install 2 bolts and nuts retaining the seat pivot/control assembly to the frame; tighten the bolts and nuts (Fig. 107).

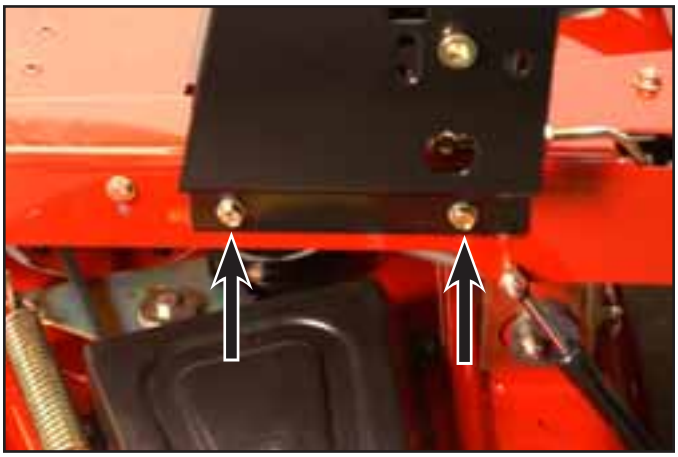

Fig. 107 PICT-9299

11. Install the two bolts and nuts located on the backside of the seat pivot/control assembly; tighten the bolts and nuts (Fig. 108).

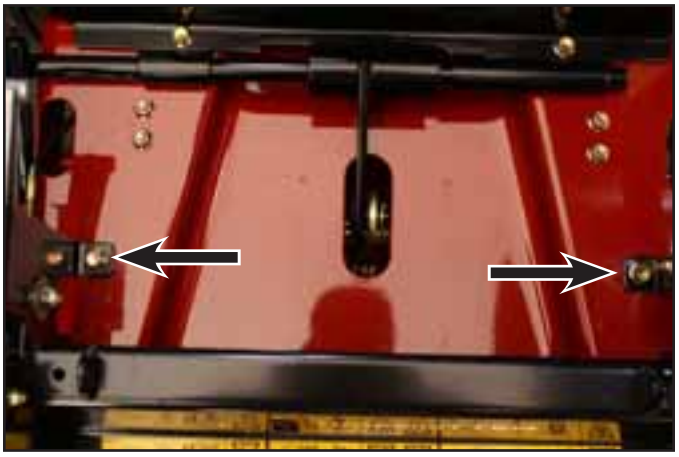

Fig. 108 PICT-9298

12. Install the two bolts and nuts located on the front of the seat pivot/control assembly; tighten the bolts and nuts (Fig. 109).

Fig. 109 PICT-9296

13. Install a bolt and nut on the top of the HOC sector and a bolt, washer and nut on the bottom of the HOC sector; tighten the bolts and nuts (Fig. 110).

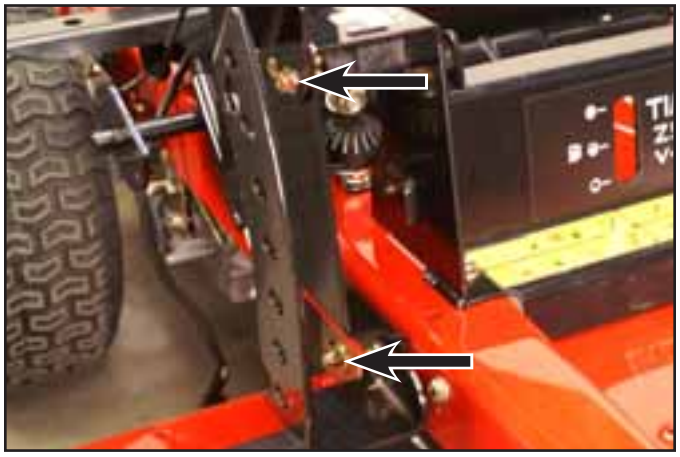

Fig. 110 PICT-9294

14. Install 2 bolts in the lift arm assembly. Note the location of the bolts, since there are four holes in the lift arm assembly (Fig. 111).

Fig. 111 PICT-9334

15. Install the lift lever assembly to the lift arm assembly and install nuts and tighten (Fig. 112).

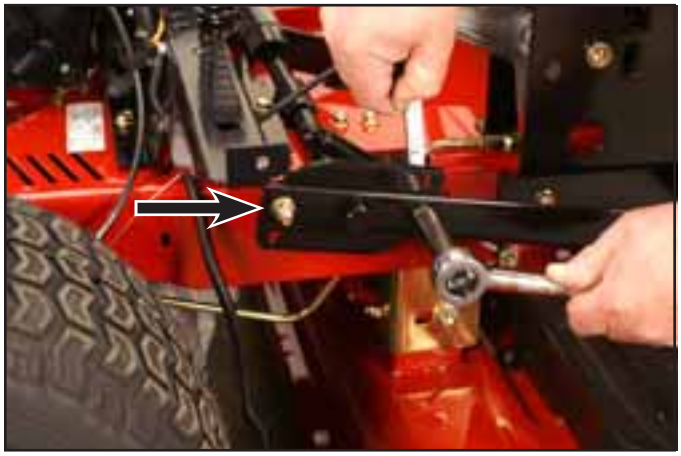

Fig. 112 PICT-9293

16. Install the clevis pins and hairpins on the adjustable yokes of the hydro links to the activator arms (Fig. 113).

Fig. 113 PICT-9340

17. Install a washer between each motion control damper and the activator arm and secure with a shoulder screw (Fig. 114).

Fig. 114 PICT-9341

18. Install the right and left neutral switch in the seat pivot/control assembly with the plunger of the switch facing up (Fig. 115).

Fig. 115 PICT-9342

Install in the slot located below the actuator arm (Fig. 116).

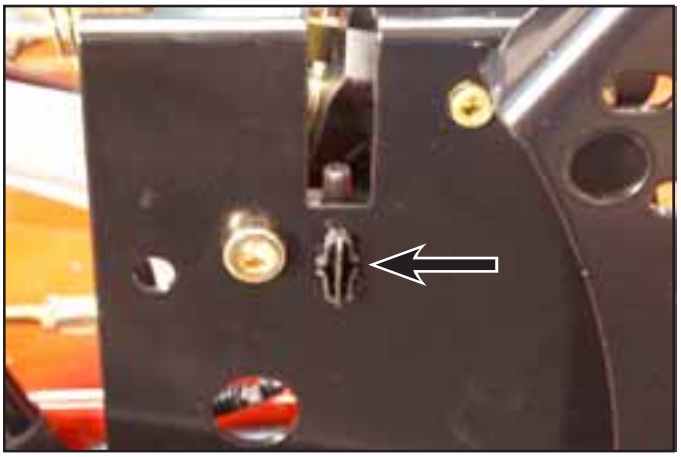

Fig. 116 PICT-9344

19. Route the parking brake cable to the inside of the motion control damper under the RH and LH activator arm assembly (Fig. 117).

Fig. 117 PICT-9346

20. Install the z-bend of the parking brake cable into the right and left gear controls (Fig. 118).

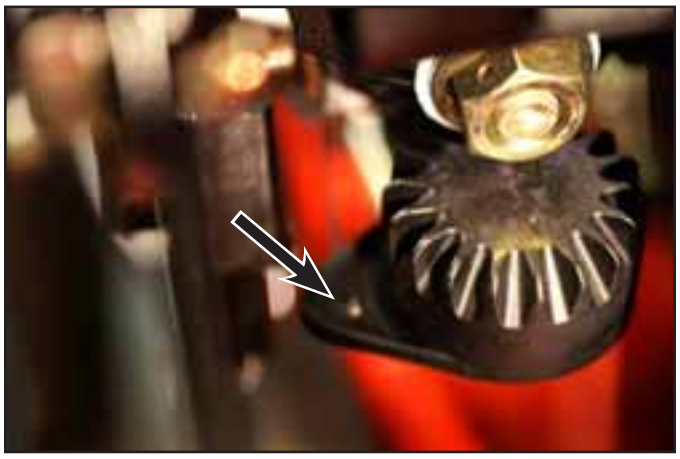

Fig. 118 PICT-9353

21. Install the right and left brake cable conduit fitting to the activator arm assembly and tighten (Fig. 119).

Fig. 119 PICT-9357

22. Check the operation of both the right and left park brake. Move the handle assembly to the neutral park position (Fig. 120).

Fig. 120 PICT-9360

23. In neutral park position, check and make sure both the right and left brake arms are dropping down on the disc brake cog (Fig. 121).

Note: Rear wheel removed for picture clarity.

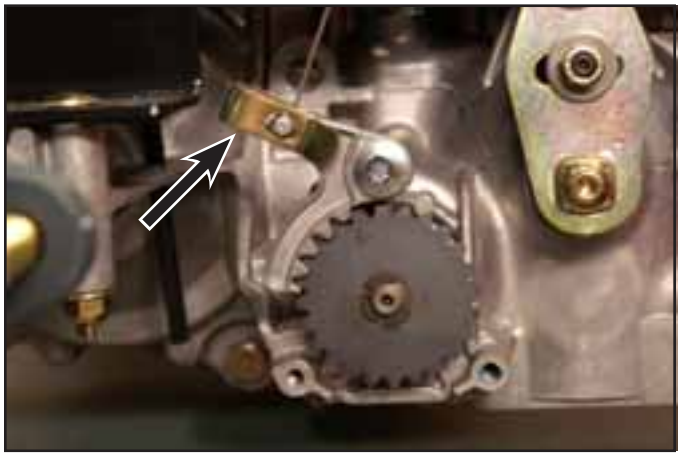

Fig. 121 PICT-9366

24. Install the right and left control covers (Fig. 122).

Fig. 122 PICT-9368

25. Install the fuel tank to the frame (Fig. 123).

Fig. 123 PICT-9265a

26. Install a cable tie through the retention tabs located on the seat pivot/control assembly (Fig. 124).

Fig. 124 PICT-9370

27. Install the right hand pod with 3 shoulder screws (Fig. 125).

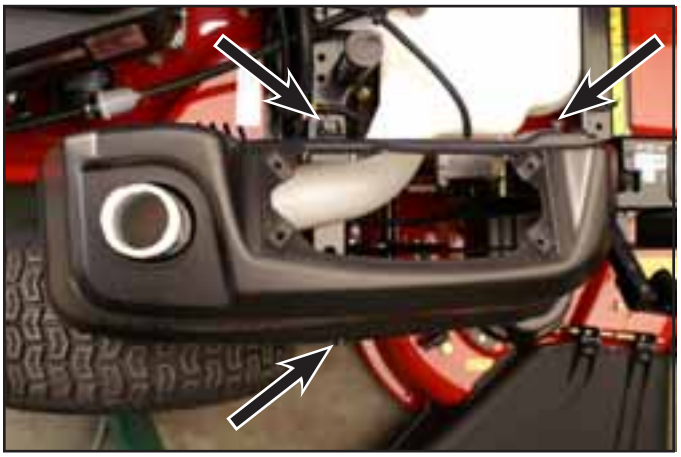

Fig. 125 PICT-9262

28. Install the rubber washer and fuel cap (Fig. 126).

Fig. 126 PICT-9226

29. Install the 4 screws retaining the control panel to the right hand pod (Fig. 127).

Fig. 127 PICT-9371

30. Install the left hand pod with 3 shoulder screws (Fig. 128).

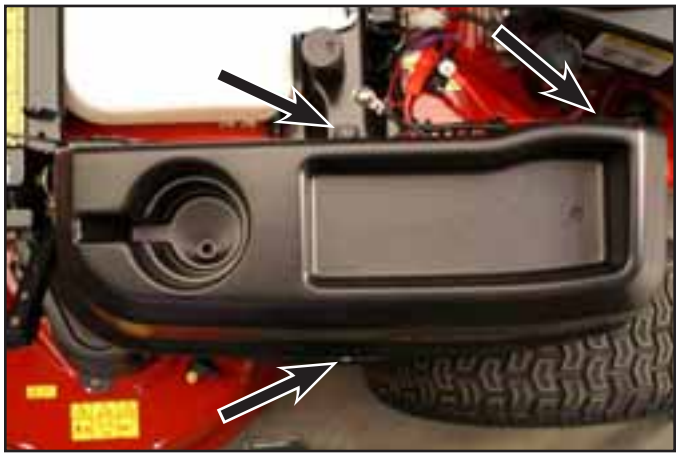

Fig. 128 PICT-9259

31. Install the two shoulder bolts and nuts retaining the seat base to the seat pivot/control assembly (Fig. 129).

Fig. 129 PICT-9257

32. Install the hairpin and clevis pin holding the retaining cable stop for the seat (Fig. 130).

Fig. 130 PICT-9256

33. Install the wire harness retainer to the seat base (Fig. 131).

Fig. 131 PICT-9251

34. Install the wire plug harness to the seat switch (Fig. 132).

Fig. 132 PICT-9246

35. Install the negative battery cable to the battery (Fig. 133).

Fig. 133 PICT-9219

36. Test operate the unit to make sure all the safety devices operate properly.

37. Check the neutral adjustment. If an adjustment is needed, see “Neutral Adjustment” on page 5-25.

Deck Lift & Seat/Pods Bracket Replacement

Deck Lift & Seat/Pods Bracket Removal

1. Remove the negative battery cable from the battery (Fig. 134).

Fig. 134 PICT-9219

2. Remove the mower deck; see “Mower Deck Removal” on page 6-12.

3. Remove the 3 shoulder screws retaining the left hand pod to the frame (Fig. 135).

Fig. 135 IMG-0457a

4. Remove the left hand pod from the unit. (Fig. 136).

Fig. 136 PICT-9260

5. Remove the four screws on the control panel and move the control panel away from the pod (Fig. 137).

Fig. 137 PICT-9225

6. Remove the fuel cap and the rubber washer.

7. Remove the 3 shoulder screws retaining the right hand pod to the frame (Fig. 138).

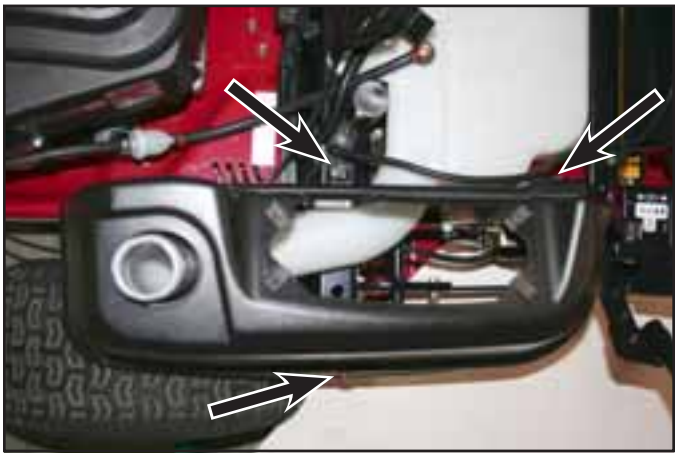

Fig. 138 IMG-0455a

8. Remove the right hand pod from the frame (Fig. 139).

Fig. 139 PICT-9232

9. Remove the wire plug of the harness from the seat switch (Fig. 140).

Fig. 140 PICT-9246

10. Remove the wire harness retainer located on the seat base (Fig. 141).

Fig. 141 PICT-9251

11. Cut and remove the cable tie running through the retention tabs located on the seat/pods bracket (Fig. 142).

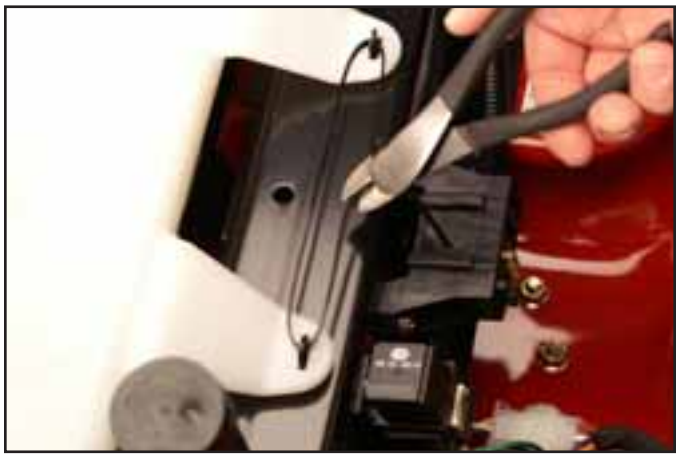

Fig. 142 PICT-9235

12. Remove the fuel tank from the frame (Fig. 143).

Fig. 143 PICT-9265a

13. Remove the battery positive cable from the battery.
14. Remove the battery hold down and remove the battery from the battery tray (Fig. 144).

Fig. 144 PICT-9372

15. Remove the screw from the battery tray and the seat/pods bracket. Remove the bolt and nut from the frame (Fig. 145).

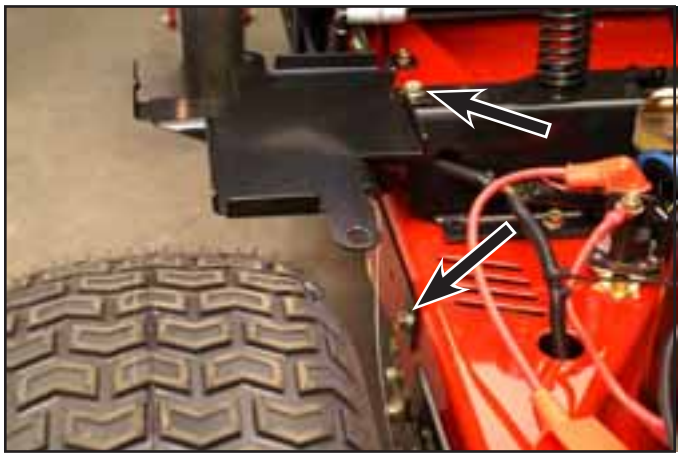

Fig. 145 PICT-9377

16. Remove the right and left neutral safety switches by pushing the clip that retains the neutral switch to the seat pivot/control assembly (Fig. 146).

Fig. 146 PICT-9379

17. Remove the neutral switch from the wiring harness (Fig. 147).

Fig. 147 PICT-9382

18. Remove the left and right spring clip retaining the brake cable to the brake arm (Fig. 148).

Note: Rear wheel removed for the picture clarity.

Fig. 148 PICT-9385

19. Remove the brake cable conduit fitting located on the right and left side of the seat/pods bracket (Fig. 149).

Fig. 149 PICT-9386

20. Remove the cotter pin and washer from the lift lever assembly (Fig. 150).

Fig. 150 PICT-9392

21. Remove the 4 bolts and nuts retaining the seat/pods bracket to the frame (Fig. 151).

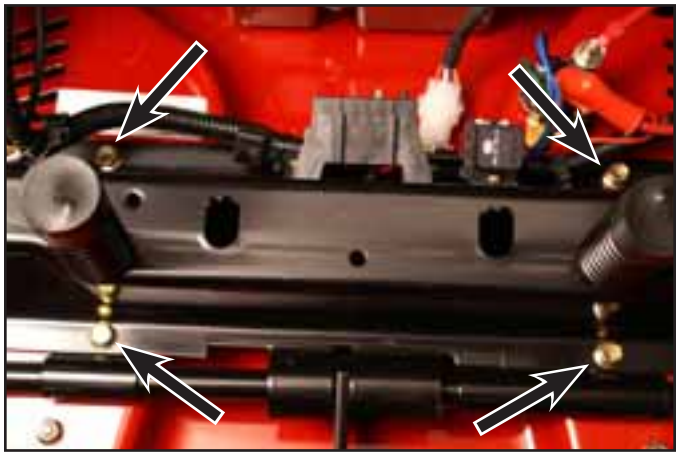

Fig. 151 PICT-9400

22. Pull the neutral wiring harness out of the hole located on the backside of the seat/pods bracket. There is one on the left side and one on the right side (Fig. 152).

Fig. 152 PICT-9465a

23. Unplug the relay from the harness (Fig. 153).

Fig. 153 PICT-9413

24. Remove the screw from the relay base and remove the base from the seats/pods bracket (Fig. 154).

Fig. 154 PICT-9417

25. Remove the two screws retaining the fuse block to the seats/pods bracket (Fig. 155).

Fig. 155 PICT-9419

26. Open the wire harness clamp located on the right side of the seat/pods bracket and remove the wire harness (Fig. 156).

Fig. 156 PICT-9422

27. Open the wire harness clamp located on the left side of the seat/pods bracket and remove the wire harness (Fig. 157).

Fig. 157 PICT-9423

28. Remove the seat/pods bracket from the frame (Fig. 158).

Fig. 158 PICT-9425

29. Remove the lift plate from the frame (Fig. 159).

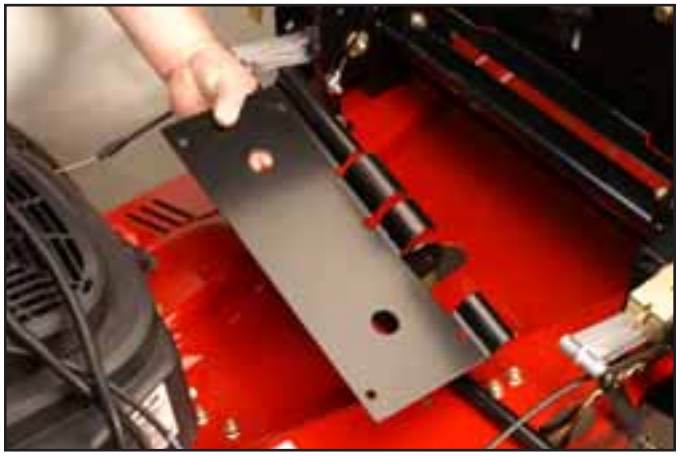

Fig. 159 PICT-9429

30. Remove the two bolts and nuts retaining the lift arm assembly to the lift lever assembly (Fig. 160).

Fig. 160 PICT-9430

31. Remove the lift lever assembly from the lift link (Fig. 161).

Fig. 161 PICT-9435

Deck Lift & Seat/Pods Bracket Installation

1. Install the lift lever assembly to the lift link (Fig. 162).

Fig. 162 PICT-9436

2. Install the two bolts through the lift lever assembly. Note the bolt location in the lift lever assembly (Fig. 163).

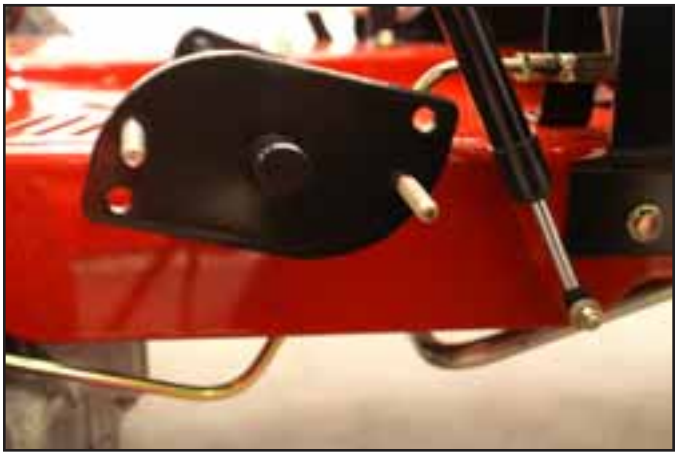

Fig. 163 PICT-9438

3. Install the bolts and nuts to the lift arm assembly and the lift lever assembly and tighten (Fig. 164).

Fig. 164 PICT-9430

4. Install the lift plate to the frame (Fig. 165).

Fig. 165 PICT-9439

5. Install the seat/pods bracket to the frame (Fig. 166).

Fig. 166 PICT-9425

6. Install the two screws in the fuse block to the seat/pods bracket (Fig. 167).

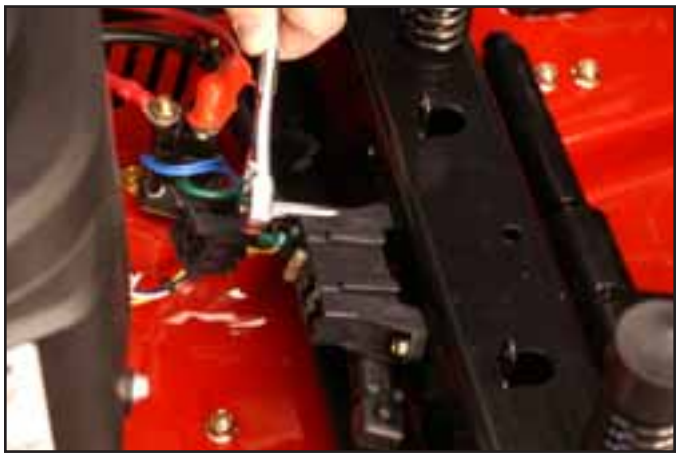

Fig. 167 PICT-9440

7. Install the relay base with one screw and tighten it down to the seat/pods bracket (Fig. 168).

Fig. 168 PICT-9441a

8. On the left side of the seat/pods bracket install the wiring harness into the wire clamp (Fig. 169).

Fig. 169 PICT-9442

9. Install the throttle/choke cable and the wiring harness in the wire clamp located on the right side of the seat/pods bracket (Fig. 170).

Fig. 170 PICT-9443

10. Plug the relay into the relay base (Fig. 171).

Fig. 171 PICT-9445

11. Install the right and left neutral wiring harnesses through the hole on the back side of the seat/pods bracket (Fig. 172).

Fig. 172 PICT-9465a

12. Install the 4 bolts and washers that retain the seat/pods bracket to the frame (Fig. 173).

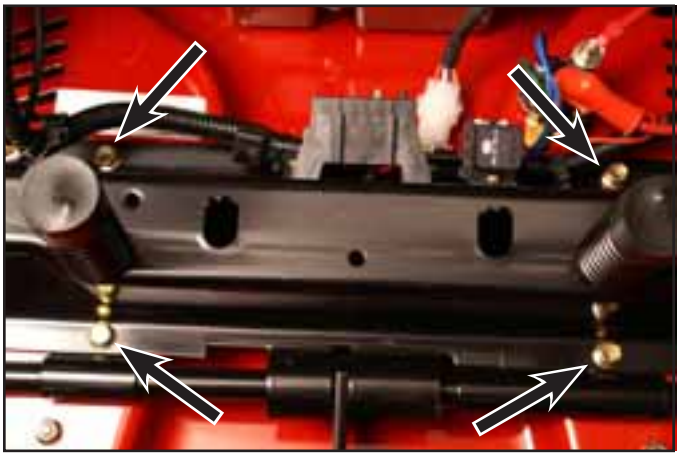

Fig. 173 PICT-9400

13. Install the washer and cotter pin on the lift lever assembly (Fig. 174).

Fig. 174 PICT-9392

14. On the left and right side, install the brake cable through the hole located in the seat/pods bracket and push until the brake cable conduit fitting locks into the hole (Fig. 175).

Fig. 175 PICT-9449

15. Install the brake cable eyelet to the brake arm and install the spring clip (Fig. 176).

Fig. 176 PICT-9385

16. Install the neutral switches in the right and left wiring harnesses (Fig. 177).

Fig. 177 PICT-9382

17. Route the left and right neutral switches, with harness attached, and clip them into the side of the seat pivot/control assembly (Fig. 178).

Fig. 178 PICT-9379

18. Install the battery tray to the seat/pods bracket with a screw, bolt and nut to the frame (Fig. 179).

Fig. 179 PICT-9377

19. Install the battery to the battery tray with the battery hold down (Fig. 180).

Fig. 180 PICT-9372

20. Install the positive battery cable to the battery.

21. Install the fuel tank to the frame (Fig. 181).

Fig. 181 PICT-9452

22. Install cable tie through the retention tabs located on the seat/pods bracket (Fig. 182).

Fig. 182 PICT-9370

23. Install the wire seat switch harness retainer to the hole located on the seat base (Fig. 183).

Fig. 183 PICT-9251

24. Install the seat switch wiring harness plug to the seat switch (Fig. 184).

Fig. 184 PICT-9246

25. Install the right hand pod to the frame (Fig. 185).

Fig. 185 PICT-9454

26. Install the 3 shoulder screws into the right hand pod and tighten (Fig. 186).

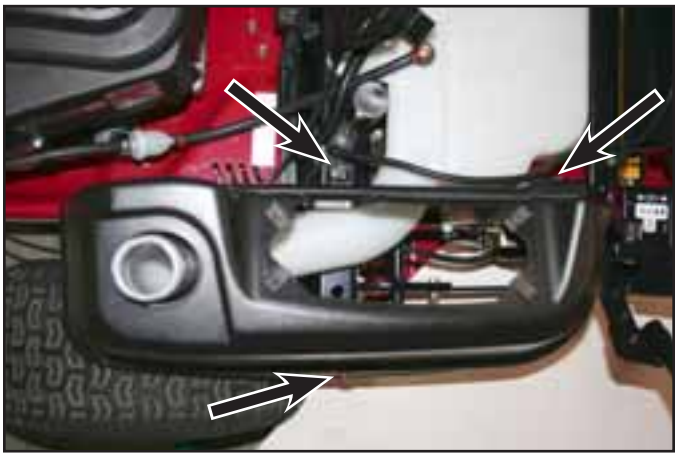

Fig. 186 IMG-0455a

27. Install the rubber washer around the fuel fill tube and install the fuel cap.

28. Install the four screws in the control panel to the right hand pod and tighten (Fig. 187).

Fig. 187 PICT-9456

29. Install the left pod onto the frame (Fig. 188).

Fig. 188 PICT-9457

30. Install the 3 shoulder screws that retain the left hand pod to the frame and tighten (Fig. 189).

Fig. 189 IMG-0457a

31. Install the mower deck; see “Mower Deck Installation” on page 6-13.

32. Install the negative battery cable to the battery (Fig. 190).

Fig. 190 PICT-9219

Arm-Lift, Rear, Replacement

Arm-Lift, Rear, Removal

1. Remove the negative battery cable from the battery (Fig. 191).

Fig. 191 PICT-9219

2. Remove the mower deck; see “Mower Deck Removal” on page 6-12.

3. Remove the four screws on the control panel and move the control panel away from the pod (Fig. 192).

Fig. 192 PICT-9225

4. Remove the fuel cap and the rubber washer from the fuel fill tube.

5. Remove the 3 shoulder screws retaining the right hand pod to the frame (Fig. 193).

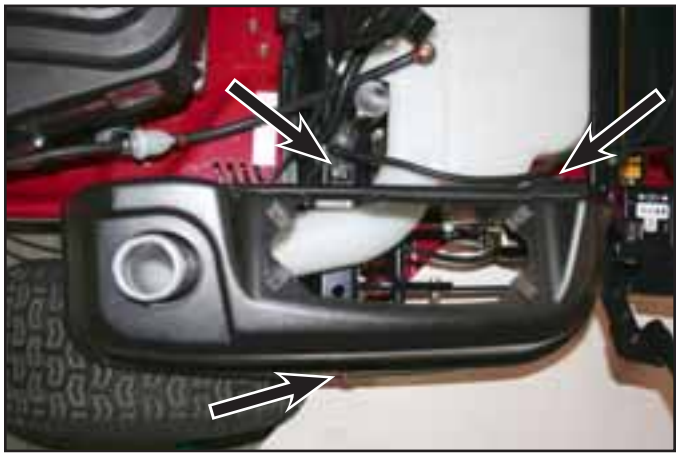

Fig. 193 IMG-0455a

6. Remove the right hand pod from the frame (Fig. 194).

Fig. 194 PICT-9232

6. Remove the wire plug on the wire harness from the seat switch (Fig. 195).

Fig. 195 PICT-9246

7. Remove the wire harness retainer located on the seat base (Fig. 196).

Fig. 196 PICT-9251

8. Cut and remove the cable tie running through the retention tabs located on the seat/pods bracket (Fig. 197).

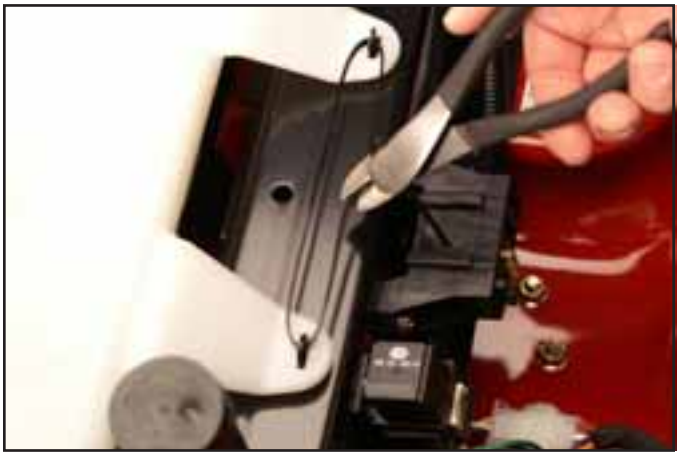

Fig. 197 PICT-9235

9. Remove the fuel tank from the frame (Fig. 198).

Fig. 198 PICT-9265a

10. Remove the cotter pin and washer from the lift lever assembly (Fig. 199).

Fig. 199 PICT-9392

11. Remove the bolt, washer and nut retaining the pivot block for the arm-lift on either the right or left side of the frame (Fig. 200). Loosen the bolt, washer, and nut on the other side.

Fig. 200 PICT-9467

12. Remove the arm-lift from the frame (Fig. 201).

Fig. 201 PICT-9472

13. Remove the pivot block located on the other side of the frame.

Arm-Lift, Rear, Installation

1. Loosely install the pivot block with the round tab (Fig. 202) into the hole located below the bolt, washer, and nut to the frame (Fig. 203).

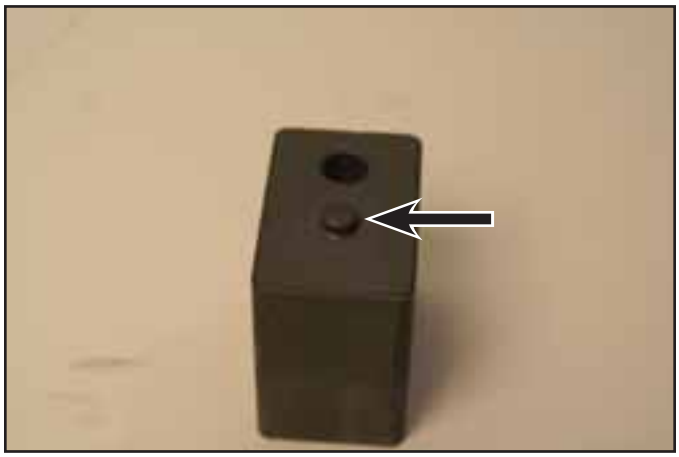

Fig. 202 PICT-9478a

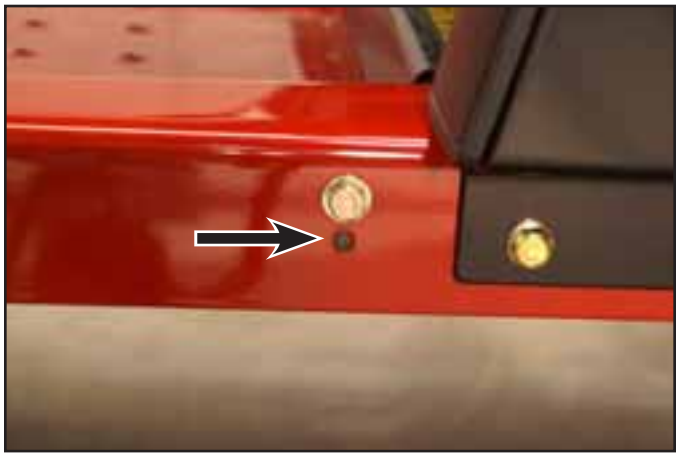

Fig. 203 PICT-9481

2. Install the end of the arm-lift into the pivot block (Fig. 204) and install the other pivot block to the other side of the frame (Fig. 205). Tighten both pivot blocks to the frame.

Fig. 204 PICT-9467

Fig. 205 PICT-9480

3. Install the lift link of the arm-lift to the lift lever assembly with washer and cotter pin (Fig. 206).

Fig. 206 PICT-9392

4. Install the fuel tank to the frame (Fig. 207).

Fig. 207 PICT-9265a

5. Install a cable tie through the retention tabs located on the seat/pods bracket (Fig. 208).

Fig. 208 PICT-9238

6. Install the wire harness retainer to the seat base (Fig. 209).

Fig. 209 PICT-9251

7. Install the wire plug on the wire harness to the seat switch (Fig. 210).

Fig. 210 PICT-9246

8. Install the right hand pod to the frame (Fig. 211).

Fig. 211 PICT-9240

9. Install the 3 shoulder screws that retain the right hand pod to the frame (Fig. 212).

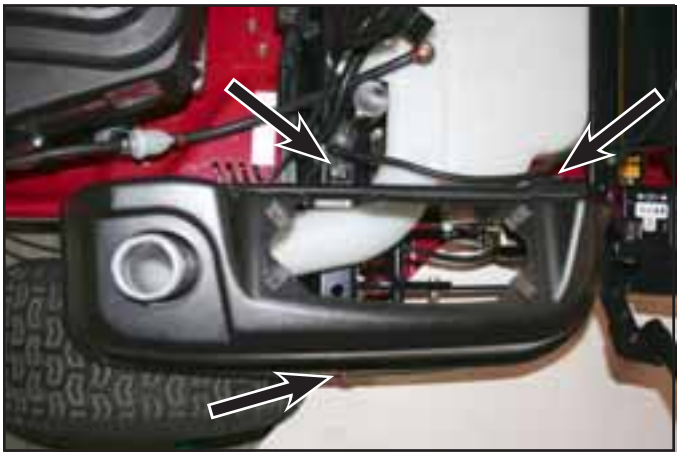

Fig. 212 IMG-0455a

10. Install the rubber washer and fuel cap to the fuel tank fill tube (Fig. 213).

Fig. 213 PICT-9226

11. Install the control panel to the right hand pod using 4 screws and tighten (Fig. 214).

Fig. 214 PICT-9241

12. Install the mower deck; see “Mower Deck Installation” on page 6-13.

13. Install the negative battery cable to the battery (Fig. 215).

Fig. 215 PICT-9219

Rear Bumper Replacement

Rear Bumper Removal

1. Remove the 4 bolts, washers and nuts (Fig. 216).

Fig. 216 PICT-9484

2. Remove rear bumper from the frame (Fig. 217).

Fig. 217 PICT-9492

Rear Bumper Installation

1. Install the rear bumper to the frame (Fig. 218).

Fig. 218 PICT-9492

2. Install washers under each bolt head. On the two outside bolts, install a large hardened washer between the bolt and the nut; the other two bolts use regular washers. Tighten all 4 bolts, washers and nuts (Fig. 219).

Fig. 219 PICT-9484

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Engine Replacement

Engine Removal

1. Remove the negative battery cable from the battery.

2. Release the mower drive belt tension and remove the mower drive belt from the electric PTO clutch (Fig. 220).

Fig. 220 PICT-9493

3. Remove the plug connector from the electric PTO clutch (Fig. 221).

Fig. 221 PICT-9500a

4. Remove the bolt retaining the electric PTO clutch to the engine crankshaft (Fig. 222).

Fig. 222 PICT-9502a

5. Remove the electric PTO clutch from the crankshaft (Fig. 223).

Fig. 223 PICT-9504

6. Release the spring tension on the idler arm using a spring tool (Toro p/n 92-5771). Remove the drive belt from the engine pulley (Fig. 224).

Fig. 224 PICT-9506

7. Remove the engine drive pulley from the crankshaft of the engine (Fig. 225).

Fig. 225 PICT-9509

8. Remove the two screws retaining the heat shield to the muffler (Fig. 226).

Fig. 226 PICT-9510a

9. Remove the heat shield from the muffler (Fig. 227).

Fig. 227 PICT-9511a

10. Remove the 4 engine bolts going through the hydro-supports of the frame and up into the engine block (Fig. 228).

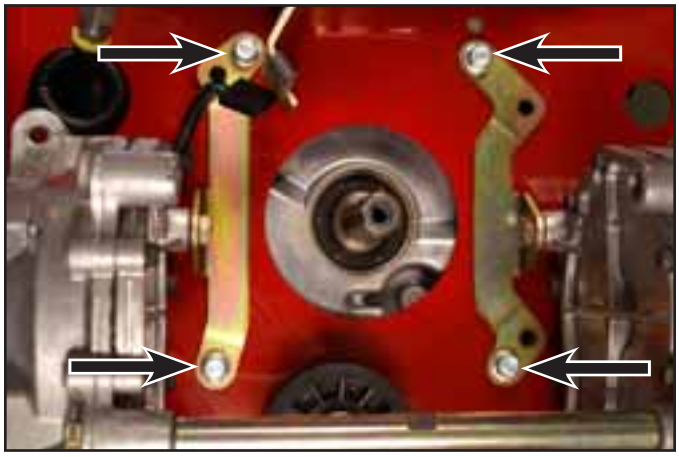

Fig. 228 PICT-9514

11. Remove the hose clamp by the fuel filter and remove the fuel line (Fig. 229).

Fig. 229 PICT-9515

12. Loosen the throttle/choke cable clamp screw and remove the cable (Fig. 230).

Fig. 230 PICT-9517a

13. Remove the z-bend of the throttle/choke cable from the engine control assembly (Fig. 231).

Fig. 231 PICT-9520

14. Remove the engine wire harness plug (Fig. 232).

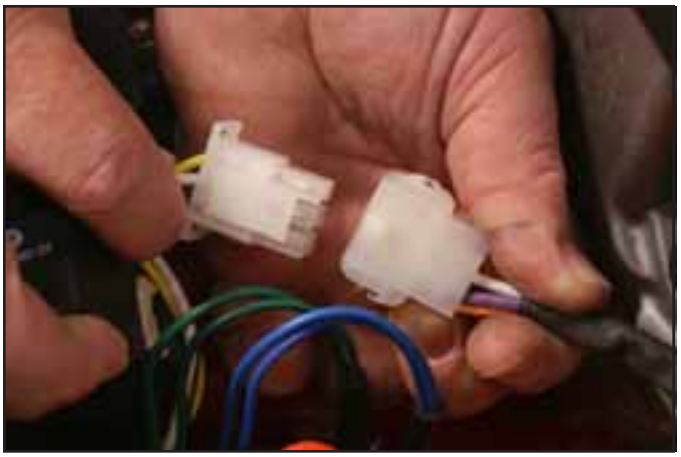

Fig. 232 PICT-9522a

15. Remove the positive starter cable from the bottom of the starter (Fig. 233).

Fig. 233 PICT-9523

16. Remove the negative battery cable and the negative wire from the wiring harness from the top of the starter (Fig. 234).

Fig. 234 PICT-9525

17. Raise the engine off the frame (Fig. 235).

Fig. 235 PICT-9529

Engine Installation

1. Install the engine into the frame (Fig. 236).

Fig. 236 PICT-9529

2. Make sure when lowering the engine that the engine oil drain tube is routed through the hole in the frame (Fig. 237).

Fig. 237 PICT-9530

3. Install the negative battery cable and the negative wire to the wiring harness to the top of the starter terminal (Fig. 238).

Fig. 238 PICT-9525

4. Install the positive starter cable to the bottom of the engine starter (Fig. 239).

Fig. 239 PICT-9523

5. Plug the engine wire harness into the main wiring harness (Fig. 240).

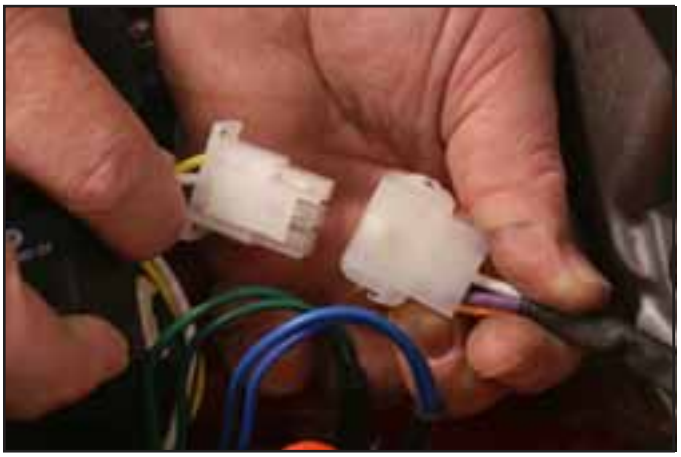

Fig. 240 PICT-9522a

6. Install the z-bend of the throttle/choke cable into the middle hole of the engine linkage (Fig. 241).

Fig. 241 PICT-9520

7. Install the throttle/choke cable into the cable clamp, before tightening the clamp, make sure the throttle control is in the low idle setting (Fig. 242). Also, make sure the throttle linkage on the engine carburetor is pushed to far left stop position (Fig. 243). Tighten the clamp.

Fig. 242 PICT-9534

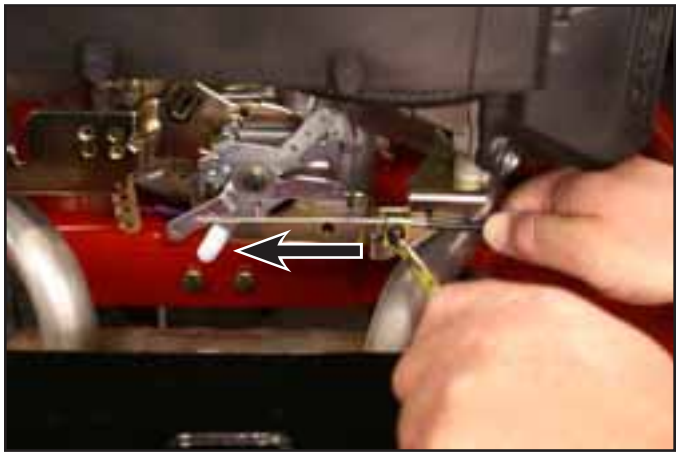

Fig. 243 PICT-9532

8. Install the fuel line onto the fuel filter and install the hose clamp (Fig. 244).

Fig. 244 PICT-9515

9. Install the 4 engine mounting bolts through the hydro-supports of the frame and into the engine (Fig. 245). Torque the engine bolts to 400 – 500 in-lbs. (33.3 – 41.6 Nm) (Fig. 246).

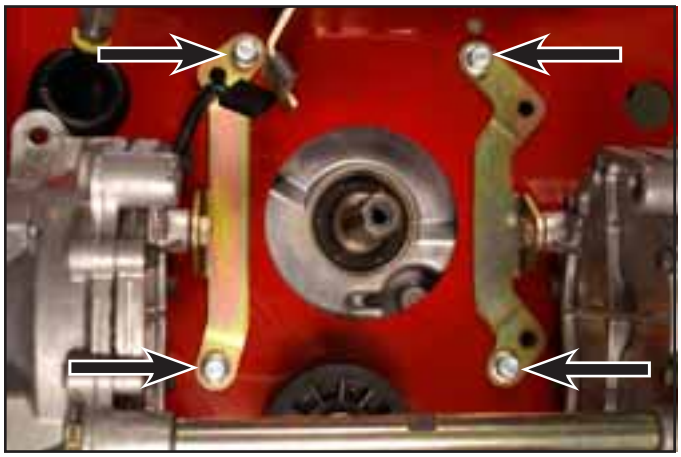

Fig. 245 PICT-9514

Fig. 246 PICT-9537

10. Install the 2 screws retaining the heat shield to the muffler (Fig. 247).

Fig. 247 PICT-9510a

11. Apply anti-seize lubricant to the engine crankshaft (Fig. 248).

Fig. 248 PICT-9538

12. Install the engine drive pulley. Make sure side of the pulley stamped “clutch side” is facing down toward the electric PTO clutch (Fig. 249).

Fig. 249 PICT-9509

13. Install the drive belt around the engine drive pulley by releasing the spring tension on the idler arm. Make sure the belt is routed around both transmission pulleys, around the two flat idler pulleys and then around the engine drive pulley (Fig. 250).

Fig. 250 PICT-9506

14. Apply medium strength thread-locking material to the threads of the clutch bolt before installing (Fig. 251).

Fig. 251 PICT-9544a

15. Install the electric PTO clutch onto the crankshaft. Make sure the slot of the PTO clutch engages with the clutch stop bracket (Fig. 252).

Fig. 252 PICT-9548

16. Torque the electric PTO clutch bolt to 50 – 60 ft-lbs. (67.8 – 81.3 Nm), while holding the center hub of the clutch (Fig. 253).

Fig. 253 PICT-9550

17. Install the plug connector into the electric PTO clutch (Fig. 254).

Fig. 254 PICT-9500a

18. Release the mower arm tension and install the mower drive belt onto the electric PTO clutch (Fig. 255).

Fig. 255 PICT-9493

19. Connect the negative battery cable to the battery.

Engine Muffler Replacement

Engine Muffler Removal

1. Remove the two screws retaining the muffler heat shield to the muffler (Fig. 256).

Fig. 256 PICT-9510

2. Remove the 4 screws, washers and 2 gaskets retaining the muffler to the engine (Fig. 257 - LH and Fig. 258 - RH).

Fig. 257 PICT-9560

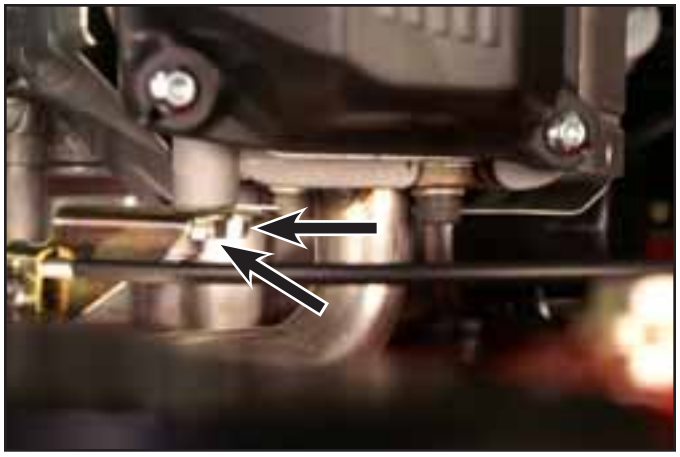

Fig. 258 PICT-9562

3. Remove the muffler from the engine (Fig. 259).

Fig. 259 PICT-9552

Engine Muffler Installation

Reinstall the muffler in reverse order.

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Hydro Drive Belt Replacement

Hydro Drive Belt Removal

1. Disconnect the negative battery cable from the battery.

2. Raise the rear end of the unit and place jack stands under the frame (Fig. 260).

Note: The rear wheels have been removed for picture clarity.

Fig. 260 PICT-9580

3. Remove the mower drive belt from the electric PTO clutch by releasing the belt tension at the mower deck idler arm (Fig. 261).

Fig. 261 PICT-9564

4. Remove the plug connector from the electric PTO clutch (Fig. 262).

Fig. 262 PICT-9500a

5. Remove the bolt retaining the electric PTO clutch to the engine crankshaft (Fig. 263).

Fig. 263 PICT-9502a

6. Remove the electric PTO clutch from the crankshaft (Fig. 264).

Fig. 264 PICT-9504

7. Release the spring tension on the idler arm using a spring tool (Toro p/n 92-5771). Remove the hydro drive belt from the engine drive pulley (Fig. 265).

Fig. 265 PICT-9506

8. Remove the engine drive pulley from the engine crankshaft (Fig. 266).

Fig. 266 PICT-9509

9. Remove the drive belt by first slipping it under the fixed idler pulley located on the right hand side (Fig. 267).

Fig. 267 PICT-9566

10. Next, slip the drive belt over the spring loaded idler (Fig. 268).

Fig. 268 PICT-9577

11. Remove the drive belt over the top of both the right and left transaxle drive pulleys and fans (Fig. 269).

Fig. 269 PICT-9575

Drive Belt Installation

Hydro drive belt routing (Fig. 270):

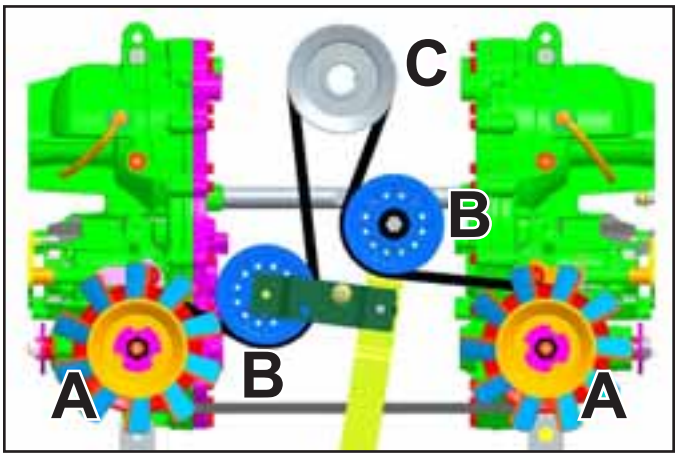

Fig. 270 matrix hydro belt routing

A. Transaxle pulleys
B. Idler pulleys
C. Engine pulley

1. Route the drive belt over the right and left transaxle fans and around the drive pulleys (Fig. 271).

Fig. 271 PICT-9575

2. From the left transaxle pulley, route the belt over the top of the spring loaded idler pulley and place the backside of the belt around the pulley (Fig. 272).

Fig. 272 PICT-9577

3. On the right side, route the belt from the transaxle pulley, under the fixed idler pulley and place the backside of the belt around the pulley (Fig. 273).

Fig. 273 PICT-9566

4. Apply anti-seize lubricant to the engine crankshaft (Fig. 274).

Fig. 274 PICT-9538

5. Install the engine drive pulley; note the pulley is stamped with the words “clutch side”. Make sure the clutch side of the pulley is facing down toward the electric PTO clutch (Fig. 275).

Fig. 275 PICT-9509

6. Install the drive belt around the engine drive pulley by releasing the spring tension on the idler arm. Make sure the belt is routed around transmission pulleys, around the two flat idler pulleys and then around the engine drive pulley (Fig. 276).

Fig. 276 PICT-9506

7. Apply a medium strength thread-locking material to the threads of the clutch bolt before installing (Fig. 277).

Fig. 277 PICT-9544a

8. Install the electric PTO clutch on the crankshaft. Make sure the slot of the PTO clutch engages with the stop bracket (Fig. 278).

Fig. 278 PICT-9548

9. While holding the center hub of the clutch, torque the electric PTO clutch bolt to 50 – 60 ft-lbs. (68 – 81 Nm) (Fig. 279).

Fig. 279 PICT-9550

10. Connect the wiring harness plug to the electric PTO clutch (Fig. 280).

Fig. 280 PICT-9500a

11. Install the mower drive belt on the electric PTO clutch by releasing the spring tension on the mower deck idler bracket (Fig. 281).

Fig. 281 PICT-9493

12. Remove the jack stands and lower the unit to the ground.

13. Install the negative battery cable to the battery.

Transaxle Replacement

Note: These instructions show the removal and installation of the left side transaxle. The same procedure is used to remove and install the right side transaxle.

Transaxle Removal

1. Disconnect the negative battery cable from the battery.

2. Raise the rear of the unit and install jack stands under the rear of the frame.

3. Remove the left side tire and wheel assembly (Fig. 282).

Fig. 282 PICT-9580

4. Release the spring tension on the idler arm assembly and remove the belt from the fixed idler pulley by pulling the belt under the pulley (Fig. 283).

Fig. 283 PICT-9644

Hydro drive belt routing (Fig. 284):

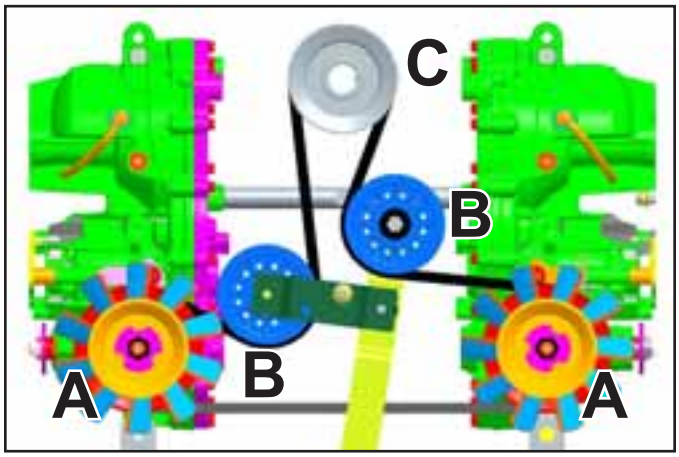

Fig. 284 matrix hydro belt routing

A. Transaxle pulleys
B. Idler pulleys
C. Engine pulley

5. Remove the drive belt by slipping it over the top of the idler arm pulley (Fig. 285).

Note: This will allow enough slack to permit slipping the drive belt over the transaxle pulley and fan on the transaxle.

Fig. 285 PICT-9643

6. Remove the spring clip retaining the brake cable to the brake arm (Fig. 286).

Fig. 286 PICT-9581

7. Remove the brake cable from the brake arm (Fig. 287).

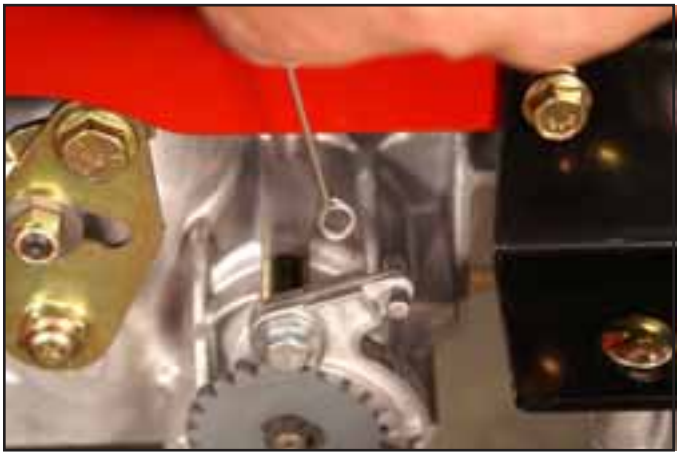

Fig. 287 PICT-9588

8. Remove the bolt and nut retaining the hydro link to the control arm (Fig. 288).

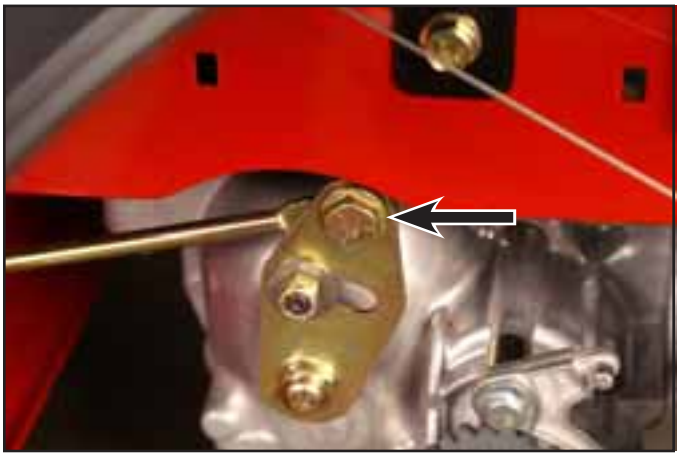

Fig. 288 PICT-9589

9. Remove the hairpin cotter and washer retaining the bypass rod to the bypass arm on the transaxle (Fig. 289).

Fig. 289 PICT-9591

10. Remove the bolt and nut located on the hydro-support (Fig. 290).

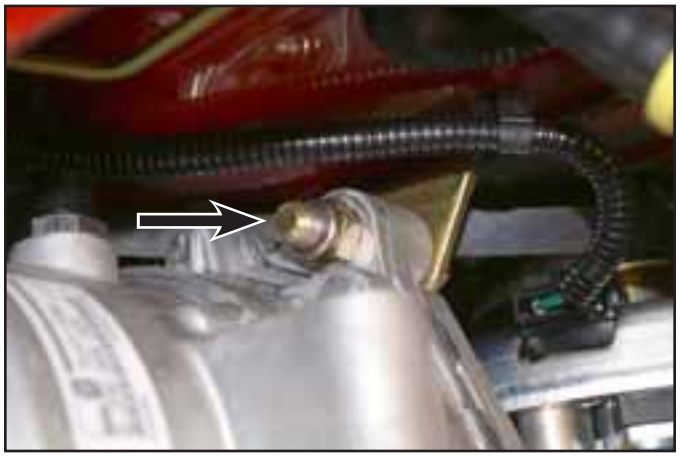

Fig. 290 PICT-9594a

11. Remove the bolt that runs through the bottom of the transaxle into the cross shaft (Fig. 291).

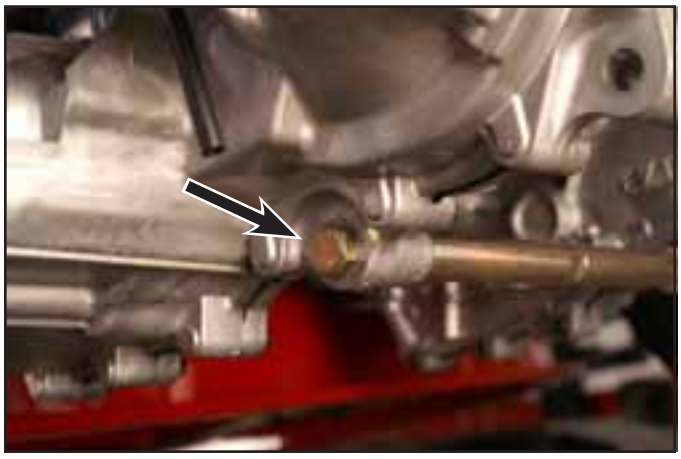

Fig. 291 PICT-9597

12. Remove the bolt and nut located on the torque strap in the front of the transaxle (Fig. 292).

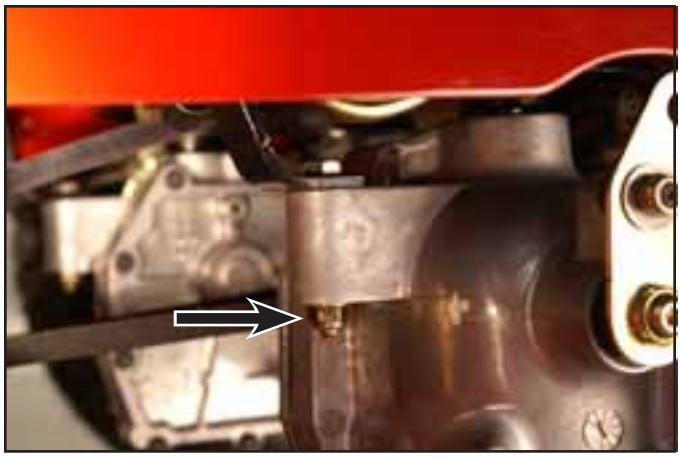

Fig. 292 PICT-9611

13. Install a floor jack under the transaxle for support (Fig. 293).

Fig. 293 PICT-9612

14. Remove the two carriage bolts and nuts retaining the transaxle to the hydro-support bracket (Fig. 294).

Fig. 294 PICT-9618

15. Lower the transaxle from the frame (Fig. 295).

Fig. 295 PICT-9620

Transaxle Installation

1. Place the transaxle on a floor jack under the frame. Before raising the transaxle up into the frame, lay the bypass rod from the frame over the top rear portion of the transaxle and the hydro link on top of transaxle inside the control arm (Fig. 296).

Fig. 296 PICT-9632

2. Raise the transaxle up into the frame and install the two carriage bolts and nuts loosely through the hydro support bracket and the transaxle (Fig. 297).

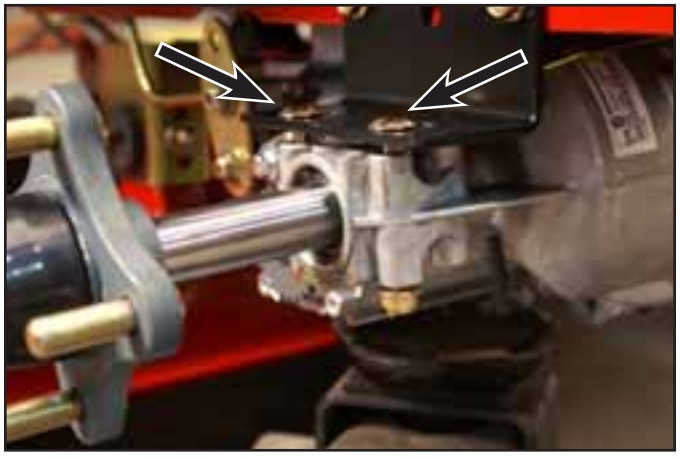

Fig. 297 PICT-9634

3. Loosely install the bolt and nut on the torque strap to the front of the transaxle (Fig. 298).

Fig. 298 PICT-9637

4. Install bolt through the bottom of the transaxle into the cross shaft and tighten (Fig. 299).

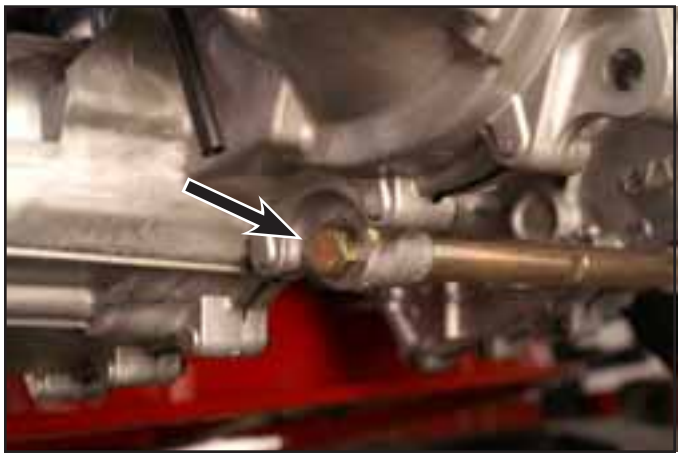

Fig. 299 PICT-9597

5. Install the bolt and nut located on the top of the transaxle to the hydro-support to the frame and tighten (Fig. 300).

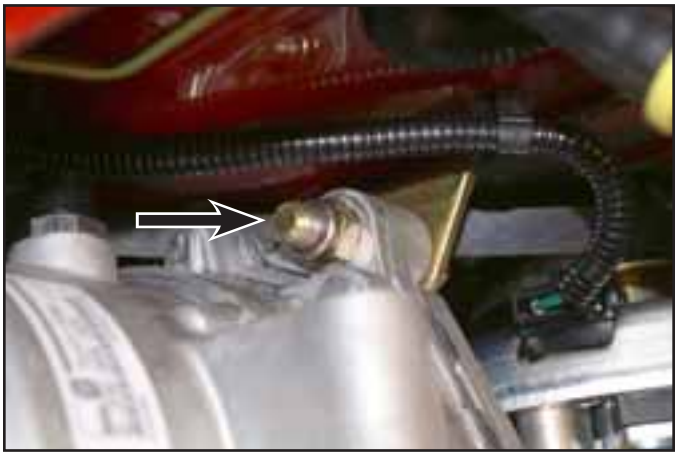

Fig. 300 PICT-9594a

6. Tighten the carriage bolts and nuts to the support bracket to the transaxle and then tighten the bolt and nut to the torque strap on the front of the transaxle.

7. Place the bypass rod onto the bypass arm. Install the washer and hairpin cotter retaining the bypass rod to the bypass arm on the transaxle (Fig. 301).

Fig. 301 PICT-9591

8. Install the bolt and nut retaining the hydro link to the control arm and tighten (Fig. 302).

Note: If a new transaxle is being installed, loosen the nut and washer on the contorl arm so that it is free to move.

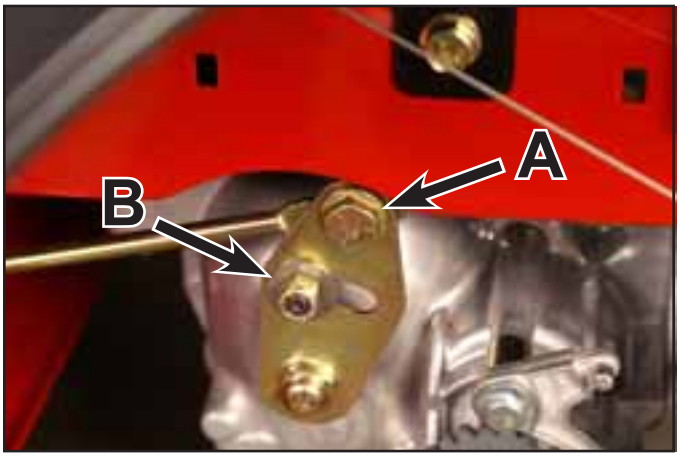

Fig. 302 PICT-9589

A. Hydro link/control arm bolt & nut
B. Contorl arm nut & washer

9. Install the brake cable to the brake arm (Fig. 303).

Fig. 303 PICT-9639

10. Install the spring clip retaining the brake cable to the brake arm (Fig. 304).

Fig. 304 PICT-9641

11. Route the drive belt around the transaxle pulleys and the engine drive pulley. Slip the belt over the top and around the idler arm pulley (Fig. 305).

Fig. 305 PICT-9642

12. Release the spring tension on the idler arm assembly and install the drive belt around the fixed idler pulley, making sure the belt is around the transaxle, engine drive, and idler spring pulleys (Fig. 306).

Fig. 306 PICT-9644

Hydro drive belt routing (Fig. 307):

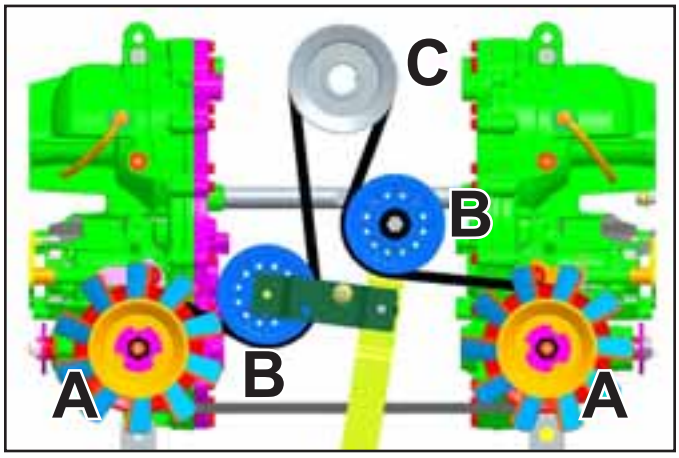

Fig. 307 matrix hydro belt routing

A. Transaxle pulleys
B. Idler pulleys
C. Engine pulley

Note: When installing a new transaxle in the machine or if any work was performed internally on the transaxle or if the oil was changed, make sure the system is purged prior to doing any neutral adjustment. Refer to "Purging Procedures - Transaxles" on page 5-31.

Note: After any service where the control linkage was disturbed or after purging procedures have been performed, check the neutral adjustment. If the neutral adjustment needs to be performed, refer to "Neutral Adjustment" on page 5-25.

13. Install the left side tire and wheel assembly.

14. Remove the jack stands and lower the unit to the ground.

15. Connect the negative battery cable to the battery.

16. Operate the unit making sure the unit and all safety devices are working properly.

Actuator Arm Replacement

Note: The following procedure shows the left actuator arm removal and installation. Both the right and left side actuators are removed and installed with the same procedure.

Actuator Arm Removal

1. Disconnect the negative battery cable from the battery.

2. Remove the front control cover from the seat pivot/ control assembly (Fig. 308).

Fig. 308 PICT-9645

3. Remove the 3 shoulder screws retaining the left hand pod to the frame (Fig. 309).

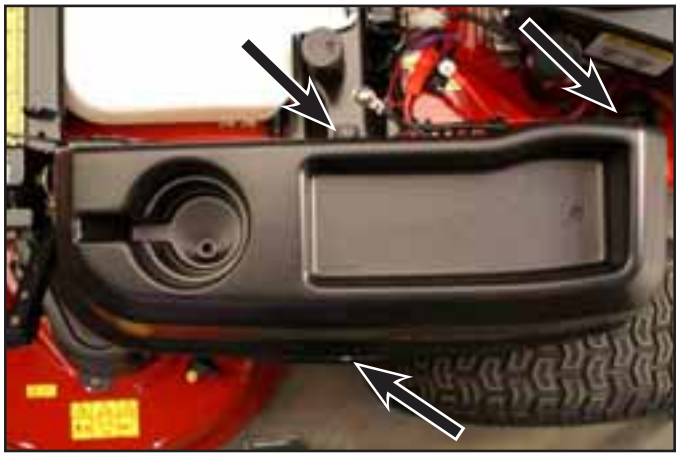

Fig. 309 PICT-9259

4. Remove the left hand pod from the unit. (Fig. 310).

Fig. 310 PICT-9260

5. Remove the two bolts and washers retaining the left handle assembly to the actuator arm (Fig. 311).

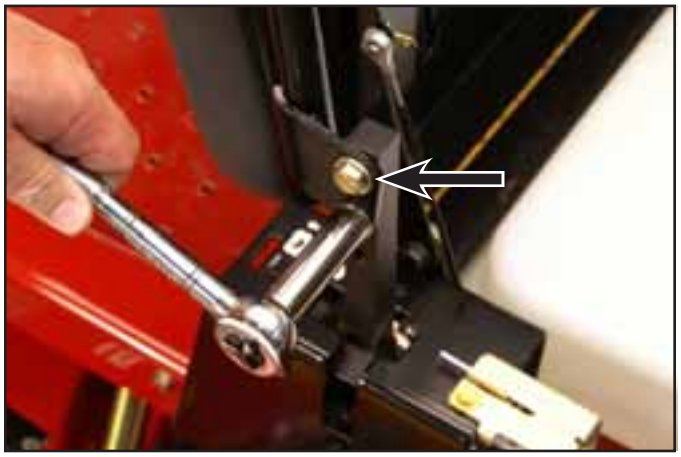

Fig. 311 PICT-9646

6. Loosen the screw retaining the stop tab to the actuator arm and turn the stop tab up (Fig. 312).

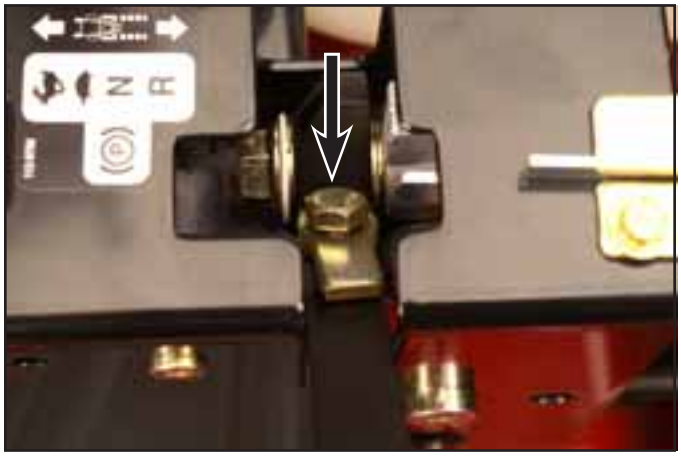

Fig. 312 PICT-9649

7. Remove the shoulder bolt, washers, Teflon washers, and nut retaining the actuator arm to the activator arm assembly (Fig. 313).

Fig. 313 PICT-9648

8. Remove the actuator arm from the seat pivot/control assembly (Fig. 314).

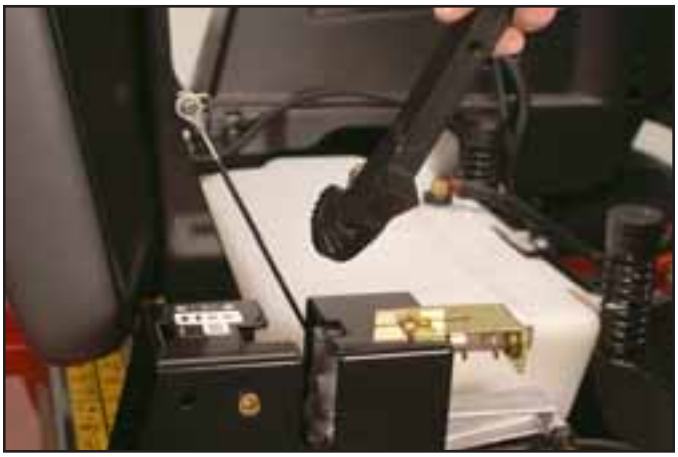

Fig. 314 PICT-9660a

Actuator Arm Installation

1. Install the shoulder bolt part way into the activator arm assembly (Fig. 315).

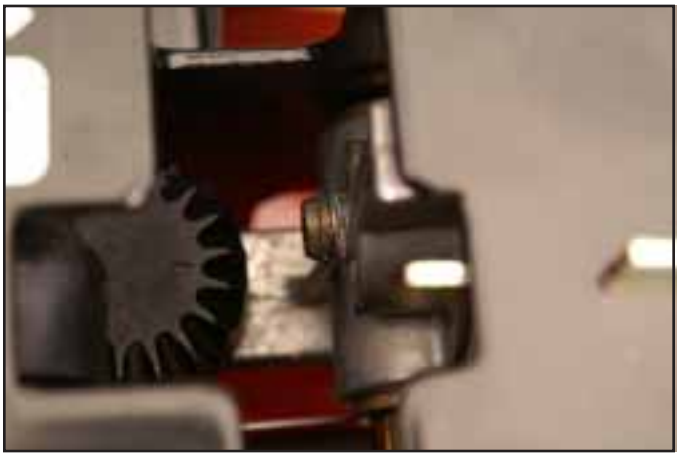

Fig. 315 PICT-9661

2. Install two washers on the threaded end of the shoulder bolt (Fig. 316).

Fig. 316 PICT-9664

Note: The actuator arm and the control gear each have a timing mark (Fig. 317).

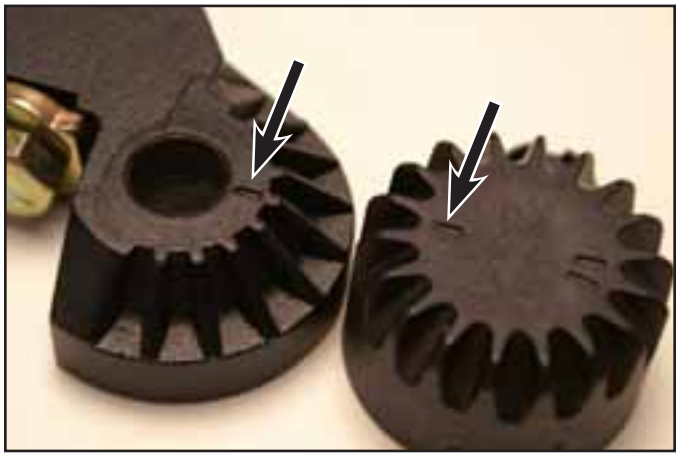

Fig. 317 PICT-9662

3. Install the actuator arm so the timing mark aligns with the timing mark on the control gear (Fig. 318).

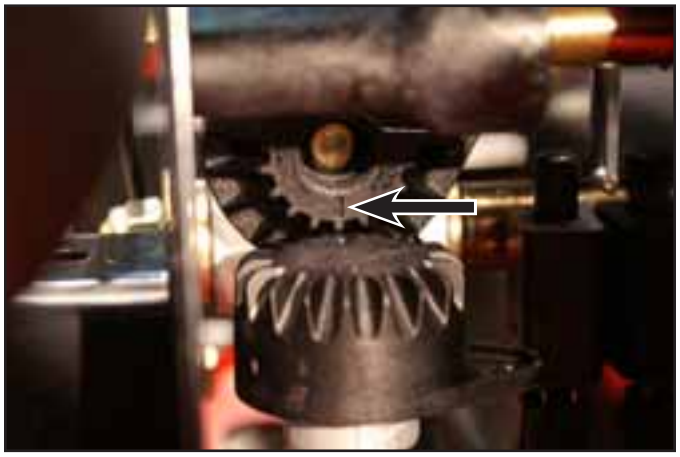

Fig. 318 PICT-9666

4 Install a washer, Teflon washer, and nut; tighten. Move the actuator arm back and forth from the operating position to the park position; adjust the nut to obtain slight resistance (Fig. 319).

Fig. 319 PICT-9648

5. Turn the stop tab down towards the rear of the unit and tighten the screw (Fig. 320).

Fig. 320 PICT-9668

6. Install two screws and washers through the handle assembly and the actuator arm (Fig. 321). Adjust the handle to align with the opposite handle and tighten screws.

Fig. 321 PICT-9646

7. Install the left hand pod with three shoulder screws and tighten (Fig. 322).

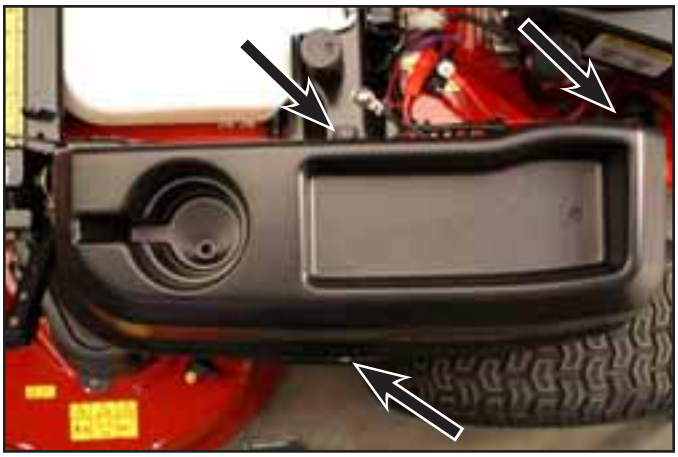

Fig. 322 PICT-9259

8. Install the front control cover (Fig. 323).

Fig. 323 PICT-9645

9. Connect the negative battery cable with the battery.

10. Operate the unit to make sure the unit and all the safety devices are working properly.

Activator Arm Assembly Replacement

Note: The following procedure shows the left activator arm removal and installation. Both the right and left side activator arm assemblies are removed and installed using the same procedure.

Activator Arm Assembly Removal

1. Disconnect the negative battery cable from the battery.

2. Remove the bolts and washers retaining the handle assembly to the actuator arm (Fig. 324).

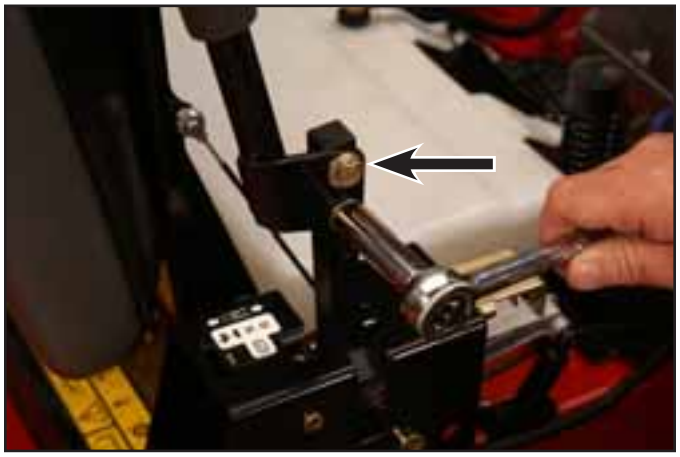

Fig. 324 PICT-9695

3. Remove the control cover from the seat pivot/control assembly (Fig. 325).

Fig. 325 PICT-9645

4. Remove the 3 shoulder screws retaining the left hand pod to the frame (Fig. 326).

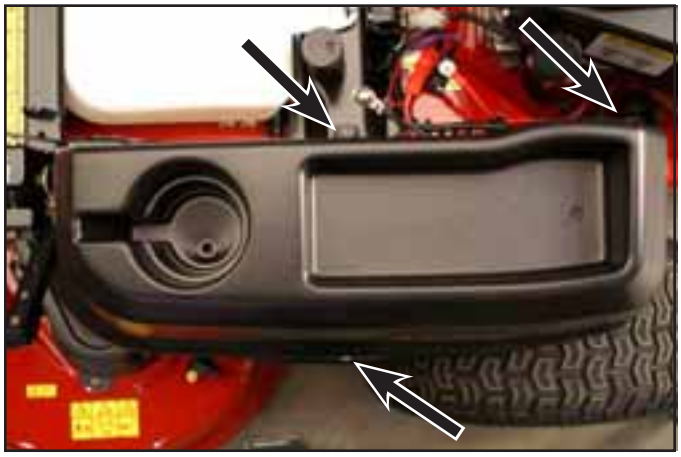

Fig. 326 PICT-9259

5. Remove the left hand pod from the unit (Fig. 327).

Fig. 327 PICT-9260

6. Pinch the retainer clip for the neutral safety switch to disconnect the neutral safety switch from seat pivot/control assembly (Fig. 328).

Fig. 328 PICT-9670

7. Remove the neutral safety switch and wire assembly from the seat pivot/control assembly (Fig. 329).

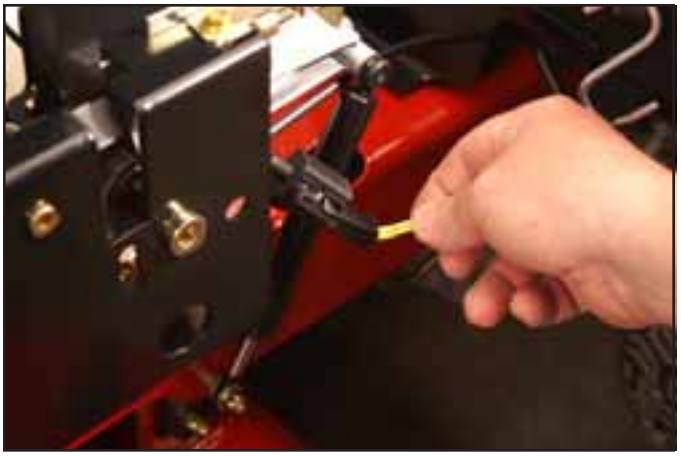

Fig. 329 PICT-9671

8. Remove the brake cable conduit fitting screw that secures to the activator arm (Fig. 330).

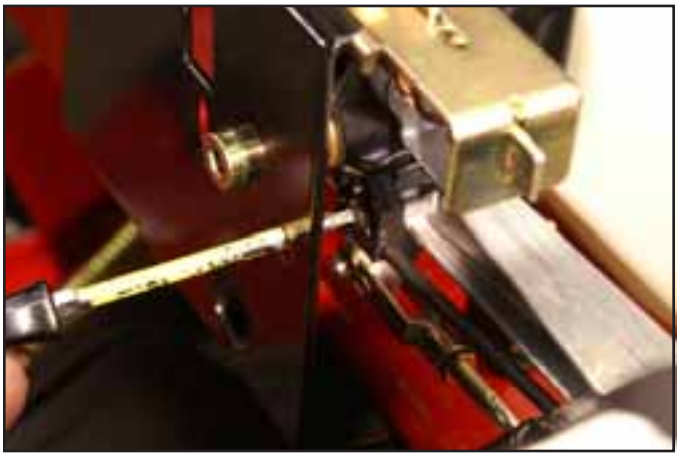

Fig. 330 PICT-9673

9. Remove the z-bend of the brake cable from the gear control (Fig. 331).

Fig. 331 PICT-9678

10. Remove the shoulder screw and washer that hold the motion control damper to the activator assembly (Fig. 332).

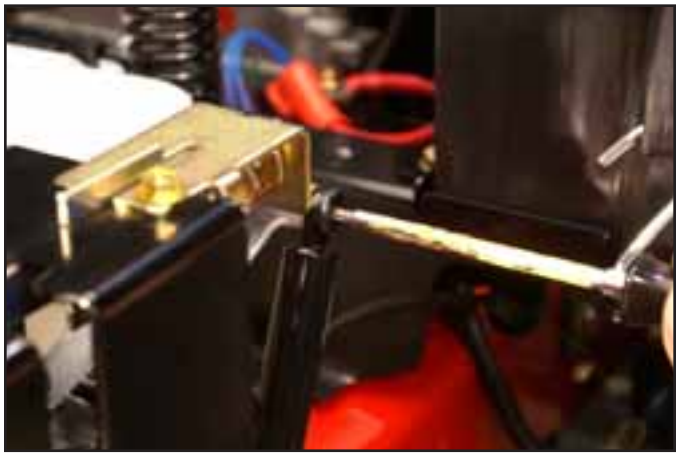

Fig. 332 PICT-9679

11. Remove the hairpin cotter and clevis pin on the adjustable yoke for the hydro link (Fig. 333).

Fig. 333 PICT-9685

12. Remove the shoulder bolt, washer, and nut retaining the activator arm assembly to the seat pivot/control assembly (Fig. 334).

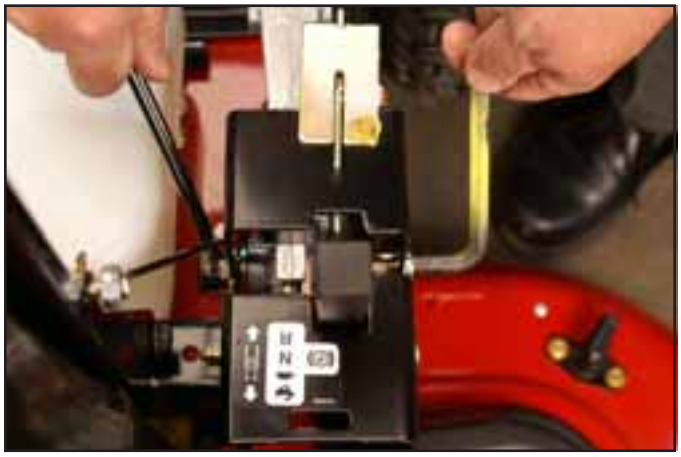

Fig. 334 PICT-9686

13. Remove the activator assembly through the backside of the seat pivot/control assembly (Fig. 335).

Fig. 335 PICT-9689

Activator Arm Assembly Installation

1. Install the activator assembly into the seat pivot/control assembly (Fig. 336).

Fig. 336 PICT-9689

2. Install the shoulder bolt, washer and nut through the seat pivot/control assembly and the activator arm assembly and tighten (Fig. 337).

Fig. 337 PICT-9690

3. Install the clevis pin and hairpin cotter on the adjustable yoke for the hydro link (Fig. 338).

Fig. 338 PICT-9691

4. Install a washer between the motion control damper and the activator and then a shoulder screw and tighten (Fig. 339).

Note: Make sure the brake cable is on the inside of the damper assembly.

Fig. 339 PICT-9693

5. Install the z-bend of the brake cable into the gear control (Fig. 340).

Fig. 340 PICT-9677

6. Install the brake cable conduit fitting screw into the activator arm (Fig. 341).

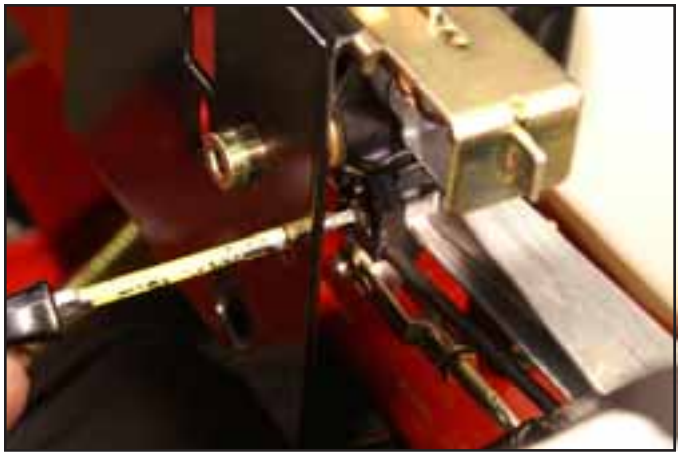

Fig. 341 PICT-9673

7. Route the neutral safety switch and wiring to the outside of the damper motion control (Fig. 342).

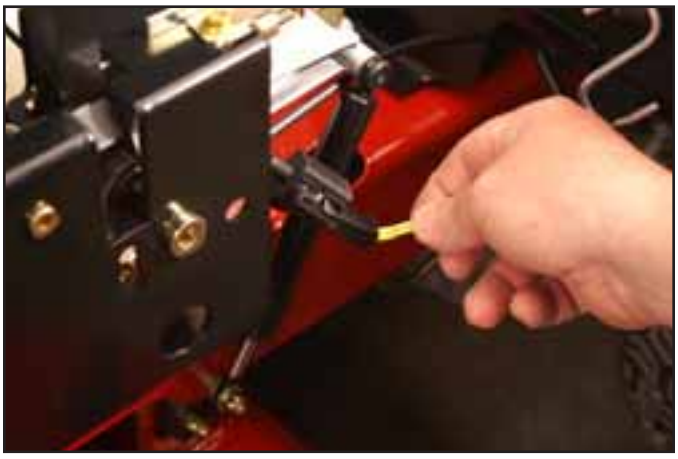

Fig. 342 PICT-9671

8. Install the neutral switch in the seat pivot/control assembly with the plunger of the switch facing up (Fig. 343). Install in the slot located below the actuator arm (Fig. 344).

Fig. 343 PICT-9342

Fig. 344 PICT-9344

9. Install the handle assembly to the actuator arm with two screws and washers (Fig. 345). Adjust to align the handle with opposite handle and tighten screws.

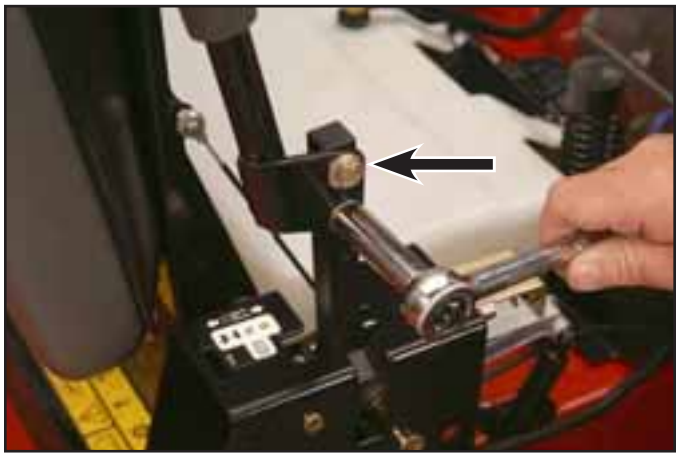

Fig. 345 PICT-9695a

10. Install the pod to the frame; make sure to route the negative battery up through the bottom of the pod to the battery. Secure with 3 shoulder screws (Fig. 346).

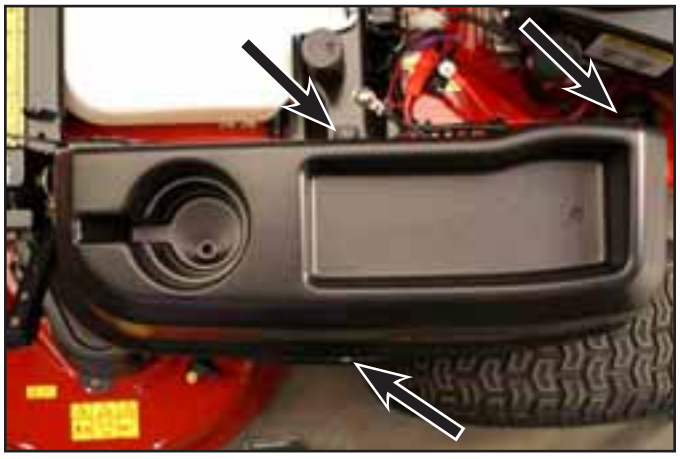

Fig. 346 PICT-9259

11. Install the control cover to the seat pivot/control assembly (Fig. 347).

Fig. 347 PICT-9645

12. Install the negative battery cable to the battery.

13. Operate the unit to ensure the unit and all safety devices are working properly.

Neutral Adjustment

Note: The following procedures show the left side hydrostatic transaxle being neutralized. The same procedure is used for the right side.

1. Raise the unit and place it on jack stands (Fig. 348). Run the engine for 10 minutes to warm up the transaxles.

Fig. 348 PICT-9704

2. Unplug the seat switch and temporarily connect a jumper wire across the plug connector (Fig. 349).

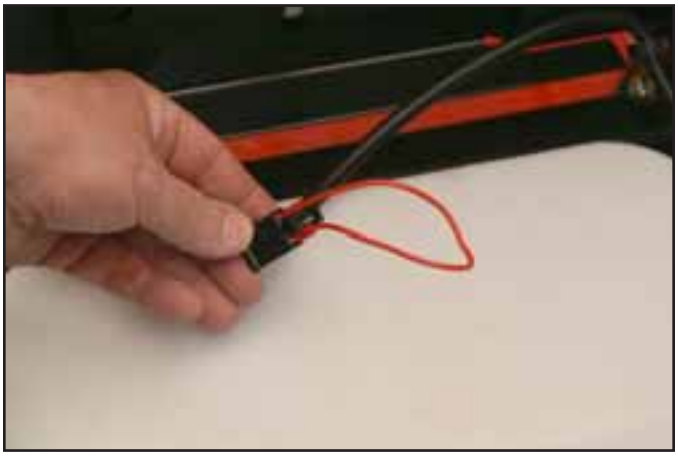

Fig. 349 PICT-9698a

3. Pivot the park brake pawl off the teeth of the park brake gear (Fig. 350).

Note: The rear tire is removed for picture clarity.

Fig. 350 PICT-9699

4. Remove the hairpin cotter and the clevis pin for the seat lanyard if equipped so the seat can be laid down in the footrest area (Fig. 351). Protect the seat from damage when lowered.

Fig. 351 PICT-9703

5. Start the unit up and ensure the forward/reverse handle is in the park position (Fig. 352).

Fig. 352 PICT-9709

6. Observe the rear tire to see if there is any movement. If the tire is creeping in either direction, a neutral adjustment is needed (Fig. 353).

Note: A small amount of creep in reverse is OK.

Fig. 353 PICT-9704

7. Turn the ignition OFF to stop the engine.

8. If adjustment is needed, remove the front control cover from the seat pivot/control assembly (Fig. 354).

Fig. 354 PICT-9645

9. Remove the 3 shoulder screws retaining the left side pod to the frame (Fig. 355).

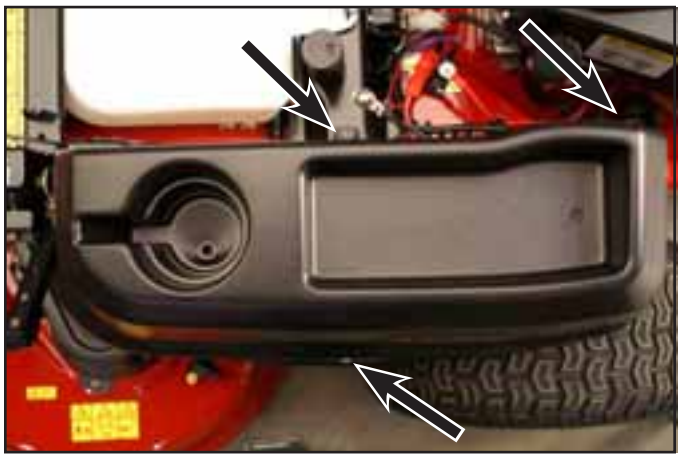

Fig. 355 PICT-9259

10. Loosen the jam nut behind the adjustable yoke on the hydro link (Fig. 356).

Fig. 356 PICT-9710

11 Remove the hairpin cotter and clevis pin from the adjustable yoke for the hydro link (Fig. 357).

Fig. 357 PICT-9685

12. To neutralize the transaxle linkage, turn the yoke assembly (Fig. 358):

    - If the tire is moving in reverse: turn the yoke outward to lengthen the control rod.
    - If the tire is moving in forward: turn the yoke inward to shorten the control rod.

Fig. 358 PICT-9715

13. Install the clevis pin and hairpin cotter.

14. Start the engine.

15. Operate the left control handle in forward and reverse with the engine running at full throttle. Move the control handle into the park position and ensure the rear wheel does not move forward or reverse. Readjust as required (Fig. 359).

Note: A small amount of creep in reverse is OK.

Fig. 359 PICT-9717

16. Pivot the parking pawl back onto the teeth of the park brake gear (with control handle in the neutral park position (Fig. 360).

Note: The tire is removed for picture clarity.

Fig. 360 PICT-9718

17. Remove the seat bypass wire and reconnect the seat safety switch (Fig. 361).

Fig. 361 PICT-9721

18. Install the seat lanyard with clevis pin and hairpin cotter. Install the pod onto the frame and install 3 shoulder screws and tighten (Fig. 362).

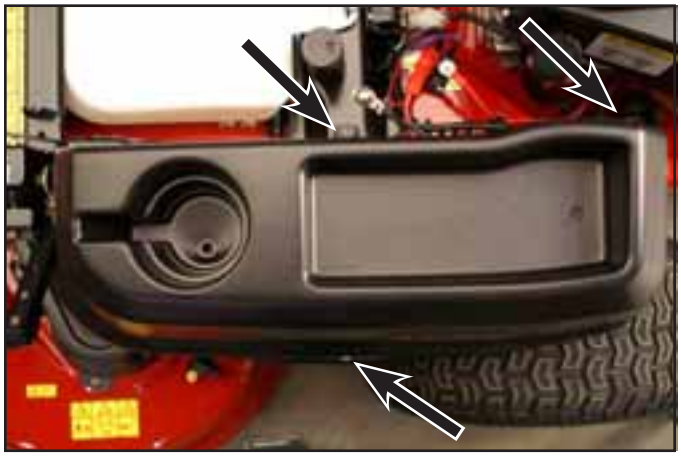

Fig. 362 PICT-9259

19. Install the front control cover on the seat pivot/ control assembly (Fig. 363).

Fig. 363 PICT-9645

20. Lower the unit to the ground.

Tracking Adjustment

With the control handles pushed all the way forward, if the unit tends to veer either to the right or to the left, tracking adjustment is needed. Adjust the left side stop if the unit veers right; adjust the right side stop if the unit veers left (Fig. 364).

Fig. 364 PICT-9724

1. Located on the front of the control handle assemblies, either the left or right, is an adjustable eccentric stop (Fig. 365).

Note: Front control cover removed for picture clarity.

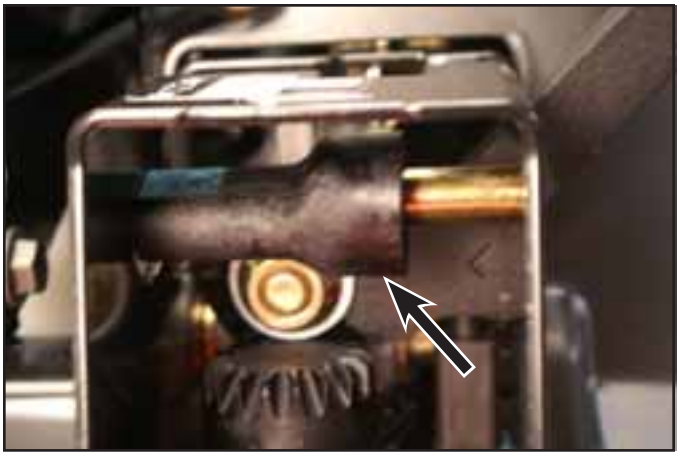

Fig. 365 PICT-9727

2. Loosen the nut located on the inside of the seat pivot/control assembly (Fig. 366).

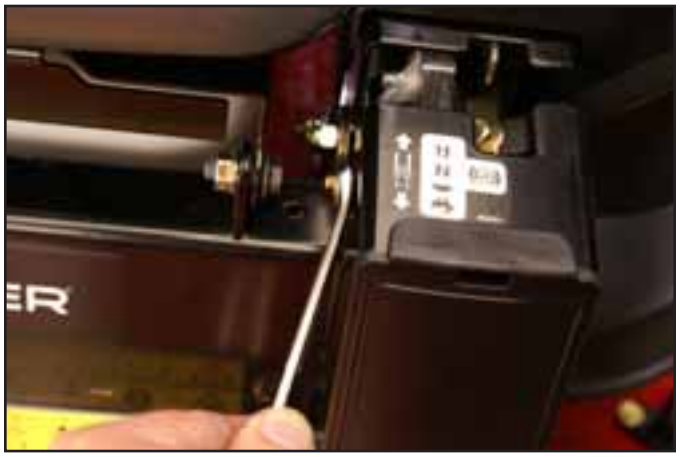

Fig. 366 PICT-9728

3. With a 1/4” Allen wrench, turn the outside screw adjustment to move the stop until the unit tracks straight forward. Tighten the nut located on the inside of the seat pivot/control assembly (Fig. 367).

Fig. 367 PICT-9729

Purging Procedures - Transaxles

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

These purge procedures should be implemented any time a hydrostatic system has been opened to facilitate maintenance, any additional oil has been added to the system, or a replacement transaxle has been installed.

Air creates inefficiency because its compression and expansion rate is higher than that of the oil in hydrostatic drive systems.

The resulting symptoms in hydrostatic systems may be:

1. Noisy operation

2. Lack of power or drive after short term operation.

3. High operation temperature and excessive expansion of “oil”; in the latter case, oil may overflow.

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

1. With the bypass valve open (push position) and the engine running, slowly move the directional controls (forward/reverse levers) in both forward and reverse directions 5 to 6 times; as air is purged from the transaxles, the oil level will drop.

2. With the bypass valves in the closed position (run position) and the engine running, slowly move the directional control levers in both forward and reverse directions 5 to 6 times.

3. It may be necessary to repeat steps 1 and 2 until all air is completely purged from the transaxles. When the transaxles move forward at normal speed, purging is complete.

HYDROSTATIC DRIVE SYSTEM

WARNING

Do not attempt any servicing or adjustments with the engine running.

Use extreme caution while inspecting the drive belt assembly and all vehicle linkage!

Follow all safety procedures outlined in the vehicle owner's manual.

In many cases, problems with the 310-2200 are not related to a defective transaxle, but are caused by slipping drive belts, partially engaged bypass valves, and loose or damaged control linkages. The table below provides a troubleshooting checklist to help determine the cause of operational problems.

310-220 EZT™ Troubleshooting Checklist

Possible Cause	Corrective Action
UNIT OPERATES IN ONE DIRECTION ONLY	
• Control linkage bent or out of adjustment. • Drive belt slipping or pulley damaged.	• Repair or replace linkage. • Repair or replace drive belt or pulley.
VEHICLE DOES NOT DRIVE/TRACK STRAIGHT	
• Vehicle tires improperly inflated • Control linkage bent or out of adjustment • Bypass assembly sticking	• Refer to vehicle manufacturer suggested pressure • Repair or replace linkage • Repair or replace bypass
UNIT IS NOISY	
• Oil level low or contaminated oil • Excessive loading • Loose parts • Bypass assembly sticking • Air trapped in hydraulic system	• Fill to proper level or change oil • Reduce vehicle loading • Repair or replace loose parts • Repair or replace linkage • Purge hydraulic system
UNIT HAS NO/LOW POWER	
• Engine speed low • Control linkage bent or out of adjustment • Drive belt slipping or pulley damaged • Oil level low or contaminated oil • Excessive loading • Bypass assembly sticking • Air trapped in hydraulic system	• Adjust to correct setting • Repair or replace linkage • Repair or replace drive belt or pulley • Fill to proper level or change oil • Reduce vehicle loading • Repair or replace linkage • Purge hydraulic system
UNIT IS OPERATING HOT	
• Debris buildup around transaxle • Cooling fan damaged • Oil level low or contaminated oil • Excessive loading • Air trapped in hydraulic system	• Clean off debris • Repair or replace cooling fan • Fill to proper level or change oil • Reduce vehicle loading • Purge hydraulic system
TRANSAXLE LEAKS OIL	
• Damaged seals, housing, or gaskets • Air trapped in hydraulic system	• Replace damaged component • Purge hydraulic system

Mower Spindle Replacement

Mower Spindle Removal

1. Remove the mower deck from the unit; see “Mower Deck Removal” on page 6-12.

2. Remove the 3 screws retaining the belt cover to the deck (Fig. 368).

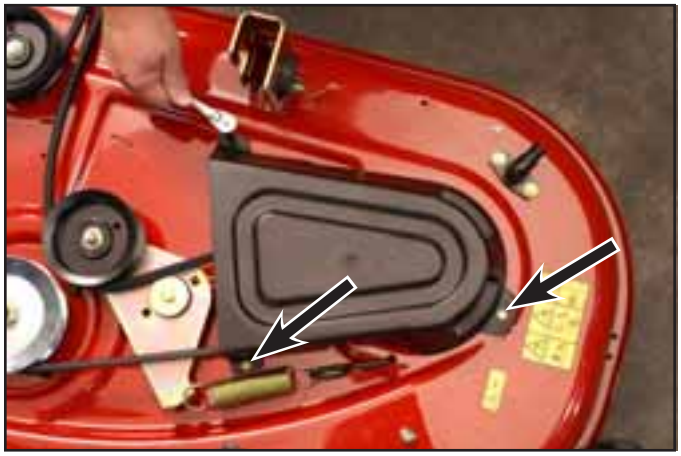

Fig. 368 PICT-9855

3. Remove the mower drive belt from the spindle pulley (Fig. 369).

Fig. 369 PICT-9860a

4. With a rag or thickly-padded glove hold the blade end and remove the nut on the spindle pulley with a 15/16” wrench (Fig. 370).

Fig. 370 PICT-9862

5. Remove the 4 screws retaining the spindle assembly to the mower deck (Fig. 371).

Fig. 371 PICT-9864

6. Remove the mower spindle assembly from the deck (Fig. 372).

Fig. 372 PICT-9865a

7. Loosen the blade screw on the spindle (Fig. 373).

Fig. 373 PICT-9870a

8. Remove the blade screw and washer from the spindle shaft (Fig. 374).

Fig. 374 PICT-9872a

9. Remove the blade stiffener (Fig. 375).

Fig. 375 PICT-9873

10. Remove the mower blade (Fig. 376).

Fig. 376 PICT-9874a

11. Remove the spindle shaft and bearing shield (Fig. 377).

Fig. 377 PICT-9875a

12. Remove the spacer (Fig. 378).

Fig. 378 PICT-9876

13. With a punch, drive one of the bearings out of the housing (Fig. 379).

Fig. 379 PICT-9878a

14. Remove the spacer from the housing (Fig. 380).

Fig. 380 PICT-9881a

15. Turn the housing over and drive the other bearing out the other side with a punch (Fig. 381).

Fig. 381 PICT-9883a

Housing, spacer, and bearings (Fig. 382)

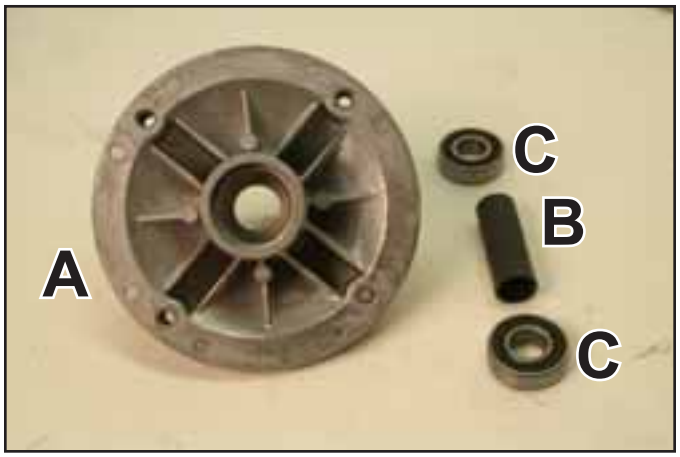

Fig. 382 PICT-9884

A. Housing
B. Spacer
C. Bearing (2)

Mower Spindle Installation

1. Starting at the top of the spindle housing, press bearing into the housing until it seats (Fig. 383).

Fig. 383 PICT-9885

2. Turn the spindle housing over and install spacer in the housing (Fig. 384).

Fig. 384 PICT-9887

3. Press another bearing in until it seats (Fig. 385).

Fig. 385 PICT-9889

4. Install the spindle shaft, bearing shield and spacer into the spindle housing (Fig. 386).

Fig. 386 PICT-9891a

5. Install the mower blade onto the spindle shaft (Fig. 387).

Fig. 387 PICT-9892a

6. Install the blade stiffener (Fig. 388).

Fig. 388 PICT-9893a

7. Install blade bolt and washer (Fig. 389).

Fig. 389 PICT-9895a

8. Torque the blade bolt to 35 – 65 ft-lbs. (47 – 88 Nm) (Fig. 390).

Fig. 390 PICT-9896a

9. Install the mower spindle assembly with blade onto the deck (Fig. 391).

Fig. 391 PICT-9865

10. Install the 4 screws retaining the spindle assembly to the deck and torque to 200 – 250 in-lbs. (16.7 – 20.8 Nm) (Fig. 392).

Fig. 392 PICT-9898a

10. Install the spindle pulley with large hub of the pulley facing down toward the deck (Fig. 393).

Fig. 393 PICT-9897

11. Install the spindle pulley nut and torque to 50 ft-lbs. (67.8 Nm) (Fig. 394).

Fig. 394 PICT-9899a

12. Install the mower drive belt around the spindle pulley (Fig. 395).

Fig. 395 PICT-9860a

13. Install the belt cover with three screws and tighten (Fig. 396).

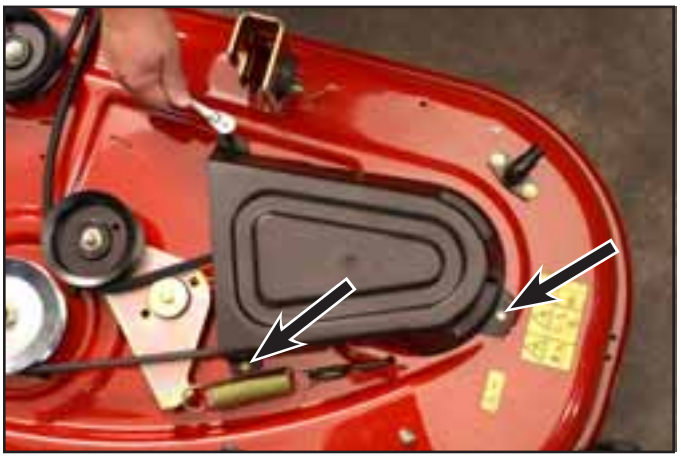

Fig. 396 PICT-9855

14. Install the mower deck to the unit; see “Mower Deck Installation” on page 6-13.

15. Check the deck to make sure it is leveled properly; see “Leveling the Mower Deck” on page 6-14.

Idler Arm Replacement

Idler Arm Removal

1. Remove the mower deck from the unit; see “Mower Deck Removal” on page 6-12.

2. Remove the spring extension from the spring return hook (Fig. 397).

Fig. 397 PICT-9900

3. Remove the other end of the spring extension from the idler arm (Fig. 398).

Fig. 398 PICT-9901

4. Remove the screw retaining the idler arm to the mower deck (Fig. 399).

Fig. 399 PICT-9902

5. Remove the idler arm from the mower deck (Fig. 400).

Fig. 400 PICT-9904

Idler arm assembly (Fig. 401)

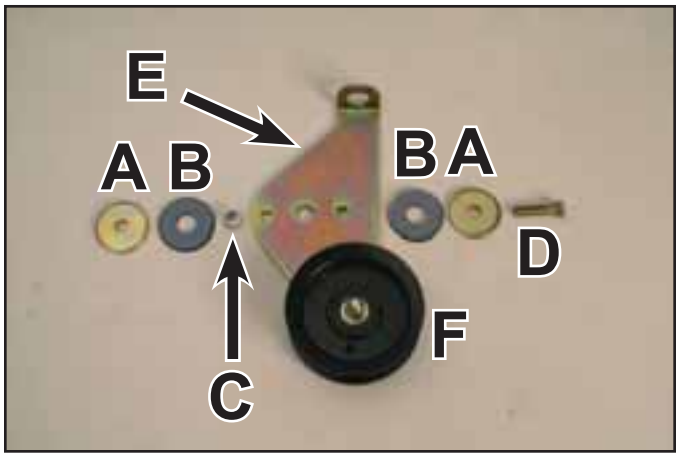

Fig. 401 PICT-9905a

A. Plain Washer (2)
B. Friction Washer-Composite (2)
C. Spacer
D. Screw
E. Idler Arm
F. Flat Idler Pulley

6. Remove the screw, washer and nut retaining the flat idler pulley to the idler arm (Fig. 402).

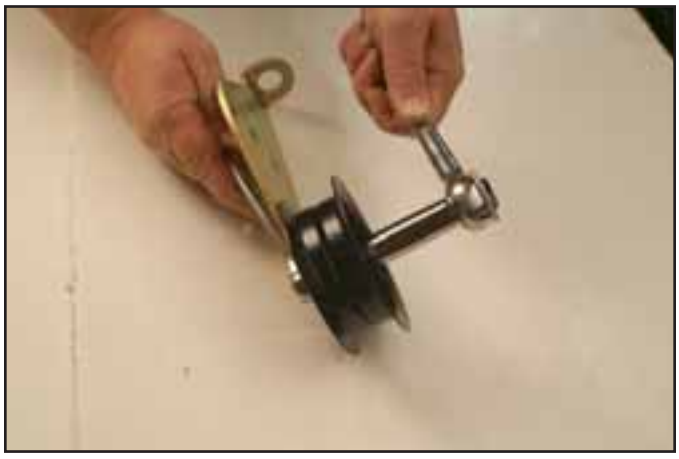

Fig. 402 PICT-9907a

Idler arm and pulley assembly (Fig. 403)

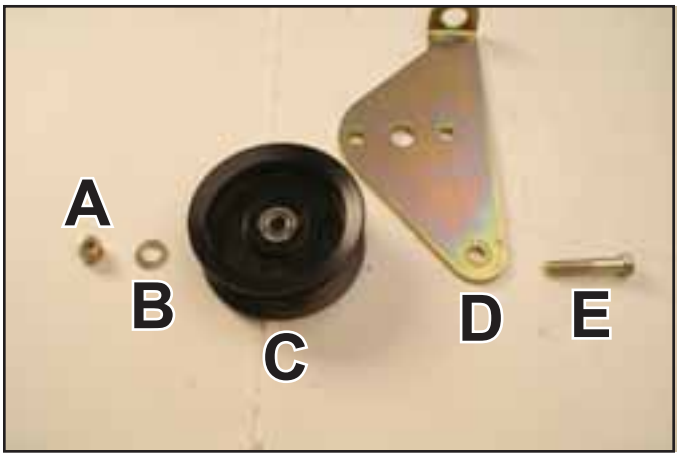

Fig. 403 PICT-9909a

A. Nut
B. Washer
C. Flat Idler Pulley
D. Idler Arm
E. Screw

Idler Arm Installation

1. Install the screw through the idler arm and install the long hub of the flat idler pulley toward the idler arm (Fig. 404).

Fig. 404 PICT-9911

2. Install the washer and nut and tighten flat idler pulley to the idler arm (Fig. 405).

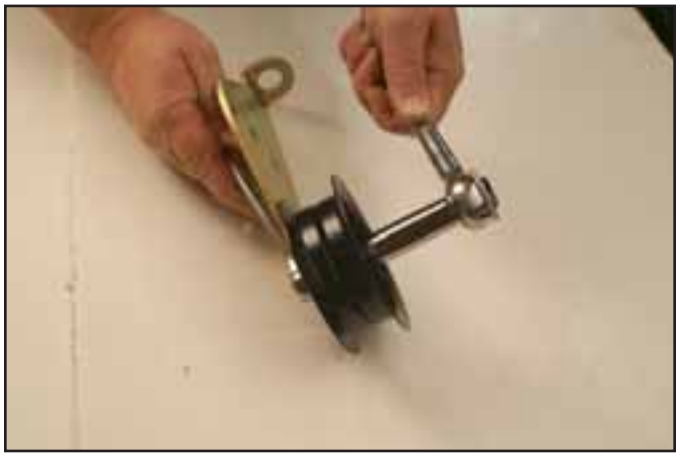

Fig. 405 PICT-9907a

3. Install a plain washer on the screw for the idler arm, friction washer-composite, spacer through the idler arm; on the other side install a friction washer-composite, plain washer (Fig. 406).

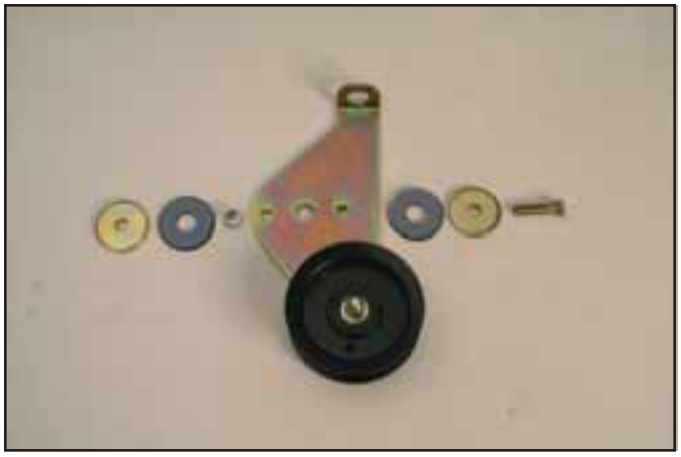

Fig. 406 PICT-9905a

4. Install and tighten the idler arm assembly to the mower deck (Fig. 407).

Fig. 407 PICT-9902

5. Install one end of the extension spring to the idler arm (Fig. 408).

Fig. 408 PICT-9913

6. Install the other end of the spring extension to the spring return hook (Fig. 409).

Fig. 409 PICT-9900

7. Install the mower deck to the unit; see “Mower Deck Installation” on page 6-13.

Fixed Flat Idler Pulley Replacement

Fixed Flat Idler Pulley Removal

Note: There are two flat idler pulleys located on top of the mower deck. They are both replaced the same way.

1. Remove the screw and washer through the fixed flat idler and remove (Fig. 410).

Fig. 410 PICT-9914

Fixed Flat Idler Pulley Installation

2. Install the fixed flat idler pulleys with screw and washer, making sure the large hub of the pulley is facing down toward the mower deck (Fig. 411).

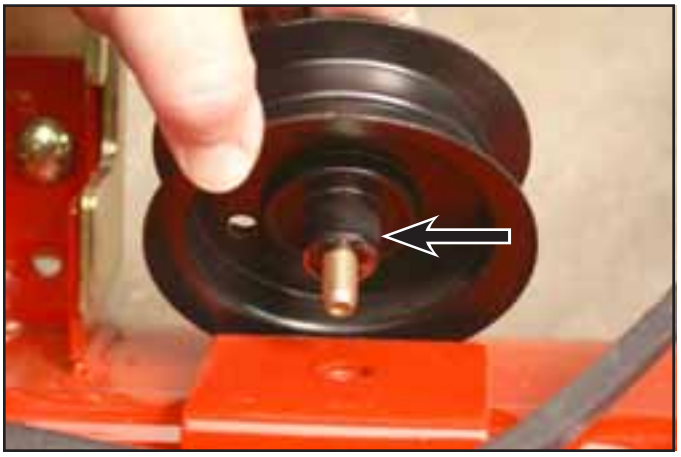

Fig. 411 PICT-9916a

Mower Deck Replacement

Mower Deck Removal

1. Park the machine on a level surface and disengage the PTO switch.
2. Move the motion control levers outward to the park position, stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Lower the height-of-cut lever to the lowest position.
4. Remove the hairpin cotter and clevis pin from the front support rod (Fig. 412). Carefully lower the front of the mower deck to the ground.

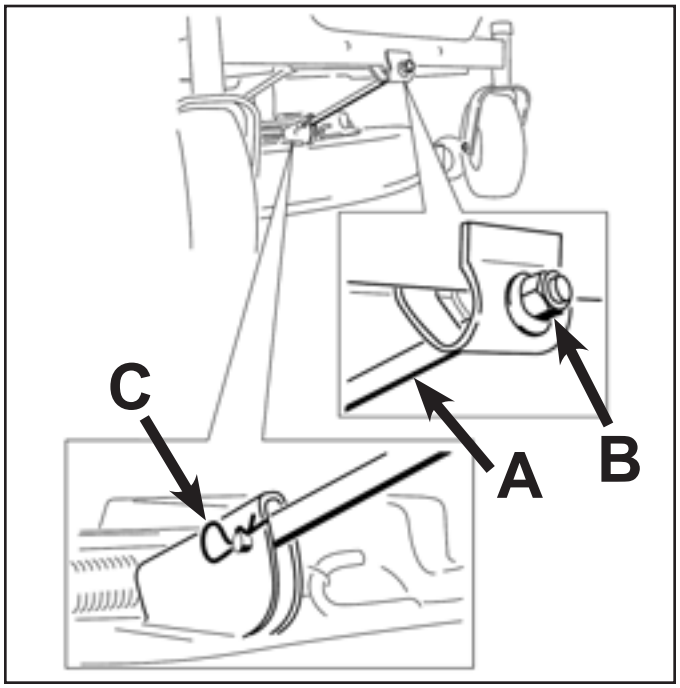

Fig. 412 fig. 52 G005076

A. Front support rod
B. Locking nut
C. Hairpin cotter and clevis pin

5. Lift the mower deck and hanger brackets clear of the rear lift rod and lower the mower carefully to the ground (Fig. 413).

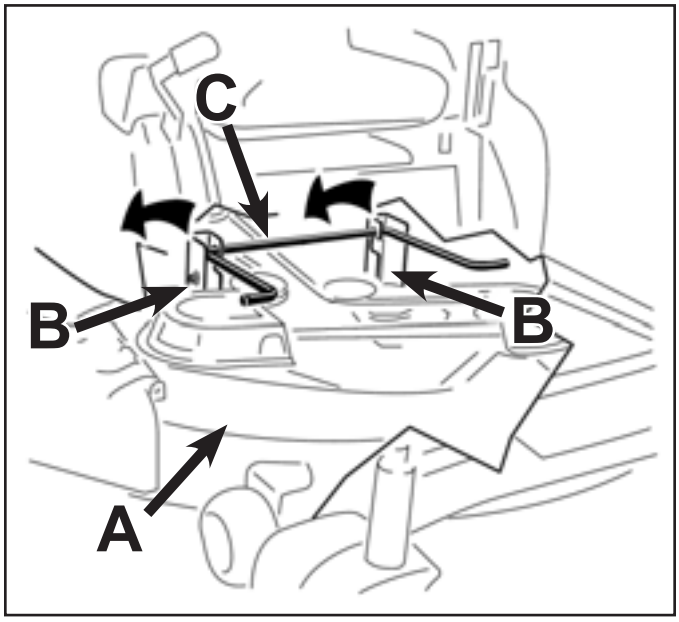

Fig. 413 fig. 53 G005077

A. Mower deck
B. Hanger bracket
C. Rear lift rod

6. Slide the mower deck rearward to remove the mower belt from the engine pulley.

7. Slide the mower deck out from underneath the machine.

Mower Deck Installation

1. Park the machine on a level surface and disengage the blade control switch.

2. Move the motion control levers outward to the park position, stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

3. Slide the mower under the machine.

4. Lower the height-of-cut lever to the lowest position.

5. Lift the rear of the mower deck and guide the hanger brackets over the rear lift rod (Fig. 414).

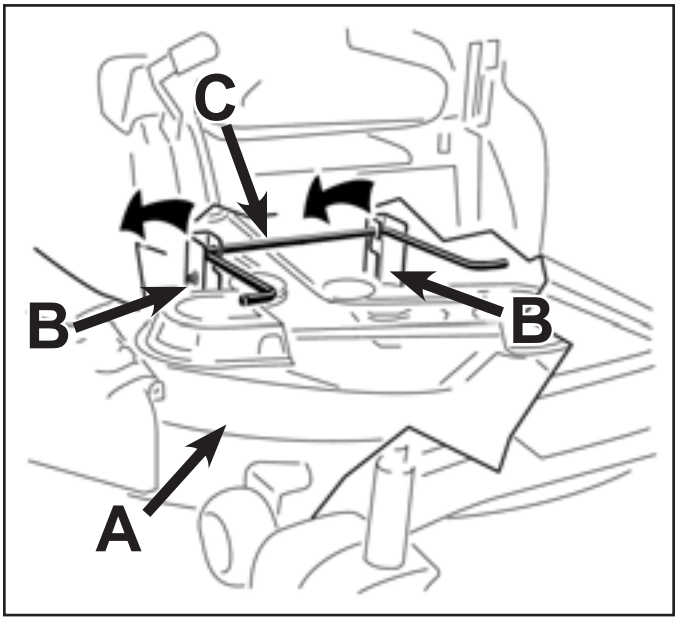

Fig. 414 fig. 53 G005077

A. Mower deck
B. Hanger braket
C. Rear lift rod

6. Attach the front support rod to the mower deck with the clevis pin and hairpin cotter (Fig. 415).

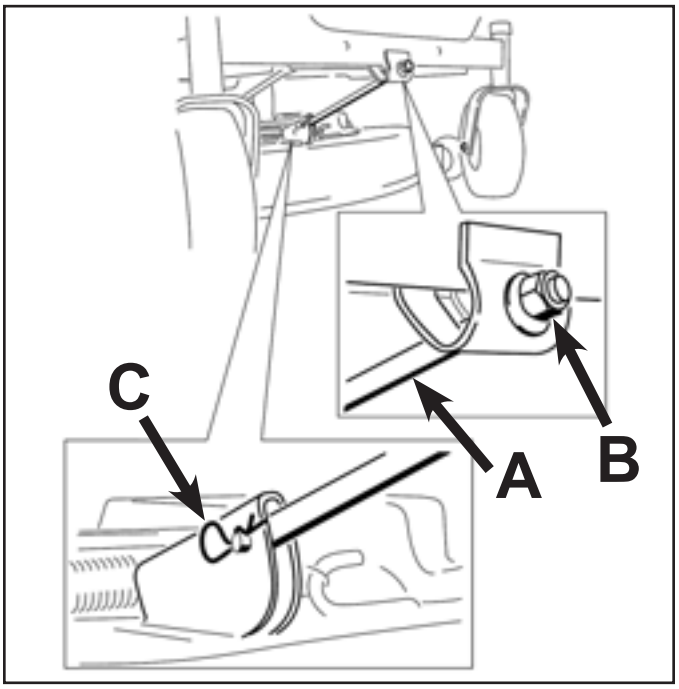

Fig. 415 fig. 52 G005076

A. Front support rod
B. Locking nut
C. Hairpin cotter and clevis pin

7. Install the mower belt onto the engine pulley; see “Mower Belt Replacement” on page 6-18.

Leveling the Mower Deck

Check to ensure the mower deck is level whenever the mower is installed or there is poor cutting performance.

The mower deck must be checked for bent blades prior to leveling; any bent blades must be removed and replaced. See “Checking for Bent Blades” on page 6-20 before continuing.

The mower deck must be leveled side-to-side first; then the front to rear slope can be adjusted.

Requirements:
- The machine must be on a level surface.
- All four tires must be properly inflated. See “Checking the Tire Pressure” on page 6-21.

Side-to-Side Leveling

1. Park the machine on a level surface and disengage the PTO switch.

2. Move the motion control levers outward to the park position, stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

3. Set the height-of-cut lever to middle position.

4. Carefully rotate the blades so that they are all side to side (Fig. 416 and Fig. 417).

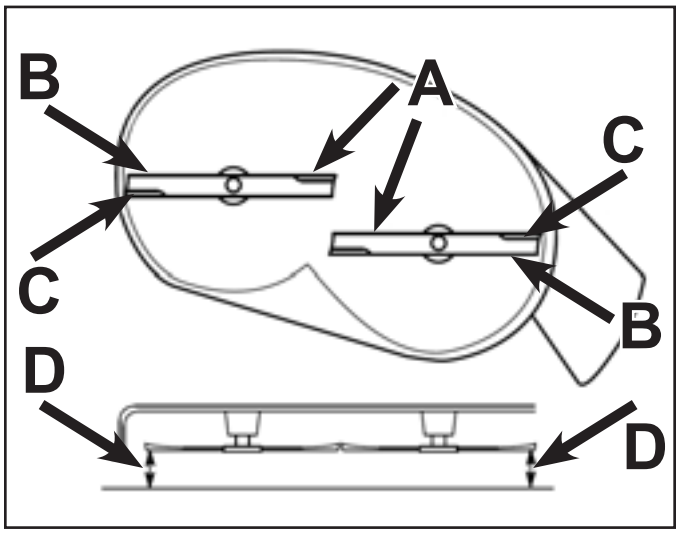

Fig. 416 fig. 46 G009682

Mower Decks with 2 Blades

A. Blades side-to-side
B. Sail area of blade
C. Outside cutting edges
D. Measure from the tip of the blade to the flat surface here

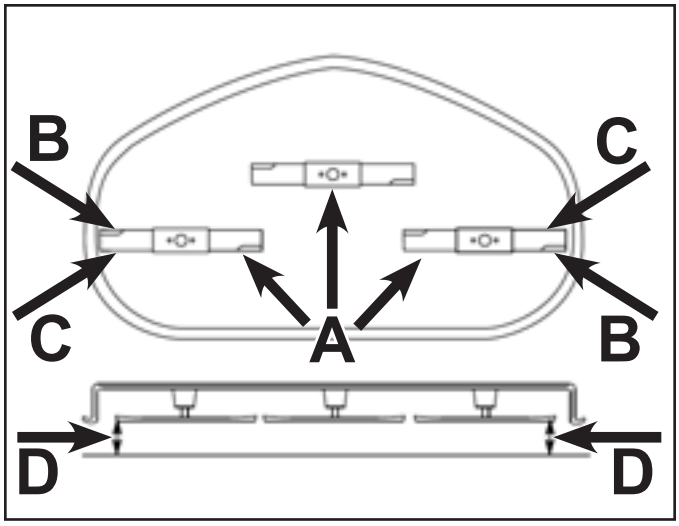

Fig. 417 fig. 47 G005278

Mower Decks with 3 Blades

A. Blades side-to-side
B. Sail area of blade
C. Outside cutting edges
D. Measure from the tip of the blade to the flat surface here

5. Measure between the outside cutting edges and the flat surface (Fig. 416 and Fig. 417). If both measurements are not within 3/16” (5mm), an adjustment is required; continue with this procedure.

6. Move to the left side of the machine. Loosen, but do not remove, the rear locking nut on the hanger bracket (Fig. 418).

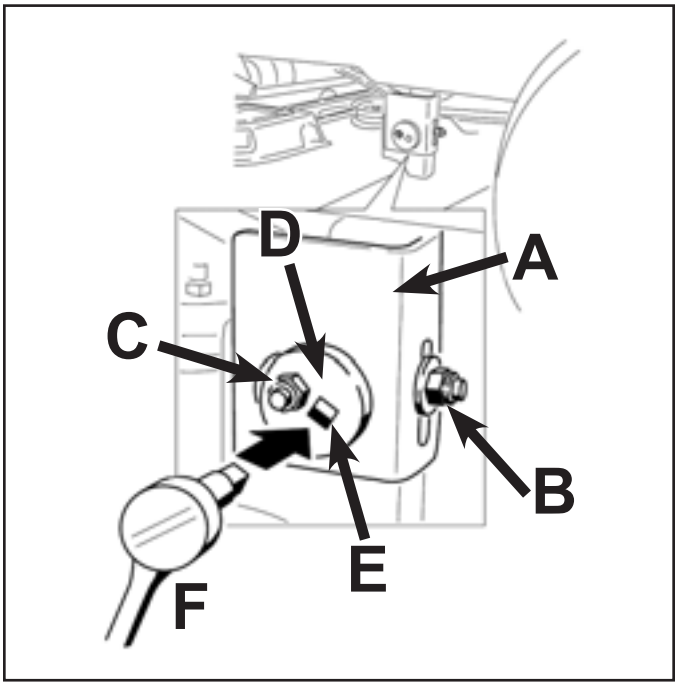

Fig. 418 fig. 48 G005074

A. Hanger bracket
B. Rear locking nut
C. Side locking nut
D. Eccentric adjustment plate
E. Socket wrench hole
F. Socket wrench with 3/8" extension

7. Loosen the side locking nut on the hanger bracket just enough to allow the eccentric plate to be adjusted (Fig. 418). Use a 3/8" drive extension on a socket wrench to manipulate the eccentric plate. Use the wrench to reposition the height of the mower deck and adjust to the desired height.

8. Stop the deck at the adjusted position and tighten the side locking nut on the hanger bracket to hold the new position (Fig. 418). Tighten the rear locking nut on the hanger bracket.

9. Continue leveling the deck by checking the front-to-rear blade slope; see "Adjusting the Front-to-Rear Blade Slope" on page 6-16.

Adjusting the Front-to-Rear Blade Slope

Check the front-to-rear blade level any time you install the mower. If the front of the mower is more than 5/16" (7.9mm) lower than the rear of the mower, adjust the blade level using the following instructions.

1. Park the machine on a level surface and disengage the blade control switch.

2. Move the motion control levers outward to the park position, stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

3. Set the height-of-cut lever to middle position.

Note: Check and adjust the side-to-side blade level first; see "Side-to-Side Leveling" on page 6-15.

4. Carefully rotate the blades so they are facing front to rear (Fig. 419 and Fig. 420).

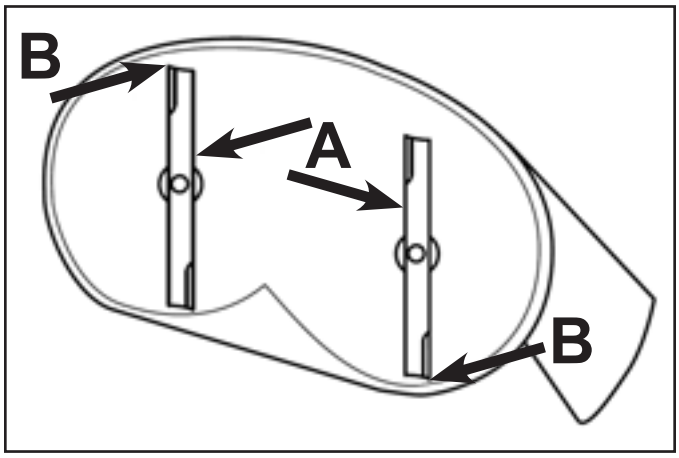

Fig. 419 fig 49 G009658

Mower Decks with 2 Blades

A. Blades front to rear
B. Measure from the tip of the blade to the flat surface here

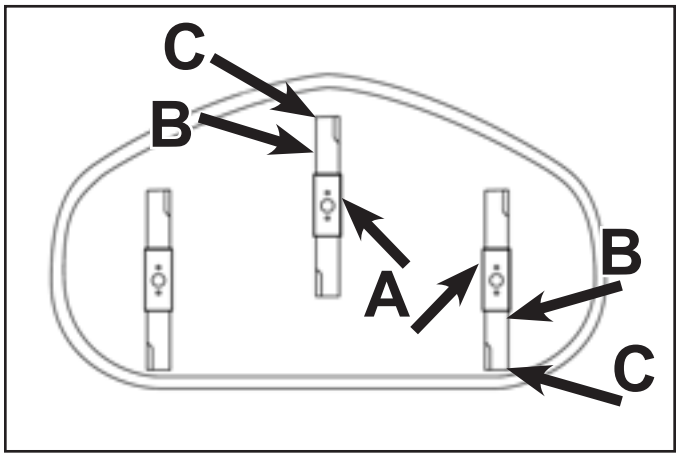

Fig. 420 fig. 50 G009659

Mower Decks with 3 Blades

A. Blades front to rear
B. Outside cutting edges
C. Measure from the tip of the blade to the flat surface here

5. Measure from the tip of the front blade to the flat surface and the tip of the rear blade to the flat surface (Fig. 419 and Fig. 420). If the front blade tip is not 1/16 - 5/16” (1.6 - 7.9mm) lower than the rear blade tip, adjust the front locknut.

6. To adjust the front-to-rear blade slope, rotate the adjustment nut in the front of the mower (Fig. 421).

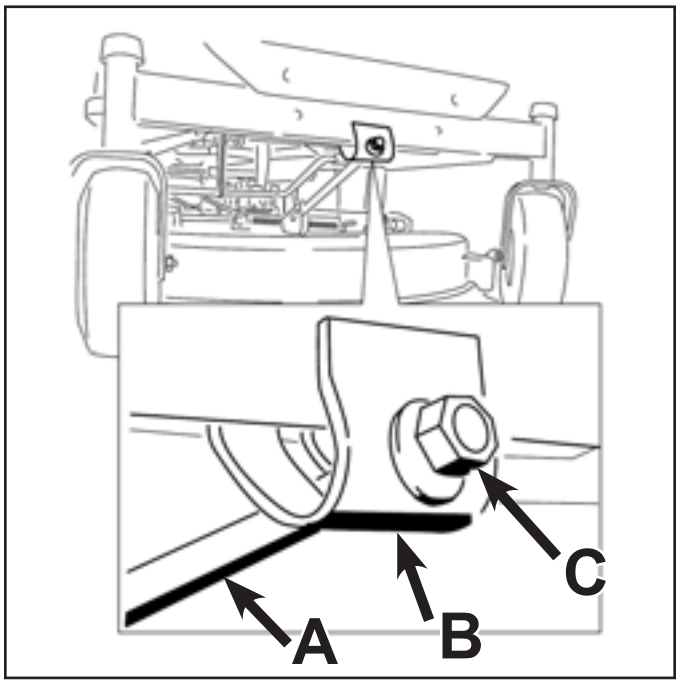

Fig. 421 fig. 51 G005075

A. Adjusting rod
B. Adjusting block
C. Lock nut

7. To raise the front of the mower, tighten the adjustment nut. To lower the front of the mower, loosen the adjustment nut.

8. After adjustment, check the front-to-rear slope again. Continue adjusting the nut until the front blade tip is 1/16 - 5/16” (1.6 - 7.9mm) lower than the rear blade tip (Fig. 419 and Fig. 420).

9. When the front-to-rear blade slope is correct check the side-to-side level of the mower again; see “Side-to-Side Leveling” on page 6-15.

Mower Belt Maintenance

Mower Belt Routing

Belt routing decals:
For models with 42” decks:

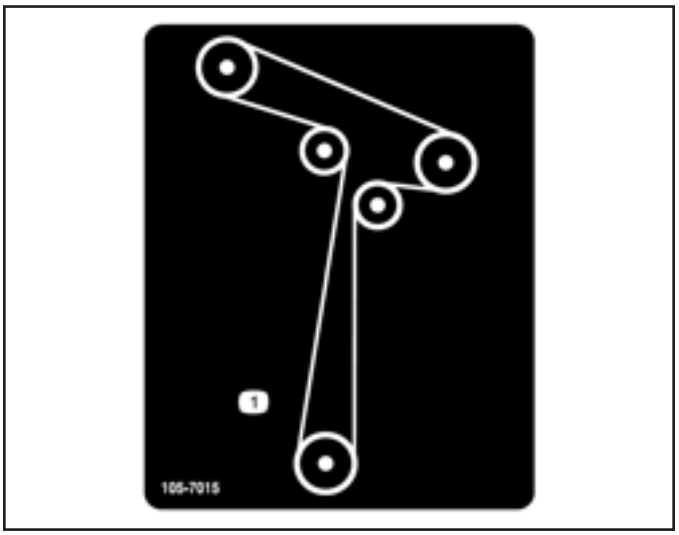

Fig. 422 decal 105-7015

For models with 50” decks:

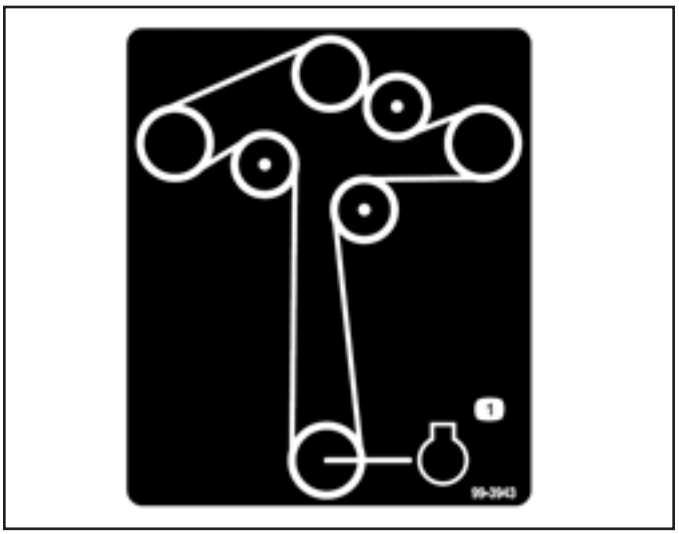

Fig. 423 decal 99-3943

Inspecting the Belts

Service Interval: Every 25 hours - Check the belts for wear/cracks.

Check the belts for cracks, frayed edges, burn marks, or any other damage. Replace damaged belts.

Mower Belt Replacement

Note: Squealing when the belt is rotating, blades slipping when cutting grass, frayed belt edges, burn marks, and cracks are signs of a worn mower belt. Replace the mower belt if any of these conditions are evident.

1. Park the machine on a level surface and disengage the PTO switch.
2. Move the motion control levers outward to the park position, stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Set the height-of-cut at the lowest cutting position (1-1/2” (38mm)).
4. Remove the belt covers over the outside spindles.

5. Pull the idler pulley in the direction shown (Fig. 424) and roll the belt off of the pulleys.

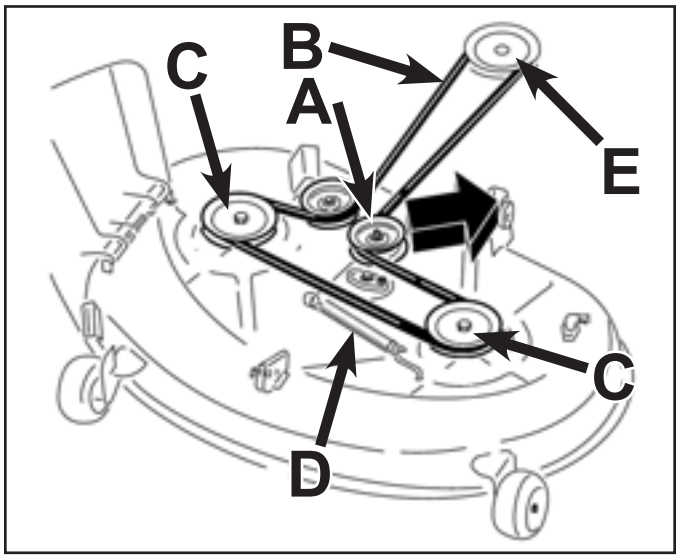

Fig. 424 fig. 54 G005078

Mower Decks with 2 Blades

A. Idler pulley
B. Mower belt
C. Outside pulley
D. Spring
E. Engine pulley

The spring is under tension when installed and can cause personal injury.

Be careful when removing the belt.

6. Route the new belt around the engine pulley and mower pulleys (Fig. 425).

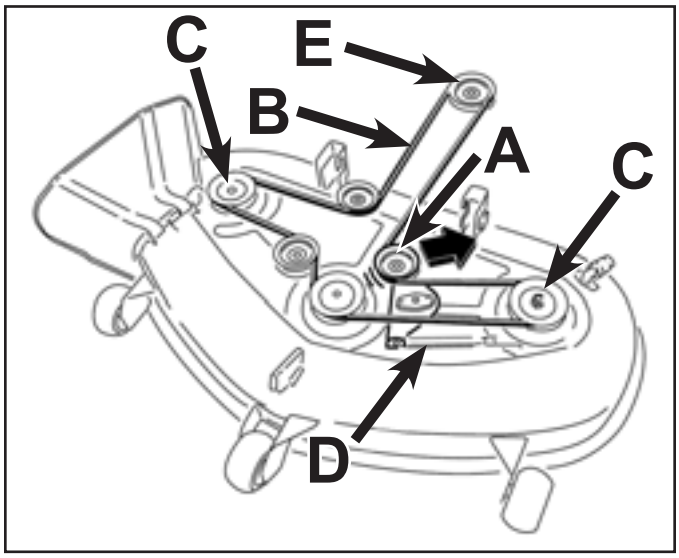

Fig. 425 fig. 55 G005191

Mower Decks with 3 Blades

A. Idler pulley
B. Mower belt
C. Outside pulley
D. Spring
E. Engine pulley

7. Pull the idler pulley in the direction shown and route the belt onto the idler pulley (Fig. 425).

8. Install the belt covers over the outside spindles.

Checking for Bent Blades

Note: The machine must be on a level surface for the following procedure.

1. Raise the mower deck to the highest height-of-cut position; also considered the 'transport' position.

2. While wearing thickly padded gloves or other adequate hand protection slowly rotate blade to be measure into a position that allows effective measurement of the distance between the cutting edge and the level surface the machine is on (Fig. 426).

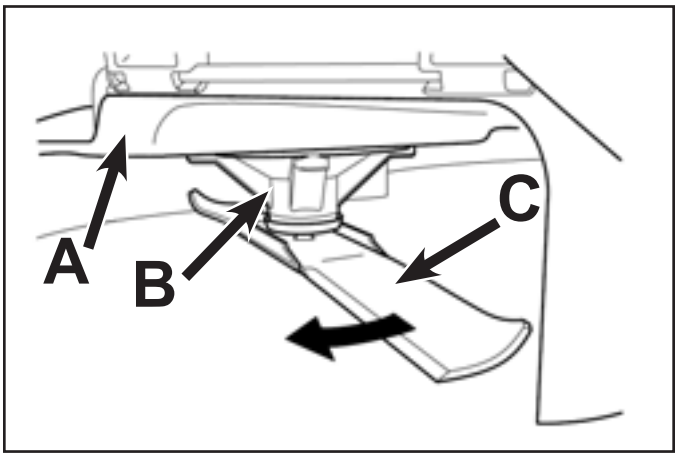

Fig. 426 fig. 39 G009679

A. Deck
B. Spindle housing
C. blade

3. Measure from the tip of the blade to the flat surface here (Fig. 427).

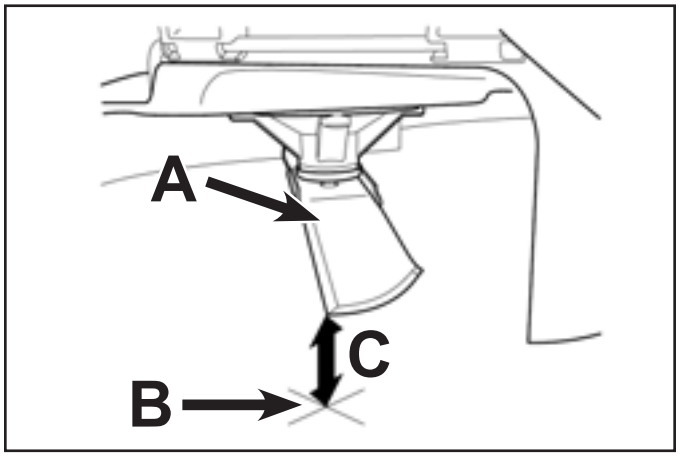

Fig. 427 fig. 40 G009680

A. Blade, in position for measuring
B. Level surface
C. Measured distance between blade and surface (a)

4. Rotate the same blade 180 degrees so that the opposing cutting edge is now in the same position (Fig. 428).

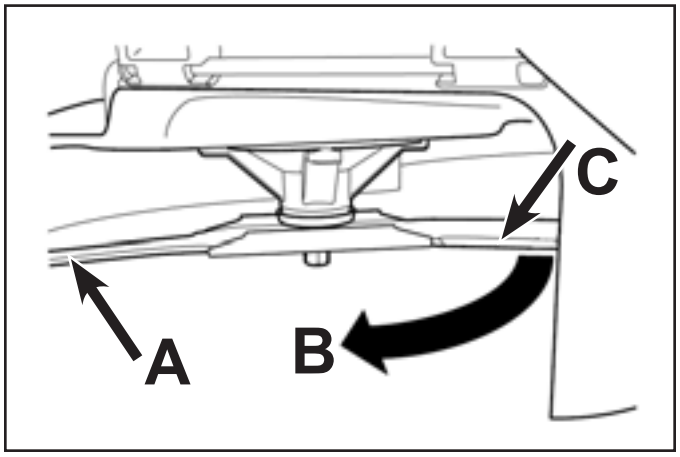

Fig. 428 fig. 41 G009681

A. Blade, side previously measured
B. Measurement position used previously
C. Opposing side of blade being moved into measurement position

5. Measure from the tip of the blade to the flat surface here. The variance should be no more than 1/8” (3mm) (Fig. 429).

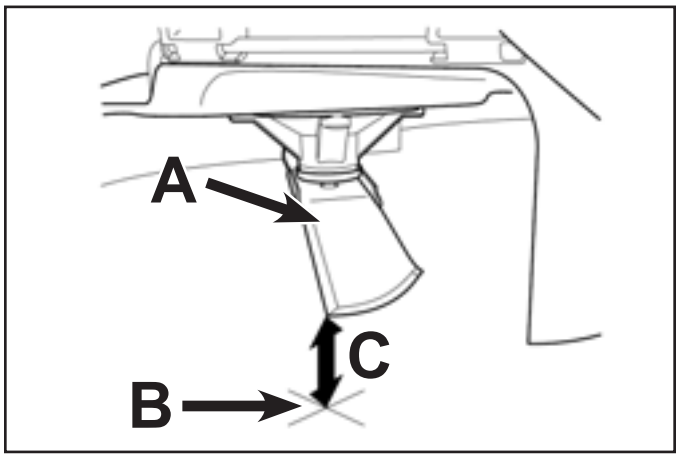

Fig. 429 fig. 40 G009680

A. Blade, in position for measuring
B. Level surface
C. Measured distance between blade and surface (a)

A blade that is bent or damaged could break apart and could seriously injure or kill you or bystanders.

- Always replace bent or damaged blade with a new blade.
- Never file or create sharp notches in the edges or surfaces of blade.

a. If the difference between A and B is greater than 1/8” (3mm) replace the blade with a new blade. Refer to Removing the Blades and Installing the Blades.

Note: If a bent blade is replaced with a new one and the dimension obtained continues to exceed 1/8” (3mm), the blade spindle could be bent. Contact an Authorized Toro Dealer for service.

b. If the variance is within constraints, move to the next blade.

Repeat this procedure on each blade.

Checking the Tire Pressure

Service Interval: Every 25 hours – Check tire pressure.

Maintain the air pressure in the front and rear tires as specified. Uneven tire pressure can cause uneven cut. Check the pressure at the valve stem (Fig. 430). Check the tires when they are cold to get the most accurate pressure reading.

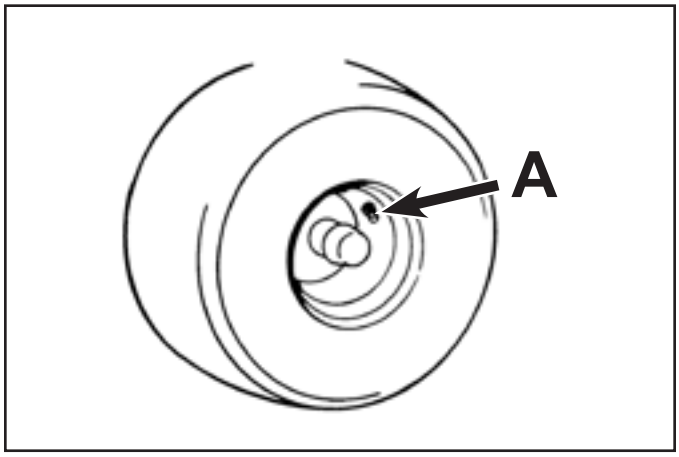

Fig. 430 fig. 37 G000554

A. Valve stem

Tire Pressures

Model	Rear Tire	Front Tire (caster wheels)
74360	35 psi (241 kPa)	13 psi (90 kPa)
74363		
74370		20 psi (138 kPa)

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Electrical System

Two things happen when turning the ignition switch to the “START” position: (1) Current flows from the ignition switch to the starter solenoid coil terminal. (2) At the same time, current will flow through the PTO (Power Take Off) switch in the OFF position, through both the brake switches in the OFF or PARK position, to the coil terminal of the interlock relay (kill relay). The interlock relay (kill relay) activates and takes the engine electronic ignition ground wire off ground to allow the engine to spark and grounds the starter solenoid to engage the starter motor of the engine.

Relay (Kill Relay)

Purpose

The relay used in the TimeCutter Z is used to connect or disconnect the engine electronic ignition and starter solenoid from chassis ground.

Location

The relay is located in front of the engine (Fig. 431).

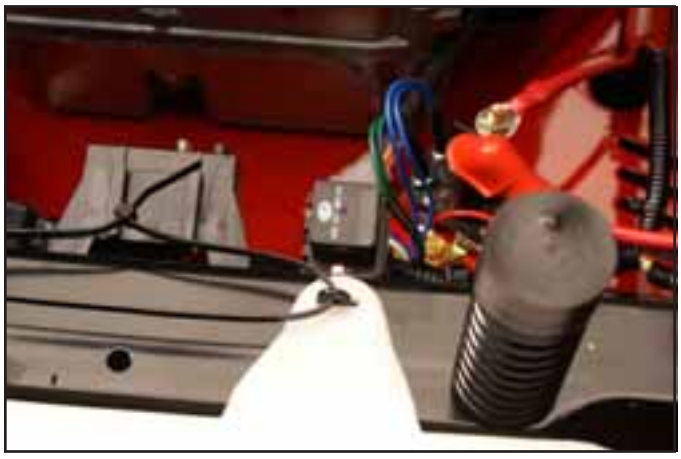

Fig. 431 PICT-9734

How It Works

A relay is an electrically actuated switch.

1. Coil: Terminals 85 and 86 are connected to a coil. Applying 12 volts to these terminals energizes the coil turning it into an electromagnet.

2. Switch: Terminals 30, 87, and 87a are actually part of a single pole, double throw (SPDT) switch. Terminal 30 is the common lead. The switch is spring loaded so that 30 and 87a are connected when the coil is not energized. When the coil is energized, the switch is “thrown” and 30 and 87 are connected (Fig. 432).

Fig. 432 MVC-671X

7

Testing

1. Disconnect the relay from the harness.
2. Verify the coil resistance between terminals 85 and 86 with a multimeter (ohms setting). Resistance should be from 70 to 90 ohms. There should be continuity between terminals 87a and 30.
3. Connect multimeter (ohms setting) leads to relay terminals 30 and 87. Ground terminal 86 and apply +12 VDC to 85. The relay should make and break continuity between terminals 30 and 87 as 12 VDC is applied and removed from terminal 85.
4. Connect multimeter (ohms setting) leads to relay terminals 30 and 87a. Apply +12 VDC to terminal 85. With terminal 86 still grounded, the relay should break and make continuity between terminals 30 and 87a as 12 VDC is applied and removed from terminal.
5. Disconnect voltage and multimeter leads from relay terminals (Fig. 433).

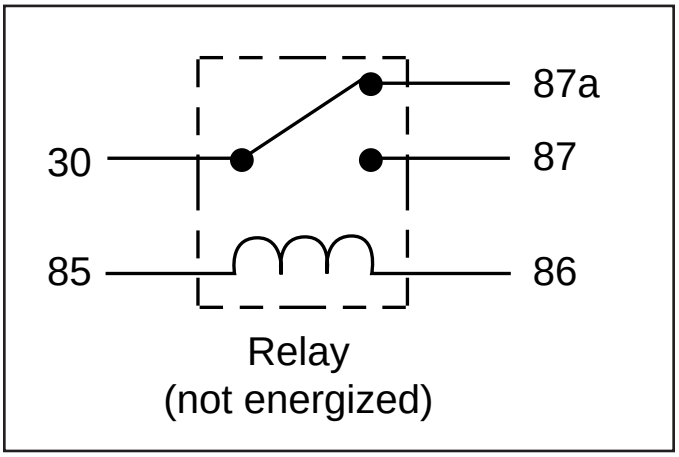

Fig. 433 xl relay 1

Solenoid

Purpose

The solenoid's purpose is simply 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 by the starter motor.

Location

The solenoid is located on the frame in front of the engine (Fig. 434).

Fig. 434 PICT-9735

How It Works

The solenoid has two primary parts. One, a coil of 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 the 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 "normally open" position. The solenoid closes and opens the switch very quickly. This minimizes the "arcing" that can damage other types 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 wiring harness.
2. With a multimeter (ohms setting), check to ensure that 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. 435).

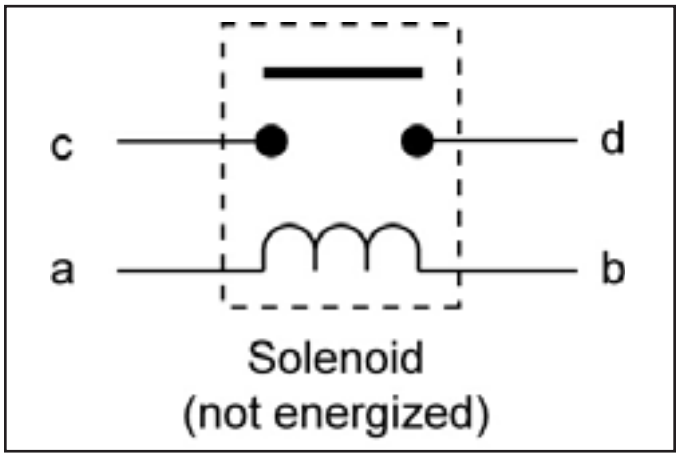

Fig. 435 xl solenoid

4. You should be able to hear the solenoid switch "click" when you make the connection (Fig. 436).

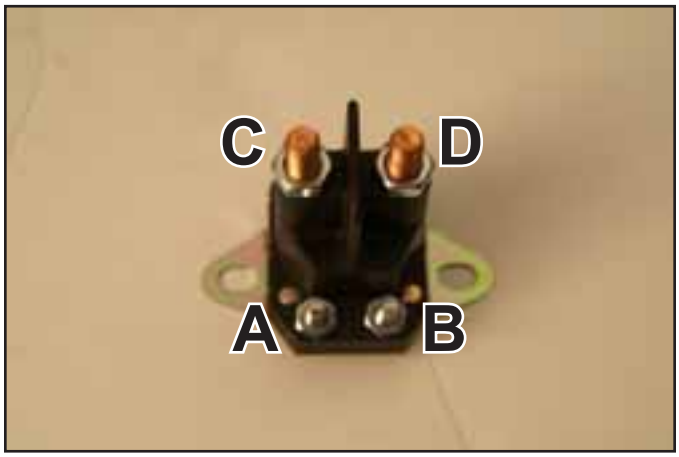

Fig. 436 PICT-9803

A & B Coil terminals C & D Contact terminals

7

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, to the right side of the operator (Fig. 437).

Fig. 437 PICT-9737

How It Works

Detents inside the switch give 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. 438).

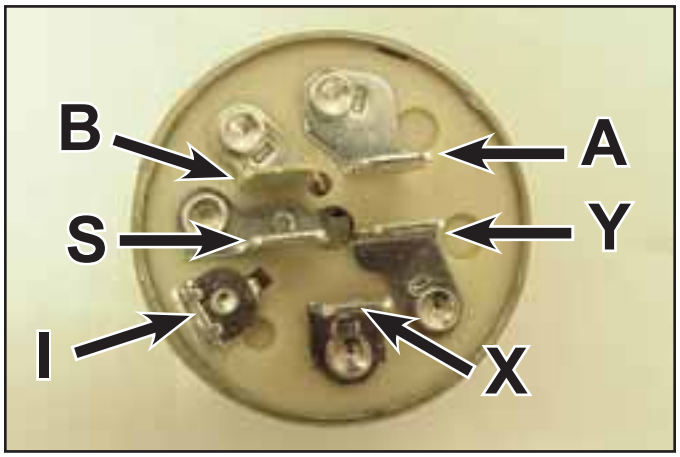

Fig. 438 MVC-166X

B - Battery voltage “in”
S - Starting circuit
I - Safety & starting circuit
A - Alternator/Regulator circuit
Y - Safety & starting circuit
X - Safety/Start/Light circuit

Testing

1. Disconnect the switch from the wiring harness.

2. Verify that continuity exists between the terminals listed for the switch position. Verify that there is NO continuity between terminals not listed for the switch position.

OFF	No continuity between terminals
RUN	Continuity - B I A and X Y
START	Continuity - B I S

PTO Switch

Purpose

The PTO (Power Take Off) switch is typically used to turn on the Electric PTO Clutch and to function as part of the safety interlock system.

Location

The PTO switch is located on the control panel, to the right side of the operator (Fig. 439).

Fig. 439 PICT-9737

How It Works

When the PTO switch is pulled out to the ON position, contacts inside the switch electrically connect various terminals. One terminal is connected to the wire that goes directly to the electric clutch. When the PTO switch is pulled out to the ON position, voltage flows to the electric clutch and it engages.

Testing

1. Disengage the PTO, set the parking brake, turn the ignition to OFF and remove the key.
2. Disconnect the wiring 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. 440).
5. Replace the switch if your test results do not correspond with those given in Fig. 440.
6. Mount the PTO switch back into the control panel and reinstall the wiring harness.

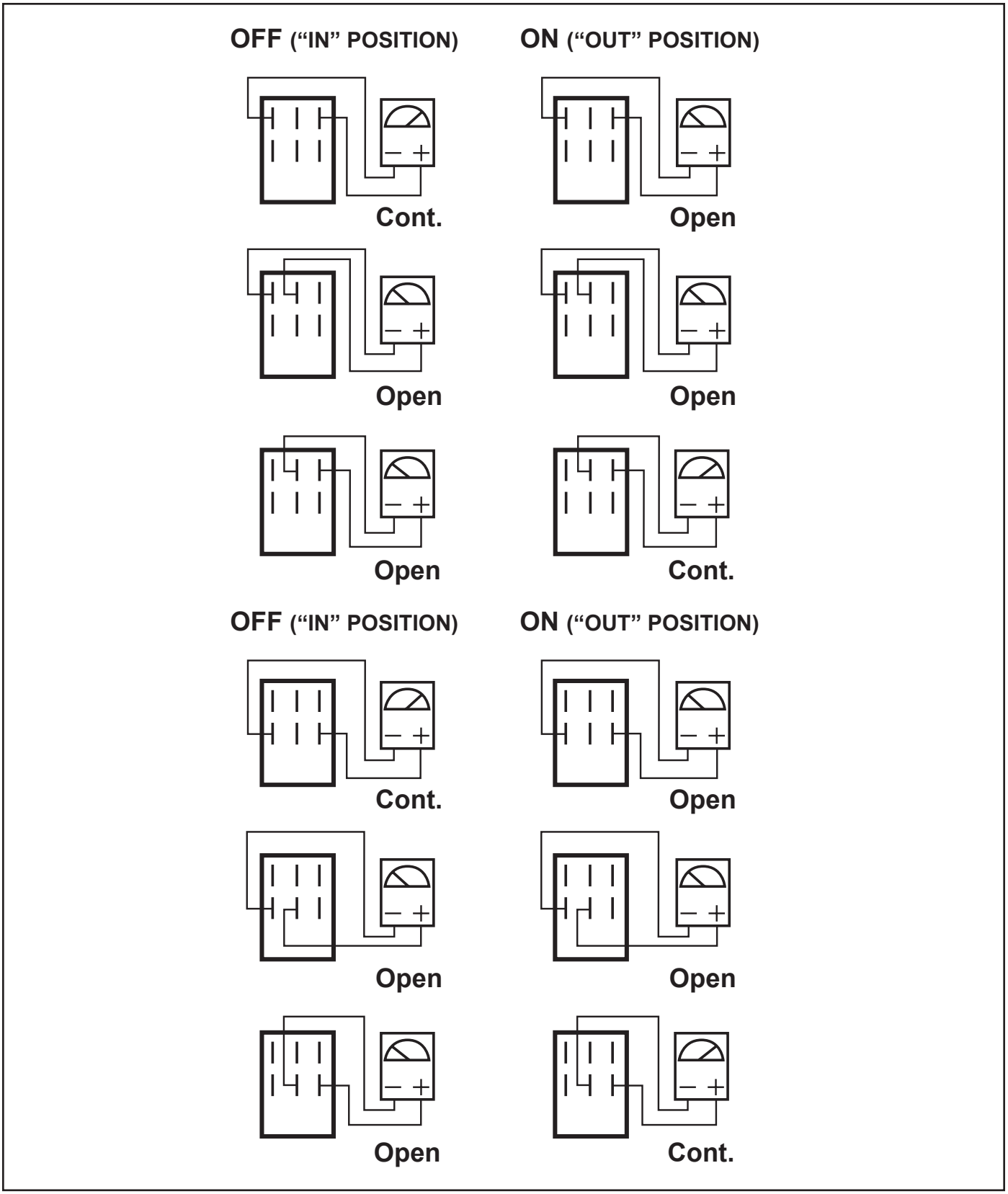

Fig. 440 PTO switch test a & b

Electric (PTO) Clutch

Purpose

This clutch electrically controls the engagement and disengagement of the Power Take Off (PTO) pulley.

Location

The electric clutch is located on the PTO end of the engine crankshaft (Fig. 441).

Fig. 441 PICT-9748

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 troubleshooting steps. 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 to OFF, and remove the key.
2. Disconnect clutch wire connector.
3. Set the multimeter or volt/ohm meter to check resistance (ohms).
4. Connect the meter lead wires to the wires in the clutch connector (Fig. 442).

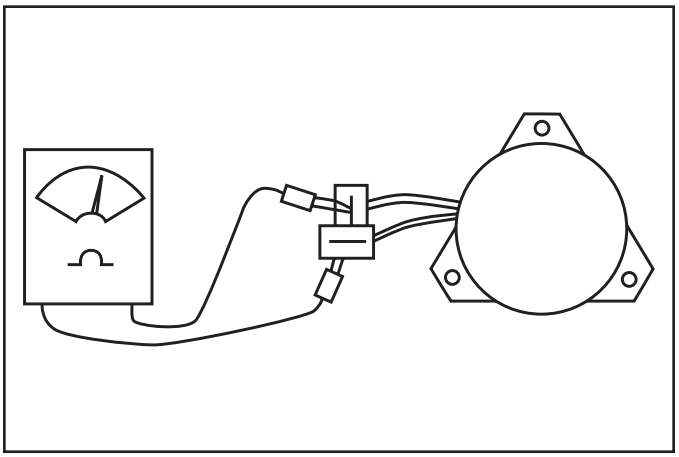

Fig. 442 coil resist msmt

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.

Measuring Clutch Current Draw

1. Disengage the PTO, set the parking brake, turn the ignition key to OFF, and remove the key.
2. Disconnect the clutch wire connector.
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. 443). Same as below
5. Connect the negative meter lead to the corresponding wire terminal (3) (Fig. 443). same as below
6. Connect a short jumper lead from terminal (2) to terminal (4) (Fig. 443).

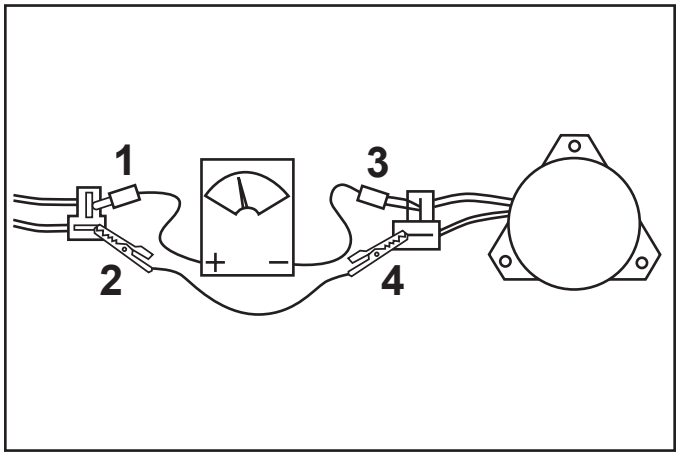

Fig. 443 clutch current msmt

7. Turn the ignition key in the switch to “RUN” position and the PTO switch to the “ON” position.
8. If the meter reads 3.5 amps or above, the system is functioning properly. If the meter reading is below 3.5 amps, check the electrical system for problems (i.e., the battery, ignition switch, PTO switch, or wiring harness may be malfunctioning).

Park Brake Switch

Purpose

Used to ensure the transaxles are in neutral and the park brakes are engaged. It is activated when the forward/reverse control levers are in the park position (handles in the out position).

Location

The park brake switches are located at the base of the actuator arm linkage. There are 2 parking brake switches. One for right side linkage and the other for the left side linkage (Fig. 444).

Note: LH pod removed for picture clarity.

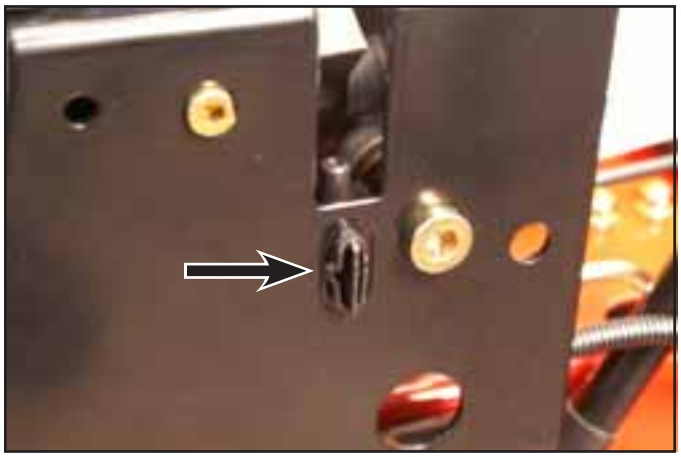

Fig. 444 PICT-9740

How It Works

This single pole plunger type switch has two terminals. When the forward/reverse control levers are in the park position (handles in the out position), it pushes on the plunger, closing the contact, and connecting the terminals (Fig. 445).

Fig. 445 IMG-0476

Testing

1 Disconnect the switch from the wiring harness.

2. Using a VOM or test light, check first to ensure there is no continuity between either terminal, plunger out.

3. With the plunger pushed in, there should be continuity between the terminals.

Switch, Seat

Purpose

The switch is in the safety circuit. If the engine is running and the operator vacates the seat with either the PTO engaged or the parking brake off, the engine will shut down.

Location

The seat switch is fastened to the bottom of the seat base (Fig. 446).

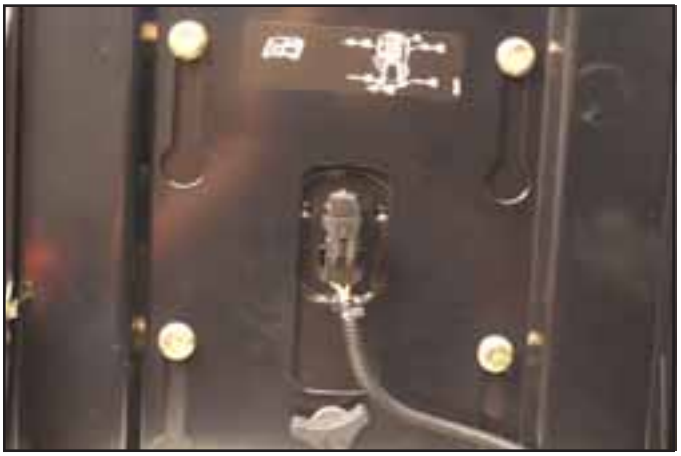

Fig. 446 PICT-9743

How It Works

When the seat is vacated, the switch is open and there should be NO continuity between the two terminals. When the seat is occupied, the switch closes and there should be continuity between the two terminals (Fig. 447).

Fig. 447 PICT-9853a

Testing

1. Disconnect the switch from the wiring harness.
2. With a multimeter, check the continuity between the two terminals of the switch. There should be NO continuity.
3. With weight or pressure on the seat, check the continuity again on the two terminals of the switch. There should be continuity.

FlyBack Diode

Purpose

The FlyBack blocking diode prevents the PTO clutch from interfering with the starting of the engine.

Location

The Flyback diode is plugged into the wiring harness under the fuse holder in front of the engine (Fig. 448).

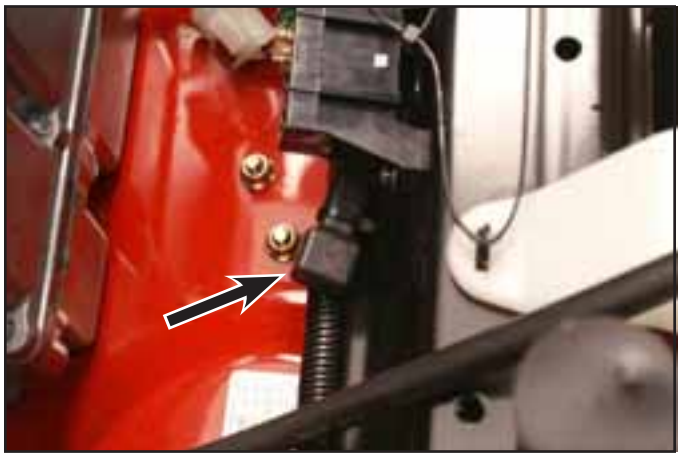

Fig. 448 PICT-9744

How It Works

If the electric PTO switch is left on after shutdown and you go to restart the engine, it could feed enough current to activate the electric PTO clutch very briefly. The FlyBack diode blocks this from happening. The FlyBack diode is located on 2009 and later TimeCutter Z (Fig. 449).

Fig. 449 PICT-9806

Testing

1. Unplug the diode from the harness.
2. Set your multimeter function to test diodes.
3. Touch one test probe tip to one of the terminals and the other test probe to the other terminal. Note the reading
4. Reverse the test probes on the terminals and note the reading.
5. You should have continuity in one direction only. Diode allows current to flow in one direction only.

Toro TimeCutter Z 2007-2008 Models Schematic

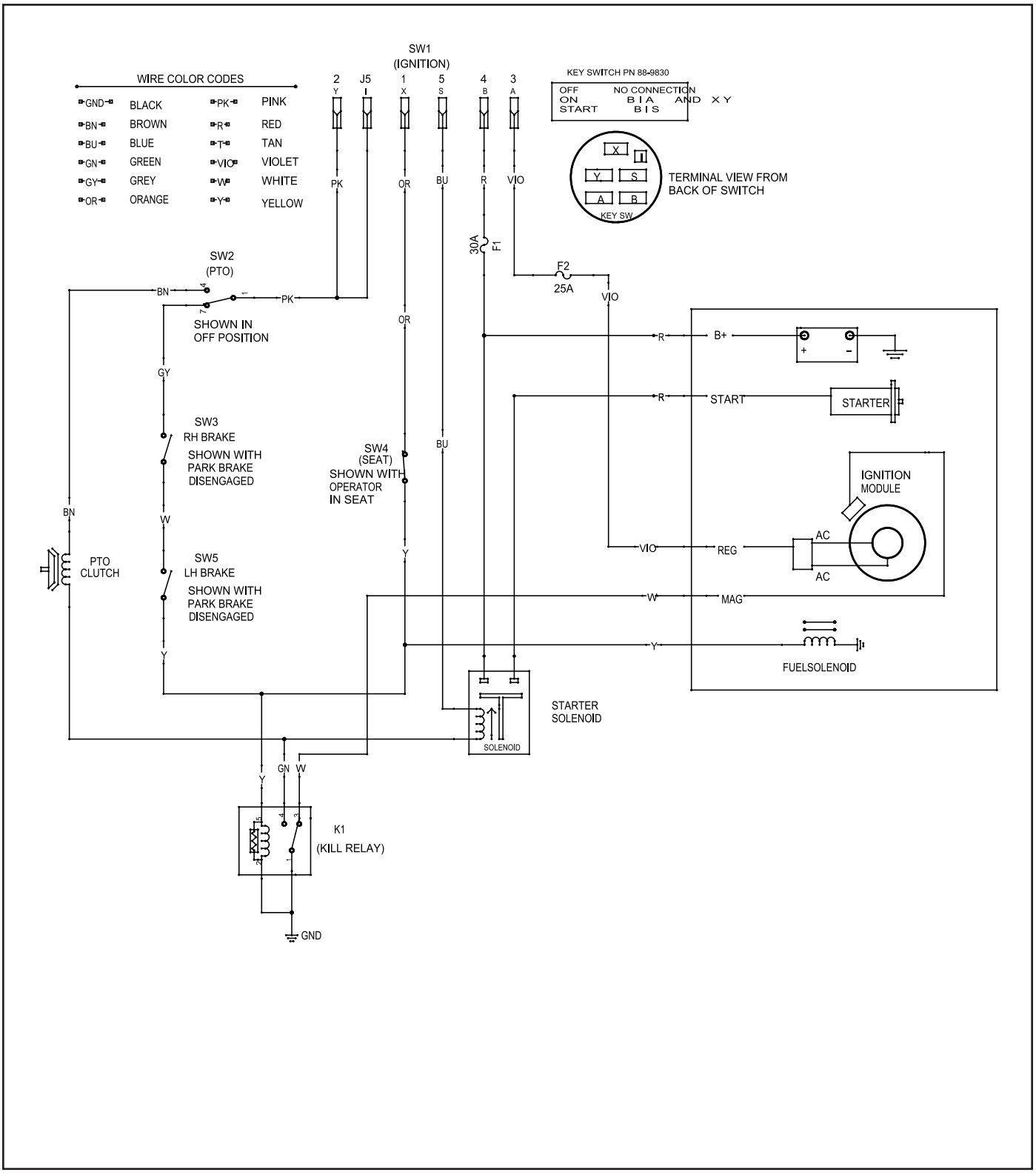

Fig. 450 74360 _2007-2008 scheme

Toro TimeCutter Z 2009 Models Schematic

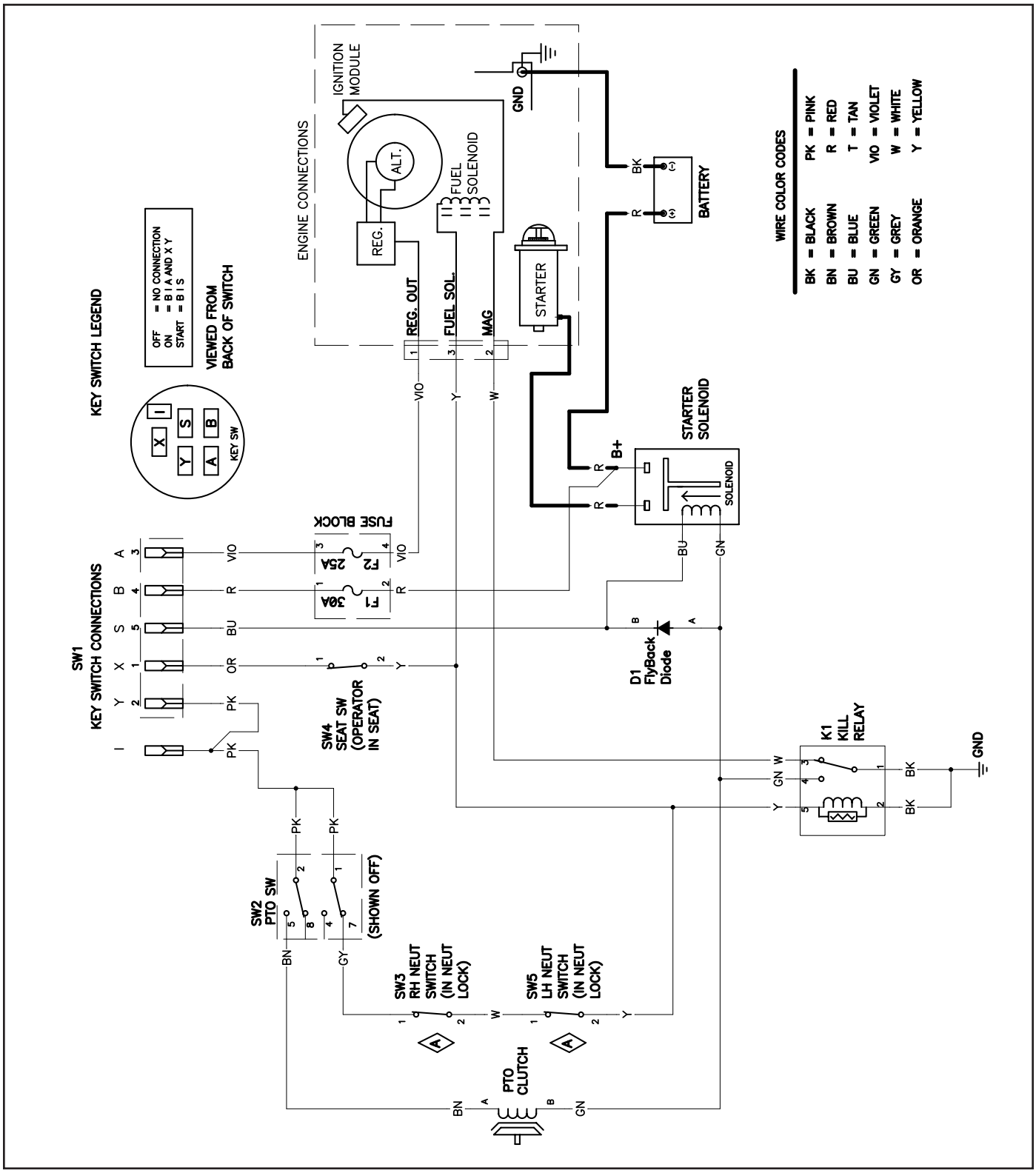

Fig. 451 74360_2009 scheme

Lawn-Boy Precision Z (Single Cylinder Engines) 2008 Models Schematic

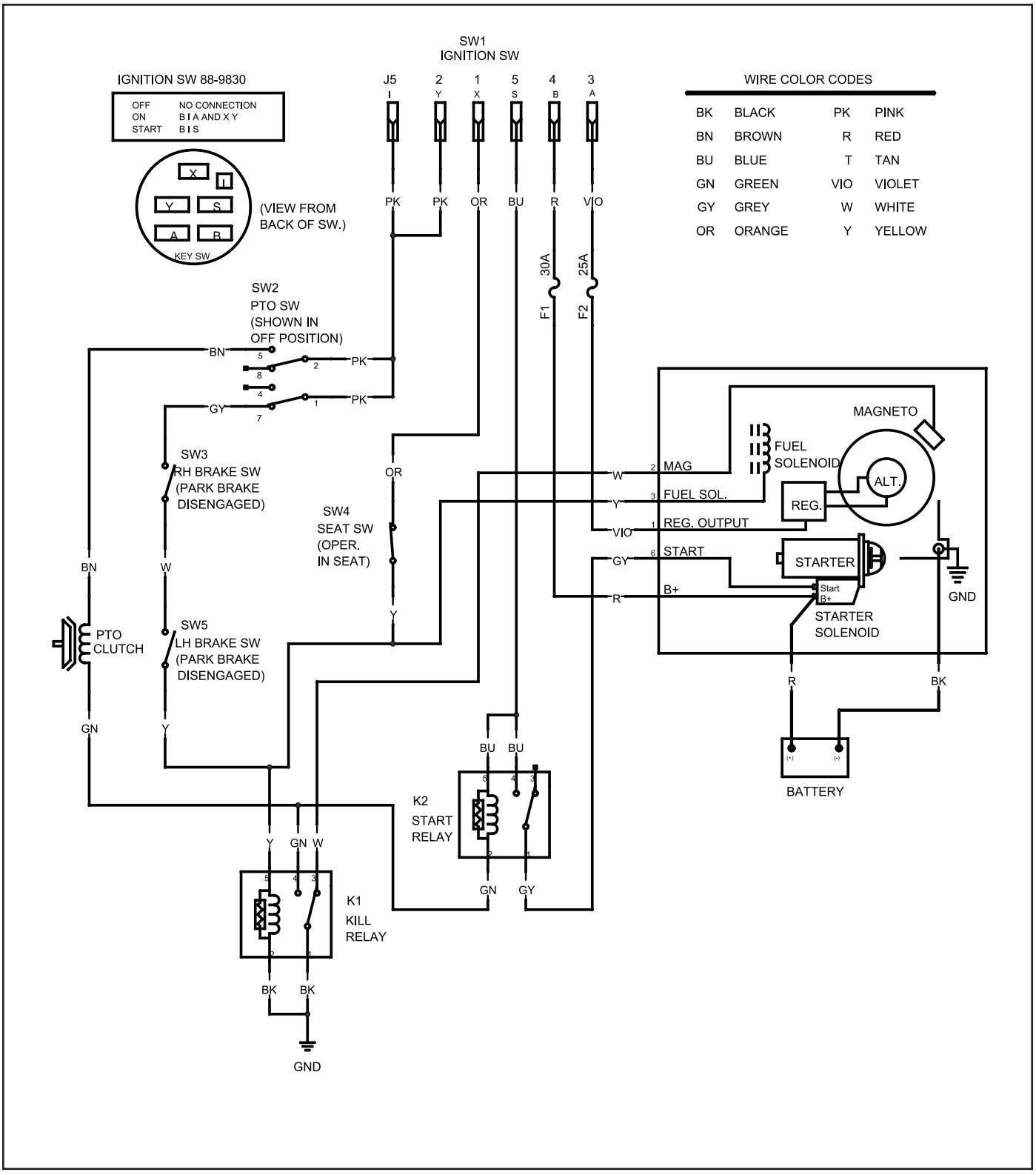

Fig. 452 81270_2008 scheme

Lawn-Boy Precision Z (Twin Cylinder Engines) 2008 Models Schematic

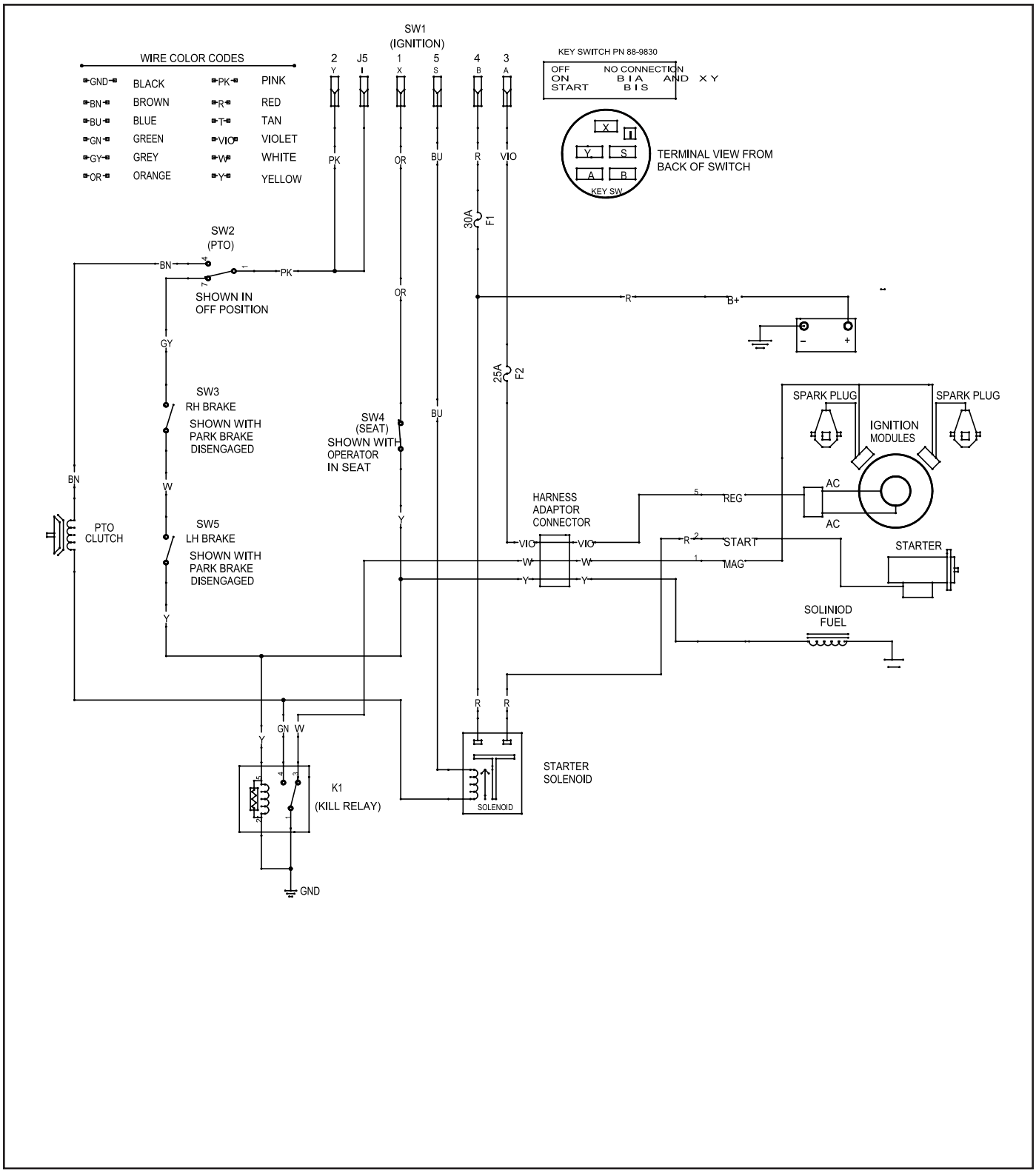

Fig. 453 81271_2008 scheme

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TimeCutter® Z / Precision® Z

Service Manual

Form No. 492-9205